HENSALL

FINAL ISSUE, ALL INFORMATION RECEIVED

OPERATION & MAINTENANCE MANUAL

Elmwood Leisure Centre

Decarbonisation and refurbishment: air source heat pumps, LTHW plant, air handling units, air conditioning and domestic water services Mechanical Services

Volume 2 of 9: Manufacturers' literature

Documents 8.1 to 8.40

Revision	Issue date	Practical completion	Job reference
A	**9th of October 2026**	**2nd of June 2026**	**HEN0203**

Prepared for Hensall Mechanical Services Ltd · Westgate Leisure Services Ltd (for the London Borough of Elmwood; operated by FitLife Active)

Compiled by OnTrack O&M

CONTENTS

What's in Volume 2

Each document follows its own divider page and is bookmarked in the PDF. Volume 1 is the manual itself, and its contents pages list every document in every volume.

NO.	DOCUMENT	PAGE
8 Manufacturers' literature		
8.1	HWH B.01 installation and servicing instructions	5
8.2	03-Safe.book	13
8.3	04. 104432- Data Sheet (1)	15
8.4	BS B.01 operation and maintenance manual	17
8.5	PU 0.01 operation and maintenance manual	21
8.6	0900766b8152832a	34
8.7	0900766b815c5547	37
8.8	14-Access-doors.book	40
8.9	140-FOX.TX	42
8.10	1641824737-8-riello2	45
8.11	41x21 Data Sheet	48
8.12	41x41 Data Sheet	50
8.13	Quinway acoustic enclosure O&M manual	52
8.14	A6V10447175_Electromotoric actuators for SAV.. 2-port and 3-po_en	56
8.15	A6V12681520	77
8.16	A700000008276030	98
8.17	A700000008884225	103
8.18	A700000009816153	108

CONTENTS, CONTINUED

NO.	DOCUMENT	PAGE
8.19	A700000010950066	114
8.20	A700000010950682	134
8.21	A700000010950710	151
8.22	A700000011254668	183
8.23	A700000011256398	200
8.24	A700000014269758	229
8.25	A700000014382073	256
8.26	AHU R.01 operation and maintenance manual	273
8.27	Armacell Class O Tech Data	406
8.28	Armitage Shanks Accessible WC	432
8.29	Armitage Shanks Ambulant WC	434
8.30	Armitage Shanks Cleaners Sink	436
8.31	Armitage Shanks Contour 21 BTW WC	438
8.32	Armitage Shanks Contour 21 Basin Tap	441
8.33	Armitage Shanks Contour 21 Under Counter Basins in WC	443
8.34	Armitage Shanks Contour 21 Unisex Doc M Shower Pack	445
8.35	Armitage Shanks Contour 21 Urinal Config	447
8.36	Armitage Shanks Portman Basin Config - Not inc Tap	450
8.37	Armitage Shanks Sensor flow 21 Urinal Flush Sensor	453
8.38	Aspen Mini Aqua (003)	455
8.39	Bray Butterfly Valves	457
8.40	Brymec Rubber Lined Pipe Clamps TDS	460

SECTION 8

8

Manufacturers' literature

Documents 8.1 to 8.40 are in this volume, each exactly as received and checked.

8.1

HWH B.01 installation and servicing instructions

The following 7 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	HEN0203-HWHB01-OM
Asset	HWH B.01
Provided by	Arbe Integrated Engineering Ltd
Source file	Arbe hot water heater and thermal store data sheet.pdf
Pages	7

SPECIFICATION

To:	David Rushbrook
Company:	Hensall Mechanical
Email Address:	drushbrook@hensall.com
Your Reference:	-
Telephone No.	01977 661318
Fax No.	-
Project Title:	Elmwood Leisure Centre

From:	Rob Brownlow
Email:	rob.brownlow@arbe.co.uk
Date:	**16 January 2025**
Quote Ref:	**AQ19592-TS/2501/PA**

Ref: Indirect Cylinders & Thermal Stores

Thank you for your valued enquiry. Please find attached our specification for the products and equipment required. We hope we have interpreted your requirements correctly and our specification provides sufficient information for your requirements.

Should you have any queries or problems, or require further assistance and information, please do not hesitate to contact the undersigned

Regards

Rob Brownlow
Arbe Integrated Engineering
rob.brownlow@arbe.co.uk
M 07585 009603

Quote Ref:	**AQ19592-TS/2501/PA**
Date:	**16 January 2025**

Reference:	**-**
Model Type:	HevaCal ALXA1000-6B-EX50-CU200/390-V
Description:	Stainless Steel Storage Calorifier c/w Removable Battery
Quantity:	2
Design & Specification Details	
Vessel Capacity:	1000 Litres
Dimensions:	Diameter 1000mm x 1960mm High Inc. Insulation
Orientation:	Vertical
Vessel Access:	DN200
Primary Duty:	37.3 kW
Primary Medium:	LTHW 45/38°C @ 1.28 Litres/Second
Maximum Primary Pressure Drop:	7.7 kPa
Secondary Temperature:	10/40°C Potable Water by Heat Pump 40/60-70°C by Immersion Heaters
Secondary Design Pressure/Temp:	6.0 BarG / 70°C
Primary Design Pressure/Temp:	6.0 BarG / 165°C
Hydraulic Test Pressure (Pri/Sec):	9.0 / 9.0 BarG
Vessel Material:	Stainless Steel AISI 316L
Heat Exchanger Type:	Removable U-Tube Heat Exchanger Comprising Finned Copper Tube with a Stainless Steel Tubeplate & Steel Chest
Primary Controls Package:	None – By Others
Applicable Standard:	UKCA PE(S)R 2016 - SEP
Vessel Insulation:	50mm Mineral Wool & Stucco Aluminium Cladding
Electrical Backup Supplied Loose: *Wiring & Controls by Others*	2 off 15 kW Heavy Duty Immersion Heaters, 400v 3ph
Accessories Supplied Loose:	Thermometer, Pressure Gauge & Drain Valve
Expansion Vessel Supplied Loose:	None
Cold Feed Kit Supplied Loose:	None
P/T Valve Supplied Loose	None
De-Stratification Pumpset Fitted:	None
Anti-Vacuum Valve Supplied:	None
Approximate Dry Weight of Calorifier:	180 kg

Quote Ref:	**AQ19592-TS/2501/PA**
Date:	**16 January 2025**

Heat Loss Calculations: Estimation based on the below stored water and ambient temperatures.

Stored Water Temperature for Calculation: 60°C	**Vessel Heat Loss for Ambient Temperature of Installation °C**							
	0°C		10°C		20°C		30°C	
	kwh/day	Wh	kwh/day	Wh	kwh/day	Wh	kwh/day	Wh
Heat Loss 50mm Insulation	12.8	534	10.7	446	8.6	359	6.4	267

**** Disclaimer: Please note the above heat loss figures given are indicative and can vary and should only be used as a guide*

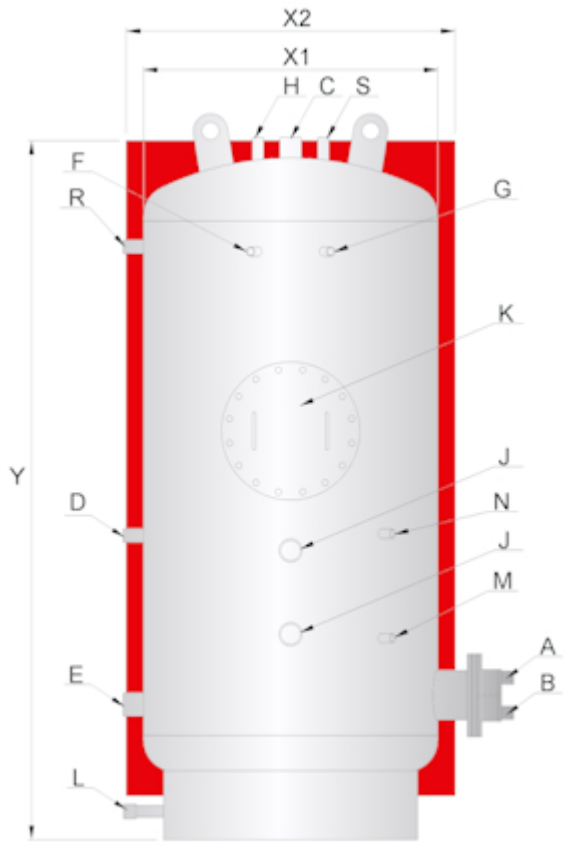
Optional Extra - Expansion & Cold Feed Unvented Kit	
Expansion Vessel Supplied Loose:	100 Litre Expansion Vessel c/w Isolating Valve, Drain Valve & Relief Valve
Cold Feed Kit Supplied Loose:	50mm Kit Comprising Isolating Valve, Strainer, Pressure Reducing Valve c/w Gauge & Check Valve
P/T Valve Supplied Loose:	20mm P/T Safety Valve
Anti-Vacuum Valve Supplied Loose:	20mm

Optional Extra	
De-Stratification Pumpset:	Factory Fitted De-Stratification Pumpset Comprising Stainless Steel Pump, Isolating Valves and Interconnecting Stainless Steel Pipework

Quote Ref:	**AQ19592-TS/2501/PA**
Date:	**16 January 2025**

Integrated Engineering

Data Sheet - 1000 Litre ALXA Storage Calorifier



Vessel Details - Ref:	
Model: ALXA1000-4B-CU200/390-EX50-V	
Capacity:	1000 Litres
Diameter (X1):	900mm
Diameter (X2 - If Insulated):	1000mm
Height (H):	1985mm
Vessel Orientation:	Vertical
Duty:	37.3 kW
Secondary Medium:	10/40°C
Recovery Period:	1 Hour(s))
Primary Medium:	45/38°C
Primary Flow Rate:	1.28 L/Sec
Primary Pressure Drop:	7.7 kPa
Design Pressure:	4.0 BarG
Hydraulic Test Pressure:	6.0 BarG
Design Temperature:	110°C (UKCA SEP)
Approx. Dry Weight:	360 kg

Note: All Connections Can Be Positioned as Required.

Connection Details					
A	Primary Inlet	1¼" BSP	**J**	Immersion Heater(s)	2" BSP x 2 off
B	Primary Outlet	1¼" BSP	**K**	Inspection Opening	DN200
C	Secondary Flow	2" BSP	**L**	Drain	1¼" BSP
D	Secondary Return	1" BSP	**M**	Temperature Sensor	½" BSP
E	Cold Feed	2" BSP	**N**	High Limit Thermostat	½" BSP
F	Thermometer	½" BSP	**R**	De-Stratification Pumpset	¾" BSP
G	Pressure Gauge	⅜" BSP	**S**	Vacuum Breaker Valve	¾" BSP
H	Safety Valve	¾" BSP			

Quote Ref:	**AQ19592-TS/2501/PA**
Date:	**16 January 2025**

Reference:	**TS.0.01**
Model Type:	AFTA-SEC3-6000-4B-UN-V
Description:	Sectional Mild Steel Thermal Store for LTHW Systems, Mounted on Steel Ring Stand. Vessel Bespoke for Application with Connection Sizes & Orientations to Suit Site Requirements. Vessel Manufactured in 4 Sections, each Approx 1950mm x 1000mm Wide Maximum for Assembly on Site (By Others)
Quantity:	1
Design & Specification Details	
Vessel Capacity:	6000 Litres
Dimensions:	Diameter 1700mm x 3165mm High (2:1 Ratio)
Vessel Orientation:	Vertical
Vessel Inspection Opening:	Yes, DN400
Internal Baffle Plates Included:	None
Internal Sparge Pipes Included:	None
Design Pressure/Temperature:	4.0 BarG / 110^{o}C
Hydraulic Test Pressure:	6.0 BarG
Vessel Material:	Mild Steel, Painted Primer Externally. Internal Self-Colour
Applicable Standard:	UKCA PE(s)R 2016 SEP
Vessel Insulation:	None
Accessories Supplied Loose:	None
Electrical Backup Supplied (Wiring & Controls by Others):	None
Primary Circuit Connection Size:	A: DN150 PN16 x 1 off / B: DN150 PN16 x 1 off
Secondary Circuit Connection Size:	C: DN150 PN16 x 1 off / D: DN150 PN16 x 1 off
Screwed Connections:	Safety Valve, Air Vent, Thermometer, Pressure Gauge, Drain, Vacuum Breaker Valve and 2 off Sensor Connections
Approximate Dry Weight:	1085 kg
Warranty:	Shell: 2 Years, All Other Equipment: 1 Year

Quote Ref:	**AQ19592-TS/2501/PA**
Date:	**16 January 2025**

Optional Extra Equipment - 6000 Litres TS.0.01





Vessel Insulation	Inspection Opening Jacket (Removable)
Cost for Site Fitted Insulation of Vessel from Mineral Wool & Stucco Aluminium Cladding.	Silicon Jacket for Inspection Opening Supplied with Ties for Fitting & Removal on Site. Size: DN400
Optional Insulation: 100mm	

**** Other insulation thicknesses available
**** Please add 1-2 weeks onto quoted delivery period for insulation
**** Site installed insulation does not include for any access equipment such as scaffolding and lifting apparatus

Vessel Temperature Sensor Pockets	Complete Ancillary Kit
An Extra Connection Fitted in the Vessel and a 150mm Long Brass Pocket Fitted	Drain Valve, Temperature Gauge, Pressure Gauge, Siphon, Gauge Cock, 1" BSP Pressure Relief Valve, 4 off Sensor Pockets, Vacuum Breaker Valve & Auto Air Vent Supplied Loose

Heat Loss Calculations: Estimation based on the below stored water and ambient temperatures.

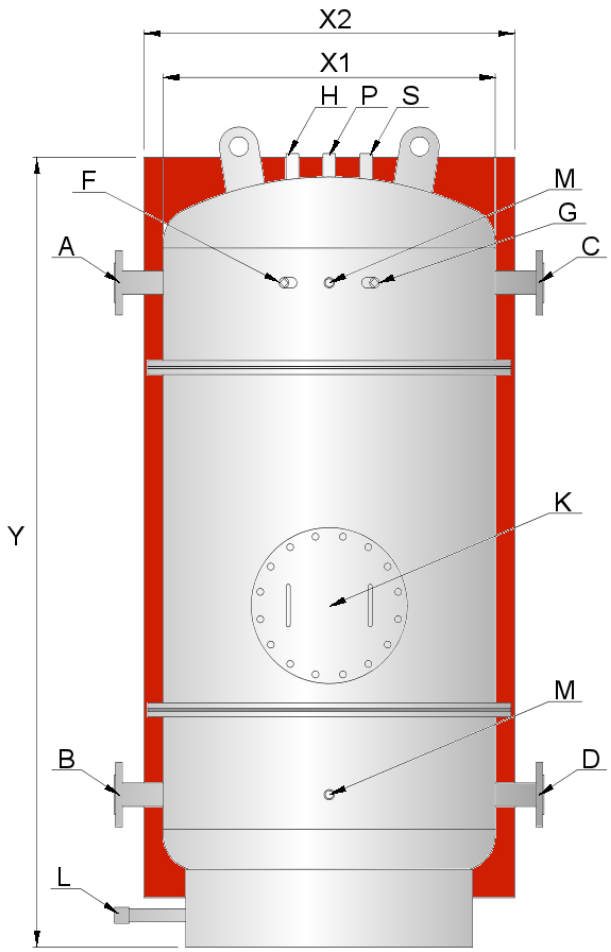
Stored Water Temperature for Calculation:	Vessel Heat Loss/Gains for Ambient Temperature of Installation °C							
	0°C		10°C		20°C		30°C	
	kwh/day	Wh	kwh/day	Wh	kwh/day	Wh	kwh/day	Wh
Heat Loss 100mm Insulation	54.3	2263	42.2	1759	30.2	1259	18.1	755

*** *Disclaimer: Please note the above heat loss figures given are indicative and can vary and should only be used as a guide*

Quote Ref:	**AQ19592-TS/2501/PA**
Date:	**16 January 2025**

Integrated Engineering

Data Sheet - 6000 Litres TS.0.01



Vessel Details	
Vessel Reference:	AFTA6000-SEC3-4B-UN-V
Capacity:	6000 Litres
Diameter (X1):	1700mm
Diameter (X2):	N/A
Height (H):	3165mm
Vessel Orientation:	Vertical
Design Pressure:	4.0 BarG
Hydraulic Test Pressure:	6.0 BarG
Design Temperature:	110°C
Baffle Plates Included:	None
Sparge Pipes Included:	None
Approx. Dry Weight:	1085 kg

Note: Connections A, B, C & D Can Be Positioned to Suit Site Requirements.
Connection(s) J To Be Positioned to Suit the Application

Connection Details					
A	Primary Inlet / Flow	DN150 PN16 x 1 off	**J**	Immersion Heater(s)	None
B	Primary Outlet / Return	DN150 PN16 x 1 off	**K**	Inspection Opening	DN400
C	Secondary Outlet / Flow	DN150 PN16 x 1 off	**L**	Drain	2" BSP
D	Secondary Inlet / Return	DN150 PN16 x 1 off	**M**	Temperature Sensor	½" BSP x 4 off
F	Thermometer	½" BSP	**P**	Vent	½" BSP
G	Pressure Gauge	⅜" BSP	**S**	Vacuum Breaker Valve	¾" BSP
H	Safety Valve	1" BSP			

8.2

03-Safe.book

The following page is the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`03-Safe.book.pdf`
Pages	1

Tecwire & Locks

TWWIRE/ TWLOCK



Technical Data

Code	Description	SWL kg	Pack qty
TWWIRE	2 mm x 100 m wire spool	50	1
TWLOCK	2 mm housing locks	50	50
TWVHS	Kit (100 m wire, 50 locks)	50	1

Description

Gives the ability to produce your own made to measure wire suspension.

Use a Tecwire lock to attach Tecwire to your chosen anchor point.

The range consists of wire reels and separate locking devices with a choice of Safe Working Loads.

Features

- Key free release system for adjustment
- Ideal for long drop lengths
- Only wire cutters required
- Can be used as a wrap-around application or coupled with a wide range of brackets or fixings
- Wire supplied in dispensing box – avoiding the risk of wire bird nesting
- Can be used to create in-line joints
- Can be used as a stop end
- Any spare material can be used on following projects
- Tecwire and Tecwire locks should not be used with alternative wire or lock systems

Applications

- Wrapping around existing steelwork, I-beams or purlins
- Suitable for use with a wide range of fixings including eye bolt adapters, concrete fixings, deck wedges, purlin clips
- Ideal for long and varied suspension lengths
- Ideal for secondary light supports

Suitable for

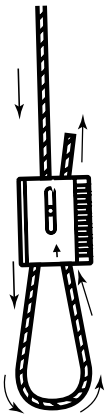
- Tear drop suspensions
- Cradle suspensions
- Trapeze brackets
- Long suspensions
- Roof spaces with varied drop lengths
- Tight void space





Installation

- Cut wire to desired length for the drop required
- Pass one end of the wire through the lock in the direction of the arrow and draw through enough wire to go around your fixing point
- Pass the wire end back through the lock leaving at least 15cm of free wire protruding
- At the other end again pass the wire through the lock in the direction of the arrow
- Pass the free end of wire around your suspension or through your fixing and back through the lock leaving 15cm of wire protruding
- Always confirm engagement of the lock on the wire by pushing the pin in the opposite direction to the arrows indicated



sales@lindab.co.uk

Lindab®
www.lindab.co.uk

We reserve the right to make changes without prior notice

8.3

04. 104432- Data Sheet (1)

The following page is the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	04. 104432- Data Sheet (1).pdf
Pages	1

EUROCOILS LIMITED

Tel: (01795) 475275 Fax: (01795) 422210

QUOTATION

Quote No : 104432

Date : 08-01-2025

Customer Name : Hensall Mechanical Services Limited
Customer Ref. : Elmwood LC

Item Number		1
Coil Reference		HB 0.01
Number Off		1
Air Volume	m3/s	1.500
Air On db	C	22.00
Air On wb	C	-
Air Off db	C	27.00
Air Off wb	C	-
Coil Capacity	kW	9.04
Medium		LPHW
Glycol Mix	%	-
Inlet Temp	C	45.00
Outlet Temp	C	38.00
Fluid Quantity	lit/s	0.31
Fluid Press Drop	kPa	4.23
Steam Pressure	Bar g	-
Steam Quantity	kg/s	-
Refrigerant PD	kPa	-
Face Velocity	m/s	3.78
Air Press. Drop	Pa	61
Fin Size H x W	mm	495x800x2 Rows
Inlet Conn. Size		1 x 3/4"
Outlet Conn. Size		1 x 3/4"
Connection Style		BSP Same Side
No. of Sections		1
Circuitry Style		-
Tube Material		Copper
Fin Material		Aluminium
Casework Material		16 swg GSS
Casework Style		Bolt On
Approx. Dry Weight	kg	47.8
Internal Volume	litres	3.08
Coil Code		4C-0230-6SP745
Price Each Nett	Ex Works	[illegible]
Delivery	Weeks	2-3

Included Extras :

Case - 16 swg GSS
Duct size=500hx800w
x 200 deep.....
Vent & Drain fitted.

NOTES: DUCT HEATER SELECTION AS SPECIFIED....
..... CONSTRUCTION HAS BEEN ASSUMED!
..... ADDITIONAL COST FOR DELIVERY = [illegible]
****

.....
Adrian Jenner
Technical Sales Engineer

8.4

BS B.01 operation and maintenance manual

The following 3 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	HEN0203-BSB01-OM
Asset	BS B.01
Provided by	TPS Ltd
Source file	Lowara SMB30 booster set data sheet, BS B.01.pdf
Pages	3

LOWARA
a xylem brand

SMB30/10HME04S22/T4/UK

Technical data

Company name
Contact
Phone number
e-mail address

Operating data

1	Nominal flow	l/s	5.831	Fluid			Water, pure
2	Nominal head	m	45.88	Operating temperature t A	°C		4
3	Static head	m	0	pH-value at t A			7
4	Inlet pressure	bar	0	Density at t A	kg/m³		1000
5	Environmental temperature	°C	20	Kin. viscosity at t A	mm²/s		1.569
6	Available system NPSH	m	0	Vapor pressure at t A	bar		1
7	Solids		0	Altitude	m		0
8							

Pump data

9	Pump designation			Impeller Ø	Max.	mm	
10	SMB30/10HME04S22/T4/UK				designed	mm	
11	Design	Variable speed sets			Min.	mm	
12	Make			Flow	Nominal	l/s	5.8 (1.9)
13					Max-	l/s	4.7
14	Speed	rpm	3061.6		Min-	l/s	1.7
15				Head	Nominal	m	45.9
16	Max. working pressure	bar	6.9		at Qmax	m	27.5
17	Head H(Q=0)	m	70		at Qmin	m	67
18	Weight	kg	On demand	Shaft power		kW	(1.6)
19	Weight data include external package			Max. shaft power		kW	6.8
20				Efficiency		%	48.42
21				NPSH 3%		m	

Materials

22	**Booster**		**Motor data**			
23	Manifolds	Stainless steel, 1.4301, AISI 304	Manufacturer	Lowara	Electric voltage	460 V
24	On-off valves	Nickel-plated brass	Specific design	Three phase e-SM motor		
25	Non-return valves	Brass	Type	ESM80/322 HM..	Electric current	5.24 A
26	Pressure switches	Galvanized steel/AISI 301	Rated power	2.2 kW	Degree of protection	IP 55
27	Pressure transmitters	Stainless steel, 1.4301, AISI 304	Speed	3600 rpm	Insulation class	F
28	Caps/plugs/flanges	AISI 304 / 316	Frame size	80		RAL 5010
29	Fittings	AISI 304 / 316	Weight	0 kg		
30	Bracket	Galvanized/painted steel				
31	Base	Painted steel				
32						

Standard options

33	Non return valve position		Non return valve in delivery side
34	Set certificate		
35	Material Combination		Standard materials combination
36	Pump Test		Set without certified pumps
37	High Pressure Protection		Without high pressure protection on delivery
38	Turned Delivery Manifold		Standard
39	Oversize Piping		Standard manifold
40	Control Panel		Standard
41	Protection Against Dry Running		Without protection against dry running
42	Control Devices Oversized		Standard
43	Delivery Side		Standard delivery
44	Suction side		Standard suction
45	Pressure Transmitter		Standard
46	Control Panel Position		Standard position
47	Electric Pump Special Seals		Standard
48	Non-return Valve		Standard non-return valve

LOWARA
a xylem brand

SMB30/10HME04S22/T4/UK

Performance curve

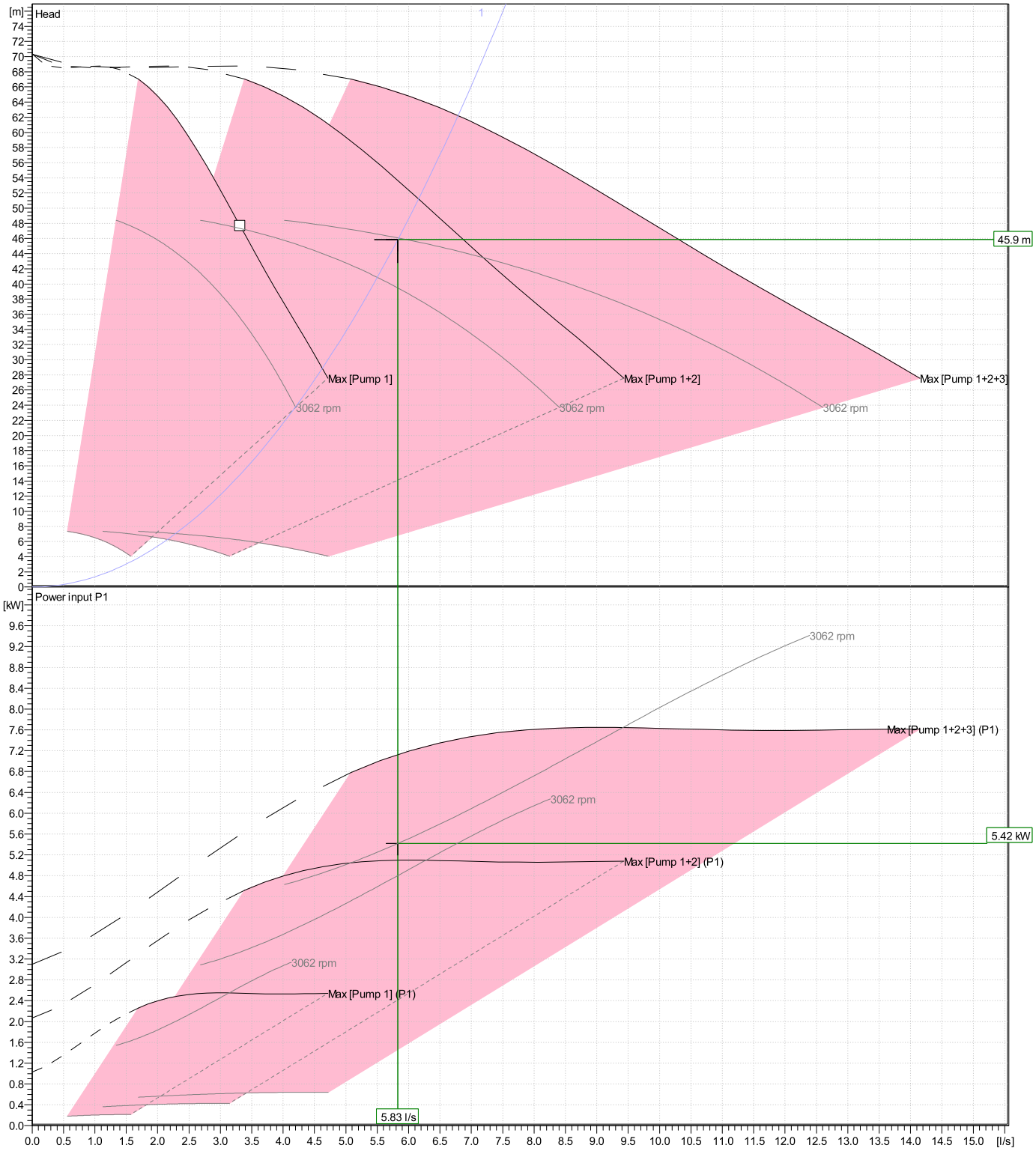
Company name
Contact
Phone number
e-mail address

Operating Data Specification	
Flow	5.83 l/s
Head	45.88 m
Static head	0 m

Hydraulic data (duty point)	
Flow	5.83 l/s
Head	45.9 m

Impeller design	
Impeller R	0 mm
Frequency	50 Hz
Speed	3061.6 rpm

Power datas refered to:
Water, pure [100%] ; 4°C; 1000kg/m³; 1.57mm²/s
Performance according to ISO 9906:2012 – Grade 3B



Project	**Xylect-20203769**	**Created by**		**Last update**	**1/16/2025**
Block	**SMB30/10HME04S22/T4/UK**	**Created on**	**1/16/2025**		

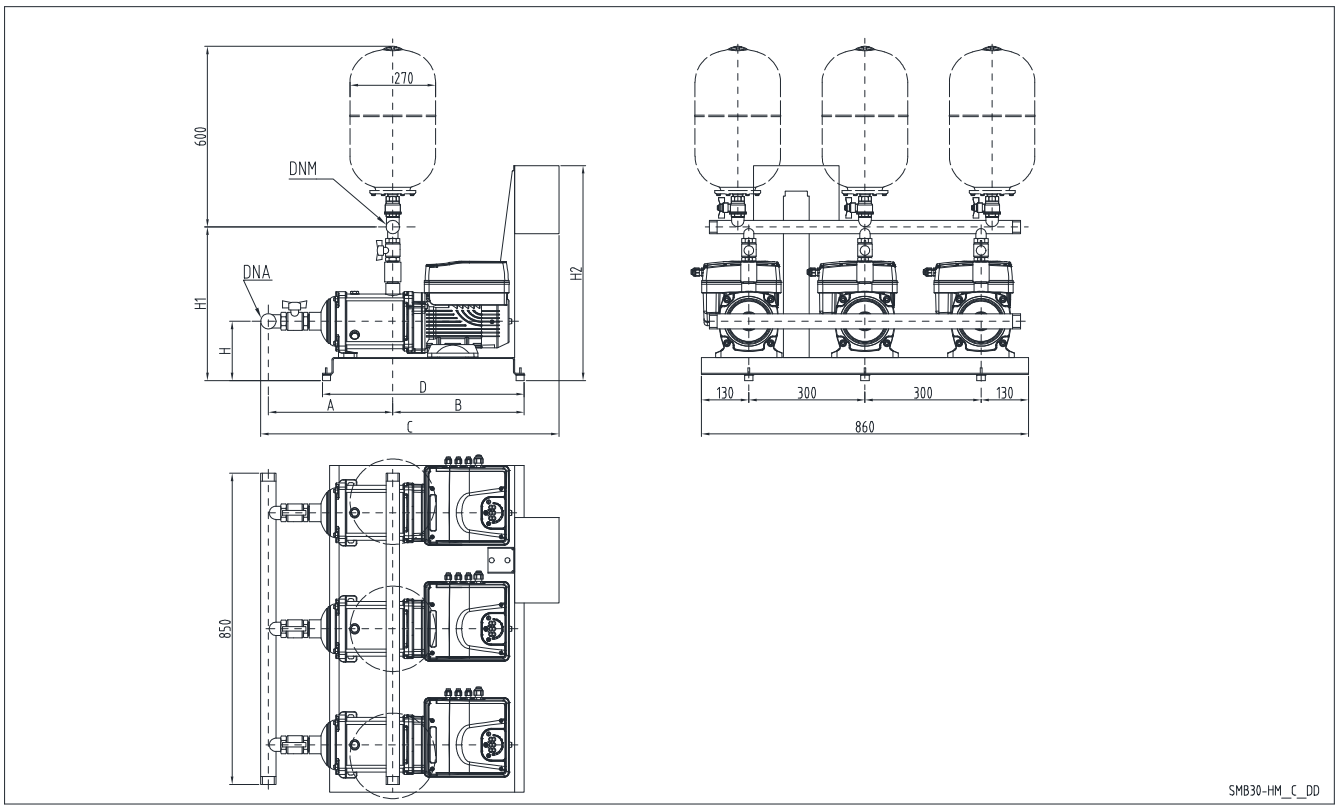
Program version	Data version	User group(s)
75.0 - 06/11/2024 (Build 274)	15/12/2024 18:59	Xylem: United Kingdom - EXT

LOWARA
a xylem brand

SMB30/10HME04S22/T4/UK

Dimensions

Company name
Contact
Phone number
e-mail address



PLEASE NOTE:

Dimensions mm

A	333					Weight (Include external package)
B	350					On demand kg
C	829					
D	590					
DNA	R 2"1/2					
DNM	R 2"1/2					
H	205					
H1	611					
H2	850					

Project Xylect-20203769 **Created by** **Last update** 1/16/2025
Block SMB30/10HME04S22/T4/UK **Created on** 1/16/2025

Program version: 75.0 - 06/11/2024 (Build 274)
Data version: 15/12/2024 18:59
User group(s): Xylem: United Kingdom - EXT

8.5

PU 0.01 operation and maintenance manual

The following 12 pages are the document exactly as received and checked. It is bookmarked in the PDF.

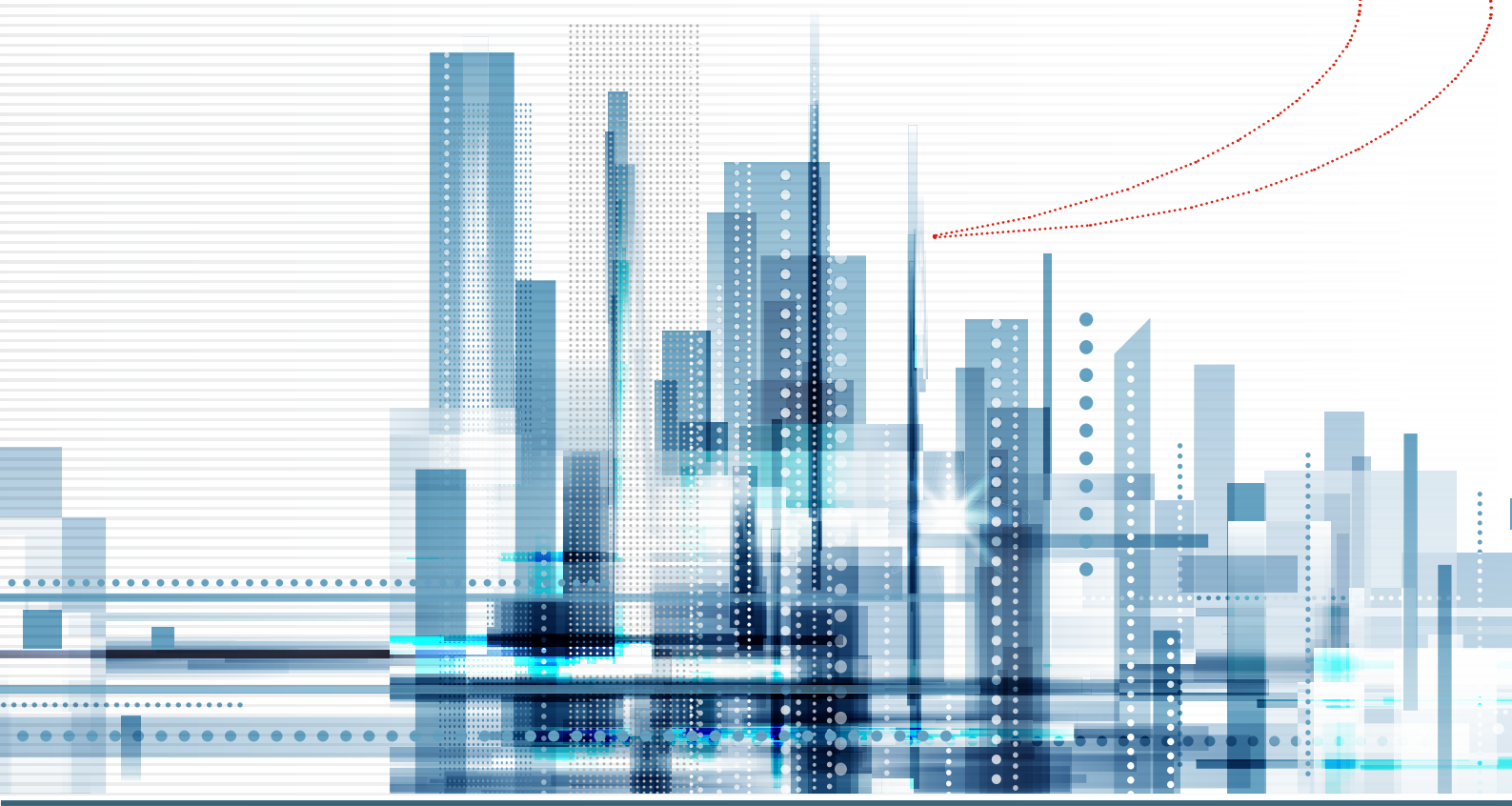
Reference	HEN0203-PU001-OM
Asset	PU 0.01
Provided by	TPS Ltd
Source file	Mikrofill 3 pressurisation unit brochure, PU 0.01.pdf
Pages	12

MIKROFILL®

INSPIRED EFFICIENCY

mikrofill

PRESSURISATION UNIT



MIKROFILL 3 PRESSURISATION UNIT

mikrofill 3

PRESSURISATION UNIT



MIKROFILL®

INSPIRED EFFICIENCY

INTRODUCTION

Renowned for developing innovative products, Mikrofill has built its success on quality, reliability and outstanding customer service.

Our rapidly expanding range of products include commercial condensing boilers, hot water loading systems and pressurisation equipment.

The Mikrofill 3 is the most advanced "direct type" pressurisation unit available, suitable for LPHW/CHW applications of any size.

CONTENTS

Mikrofill 3	4 - 5
Technical Data/ Dimensions	6 - 7
Expansion Vessels	8 - 9
Schematic	10

mikrofill 3 PRESSURISATION UNIT

The WRAS approved Mikrofill 3 pressurisation unit incorporates

- Fluid Risk Category 4 backflow prevention
- The ability to fill directly from mains/ boosted water supply any LPHW or CHW system from empty
- Comprehensive electronic pressure management



The Mikrofill 3 contains no pumps or RPZ valves.

MIKROFILL®
INSPIRED EFFICIENCY

Unlike "pump type" pressurisation units the Mikrofill 3 is designed to be connected directly to a buildings incoming mains/boosted water supply and fill a heating or chilled water system without the use of a pump.

The Mikrofill 3 is the most energy efficient unit of its kind consuming as little as 10 watts/hr on standby and 30 watts/hr fully operational.



FEATURES

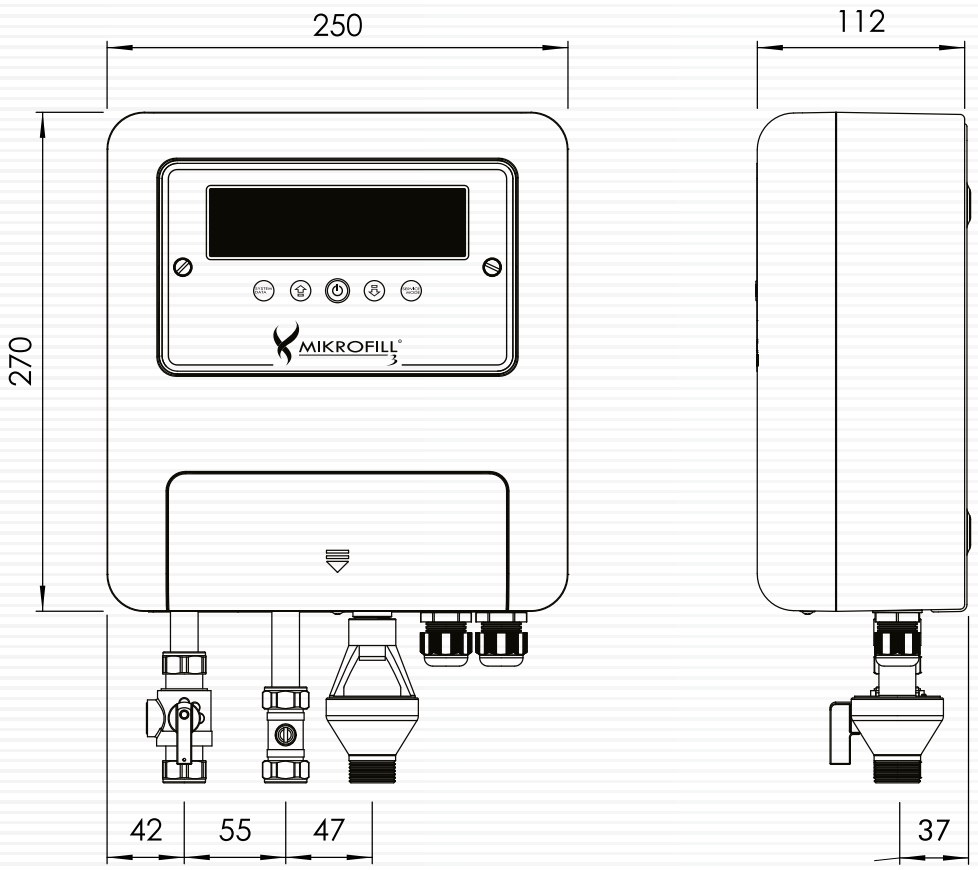
- Integral fluid risk category 4 backflow prevention
- Fills any LPHW/CHW system from empty
- Comprehensive electronic pressurisation manager
- Consumes 10 watts on standby and 30 watts fully operational per hour
- Wall mounted unit
- Fill volume indicator
- Pre- commissioned packages available
- Large colour screen display

BENEFITS

- No RPZ valve required
- Connects directly to the mains/boosted water supply
- 2 methods of flood protection
- 97% more energy efficient than some pump type units
- Compact enough to fit in the smallest of plantrooms
- Aids water treatment calculation
- No onsite commissioning required
- Clear and concise instruction

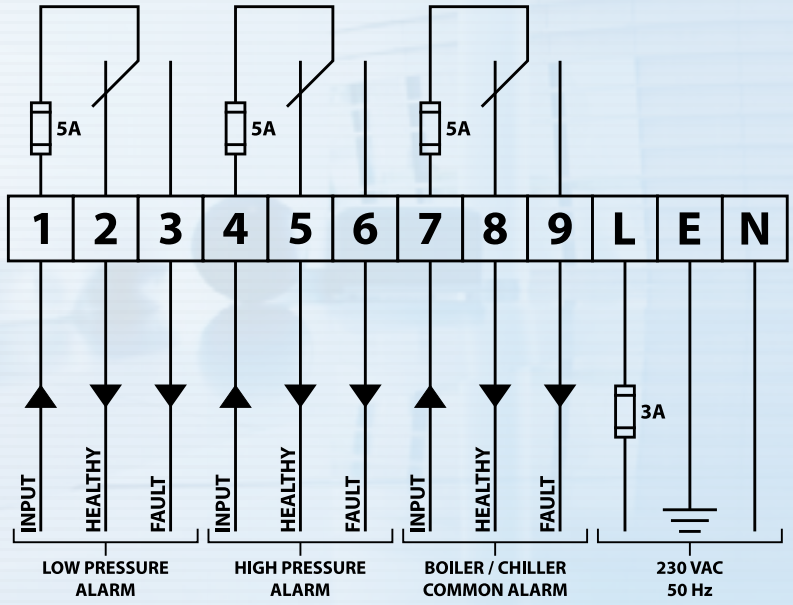
MIKROFILL 3 WRAS APPROVAL NO 1806078	
DIMENSIONS H X W X D	270 x 250 x 112mm
CONNECTION DETAILS	
COLD WATER INLET	15mm Compression
SYSTEM OUTLET	15mm Compression
DRAIN (VIA TUNDISH)	¾" BSP
MAXIMUM INLET PRESSURE	5 Bar
MAXIMUM COLD FILL PRESSURE	4.7 Bar
NOMINAL FLOW RATE AT 2.0 BAR	14 l/min
DRY WEIGHT	5kg

Dimensions (in Millimetres)



ELECTRICAL DETAILS	
SUPPLY VOLTAGE	230 Volt
FULL LOAD CURRENT	1 Amp
START CURRENT	1 Amp
FUSE RATING	3 Amp
MAXIMUM LOAD BMS RELAYS	5 Amp

ELECTRICAL DIAGRAM (WHEN NOT AT FAULT)



ELECTRICAL DATA

- Supply: 230 V 1 ph 3 Amp.
- Full Load Current: 1 Amp.
- Start Current: 1 Amp.
- Fuse Rating: 3 Amp.
- BMS Relays and Boiler / Chiller Relays: Volt Free Contacts rated at 250 VAC at 5 Amp.
- All relays are independently fused at 5 Amp.

mikrofill EXPANSION VESSELS

Mikrofill supply pre commissioned “pressurisation packages”.
Each package includes:

- Mikrofill 3 unit
- System relative expansion vessel/s
- Expansion vessel/s service isolation and drain valve



MIKROFILL®
INSPIRED EFFICIENCY

EXPANSION VESSEL MODELS

MikroPro range

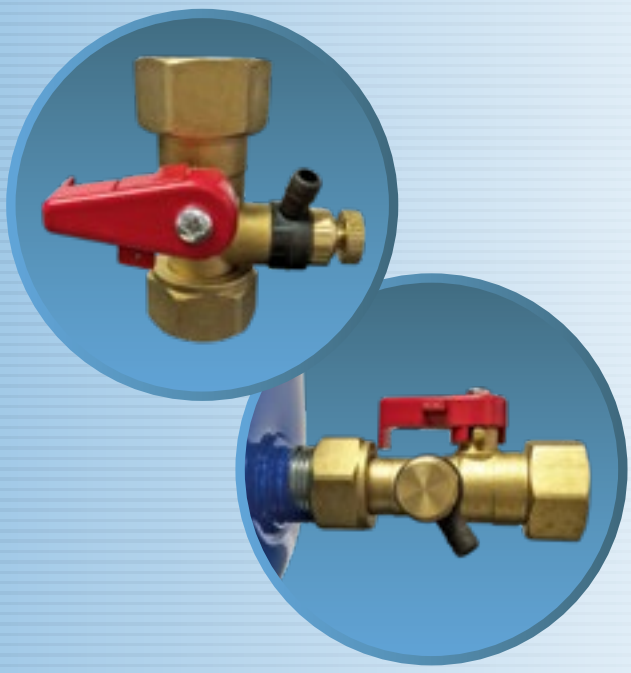
For heating and chilled water applications

- Max working pressure of 6 bar
- Max flow temperature of 95°C
- Max return temperature of 70°C
- Available in individual sizes from 8 to 900 litres

MikroPro XP range

For heating, chilled and potable water applications

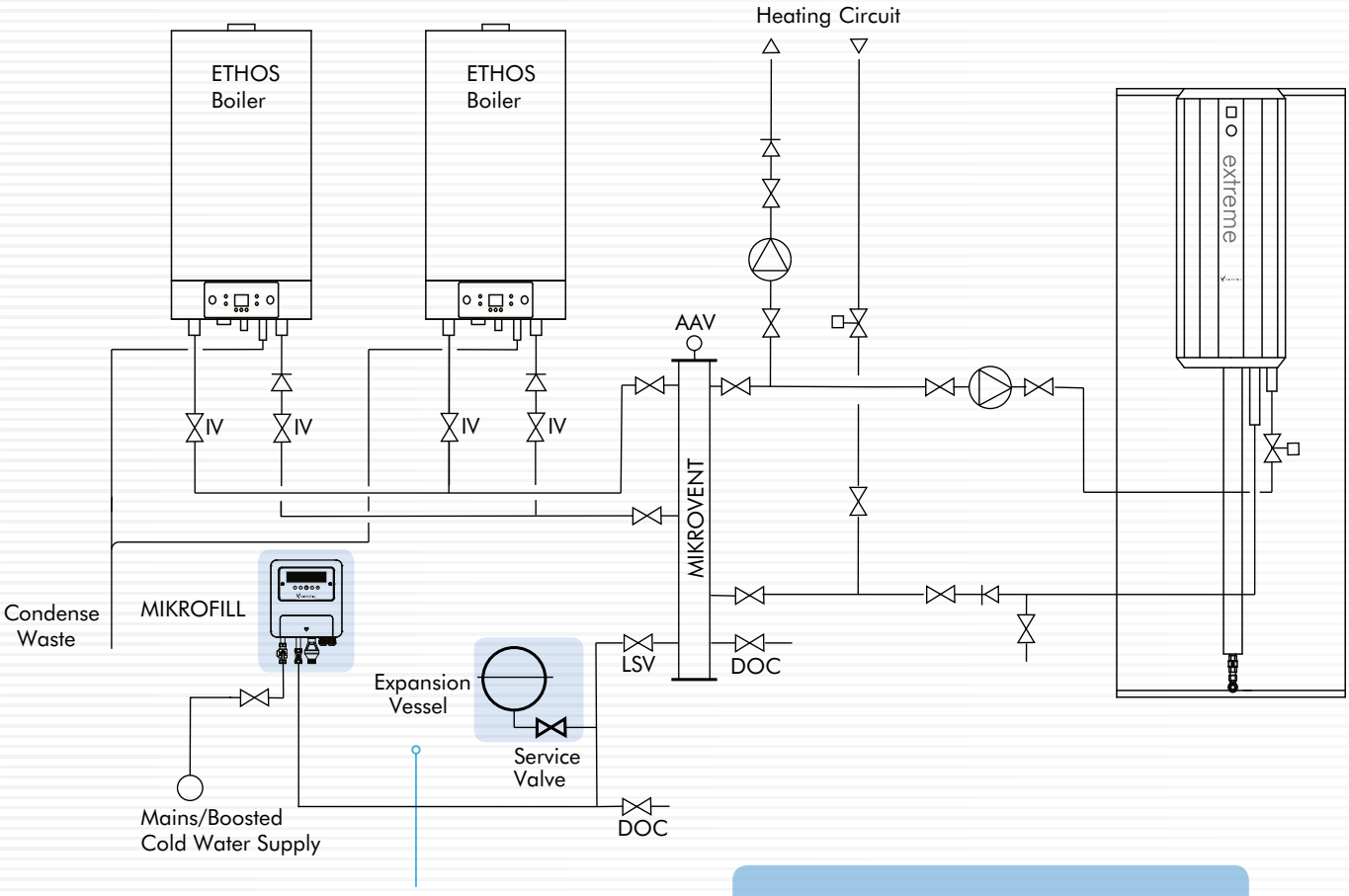
- Replaceable Butyl rubber diaphragm
- Max working pressure of 10 bar
- Max flow temperature of 95°C
- Max return temperature of 70°C
- Available in individual sizes from 8 to 500 litres



Please contact our specialist sales team on **03452 606020** or email **info@mikrofill.com** for package sizing and further information.

mikrofill 3 PRESSURISATION UNIT

A schematic drawing of a Mikrofill 3 pressurisation package including Ethos wall mounted condensing boilers and an Extreme domestic hot water loading system.



The highlighted items including a "pre-commissioning", form a Mikrofill pressurisation package



We always recommend the Mikrofill 3 unit is installed into a "neutral point" on the system as indicated above.

MIKROFILL®

INSPIRED EFFICIENCY

WATER | A PRECIOUS RESOURCE

The water regulations define fluid risk categories by the type of contaminants which are present and specify the appropriate type of prevention device which must be fitted to guard against backflow.

Commercial heating and chilled water systems are defined as fluid risk category 4 and as such any device that is permanently connected to the wholesome water supply must provide at minimum, that level of protection.

The Mikrofill 3 provides that level of protection.



Mikrofill Systems Ltd.
11 Merse Road, North Moons Moat, Redditch, Worcestershire B98 9HL

T +44 (0)3452 60 60 20 **F** +44 (0)3452 60 60 21
E info@mikrofill.com **www.**mikrofill.com

8.6

0900766b8152832a

The following 2 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`0900766b8152832a.pdf`
Pages	2

iDialog

DIGITAL LIVING

1:1 400-1600 VA

UPS **VFD**

Tower

Plug & Play installation

USB plug



HIGHLIGHTS

- **Compact**
- **Silent operation**
- **Contemporary design**
- **Auto restart**
- **Low power consumption**

The iDialog range is the ideal solution for protecting PCs and peripherals in the home and office. iDialog is easy to install and economic to run for protecting:

- IT equipment such as PCs, Media Centres and peripherals, TVs, Home Cinema systems, Satellite and Digital Terrestrial Receivers and Digital Living devices;
- xDSL modems and routers;
- Small home appliances.

SILENT OPERATION

The UPS is silent in operation (0 dBA) thanks to its use of a fan-free design and high frequency components.

ADVANCED COMMUNICATIONS

PowerShield³ software allows for the safe shutdown of connected IT systems on mains power supply failure. PowerShield³ provides efficient and intuitive UPS management using bar chart displays for important operating information.

AUTO RESTART

The UPS automatically restarts when the mains power supply is restored.

ECO LINE ENVIRONMENTAL PROTECTION

With energy savings in mind, the iDialog range features a shut-off button to reduce energy consumption during periods of prolonged inactivity.

FEATURES

- Reduced energy consumption and 99% efficiency;

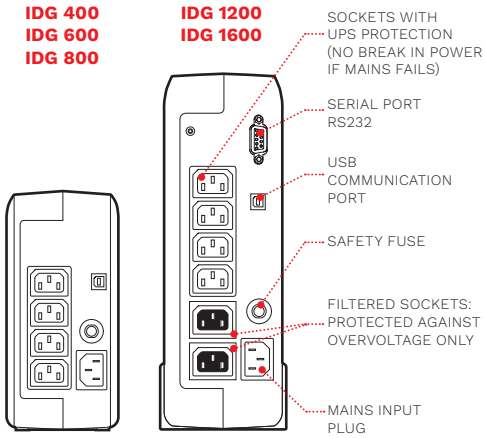
- Maximum reliability and protection of PCs thanks to PowerShield[3] monitoring and shutdown software, which can be downloaded free at www.riello-ups.com;
- Can be installed on PCs with Windows operating systems 11, 10, 8, Server 2022, 2019, 2016 and previous versions, Windows Server Virtualization Hyper-V, macOS, Linux, Citrix XenServer and other Unix operating systems;
- Small size: With its compact shape, iDialog can be placed anywhere on the desk or in the home;
- Silent: iDialog is also suitable for protecting your non-professional digital equipment such as home cinema systems, satellite and digital terrestrial receivers and Digital Living devices.

2-YEAR WARRANTY

OPTIONS

SOFTWARE
PowerShield[3]

DETAILS



MODELS	IDG 400	IDG 600	IDG 800	IDG 1200	IDG 1600
POWER	**400 VA/240 W**	**600 VA/360 W**	**800 VA/480 W**	**1200 VA/720 W**	**1600 VA/960 W**
INPUT					
Rated voltage [V]	220 / 230 / 240				
Voltage tolerance [V]	230 (+20/-25%)				
Rated frequency [Hz]	50 / 60 with automatic selection				
OUTPUT					
Voltage during mains operation [V]	230 (+20/-25%)				
Voltage during battery operation [V]	230 (±10%)				
Frequency during battery operation [Hz]	50 or 60 (±1%)				
Waveform	Pseudo Sinusoidal				
BATTERIES					
Type	VRLA AGM maintenance-free lead based				
Recharge time	6-8 h				
OVERALL SPECIFICATIONS					
Net weight [kg]	3.2		3.4	6.6	6.9
Gross weight [kg]	3.7		4.1	8.1	8.6
Dimensions (WxDxH) [mm]	90x232x192			93x310x270	
Packaging dimensions (WxDxH) [mm]	138x300x278			170x400x370	
Protections	Excessive low battery - overvoltage - short circuit				
Communications	USB			USB + RS232	
Output sockets	4x IEC 320 C13 (10 A)			6x IEC 320 C13 (10 A)	
Standards	European directives: LV 2014/35/EU low voltage Directive; EMC 2014/30/EU electromagnetic compatibility Directive Standards: Safety IEC EN 62040-1; EMC IEC EN 62040-2; RoHS compliant				
Certificates	CE				
Operating temperature	0 °C / +40 °C				
Colour	RAL 9005				
Ambient temperature for the UPS	0 °C - +40 °C				
Recommended temperature for battery life	+20 °C - +25 °C				
Range of relative humidity	5-95% non-condensing				
Standard equipment	2 output power supply cables, user manual				

The information in this document is subject to change without notice. Riello UPS assumes no responsibility for any errors that may appear in this document.

RPS SpA - Riello Power Solutions - Member of the Riello Elettronica Group
Viale Europa, 7 - 37045 Legnago (Verona) - ITALY - Tel: +39 0442 635811
www.riello-ups.com

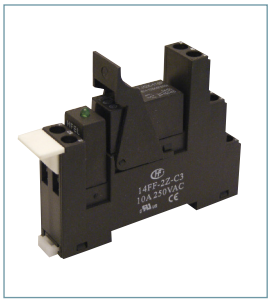
8.7

0900766b815c5547

The following 2 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`0900766b815c5547.pdf`
Pages	2

2RM Series



- Change Over Contacts
- Supplied complete, Relay, LED Socket, Ejector Clip and Identification Label
- 1 Part Number for simple ordering
- AC & DC Coils
- Supply Status LED as standard
- 35mm Din Rail mounting
- 2 Socket Types for ease of installation
- Other Voltages available on request

Approved by:

Double Pole Relay Interface Module

2RM 8A Module with Standard Socket complete with LED & Ejector Clip

Product Code	Coil Voltage	Relay Type	Socket Type	Module Type	Retainer Type
2RM-12	12VDC	HF115F0122ZS4AF	14FF-2Z-C2	HF-EL	14F-ERC-1
2RM-24	24VDC	HF115F0242ZS4AF	14FF-2Z-C2	HF-EL	14F-ERC-1
2RM-24A	24VAC	HF115FA0242ZS4AF	14FF-2Z-C2	HF-EL	14F-ERC-1
2RM-110A	110VAC	HF115FA1152ZS4AF	14FF-2Z-C2	HF-EN	14F-ERC-1
2RM-240A	230VAC	HF115FA2302ZS4AF	14FF-2Z-C2	HF-EN	14F-ERC-1

2RM 8A Module, Coil / Contact separation Socket with LED & Ejector Clip

Product Code	Coil Voltage	Relay Type	Socket Type	Module Type	Retainer Type
2RM-12-3	12VDC	HF115F0122ZS4AF	14FF-2Z-C3	HF-EL	14F-ERC-1
2RM-24-3	24VDC	HF115F0242ZS4AF	14FF-2Z-C3	HF-EL	14F-ERC-1
2RM-24A-3	24VAC	HF115FA0242ZS4AF	14FF-2Z-C3	HF-EL	14F-ERC-1
2RM-110A-3	110VAC	HF115FA1152ZS4AF	14FF-2Z-C3	HF-EN	14F-ERC-1
2RM-240A-3	230VAC	HF115FA2302ZS4AF	14FF-2Z-C3	HF-EN	14F-ERC-1

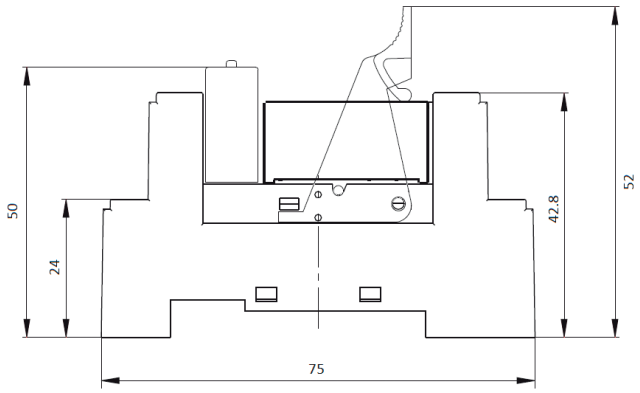
Contact Data	
Contact Arrangement	2C
Contact Rating	8A 250VAC
Max. Switching Power	2000VA
Contact Resistance	100mΩ (at 1A 6VDC)
Contact Material	$AgSnO_2$
Electrical Life	AC: 50,000 DC:100,000
Mechanical Life	AC: 100,000 DC: 10,000,000

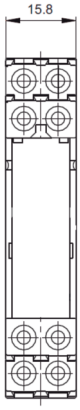
Relay Characteristics	
Insulation Resistance	1000MΩ
Dielectric Strength:	
Between Coil & Contacts	5000VAC 1Min
Between Open Contacts	1000VAC 1Min
Between Adjacent Contacts	2500VAC 1Min
Operate Time	15ms Max.
Release Time	8ms Max.
Ambient Temperature	-40°C to 85°C
Coil Consumption	AC: 0.75VA DC: 400mW

2RM Series

Outline Dimensions

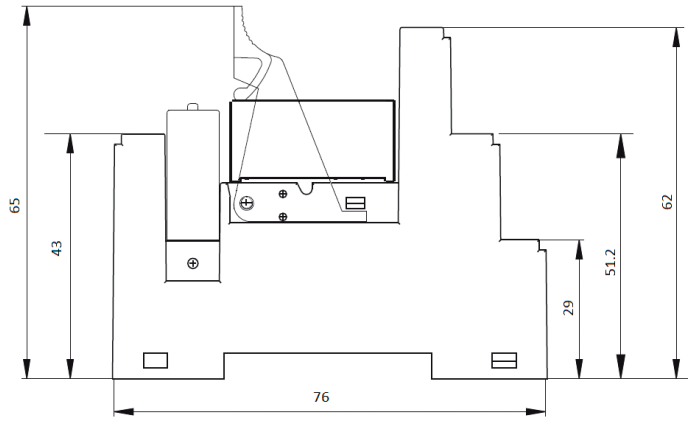
Standard Type

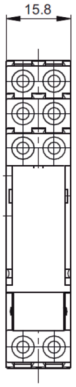




(Top View)

Coil / Contact Separation Type





(Top View)

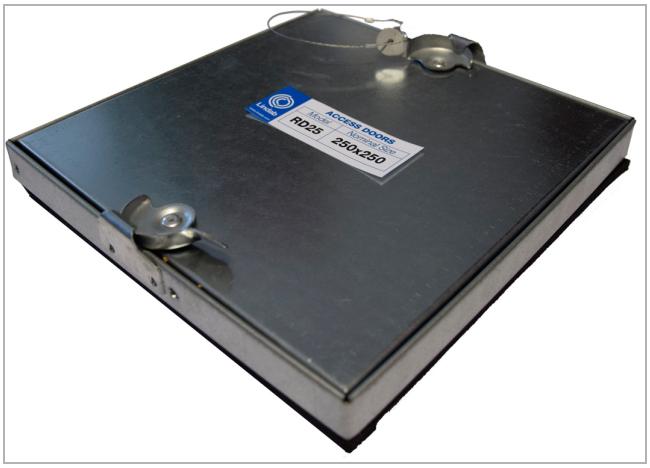
8.8

14-Access-doors.book

The following page is the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`14-Access-doors.book.pdf`
Pages	1

Rectangular Access Door RD



Description

The Lindab range of rectangular access doors is designed to provide rapid access to smoke, fire and volume control dampers or other equipment mounted inside ductwork or associated plant.

All Lindab RD access doors are now fitted with a safety wire as standard, ensuring when inspection takes place, there is no risk of the door falling. This simplifies working at height.

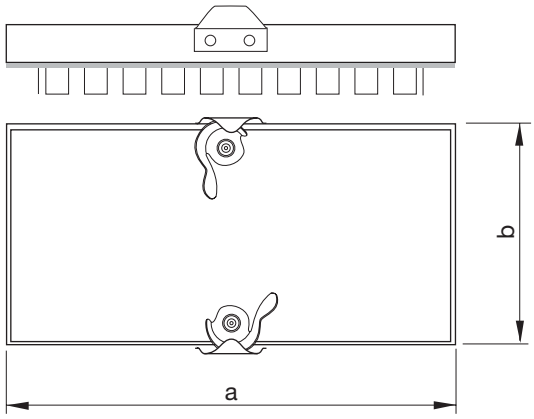
Features

- Double skin construction enclosing 25mm thick high density insulation providing thermal and acoustic performance
- All doors are manufactured using close fit tolerances
- Radiused tabs on frame for safety
- Camlocks & strike plates are manufactured from heavy gauge steel to prevent twisting and deformation.
- Fitted with two high-quality gaskets, one between door and frame and a second on the back face of the frame
- Quick and easy to install
- Suitable for high, medium and low pressure applications
- Complies with DW144 air tightness class C

Installation

1. Cut a hole in duct 30mm under nominal panel size.
2. Ensure that the hole is square and that the duct is adequately stiffened to prevent ‘panting’.
3. Offer access door subframe into aperture and knock over edge tabs whilst supporting the subframe firmly onto the duct. Ensure that all tabs are knocked over and that the sealing gasket is under compression on all faces including corners.
4. Mount doors into frame and tighten camlocks - do not over tighten.

Dimensions



Type	Nominal Size a mm	Nominal Size b mm	Opening Size a mm	Opening Size b mm
RD15	150	150	120	120
RD210	200	100	170	70
RD21	200	125	170	95
RD20	200	200	170	170
RD25	250	250	220	220
RD31	300	150	270	120
RD32	300	200	270	170
RD30	300	300	270	270
RD35	350	350	320	320
RD42	400	200	370	170
RD425	400	250	370	220
RD44	400	300	370	270
RD40	400	400	370	370
RD43	450	300	420	270
RD45	450	450	420	420
RD50	500	500	470	470
RD63	600	300	570	270
RD64	600	400	570	370
RD65	600	450	570	420
RD66	600	600	570	570

Ordering example

	RD44	400	300
Product			
Largest side	a		
Smallest side	b		

8.9

140-FOX.TX

The following 2 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`140-FOX.TX.pdf`
Pages	2

FOXTAM CONTROL PANEL TRANSFORMERS

PRODUCT GROUP T

FEATURES

- Primary voltage multi tap 0-230/240-400-415-440V
- Multi tap secondaries 0-12-24V / 0-55-110V / 0-115-230V
- VA sizes from 30VA to 3200VA
- Double wound isolating
- With primary winding earth screen
- Earth terminal
- Non welded construction means cool operation
- UKCA & CE marked



DESCRIPTION

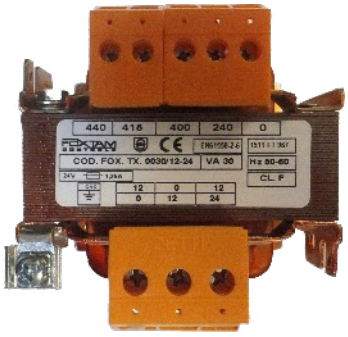
Quality double wound isolating transformers for general "Control Panel" applications, giving excellent on load and off load performance and stability. Benefiting from a multi tap primary 0-230/240-400-415-440V with no confusing terminal links required, likewise the secondary taps are also without requiring links. Available with a choice of secondary voltages 0-12-24V / 0-55-110V or 0-115-230V. The construction in of a non-welded style, which is preferable to ensure cool operation both on and off load. The transformers also benefit from a primary Earth screen as a safeguard in the event of a catastrophic short circuit in the primary, thus ensuring any potential is routed to Earth rather than to the secondary. An optional Din rail mounting adaptor is available for the 30VA, 50VA, 100VA and 160VA transformers sizes, (one adaptor fits all). **It is important to note, when sizing a transformer that the lower secondary voltage tap will be at half the specified VA rating. Example, a 100VA / 24VAC transformer will give you 50VA at 12VAC.**

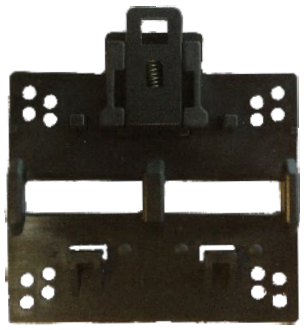
SPECIFICATIONS

UKCA & CE Marked:	Yes
Type 1 In Accordance with:	EN61558-2-6
Types 2 & 3 In Accordance with:	EN61558-2-4
Terminals:	IP20
Copper:	Class F/H
Lamination Loss:	1.5W/Kg
Thermic Class:	Class F
Protection Class:	Class 1
Insulation:	4KV between windings 2KV between windings & chassis Earth
Tropicalised:	Yes
Frequency:	50/60Hs
Continuously Rated:	Yes

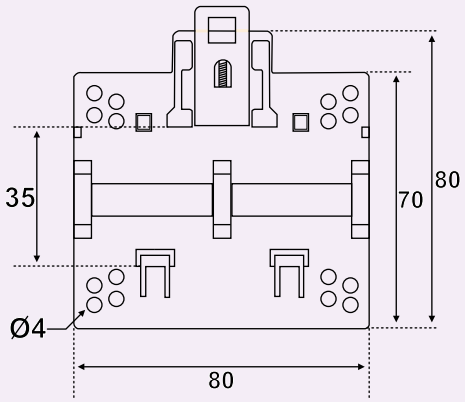
FOX.TX.D-CLIP

Optional DIN Rail Mounting Clip suitable for 30VA, 50VA, 100VA & 160VA secondary transformers.





DIMENSIONS



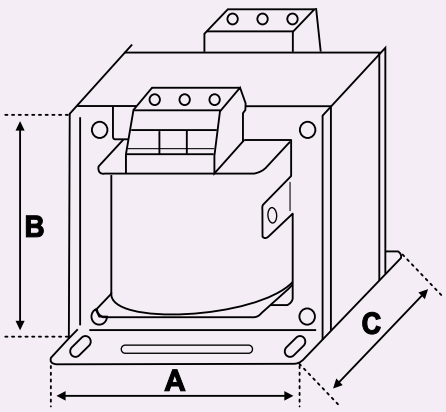
FOXTAM CONTROL PANEL TRANSFORMERS

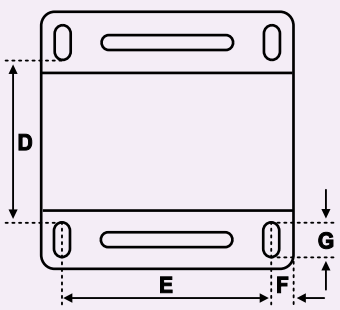
Dimensions

Type-1 (0-12-24V)	A	B	C	D	E	F	G
FOX.TX 0030	77	77	75	37	53	4	6
FOX.TX 0050	77	76	80	42	53	4	6
FOX.TX 0100	86	84	80	37	70	4	10
FOX.TX 0160	86	84	89	47	70	4	10
FOX.TX 0200	97	92	98	48	80	4	12
FOX.TX 0320	123	110	95	59	99	12	14
FOX.TX 0400	122	113	98	64	99	12	14
FOX.TX 0500	122	111	108	74	100	12	14
FOX.TX 0630	154	149	120	77	125	8	17
FOX.TX 0800	150	154	158	116	125	8	18
FOX.TX 1000	150	149	138	113	124	8	24
FOX.TX 1600	198	224	180	108	169	13	12
FOX.TX 2000	198	258	211	127	169	19	12
FOX.TX 2500	198	260	245	145	169	19	12
FOX.TX 3200	242	278	240	112	210	16	22

Type-2 (0-115-230V)	A	B	C	D	E	F	G
FOX.TX 0030	77	77	75	37	53	4	6
FOX.TX 0050	77	76	80	42	53	4	6
FOX.TX 0100	86	84	80	37	70	4	10
FOX.TX 0160	86	84	89	47	70	4	10
FOX.TX 0200	97	92	91	51	80	4	12
FOX.TX 0320	121	110	88	60	110	6	14
FOX.TX 0400	121	110	95	64	100	7	14
FOX.TX 0500	120	118	114	75	100	6	14
FOX.TX 0630	150	133	112	75	126	8	19
FOX.TX 0800	150	135	128	85	125	8	18
FOX.TX 1000	150	139	168	113	124	8	24
FOX.TX 1600	198	198	150	112	169	16	13
FOX.TX 2000	198	198	180	130	168	14	12
FOX.TX 2500	198	198	199	146	168	14	12
FOX.TX 3200	241	240	200	116	200	20	33

Type-3 (0-55-110V)	A	B	C	D	E	F	G
FOX.TX 0030	77	77	75	37	53	4	6
FOX.TX 0050	77	76	80	42	53	4	6
FOX.TX 0100	86	84	80	37	70	4	10
FOX.TX 0160	86	84	89	47	70	4	10
FOX.TX 0200	97	92	91	51	80	4	12
FOX.TX 0320	120	111	94	58	100	7	14
FOX.TX 0400	120	118	108	64	100	6	14
FOX.TX 0500	120	130	118	74	100	7	14
FOX.TX 0630	150	138	128	74	125	8	24
FOX.TX 0800	150	154	158	116	135	8	19
FOX.TX 1000	150	139	168	113	124	8	24
FOX.TX 1600	198	198	155	112	169	14	12
FOX.TX 2000	198	198	180	130	168	14	12
FOX.TX 2500	198	200	197	145	169	19	22
FOX.TX 3200	240	240	200	112	200	20	33





8.10

1641824737-8-riello2

The following 2 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`1641824737-8-riello2.pdf`
Pages	2

riello ups

SOHO

iDialog

UPS **VFD** | **Tower** | **USB** plug | **Plug & Play** installation



1:1 400-1600 VA

HIGHLIGHTS

- **Compact**
- **Silent operation**
- **Contemporary design**
- **Auto restart**
- **Low power consumption**

The iDialog range is the ideal solution for protecting PCs and peripherals in the home and office.
iDialog is easy to install and economic to run for protecting:

- IT equipment such as PCs, Media Centres and peripherals, TVs, Home Cinema systems, Satellite and Digital Terrestrial Receivers and DVD recorders and players;
- xDSL modems and routers;
- Small home appliances.

SILENT OPERATION

The UPS is silent in operation (0 dBA) thanks to its use of a fan-free design and high frequency components.

ADVANCED COMMUNICATIONS

PowerShield³ software allows for the safe shutdown of connected IT systems on mains power supply failure. PowerShield³ provides efficient and intuitive UPS management using bar chart displays for important operating information.

AUTO RESTART

The UPS automatically restarts when the mains power supply is restored.

ECO LINE ENVIRONMENTAL PROTECTION

With energy savings in mind, the iDialog range features a shut-off button to reduce energy consumption during periods of prolonged inactivity.

FEATURES

- Reduced energy consumption and 99% efficiency;
- Maximum reliability and protection of PCs thanks to PowerShield³ monitoring and shutdown software, which can be

MODELS	IDG 400	IDG 600	IDG 800	IDG 1200	IDG 1600
POWER	**400 VA/240 W**	**600 VA/360 W**	**800 VA/480 W**	**1200 VA/720 W**	**1600 VA/960 W**
INPUT					
Rated voltage [V]	220 / 230 / 240				
Voltage tolerance [V]	230 (+20/-25%)				
Rated frequency [Hz]	50 / 60 with automatic selection				
OUTPUT					
Voltage during mains operation [V]	230 (+20/-25%)				
Voltage during battery operation [V]	230 (±10%)				
Frequency during battery operation [Hz]	50 or 60 (±1%)				
Waveform	Pseudo Sinusoidal				
BATTERIES					
Type	VRLA AGM maintenance-free lead based				
Recharge time	6-8 h				
OVERALL SPECIFICATIONS					
Net weight [kg]	3.2		3.4	6.6	6.9
Gross weight [kg]	3.7		4.1	8.1	8.6
Dimensions (WxDxH) [mm]	90x232x192			93x310x270	
Packaging dimensions (WxDxH) [mm]	138x300x278			170x400x370	
Protections	Excessive low battery - overvoltage - short circuit				
Communications	USB			USB + RS232	
Output sockets	4 IEC 320 C13			6 IEC 320 C13	
Standards	European directives: L V 2014/35/EU low voltage Directive; EMC 2014/30/EU electromagnetic compatibility Directive Standards: Safety IEC EN 62040-1; EMC IEC EN 62040-2; RoHS compliant				
Certificates	CE				
Operating temperature	0 °C / +40 °C				
Colour	Black				
Ambient temperature for the UPS	0 °C - +40 °C				
Recommended temperature for battery life	+20 °C - +25 °C				
Range of relative humidity	5-95% non-condensing				
Altitude	6000 m max altitude				
Standard equipment	2 output power supply cables, user manual				

The information in this document is subject to change without notice. Riello UPS assumes no responsibility for any errors that may appear in this document.

DATIDGA1Y20AREN

downloaded free at www.riello-ups.com;
- Can be installed on PCs with Windows operating systems 10, 8, 7, Hyper-V, 2019, 2016, 2012, and previous versions, Mac OS X, Linux;
- Small size: With its compact shape, iDialog can be placed anywhere on the desk or in the home;
- Silent: iDialog is also suitable for protecting your non-professional digital equipment such as home cinema systems, satellite and digital terrestrial receivers and DVD players/recorders.

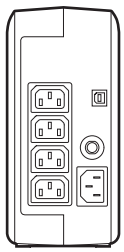
2-YEAR WARRANTY

OPTIONS

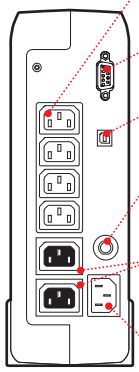
SOFTWARE
PowerShield[3]

DETAILS

IDG 400
IDG 600
IDG 800



IDG 1200
IDG 1600



RPS SpA - Riello Power Solutions - Member of the Riello Elettronica Group
Viale Europa, 7 - 37045 Legnago (Verona) - ITALY - Tel: +39 0442 635811
www.riello-ups.com - riello@riello-ups.com

8.11

41x21 Data Sheet

The following page is the document exactly as received and checked. It is bookmarked in the PDF.

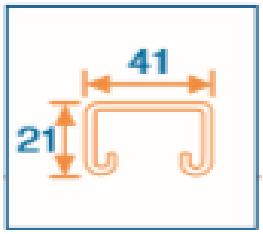
Reference	
Asset	General
Provided by	Not recorded
Source file	`41x21 Data Sheet.pdf`
Pages	1

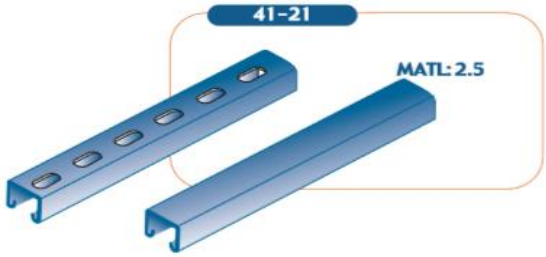
Steel Sections

Cold Rolled Forming Specialists

Steel Sections
Howard Street, Hill Top
West Bromwich B70 0ST
Tel: 0121 556 911
Fax: 0121 502 5611

Product Data Sheet





Manufactured in accordance to BS6946 1988
Available with Slots 28x14mm or 28x12mm at 50mm c/c.
Lengths - 3m or 6m

Material:

HR.S2	Plain Coil to BS EN 10025 Pickled & Oiled min. yield 275 n/mm²
G.S2	Pre Galvanised Steel - BS EN 10346 2015, S280 min. yield, Z275 NAC
HDG.S2	Plain Coil to BS EN 10025 Pickled & Oiled min. yield 275 n/mm²
T316.S2	Stainless Steel Coil Hot Rolled to BS EN 10088-2-1.4404

Finishes:

HR.S2	Self Colour - Black Mild Steel
G.S2	BS EN 10346 Coating
HDG.S2	Hot Dip Galvanised - to BS EN ISO 1461: to a mean coating thickness (average) of 55µm
T316.S2	Stainless Steel - HR

Steel Sections cannot be held responsible for any changes or amendments made by BS or BS EN standards applicable to the above products.

8.12

41x41 Data Sheet

The following page is the document exactly as received and checked. It is bookmarked in the PDF.

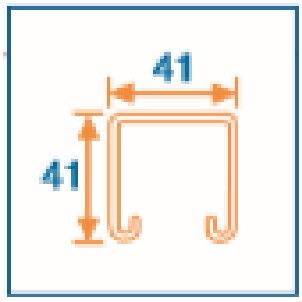
Reference	
Asset	General
Provided by	Not recorded
Source file	`41x41 Data Sheet.pdf`
Pages	1

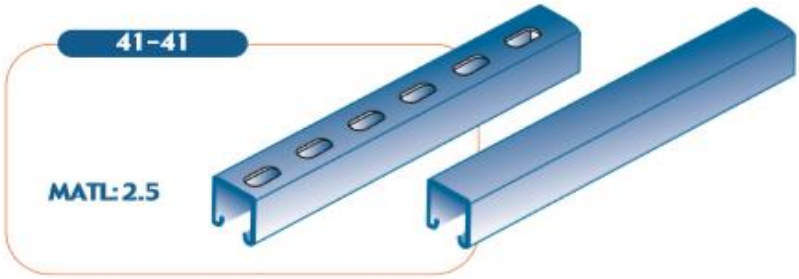
Steel Sections

Cold Rolled Forming Specialists

Steel Sections
Howard Street, Hill Top
West Bromwich B70 0ST
Tel: 0121 556 911
Fax: 0121 502 5611

Product Data Sheet





Manufactured in accordance to BS6946 1988
Available with Slots 28x14mm or 28x12mm at 50mm c/c.
Lengths - 3m or 6m

Material:

HR.S1	Plain Coil to BS EN 10025 Pickled & Oiled min. yield 275 n/mm²
G.S1	Pre Galvanised Steel - BS EN 10346 2015, S280 min. yield, Z275 NAC
HDG.S1	Plain Coil to BS EN 10025 Pickled & Oiled min. yield 275 n/mm²
T316.S1	Stainless Steel Coil Hot Rolled to BS EN 10088-2-1.4404

Finishes:

HR.S1	Self Colour - Black Mild Steel
G.S1	BS EN 10346 Coating
HDG.S1	Hot Dip Galvanised - to BS EN ISO 1461: to a mean coating thickness (average) of 55µm
T316.S1	Stainless Steel - HR

Steel Sections cannot be held responsible for any changes or amendments made by BS or BS EN standards applicable to the above products.

8.13

Quinway acoustic enclosure O&M manual

The following 3 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`Quinway acoustic enclosure O&M manual.pdf`
Pages	3

OPERATION & MAINTENANCE INSTRUCTIONS

Our Ref: 99307C
Date: 22/10/2025
Client: Hensall Mechanical Services Ltd
Project: Elmwood Leisure Centre

1. **Scope of Works**
   The manufacture and installation of three AA306S packages.

2. **Manufacturer's Details**
   Name: Quinway Acoustics Limited.
   Address: Old Police Station, 1 Queens Road, Hertford, Herts SG14 1EN.
   Phone: 01992 550825.
   Fax: 0800 098 8744.
   E-mail: enquiries@quinwayacoustics.co.uk.

3. **Drawings**
   Drawings: 99307D 001 & 99307D 002

4. **Schedule of Products**
   As detailed on attached drawings.

5. **Materials**
   All items constructed from pre-galvanised sheet steel, or aluminium sheet, and finished with polyester powder coat to RAL7035, matt finish.

6. **Handling**
   Items may contain sharp edges, take care when handling.
   Refer to drawings and schedules for significant item weights.

7. **Hazardous Materials**
   The products contain no hazardous materials.

8. **Operation**
   No operation instructions are required for the end users.

9. **Inspection and Maintenance Regime**

Product / Item	Frequency (a)	Frequency (b)	Action
Acoustic Door Set	Annually	Quarterly	Clean all surfaces with a mild detergent and non-abrasive cloth, then rinse with clean water. Pay particular attention to any perforated metal faces.
	Annually	Quarterly	Carry out a visual inspection to check for any defects to the galvanised surface. Any scratches, gouges, dents, or the like should be rubbed down with a soft wire brush to prepare the surface, cleaned and then painted with two generous coats of zinc rich paint.
	Annually	Quarterly	If powder coated, carry out a visual inspection to check for any defects to the painted surface. Any scratches, gouges, dents, or the like should be rubbed down with a soft wire brush to prepare the surface, cleaned and then painted with two generous coats of zinc rich paint. A topcoat should then be applied to match the existing colour.

Acoustic Panels	Annually	Quarterly	Clean all surfaces with a mild detergent and non-abrasive cloth. Rinse with clean water. Pay particular attention to any perforated metal faces.
	Annually	Quarterly	Carry out a visual inspection to check for any defects to the galvanised surface. Any scratches, gouges, dents, or the like should be rubbed down with a soft wire brush to prepare the surface, cleaned and then painted with two generous coats of zinc rich paint.
	Annually	Quarterly	If powder coated, carry out a visual inspection to check for any defects to the painted surface. Any scratches, gouges, dents, or the like should be rubbed down with a soft wire brush to prepare the surface, cleaned and then painted with two generous coats of zinc rich paint. A topcoat should then be applied to match the existing colour.
Acoustic Louvres	Annually	Annually	Carry out a visual inspection to check for any blockages to the airways, remove as required.
	Annually	Quarterly	Clean all surfaces with a mild detergent and non-abrasive cloth. Rinse with clean water. Pay particular attention to any perforated metal faces.
	Annually	Quarterly	Carry out a visual inspection to check for any defects to the galvanised surface. Any scratches, gouges, dents, or the like should be rubbed down with a soft wire brush to prepare the surface, cleaned and then painted with two generous coats of zinc rich paint.
	Annually	Quarterly	If powder coated, carry out a visual inspection to check for any defects to the painted surface. Any scratches, gouges, dents, or the like should be rubbed down with a soft wire brush to prepare the surface, cleaned and then painted with two generous coats of zinc rich paint. A topcoat should then be applied to match the existing colour.
Attenuators	Annually	Annually	Visual inspection to check for any blockages to the airways, remove as required.
	Annually	Quarterly	Clean all surfaces with a mild detergent and non-abrasive cloth. Rinse with clean water. Pay particular attention to any perforated metal faces.
	Annually	Quarterly	Visual inspection to check for any defects to the galvanised surface. Any scratches, gouges, dents, or the like should be rubbed down with a soft wire brush to prepare the surface, cleaned and then painted with two generous coats of zinc rich paint.
	Annually	Quarterly	If painted, carry out a visual inspection to check for any defects to the painted surface. Any scratches, gouges, dents or the like should be rubbed down with a soft wire brush to prepare the surface, cleaned and then painted with two generous coats of zinc rich paint. A topcoat should then be applied to match the existing colour.
Ironmongery and Hardware	Annually	Quarterly	Clean and lubricate moving parts with 3-in-1 oil or similar.
	Quarterly	Quarterly	Check all screws, bolts and other fixings are tight, adjust as necessary.
	Annually	Annually	Check for damage or fatigue and replace if necessary.
Seals and Gaskets	Annually	Quarterly	Remove dust and debris from seals and clean using mild detergent and non-abrasive cloth. Rinse with clean water.

	Annually	Annually	Check for damage or fatigue and replace if necessary.
Fixings	Annually	Annually	Check that all fixings are tight and secure, adjust as necessary.

Frequency (a): Equipment in non-coastal areas.
Frequency (b): Equipment in coastal areas and areas susceptible to high levels of pollution.

10. Other

Spare parts should be obtained from Quinway Acoustics Limited.

Acoustic, fire or any other applicable performance rating is dependent on regular and adequate maintenance.

8.14

A6V10447175_Electromotoric actuators for SAV.. 2-port and 3-po_en

The following 20 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`A6V10447175_Electromotoric actuators for SAV.. 2-port and 3-po_en.pdf`
Pages	20

SIEMENS

Electromotive actuators for valves

SAV..



Actuators with 40 mm stroke and 1600 N force

- SAV31.. Operating voltage AC 230 V, 3-position control signal
- SAV61.. Operating voltage AC/DC 24 V, positioning signal 0...10V, 4...20 mA with position feedback, forced control, characteristic changeover
- SAV61../MO operating voltage AC/DC 24 V
  RS-485 for Modbus RTU communication
- SAV81.. Operating voltage AC/DC 24 V, 3-position control signal
- For direct mounting on valves; no adjustments required
- Manual adjuster, position and status indication (LED)
- Optional functions with auxiliary switches, potentiometer, function module, stem heating

Application

Electromotive actuators to operate Siemens 2-port and 3-port valves, types V..F22.., V..F32.., V..F42.., V..F43.., and V..F53.. with 40 mm stroke as control and safety shut-off valves in heating, ventilation and air conditioning systems.

Features

Function	Description	Type
3-position control	A 3-position signal controls the actuator via connection terminals Y1 or Y2. The desired position is transmitted to the valve.	SAV31.., SAV81..
Modulating control	The positioning signal range (DC 0...10 V / DC 4...20 mA / 0...1000 Ω) corresponds to the positioning range (closed...open, or 0…100% stroke) in a linear manner.	SAV61..
Positioning signal and characteristic changeover	Setting with DIL switch. Factory setting: ● Characteristic curve: log = Equal percentage (switch set to Off) ● Positioning signal: DC 0...10 V (switch set to Off)	
Position feedback U	Signal returned to acquire the position via input.	SAV61.., SAV61../MO
Forced control (Z-mode)	Forced control helps override automatic mode and is implemented via higher control.	
Calibration	Carry out during initial commissioning. The actuator drives to the top or bottom end position; the measured values are saved.	
Valve seat detection	The actuators have power-dependent seat detection. After calibration, the exact valve stroke is stored in the actuator's memory.	
Foreign body detection	After clogging is detected, three attempts are made to get past clogging. If unsuccessful, the actuator continues to follow the positioning signal only within a limited range, and the LED flashes red.	
Modbus RTU (RS-485), not galvanically isolated	Setpoint 0...100 % valve setting Actual value 0..100% for valve position Override control Open / Close / Min / Max / Stop Setpoint monitoring and backup mode	SAV61../MO

Type summary

Type	Item NO.	Stroke	Positioning force	Operating voltage	Positioning signal	Spring return time	Positioning time	LED	Manual adjustment [3]	Comment
SAV31.00 [1]	S55150-A112	40 mm	1600 N	AC 230 V	3-pos.	-	120 s	-	Push and fix	-
SAV61.00 [2]	S55150-A110			AC 24 V DC 24 V	DC ...10 V DC 4...20 mA 0...1000 Ω			yes		[4]
SAV61.00U [2]	S55150-A110-A100									
SAV61.00/MO [1]	S55150-A141				Modbus RTU					[5]
SAV81.00 [1]	S55150-A111				3-pos.			-		-
SAV81.00U [2]	S55150-A111-A100									

[1] Approbation: CE

[2] Approvals: CE, UL

[3] Not designed for continuous operation.

[4] Position feedback, forced control, characteristic changeover

[5] Position feedback, forced control

Scope of delivery

Actuators, valves and accessories are supplied in individual packs.

Accessories / spare parts

Electrical accessories

Type	Auxiliary switch ASC10.51	Potentiometer ASZ7.5	Function module AZX61.1	Stem heating element ASZ6.6
Item NO.	S55845-Z103	S55845-Z106	S55845-Z107	S55845-Z108
	Max. 2			Max. 1
SAV31..	Max. 2	Max. 1	-	
SAV61..		-	Max. 1	
SAV61../MO		-		
SAV81..		Max.1	-	

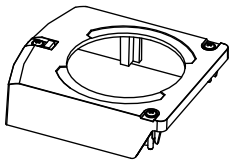
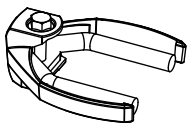
Mechanical accessory

Type	Weather shield ASK39.1
Item NO.	S55845-Z109

Ordering (example)

Type	Order number	Designation	Number of pieces
SAV81.00	S55150-A111	Actuator	1
ASZ7.5	S55845-Z106	Potentiometer	1

Spare parts

Product no. / SSN		
8000060843	**Housing cover** 	**Screw (valve stem coupling)**  **U-bracket** 

Device combinations

2-port valves VV.. (control or safety shutoff valves)

Valve type		DN	PN class	k_{vs} [m^3/h]	Data sheet
VVF22..	Flange	40...100	6	16...160	N4401
VVF32..		40...150	10	16...400	N4402
VVF42..			16		N4403
VVF42..K		100...150		160...360	
VVF43..		65...150		50...400	N4404
VVF43..K [1)]		-			
VVF53..		40...150	25	16...400	N4405
VVF53..K [1)]		-			

[1)] Combination not permissible

3-port valves VX.. (Control valves for functions "mixing" and "distribution")

Valve type		DN	PN class	k_{vs} [m^3/h]	Data sheet
VXF22..	Flange	40...100	6	16...160	N4401
VXF32..		40...150	10	16...400	N4402
VXF42..			16		N4403
VXF43..		65...150		63...400	N4404
VXF53..		40...150	25	16...400	N4405

Product documentation

Title	Contents	Document ID
Actuators SAX.., SAY.., SAV.., SAL.. for valves	Basic documentation: Detailed information on stroke actuators including Modbus types Stroke actuators for valves with 20/40 mm stroke and rotary actuators for butterfly valves	CE1P4040en
Electromotive actuators for valves SA.., Modbus RTU	Datasheet: Modbus communication profiles	A6V101037195
Mounting instructions G..161../MO and S..6/MO	Mounting instructions: Mounting and installation instructions for Modbus actuators	A5W00027551
Valve Actuator DIL Switch characteristic overview	Commissioning / configuration: Depictions, description of actuator and valve characteristics by DIL switch setting (English)	A6V12050595

Related documents such as the environmental declarations, declarations of conformity, etc., can be downloaded from the following Internet address:

www.siemens.com/bt/download

Notes

Safety

⚠ CAUTION	
	**National safety regulations** Failure to comply with national safety regulations may result in personal injury and property damage. ● Observe national provisions and comply with the appropriate safety regulations.

⚠ WARNING	
	**Risk of burns from hot actuator brackets** The actuator brackets on heating plants can also become hot from the contact with the hot valve during operation. The temperature of the actuator bracket can reach 100 °C. When servicing the actuator: ● Switch off the pump and disconnect power supply. ● Close the shut-off valves in the piping network. ● Allow the piping to cool off.

Engineering

SAV31.. / SAV81..

3-position actuators must be controlled by a controller, see Connection diagrams.

SAV61..

Up to 10 actuators can drive in parallel on a controller output with a rating of 1 mA. Modulating actuators have an input impedance of 100 kΩ.

SAV61../MO

The Modbus converter is designed for analog control at 0...10 V.



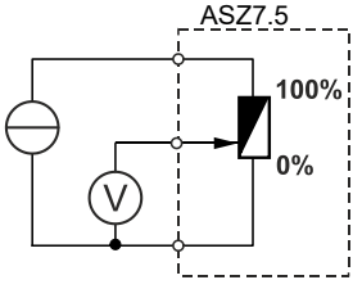
Keep the analog signal setting on the actuator as is (switch 1 to OFF); adjustment not permitted.

ASZ7.5

Actuators with a DC 0...9.8 V feedback signal are recommended for the combination SIMATIC S5/S7 and position feedback.

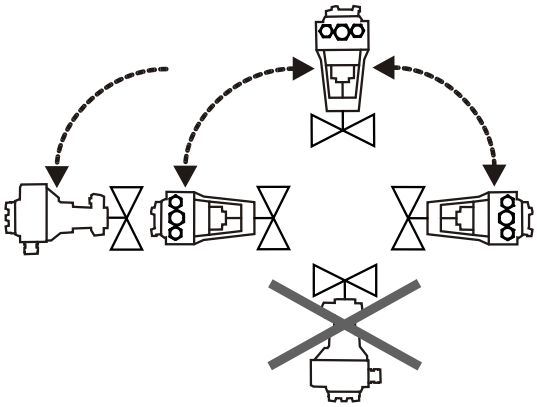
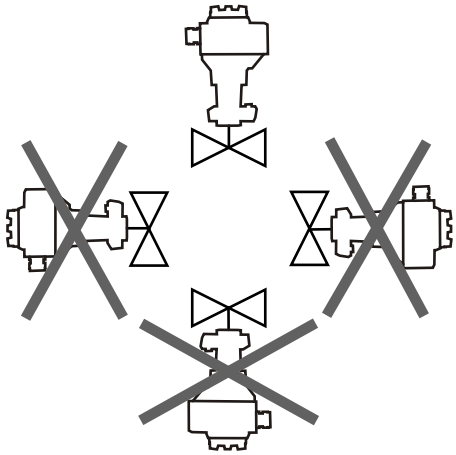
Signal peaks in potentiometer ASZ7.5 may result in error messages on Siemens SIMATIC. This is not the cause, however, when combined with Siemens HVAC controllers. The reason is the higher resolution and faster reaction time on SIMATIC.

Use the potentiometer as voltage divider on the 3-wire connection. Powering the potentiometer over the wiper may shorten the life cycle of the potentiometer. Signal peaks increase in frequency and scope over the lifespan in this operating mode.



Mounting

Mounting positions

Indoor application	Outdoor application [1] [2]
	

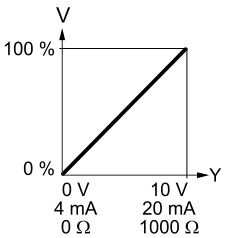
[1] Requires weather shield ASK39.1. Housing protection class remains IP 54.

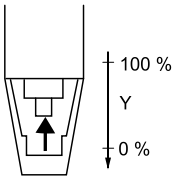
[2] SAV61../MO is not intended for outdoor use.

Operation

Control action

On valves where the stem retracts to the close position, "direct acting" means that the value is fully closed at positioning signal Y = 0 V or Z = 0 Ω (i.e. 0 %).



Direct acting	
	
Positioning signal Y	DC 0...10 V, 4...20 mA
Positioning signal Z	0...1000 Ω

Y, Z	Positioning signal
V	Volume flow
———	Control action: Direct acting

Maintenance

Actuators are maintenance-free.

Disposal



This symbol or any other national label indicate that the product, its packaging, and, where applicable, any batteries may not be disposed of as domestic waste. Delete all personal data and dispose of the item(s) at separate collection and recycling facilities in accordance with local and national legislation.
For additional details, refer to Siemens information on disposal.

Warranty

The application-specific technical data is guaranteed only in combination with the Siemens products listed in the 'Device combinations' section. If third-party products are used, any guarantee provided by Siemens will be invalidated.

Technical data

Power supply		
Operating voltage	SAV31..	AC 230 V ± 15 %
	SAV61..	AC 24 V ± 20 % / DC 24 V + 20 % / - 15 % (SELV / PELV)
	SAV81..	
Frequency		45...65 Hz
External supply line fusing (EU)		• Non-renewable fuse 6...10 A slow • Circuit break max. 13 A, tripping characteristic B, C, D to EN 60898 • Power source with current limitation of max. 10 A
Typical switch-on current [1] (3-position actuators)	SAV31..	2.3A
	SAV81..	4.5A

Functional data	
Positioning times (with the specified nominal stroke)	The positioning time may vary depending on the type of valve (Type summary [▶ 3])
SAV31.., SAV61.., SAV81..	120 s
Positioning force	1600 N
Nominal stroke	40 mm
Working stroke range at which the actuator is calibrated	15...43 mm
Permissible media temperature (valve fitted)	-25...130 °C At 150 °C, installed horizontally

Signal inputs		
Positioning signal ”Y”	SAV31.., SAV81..	3-pos.
	SAV31.. Voltage	AC 230 V ± 15 %
	SAV81.. Voltage	AC 24 V ± 20% / DC 24 V + 20% / - 15%
	SAV61.. (DC 0...10 V) current draw	≤ 0.1 mA
	Input impedance	≥100 kΩ
	SAV61.. (DC 4…20 mA) current draw	DC 4...20 mA ± 1%
	Input impedance	≤ 500 Ω

Power consumption at 50 Hz					
Type	**Item NO.**	**Operating [W]**	**Operating [VA]**	**Standby [W]**	**Standby [VA]**
SAV31.00	S55150-A112	4.1	7.2	1.3	2.3
SAV61.00	S55150-A110	4.0	9.5	1.7	4.4
SAV61.00U	S55150-A110-A100	4.0	9.5	1.7	4.4
SAV61.00/MO	S55150-A141	4.5	10.2	2.2	5.8
SAV81.00	S55150-A111	4.0	6.9	1.5	2.7
SAV81.00U	S55150-A111-A100	4.0	6.9	1.5	2.7

Communication		
Communication protocol	Modbus RTU	RS-485, not galvanically isolated
	Number of nodes	Max. 32
	Address range	1...245 / 255
	Factory setting	255
	Transmission formats	1-8-E-1 / 1-8-O-1 / 1-8-N-1 / 1-8-N-2
	Factory setting	1-8-E-1
	Baud rates (kbaud)	Auto / 9.6 / 19.2 / 38.4 / 57.6 / 76.8 / 115.2
	Factory setting	Auto
	Bus termination	120 Ω electronically switchable
	Factory setting	Off

Parallel connection	
SAV61..	≤ 10 (depending on controller output)

Forced control		
Z positioning signal	SAV61..	R = 0...1000 Ω, G, G0
	R = 0...1000 Ω	Stroke proportional to R
	Z connected to G	Max. stroke 100 % [2)]
	Z connected to G0	Max. stroke 0 % [2)]
	Voltage	Max. AC 24 V ± 20 %
		Max. DC 24 V + 20 % / - 15 %
	Power consumption	≤ 0.1 mA

Position feedback		
U	Voltage range SAV61..	0...10 V DC
	Load impedance	> 10 kΩ resistive
	Load	Max. 1 mA

Connection cable		
Wire cross-sectional areas		0.13...1.5 mm ^{2}, AWG 24...16 [3)]
Cable entries	SAV.. (EU)	2 entries ø 20.5 mm (for M20) 1 entry ø 25.5 mm (for M25)
	SAV..U (US)	3 entries ø 21.5 mm for ½" tube connection
	SAV61../MO	Fixed connection cable 0.9m
		Number of cores 5 x 0.75 mm ^{2}

Degree of protection and class		
Housing from vertical to horizontal		IP 54 as per EN 60529 [4)]
Device protective class per EN 60730-1	SAV31.. AC 230 V	II
	SAV61.. AC / DC 24 V	III
	SAV81.. AC / DC 24 V	

Environmental conditions		
Operation per IEC 60721-3-3	Climatic conditions	Class 3K5
	Mounting location	Indoors (weather-protected) [4]
	Temperature, general	-5...<55 °C
	Humidity (non-condensing)	5...95 % r.h.
Transport per IEC 60721-3-2	Climatic conditions	Class 2K3
	Temperature	-25...70 °C
	Humidity	5...95 % r.h.
Storage per IEC 60721-3-1	Climatic conditions	Class 1K3
	Temperature	-15...55 °C
	Humidity	5...95 % r.h.
Max. media temperature when mounted on valve		130 °C At 150 °C, installed horizontally

Directives and standards		
Product standard		EN 60730-x
Electromagnetic compatibility (field of use)		For residential, commercial, and industrial environments
EU conformity (CE)		See EU declaration of conformity CE1T4503xx [5]
UK conformity (UKCA)		See UK declaration of conformity A5W00197822A-001 [5]
RCM compliance	AC 230 V	See RCM declaration of conformity 8000078495 [5]
EAC compliance		Eurasian compliance for all SAV..
UL, cUL	AC 230 V	-
	AC / DC 24 V	UL 873 http://ul.com/database; File number E35198

Environmental compatibility
Product environmental declarations 71 7331 0522 [5] and A6V101083254 [5] include data on environmentally friendly product design and testing (RoHS compliance, material composition, packaging, environmental benefits, disposal).

Dimensions
See Dimensions [▶ 18]

Accessories		
Potentiometer ASZ7.5 [6] 0...1000 Ω ± 5 %	Voltage	DC 10 V
	Current rating	<4 mA
Auxiliary switch ASC10.51 [6]	Switching capacity	AC 24…230 V, 6 (2) A, potential free
External fusing of supply line		• Non-renewable fuse 6...10 A slow • Circuit break max. 13 A, tripping characteristic B, C, D to EN 60898 • Power source with current limitation of max. 10 A
US installation, UL & cUL		AC 24 V class 2, 5 A general purpose
Stem heating element ASZ6.6	Operating voltage	AC / DC 24 V ± 20 %
	Power draw	50 VA, 30 W
	Switch-on current (cold)	Max. 8.5 A (max. temperature 85 °C/185 F)

[1] Switching time for RMS value of the sine wave at nominal voltage

[2] Observe acting direction of DIL switches

[3] AWG = American wire gauge

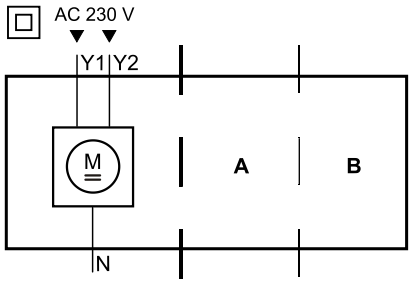
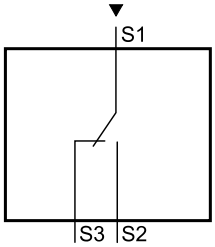
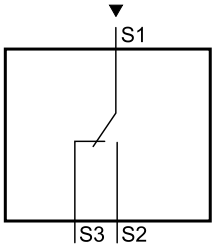
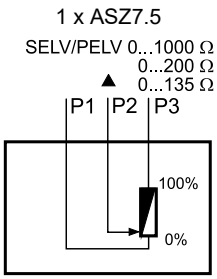
[4] For outdoor operation, always use weather shield ASK39.1, housing protection class IP 54 remains as is. SAV61../MO is not intended for outdoor use.

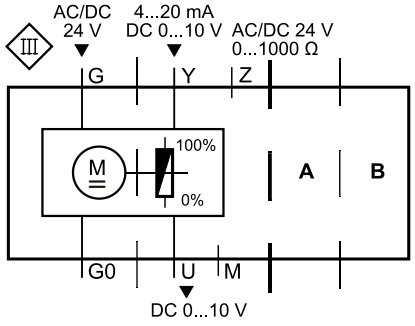
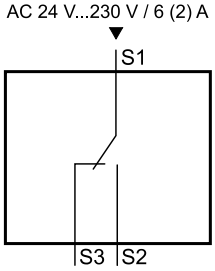
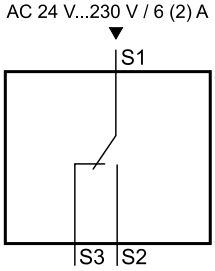
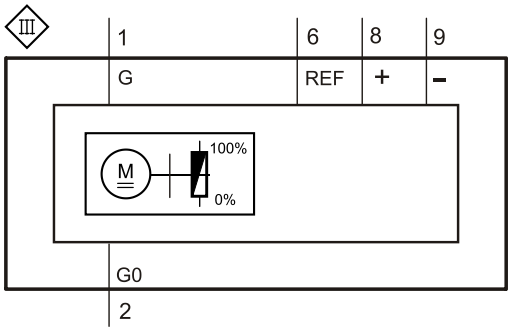
[5] Documents can be downloaded at http://www.siemens.com/bt/download

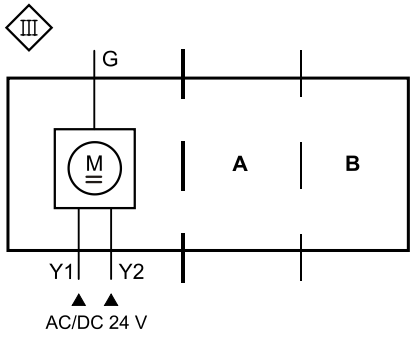
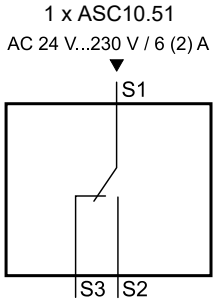
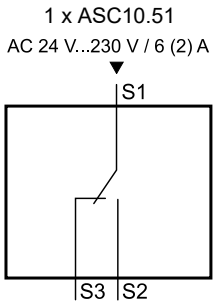
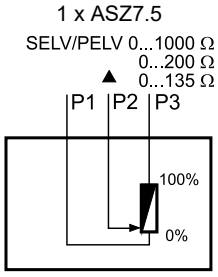
[6] UL-approved components

Connection diagrams

Internal diagrams

SAV31..	Accessories		
	B	and/or	A
			 or 

SAV61..	Accessories		
	B	and/or	A
			
SAV61../MO 			

SAV81..	Accessories		
	B	and/or	A
			 or 

Connection terminals

SAV31..

SAV31..	AC 230 V	3-position
N	System neutral (SN)	
Y1	Positioning signal (actuator stem extends)	
Y2	Positioning signal (actuator stem retracts)	

SAV61..

SAV61..	AC / DC 24 V	DC 0...10 V / 4...20 mA / 0...1000 Ω
G0	System neutral (SN)	
G	System potential (SP)	
Y	Positioning signal for DC 0...10 V / 4...20 mA	
M	Measuring neutral	
U	Position feedback DC 0...10 V - (reference potential is measuring neutral M)	
Z	Control signal override control	

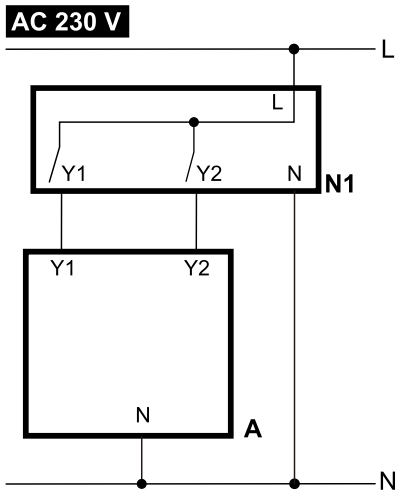
SAV61../MO

	AC / DC 24 V	Modbus RTU connection cable
G0	System neutral (SN)	black
G	System potential (SP) AC 24 V / DC 24 V	red
REF	Reference line (Modbus RTU)	purple
+	Bus + (Modbus RTU)	gray
-	Bus - (Modbus RTU)	pink

SAV81..

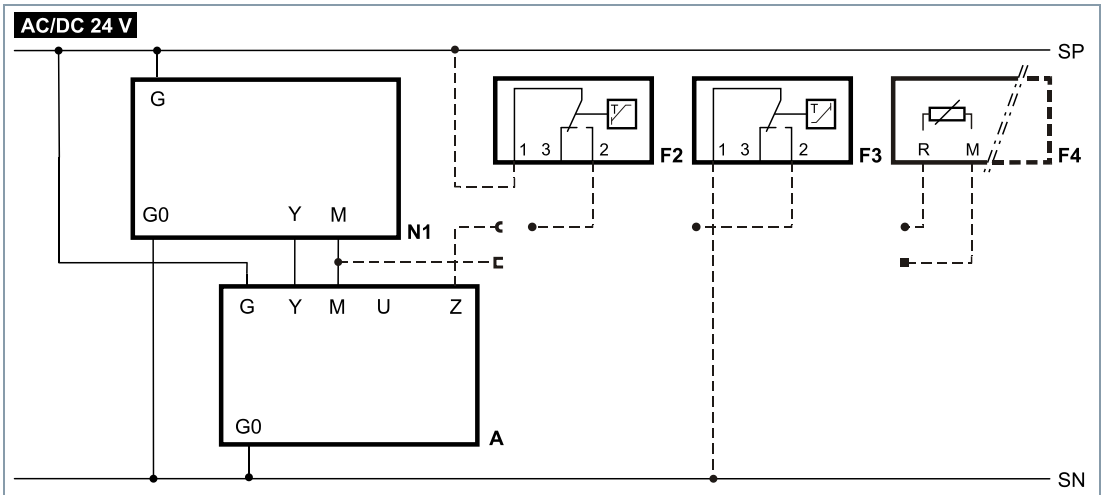
SAV81..	AC / DC 24 V	3-position
G	System potential (SP)	
Y1	Positioning signal (actuator stem extends)	
Y2	Positioning signal (actuator stem retracts)	

SAV31..



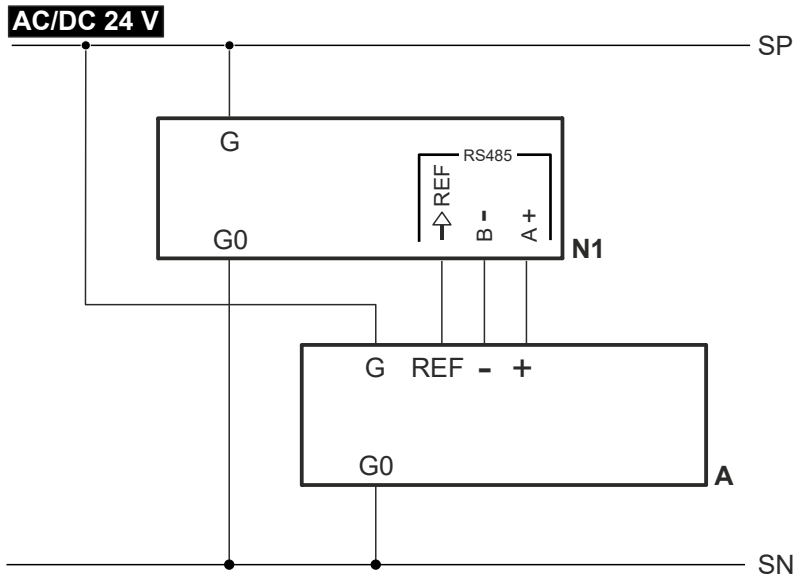
A	Actuator
L	Phase
N	Neutral
N1	Controller
Y1, Y2	Positioning signals

SAV61..



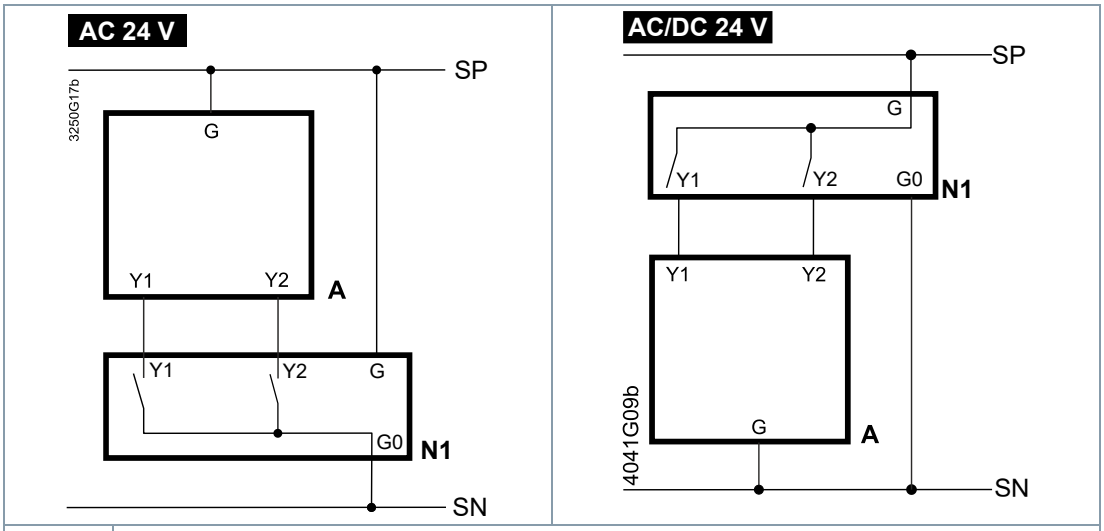
A	Actuator
F2	Frost protection thermostat: terminals: 1 – 2 frost hazard / sensor is interrupted (thermostat closes with frost) 1 – 3 normal operation
F3	Thermal reset limit thermostat
F4	Frost protection monitor with 0…1000 Ω signal output, does **NOT** support QAF21.. or QAQ61..
M	Measuring neutral
N1	Controller
SN	System zero
SP	System potential AC/DC 24 V
U	Position feedback - (System neutral is measuring ground M)
Y	Positioning signal
Z	Control signal forced control

SAV61../MO



A	Actuator
N1	Controller
SP / G	System potential AC/DC 24 V
SN / G0	System neutral
REF	Reference line (Modbus RTU)
+	Bus + (Modbus RTU)
-	Bus - (Modbus RTU)

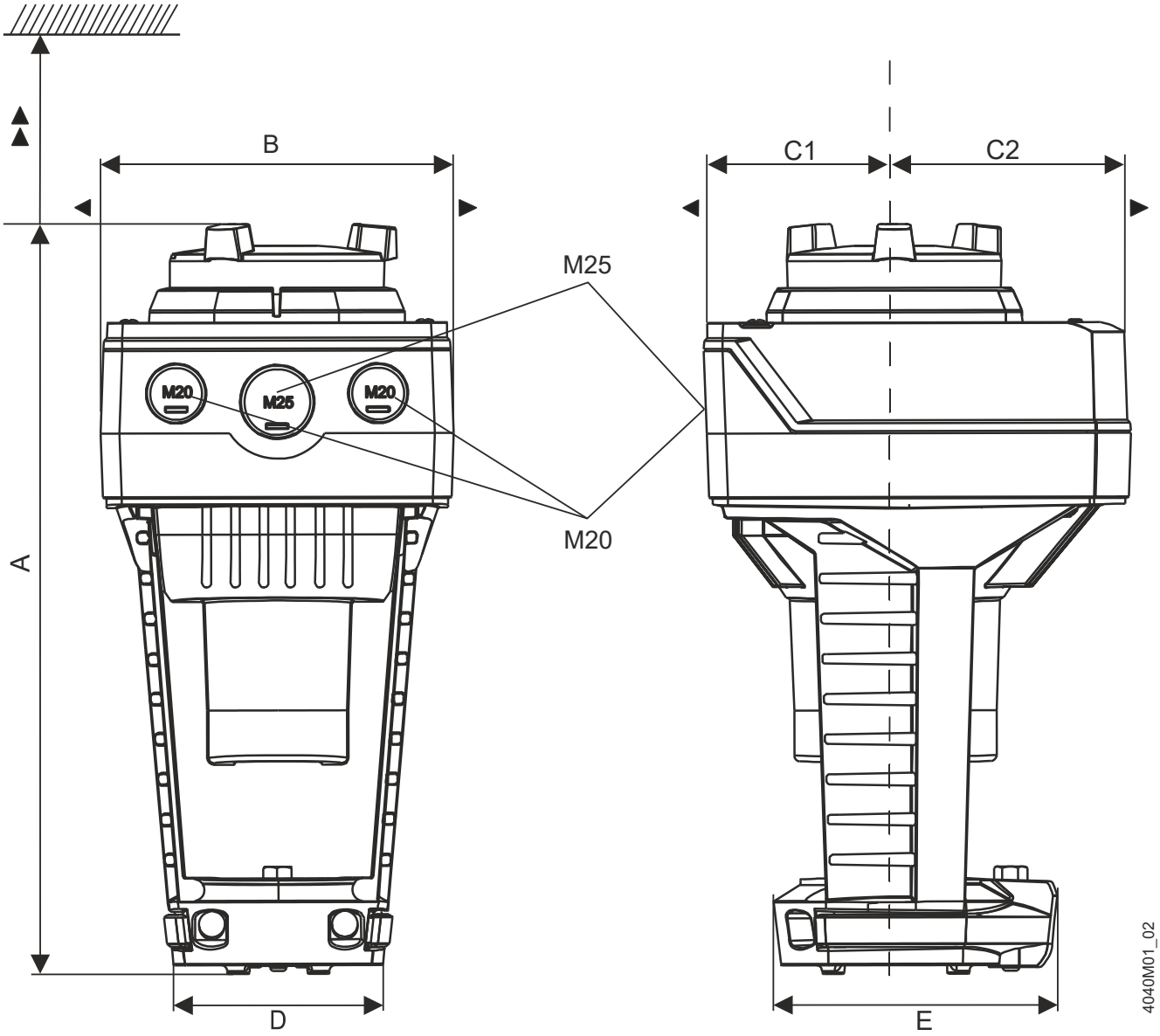
SAV81..



A	Actuator
N1	Controller
SN	System neutral
SP	System potential
Y1, Y2	Positioning signals

Dimensions

Actuator

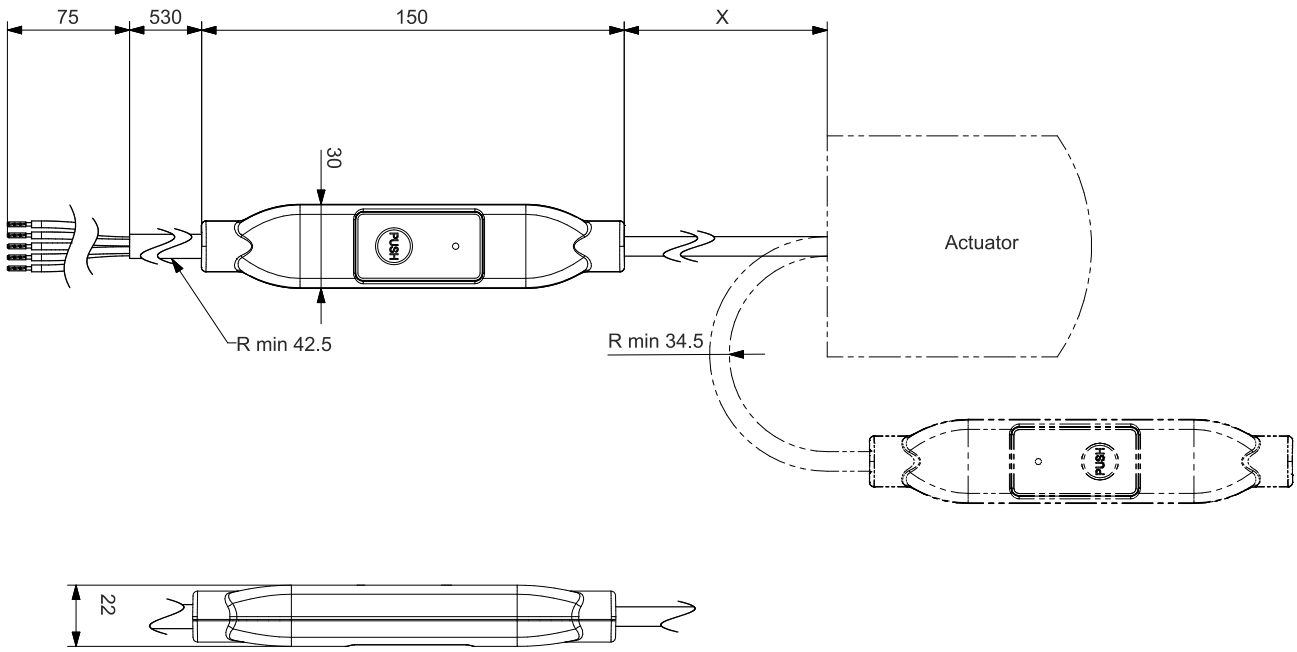


Type	A	B	C	C1	C2	D	E	►	►►	kg
	[mm]									[kg]
SAV..(U [1])	265	124	150	68	82	80	100	100	200	1.920
SAV../MO [2]										2.070
With ASK39.1	290	154	300	200	100	-				2.150

[1] SAV..U: For ½" tube connections (Ø 21.5 mm)

[2] Device has fixed connection cable – left cable entry occupied

External Modbus converter



Dimensions in mm

Type	X	kg
	[mm]	[kg]
SAV61../MO	250	0.15 [1]

[1] Included in total weight.

Revision numbers

Type	Valid from rev. no.
SAV31.00	..C
SAV61.00	..B
SAV61.00U	..B
SAV61.00/MO	..A
SAV81.00	..D
SAV81.00U	..B

Issued by
Siemens Switzerland Ltd
Smart Infrastructure
Global Headquarters
Theilerstrasse 1a
CH-6300 Zug
+41 58 724 2424
www.siemens.com/buildingtechnologies

© Siemens 2011-2025
Technical specifications and availability subject to change without notice.

Document ID CE1N4503en
Edition 2025-10-03

8.15

A6V12681520

The following 20 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`A6V12681520.pdf`
Pages	20

SIEMENS

Electromotoric actuator

SSD131.09U, SSD131.29U, SSD161S.05DU, SSD161S.25DU



- SSD161S.05DU (fail-in-place), and SSD161S.25DU (fail-safe): Operating voltage AC/DC 24 V, modulating control signal DC 0...10 V
- SSD131.09U (fail-in-place), and SSD131.29U (fail-safe): Operating voltage AC 24 V, 3-position (floating) control signal
- All actuators are self-calibrating to the valve stroke
- Modulating variants have position feedback signal
- Modulating variants are DIP switch configurable for equal percentage/linear flow characteristic, direct/reverse acting, and the fail-safe variant for fail up/fail down
- 3-position (floating) fail-safe variant is DIP switch configurable for fail up/fail down
- Direct mounting with coupling nut, no tools required
- Manual override
- Position and actuator motion indication (LED)
- Positioning force 67 lbf (300 N)
- Parallel operation of multiple actuators possible

Use

- For Normally Open and Normally Closed applications using Normally Open PICV Series
  - 0.5 inch, 599-04320-XX and 599-04321-XX
  - 0.75 inch, 599-04322-XX
  - 1 inch, 599-04323-XX
  - 1.25 inch, 599-04314-XX
- Replacement only for SSD61.U or SSD81.5U actuators on Normally Closed PICV Series
  - 0.5 inch, 599-04300-XX and 599-04301-XX
  - 0.75 inch, 599-04302-XX and 599-04303-XX
  - 1 inch, 599-04304-XX
  - 1.25 inch, 599-04305-XX
- Typical application in chilled ceiling, VAV, unit ventilators, fan coil unit and other terminal unit applications
- Max.10 units of SSD161S.05DU, SSD161S.25DU can operate in parallel, provided the controller output suffices.
- Max.10 units of SSD131.09U can operate in parallel, provided the controller output suffices.
- For 3-position actuator, SSD131.29U, 24 actuators can run in parallel.

NOTICE	
!	• SSD131.29U floating fail-safe actuators cannot be run in parallel with legacy SSD81.5U actuators. • For parallel operation of floating fail-safe SSD actuators all actuators in parallel must be the same part number.

Technical design

When the actuator is driven by DC 0…10 V positioning signal, it produces a stroke, which is transmitted to the valve stem.

3-position control signal (SSD131.09U)

Voltage at Y1:	Stem extends	Normally open valve closes, normally closed valve opens
Voltage at Y2:	Stem retracts	Normally open valve opens, normally closed valve closes
No voltage at Y1 or Y2:	Actuator maintains its current position	

Note: For normally closed applications of SSD131..U actuators the Y1 and Y2 control signal connections must be switched.

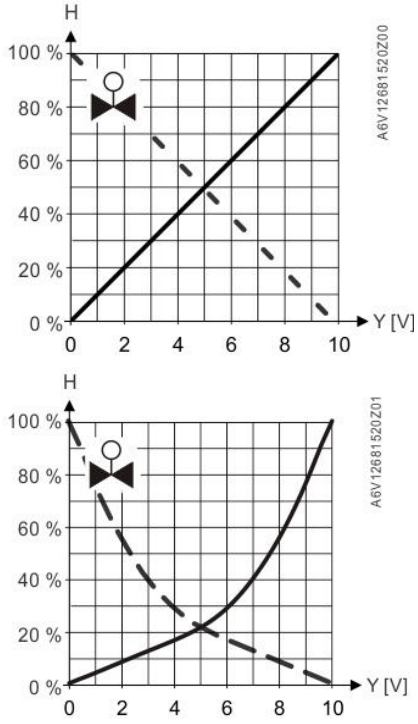
3-position control signal (SSD131.29U)

● Voltage at Y1:	Stem extends	Normally open valve closes, normally closed valve opens
● Voltage at Y2:	Stem retracts	Normally open valve opens, normally closed valve closes
● No voltage at Y1 or Y2:	Actuator maintains its current position	
● Voltage applied to both Y1 and Y2 (not recommended): When no power is supplied, the SSD131.29U actuator fails with either the stem fully retracted or fully extended, depending on the position of the associated fail up/fail down DIP switch.	Stem moves to Y2	

Note: For normally closed applications of SSD131..U actuators the Y1 and Y2 control signal connections must be switched.

DC 0...10 V control signal (SSD161S.25DU, SSD161S.05DU)

- At DC 0 V, actuator stem will be either extended or retracted, resulting in the valve being either fully closed or open, depending on the position of the associated direct/reverse acting DIP switch and whether the valve is a normally open or normally closed valve.
- The valve opens / closes in proportion to the control signal at Y. The SSD161.. actuators can be set to either a linear or equal percentage control signal response, depending on the position of the associated flow characteristic DIP switch.
- When no power is supplied, the SSD161S.05DU actuator maintains its current position and the SSD161S.25DU fails with either the stem fully retracted or fully extended, depending on the position of the associated fail up/fail down DIP switch.
- This actuator provides a DC 0…10 V position feedback signal proportional to the stroke of the actuator stem.



Y = Control signal Y [V]

H = Percentage of calibrated valve stroke

——— = Acting direction: Direct

— — — = Acting direction: Reverse

LED indication

Status	LED indication patterns
Variants	SSD161S.05DU, SSD161S.25DU, SSD131.29U 
Modulation: Stem retracting	Flashing green in sequence: LED1-->LED2-->LED3 (500 ms each)
Modulation: Stem extending	Flashing green in sequence: LED3-->LED2-->LED1 (500 ms each)
Stem position	At H0 - H40: Constant green (LED3) At H40 - H60: Constant green (LED2) At H60 - H100: Constant green (LED1)
Fail-safe*	Flashing red (LED2): 500 ms on, 500 ms off
Calibration	Flashing green (LED2): 100 ms on, 100 ms off
Error	Constant red (LED2)
Manual operation	Flashing green/red alternatively (LED2): Green 500 ms, red 500 ms
Ultra-cap initial charging*	Constant green & red simultaneously (LED2): Constant orange

* Only available for SSD131.29U, SSD161S.25DU.

Variants	LED	Color	Pattern	Description
SSD131.09U 	LED 1	Green	Constant	Actuator stem is fully extended.
	LED 2	Green	Constant	Actuator stem is moving in-between.
	LED 3	Green	Constant	Actuator stem is fully retracted.

Type summary

Type	Stock number	Operating voltage	Running speed	Running time 5.5 mm	Control signal	Actuator characteristic
SSD131.09U	S55180-A152	AC 24 V	16 s/mm	88 s ± 25 %	AC 24 V	-
SSD131.29U	S55180-A153	AC 24 V	16 s/mm	88 s ± 25 %	AC 24 V	-
SSD161S.05DU	S55180-A154	AC/DC 24 V	5 s/mm	27.5 s ± 25 %	DC 0...10 V	Linear
SSD161S.25DU	S55180-A155	AC/DC 24 V	5 s/mm	27.5 s ± 25 %	DC 0...10 V	Linear

Ordering

When ordering, specify both stock number and quantity.

Example:

Type	Stock number	Designation	Quantity
SSD161S.05DU	S55180-A154	Electromotoric actuator	60

Delivery

Valves and actuators can be ordered assembled in the factory or ordered separately. For easier valve assembly, actuators ordered separately have the actuator stem fully retracted.

Valves

Combinable valves for SSD131.09U, SSD131.29U, SSD161S.05DU, SSD161S.25DU - 2-way PICV Series – 0.5 inch

Nominal Line Size		Normally Closed (for replacement only of SSD61_U actuators)	For Normally Open or Normally Closed applications
Inch	mm		
0.5	15	599-04300-XX	599-04320-XX
0.5	15	599-04301-XX	599-04321-XX

Combinable valves for SSD131.09U, SSD131.29U, SSD161S.05DU, SSD161S.25DU - 2-way PICV Series – 0.75 inch

Nominal Line Size		Normally Closed (for replacement only of SSD61_U actuators)	For Normally Open or Normally Closed applications
Inch	mm		
0.75	20	599-04302-XX	599-04322-XX
0.75	20	599-04303-XX	

Combinable valves for SSD131.09U, SSD131.29U, SSD161S.05DU, SSD161S.25DU - 2-way PICV Series – 1 inch

Nominal Line Size		Normally Closed (for replacement only of SSD61_U actuators)	For Normally Open or Normally Closed applications
Inch	mm		
1	25	599-04304-XX	599-04323-XX

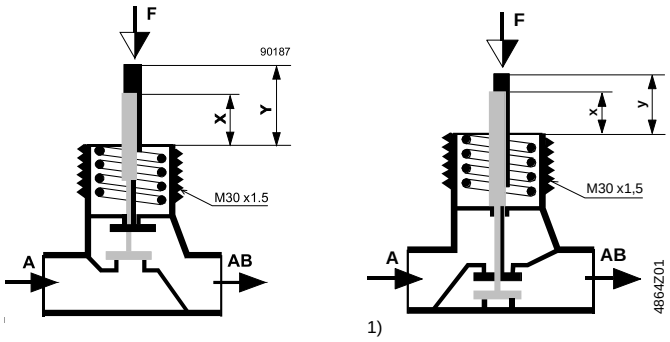
Combinable valves for SSD131.09U, SSD131.29U, SSD161S.05DU, SSD161S.25DU - 2-way PICV Series – 1.25 inch

Nominal Line Size		Normally Closed (for replacement only of SSD61_U actuators)	For Normally Open or Normally Closed applications
Inch	mm		
1.25	32	599-04305-XX	599-04314-XX

Note: To ensure trouble-free operation of third-party valves with the SSD.. actuators, the valves must satisfy the following requirements:

- Threaded connections with coupling nut M30 × 1.5.
- Nominal force F > 67 lbf (300 N)
- Dimension X ≥ 0.35 in (8.8 mm)
- Dimension Y ≤ 0.56 in (14.3 mm)

[1] This only applies for old valves (for replacement only).



Product documentation

Topic	Title	Document ID
Installation	Mounting instruction	A6V13122038
Standards and directives	CE declarations	A5W00254962A
	RCM conformity	A5W00254983A
Environmental compatibility	Environmental declarations for SSD161S.05DU	A5W00242127A
	Environmental declarations for SSD131.29U, SSD161S.25DU	A5W00244689A

Related documents such as the environmental declarations, declarations of conformity, etc., can be downloaded from the following Internet address:

www.siemens.com/bt/download

Notes

Engineering

The actuators must be electrically connected in accordance with local regulations (see "Connection diagrams").

⚠ CAUTION	
⚠	**National safety regulations** Failure to comply with national safety regulations may result in personal injury and property damage. ● Observe national provisions and comply with the appropriate safety regulations.

Observe permissible temperatures (see "Technical data [▶ 12]").

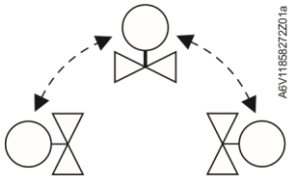
Mounting

⚠ WARNING	
	● Do not use pipe wrenches, pliers or similar tools. ● Avoid lateral pressure or (cable) tension on the mounted actuator!

Valve and actuator are easy to assemble on site before commissioning:

- Remove protective cover from the valve body.
- Position the actuator and tighten the connection nut manually.
- See "Mounting instruction" for graphical instructions.

Orientation



Commissioning

When commissioning, check both wiring and functioning of the actuator.

- Actuator stem extends Normally open valve closes, normally closed valve opens
- Actuator stem retracts Normally open valve opens, normally closed valve closes

NOTICE	
!	The actuator must be commissioned only with a correctly mounted valve in place!

Self-calibration (SSD131.29U, SSD161S.05DU, SSD161S.25DU)

When operating voltage is applied, the actuator self-calibrates (fully retracted → fully extended → setpoint).

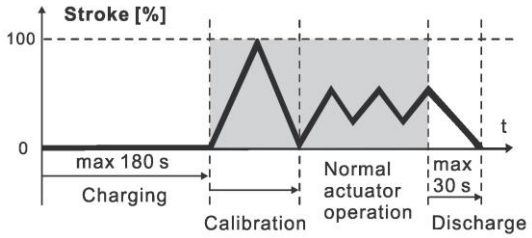
⚠ CAUTION	
	Never intervene manually during self-calibration.

NOTICE	
!	● Correct calibration is only possible with valve stroke > 0.05 inch (1.2 mm). Valve stroke < 0.05 inch (1.2 mm) results in calibration failure. ● If calibration fails, the actuator performs another calibration automatically after 10 seconds. ● After three failed calibration attempts, the actuator stem remains in the extended position and the valves are open.

Electrical fail-safe function (SSD161S.25U, SSD131.29U)

When first connected to power, or after a power failure, the capacitor which stores energy for the fail-safe function will be charged. This process takes up to 180 seconds. While the capacitor is being charged, the actuator cannot respond to any control signals.

In the event of a power failure of more than 5 seconds, the actuator will return to its fail-safe position within 30 seconds.

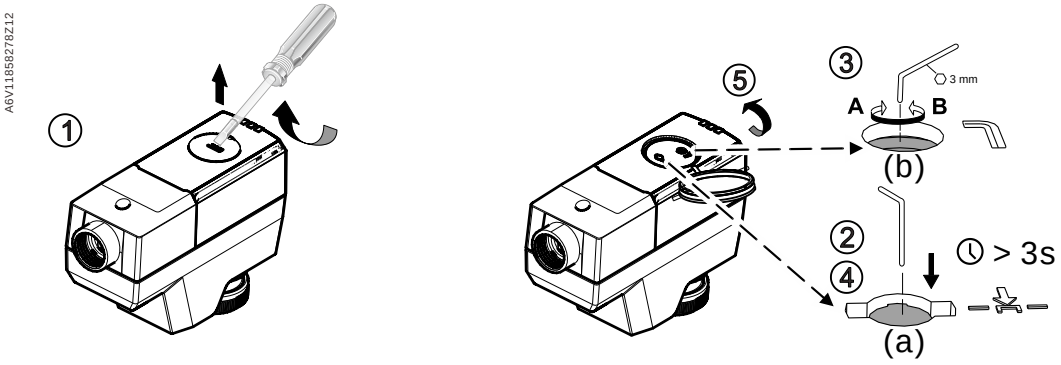


Manual operation

A 3-mm Allen wrench can be used to move the actuator to any position.

To move the actuator stem manually (SSD131.29U, SSD161S.05DU, SSD161S.25DU)

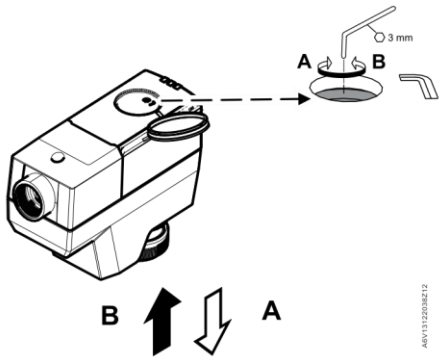
1. Open the cover using a proper screwdriver.
2. Press and hold down button (a) illustrated below for at least three seconds.
   – The actuator ignores any control signal from the controller.
3. Adjust the position of the actuator stem by rotating Allen wrench (b) illustrated below clockwise or counter-clockwise.
   – The actuator stem moves down if you rotate clockwise; it moves up if you rotate counter-clockwise. The manually set position is retained.
4. To release the actuator from manual operation mode, press and hold down button (a) illustrated below again for at least three seconds.
   – The actuator runs a self-calibration automatically. Control signal sent from the controller takes effect.
5. Close the cover.



NOTICE	
!	**If operating voltage is applied to actuator, press button (a) before and after manually adjusting the position of the actuator stem.** If no operating voltage and control signal are applied, manual operation can be done without pressing button (a).

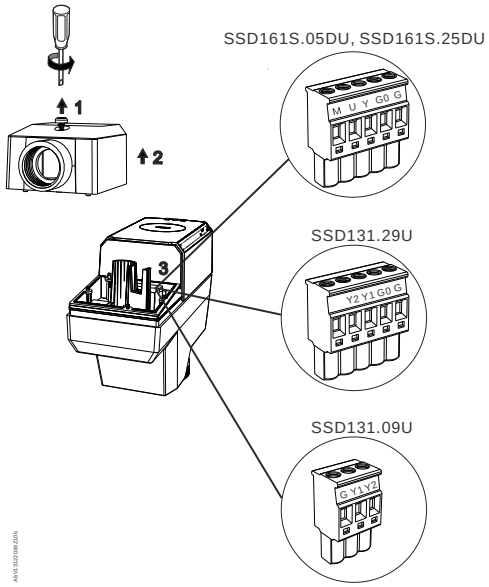
To move the actuator stem manually (SSD131.09U)

1. Open the cover using a proper screwdriver.
2. Adjust the position of the actuator stem by rotating Allen wrench (b) illustrated below clockwise or counter-clockwise.
   – The actuator stem moves down if you rotate clockwise; it moves up if you rotate counter-clockwise. The manually set position is retained.
3. Close the cover.

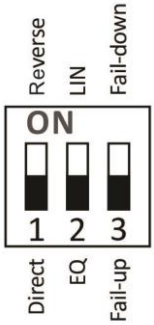


Cabling operation

1. Unscrew cover screw
2. Remove cover
3. Remove terminal block and connect or disconnect wire terminals
4. Re-install the terminal block
5. Install the cover
6. Screw in the cover screw



DIP switch configurations (SSD131.29U, SSD161S.05DU, SSD161S.25DU)

DIP Switches	Product types
	SSD161S.05DU
	SSD161S.25DU
	SSD131.29U

Running direction	Direct	Stem extends as voltage increases
	Reverse	Stem retracts as voltage increases
Stroke characteristic	EQ	Stroke control provides equal percentage flow characteristic
	LIN	Stroke control provides linear flow characteristic
Fail direction	Fail-up	Stem retracts to end position
	Fail-down	Stem extends to end position

Note: The factory settings of all switches are off by default.

Maintenance

The actuators require no maintenance.

⚠ WARNING	
	**Operating voltage must be switched off during any maintenance!**

NOTICE	
!	When carrying out service work on the plant, note the following: • Switch off operating voltage. • If necessary, disconnect electrical connections from the terminals. • The actuator must be commissioned only with a correctly mounted valve in place!

Repair

The actuators cannot be repaired; the complete unit must be replaced.

Disposal

	This symbol or any other national label indicate that the product, its packaging, and, where applicable, any batteries may not be disposed of as domestic waste. Delete all personal data and dispose of the item(s) at separate collection and recycling facilities in accordance with local and national legislation. For additional details, refer to Siemens information on disposal.

Warranty

Technical data on specific applications are valid only together with Siemens products listed under "Equipment combinations". Siemens rejects any and all warranties in the event that third-party products are used.

Open Source Software (OSS) (SSD131.29U, SSD161S.05DU, SSD161S.25DU)

Software license overview

These devices use Open Source Software (OSS). All Open Source Software components used in the product (to include copyrights and licensing agreement) are available at http://siemens.com/bt/download.

Firmware version	OSS document		Device
	Document ID	Title	
2.10.0 or above	A6V13503690	Readme OSS for Modulating Room Actuator 200 N, 300 N	All

Technical data

Power supply		
Operating voltage	SSD131.09U, SSD131.29U	AC 24 V (± 20 %)
	SSD161S.05DU, SSD161S.25DU	AC 24 V (± 15 %) or DC 24 V (± 20 %)
Frequency	50/60 Hz	
Power consumption	SSD131.09U	Normal Operation: 1 VA (AC)
	SSD161S.05DU	Normal Operation: 3.5 VA (AC); 1.5 W (DC) Peak (Ultra cap recharge): N/A
	SSD161S.25DU	Normal Operation: 3.5 VA (AC); 1.5 W (DC) Peak (Ultra cap recharge): 8 VA (AC); 4 W (DC)
	SSD131.29U	Normal Operation: 3 VA (AC); 1.5 W (DC) Peak (Ultra cap recharge): 6 VA (AC); 4 W (DC)
Primary fuse or breaker rating	External, 2 A quick blow	

Signal input	SSD131.29U, SSD161S.05DU, SSD161S.25DU	SSD131.09U
Control signal	Modulating: DC 0...10 V to Y Floating: AC 24 V to Y1 or Y2	Floating: AC 24 V to Y1 or Y2
Input impedance	100 kOhm	-
Parallel operation (number of actuators)	Max. 10 modulating or 24 floating actuators[1)]	Max. 10 modulating actuators[1)]

[1)] Provided that the controller output is sufficient.

Signal output (SSD131.29U, SSD161S.05DU, SSD161S.25DU)	
Feedback signal (modulating actuators only)	DC 0...10 V
Max. output current	1 mA
Max. output voltage	-
Resolution	1:100

Operating data	
Position with de-energized contact Y	See "Technical design"
Running speed (time for 5.5 mm)	SSD161S.05DU, SSD161S.25DU: 5 s/mm ± 25 % (27.5 s ± 25 %)
	SSD131.09U, SSD131.29U: 16 s/mm ± 25 % (88 s ± 25 %)
Positioning force	67 lbf (300 N)
Stroke	0.05 to 0.25 inch (1.2…6.5 mm)
Permissible temperature of medium in the connected valve	34 to 248 °F (1…120 °C)

Electrical connection	
Permissible length for signal lines	65 ft (20 m)
Wire cross section	18...20 AWG (0.5...0.75 mm²)
Cable diameter	<0.22 inch (5.5 mm)

Mounting	
Connection to valve	Brass coupling nut M30 × 1.5
Orientation	Above horizontal

Standards	
EU conformity declaration (CE)	A5W00254962A
RCM conformity declaration	A5W00254983A
UK conformity declaration (UKCA)	A5W00257055A
Housing protection degree	NEMA 2 / IP20 (EN 60529)
Protection class according to EN 60730	III
Pollution degree	2
Overvoltage category	I
Environmental compatibility	The product environmental declaration (SSD161S.05DU: A5W00242127A; SSD161S.25DU, SSD131.29U: A5W00244689A)) contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).
UL Approval Federal Communications Commission	UL as per UL60730-1, UL60730-2-14 http://ul.com/database cUL as per CSA – CAN E60730-1, E730-2-14 FCC CFR 47 Part 15 Class B
ICES003	CAN ICES-3 (B)/NMB-3(B)

FCC regulations

Modification of this device to receive cellular radio telephone service signals is prohibited under FCC rules and federal law.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Housing color	
Cover/base	2003, Ti-Gray

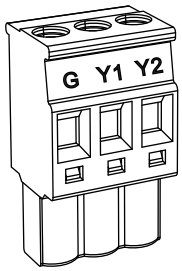
General ambient conditions			
	Operation	**Transport**	**Storage**
Temperature	34 to 122°F (1…50 ℃)	-13 to 158°F (-25…70 ℃)	-13 to 158°F (-25…70 ℃)
Humidity	5…95 % r.h. non condensing	<95 % r.h. non condensing	5…95 % r.h. non condensing
Atmospheric pressure	Min. 700 hPa, corresponding to max. 3,000 m above sea level	-	-

Material	
Cover/base	PC + ABS
Connecting nut	Brass

Weight	
SSD131.09U	9.8 ounces (278 g)
SSD131.29U	10.3 ounces (293 g)
SSD161S.05DU	9.6 ounces (271 g)
SSD161S.25DU	10.4 ounces (294 g)

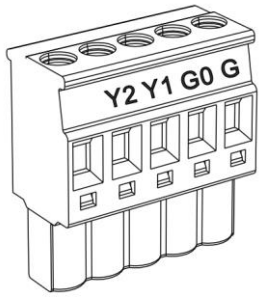
Connection terminals

Connection terminals for SSD131.09U



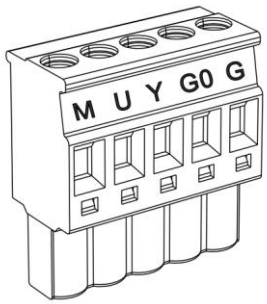
G	System potential (AC 24 V)
Y1	3-position
Y2	3-position

Connection terminals for SSD131.29U



G	System potential (AC 24 V)
G0	System neutral
Y1	Stem extends
Y2	Stem retracts

Connection terminals for SSD161S.05DU, SSD161S.25DU

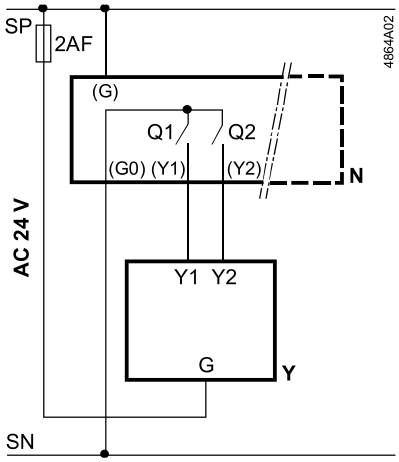


G	System potential (AC/DC 24 V)
G0	System neutral
Y	Control signal DC 0...10 V
U	Feedback signal
M	Measurement reference

Note: For normally closed applications of SSD131..U actuators the Y1 and Y2 control signal connections must be switched.

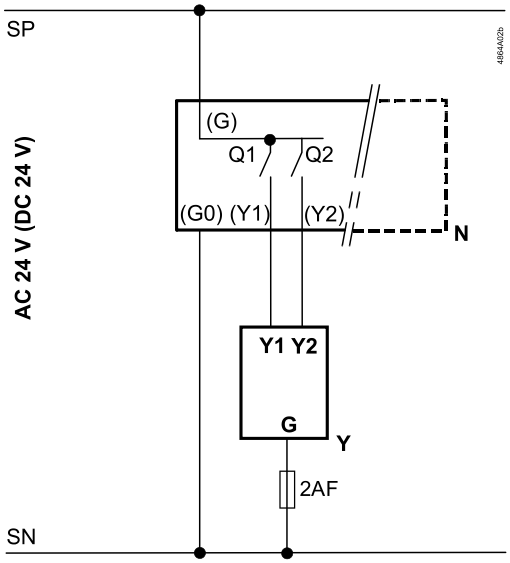
Connection diagrams for SSD131.09U

Neutral switch



N = Controller
Y = Actuator
SP, G = System potential AC 24 V
SN, G0 = System neutral
Y1, Y2 = Control signal OPEN, CLOSE
Q1, Q2 = Controller contacts
2AF = Fuse rated current is 2A

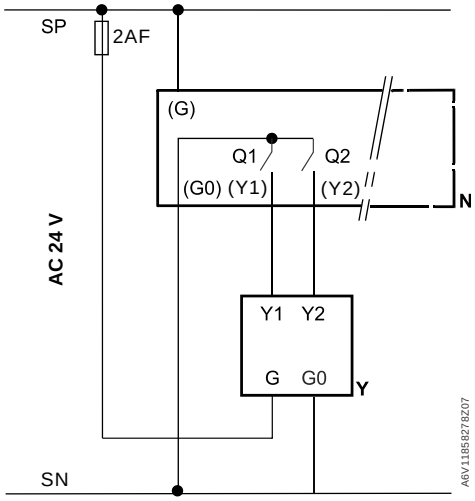
Hot switch



Note: For normally closed applications of SSD131..U actuators the Y1 and Y2 control signal connections must be switched.

Connection diagrams for SSD131.29U

Neutral switch



N = Controller

Y = Actuator

SP, G = System potential AC 24 V

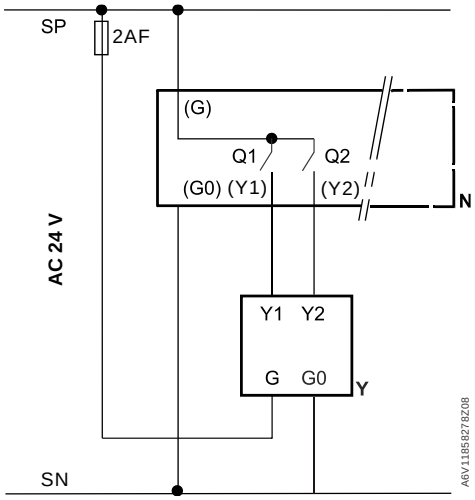
SN, G0 = System neutral

Y1, Y2 = Control signal OPEN, CLOSE

Q1, Q2 = Controller contacts

2AF = Fuse rated current is 2A

Hot switch



N = Controller

Y = Actuator

SP, G = System potential AC 24 V

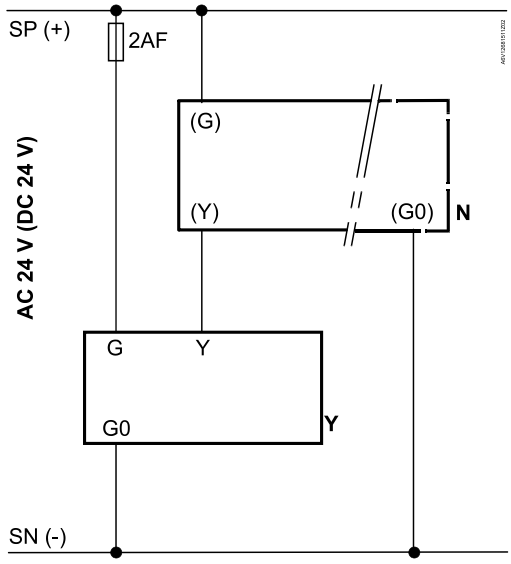
SN, G0 = System neutral

Y1, Y2 = Control signal OPEN, CLOSE

Q1, Q2 = Controller contacts

2AF = Fuse rated current is 2A

Connection diagrams for SSD161S.05DU, SSD161S.25DU



N = Controller

Y = Actuator

SP, G = System potential AC/DC 24 V

SN, G0 = System neutral

Y = Control signal

U = Feedback signal

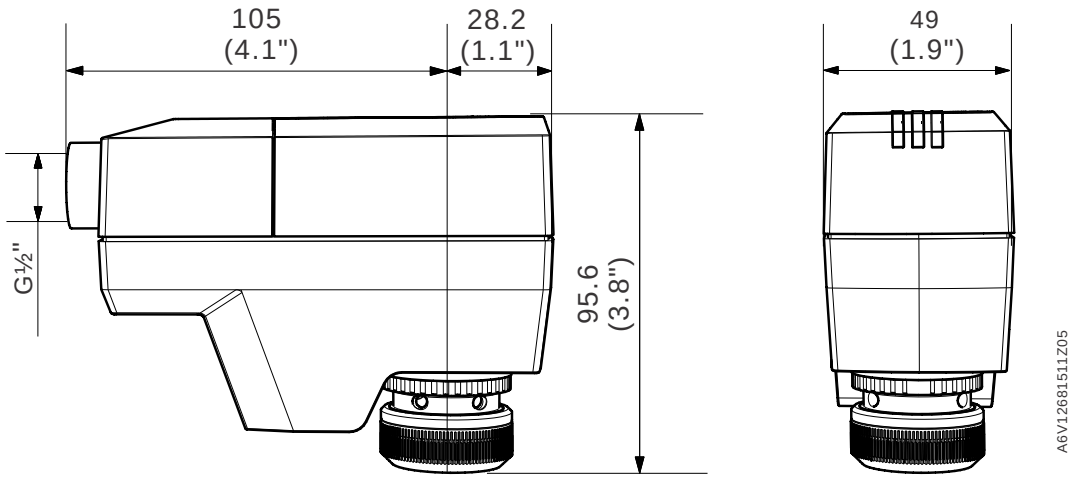
M = Measurement reference

2AF = Fuse rated current is 2A

NOTICE	
!	• SSD131.29U floating fail-safe actuators cannot be run in parallel with legacy actuators. • For parallel operation of floating fail-safe SSD actuators all actuators in parallel must be the same part number.

Dimensions

mm (inch)



Revision numbers

Type	Valid from rev. no.
SSD131.09U	..A
SSD131.29U	..A
SSD161S.05DU	..A
SSD161S.25DU	..A

Issued by
Siemens Switzerland Ltd
Smart Infrastructure
Global Headquarters
Theilerstrasse 1a
CH-6300 Zug
+41 58 724 2424
www.siemens.com/buildingtechnologies

© Siemens 2023
Technical specifications and availability subject to change without notice.

Document ID A6V12681520_enUS_c
Edition 10/22/2024

8.16

A700000008276030

The following 4 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`A700000008276030.pdf`
Pages	4

PRODUCT-DETAILS

OT200E04P

OT200E04P SWITCH-DISCONNECTOR



General Information

Extended Product Type	OT200E04P
Product ID	1SCA022713R4930
EAN	6417019228747
Catalog Description	OT200E04P SWITCH-DISCONNECTOR
Long Description	4-pole, front operated, base mounted switch-diconnector with black IP65 handle and shaft, terminal bolt kit included

Ordering

Minimum Order Quantity	1 piece
Customs Tariff Number	85365080
Country of Origin	Finland (FI)

Popular Downloads

Data Sheet, Technical Information	1SCC301020C0201
Instructions and Manuals	1SCC301031M0220
Mechanical Drawings	1SCC301392F0001 1SCC301201F0001 OT200-250E04.igs

Dimensions

Product Net Width	180.5 mm
Product Net Height	150 mm
Product Net Depth / Length	82.5 mm
Product Net Weight	1.8 kg

Technical

Rated Operational Current AC-21A (I_e)	(380 ... 415 V) 200 A (500 V) 200 A (690 V) 200 A (1000 V) 200 A
Rated Operational Current AC-22A (I_e)	(380 ... 415 V) 200 A (500 V) 200 A (690 V) 200 A
Rated Operational Current AC-23A (I_e)	(380 ... 415 V) 200 A (500 V) 200 A (690 V) 200 A
Rated Operational Power AC-23A (P_e)	(220 ... 240 V) 60 kW (400 ... 415 V) 110 kW (500 V) 132 kW (690 V) 200 kW
Conventional Free-air Thermal Current (I_{th})	q = 40 °C 200 A
Conventional Thermal Current (I_{the})	Fully Enclosed 200 A
Rated Impulse Withstand Voltage (U_{imp})	12 kV
Rated Insulation Voltage (U_i)	acc. to IEC/EN 60664-1 1000 V
Rated Operational Voltage	Main Circuit 1000 V
Rated Short-Circuit Making Capacity (I_{cm})	(690 V) 30 kA
Rated Short-time Withstand Current (I_{cw})	for 1 s 8 kA
Power Loss	at Rated Operating Conditions per Pole 4.0 W
Pollution Degree	3
Handle Color	Black
Handle Type	Handle and shaft included
Fourth Pole Position	Right Side
Fourth Pole Type	Switched - Simultaneous Function
Switches Operating Mechanism	Mechanism at the End of the Switch 04 (Left Side)
Distance Between Phases	Standard
Position of Line Terminals	Top In - Bottom Out Bottom In - Top Out
Operating Mode	Front operated
Standards	IEC 60947-3
Special Functions	No
Mounting Type	Base mounting

Number of Poles	4
Degree of Protection	Front IP00
Terminal Type	Lug terminals
Terminal Width	20 mm
Tightening Torque	acc. IEC 60947-1 15…22 N·m
Mechanical Durability	20000
Lock Type	Yes

Environmental

RoHS Status	Following EU Directive 2011/65/EU
Environmental Information	1SCC301149D0202

Certificates and Declarations (Document Number)

BV Certificate	1SCC301103D0201
Declaration of Conformity - CE	1SCC301131D2705
DNV GL Certificate	1SCC301174D0204
Environmental Information	1SCC301149D0202
GL Certificate	1SCC301139D0201
Instructions and Manuals	1SCC301031M0220
LR Certificate	1SCC301144D0201
RoHS Information	1SCC301149D0203

Container Information

Package Level 1 Units	box 1 piece
Package Level 1 Width	170 mm 6.69 in
Package Level 1 Depth / Length	190 mm 7.48 in
Package Level 1 Height	145 mm 5.71 in
Package Level 1 Gross Weight	2.1 kg 0.93 lb
Package Level 1 EAN	6417019228747

Classifications

Object Classification Code	Q
ETIM 5	EC000216 - Switch disconnector
ETIM 6	EC000216 - Switch disconnector
ETIM 7	EC000216 - Switch disconnector
WEEE Category	5. Small Equipment (No External Dimension More Than 50 cm)
E-Number (Finland)	3661306
E-Number (Sweden)	3171157

Categories

Low Voltage Products and Systems → Switches → Switch Disconnectors



8.17

A700000008884225

The following 4 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`A700000008884225.pdf`
Pages	4

PRODUCT-DETAILS

OT25F4N2

OT25F4N2 SWITCH-DISCONNECTOR



General Information

Extended Product Type	OT25F4N2
Product ID	1SCA104886R1001
EAN	6417019390185
Catalog Description	OT25F4N2 SWITCH-DISCONNECTOR
Long Description	4-pole, front operated, base mounted, DIN-rail mountable switch-diconnector / non-fusible diconnect switch with protected clamp terminals, handle and shaft are not included

Ordering

Minimum Order Quantity	10 piece
Customs Tariff Number	85365080
Country of Origin	Finland (FI)

Popular Downloads

Data Sheet, Technical Information	1SCC301020C0201
Instructions and Manuals	1SCC301052M0006
Mechanical Drawings	1SCC301436F0001 1SCC301435F0001 OT16-40F4N2.igs

Dimensions

Product Net Width	48 mm
Product Net Height	48 mm
Product Net Depth / Length	56 mm
Product Net Weight	0.125 kg

Technical

Rated Operational Current AC-21A (I_e)	(380 ... 415 V) 25 A (500 V) 25 A (690 V) 25 A
Rated Operational Current AC-22A (I_e)	(380 ... 415 V) 25 A (500 V) 25 A (690 V) 25 A
Rated Operational Current AC-23A (I_e)	(380 ... 415 V) 20 A (500 V) 20 A (690 V) 11 A
Rated Operational Power AC-23A (P_e)	(220 ... 240 V) 4 kW (400 ... 415 V) 9 kW (500 V) 9 kW (690 V) 9 kW
Conventional Free-air Thermal Current (I_{th})	q = 40 °C 32 A
Conventional Thermal Current (I_{the})	Fully Enclosed 32 A
Rated Impulse Withstand Voltage (U_{imp})	8 kV
Rated Insulation Voltage (U_i)	acc. to IEC/EN 60664-1 750 V
Rated Operational Voltage	Main Circuit 750 V
Rated Short-Circuit Making Capacity (I_{cm})	(690 V) 0.71 kA
Rated Short-time Withstand Current Low Voltage (I_{cw})	for 1 s 0.5 kA
Power Loss	at Rated Operating Conditions per Pole 0.6 W
Pollution Degree	3
Handle Type	Knob Handle and shaft not included
Fourth Pole Position	Right Side
Fourth Pole Type	Switched - Simultaneous Function
	Mechanism on Top of the Switch
Distance Between Phases	Standard
Position of Line Terminals	Top In - Bottom Out Bottom In - Top Out
Operating Mode	Front operated
Standards	IEC 60947-3 / UL 508 / CSA C22.2 No. 14
Special Functions	No
Mounting Type	Base mounting
Number of Poles	4
Cable Cross-Section	Cu 0.75...10 mm²
Degree of Protection	Front IP20
Terminal Type	Screw Terminals
Tightening Torque	acc. IEC 60947-1 0.8 N·m
Mechanical Durability	20000
Lock Type	No

Technical UL/CSA

Maximum Operating Voltage UL/CSA	600 V
Horsepower Rating UL/CSA	(110 ... 120 V AC) Single Phase 1.5 Hp (240 V AC) Single Phase 3 Hp (440 ... 480 V AC) Single Phase 7.5 Hp (550 ... 600 V AC) Single Phase 10 Hp (220 ... 240 V AC) Three Phase 7,5 Hp (440 ... 480 V AC) Three Phase 15 Hp (550 ... 600 V AC) Three Phase 20 Hp
Ampere Rating UL/CSA	30 A
Tightening Torque UL/CSA	7 in·lb

Environmental

RoHS Status	Following EU Directive 2011/65/EU
Environmental Information	1SCC301183D0201

Certificates and Declarations (Document Number)

Declaration of Conformity - CE	1SCC301166D2703
Environmental Information	1SCC301183D0201
Instructions and Manuals	1SCC301052M0006
RoHS Information	1SCC301183D0202
UL Certificate	cULus certificate OT16-80

Container Information

Package Level 1 Units	box 1 piece
Package Level 1 Width	67 mm
Package Level 1 Depth / Length	79 mm
Package Level 1 Height	61 mm
Package Level 1 Gross Weight	0.14 kg
Package Level 1 EAN	6417019390185

Classifications

Object Classification Code	Q
ETIM 5	EC000216 - Switch disconnector
ETIM 6	EC000216 - Switch disconnector
ETIM 7	EC000216 - Switch disconnector
ETIM 8	EC000216 - Switch disconnector
UNSPSC	39122233
WEEE Category	5. Small Equipment (No External Dimension More Than 50 cm)
E-Number (Finland)	3601431
E-Number (Sweden)	3171067

Categories

Low Voltage Products and Systems → Switches → Switch Disconnectors



8.18

A700000009816153

The following 5 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`A700000009816153.pdf`
Pages	5

PRODUCT-DETAILS

OT63F4N2

OT63F4N2 SWITCH-DISCONNECTOR



General Information

Extended Product Type	OT63F4N2
Product ID	1SCA105365R1001
EAN	6417019393094
Catalog Description	OT63F4N2 SWITCH-DISCONNECTOR
Long Description	4-pole, front operated, base mounted, DIN-rail mountable switch-diconnector / non-fusible diconnect switch with protected clamp terminals, handle and shaft are not included

Circular Value

Conflict Minerals Reporting Template (CMRT)	9AKK108467A5658
Environmental Information	1SCC301263D0201
REACH Declaration	1SCC011021D0201
RoHS Information	1SCC011020D0201

Ordering

Minimum Order Quantity	10 piece
Customs Tariff Number	85365080

© 2023 ABB. All rights reserved.

Country of Origin	Finland (FI)

Popular Downloads

Data Sheet, Technical Information	1SCC301020C0201
Instructions and Manuals	1SCC301064M0212
Mechanical Drawings	1SCC301452F0001 1SCC301451F0001 OT63-80F4N2.igs

Dimensions

Product Net Width	70 mm
Product Net Height	91.5 mm
Product Net Depth / Length	72.5 mm
Product Net Weight	0.31 kg

Technical

Rated Operational Current AC-21A (I_e)	(380 ... 415 V) 63 A (500 V) 63 A (690 V) 63 A
Rated Operational Current AC-22A (I_e)	(380 ... 415 V) 63 A (500 V) 63 A (690 V) 63 A
Rated Operational Current AC-23A (I_e)	(380 ... 415 V) 63 A (500 V) 45 A (690 V) 20 A
Rated Operational Power AC-23A (P_e)	(220 ... 240 V) 11 kW (400 ... 415 V) 22 kW (500 V) 22 kW (690 V) 15 kW
Conventional Free-air Thermal Current (I_{th})	Θ = 40 °C 63 A
Conventional Thermal Current (I_{the})	Fully Enclosed 63 A
Rated Impulse Withstand Voltage (U_{imp})	8 kV
Rated Insulation Voltage (U_i)	acc. to IEC/EN 60664-1 750 V
Rated Operational Voltage	Main Circuit 750 V
Rated Short-Circuit Making Capacity (I_{cm})	(690 V) 2.1 kA
Rated Short-time Withstand Current Low Voltage (I_{cw})	for 1 s 1.5 kA
Rated Conditional Short-Circuit Current (I_{nc})	(100 A fuse, ≤415 V) 50 kA (100 A fuse, 500 V) 100 kA (80 A fuse, 690 V) 50 kA
Power Loss	at Rated Operating Conditions per Pole 2.8 W

© 2023 ABB. All rights reserved.

Pollution Degree	3
Handle Type	Knob Handle and shaft not included
Fourth Pole Position	Right Side
Fourth Pole Type	Switched - Simultaneous Function
Switches Operating Mechanism	Mechanism on Top of the Switch
Distance Between Phases	Standard
Position of Line Terminals	Top In - Bottom Out Bottom In - Top Out
Operating Mode	Front operated
Standards	IEC 60947-3 / UL 508 / CSA C22.2 No. 14
Special Functions	No
Mounting Type	Base mounting
Number of Poles	4
Cable Cross-Section	Cu 1.5 ... 35 mm²
Degree of Protection	Front IP20
Terminal Type	Screw Terminals
Tightening Torque	acc. IEC 60947-1 2 N·m
Mechanical Durability	20000
Lock Type	No

Technical UL/CSA

Maximum Operating Voltage UL/CSA	600 V
Ampere Rating	60 A
Horsepower Rating UL/CSA	(110 ... 120 V AC) Single Phase 2 Hp (240 V AC) Single Phase 7.5 Hp (440 ... 480 V AC) Single Phase 15 Hp (550 ... 600 V AC) Single Phase 15 Hp (220 ... 240 V AC) Three Phase 15 Hp (440 ... 480 V AC) Three Phase 30 Hp (550 ... 600 V AC) Three Phase 30 Hp
Tightening Torque	acc. IEC 60947-1 2 N·m
Tightening Torque UL/CSA	18 in·lb

Environmental

RoHS Status	Following EU Directive 2011/65/EU and Amendment 2015/863 July 22, 2019
Environmental Information	1SCC301263D0201

Certificates and Declarations (Document Number)

ATEX Certificate	No certification needed
Declaration of Conformity - CE	1SCC301167D2704
Environmental Information	1SCC301263D0201
Instructions and Manuals	1SCC301064M0212

© 2023 ABB. All rights reserved.

REACH Declaration	1SCC011021D0201
RoHS Information	1SCC011020D0201
UL Certificate	cULus certificate OT16-80
VDE Certificate	No certification needed

Container Information

Package Level 1 Units	box 1 piece
Package Level 1 Width	84 mm
Package Level 1 Depth / Length	103 mm
Package Level 1 Height	82 mm
Package Level 1 Gross Weight	0.34 kg
Package Level 1 EAN	6417019393094

Classifications

Object Classification Code	Q
ETIM 5	EC000216 - Switch disconnector
ETIM 6	EC000216 - Switch disconnector
ETIM 7	EC000216 - Switch disconnector
ETIM 8	EC000216 - Switch disconnector
ETIM 9	EC000216 - Switch disconnector (low voltage)
UNSPSC	39122233
IDEA Granular Category Code (IGCC)	5290 >> Disconnect switch
eClass	V11.1 : 27371403
WEEE Category	5. Small Equipment (No External Dimension More Than 50 cm)
E-Number (Finland)	3601451
E-Number (Sweden)	3171070

Categories

Low Voltage Products and Systems → Switches → Switch Disconnectors

© 2023 ABB. All rights reserved.



© 2023 ABB. All rights reserved.

8.19

A700000010950066

The following 19 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`A700000010950066.pdf`
Pages	19

SIEMENS



VPP46..



VPI46..



VPP46..Q, with pressure test points P/T



VPI46..Q, with pressure test points P/T

ACVATIX™

Combi valves, PN 25

VPP46..
VPP46..Q
VPI46..
VPI46..Q

For rooms, zones, ventilation and air-conditioning systems

- **With integrated differential pressure controller**
- **DN 10…DN 32: Valve body made of dezincification resistant hot-pressed brass (DZR)**
- **DN 40…DN 50: Housing made of spheroidal graphite iron**
- **Volumetric flow 30... 11500 l/h,**
- **Differential pressure range 15…600 kPa**
- **Internally threaded Rp conforming to ISO 7-1**
- **Externally threaded G conforming to ISO 228-1**
- **Version with pressure test points for Δp measurement (optional)**
- **Can be equipped with electro thermal or electromotive actuators**
  - **SSA.. (3-position, DC 0…10 V and KNX communication)**
  - **STA.. /STP..**
  - **SUA21/3P, SUE21P (2-position SPST)**
  - **SAY..1P03 (3-position or DC 0…10 V)**
  - **SBY61P (DC 0...10 V)**

Use

- In ventilation and air conditioning plants for control on the water side and automatic hydraulic balancing of terminal units, such as fan coils, induction units, and in heat exchangers for heating or cooling
- In heating zones like self-contained heating systems, apartments, individual rooms, etc.
- For closed circuits

Type summary

Product no.	Stock	DN	H_{100}	Connections		Test points	$\dot{v}_{min}$	$\dot{v}_{100}$	SUA21/3P	SUE21P	STA.. / STP..[2]	SSA..
									Δp_{max}[1]	Δp_{max}[1]	Δp_{max}[1]	Δp_{max}[1]
			[mm]	[inch]			[l/h]	[l/h]	[kPa]	[kPa]	[kPa]	[kPa]
VPP46.10L0.2	S55264-V101	10	2.5	G ½	Externally threaded	-	30	200	600	-	600	600
VPP46.10L0.4	S55264-V131		4.5				65	333	-	-		-
			5					370		600	-	600
VPP46.15L0.2	S55264-V102	15	2.5	G ¾			30	200	600	-	600	
VPP46.15L0.6	S55264-V103						100	575				
VPP46.20F1.4	S55264-V104	20	4.5	G 1			200	1190	-	-		-
			5				220	1330		600	-	600
VPP46.25F1.8	S55264-V121	25	4.5	G 1¼			238	1530	-	-	600	-
			5				260	1670		600	-	-
			5.5				280	1800		-	-	600
VPP46.32F4	S55264-V122	32	4.5	G 1½			468	3400	-	-	600	-
			5				510	3700		600	-	-
			5.5				550	4001		-	-	600
VPP46.10L0.2Q	S55264-V105	10	2.5	G ½		With pressure test points P/T	30	200	600	-	600	
VPP46.10L0.4Q	S55264-V132		4.5				65	333	-	-		-
			5					370		600	-	600
VPP46.15L0.2Q	S55264-V106	15	2.5	G ¾			30	200	600	-	600	
VPP46.15L0.6Q	S55264-V107						100	575				
VPP46.20F1.4Q	S55264-V108	20	4.5	G 1			200	1190	-	-		-
			5				220	1330		600	-	600
VPP46.25F1.8Q	S55264-V123	25	4.5	G 1¼			238	1530	-	-	600	-
			5				260	1670		600	-	-
			5.5				280	1800		-	-	600
VPP46.32F4Q	S55264-V124	32	4.5	G 1½			468	3400	-	-	600	-
			5				510	3700		600	-	-
			5.5				550	4001		-	-	600
VPI46.15L0.2	S55264-V109	15	2.5	Rp ½	Internally threaded	-	30	200	600	-	600	600
VPI46.15L0.6	S55264-V110						100	575				
VPI46.20F1.4	S55264-V111	20	4.5	Rp ¾			200	1190	-	-		-
			5				220	1330		600	-	600
VPI46.25F1.8	S55264-V125	25	4.5	Rp 1			238	1530	-	-	600	-
			5				260	1670		600	-	-
			5.5				280	1800		-	-	600
VPI46.32F4	S55264-V126	32	4.5	Rp 1¼			468	3400	-	-	600	-
			5				510	3700		600	-	-
			5.5				550	4001		-	-	600
VPI46.15L0.2Q	S55264-V112	15	2.5	Rp ½		With pressure test points P/T	30	200	600	-	600	
VPI46.15L0.6Q	S55264-V113						100	575				
VPI46.20F1.4Q	S55264-V114	20	4.5	Rp ¾			200	1190	-	-		-
			5				220	1330		600	-	600
VPI46.25F1.8Q	S55264-V127	25	4.5	Rp 1			238	1530	-	-	600	-
			5				260	1670		600	-	-
			5.5				280	1800		-	-	600
VPI46.32F4Q	S55264-V128	32	4.5	Rp 1¼			468	3400	-	-	600	-
			5				510	3700		600	-	-
			5.5				550	4001		-	-	600

[1] Δp_{min} value refer to page 3

[2] STP.. may only be used in combination with

- VPP46.10L0.2
- VPP46.10L0.2Q
- VPI46.15L0.2
- VPI46.15L0.2Q
- VPP46.15L0.2
- VPP46.15L0.2Q
- VPI46.15L0.6
- VPI46.15L0.6Q
- VPP46.15L0.6
- VPP46.15L0.6Q

Product no.	Stock no.	DN	H_{100} [mm]	Connections [Inch]		Test points	$\dot{v}_{min}$ [l/h]	$\dot{v}_{100}$ [l/h]	SAY..P SBY61P Δp_{min} [kPa]	SAY..P SBY61P Δp_{max} [kPa]
VPI46.40F9.5Q	S55264-V129	40	15	Rp 1½	Internally threaded	With pressure test points P/T	1370	9500	25	600
VPI46.50F12Q	S55264-V130	50		Rp 2			1400	11500	36	

DN = nominal size

H_{100} = nominal stroke

$\dot{v}_{100}$ = volumetric flow through fully open valve (H_{100})

$\dot{v}_{min}$ = smallest pre-settable volumetric flow through fully open valve (H_{100})

Δp_{max} = maximum permissible differential pressure across the valves control path, valid for the entire actuating range of the motorized valve

Δp_{min} = minimum differential pressure required across the valve's control path, so that the difference pressure regulator works reliably

Fittings

Product no.	Stock no.	Description
ALG..2	**ALG..2**	Set of 2 fittings with threaded connections for 2-port valves, consisting of 2 union nuts, 2 discs and 2 flat seals
ALG..2B	**S55846-Z1..**	Brass fittings, for media temperatures up to 100 °C

Ordering

Example

Product no.	Stock no.	Designation
VPP46.15L0.2	S55264-V102	Combi valve, PN 25, externally threaded
SSA331	S55180-A105	Actuator

Delivery — PICV valves, actuators and accessories are packed and supplied separately.

Revision numbers — See page 18

Equipment combinations DN 15…32

Actuators	Mounting set	Operating voltage	Positioning signal	Positioning force	Actuators (no power)[1]	Spring return	Stroke	Connecting cable	Data sheet
SSA131	-	AC 24 V	3-position	100 N	-	-	6.5 mm	1.5 m	A6V11858276
SSA331		AC 230 V							
SSA161.05		AC/DC 24 V	DC 0...10 V						A6V11858278
SSA151.05HF			DC 4...20 mA						
SSA161.05HF			DC 0...10 V						
SSA161E.05HF									
SSA118.09HKN		DC 24 V	KNX S-Mode KNX PL-Link						A6V11858280
SUA21/3P	-	AC 230V	3-wire on/off (SPST[1])	100N	-		2.5 mm	0.8 m	A6V11780780
SUE21P		AC 230V					5mm		A6V11780777
STA121..		AC / DC 24 V	2-position	110 N	NC		Max. 4.5 mm	1 m / 2 m / 5 m	A6V12986007
STA321..		AC 230V							
STP121..		AC / DC 24 V			NO				
STP321..		AC 230V							
STP161.L10		AC 24 V	DC 0...10 V					1 m	
STP561.L10		DC 24 V							
STA161.L10		AC 24 V			NC				
STA561.L10		DC 24 V							

[1] NC = Normal Closed = VPP46../VPI46.. powerless closed
NO = Normal Open = VPP46../VPI46.. powerless open
The valve is fully opened without an actuator

Equipment combinations DN 40…50

Type	Article no.	Stroke	Pos. force	Operating voltage	Positioning signal	Spring return	Spring return direction	Pos. time	LED	Manual adjustment	Auxiliary functions
SAY31P03	**S55150-A132**	15 mm	200 N	AC 230 V	3-position	-	-	30 s	-	Press and fix in place	[1]
SAY61P03	**S55150-A133**			AC/DC 24 V	DC 0…10 V DC 4…20 mA 0…1000 Ω				✓		[2], [3]
SAY81P03	**S55150-A134**				3-position				-		[1]
SBY61P	**S55160-A118**	15 mm	300 N	AC 24 V	DC 0…10 V	-	-	90 s	-	Turnkey for manual adjustment	AZX420 [4]

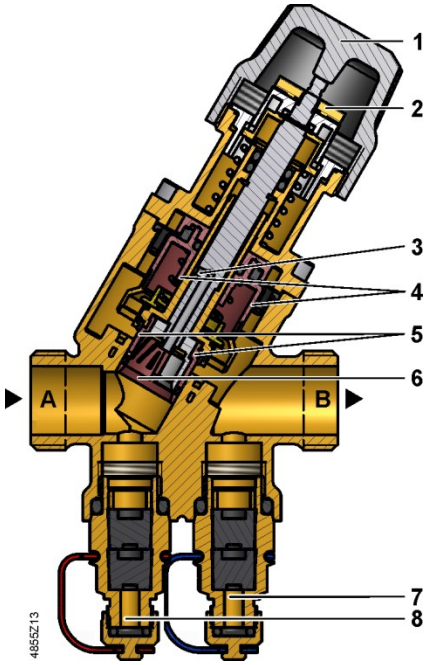
[1] Optional accessories: Auxiliary switch ASC10.51
[2] Positioning feedback, forced control, characteristic curve changeover
[3] Optional accessories: Auxiliary switch ASC10.51, sequence control, control action changeover AZX61.1
[4] 4...20 mA signal by AZX420 function module

Fittings

Combi valves		**Set of fittings**		
Externally threaded		**Malleable cast iron**	**Brass**	
Product no.	Stock no.	Type / Stock no.	Product no.	Stock no.
VPP46.10L0.2	S55264-V101	-	ALG132 [1]	BPZ:ALG132
VPP46.10L0.4	S55264-V131	-	ALG132 [1]	BPZ:ALG132
VPP46.15L0.2	S55264-V102	-	ALG142 [1]	BPZ:ALG142
VPP46.15L0.6	S55264-V103	-	ALG142 [1]	BPZ:ALG142
VPP46.20F1.4	S55264-V104	ALG152	ALG152B [2]	S55846-Z100
VPP46.25F1.8	S55264-V121	ALG202	ALG202B [2]	S55846-Z102
VPP46.32F4	S55264-V122	ALG252	ALG252B [2]	S55846-Z104
VPP46.10L0.2Q	S55264-V105	-	ALG132 [1]	BPZ:ALG132
VPP46.10L0.4Q	S55264-V132	-	ALG132 [1]	BPZ:ALG132
VPP46.15L0.2Q	S55264-V106	-	ALG142 [1]	BPZ:ALG142
VPP46.15L0.6Q	S55264-V107	-	ALG142 [1]	BPZ:ALG142
VPP46.20F1.4Q	S55264-V108	ALG152	ALG152B [2]	S55846-Z100
VPP46.25F1.8Q	S55264-V123	ALG202	ALG202B [2]	S55846-Z102
VPP46.32F4Q	S55264-V124	ALG252	ALG252B [2]	S55846-Z104

[1] Connecting thread pipe side: Internally threaded
[2] Usable up to maximum medium temperature of 100 °C

Technical / mechanical design



1 Manual control knob

2 Ring with dial for presetting

3 Aperture for differential pressure controller is linked with outlet port B

4 Differential pressure controller

5 Plug for presetting opening

6 Flow control valve

7 Pressure test point, blue ribbon, P-

8 Pressure test point, red ribbon, P+

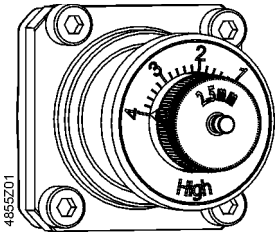
A Inlet port A

B Outlet port B

Combi valves VP..46..Q (shown here) are additionally equipped with pressure test points P/T.

Functional principle

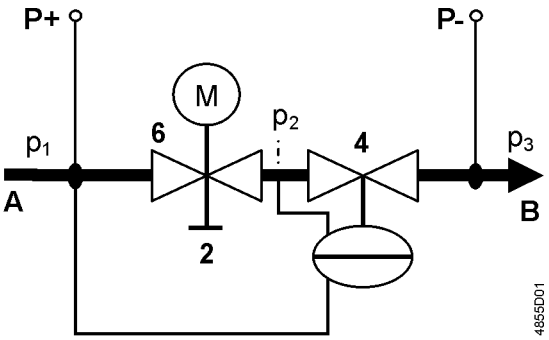
The medium entering the valve (inlet port A) passes through the variable presetting opening (5) which is connected to the ring with the dial (2) for presetting the desired maximum volumetric flow. Then, the medium flows through the flow control valve (6) with a linear characteristic and a stroke of 2.5 mm (DN 10…15) respectively 5 mm (DN 20).



Ring with dial for presetting (2)

The actuator (not shown here) opens and accurately positions the control valve (6). Before leaving the Combi valve, the medium passes through a built-in mechanical differential pressure controller (4). This differential pressure controller is the heart of the Combi valve and ensures that the selected volumetric flow is maintained across the whole working range and independent of the inlet pressure p_1.

The Combi valves VP..46..Q are additionally equipped with two pressure test points (P+, P-), which allow measurement of the differential pressure across the Combi valve. For that purpose, the electronic manometer ALE10 can be used.



A Inlet medium (inlet port)

B Outlet medium (outlet port)

2 Ring with dial for presetting

4 Differential pressure controller maintains the pressure $p_1 – p_2$ constant across the flow control valve (6) and the presetting (2)

6 Control valve with mounted actuator

P- = P/T port, pressure test point with blue ribbon (7)

P+ = P/T port, pressure test point with red ribbon (8)

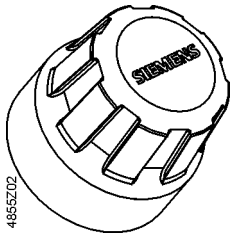
p_1 = pressure at inlet of Combi valve

p_2 = pressure at outlet of flow control valve

p_3 = pressure at outlet of Combi valve

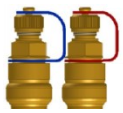
Manual control
DN 10…32

The manual control knob (1) is ready fitted to protect valve stem and pre-set mechanism and facilitates manual control of the Combi valve during commissioning.



Factory setting:
The valve is open. To close the valve, turn the manual knob clockwise.
The valve must be open to purge the system.

Accessories

Product no.	Stock no.		Description
ALE10	**ALE10**		Electronic manometer **excluding** measuring lines and measuring tips. Measuring range 0-700 kPa. A differential pressure of more than 1000 kPa will destroy the pressure sensor. For measuring the differential pressure between P+ and P- of the Combi valves (refer to diagram under "Functional principle" on page 6). Functions of the manometer: • Start/stop • Automatic zero position • Backlit display • Display: Out → outside the measuring range • Holding function
ALE11	**ALE11**		Measuring lines and straight measuring tips for use with Siemens Combi valves. Equipped with G ⅛" connection with 2 x 40 mm needles.
ALP45	**ALP45**		Spare nipples P/T port (set of 2) Set contains 1 piece each with a red and blue ribbon. Port: External threads G ⅛" to ISO 228 Connection to valve body: G ¼" to ISO 228, inclusive O-ring Length: 40 mm
ALP46	**S55264-V115**		Blanking plug for P/T ports Connection to valve body: G ¼" to ISO 228, inclusive O-ring
ALP47	**S55264-V116**		Drain ball valve inclusive O-ring Port: External threads G ½" to ISO 228 Connection to valve body: G ¼" to ISO 228, inclusive O-ring Length: 48 mm
ALP48	**S55264-V117**		Combined P/T port and drain ball valve with red ribbon Port: External threads G ⅛" to ISO 228 Connection to valve body: G ¼" to ISO 228, inclusive O-ring Length: 80 mm
ALP49	**S55264-V118**		Long P/T ports (set of 2 pieces) Set contains 1 piece each with a red and blue ribbon. Port: External threads G ⅛" to ISO 228 Connection to valve body: G ¼" to ISO 228, inclusive O-ring Length: 120 mm
ALP50	**S55264-V119**		Spare black valve protection cap

Engineering example

Basis of calculation

1. Determine energy demand Q [kW]
2. Determine temperature differential ΔT [K]
3. Calculate volumetric flow

$$\dot{v} = \frac{Q[kW] \cdot 1000}{1{,}163 \cdot \Delta T[K]} \left[\frac{l}{h}\right]$$

4. Select suitable Combi valve
   - pipe connections (internally or externally threaded)
   - with or without P/T ports
5. Determine dial setting using volumetric flow/dial presetting table, see the following page

Example

1. Given is a heat exchanger with Q = 1.9 kW
2. Temperature differential (supply - return) ΔT = 6 K
3. Volumetric flow

$$\dot{v} = \frac{1{,}9 kW \cdot 1000}{1{,}163 \cdot 6\ K} = 272{,}28\ l/h$$

   Hint: You can also determine the volumetric flow using the valve slide rule.
4. The valve shall have connections with external threads to ISO 228-1 and size DN 15.
5. Combi valve selection:
   Ideally, Combi valves should be selected such that they operate at about 80 % of their maximum flow, enabling them to deliver spare capacity, if required.
   VPP46.15L0.6 (externally threaded connections, no pressure test points P/T, nominal volumetric flow 600 l/h)
6. Determine dial setting using volumetric flow/dial presetting table below:
   Volumetric flow 270 l/h
   Dial setting 1.8

Volumetric flow/dial presetting

Tables to determine the dial setting for a desired volumetric flow.

Dp min [kPa] based on volumetric flow; interpolate missing values.

Note

The presetting tables indicate the expected nominal volumetric flow. During commissioning, check whether current pre-settings correspond to the planned design. Further adjustment of the pre-settings may be required to achieve the needed volumetric flow.

Presetting range linear to VDI/VDE 2173
Presetting range linear
Presetting range not permitted

VPP46.10L0.2, VPP46.10L0.2Q, VPP46.15L0.2, VPP46.15L0.2Q, VPI46.15L0.2, VPI46.15L0.2Q — **200 l/h nominal**

V̇ [l/h]				30	35	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
Dial	Min.	0.2	0.4	0.5	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δpmin [kPa]				14.3	14.3	14.3	14.5	14.6	14.6	14.7	14.8	14.9	15	15.1	15.2	15.3	15.4	15.5	15.5	15.6	15.7	15.8

VPP46.10L0.4, VPP46.10L0.4Q with STA.. — **330 l/h nominal**

V̇ [l/h]					59	75	91	107	123	140	161	172	188	203	220	236	252	268	284	301	317	333
Dial	Min.	0.2	0.4	0.5	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δpmin [kPa]					14.6	14.7	14.8	15	15.1	15.3	15.5	15.6	15.7	15.8	16	16.1	16.2	16.4	16.5	16.6	16.8	16.9

VPP46.10L0.4, VPP46.10L0.4Q — **370 l/h nominal**

V̇ [l/h]					65	83	101	119	137	155	179	191	209	226	244	262	280	298	316	334	352	370
Dial	Min.	0.2	0.4	0.5	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δpmin [kPa]					14.6	14.8	14.9	15.1	15.3	15.4	15.6	15.7	15.9	16	16.2	16.3	16.5	16.6	16.7	16.9	17	17.2

VPP46.15L0.6, VPP46.15L0.6Q, VPI46.15L0.6, VPI46.15L0.6Q — **600 l/h nominal**

V̇ [l/h]				100	115	130	160	180	210	240	270	300	320	350	380	410	440	460	490	520	550	575
Dial	Min.	0,2	0,4	0,5	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δpmin [kPa]				14.9	15.2	15.5	15.6	15.9	16.1	16.4	16.6	16.8	17	17.2	17.5	17.6	17.8	18	18.2	18.4	18.6	18.9

VPP46.20F1.4, VPP46.20F1.4 Q with STA.., VPI46.20F1.4, VPI46.20F1.4Q with STA.. — **1200 l/h nominal**

V̇ [l/h]					200	260	310	380	430	490	550	610	660	730	780	840	900	960	1010	1070	1130	1190
Dial	Min.	0.2	0.4	0.5	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δpmin [kPa]					16	16.5	17	17.5	17.9	18.4	18.8	19.2	19.5	19.9	20.2	20.4	20.7	20.9	21.1	21.3	21.4	21.6

VPP46.20F1.4, VPP46.20F1.4Q, VPI46.20F1.4, VPI46.20F1.4Q — **1400 l/h nominal**

V̇ [l/h]					220	290	350	420	480	550	610	680	740	810	870	940	1000	1070	1130	1200	1260	1330
Dial	Min.	0.2	0.4	0.5	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δpmin [kPa]					16	16.5	17	17.5	17.9	18.4	18.8	19.2	19.5	19.9	20.2	20.4	20.7	20.9	21.1	21.3	21.4	21.6

VPP46.25F1.8, VPP46.25F1.8Q, VPI46.25F1.8, VPI46.25F1.8Q with STA.. — **1530 l/h nominal**

V̇ [l/h]					238	303	366	427	488	550	614	680	749	822	898	978	1063	1150	1241	1335	1432	1530
Dial	Min.	0.2	0.4	0.5	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δpmin [kPa]					15.3	15.8	16.1	16.4	16.7	17	17.5	18	18.7	19.7	20.9	22.3	24.2	26.4	28.9	32.0	35.4	39.4

VPP46.25F1.8, VPP46.25F1.8Q, VPI46.25F1.8, VPI46.25F1.8Q — **1800 l/h nominal**

V̇ [l/h]					280	356	430	502	574	647	722	800	881	967	1057	1151	1250	1353	1460	1571	1685	1800
Dial	Min.	0.2	0.4	0.5	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δpmin [kPa]					15.3	15.8	16.1	16.4	16.7	17	17.5	18	18.7	19.7	20.9	22.3	24.2	26.4	28.9	32.0	35.4	39.4

VPP46.32F4, VPP46.32F4Q, VPI46.32F4, VPI46.32F4Q with STA.. — **3400 l/h nominal**

V̇ [l/h]					468	680	770	940	1120	1290	1460	1640	1810	1980	2150	2330	2500	2670	2850	3020	3190	3400
Dial	Min.	0.2	0.4	0.5	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δpmin [kPa]					17.9	18	18.1	18.2	18.3	18.5	18.7	18.9	19.2	19.6	20.1	20.7	21.4	22.3	23.4	24.6	26	28

VPP46.32F4, VPP46.32F4Q, VPI46.32F4, VPI46.32F4Q — **4000 l/h nominal**

V̇ [l/h]					550	800	910	1110	1320	1520	1720	1930	2130	2330	2530	2740	2940	3140	3350	3550	3750	4001
Dial	Min.	0.2	0.4	0.5	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δpmin [kPa]					17.9	18	18.1	18.2	18.3	18.5	18.7	18.9	19.2	19.6	20.1	20.7	21.4	22.3	23.4	24.6	26	28

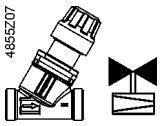
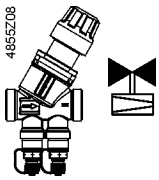
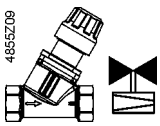
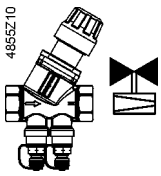
VPI46.40F9.5Q — **9500 l/h nominal**

V̇ [l/h]					1370	1600	1950	2250	2650	3000	3400	3800	4250	4750	5250	5800	6350	6950	7550	8200	8800	9500
Dial	Min.	0.2	0.4	0.5	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δpmin [kPa]					10	10	10	10	10	10	10	11	11	12	13	15	16	18	20	22	24	25

VPI46.50F12Q — **11500 l/h nominal**

V̇ [l/h]					1400	1650	2000	2350	2700	3150	3550	4050	4600	5150	5800	6500	7300	8150	9000	9800	10600	11500
Dial	Min.	0.2	0.4	0.5	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δpmin [kPa]					10	10	11	11	11	12	12	13	14	15	17	19	21	24	27	30	33	36

Engineering notes

Valve	Symbols / Direction of flow		Flow in control mode	Valve stem	
	VP..46..	VP..46..Q		retracts	extends
Combi valve VPP46..			Variable	Closes	Opens
Combi valve VPI46..			Variable	Closes	Opens

⚠ **The direction of flow indicated (arrow on the valve body) is mandatory!**

The valves should preferably be mounted in the return pipe where temperatures are lower and where the sealing gland is less affected by strain.

Symbols

Symbol used in catalogs and application descriptions	Symbol used in diagrams
	There are no standard symbols for Combi valves in diagrams.

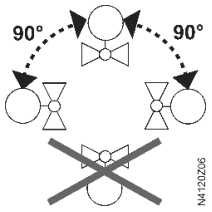
Recommendation

A strainer or dirt trap should be fitted upstream of the valve to enhance reliability.
Remove dirt, welding beads etc. from valves and pipes.
Do not insulate the actuator bracket, as air circulation must be ensured!

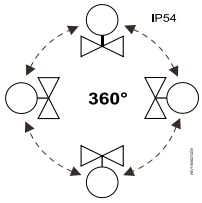
Mounting notes

Combi valve and actuator can be straightforwardly assembled on site. Special tools or adjustments are not required.
Prior to mounting the actuator, the required volumetric flow must be set.
The valve is supplied complete with Mounting Instructions (74 319 0649 0 b).

Mounting positions



SUA21/3P
SUE21P, SAY.. indoor



STA.., STP..,
SSA1.., SSA3..

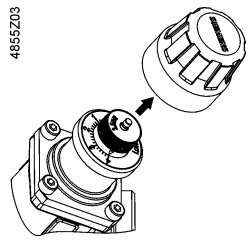
Actuators STA.., STP.., SSA1.. and SSA3.. may be installed in any position.
Actuators SUA21/3P, SUE21P and SAY.. must be installed horizontally up to 90° and not hanging.

Installation notes

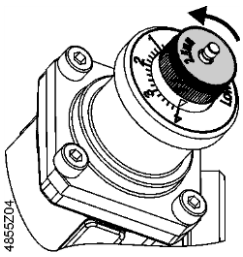
Prior to mounting the actuator, the presetting is to be made as follows:

Presetting DN 10…32:

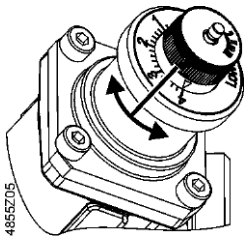
1. Remove control knob from Combi valve.



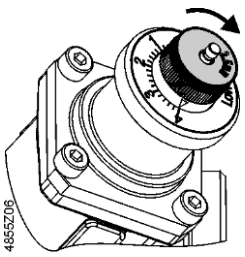
2. Loosen knurled nut.



3. Adjust the desired dial setting with the white knob.

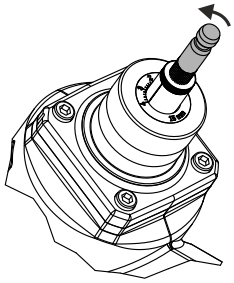


4. Retighten knurled nut by hand.

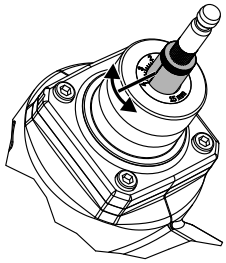


Presetting DN 40…50:

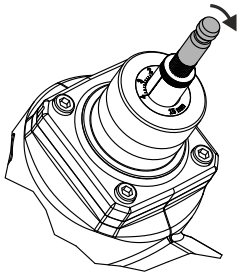
1. Loosen spindle head



2. Adjust the desired dial setting with the white knob.

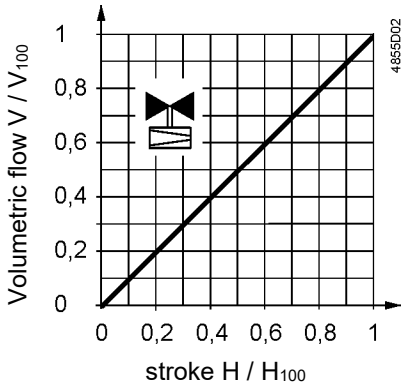


3. Retighten spindle head - by hand only



Valve characteristic

VP..46.., VP..46..Q



Commissioning notes

⚠ **The valves must be commissioned with the manual control knob or actuator correctly fitted. Strong pressure impacts can damage closed Combi valves.**

⚠ **The Combi valves have to be open when flushing or pressure testing the system. Flush only in correct flow direction. Strong pressure impacts can damage closed Combi valves.**

⚠ **Differential pressure Δp_{max} across the valve's control path is not allowed to exceed 600 kPa.**

Manual control

When turning the manual control knob in counter-clockwise direction or manually operating the actuator, the valve opens. The actuator closes the valve. The valves are supplied fully open. The manual knob is not designed for permanent manual operation.

Maintenance notes

The V..P46.. PICV valves are maintenance-free without cartridge.
Valve plug, stem, presetting, diaphragm etc. may not be disassembled

⚠ When performing service work on the valve and / or actuator:

- Switch off the pump and disconnect power supply.
- Close the shut-off valves in the piping network.
- Fully reduce pressure in the piping network and allow the pipes to cool down completely.

Remove the electrical connections only if necessary.

Sealing gland

The stem sealing gland cannot be exchanged. Should leakage occur, the whole valve must be replaced.

Disposal

Do not dispose of the device as household waste.

⚠ **Warning**
Due to the tensioned spring return, valve disassembly may result in flying parts causing possible injury.

Only authorized staff may disassemble valves with tensioned spring return!

Disposal

- Special handling of individual components may be mandated by law or make ecological sense.
- Observe all local and currently applicable laws and regulations.

Warranty

Application-related technical data are guaranteed only when the valves are used in connection with the Siemens actuators listed under "Equipment combinations" on page 3. When used with actuators of other manufacture, any warranty by Siemens becomes void.

Technical data

Functional data	PN class		PN 25 as per EN 1333
	Permissible operating pressure		2.500 kPa (25 bar) as per ISO 7628 / EN 1333
	Max. differential pressure		600 kPa
	Min. differential pressure		See tables volumetric flow/dial presetting
	Valve characteristic		Linear as per VDI/VDE 2173
	Leakage rate in general		Class IV (0…0.01 % of volumetric flow V_{100}) to EN 1349
	DN 25…32 with STA..		Class III (0…0.1 % of volumetric flow V_{100}) per EN 1349
	Average flow accuracy		+/-10 % from ΔPmin - to 2.5 x ΔPmin
			+/- 5 % from 2.5 x ΔPmin – to 600 kPa
	Permissible media		Low-temperature hot water, chilled water, water with antifreeze Recommendation: Water treatment to VDI 2035
	Medium temperature:		
	Valve with actuator		1...120 °C
			1…110°C with SUA21/3P, SUE21P
	Permissible ambient temperature		1…50 °C
	Nominal stroke	DN 10L0.2 DN 15L0.2 DN 15L0.6	2.5 mm
		DN 10L0.4 / DN 20	5 mm
		DN 25…32	5.5 mm
		DN 40…50	15 mm
Materials	Valve body, port, seat, sealing gland and test points		Dezincification resistant hot-pressed brass (DZR), CW602N
	Valve body DN 40…50		Nodular cast iron
	Stem, spring		Stainless steel
	Presetting element		PTFE, PPO, POM C and ABS
	Regulator		PPS
	Seals		EPDM 281 (O-ring)
Dimensions / weight	Dimensions		Refer to "Dimensions" on page 6
	Threaded connections	VPP46..	G to ISO 228-1 (externally threaded)
		VPI46..	Rp to ISO 7-1 (internally threaded)
	Actuator connection	DN 10…32	M30 x 1.5 mm
		DN 40…50	Siemens large stroke connector
	Pressure test points (P/T-ports)		G ¼” (connection valve body)
			2 mm x 40 mm (needles)
	Weight		Refer to "Dimensions" on page 16
Standards, directives and approvals	Pressure Equipment Directive		PED 2014/68/EU
	Pressure-carrying accessories		Scope: Article 1, section 1 Definitions: Article 2, section 5
	Fluid group 2	DN 10…40	Without CE-marking as per article 4, section 3 (sound engineering practice) [1)]
		DN 50	Category I, Modul A, with CE-marking as per article 14, section 2

	EU conformity (CE)	DN 50	A5W00022837, CE1T4855xx [2]
	EAC conformity		Eurasia conformity
Environmental compatibility	The product environmental declaration CE1E4855en [2] contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).		

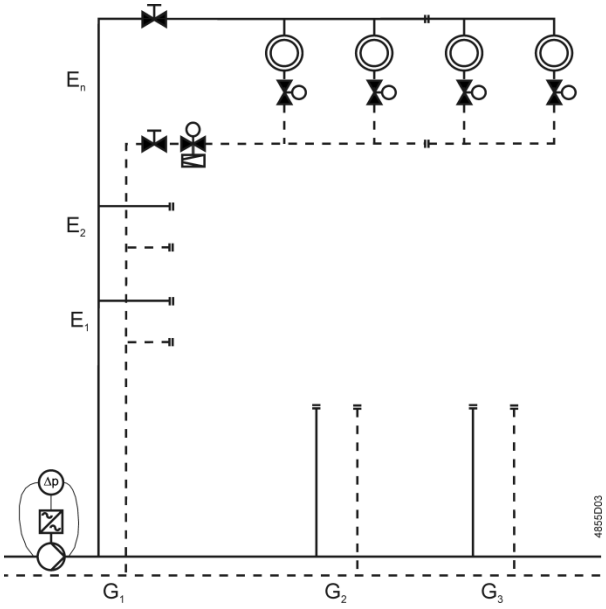
[1] Valves where PS x DN < 1000, do not require special testing and cannot carry the CE label.

[2] Documents are available at http://www.siemens.com/bt/download

Combi valves in HVAC systems combined with variable speed pumps provide even higher energy efficiency. When sizing the pump, it must be made certain that the most critical branch or consumer in the system – usually the remotest from the pump – gets enough pressure (pump head). Thus, it is recommended to use a variable speed pump in constant-pressure mode with end-point feedback, to maintain a minimum differential pressure across the critical valve.

Residential buildings

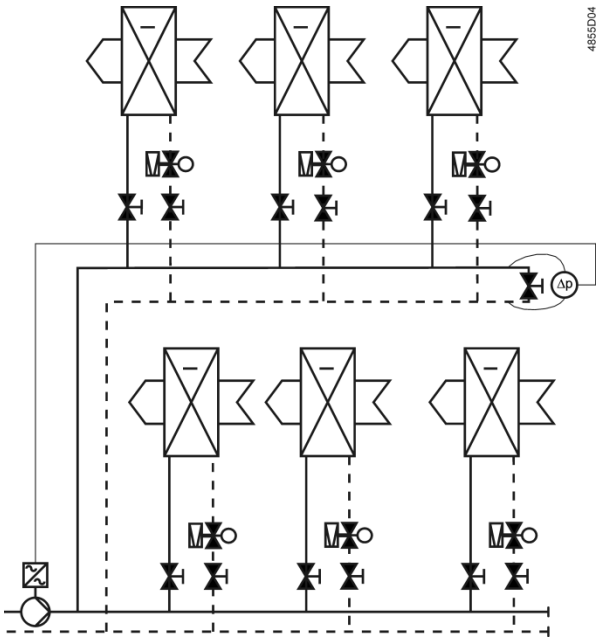
Residential buildings with for example self-contained flat heating systems:



E = Floor
G = Group or zone

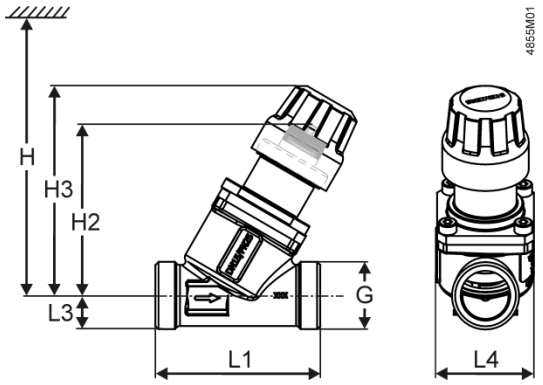
Non-residential buildings

Commercial buildings with for example Fan Coil Units or heat exchangers for heating or cooling:

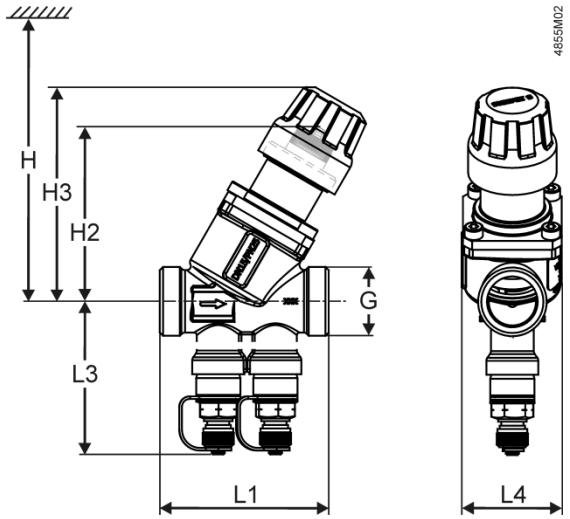


Dimensions

VPP46..

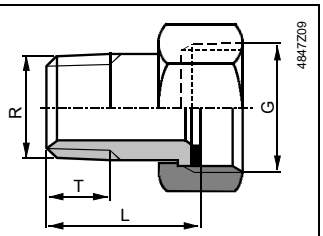
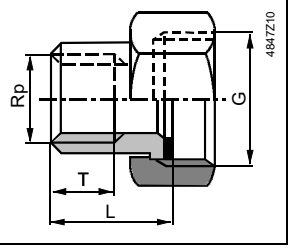


VPP46..Q



Valves	DN	G	L1	L3	L4	H2	H3	H [1]		Weight
								SSA..	STA.. / STP..	
		[inch]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
VPP46.10L0.2	10	½	65	10.5	38	68.5	83.5	170	160	0.314
VPP46.10L0.4										
VPP46.15L0.2	15	¾		13.2		67.3	82.2			0.333
VPP46.15L0.6										
VPP46.20F1.4	20	1	70	13.6		67.5	82.5			0.371
VPP46.25F1.8	25	1¼	78	22		70	85			0.497
VPP46.32F4	32	1½	104	26	63	85	100	185	175	1.22
VPP46.10L0.2Q	10	½	65	54.8	38	68.5	83.5	170	160	0.402
VPP46.10L0.4Q										0.302
VPP46.15L0.2Q	15	¾		55.5		67.3	82.2			0.422
VPP46.15L0.6Q										
VPP46.20F1.4Q	20	1	70	57.3		67.5	82.5			0.459
VPP46.25F1.8Q	25	1¼	78	59		70	85			0.59
VPP46.32F4Q	32	1½	104	68	63	85	100	185	175	1.317

[1] Total height including actuator

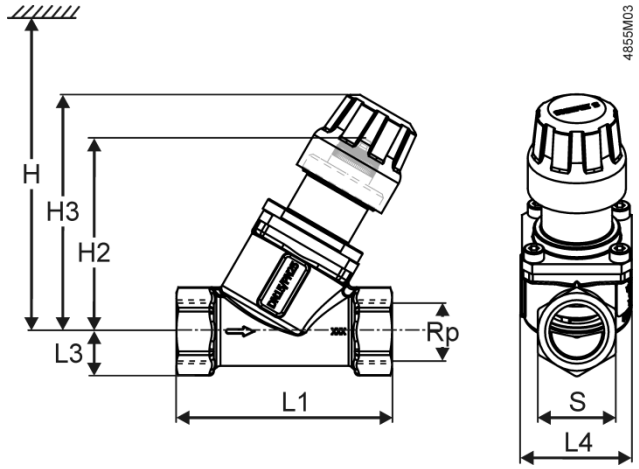
Sets of threaded fittings with flat seal ALG…2: set of 2 threaded fittings	ALG132 ALG142	pipe side with external R threads	
	ALG152 ALG152B ALG202 ALG202B ALG252 ALG252B	pipe side with internal Rp threads	

Type ALG..		for valve type	DN	G	R	Rp	L	T
Malleable cast iron	Brass [1]			[Inch]	[Inch]	[Inch]	[mm]	[mm]
	ALG132	VPP46.10..	10	G ½	R ⅜		≈ 24	≈ 9
	ALG142	VPP46.15..	15	G ¾	R ½		≈ 29.5	≈ 12
ALG152	**ALG152B**	VPP46.20..	20	G 1		Rp ½	≈ 23	≈ 13
ALG202	**ALG202B**	VPP46.25..	25	G 1¼		Rp ¾		
ALG252	**ALG252B**	VPP46.32..	32	G 1½		Rp 1		

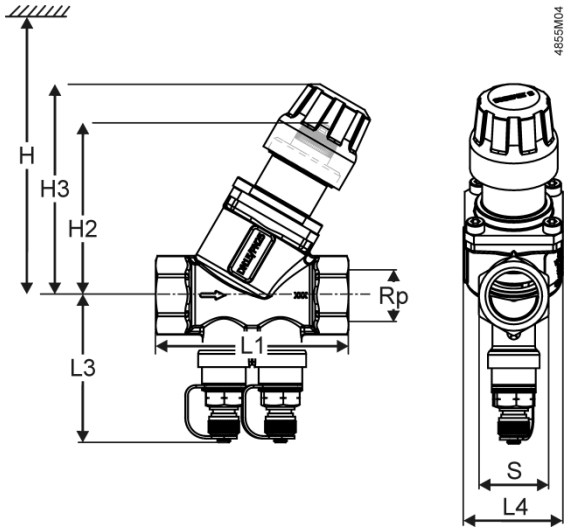
[1] Maximum medium temperature 100 °C

- On valve side: cylindrical thread to ISO 228-1, on pipe side: with cylindrical thread to ISO 7-1

VPI46..



VPI46..Q



Valves	DN	Rp	S	L1	L3	L4	H2	H3	H [1]				Weight
									SSA..	STA.. STP..	SAY..	SBY61P	
		[inch]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
VPI46.15L0.2	15	½	27	75	15.2	38	67.3	82.4	170	160	-	-	0.377
VPI46.15L0.6													
VPI46.20F1.4	20	¾	32	79	17.9		67.5	82.5					0.418
VPI46.25F1.8	25	1	39	83	22		70	85					0.533
VPI46.32F4	32	1¼	46	104	26	63	85	100	185	175			1.219
VPI46.15L0.2Q	15	½	27	75	60.2	38	67.3	82.4	170	160			0.477
VPI46.15L0.6Q													
VPI46.20F1.4Q	20	¾	32	79	62.9		67.5	82.5					0.506
VPI46.25F1.8Q	25	1	39	83	59		70	85					0.625
VPI46.32F4Q	32	1¼	46	104	68	63	85	100	185	175			1.316
VPI46.40F9.5Q	40	1½	56	138	71	90	161	-	-	-	500	450	3.253
VPI46.50F12Q	50	2	70		77								3.683

[1] Total height including actuator

Revision Numbers

Product number	Valid from rev. no.	Product number	Valid from rev. no.
VPP46.10L0.2	..A	VPP46.10L0.2Q	..A
VPP46.10L0.4	..B	VPP46.10L0.4Q	..B
VPP46.15L0.2	..A	VPP46.15L0.2Q	..A
VPP46.15L0.6	..A	VPP46.15L0.6Q	..A
VPP46.20F1.4	..A	VPP46.20F1.4Q	..A
VPP46.25F1.8	..A	VPP46.25F1.8Q	..A
VPP46.32F4	..A	VPP46.32F4Q	..A
VPI46.15L0.2	..A	VPI46.15L0.2Q	..A
VPI46.15L0.6	..A	VPI46.15L0.6Q	..A
VPI46.20F1.4	..A	VPI46.20F1.4Q	..A
VPI46.25F1.8	..A	VPI46.25F1.8Q	..A
VPI46.32F4	..A	VPI46.32F4Q	..A
		VPI46.40F9.5Q	..A
		VPI46.50F12Q	..A

Documentation form

Installed location	Valve type	Actuator Type	Valve Size	Planned Pre-setting	Required ∆pmin (kPa)	Verified ∆p (kPa)	Flow[1] (l/h)

[1)] Flow = if Verified Δp_{min} > Required Δp_{min}, then Flow is as per presetting in datasheet, otherwise check.

Issued by
Siemens Switzerland Ltd
Smart Infrastructure
International Headquarters
Theilerstrasse 1a
6300 Zug
Switzerland
Tel. +41 58-724 24 24
www.siemens.com/buildingtechnologies

© Siemens Switzerland Ltd, 2023
Technical specifications and availability subject to change without notice.

8.20

A700000010950682

The following 16 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`A700000010950682.pdf`
Pages	16

SIEMENS

ACVATIX™

Electromotoric actuators for VPI46..

SAY..P..



Actuators with 15 mm stroke and 200 N force

- SAY31P03 Operating voltage AC 230 V, positioning signal 3-position
- SAY61P03 Operating voltage AC/DC 24 V, positioning signal 0...10V, 4...20 mA
  With position feedback, forced control, characteristic changeover
- SAY61P03/MO operating voltage AC/DC 24 V,
  RS-485 for Modbus RTU communication
- SAY81P03 Operating voltage AC/DC 24 V, positioning sign 3-position
- For direct mounting on valves; no adjustments required
- Manual adjuster, position and status indication (LED)
- Optional functional extension with auxiliary switch

Use

Electromotoric actuators to operate Siemens combi valves for type series VPI46.40F9.5Q and VPI46.50F12Q with 15 mm stroke, as control valves on ventilation, air conditioning, district heating and refrigeration plants.

Functions

Function	Description	Type
3-position control	A 3-position signal controls the actuator via connection terminals Y1 or Y2. The desired position is transmitted to the valve.	SAY31P03, SAY81P03
Modulating control	The modulating positioning signal provides stepless motor control. The positioning signal range (DC 0...10 V / DC 4...20 mA / 0...1000 Ω) corresponds to the positioning range (closed...open, or 0…100% stroke) in a linear manner.	SAY61P03
Positioning signal and characteristic changeover	Setting with DIL switch. Factory setting: ● Characteristic curve: log = Equal percentage (switch set to Off) ● Positioning signal: DC 0...10 V (switch set to Off)	
Position feedback U	Signal returned to acquire the position via input.	SAY61 P03, SAY61P03/MO
Forced control (Z-mode)	Forced control helps override automatic mode and is implemented via higher control.	
Calibration	Carry out during initial commissioning. The actuator drives to the top or bottom end position; the measured values are saved.	
Valve seat detection	The actuators have power-dependent seat detection. After calibration, the exact valve stroke is stored in the actuator's memory.	
Foreign body detection	After clogging is detected, three attempts are made to get past clogging. If unsuccessful, the actuator continues to following the positioning signal only within a limited range, and the LED blinks red.	
Modbus RTU (RS-485), not galvanically isolated	Setpoint 0...100 % valve position Actual value 0...100 % for valve position Override control Open / Close / Min / Max / Stop Setpoint monitoring and backup mode	SAY61P03/MO

Type summary

Type	Item No.	Stroke	Positioning force	Operating voltage	Positioning signal	Spring return time	Positioning time	LED	Manual adjuster	Auxiliary functions
SAY31P03 [1]	S55150-A132	15 mm	200 N	AC 230 V	3-position	-	30 s	-	Push and fix	[3]
SAY61P03 [2]	S55150-A133			AC 24 V DC 24 V	DC ...10 V DC 4...20 mA 0...1000 Ω			Yes		[4] [6]
SAY61P03/MO [2]	S55150-A145				Modbus RTU					[5]
SAY81P03 [2]	S55150-A134				3-position			-		[6]

[1] Approbation: CE

[2] Approbation: CE, UL

[3] Optional accessories: Auxiliary switch

[4] Position feedback, forced control, characteristic changeover

[5] Position feedback, forced control

[6] Optional accessories: Auxiliary switch, sequence control, control action changeover

Scope of delivery

Actuators, valves and accessories are supplied in individual packs.

Accessories/spare parts

Electrical accessories

Type	Auxiliary switch ASC10.51	Function module AZX61.1
Item No.	S55845-Z103	S55845-Z107
SAY31P..	Max. 2	Max. 1
SAY61P..		
SAY61P../MO		-
SAY81P..		Max. 1

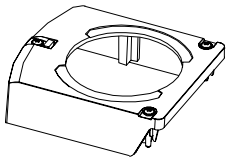
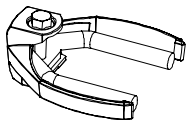
Mechanical accessory

Type	Weather shield ASK39.1
Item No.	S55845-Z109

Ordering (example)

Type	Stock number	Designation	Number of pieces
SAY81P03	S55150-A134	Actuator	1
ASC10.51	S55845-Z103	Auxiliary switch	1

Spare parts

Product number / Stock number		
8000060843	Housing cover 	Screw (valve stem coupling) 
		U-bracket 

Equipment combinations

Valve type		DN	H_{100} [mm]	$\dot{V}_{Min.}$ [l/h]	$\dot{V}_{m100}$ [l/h]	Δp_{min} [kPa]	Data sheet
VPI46.40F9.5Q	S55264-V129	40	15	1370	9500	25	N4855
VPI46.50F12Q	S55264-V130	50		1400	11500	36	

Product documentation

Title	Contents	Document ID
Actuators SAX.., SAY.., SAV.., SAL.. for valves	Basic documentation: Detailed information on stroke actuators including Modbus types Stroke actuators for valves with 15/20/40 mm stroke and rotary actuators for butterfly valves	CE1P4040en
Electromotoric actuators for valves SA.., Modbus RTU	Data sheet: Modbus communication profiles	A6V101037195
Mounting instructions G..161../MO and S..6/MO	Mounting instructions: Mounting and installation instructions for Modbus actuators	A5W00027551
Valve Actuator DIL Switch Characteristic Overview	Commissioning / Configuration: Describes the characteristics of valve and actuator combinations, it describes the DIL Switch function.	A6V12050595

Related documents such as environmental declarations, CE declarations, etc., can be downloaded at the following Internet address:

http://siemens.com/bt/download

Notes

Safety



⚠ CAUTION

National safety regulations

Failure to comply with national safety regulations may result in personal injury and property damage.

- Observe national provisions and comply with the appropriate safety regulations.



⚠ WARNING

Risk of burns from hot actuator brackets

The actuator brackets on heating plants can also become hot from the contact with the hot valve during operation. The temperature of the actuator bracket can reach 100 °C.

When servicing the actuator:

- Switch off both pump and operating voltage.
- Close the main shutoff valve in the piping.
- Allow the piping to cool off.

Engineering

SAY31P03 / SAY81P03

3-position actuators must be controlled by a controller, see Connection diagrams [→ 13].

SAY61P03

Up to 10 actuators can drive in parallel on a controller output with a rating of 1 mA. Modulating actuators have an input impedance of 100 kΩ.

SAY61P03/MO

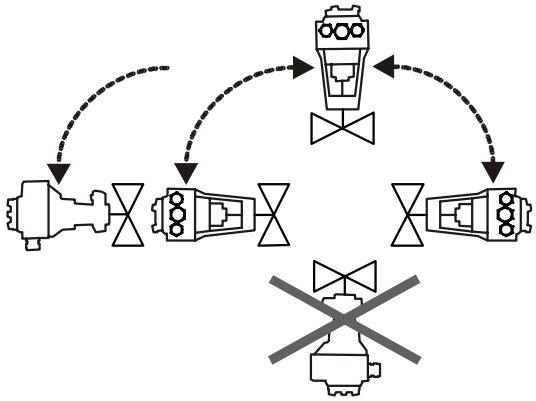
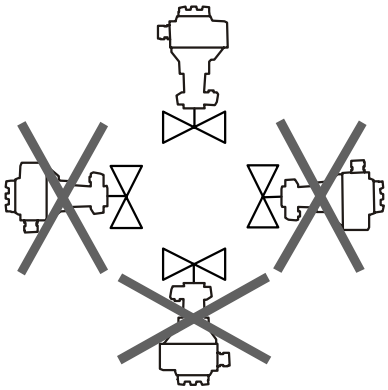
The Modbus converter is designed for analog control at 0...10 V.



Keep the analog signal setting on the actuator as is (switch 1 to OFF); adjustment not permitted.

Mounting

Mounting positions

Indoor application	Outdoor application [1) 2)]
	

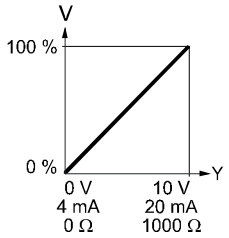
1) Only together with weather shield ASK39.2. IP54 housing protection remains unchanged.

2) SAY61P../MO is not intended for outdoor use.

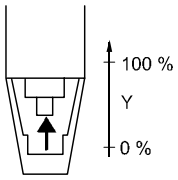
Operation

Direction of control action

On valves where the stem retracts to the close position, "direct acting" means that the value is fully closed at positioning signal Y = 0 V or Z = 0 Ω (i.e. 100 %).



Direct acting



Positioning signal Y	DC 0...10 V, 4...20 mA
Positioning signal Z	0...1000 Ω

Y, Z	Positioning signal
R	Flow speed
_____	Control action: Direct acting

Maintenance

The actuators are maintenance-free.

Disposal



The device is considered an electronic device for disposal in accordance with the European Guidelines and may not be disposed of as domestic garbage.

- Dispose of the device through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Warranty service

Technical data on specific applications are valid only together with Siemens products listed under "Equipment combinations". Siemens rejects any and all warranties in the event that third-party products are used.

Technical data

Power			
Operating voltage			
	SAY31P03		AC 230 V ±15%
	SAY61P03..		AC 24 V ± 20 % / DC 24 V +20 % / -15 % (SELV / PELV)
	SAY81P03		
Frequency			45...65 Hz
External supply line fusing (EU)			• Non-renewable fuse 6...10 A slow • Circuit break max. 13 A, tripping characteristic B, C, D to EN 60898 • Power source with current limitation of max. 10 A
Power consumption at 50 Hz			
	SAY31P03	Stem retracts/extends	6 VA / 3.5 W
	SAY61P03		8 VA / 3.75 W
	SAY61P/MO		8.7 VA / 4.25 W
	SAY81P03		5 VA / 3.75 W
Typical inrush current [1] (3-position actuators)			
	SAY31P03		2.3 A
	SAY81P03		4.5 A

Operating data		
Positioning times (with the specified nominal stroke)		The positioning time may vary depending on the type of valve (Type summary [→ 3])
	SAY31P03, SAY61P03, SAY81P03.	30 s
Positioning force		200 N
Nominal stroke		15 mm
Permissible media temperature (valve fitted)		1...120 °C

Signal inputs			
Positioning signal ”Y”			
	SAY31P03, SAY81P03		3-position
	SAY31P03	Voltage	AC 230 V ±15%
	SAY81P03		AC 24 V ± 20% / DC 24 V + 20% / - 15%
	SAY61P03		
	DC 0...10 V	Power consumption	≤ 0.1 mA
		Input impedance	≥100 kΩ
	DC 4...20 mA	Power consumption	DC 4...20 mA ± 1%
		Input impedance	≤ 500 kΩ

Communication SAY61P../MO			
Communication protocol			
	Modbus RTU		RS-485, not galvanically isolated
	Number of nodes		Max. 32
	Address range		1...248 / 255
		Factory setting	255
	Transmission formats		1-8-E-1 / 1-8-O-1 / 1-8-N-1 / 1-8-N-2
		Factory setting	1-8-E-1
	Baud rates (kbaud)		Auto / 9.6 / 19.2 / 38.4 / 57.6 / 76.8 / 115.2
		Factory setting	Auto
	Bus termination		120 Ω electronically switchable
		Factory setting	Off

Parallel connection	
SAY61P03	≤ 10 (depending on controller output)

Forced control			
Z positioning signal			
	SAY61P03		R = 0...1000 Ω, G, G0
		R = 0...1000 Ω	Stroke proportional to R
		Z connected to G	Max. stroke 100 % [2]
		Z connected to G0	Max. stroke 0 % [2]
		Voltage	Max. AC 24 V ± 20 %
			Max. DC 24 V +20% / -15%
		Power consumption	≤ 0.1 mA

Position feedback			
Position feedback U			
	SAY61P03		DC 0...10 V
		Load impedance	> 10 kΩ resistive
		Load	Max. 1 mA

Connection cables			
Wire cross-sectional areas			0.75 mm^2, AWG 20...16 [3]
Cable entries			
	SAY..P..		• 2 entries Ø 20.5 mm (for M20) • 1 entry Ø 25.5 mm (for M25)
	SAYP61../MO		
		Fixed connection cable	0.9 m
		Number of cores	5 x 0.75 mm^2

Degree of protection and class			
Housing from vertical to horizontal			IP 54 as per EN 60529 [4]
Protection class			As per EN 60730
	SAY31P03	AC 230 V	II
	SAY61P03	AC / DC 24 V	III
	SAY81P03		

Environmental conditions			
Operation			IEC 60721-3-3
	Climatic conditions		Class 3K5
		Mounting location	Indoors (weather-protected) [4]
		Temperature, general	-5...55 °C
		Humidity (non-condensing)	5...95 % r.h.
Transportation			IEC 60721-3-2
	Climatic conditions		Class 2K3
		Temperature	-25...70 °C
		Humidity	< 95% r.h.
Storage			IEC 60721-3-1
	Climatic conditions		Class 1K3
		Temperature	-15...55 °C
		Humidity	5...95 % r.h.
Max. media temperature when mounted on valve			120 °C

Directives and standards		
Product standard		EN 60730-x
Electromagnetic compatibility (field of use)		For residential, commercial, and industrial environments
EU conformity (CE)		A5W00000333 [5]
RCM conformity	AC 230 V	A5W00000334 [5]
EAC compliance		Eurasian compliance for all SAY..P..
UL, cUL	AC 230 V	-
	AC / DC 24 V	UL 873 http://ul.com/database; file number E35198

Environmental compatibility
Product environmental declarations 71 7331 0559 [5] und A6V101083254 [5] include data on environmentally friendly product design and testing (RoHS compliance, material composition, packaging, environmental benefits, disposal).

Dimensions
See Dimensions [→ 15]

Accessories [6]		
Auxiliary switch ASC10.51	Switching capacity	AC 24…230 V, 6 (2) A, potential free
External fusing of supply line		• Non-renewable fuse 6...10 A slow • Circuit break max. 13 A, tripping characteristic B, C, D to EN 60898 • Power source with current limitation of max. 10 A
US installation, UL & cUL		AC 24 V class 2, 5 A general purpose

1) Switching time for RMS value of the sine wave at nominal voltage

2) Observe acting direction of DIL switches

3) AWG = American wire gauge

4) For outdoor operation, always use weather shield ASK39.1, housing protection class IP 54 remains as is. SAY61P../MO is not intended for outdoor use.

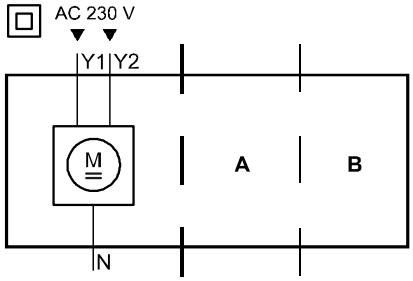
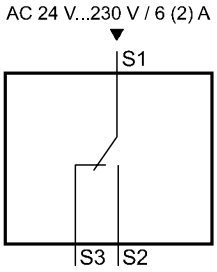
5) Documents can be downloaded at http://www.siemens.com/bt/download

6) UL-approved component

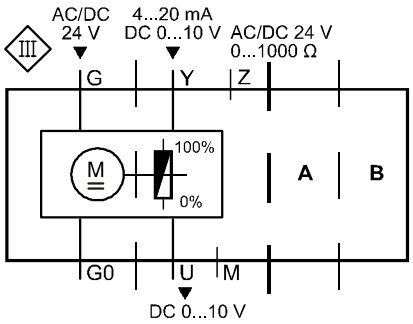
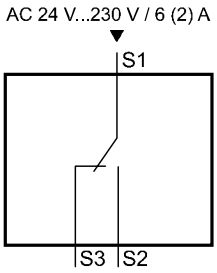
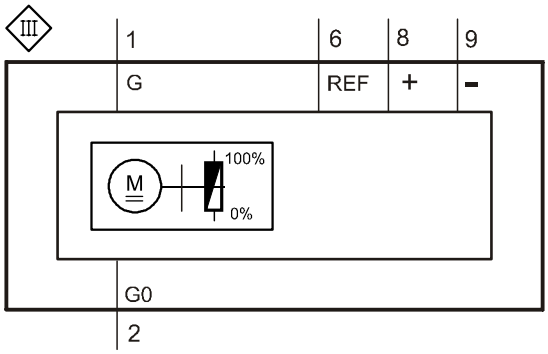
Connection diagrams

Internal Diagrams

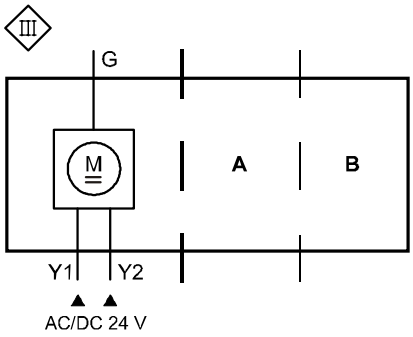
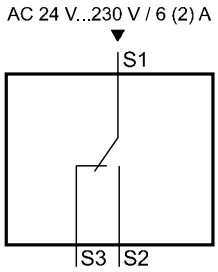
SAY31P03

	Accessories
	1 x ASC10.51 

SAY61P..

	Accessories
SAY61P03 	1 x ASC10.51 
SAY61P03/MO 	

SAY81P03

	Accessories
	1 x ASC10.51 

Connection terminals

SAY31P03

	AC 230 V	3-position
N	System neutral (SN)	
Y1	Positioning signal (actuator's stem extends)	
Y2	Positioning signal (actuator's stem retracts)	

SAY61P03

	AC / DC 24 V	D 0...10 V 4...20 mA 0...1000
G0	System neutral (SN)	
G	System potential (SP)	
Y	Positioning signal for DC 0...10 V / 4...20 mA	
M	Measuring neutral	
U	Position feedback DC 0…10 V - (System neutral is measuring ground M)	
Z	Control signal forced control	

SAY61P03/MO

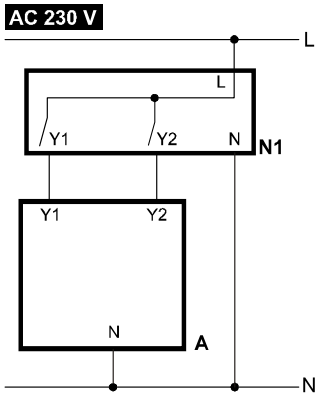
	AC / DC 24 V	Modbus RTU connecting cable
G0	System neutral (SN)	black
G	System potential (SP) AC 24 V / DC 24 V	red
REF	Reference line (Modbus RTU)	violet
+	Bus + (Modbus RTU)	gray
-	Bus - (Modbus RTU)	pink

SAY81P03

	AC / DC 24 V	3-position
G	System potential (SP)	
Y1	Positioning signal (actuator's stem extends)	
Y2	Positioning signal (actuator's stem retracts)	

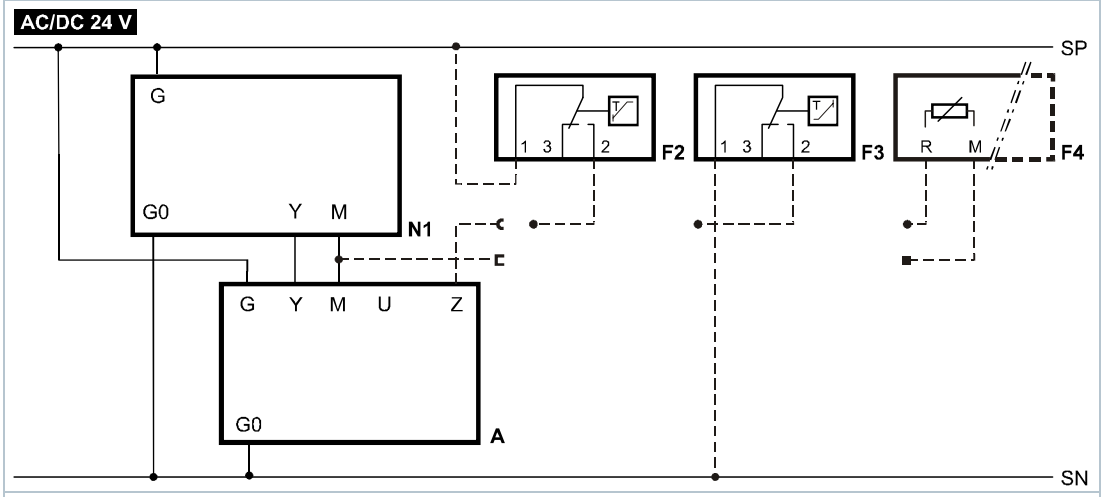
Connection diagrams

SAY31P03



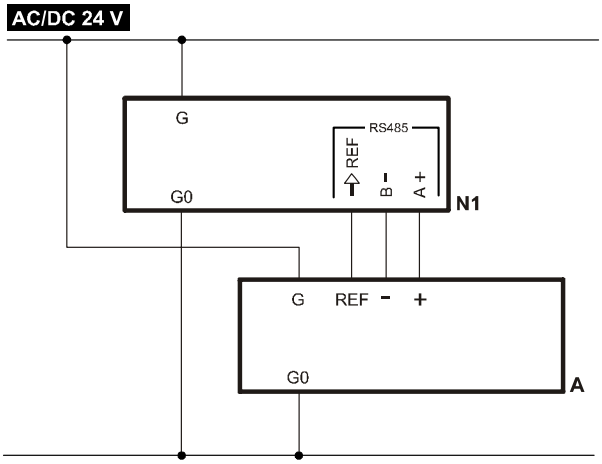
A	Actuator
L	Phase
N	Neutral
N1	Controller
Y1, Y2	Positioning signals

SAY61P03



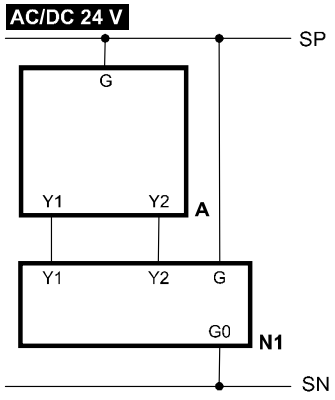
A	Actuator
F2	Frost protection thermostat: terminals: 1 – 2 frost hazard / sensor is interrupted (thermostat closes with frost) 1 – 3 normal operation
F3	Thermal reset limit thermostat
F4	Frost protection monitor with 0…1000 Ω signal output, does **NOT** support QAF21.. or QAQ61..
M	Measuring neutral
N1	Controller
SN	System zero
SP	System potential AC/DC 24 V
U	Position feedback - (System neutral is measuring ground M)
Y	Positioning signal
Z	Control signal forced control

SAY61P03/MO



A	Actuator
N1	Controller
G	System potential AC/DC 24 V
G0	System zero
REF	Reference line (Modbus RTU)
+	Bus + (Modbus RTU)
-	Bus - (Modbus RTU)

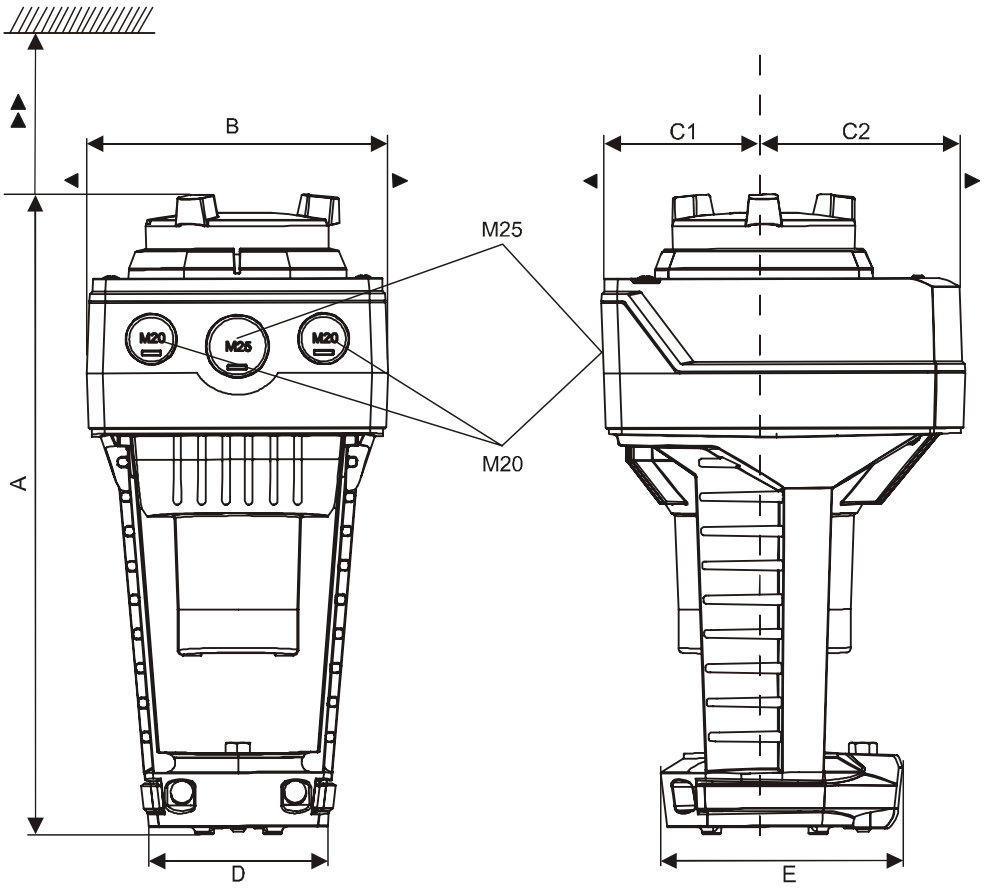
SAY81P03



A	Actuator
N1	Controller
SN	System zero
SP	System potential
Y1, Y2	Positioning signals

Dimensions

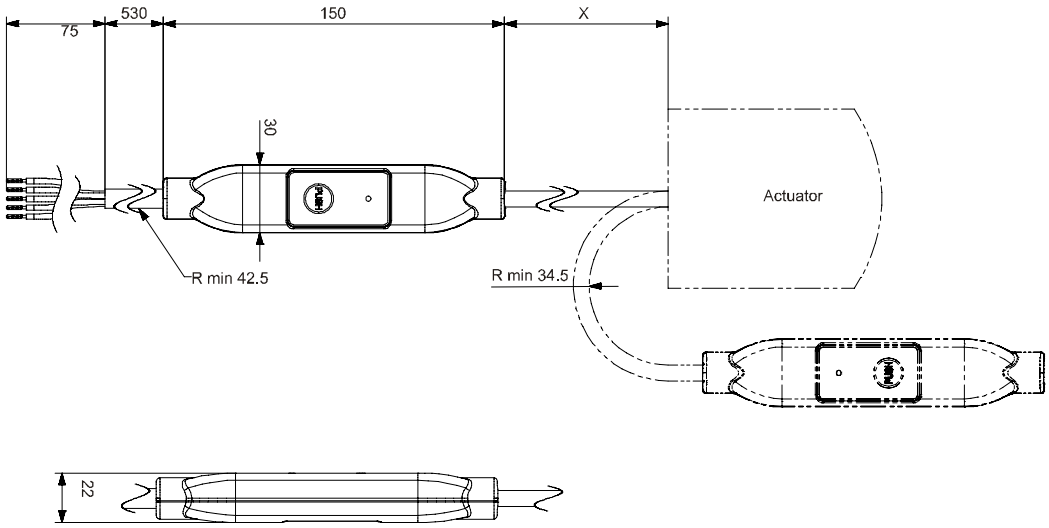
Actuator



Type	A	B	C	C1	C2	D	E	►	►►	kg
	[mm]									[kg]
SAY..P..	242	124	150	68	82	80	100	100	200	1.780
SAY61P03/MO [1]										1.930
With ASK39.1	267	154	300	200	100	-				2.010

[1] Device has fixed connection cable – left cable entry occupied

External Modbus converter



Dimensions in mm

Type	X	kg
	[mm]	[kg]
SAY61P03/MO	250	0.15 [1]

[1] Included in total weight.

Revision numbers

Type	Valid from rev. no.
SAY31P03	..A
SAY61P03	..B
SAY61P03/MO	..B
SAY81P03	..B

Issued by
Siemens Switzerland Ltd
Smart Infrastructure
Global Headquarters
Theilerstrasse 1a
CH-6300 Zug
Tel. +41 58 724 2424
www.siemens.com/buildingtechnologies

© Siemens Switzerland Ltd, 2015
Technical specifications and availability subject to change without notice.

8.21

A700000010950710

The following 31 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`A700000010950710.pdf`
Pages	31

SIEMENS

ACVATIX™

Electro-hydraulic actuators for valves

SKC..



with a 40 mm stroke

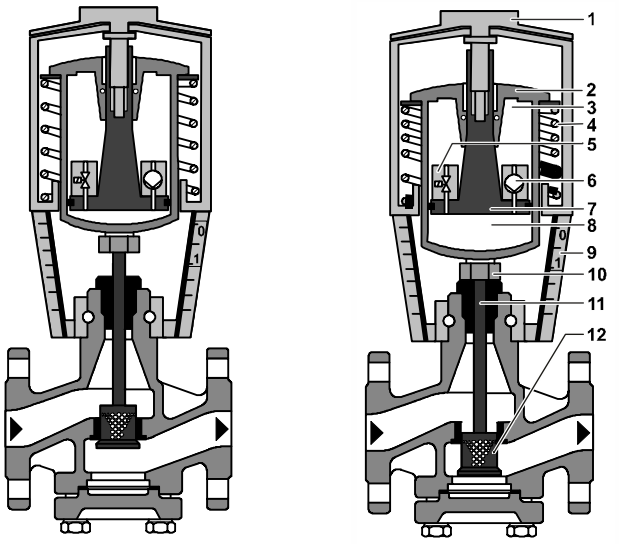
- SKC32.. Operating voltage AC 230 V, 3-position control signal
- SKC82.. Operating voltage AC 24 V, 3-position control signal
- SKC6.. Operating voltage AC 24 V,
  - Control signal DC 0...10 V, 4...20 mA or 0...1000 Ω
  - SKC62/MO RS-485 for Modbus RTU communication
  - Selection of flow characteristic, position feedback, stroke calibration, LED status indication, override control
  - SKC62UA with selection of direction of operation, stroke limit control, sequence control with adjustable start point and operation range, operation of frost protection monitors QAF21.. and QAF61..
- Positioning force 2800 N
- Versions with or without spring-return function
- For direct mounting on valves; no adjustments required
- Manual adjuster and position indicator
- Optional functions with auxiliary switches, potentiometer and stem heater
- SKC..U are UL-approved

Use

For the operation of Siemens 2-port and 3-port valves of the types VVF.. and VXF.. with a 40 mm stroke as control and safety shut-off valves in heating, ventilation and air conditioning systems.

Technical designs

Principle of electro-hydraulic actuators



Valve closed Valve opened

1	Manual adjuster
2	Pressure cylinder
3	Suction chamber
4	Return spring
5	Solenoid valve
6	Hydraulic pump
7	Piston
8	Pressure chamber
9	Position indicator (0 to 1)
10	Coupling
11	Valve stem
12	Plug

Opening the valve

The hydraulic pump [6] forces oil from the suction chamber [3] to the pressure chamber [8], thereby moving the pressure cylinder [2] downwards. The valve stem [11] retracts and the valve opens. Simultaneously, the return spring [4] is compressed.

Closing the valve

Activating the solenoid valve [5] allows the oil in the pressure chamber to flow back into the suction chamber. The compressed return spring moves the pressure cylinder upwards. The valve stem extends and the valve closes.

Manual operation mode

For manual operation, swing out the crank so that the display window becomes visible. By rotating the crank clockwise, the pressure cylinder is moved downwards. The display window shows the engagement bar and/or the scale dial with stroke indication.

In the manual operation mode, the positioning signals Y and Z can further open the valve but cannot move to the 0 % stroke position of the valve. To retain the manually set position, switch off the power supply or disconnect the positioning signals Y and Z. The crank remains swung out and in the display window the red indicator dial remains visible.

Hinweis: When setting the controller to manual operation for a longer period of time, we recommend adjusting the actuator with the manual adjuster to the desired position. This guarantees that the actuator remains in this position for that period of time.

Attention: Do not forget to switch back to automatic operation after the controller is set back to automatic control.

Automatic operation mode

For automatic operation, turn the manual adjuster clockwise to the end stop. The pressure cylinder moves upwards to the 0% stroke position of the valve. In the display window, the read scale disappears. Afterwards, swing the crank closed.

Minimal volumetric flow

The actuator can be manually adjusted to a stroke position > 0%, allowing its use in applications requiring a constant minimal volumetric flow.

SKC32.. SKC82..

3-position control signal

The actuator is controlled by a 3-position signal either via terminals Y1 or Y2 and generates the desired stroke, which is transferred to the valve stem:

● Voltage on Y1:	Piston extends	Valve opens
● Voltage on Y2:	Piston retracts	Valve closes
● No voltage on Y1 and Y2:	Piston and valve stem remain in the respective position	

SKC62.. SKC60

Y positioning signal

DC 0...10 V and/or 0...1000 Ω, DC 4...20 mA

The actuator is either controlled via terminal Y or override control Z. The positioning signals generate the desired stroke by means of the above described principle of operation, which is transferred to the valve stem:

● Signal Y increasing:	Piston extends	Valve opens
● Signal Y decreasing:	Piston retracts	Valve closes
● Signal Y constant:	Piston and valve stem remain in the respective position	
● Override control Z:	See Functions [→ 8]	

Frost protection monitor

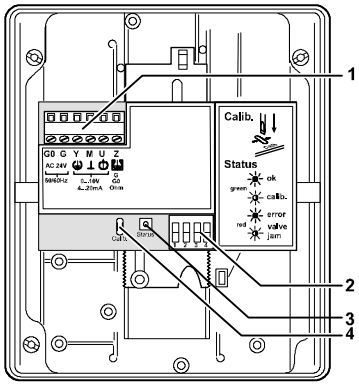
Frost protection thermostat

A frost protection thermostat can be connected to the SKC6.. actuator.

The added signals from the frost protection monitors QAF21.. and QAF61.. require the use of SKC62UA actuators. Notes on special programming of the electronics are described under Electronics [→ 5].

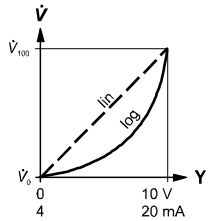
Connection diagrams for operation with frost protection thermostat or frost protection monitor can be found under Connection diagrams [→ 26].

SKC60 [1)]

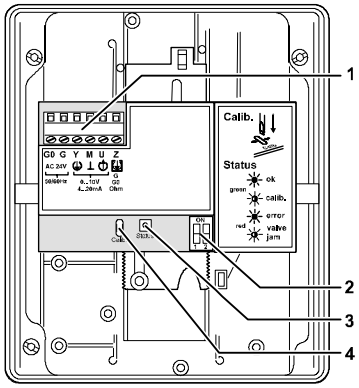


1 Connection terminals
2 DIL switches
3 LED status indication
4 Stroke calibration

1) From version ..L onward

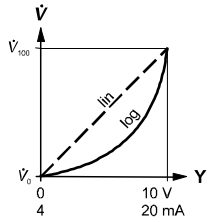
DIL switches								
	Direction of operation		**Fail-in-place (behaviour in case of control signal loss) ****		**Positioning signal Y Positioning feedback U**		**Flow characteristic**	
ON		Reverse acting		Stops at current position		DC 4...20 mA		lin = linear
OFF *		Direct acting		Closes		DC 0...10 V		log = equal percentage
					Relationship between positioning signal Y and volumetric flow			
*	Factory setting: all switches OFF							
**	Only considered when DIL switch 3 ON (control signal = DC 4…20 mA)							

SKC60 [2)], SKC62..

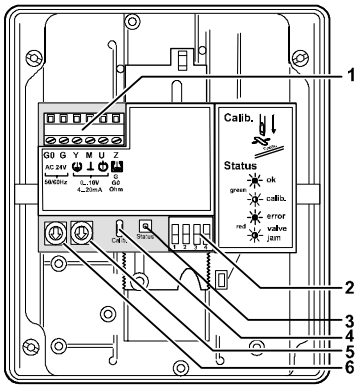


1 Connection terminals
2 DIL switches
3 LED status indication
4 Stroke calibration

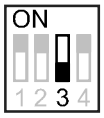
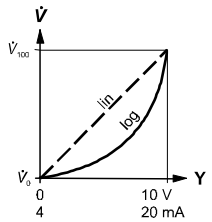
2) Up to and including version ..K

DIL switches				
	Positioning signal Y **Positioning feedback U**		**Flow characteristic**	
ON		DC 4...20 mA		lin = linear
OFF *		DC 0...10 V		log = equal percentage
			Relationship between positioning signal Y and volumetric flow	
*	Factory setting: all switches OFF			

SKC62UA



1	Connection terminals
2	DIL switches
3	LED status indication
4	Stroke calibration
5	Rotary switch UP (factory setting 0)
6	Rotary switch LO

DIL switches								
	Direction of operation		**Sequence control or stroke limit control**		**Positioning signal Y** **Positioning feedback U**		**Flow characteristic**	
ON		Reverse acting		Sequence control Signal addition QAF21../QAF61..		DC 4...20 mA		lin = linear
OFF *		Direct acting		Stroke limit control		DC 0...10 V		log = equal percentage
					Beziehung zwischen Stellsignal Y und Volumendurchfluss			
*	Werkseinstellung: alle Schalter auf OFF							

SKC62/MO

The Modbus converter is designed for analog control at 0...10 V.

Keep the analog signal setting on the actuator as is (switch 1 to OFF); adjustment not permitted.

The actuators are factory configured for equal-percentage characteristic.

DIL switch (internal actuator characteristic changeover) to "log" (switch 2 to OFF).

Functions

Spring-return function

The SKC32.61.., SKC82.61.. and SKC62.., which feature a spring-return function, incorporate a solenoid valve which opens if the control signal or power fails. The return spring causes the actuator to move to the 0% stroke position and closes the valve.

Calibration

SKC60, SKC62.., SKC62/MO

In order to determine the stroke positions 0% and 100% in the valve, calibration is required on initial commissioning.

▷ Mechanical coupling of the actuator SKC6.. with a Siemens valve.

▷ ⚠ **Actuator must bin in „Automatic operation mode“ enabling stroke calibration to capture the effective 0% and 100% values.**

▷ AC 24 V power supply applied.

▷ Housing cover removed.

1. Short-circuit contacts in calibration slot (e.g. with a screwdriver) and trigger calibration process.

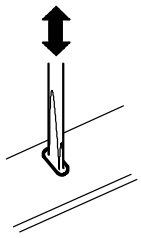
2. Actuator moves to 0% stroke position [1].

⇨ Valve closes.

3. Actuator moves to 100% stroke position [2].

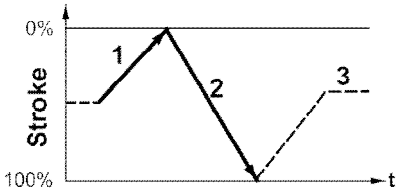
⇨ Valve opens.

⇨ Measured values are stored.



LED flashes grün, positioning feedback U inactive

⇨ Normal operation:
Actuator moves to the position [3] as indicated by signals Y or Z.
LED is lit green permanently, positioning feedback U active, values correspond to the actual positions.



A red lit LED on the actuator indicates a calibration error.

The LED on the SKC62/MO cable adapter flashes red during the calibration, as the positioning signal Y and the positioning feedback U do not correspond anymore. This is interpreted as a blockage and thus indicated as an error.

necessary, the calibration can be repeated any number of times.

LED indication of operational status

SKC60, SKC62.., SKC62/MO

The dual-colored LED indicating the operational status is visible when the cover is removed.

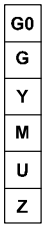
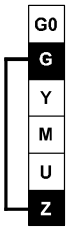
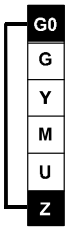
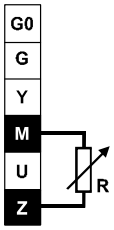
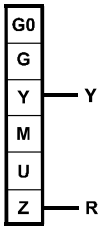
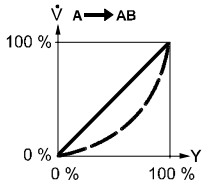
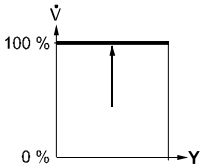
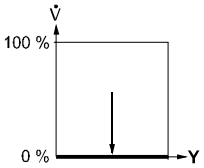
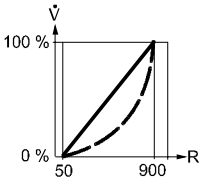
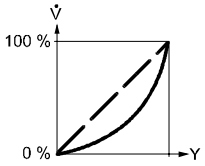
LED indication	Function	Remarks, troubleshooting
 Lit green	Normal operation	Automatic operation; everything o.k.
 Flashing green	Stroke calibration in progress	Wait until calibration is finished (LED stops flashing, will be lit green or red)
 Lit red	Faulty stroke calibration	Check mounting; restart stroke calibration (by short-circuiting calibration slot)
	Internal error	Replace electronics
 Flashing red	Inner valve jammed	Troubleshoot, check valve, restart stroke calibration
 Dark	No power supply	Check mains network, check wiring
	Electronics faulty	Replace electronics

As a general rule, the LED can only assume the states shown above – continuously lit red or green, flashing red or green, or off/dark.

Override control Z

SKC60, SKC62..

The override control input Z can be operated in the following modes of operation:

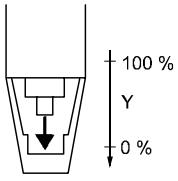
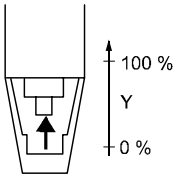
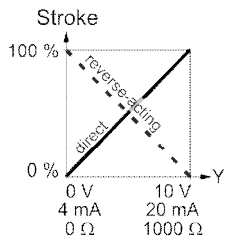
Z-mode					
	No function	**Fully open**	**Closed**	**Override with 0…1000 Ω**	**Signal addition** SKC62UA only
Connections					
Transfer					
	Equal percentage or linear			Equal percentage or linear	
	• Z-contact not connected	• Z-contact directly connected to G	• Z-contact directly connected to G0	• Z-contact connected to M via resistor R • Starting position at 50 Ω End position at 900 Ω	• Z-contact connected to R of frost protection monitor QAF21.. or QAF61..
	• Valve stroke follows Y-input	• Y-input has no effect			• Valve stroke follows Y **and** R(Z) signal

Shown operation modes are based on the factory setting “direct acting”.
Y-input has no effect in Z-mode..

Selection of direction of operation

SKC60 (from version ..L), SKC62UA

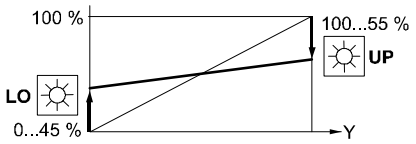
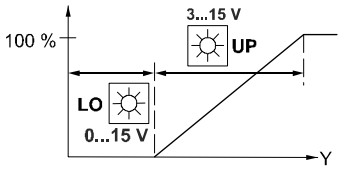
- With normally-closed valves, “direct acting” means that with a signal input of 0 V, the valve closes (applies to all Siemens valves listed under Equipment combinations [→ 12]).
- With normally-open valves, “direct acting” means that with a signal input of 0 V, the valve is open.

Direct acting		**Reverse acting**		**Stroke**
				
Input	DC 0...10 V DC 4...20 mA 0...1000 Ω	Input	DC 0...10 V DC 4...20 mA 0...1000 Ω	

The mechanical spring-return function is not affected by the direction of operation selected.

Stroke limit control and sequence control

SKC62UA

Setting the stroke limit control		Setting the sequence control
The rotary switches LO and UP can be used to apply a lower and upper limit to the stroke in increments of 3%, up to a maximum of 45%.		The rotary switches LO and UP can be used to determine the start point or the operating range of a sequence.
		

Position of LO	Lower stroke limit	Position of UP	Upper stroke limit		Position of LO	Sequence control start point	Position of UP	Sequence control operating range
0	0 %	0	100 %		0	0 V	0	10 V
1	3 %	1	97 %		1	1 V	1	10 V *
2	6 %	2	94 %		2	2 V	2	10 V **
3	9 %	3	91 %		3	3 V	3	3 V ***
4	12 %	4	88 %		4	4 V	4	4 V
5	15 %	5	85 %		5	5 V	5	5 V
6	18 %	6	82 %		6	6 V	6	6 V
7	21 %	7	79 %		7	7 V	7	7 V
8	24 %	8	76 %		8	8 V	8	8 V
9	27 %	9	73 %		9	9 V	9	9 V
A	30 %	A	70 %		A	10 V	A	10 V
B	33 %	B	67 %		B	11 V	B	11 V
C	36 %	C	64 %		C	12 V	C	12 V
D	39 %	D	61 %		D	13 V	D	13 V
E	42 %	E	58 %		E	14 V	E	14 V
F	45 %	F	55 %		F	15 V	F	15 V

* Operating range of QAF21.. (see below)

** Operating range of QAF61.. (see below)

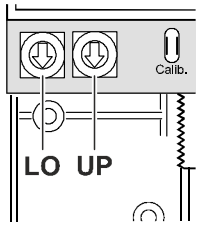
*** The smallest adjustment possible is 3 V; control with 0...30 V is only possible via Y.

Stroke control with QAF21.. / QAF61.. signal addition

SKC62UA

Setting the signal addition

The operating range of the frost protection monitor QAF21.. or QAF61.. can be defined with rotary switches LO and UP.



Position of LO	Sequence control start point	Position of UP	QAF21.. / QAF61.. operating range
0	→	1	QAF21..
0	→	2	QAF61..

Type summary

Type			Operasting voltage	Positioning signal	Spring-return-		Positioning	
					Function	Time	Opening	Closing
SKC32.60 [1]		-	AC 230 V	3-position	-	-	120 s	120 s
SKC32.60/F [1], [3]								
SKC32.61 [1]					yes	18 s		
SKC32.61/F [1], [3]								
SKC82.60 [1]			AC 24 V		-	-		
SKC82.60U [2]								
SKC82.61 [1]					yes	18 s		
SKC82.61U [2]								
SKC60 [1], [4]		Standard electronics		DC 0...10 V 4...20 mA 0...1000 Ω	-	-	120 s	20 s
SKC62 [1]					yes	20 s		
SKC62/F [1], [3]								
SKC62U [2]								
SKC62UA [2], [5]		Enhanced electronics						
SKC62/MO [2]	S55195-A128	Standard electronics		Modbus RTU				

[1] Approbation: CE

[2] Approbation: CE, UL

[3] Only available in France

[4] Enhanced functions, from version ..L onward: Direction of operation, fail-in-place

[5] Enhanced functions: Direction of operation, stroke control limit, sequence control, signal addition

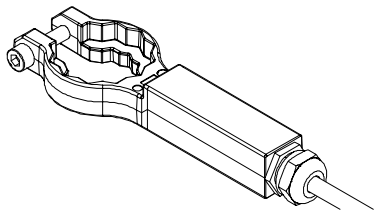
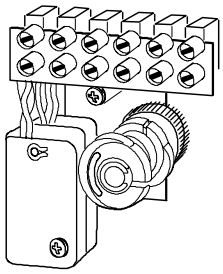
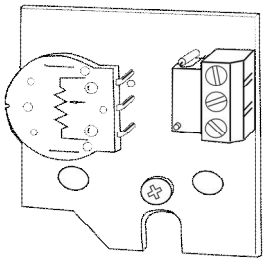
Scope of delivery

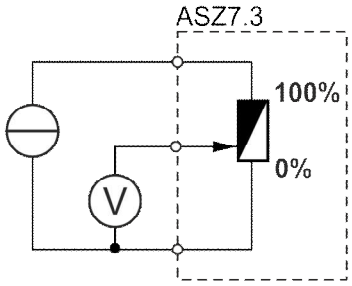
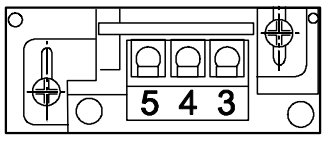
The actuator, valve and accessories are supplied in separate packaging and not assembled prior to delivery.

Accessories / spare parts

Accessories

Type	Auxiliary switch	Double auxiliary switch	Potentiometer 1000 Ω	Stem heater AC 24 V
	ASC1.6	ASC9.3	ASZ7.3	ASZ6.6 (S55845-Z108)
	Max. 2			
SKC32..	-	Max.1	Max.1	Max.1
SKC82				
SKC6..	Max.1	-	-	

<table>
<tr><td>SKC..</td><td colspan="2">ASZ6.6 (S55845-Z108)
Steam heater

● For media below 0 °C
● Mount between valve and actuator</td></tr>
<tr><td rowspan="4">SKC32..
SKC82..</td><td>ASC9.3
Double auxiliary switch</td><td>ASZ7.3
Potentiometer</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Adjustable switching points</td><td>0…1000 Ω</td></tr>
<tr><td>Note: ASZ7.3</td><td colspan="2">For the combination SIMATIC S5/S7 and use of positioning feedback, we recommend actuators with DC 0...9.8 V feedback signals.

The signal peaks that occur in the potentiometer ASZ7.3 may result in error messages on Siemens SIMATIC. This is not the case when combined with Siemens HVAC controllers. The reason is that SIMATIC has a higher resolution and faster response time.
Use the potentiometer as voltage divider on the 3-wire connection. Powering the potentiometer over the wiper may shorten the life cycle of the potentiometer. Signal peaks increase in frequency and scope over the lifespan in this operating mode.

</td></tr>
<tr><td>SKC60
SKC62..</td><td colspan="2">ASC1.6
Auxiliary switch


Switching point 0...5 % stroke</td></tr>
</table>

For more information, see Technical data [→ 19]

Ordering (example)

Type / Stock number [1]	Designation	Number of pieces
SKC62/MO / S55195-A127	Actuator Modbus RTU	1
ASC1.6	Auxiliary switch	1

[1] Specify stock number if available.

Spare parts

Actuator	Cover	Hand control [1]	Clamp	Stem connection	Control unit
					
SKC32.60	410455828	426855108	410355768	417856498	-
SKC32.61					
SKC82.60					
SKC82.60U			410356058		
SKC82.61			410355768		
SKC82.61U			410356058		
SKC60			410355768		466857598
SKC62					466857488
SKC62U			410356058		
SKC62UA					466857518
SKC62/MO			410355768		466857488

[1] Hand control, blue with mechanical parts

Equipment combinations

2-port valves VV.. (control or safety shut-off valves)

Valve type		DN	PN class	k_{vs} [m^3/h]	Data sheet
VVF21.. [1]	Flanged	100	6	124...160	N4310
VVF22..				160	N4401
VVF31.. [1]		100...150	10	124...315	N4320
VVF32..				160...400	N4402
VVF40.. [1]			16	124...315	N4330
VVF41.. [1]		65...150		49...300	N4340
VVF45..					N4345
VVF43..		15...80		50...400	N4404
VVF42..		100...150	25	125...400	N4403
VVF53..		65...150	25	63...400	N4405
VVF61..		15...50	40	49...300	N4382
VVF63..		15...50		50...315	A6V11459527

Admissible differential pressures Δp_{max} and closing pressures Δp_s: cf. relevant valve data sheets

[1] Valves are no longer available

3-port valves VX.. (control valves for “mixing” and “distribution”)

Valve type		DN	PN class	k_{vs} [m^3/h]	Data sheet
VXF21.. [1)]	Flanged	100	6	124...160	N4410
VXF22..				160	N4401
VXF31.. [1)]		100...150	10	124...315	N4420
VXF32..				160...400	N4402
VXF40.. [1)]			16	124...315	N4430
VXF41.. [1)]		65...150		49...300	N4440
VXF43..		15...80		63...400	N4404
VXF42..		100...150	25	125...400	N4403
VXF53..		65...150	25	63...400	N4405
VXF61..			40	49...300	N4482

Admissible differential pressures Δp_{max} and closing pressures Δp_s: cf. relevant valve data sheets

[1)] Valves are no longer available

Third-party valves with strokes between 6...20 mm can be motorized, provided they are “closed with the de-energized” fail-safe mechanism and provided that the necessary mechanical coupling is available. For SKC32.. and SKC82.. the Y1 signal must be routed via an additional, freely adjustable end switch (ASC9.3) to limit the stroke.

We recommend that you contact your local Siemens office for the necessary information.

Product documentation

SKC..				Accessories	Mounting instructions	
Mounting instructions SKB../SKC..	M3240	74 319 0324 0		**ASC1.6**	G4563.3	4 319 5544 0
		74 319 0326 0		**ASC9.3**	G4561.3	4 319 5545 0
		(Setting instructions Standard electronics)		**ASZ7.3**		74 319 0247 0
		A5W00027551		**ACT control unit**	M4568	74 319 0554 0
		(Mounting instructions Modbus converter)		**QAF21..**		74 319 0399 0
		A6V12057657		**ASZ6.6**	M4501.1	74 319 0750 0
		(Communication profiles Modbus)				

Related documents such as environmental declarations, CE declarations, etc., can be downloaded at the following Internet address:

http://siemens.com/bt/download

Notes

Safety



⚠ CAUTION

National safety regulations

Failure to comply with national safety regulations may result in personal injury and property damage.

- Observe national provisions and comply with the appropriate safety regulations.



⚠ WARNING

Tensioned spring return

Opening the actuator housing can release the highly tensioned return spring, which can cause flying parts and injuries.

- Do not open the actuator housing.



⚠ WARNING

Risk of injury through broken housing or cover

Dismounting the actuator with broken housing from the valve can release the highly tensioned spring return, which can cause flying parts and injury.

- NEVER dismount actuator from valve.
- Dismount valve-actuator combination (control device) as complete unit.
- Disassembly only by qualified personnel.
- Send the control device along with an error report to the local Siemens office for analysis and disposal.
- Mount new control device (valve and actuator) properly.



⚠ WARNUNG

Risk of burns from hot actuator brackets

The actuator brackets on heating plants can also become hot from the contact with the hot valve during operation. The temperature of the actuator bracket can reach 100 ° C.

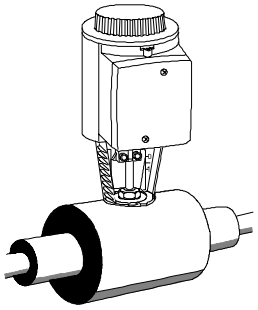
When servicing the actuator:

- Switch off both pump and operating voltage.
- Close the main shutoff valve in the piping.
- Release pressure in the pipes and allow them to cool off completely.

Conduct the electrical connections in accordance with local regulations on electrical installations as well as the section Connection diagrams [→ 26].

⚠	***NOTE***
	Using a safety limiter Failure to comply with applicable regulations for cable insulation may result in the suspension of the safety limiter function. ● Compliance with all applicable regulations for cable insulation must be ensured by the plant operator.

⚠	**⚠ WARNING**
	Risk of injury and fire from hot device parts For media below 0 °C, the stem heater ASZ6.6 keeps the valve stem ice-free. In this case, the actuator bracket and the valve stem must not be insulated in order to ensure air circulation. Touching heated parts without safety measures leads to burns. ● For safety reasons, the steam heater is operated with AC 24 V / 30 W. ● Recommendation: For media above 140 °C, the valve must be insulated.



Observe admissible temperatures, see Use [→ 2] and Technical data [→ 19].

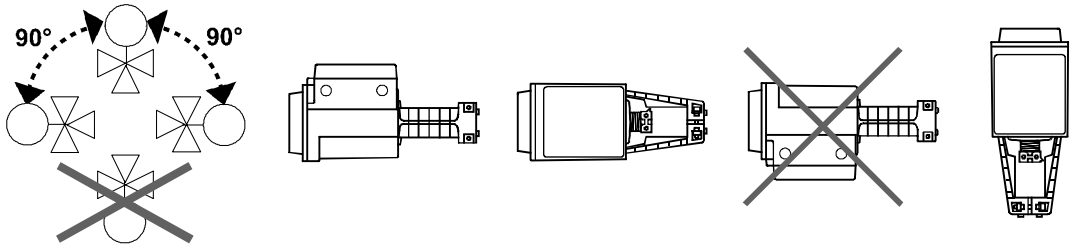
If an auxiliary switch is used, its switching point should be indicated on the plant schematic.

Every actuator must be driven by a dedicated controller, see Connection diagrams [→ 26].

Mounting

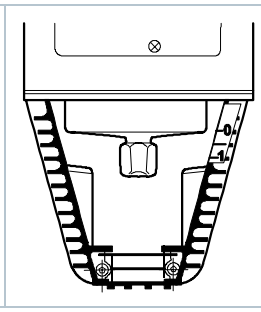
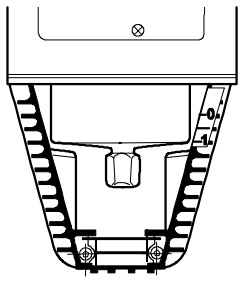
Mounting Instructions 74 319 0324 0 for fitting the actuator to the valve and A5W00027551 for SKC62/MO are enclosed in the actuator packaging. The instructions for accessories are enclosed with the accessories themselves (see Product documentation [→ 13]).

Mounting positions



Commissioning

When commissioning the system, check the wiring and functions, and set any auxiliary switches and potentiometers as necessary, or check the existing settings.

Cylinder with valve stem connector fully retracted → stroke = 0 %		Cylinder with valve stem connector fully extended → stroke = 100 %	

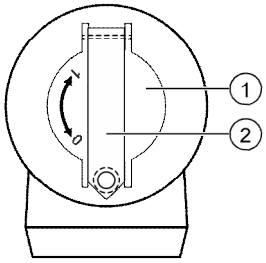
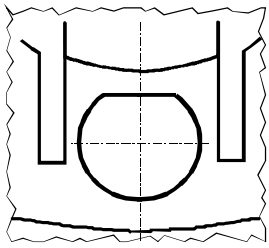
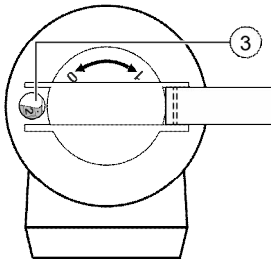
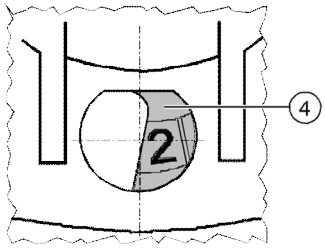
The manual adjuster must be rotated counter-clockwise to the end stop.
This causes the Siemens valves, types VVF.. und VXF.. to close (stroke = 0 %).

Automatic operation

For automatic operation, the crank [2] on the manual adjustment knob [1] must be engaged. If not engaged, turn the crank counter-clockwise until the display window [3] shows neither the scale [4] nor the crank engagement bar.

Manual operation

For manual operation, swing out the crank [2] so that the display window [3] becomes visible. By rotating the crank or the manual adjustment knob [1], the display window shows the engagement bar and/or the scale dial [4] with stroke indication.

	
Engaged crank [2] on the manual adjustment knob [1]	Display window with invisible scale dial and crank engagement bar
	
Swung-out crank; display window [3]	Display window with scale dial [4] and stroke indication in mm

Maintenance

The actuators are maintenance-free.

When **servicing** the control device:



⚠ WARNING

Risk of burns from hot actuator brackets

The actuator brackets on heating plants can also become hot from the contact with the hot valve during operation. The temperature of the actuator bracket can reach 100 ° C.

When servicing the actuator:

- Switch off both pump and operating voltage.
- Close the main shutoff valve in the piping.
- Release pressure in the pipes and allow them to cool off completely.

	**⚠ WARNING**
	Risk of injury ● Disconnect electrical connections from the terminals as neede. ● The actuator must be properly installed prior to recommissioning the valve.



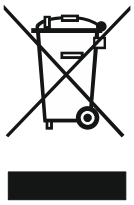
Recommendation SKC6..:
Trigger stroke calibration after maintenance.

Repair:
See Spare parts [→ 12]

	**⚠ WARNING**
	VerlRisk of injury through broken housing or cover Dismounting the actuator with broken housing from the valve can release the highly tensioned spring return, which can cause flying parts and injury. ● NEVER dismount actuator from valve. ● Dismount valve-actuator combination (control device) as complete unit. ● Disassembly only by qualified personnel. ● Send the control device along with an error report to the local Siemens office for analysis and disposal. ● Mount new control device (valve and actuator) properly.

Disposal

	**⚠ WARNING**
	Tensioned spring return Opening the actuator housing can release the highly tensioned return spring, which can cause flying parts and injuries. ● Do not open the actuator housing.

	The device is considered an electronic device for disposal in accordance with the European Guidelines and may not be disposed of as domestic garbage. ● Dispose of the device through channels provided for this purpose. ● Comply with all local and currently applicable laws and regulations.

Warranty

Technical data on specific applications are valid only together with Siemens products listed under "Equipment combinations". Siemens rejects any and all warranties in the event that third-party products are used.

Technical data

Power supply		
Operating voltage		
	SKC32..	AC 230 V ± 15 %
	SKC82..	AC 24 V ± 20 % (SELV/PELV)
	SKC6..	
	SKC62/MO	
Frequency		50 / 60 Hz
Maximum power consumption at 50 Hz		
	SKC32.60, SKC32.60/F	18 VA / 14 W
	SKC32.61, SKC32.61/F	24 VA / 18 W
	SKC82.60, SKC82.60U	15 VA / 12 W
	SKC82.61, SKC82.61U	19 VA / 14 W
	SKC60..	17 VA / 13 W
	SKC62..	21 VA / 15 W
External supply cable fuse		
	SKC32..	Min. 0.5 A, slow Max. 6 A slow
	SKC82..	Min. 1.6 A, slow Max. 10 A slow
	SKC6..	

Function data			
Positioning time at 50 Hz [1]			
	SKC32.6..	Opening, closing	120 s
	SKC82.6..	Opening, closing	120 s
	SK6..	Opening	120 s
		Closing	20 s
Spring-return time [1]			
	SKC32.61, SKC32.61/F		18 s
	SKC82.61, SKC82.61U		
	SKC62..		20 s
Positioning force			2800 N
Nominal stroke			40 mm
Maximum permissible medium temperature (valve fitted)			-25...220 °C
			< 0 °C: Requires stem heater ASZ6.6

Signal inputs / signal outputs		
Control signal		
	SKC32..	3- position
	SKC82..	
	SKC6..	DC 0…10 V
		DC 4…20 mA
		0…1000 Ω

Signal inputs / signal outputs			
Positioning signal Y SK6..			
	Input impedance	DC 0…10 V	100 kΩ
		DC 4…20 mA	240 Ω
	Signal resolution		< 1 %
	Hysteresis		1 %
Override control Z SK6..			
	Resistor		0…1000 Ω
	Z not connected, priority terminal Y		No function
	Z connected directly to G		Max. stroke 100 %
	Z connected directly to G0		Min. stroke 0 %
	Z connected to M via 0...1000 Ω		Stroke proportional to R
Position feedback U SK6..			
	Load impedance	DC 0…9.8 V	> 10 kΩ
		DC 4…19.6 mA	< 500 Ω

Enhanced functions SKC60 [2], SKC62UA			
Selection of direction of operation			
	SKC60, SKC62UA	Direct-acting / reverse-acting	DC 0...10 V / DC 10...0 V
			DC 4...20 mA / DC 20...4 mA
			0...1000 Ω / 1000...0 Ω
Stroke limit control			
	SKC62UA	Range of lower limit	0...45 % adjustable
		Range of upper limit	100...55% adjustable
Sequence control			
	SKC62UA	Terminal Y	
		Starting point of sequence	0...15 V adjustable
		Operating range of sequence	3...15 V adjustable
Signal addition			
	SKC62UA	Z connected to R of	
		Frost protection monitor QAF21..	0…1000 Ω, added to Y signal
		Frost protection monitor QAF61..	DC 1.6 V, added to Y signal

Communication SKC62/MO			
Communication protocol			
	Modbus RTU		RS-485, not galvanically isolated
	Number of nodes		Max. 32
	Adress range		1...248 / 255
		Factory setting	
	Transmission formats		1-8-E-1 / 1-8-O-1 / 1-8-N-1 / 1-8-N-2
		Factory setting	
	Baud rates (kBaud)		Auto / 9.6 / 19.2 / 38.4 / 57.6 / 76.8 / 115.2
		Factory setting	
	Bus termination		120 Ω electronically switchable
		Factory setting	

Electrical connections and connecting cable			
Wire cross-sectional area			0.5...2.5 mm², AWG 21...14 [3]
Cable entries			4 x M20 (ø 20.5 mm)
	SKC..U		With knockouts for standard ½" conduit connectors (ø 21.5 mm)
	SKC62/MO		Fixed connecting cable
		Cable length	0.9 m
		Number of cores	5 x 0.75 mm²

Degree and class of protection		
Protection class		As per EN 60730
	Automatic action	Type 1AA / Type 1AC / Modulation Action
	Pollution degree	2
Housing protection upright to sideways		IP 54 as per EN 60529

Environmental conditions			
Operation			IEC 60721-3-3
	Climatic conditions		Class 3K5
		Temperature, general	-15...<55 °C
		Humidity (non-condensing)	5...95 % r.h.
Transportation			IEC 60721-3-2
	Climatic conditions		Class 2K3
		Temperature	-30...65 °C
		Humidity (non-condensing)	5...95 % r.h.
Storage			IEC 60721-3-1
	Climatic conditions		Class 1K3
		Temperature	-15...55 °C
		Humidity (non-condensing)	-5...95 % r.h.

Directives and standards		
Product standard		EN 60730-x
Electromagnetic compatibility (Applications)		For use in residential, commerical, and industrial environments
EU conformity (CE)		A5W00007751 [4]
RCM conformity		A5W00007895 [4]
EAC conformityt		Eurasia conformity for all SKC..
UL, cUL	AC 230 V	-
	AC 24 V	UL 873 http://ul.com/database

Environmental compatibility
The product environmental declarations CE1E4566enX1 (SKC3.., SKC8..) [4], CE1E4566enX2 (SKC6..) [4] and A6V101083254 (external Modbus converter) [4] enthalten Daten zu umweltverträglichem Produktdesign und Prüfungen (RoHS-Konformität, Materialzusammensetzung, Verpackung, ökologischer Nutzen, Entsorgung).

Dimensions / weight			
Dimensions			See Dimensions [→ 30]
Weight			
	SKC32.60, SKC32.60/F		9.80 kg
	SKC32.61, SKC32.61/F		9.85 kg
	SKC82.60		9.80 kg
	SKC82.60U		10.10 kg
	SKC82.61		9.85 kg
	SKC82.61U		10.15 kg
	SKC60 SKC62, SKC62/MO		9.85 kg
		External Modbus converter	0.15 kg
	SKC62U SKC62UA		10.15 kg

Materialð	
Housing	Die-cast aluminium
Bracket	
Housing box	Plastic
Manual adjuster	

Accessories			
Auxiliary switch ASC1.6			
	SKC6..	Switching capacity	AC 24 V, 10 mA....4 A resistive, 2 A inductive
Double auxiliary switch ASC9.3			
	SKC32.., SKC82..	Switching capacity per auxiliary switch	AC 250 V, 6 A resistive, 2.5 A inductive
Potentiometer ASZ7.3			
	SKC32.., SKC82..	Change in overall resistance of potentiometer at nominal stroke	0...1000 Ω
Stem heater ASZ6.6			
		Operating voltage	AC 24 V ± 20 %
		Power consumption	40 VA / 30 W
		Inrush current	Max. 8.5 A (Max. temperature 85 °C / 185 °F)

1) At room temperature (23 °C); low ambient temperatures or high Δp may prolong these times

2) From version ..L onward

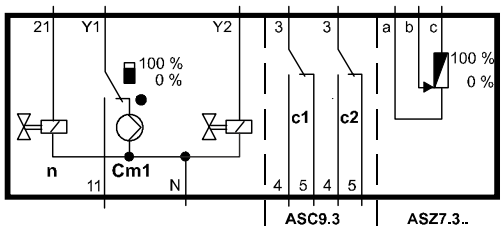
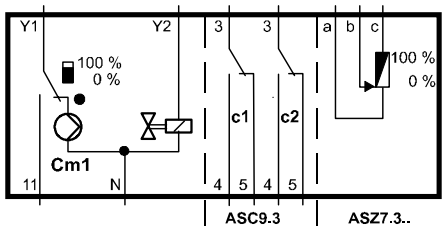
3) AWG = American wire gauge

4) The documents can be downloaded at http://www.siemens.com/bt/download

Connection diagrams

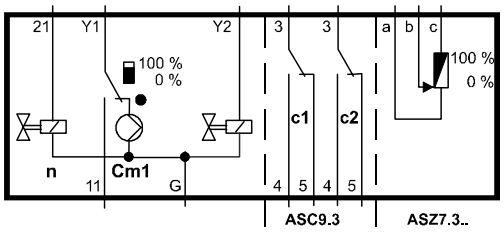
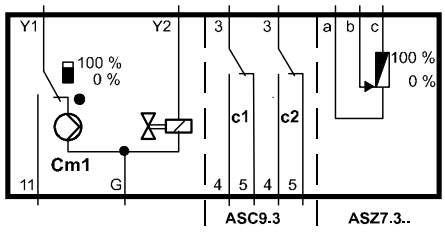
Internal diagrams

SKC32..

SKC32.61	SKC32.60
AC 230 V 3-position	
	

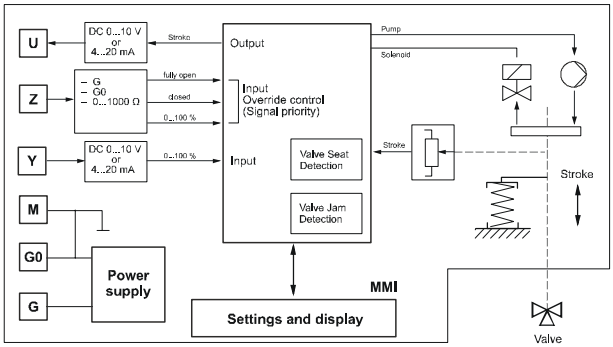
Cm1	End switch
n	Solenoid valve for spring-return
c1, c2	ASC9.3 double auxiliary switch
a, b, c	ASZ7.3 potentionmeter
Y1	Positioning signal „open“
Y2	Positioning signal „close“
21	Spring-return function
N	Neutral conductor

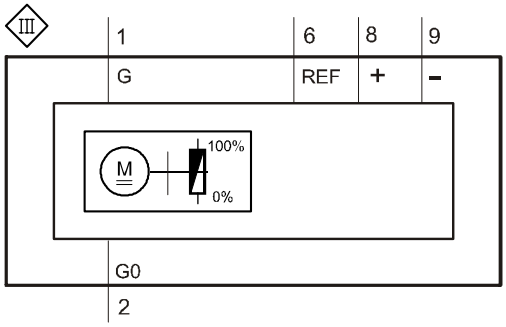
SKC82..

SKC82.61	SKC82.60
AC 24 V 3-position	
	

Cm1	End switch
n	Solenoid valve for spring-return
c1, c2	ASC9.3 double auxiliary switch
a, b, c	ASZ7.3 potentionmeter
Y1	Positioning signal „open“
Y2	Positioning signal „close“
21	Spring-return function
G	System potential

SKC6..

SKC60, SKC62 SKC62U, SKC62UA
AC 24 V
DC 0...10 V 4...20 mA 0...1000 Ω


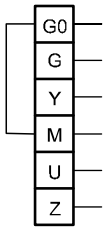
SKC62/MO
AC 24 V
Modbus RTU


U	Position indication	**REF**	Reference line (Modbus RTU)
Z	Override control	**+**	Bus + (Modbus RTU)
Y	Positioning signal	-	Bus - (Modbus RTU)
M	Measuring neutral		

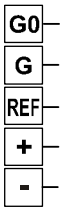
	G0	Operating voltage AC 24 V: System neutral (SN)	
	G	Operating voltage AC 24 V: System potential (SP) Switching without power as a spring-return function	

Connection terminals

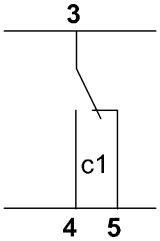
SKC6..

	AC 24 V	DC 0...10 V 4...20 mA 0...1000 Ω
	System neutral (SN)	
	System potential (SP)	
	Positioning signal DC 0...10 (30) V or DC 4...20 mA	
	Measuring neutral (= G0)	
	Position indication DC 0...10 V oder DC 4...20 mA	
	Override control (Functions [→ 8])	

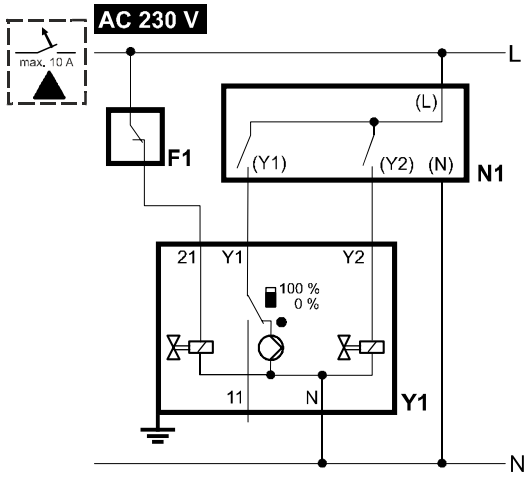
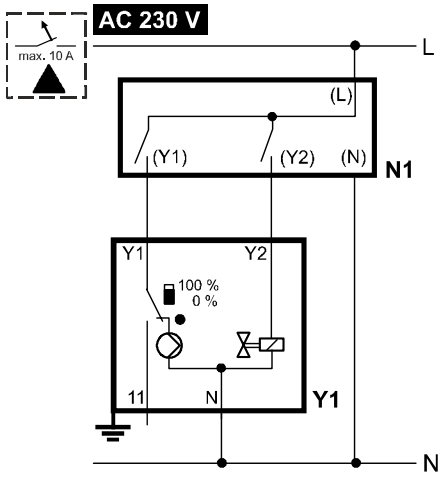
SKC62/MO

	AC 24 V	Modbus RTU Connecting cable
	System neutral (SN)	Black
	System potential (SP)	Red
	Reference line (Modbus RTU)	Violet
	Bus + (Modbus RTU)	Gray
	Bus - (Modbus RTU)	Pink

Auxiliary switch ASC1.6

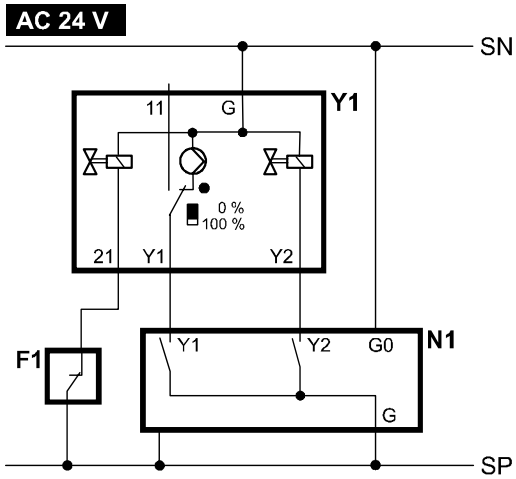
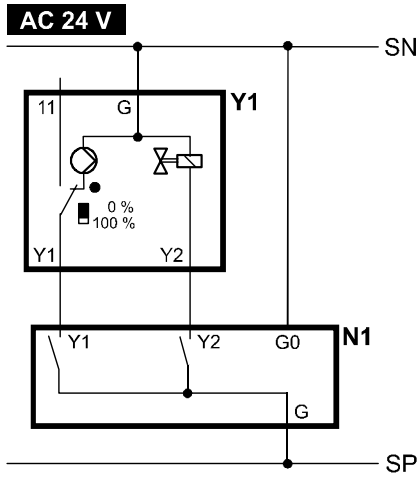
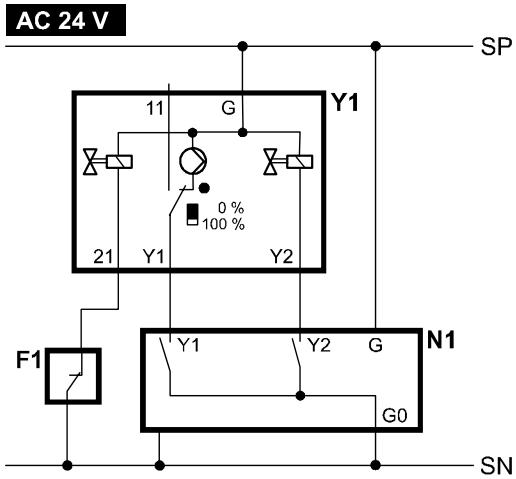
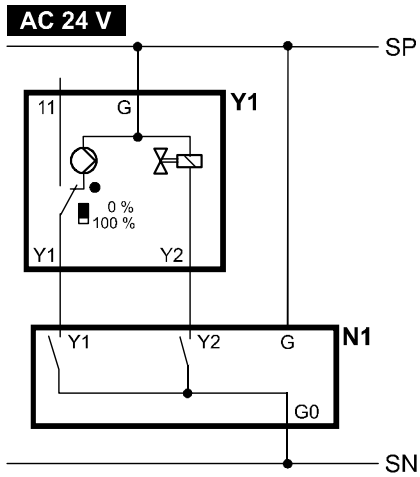


SKC32..

SKC32.61	SKC32.60
AC 230 V 3-position	
	

F1	Safety limiter (e.g. temperature limiter)			**Y1**	Positioning signal „open“
N1, N2	Controller	**L**	Phase	**Y2**	Positioning signal „close“
Y1, Y2	Actuators	**N**	Neutral	**21**	Spring-return function

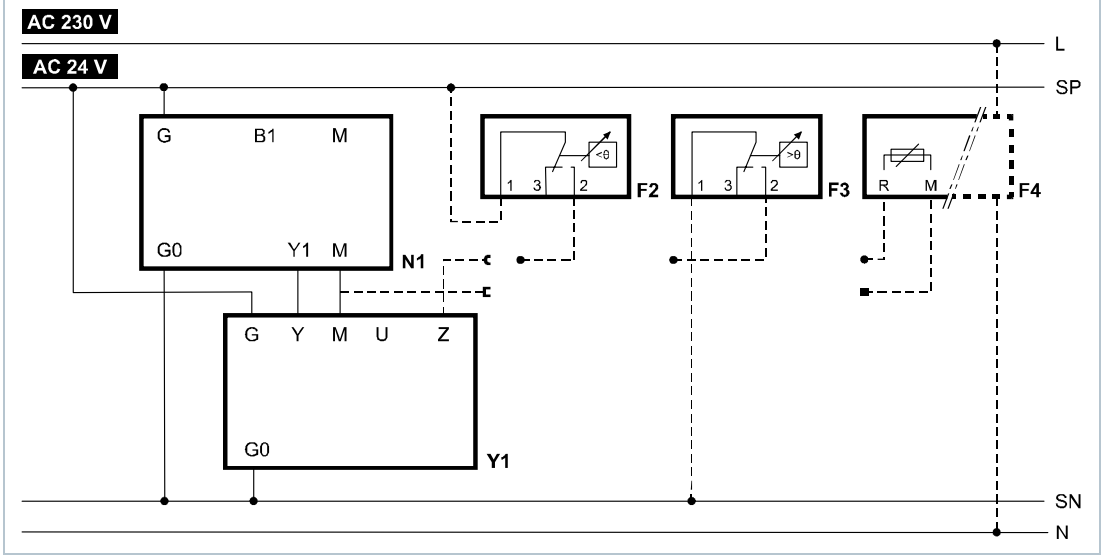
SKC82..

SKC82.61, SKC82.61U	SKC82.60, SKC82.60U
AC 24 V 3-position	
	
	

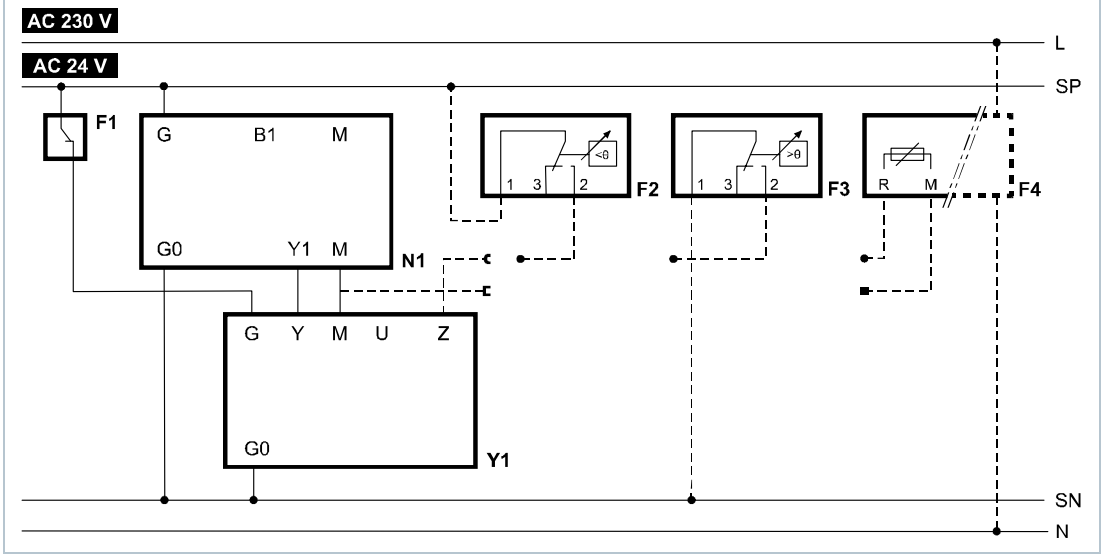
F1	Safety limiter (e.g. temperature limiter)			**(Y1), (Y2)**	Controller contacts
		SP	System potential AC 24 V	**Y1**	Positioning signal „open“
N1, N2	Controller	**SN**	System neutral	**Y2**	Positioning signal „close“
Y1, Y2	Actuators			**21**	Spring-return function

SKC6..

SKC60	
AC 24 V	DC 0...10 V 4...20 mA 0...1000 Ω

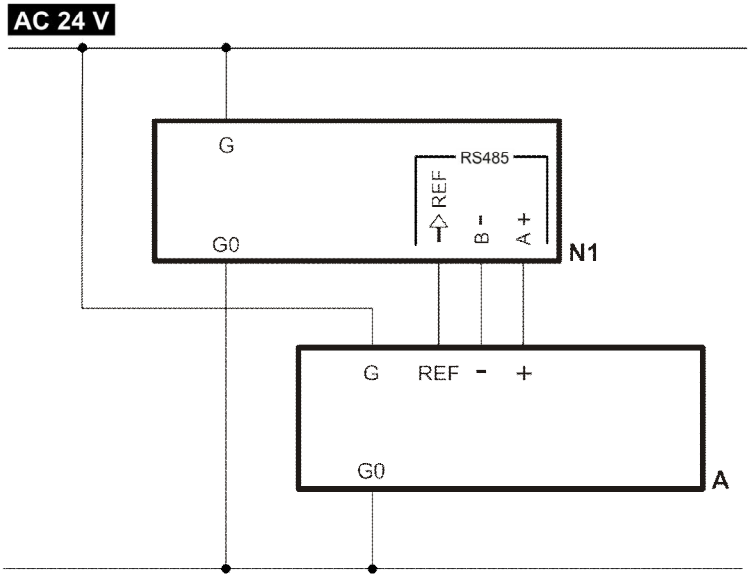


SKC62, SKC62U, SKC62UA	
AC 24 V	DC 0...10 V 4...20 mA 0...1000 Ω



Y1	Actuator			**F3**	Temperature detector
N1	Controller			**F4**	Frost protection monitor with 0...1000 Ω signal output, e.g. QAF21.. or QAF61.. (only SKC62UA) *)
F1	Safety limiter (e.g. temperature limiter)			**G (SP)**	System potential AC 24 V
F2	Frost protection thermostat			**G0 (SN)**	System neutral
	Terminals:	1-2	Frost hazard/sensor is interrupted (thermostat closes with frost)		
		1-3	Normal operation		

*) Only SKC62UA: only with sequence control and the appropriate selector switch settings, see Electronics [→ 5], Functions [→ 6]

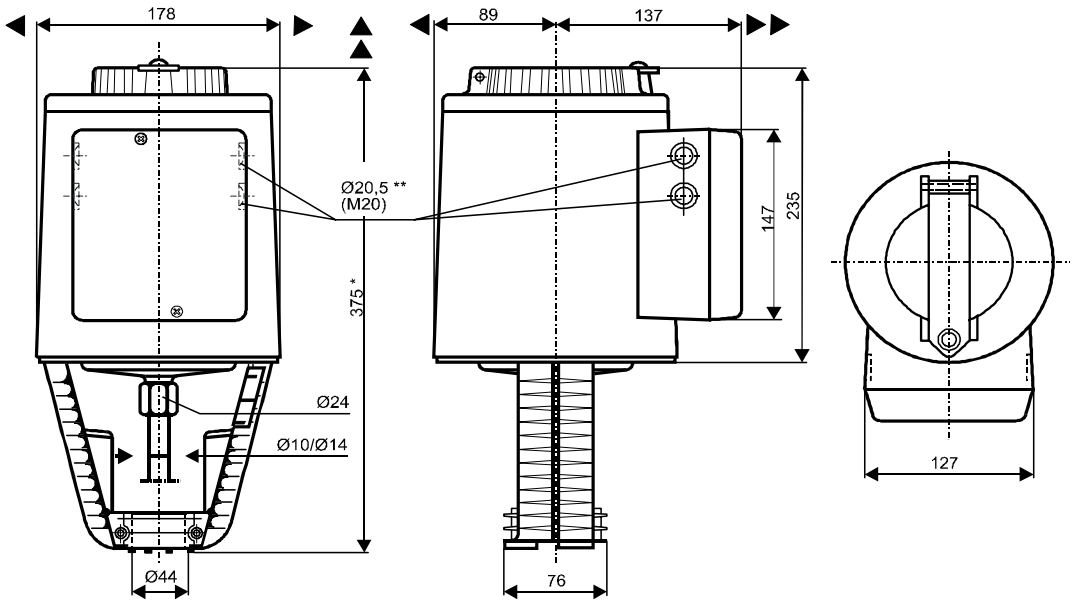
SKC62/MO
AC 24 V Modbus RTU


A	Actuator
N1	Controller
G	System potential
G0	System neutral
REF	Reference line (Modbus RTU)
+	Bus + (Modbus RTU)
-	Bus - (Modbus RTU)

⚠	***NOTE***
	Using safety limiter F1 When using the safety limiter F1, ensure that no mistakes may occur on cable insulation that may cancel out the temperature limiter function (applies to both 230 V as well as 24 V types). ● For SN earthing (e.g. PELV) comply under all circumstances with the note above.

Dimensions

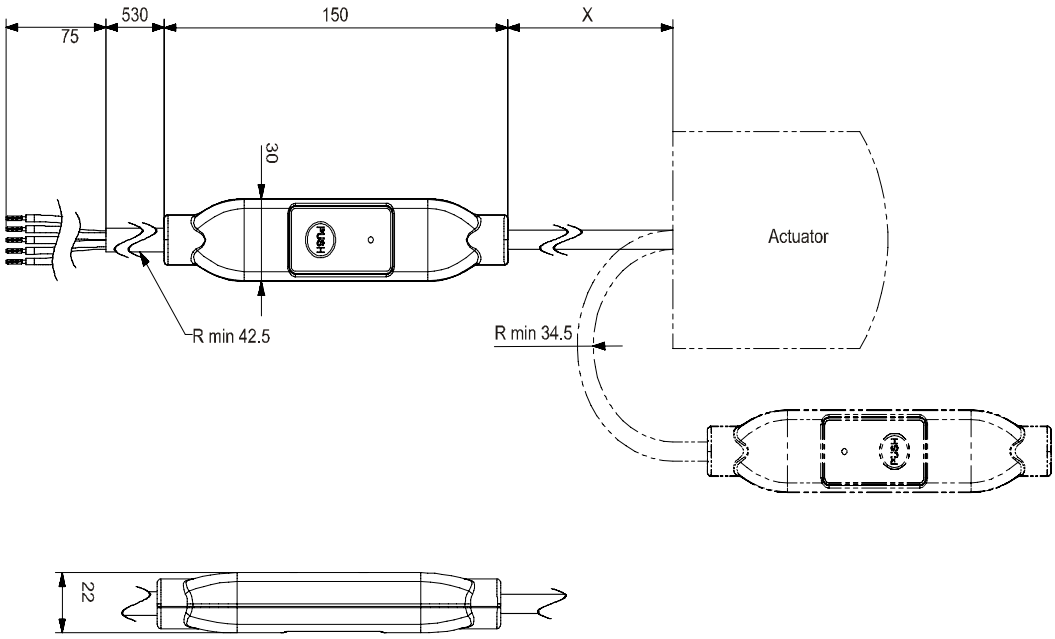
Actuator



All dimensions in mm

*	Height of actuator from plate **with** stroke inverter **ASK51 = 432 mm**
**	**SKC..U: with knockouts for standard ½" conduit connectors (Ø 21.5 mm)**
▶	> 100 mm, minimum clearance form ceiling or wall for mounting
▶▶	> 200 mm, connection, operation, maintenance, etc.

External Modbus converter



All dimensions in mm

X	250 mm

Revision numbers

Type	Valid from rev. no.	Type	Valid from rev. no.
SKC32.60	..D	SKC62	..G
SKC32.60/F	..D	SKC62/F	..G
SKC32.61	..D	SKC62U	..G
SKC32.61/F	..D	SKC60	..G
SKC82.60	..D	SKC62UA	..G
SKC82.60U	..D	SKC62/MO	..H
SKC82.61	..D		
SKC82.61U	..D		

Issued by
Siemens Switzerland Ltd
Smart Infrastructure
Global Headquarters
Theilerstrasse 1a
CH-6300 Zug
Tel. +41 58 724 2424
www.siemens.com/buildingtechnologies

© Siemens Switzerland Ltd, 1998
Technical specifications and availability subject to change without notice.

8.22

A700000011254668

The following 16 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	A700000011254668.pdf
Pages	16

SIEMENS

ACVATIX™

2-port and 3-port valves, externally threaded, PN16

VVG44.., VXG44..

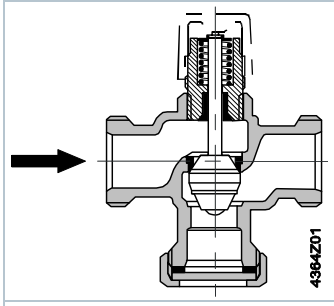


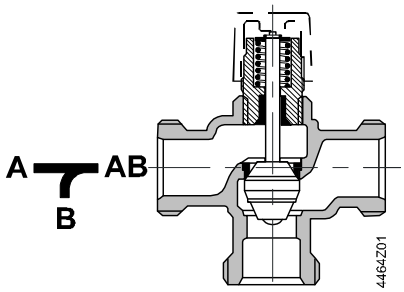
In small and medium-sized heating, ventilating and air conditioning systems as a control valve for mixing and diverting functions or as a shutoff valve. For closed circuits only.

- Housing made of bronze CC499K
- DN 15...40
- k_{vs} 0.25...25 m^3/h
- Flat sealing, externally threaded connections G..B, as per ISO 228-1
- Siemens can deliver fitting sets ALG.. with threaded connection and ALS.. with welded connection
- Manual adjustment by means of mounted knob
- Can be equipped with motorized SAS.. actuators

Design

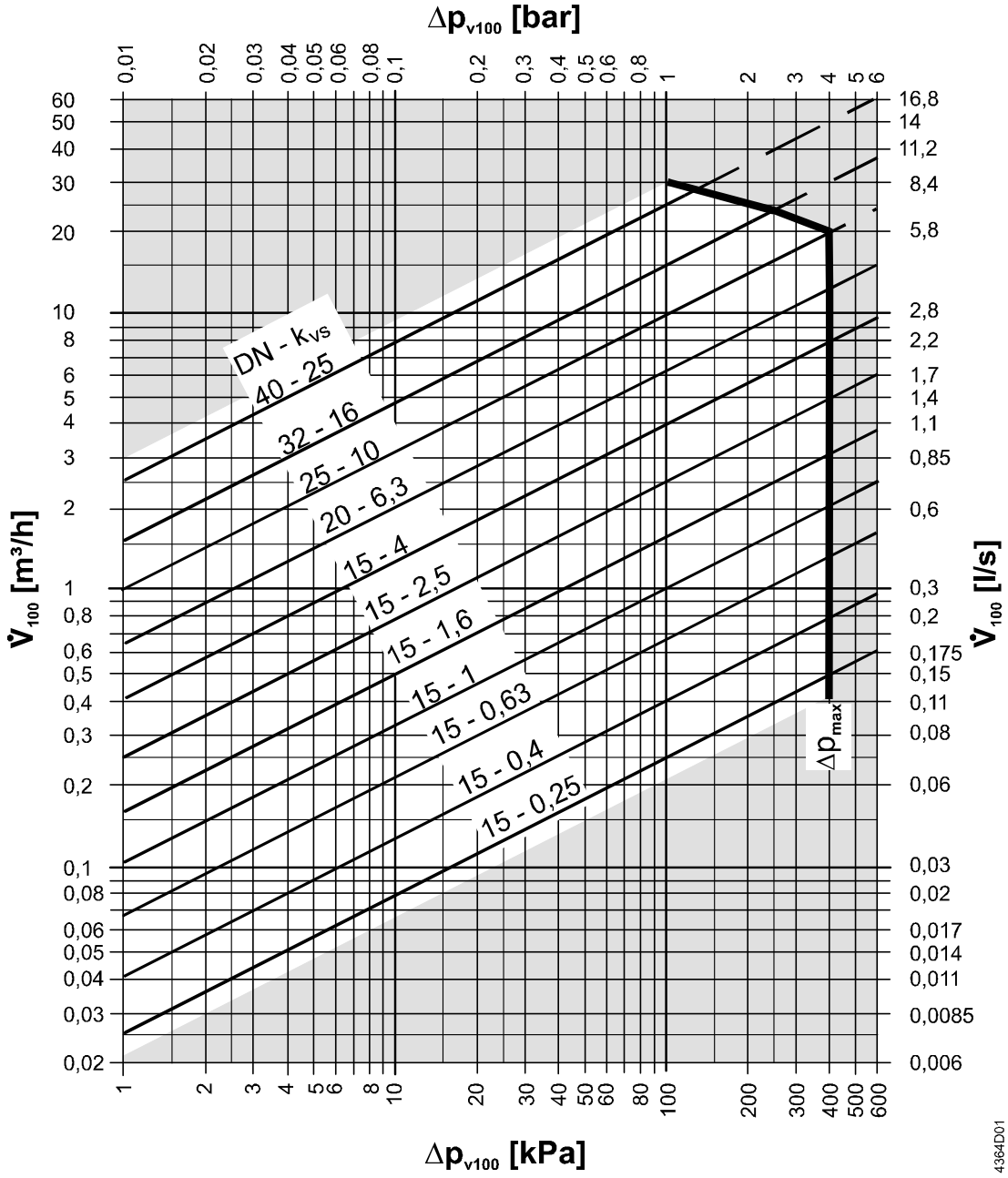
Valve cross-section:

VVG44..	
	Guided parabolic plug, integrated in the valve stem. The seat is pressed to the valve body with the aid of special gland material.
Caution: The 2-port seat valve does not become a three-port valve by removing the cover plate!	

VXG44..	
	Guided parabolic plug (as of DN25) which is integrated in the valve stem. The seat is fitted in the through-port and attached directly to the valve body in the bypass. From DN25, the seat in the through-port is attached directly to the valve body and fitted to the ring in the bypass.

Sizing

Flow diagram:



Δp_{max} = Maximum permissible differential pressure across the valve (VXG44..: mixing port: Ports A-AB, B-AB, diverting: Ports AB-A, AB-B), valid for the entire actuating range valve-actuator unit

Δp_{v100} = Differential pressure across the fully open valve and the valve's control path (VXG44..: A - AB, B - AB) at a volume flow V_{100}

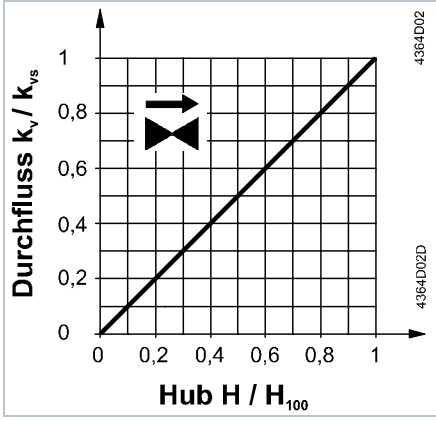
$\dot{V}_{100}$ = Volume flow through the fully open valve (H_{100})

100 kPa = 1 bar ≈ 10 mWS

1 m^3/h = 0.278 l/s water at 20 °C

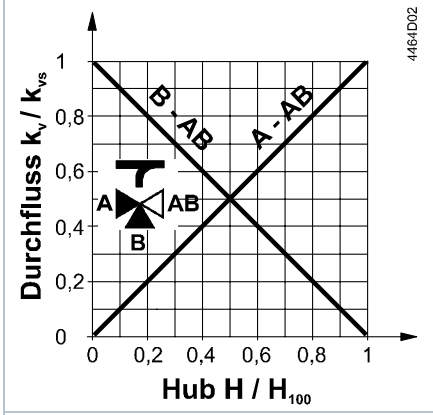
Valve flow characteristic

VVG44..



Valve flow characteristic:
Through-port: 0…100% linear as per VDI / VDE 2173

VXG44..



Valve flow characteristic:
Through-port: Linear as per VDI /VDE2173
Bypass: Linear as per VDI /VDE2173

Mixing:
Flow from port A and B to port AB

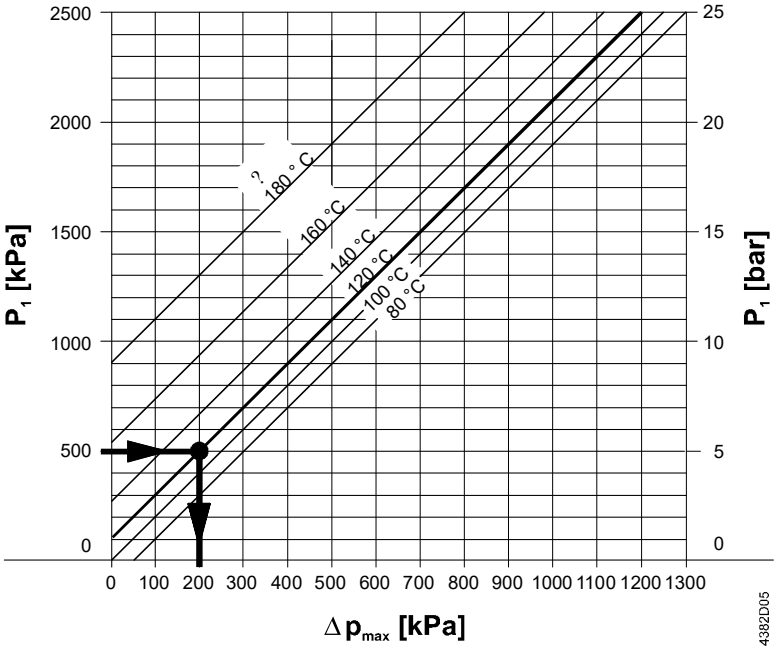
Diverting:
Flow from port AB to port A and B

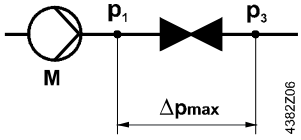
Port A = Variable flow
Port B = Bypass (variable flow)
Port AB = Constant flow

Use the three-port valve primarily as a mixing valve.

Cavitation

Cavitation increases wear and tear on the parabolic plug and seat and results in unwanted noise. Cavitation can be prevented by not exceeding the differential pressures as per the flow diagram and maintaining the static pressures depicted below.





Δp_{max}	=	Differential pressure at a nearly closed valve to largely avoid cavitation
p_1	=	Static pressure and the valve inlet
P_3	=	Static pressure and the valve outlet
M		Pump
J		Water temperature

Example with hot water:

Pressure p_1 at valve inlet: 500 kPa (5 bar)

Water temperature: 120 °C

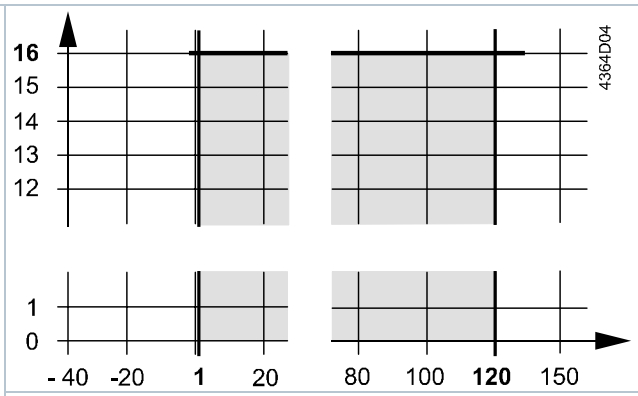
The above diagram clearly indicates that the maximum permissible differential pressure is Δp_{max} → 200 kPa (2 bar) at a nearly closed valve.

Note on chilled water applications

To prevent cavitation in chilled water circuits, sufficient counter pressure must be supplied to the valve output, e.g. using an additional butterfly valve downstream of the valve. Maximum permissible differential pressure over the valve: See 80 °C curve in the above diagram.

Operating pressure and operating temperature

Liquids:



Operating pressure and medium temperature per IS0 7005
(Observe all local and applicable laws).

Type summary

Type	DN	k_{vs} [m^3/h]	S_v
VVG44.15-0.25 VXG44.15-0.25	15	0.25	>50
VVG44.15-0.4 VXG44.15-0.4		0.4	
VVG44.15-0.63 VXG44.15-0.63		0.63	
VVG44.15-1 VXG44.15-1		1	
VVG44.15-1.6 VXG44.15-1.6		1.6	>100
VVG44.15-2.5 VXG44.15-2.5		2.5	
VVG44.15-4 VXG44.15-4		4	
VVG44.20-6.3 VXG44.20-6.3	20	6.3	
VVG44.25-10 VXG44.25-10	25	10	
VVG44.32-16 VXG44.32-16	32	16	
VVG44.40-25 VXG44.40-25	40	25	

DN = Nominal size

k_{vs} = Flow nominal value for cold water (5…30 °C) through a fully opened valve (H100), at a differential pressure of 100 kPa (1 bar)

S_v = Rangeability k_{vs} / k_{vr}

k_{vr} = Smallest k_v value at which the characteristic curve tolerance is still maintained, at a differential pressure of 100 kPa (1 bar)

Fittings

Type	Stock number	Description
ALG..2	BPZ:ALG..2	2 piece fittings set for 2-port valves, existing of 2 cap nuts, 2 insert nuts, and 2 flat seals. ALG..2B are fittings made of brass for media temperatures up to 100 °C
ALG..2B	S55846-Z1..	
ALG..3	BPZ:ALG..3	3 piece fittings set for 3-port valves, existing of 3 cap nuts, 3 insert nuts, and 3 flat seals. ALG..3B are fittings made of brass for media temperatures up to 100 °C
ALG..3B	S55846-Z1..	
ALS..2	BPZ:ALS..	2 piece on pipe fittings set with welded connection for 2-port valves, existing of 2 cap nuts, 2 insert nuts, and 2 flat seals

Filter

Installed upstream of the valve:

Type	Stock number	Description	DN	Mesh width [mm]
ALX15	S55845-Z174	Filter with internal threading	15	0.5
ALX20	S55845-Z175	Filter with internal threading	20	0.8
ALX25	S55845-Z176	Filter with internal threading	25	0.8
ALX32	S55845-Z177	Filter with internal threading	32	0.8
ALX40	S55845-Z178	Filter with internal threading	40	0.8
ALX50	S55845-Z179	Filter with internal threading	50	0.8

Equipment combinations

Valves	SAS.. actuators	
	Dp_{max} Mixing [1]	Dp_s Diverting [1]
	[kPa]	[kPa]
VVG44.15-0.25	400	1600
VVG44.15-0.4		
VVG44.15-0.63		
VVG44.15-1		725
VVG44.15-1.6		
VVG44.15-2.5		400
VVG44.15-4		
VVG44.20-6.3		750
VVG44.25-10		400
VVG44.32-16	250	250
VVG44.40-25	125	125
VXG44.15-0.25	400	100
VXG44.15-0.4		
VXG44.15-0.63		
VXG44.15-1		
VXG44.15-1.6		
VXG44.15-2.5		
VXG44.15-4		
VXG44.20-6.3		
VXG44.25-10		75
VXG44.32-16	250	50
VXG44.40-25	125	35

[1] = Three-port valves only: If noise is permitted, the same values apply as for a mixing valve

Valves	Fittings set			
	Threaded connection			Welded connection
	Malleable cast iron	Brass [1]		Steel
	Type / Item NO.	Type	Item NO.	Type / Item NO.
VVG44.15-0.25	ALG152	ALG152B	S55846-Z100	ALS202
VVG44.15-0.4				
VVG44.15-0.63				
VVG44.15-1				
VVG44.15-1.6				
VVG44.15-2.5				
VVG44.15-4				
VVG44.20-6.3	ALG202	ALG202B	S55846-Z102	ALS252
VVG44.25-10	ALG252	ALG252B	S55846-Z104	-
VVG44.32-16	ALG322	ALG322B	S55846-Z106	-
VVG44.40-25	ALG402	ALG402B	S55846-Z108	-
VXG44.15-0.25	ALG153	ALG153B	S55846-Z101	-
VXG44.15-0.4				
VXG44.15-0.63				
VXG44.15-1				
VXG44.15-1.6				
VXG44.15-2.5				
VXG44.15-4				
VXG44.20-6.3	ALG203	ALG203B	S55846-Z103	-
VXG44.25-10	ALG253	ALG253B	S55846-Z105	-
VXG44.32-16	ALG323	ALG323B	S55846-Z107	-
VXG44.40-25	ALG403	ALG403B	S55846-Z109	-

[1] Medium temperature: Maximal 100 °C

Δp_{max} = Maximum permissible differential pressure over the valve control path, valid for the entire positioning range of the valve-actuator unit; if low noise operation is desired, we recommend a differential pressure of 200 kPa

Δp_s = Maximum permissible differential pressure (closing pressure) at which the valve-actuator unit securely closes against the pressure

Actuators: Overview

Typ3	Stock number	Operating voltage	Positioning		Spring return		Data sheet
			Signal	Time		Signal	
SAS31.00	S55158-A106	AC 230 V	3-position	120 s	-	-	N4581
SAS31.03	S55158-A107			30 s			
SAS31.50	S55158-A108			120 s	ja	< 28 s	
SAS31.53	S55158-A109			30 s	ja	< 14 s	
SAS61.03 [1)]	S55158-A100	AC/DC 24 V	DC 0…10 V DC 4…20 mA 0…1000 Ω	30 s	-	-	
SAS61.03U [2)]	S55158-A100-A100						
SAS61.03/MO	S55158-A121		Modbus RTU				
SAS61.33 [1)]	S55158-A101		DC 0…10 V DC 4…20 mA 0…1000 Ω		ja	< 14 s	
SAS61.33U [2)]	S55158-A101-A100						
SAS61.33U/MO	S55158-A122		Modbus RTU				
SAS61.53 [1)]	S55158-A102		DC 0…10 V DC 4…20 mA 0…1000 Ω				
SAS81.00 [1)]	S55158-A103	AC/DC 24 V	3-position	120 s	-	-	
SAS81.00U [2)]	S55158-A103-A100						
SAS81.03 [1)]	S55158-A104			30 s			
SAS81.03U [2)]	S55158-A104-A100						
SAS81.33 [1)]	S55158-A105				ja	< 14 s	
SAS81.33U [2)]	S55158-A1105-A100						

[1)] Approbation CE+UL

[2)] Approbation CE+UL, cable gland: ½" (UL514C)

Ordering

Please indicate material, article type, order text, and quantity; example:

Material	Article type	Order text	Quantity
VVG44.25-10	VVG44.25-10	Valve.	3
ALG252B	S55846-Z104	Fitting sets	3

Delivery

Valves, rotary actuators, and mounting kits are not assembled and are delivered in individual packaging and without a minimum order size.

Product documentation

Related documents such as environmental declarations, CE declarations, etc., can be downloaded at the following Internet address:

http://siemens.com/bt/download

Notes

Safety

	**⚠ DANGER**
	There is a risk to operating personnel and device when working on the unit Failure to comply with these safety notes can result in personal injury and damage to property from pipe pressure, electrical voltage, or device in operation. □ Note the following when servicing a valve/actuator: ● Switch off both pump and operating voltage. ● Close shutoff valves. ● Release pressure in the pipes and allow them to cool down completely. ● Disconnect electrical connections from the terminals as needed. ● The actuator must be properly installed or manually adjusted prior to recommissioning the valve.

	**⚠ CAUTION**
	National safety regulations Failure to comply with national safety regulations may result in personal injury and property damage. ● Observe national provisions and comply with the appropriate safety regulations.

Engineering

We recommend installing the valve with spring return since temperatures are lower on heating plants which increases the lifespan of the sealing gland on the stem.

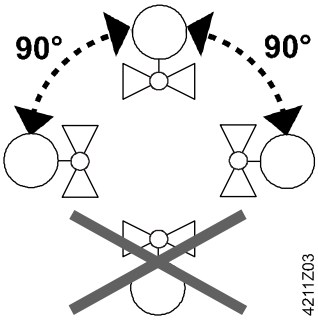
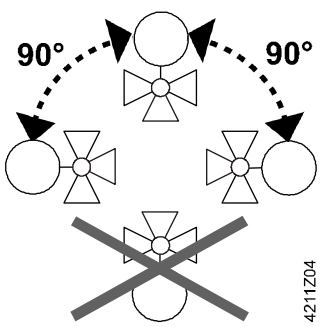
A filter must be installed upstream of the valve to increase functional safety.

Mounting

It is easy to assemble the valve and actuator; it can be done at the construction site. No special tools or settings required.

Valve VVG44.. / VXG44.. is supplied with Mounting instructions M4364 (4 319 9564 0).

Mounting position

VVG44..		VXG44..	

Pipe connection

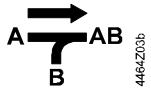
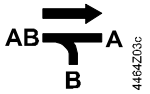
Avoid leakage:

- Install fittings as per ISO 7-1.
- Do not use too much hemp or PTFE tape.
- Do not tighten pipe threading to "the very end".

Flow direction

Make sure that the valve is mounted in the proper flow direction. A symbol is applied to the valve body:

VVG44.. :	
Flow direction:	→

VXG44.. :			
Mixing A / B to AB:		Diverting AB to A / B:	

Commissioning

The actuator must be properly mounted or manually adjusted before commissioning the valve.

VVG44..	
Turn the manual adjuster clockwise:	Valve opening = Increasing flow
Turn the manual adjuster counter clockwise:	Valve closing = Decreasing flow

VXG44..	
Turn the manual adjuster clockwise:	Through-put A – AB opens, bypass B closes
Turn the manual adjuster counter clockwise:	Through-put A – AB closes, bypass B opens

Maintenance

Valves VVG44.. and VXG44.. are maintenance free.

Stem sealing gland

The stem sealing gland cannot be exchanged. The entire valve must be replaced in the event of leakage. Contact your local Siemens office or branch for information.

Disposal

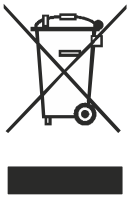


⚠ WARNING

Tensioned return spring

Opening the valve housing can release the tensioned return spring resulting in flying parts that may cause injury.

- Do not open the valve body.



The valve is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

- Dispose of the valve through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Warranty

Technical data on specific applications are valid only together with Siemens products listed under "Equipment combinations". Siemens rejects any and all warranties in the event that third-party products are used.

Technical data

Functional data		
	VVG44..	VXG44..
PN class	PN 16 per ISO 7268	
Operating pressure	Per ISO 7005 within the permissible media temperature as per Section Technical design [→ 2]	
Characteristic curve 0…100 %	linear as per VDI / VDE 2173	
Leakage rate	0…0.02 % of k_{vs} value per DIN EN 1349	0…0.02 % of k_{vs} value per DIN EN 1349 (through-put and bypass)
Permissible media	Chilled water, hot water, water with frost temperature. Recommendation: Water treatment per VDI 2035	
Medium temperature [1]	1…120 °C	
Rangeability S_v	DN 15: >50 or >100, see Section Type overview [→ 6] DN ≥20: >100	
Nominal stroke	5.5 mm	

Materials	
Housing	Bronze CC499K
Seat in through-put	CrNi steel, bronze (worked directly into housing) or Messing
Seat in bypass (VXG44.. only)	Bronze (worked directly into housing) or brass
Plug	CrNi steel or brass
Stem	CrNi steel
Sealing gland	Brass
Gland materials	EPDM-O rings

Dimensions / Weight	
See Dimensions [→ 14]	
Connections with external threading	G..B per ISO 228-1
Actuator fixing	G ¾"

Standards, directives and approvals	
Pressure Equipment Directive	DGR 2014/68/EU
Pressure accessories Fluid group 2	Range: Article 1, para. 1 Definition: Article 2, para. 5 Without CE certification as per article 3, para. 3 (generally applicable engineering practice) [2]
EAC compliance	Eurasian compliance
Environmental compatibility	Environmental Declaration CE1E4364en [3] contains data on environmental-compatible product design and assessment (RoHS compliance, compositions, packaging, environmental benefits and disposal).

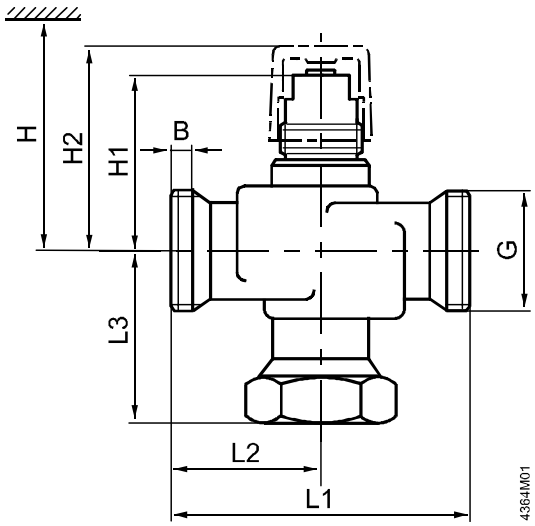
[1] With ALG..B fitting up to 100 °C

[2] Fittings for a product where PS x DN < 1000, do not require special testing and cannot have CE labeling

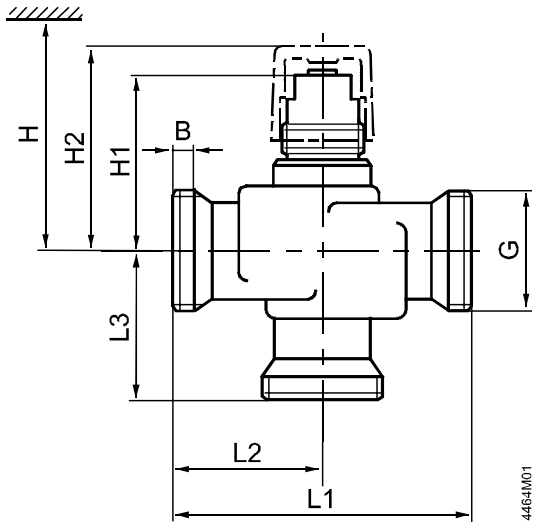
[3] See Section Product documentation [→ 10]

Dimensions

VVG44..



VXG44..



DN = Nominal size

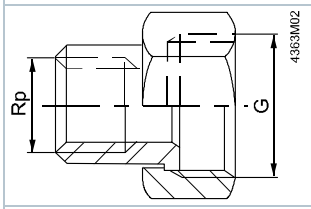
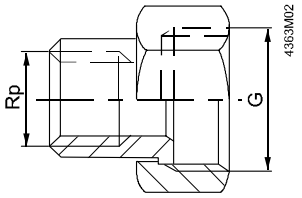
H = Total height of actuator plus minimum mounting distance to wall or ceiling, for mounting, connection, operation, maintenance, etc.

H1 = Dimension from the pipe to the center to install actuator (upper edge)

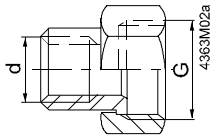
H2 = Pipe center to the upper edge of the manual adjustment button, valve is in the "closed" position

Valve type	DN	B	G	L1	L2	L3	H1	H2	H	Weight
		mm	Inch	mm	mm	mm	mm	mm	SAS..	kg
VVG44.15-0.25	15	8,5	G 1B	100	50	58	45	55	>381	0.65
VVG44.15-0.4										
VVG44.15-0.63										
VVG44.15-1										
VVG44.15-1.6							49	59		0.67
VVG44.15-2.5										
VVG44.15-4		12					53	63		0.77
VVG44.20-6.3	20	9	G 1¼B			59	68	78	>396	1.0
VVG44.25-10	25	11	G 1½B	105	52.5	62.5	71	81	>399	1.48
VVG44.32-16	32		G 2B			63.5	77.5	87.5	>406	1.95
VVG44.40-25	40		G 2¼B	130	65	76	80.5	90.5	>409	2.75
VXG44.15-0.25	15	8.5	G 1B	100	50	50	45	55	>381	0.5
VXG44.15-0.4										
VXG44.15-0.63										
VXG44.15-1										
VXG44.15-1.6							49	59		0.59
VXG44.15-2.5										
VXG44.15-4							53	63		0.67
VXG44.20-6.3	20	9	G 1¼B				68	78	>396	0.90
VXG44.25-10	25	11	G 1½B	105	52.5	52.5	71	81	>399	1.30
VXG44.32-16	32		G 2B				77.5	87.5	>406	1.74
VXG44.40-25	40		G 2¼B	130	65	65	80.5	90.5	>409	2.39

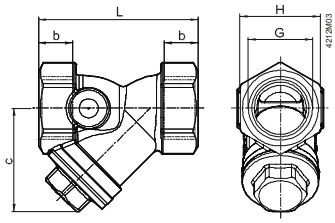
Fittings

	Type	Article no.	Type	Article no.	For valve type	G	Rp
						[inch]	[inch]
VVG44..	ALG152	BPZ:ALG152	ALG152B	S55846-Z100	VVG44.15..	G 1	Rp ½
	ALG202	BPZ:ALG202	ALG202B	S55846-Z102	VVG44.20	G 1¼	Rp ¾
	ALG252	BPZ:ALG252	ALG252B	S55846-Z104	VVG44.25	G 1½	Rp 1
	ALG322	BPZ:ALG322	ALG322B	S55846-Z106	VVG44.32	G 2	Rp 1¼
	ALG402	BPZ:ALG402	ALG402B	S55846-Z108	VVG44.40	G 2¼	Rp 1½
VXG44..	ALG153	BPZ:ALG153	ALG153B	S55846-Z101	VXG44.15..	G 1	Rp ½
	ALG203	BPZ:ALG203	ALG203B	S55846-Z103	VXG44.20	G 1¼	Rp ¾
	ALG253	BPZ:ALG253	ALG253B	S55846-Z105	VXG44.25	G 1½	Rp 1
	ALG323	BPZ:ALG323	ALG323B	S55846-Z107	VXG44.32	G 2	Rp 1¼
	ALG403	BPZ:ALG403	ALG403B	S55846-Z109	VXG44.40	G 2¼	Rp 1½

- Valve side with cyclindrical threading per ISO 228-1
- Pipe side with cyclindrical threading per ISO 7-1
- ALG..B fittings up to 100 °C medium temperature

	Type	Article no.	For valve type	G	Rp
				[inch]	[inch]
	ALS202	BPZ:ALS202	VVG44.15..	G 1	26.8
	ALS252	BPZ:ALS252	VVG44.20	G 1¼	33.7
	-	-	VVG44.25	-	-
	-	-	VVG44.32	-	-
	-	-	VVG44.40	-	-

Filter

	Type	DN	b	c	G	L	H	K_{vs}	Weight
			mm	mm	Inch [1]	mm	mm		kg
	ALX15	15	12	38	G ½	54	27	3.5	0.178
	ALX20	20	15	43	G ¾	67	34	5.8	0.290
	ALX25	25	16	53	G 1	79	41	9.1	0.410
	ALX32	31	17	64	G 1¼	98	51	19	0.680
	ALX40	40	18	70	G 1½	106	57	24	0.874
	ALX50	50	20	85	G 2	122	69	36	1.428

[1] ISO 228-1

Replacement parts

Type	Item no.	Designation	Quantity
74 676 0273 0	74 676 0273 0	Rotary knob for small-stroke valves	10

Revision numbers

Type	Valid from rev. no.	Type	Valid from rev. no.
VVG44.. 2-port		**VXG44.. 3-port**	
VVG44.15-0.25	..A	VXG44.15-0.25	..A
VVG44.15-0.4	..A	VXG44.15-0.4	..A
VVG44.15-0.63	..A	VXG44.15-0.63	..A
VVG44.15-1	..A	VXG44.15-1	..A
VVG44.15-1.6	..A	VXG44.15-1.6	..A
VVG44.15-2.5	..A	VXG44.15-2.5	..A
VVG44.15-4	..A	VXG44.15-4	..A
VVG44.20-6.3	..A	VXG44.20-6.3	..A
VVG44.25-10	..A	VXG44.25-10	..A
VVG44.32-16	..A	VXG44.32-16	..A
VVG44.40-25	..A	VXG44.40-25	..A

Issued by
Siemens Switzerland Ltd
Smart Infrastructure
Global Headquarters
Theilerstrasse 1a
6300 Zug
Switzerland
Tel. +41 58-724 24 24
www.siemens.com/buildingtechnologies

© Siemens Switzerland Ltd, 2016
Technical specifications and availability subject to change without notice.

8.23

A700000011256398

The following 28 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`A700000011256398.pdf`
Pages	28

SIEMENS

Acvatix™

PICV PN16/PN25 with flanged connections

PN16: VPF43../VPF44.., PN25: VPF53../VPF54..



VPF44../VPF54.. VPF43../VPF53..

Pressure Independent Control Valves (PICV)

- With integrated pressure differential controller
- Valve body made of gray cast iron GJL-250 or nodular cast iron GJS-400
- Available in the range from DN 50 to 200
- Volumetric flow 15 to 280 m^3/h nominal, with presetting
- Equipped with pressure test points P/T
- Can be equipped with SAX..P.., SAV..P.., SQV..P.., SBX..P or SBV..P electromotoric actuators

Use

- For use in heating, ventilation and air conditioning systems, district heating, as a control valve
- For closed circuits

Type summary

	Product number	Stock number	DN	H_{100} [mm]	V_{min} [m^3/h]	V_{100} [m^3/h]	ΔP_{min} [kPa]
Standard flow rate	VPF44.50F15	S55266-V174	50	20	3.7	14.3	See "Standard flow rate" in Equipment combinations [▶ 4]
	VPF54.50F15	S55266-V152					
	VPF44.65F25	S55266-V176	65		4.5	24.4	
	VPF54.65F25	S55266-V154					
	VPF44.80F35	S55266-V178	80		6.8	35.7	
	VPF54.80F35	S55266-V156					
	VPF44.100F70	S55266-V142	100	40	12.2	69.6	
	VPF54.100F70	S55266-V158					
	VPF44.125F110	S55266-V144	125		15	112	
	VPF54.125F110	S55266-V180					
	VPF44.150F150	S55266-V146	150	43	19	150	
	VPF54.150F150	S55266-V182					
	VPF43.200F210	S55266-V148	200		95	210	
	VPF53.200F210	S55266-V150					
High flow rate	VPF44.50F25	S55266-V175	50	20	5.7	24.6	See "High flow rate" in Equipment combinations [▶ 4]
	VPF54.50F25	S55266-V153					
	VPF44.65F35	S55266-V177	65		6.4	37.7	
	VPF54.65F35	S55266-V155					
	VPF44.80F45	S55266-V179	80		8.5	49.0	
	VPF54.80F45	S55266-V157					
	VPF44.100F90	S55266-V143	100	40	14.8	90.9	
	VPF54.100F90	S55266-V159					
	VPF44.125F135	S55266-V145	125		18	132	
	VPF54.125F135	S55266-V181					
	VPF44.150F200	S55266-V147	150	43	26	208	
	VPF54.150F200	S55266-V183					
	VPF43.200F280	S55266-V149	200		130	280	
	VPF53.200F280	S55266-V151					

Notes:

When valve installed with stem horizontally, the flow rate will reduce by about 5 %.

DN = Nominal size

H_{100}= Nominal stroke

V_{100} = Volumetric flow through fully open valve (H_{100})

V_{min} = Smallest pre-settable volumetric flow through fully open valve (H_{100})

ΔP_{min} = Minimum differential pressure required across the valve's control path, so that the differential pressure regulator works reliably

Ordering

PICV valve, actuator must be ordered separately.

When ordering please specify the quantity, product name and type code.

Example:

Product number	Stock number	Designation
VPF44.65F25	S55266-V176	PICV PN 16 with flanged connections

Delivery

- PICVs, actuators and accessories are packed and supplied separately.
- The valves are supplied without counter-flanges and without flange gaskets.

Equipment combinations

Valves				Actuators									
				SAX..P..		SQV..P..		SAV..P..		SBX..P..		SBV..P..	
		DN	H100 [mm]	Δp_{max} [kPa]	Δp_s [kPa]	Δp_{max} [kPa]	Δp_s [kPa]	Δp_{max} [kPa]	Δp_s [kPa]	Δp_{max} [kPa]	Δp_s [kPa]	Δp_{max} [kPa]	Δp_s [kPa]
Standard flow rate	VPF44.50F15 VPF54.50F15	50	20	600	700	600	700	-	-	600	700	-	-
	VPF44.65F25 VPF54.65F25	65											
	VPF44.80F35 VPF54.80F35	80											
	VPF44.100F70 VPF54.100F70	100	40	-	-			600	700	-	-	600	700
	VPF44.125F110 VPF54.125F110	125					600		600				600
	VPF44.150F150 VPF54.150F150	150	43										
	VPF43.200F210 VPF53.200F210	200											
High flow rate	VPF44.50F25 VPF54.50F25	50	20	600	700	600	700	-	-	600	700	-	-
	VPF44.65F35 VPF54.65F35	65											
	VPF44.80F45 VPF54.80F45	80											
	VPF44.100F90 VPF54.100F90	100	40	-	-			600	700	-	-	600	700
	VPF44.125F135 VPF54.125F135	125					600		600				600
	VPF44.150F200 VPF54.150F200	150	43										
	VPF43.200F280 VPF53.200F280	200											

Note:

H_{100} = Nominal stroke

Δp_{max} = Maximum permissible differential pressure across valve's control path, valid for the entire actuating range of the motorized valve

Δp_s = Maximum permissible differential pressure at which the motorized valve will close securely against the pressure (close off pressure)

Actuator overview

Type	Stock no.	Stroke	Pos. force	Operating voltage	Positioning signal	Spring return time	Spring return direction	Positioning time	LED	Manual adjuster	Extra functions
SAX31P03	S55150-A118	20 mm	500 N	AC 230 V	3-position	-	-	30 s	-	Push and fix	1)
SAX61P03	S55150-A114			AC/DC 24 V	DC 0…10 V DC 4…20 mA 0…1000 Ω	-	-	30 s	√		2)3)
SAX81P03	S55150-A116				3-position	-	-	30 s	-		1)
SQV91P30	S55150-A130	20 mm 40 mm	1100 N	AC/DC 24 V AC 230 V4)	3-position DC 0…10 V DC 4…20 mA	30 s	Pull to open or push to close5)	< 120 s5)	√	Turn and fix	1)6)
SQV91P40	S55150-A131										
SAV31P00	S55150-A121	40 mm	1100 N	AC 230 V	3-position	-	-	120 s	-	Push and fix	1)
SAV61P00	S55150-A119			AC/DC 24 V	DC 0…10 V DC 4…20 mA 0…1000 Ω				√		2)3)
SAV81P00	S55150-A120				3-position				-		1)
SAV61P00/MO 7)	S55150-A144	40 mm	1100 N	AC/DC 24 V	Modbus RTU	-	-	120 s	√	Push and fix	6)
SAX61P03/MO 8)	S55150-A143	20 mm	500 N	AC/DC 24 V	Modbus RTU	-	-	30 s	√	Push and fix	3)6)
SBX31P	S55160-A110	20 mm	700 N	AC 230 V	3-position	-	-	120 s	-	Turnkey	9)
SBX61P	S55160-A111			AC/DC 24 V	DC 0…10 V	-	-				
SBX81P	S55160-A112				3-position	-	-				
SBV31P	S55160-A113	40 mm	1600 N	AC 230 V	3-position	-	-	180 s	-	Turnkey	9)
SBV61P	S55160-A114			AC/DC 24 V	DC 0…10 V	-	-				
SBV81P	S55160-A115				3-position	-	-				

1) Optional accessories: Auxiliary switch, potentiometer

2) Position feedback, forced control, change of flow characteristic

3) Optional accessories: Auxiliary switch, sequence control, acting direction

4) Voltage adapter required, order separately

5) Selectable

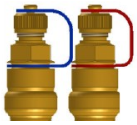
6) Position feedback, forced control

7) UL certified

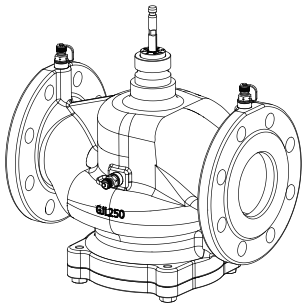
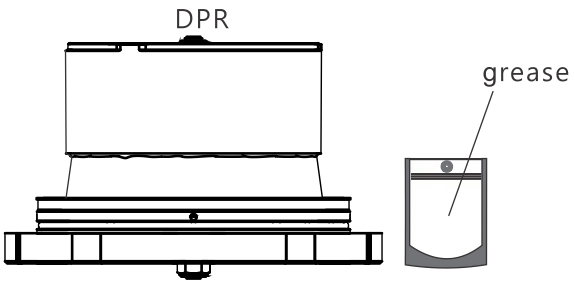
8) UL certified and CE conform

9) Optional accessories: 4...20 mA control signal with AZX420 function module

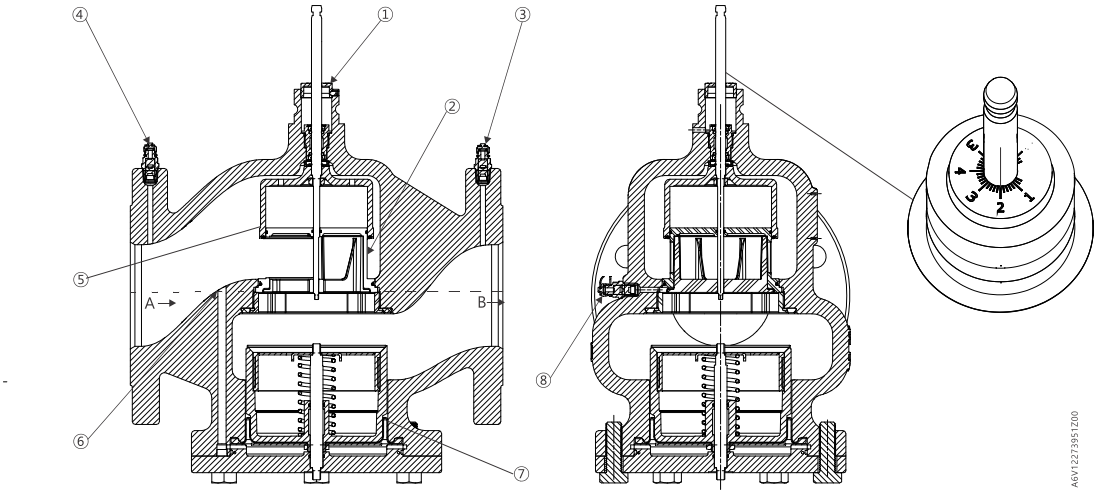
Accessories

Product no.	Order number	Designation	Description
ALE10	ALE10		Electronic manometer excluding measuring lines and measuring tips. Measuring range 0 .. 700 kPa. A differential pressure of more than 1000 kPa will destroy the pressure sensor. For measuring the differential pressure between p_1, and P_2/p_3 of the PICVs (see diagram under "Functional principle"). Functions of the manometer: ● Start/stop ● Automatic zero position ● Backlit display ● Display: Out → outside the measuring range ● Holding function
ALE11	ALE11		Measuring lines and straight measuring tips for use with Siemens PICVs. Equipped with G ⅛" connection with 2 x 40 mm needles.
ALP45	ALP45		Spare nipples P/T port (set of 2). Set contains 1 piece each with a red and blue ribbon. Port: External threads G 1/8" to ISO 228 Connection to valve body: G 1/4" to ISO 228, including O-ring Length: 40 mm
ALP46 (only for p_1, p_3)	S55264-V115		Blanking plugs for P/T ports Connection to valve body: G ¼" to ISO 228, inclusive O-ring
ALP47 (only for p_1, p_3)	S55264-V116		Drain ball valve inclusive O-ring Port: External threads G ½" to ISO 228 Connection to valve body: G ¼" to ISO 228, inclusive O-ring Length: 48 mm
ALP48 (only for p_1, p_3)	S55264-V117		Combined P/T port and drain ball valve Port: External threads G ⅛" to ISO 228 Connection to valve body: G ¼" to ISO 228, inclusive O-ring Length: 80 mm
ALP49	S55264-V118		Long P/T ports (set of 2 pieces) Set contains 1 piece each with a red and blue ribbon. Port: External threads G ⅛" to ISO 228 Connection to valve body: G ¼" to ISO 228, inclusive O-ring Length: 120 mm

DPR assembly replacement

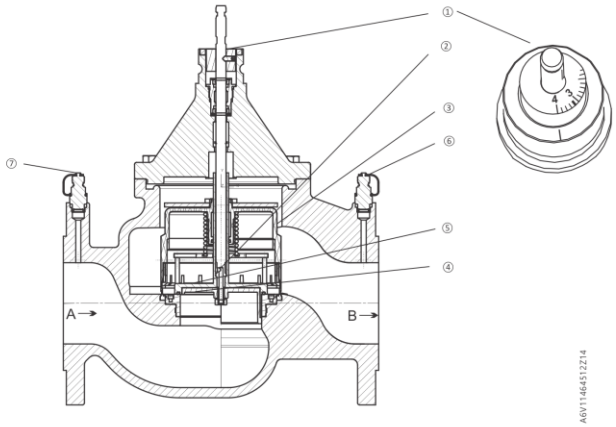
		
VPF44.50F15	ALR50F15	S55264-V155
VPF54.50F15		
VPF44.50F25	ALR50F25	S55264-V156
VPF54.50F25		
VPF44.65F25	ALR65F25-LP	S55264-V157
VPF54.65F25	ALR65F25-HP	S55264-V163
VPF44.65F35	ALR65F35-LP	S55264-V158
VPF54.65F35	ALR65F35-HP	S55264-V164
VPF44.80F35	ALR80F35	S55264-V159
VPF54.80F35		
VPF44.80F45	ALR80F45	S55264-V160
VPF54.80F45		
VPF44.100F70	ALR100F70	S55264-V161
VPF54.100F70		
VPF44.100F90	ALR100F90	S55264-V162
VPF54.100F90		

VPF44../VPF54..



1	Ring with dial for presetting
2	Seat with variable presetting opening
3	Pressure test point (P/T) at outlet port B, blue ribbon, p_3
4	Pressure test point (P/T) at inlet port A, red ribbon, p_1
5	Control valve
6	Aperture for the differential pressure regulator is linked with inlet port A
7	Differential pressure controller - DPR
8	Pressure test point (P/T) at outlet of control valve, blue ribbon, p_2
A	Inlet port A
B	Outlet port B

VPF43../VPF53..



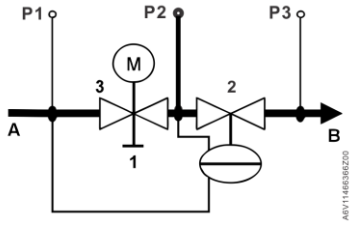
1	Ring with dial for presetting
2	Aperture for the differential pressure controller is linked with outlet port B
3	Differential pressure controller
4	Plug with variable presetting opening
5	Control valve
6	Pressure test point (P/T) at outlet port B, blue ribbon, p_3
7	Pressure test point (P/T) at inlet port A, red ribbon, p_1
A	Inlet port A
B	Outlet port B

Functional principle

The PICVs VPF43../VPF44../VPF53../VPF54.. combine three functions:

- a control valve for controlling the volumetric flow
- an adjustable mechanism with a dial for a pre-settable maximum volumetric flow
- a DPR for balancing pressure fluctuations in the hydraulic system respectively across the control valve

The mechanical series-connected differential pressure controller keeps the differential pressure ($p_1 – p_2$) constant across the control valve and thus the volumetric flow too. The desired maximum volumetric flow V100 can be preset with the adjusting mechanism. The controller (not shown) and the actuator regulate the volumetric flow and consequently the desired temperature in buildings, rooms or zones.



A	Inlet medium (inlet port A)
B	Outlet medium (outlet port B)
1	Ring with dial for presetting
2	Differential pressure controller (DPR)
3	Control valve with mounted actuator

p_1	P/T port with red ribbon, pressure test point at inlet port A of PICV
p_2	P/T port with blue ribbon, pressure at outlet port of control valve (3)
p_3	P/T port with blue ribbon, pressure test point at outlet port B of PICV

Medium flow

The medium entering the PICV (inlet port A) first passes through the control valve (3) with a linear characteristic and a stroke of 20 mm (DN 50…80) respectively 40 mm (DN 100…125) and 43 mm (DN 150…200). The actuator (not shown here) opens or closes accurately the control valve. Then, the medium flows through the variable presetting opening which is connected to the ring with dial (1) for presetting the desired maximum volumetric flow V_{100}.

Before leaving the PICV (outlet port B), the medium passes through a built-in mechanical differential pressure controller. This differential pressure controller is the heart of the PICV and ensures that the selected volumetric flow is maintained across the whole working range and independent of the inlet pressure P_1.

Pressure test points

The PICV VPF44../VPF54.. are equipped with three pressure test points (p_1, p_3, p_2) for measuring and monitoring the differential pressure across the control valve and PICV during commissioning or for analysis during operation. The PICV VPF43../VPF53.. are equipped with two pressure test points (p_1, p_3) for measuring and monitoring the differential pressure across the valve during commissioning or operation. For that purpose, the electronic manometer ALE10 can be used.

Manual control

Only possible with mounted actuator.

Advantages

The advantages of PICVs are that:

- Once the flow limiter (presetting) is set to the desired nominal flow, the hydraulic circuit is self-balanced, even when changes to the system are made, such as additions.
- For any heat or cold demand the PICV with mounted actuator can be set to the desired volumetric flow and will be relatively constant regardless of pressure fluctuations in the system.

Constant flow regardless of pressure changes in the system reduces hydraulic interdependence between hydraulic groups and leads to a more stable control.

Notes: PICV can’t be used as flow limiting valve without an actuator mounted on top.

Engineering Example

$$\dot{V} = \frac{Q[kW] \cdot 1000}{1.163 \cdot \Delta T[K]} \left[\frac{l}{h}\right]$$

Basis of design

1. Determine heat/cold demand Q [kW]
2. Determine temperature spread ΔT [K]
3. Calculate volumetric flow
4. Select suitable PICV VPF43../VPF44../VPF53../VPF54..
5. Determine dial setting using volumetric flow/dial presetting tables, see below.

Example

1. Heat demand Q = 150 kW
2. Temperature spread ΔT = 6 K
3. Volumetric flow

   $$\dot{V} = \frac{150\ kW \cdot 1000}{1.163 \cdot 6\ K} = 21'654\ l/h = 21.6\ m^3/h$$

   Hint: You can also determine the volumetric flow using the valve slide rule.
4. PN class: PN 16
5. Select PICV VPF44., PN 16
   Ideally, PICVs should be selected such that they operate at about 80% of their maximum flow, enabling them to deliver spare capacity, if required.
   Selections:
   VPF44.65F25 Δp_{min} = 25 kPa
   VPF44.65F35 Δp_{min} = 40.5 kPa
6. Determine dial setting using volumetric flow/dial presetting tables:
   VPF44.65F25 Volumetric flow 21.6 m^3/h
   Dial setting 3.7
   VPF44.65F35 Volumetric flow 21.6 m³/h
   Dial setting 2.5

Volumetric flow/dial presetting

Tables to determine the dial setting for a desired volumetric flow.

Δp_{min} [kPa] based on volumetric flow; interpolate missing values.

	Presetting range linear to VDI/VDE 2173
-	Presetting range not permitted

Standard flow rate

VPF44.50F15/VPF54.50F15, 15 m³/h nominal																				
$\dot{V}$ [m³/h]	-	-	-	3.7	4.2	4.9	5.6	6.3	7.0	7.7	8.4	9.2	10.0	11.0	11.9	12.6	13.2	13.5	13.8	14.1	14.3
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min}[kPa]				13	14	15	16	16	17	18	18	19	20	21	21	22	23	23	24	25	25

VPF44.65F25/VPF54.65F25, 25 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	4.5	5.3	6.2	7.1	7.9	8.7	9.9	11.1	12.5	13.8	15.3	16.7	17.9	19.1	20.4	21.6	23.0	24.4
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]				28	29	29	29	29	30	30	30	30	31	31	31	31	32	32	32	32	32

VPF44.80F35/VPF54.80F35, 35 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	6.8	8.4	9.6	10.7	12.2	13.7	15.5	17.3	19.4	21.4	23.3	25.1	27.2	29.3	31.2	33.2	34.5	35.7
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]				18	19	19	19	19	20	20	20	20	21	21	21	21	22	22	22	22	22

VPF44.100F70/VPF54.100F70, 70 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	12.2	14.8	17.3	19.8	22.5	25.2	29.1	33.0	37.1	41.2	46.2	51.1	56.3	61.5	64.3	67.2	68.4	69.6
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]				18	19	20	21	22	23	24	25	26	26	27	28	29	30	31	32	33	33

VPF44.125F110/VPF54.125F110, 110 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	15	19	22	26	31	36	40	45	52	57	65	73	83	89	96	103	109	112
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]				20	20	22	22	23	24	24	25	25	26	26	26	28	28	28	28	29	30

VPF44.150F150/VPF54.150F150, 150 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	19	23	28	33	39	45	51	58	66	75	84	94	104	111	120	129	139	150
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]				17	17	18	18	19	20	20	22	22	23	23	24	25	26	28	28	29	30

VPF43.200F210/VPF53.200F210, 210 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	-	-	95	100	105	112	118	124	132	140	149	157	165	173	182	192	200	210
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]						11	12	12	14	15	16	17	19	21	22	24	26	27	29	30	32

High flow rate

VPF44.50F25/VPF54.50F25, 25 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	5.7	6.9	7.8	8.8	9.9	11.1	12.3	13.5	15.0	16.5	18.1	19.7	21.0	22.2	22.9	23.5	24.0	24.6
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]				30	32	33	35	36	38	39	41	42	44	45	47	48	50	51	53	54	55

VPF44.65F35/VPF54.65F35, 35 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	6.4	7.8	8.8	10.1	11.2	12.3	14.2	16.1	18.1	20.2	22.4	24.6	26.5	28.5	30.6	32.7	35.2	37.7
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]				30	32	33	34	35	36	38	39	40	41	42	43	45	46	47	48	49	50

VPF44.80F45/VPF54.80F45, 45 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	8.5	10.5	12.2	13.9	16.0	18.0	20.2	22.4	24.7	27.0	30.2	33.4	36.5	39.6	42.5	45.4	47.2	49.0
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]				22	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

VPF44.100F90/VPF54.100F90, 90 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	14.8	18.2	21.3	24.4	27.6	30.8	35.4	39.9	43.7	47.4	55.7	64.0	70.8	77.5	82.3	87.1	89.0	90.9
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]				20	22	23	25	26	28	29	31	32	34	35	37	38	40	41	43	44	45

VPF44.125F135/VPF54.125F135, 135 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	18	23	25	30	36	41	45	51	59	65	74	85	94	100	109	120	126	132
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]				20	22	24	25	26	28	29	31	32	34	35	37	38	40	42	42	43	45

VPF44.150F200/VPF54.150F200, 200 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	26	34	38	45	53	63	69	79	91	102	116	131	143	153	167	183	194	208
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]				20	20	22	24	24	26	28	32	36	36	38	40	42	44	45	48	48	50

VPF43.200F280/VPF53.200F280, 280 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	-	-	130	137	145	153	162	170	180	189	199	209	220	232	243	256	267	280
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]						31	32	33	35	38	41	45	49	53	57	61	65	69	73	75	78

Notes: When valve installed with stem horizontally, the flow rate will reduce by about 5 %.

Product documentation

Topic	Title	Document ID
Mounting and installation	VPF43../VPF44../ VPF53../VPF54.. Mounting instructions	A6V12190279
Product environmental compatibility	VPF44../VPF54.. The product environmental declaration A5W00159028A contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).	A5W00159028A
	VPF43../VPF53.. The product environmental declaration CE1E4315en contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).	CE1E4315en
EU Conformity (CE)	VPF44../ VPF54..	A5W00159722A
	VPF43../ VPF53..	CE1T4315xx

Related documents such as the environmental declarations, declarations of conformity, etc., can be downloaded from the following Internet address:

www.siemens.com/bt/download

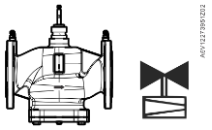
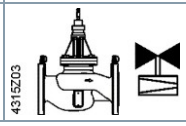
Notes

Safety

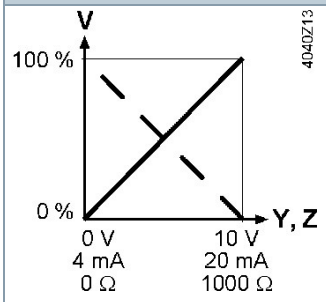
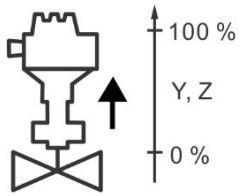
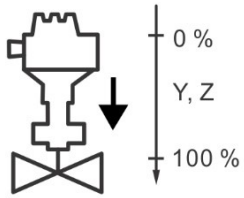
⚠ CAUTION	
	**National safety regulations** Failure to comply with national safety regulations may result in personal injury and property damage. ● Observe national provisions and comply with the appropriate safety regulations.

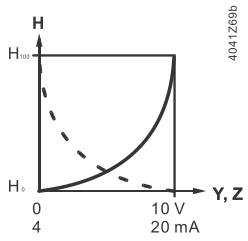
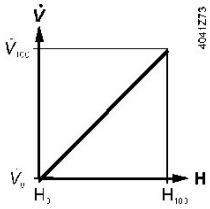
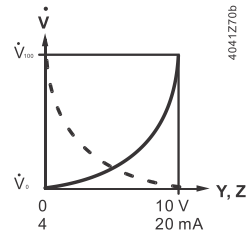
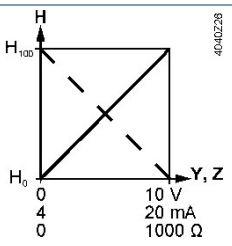
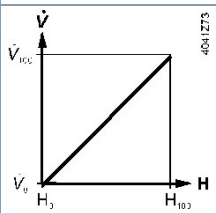
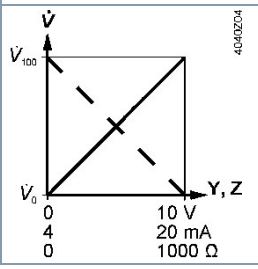
Engineering

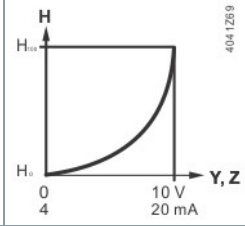
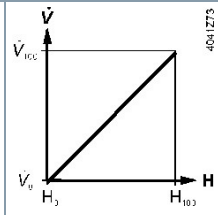
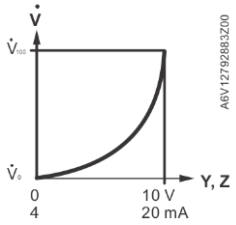
Valve and actuator combination

Valve	Symbols / Direction of flow	Flow in control mode	Valve stem	
			Stem retracts	Stem extends
PICV VPF44../54..		Variable	Valve closes	Valve opens
PICV VPF43../53..				

Valve and actuator combination

SAX61P../SAV61P.. SQV91P..	Actuator set to Direct acting	Actuator set to Reverse acting
		
Positioning signal Y: DC 0…10 V 4…20 mA Positioning signal Z: 0...1000 Ω		
Y, Z	Positioning signal	
V	Volumetric flow	
———	Acting direction: Direct	
— — —	Acting direction: Reverse	

SAX61P../SAV61P.. SQV91P..	Actuator	VPF.. PICV	Actuator and VPF.. PICV combination
Log			
Lin			
Y, Z	Positioning signal		
H	Stroke		
V	Volumetric flow		
———	Acting direction: Direct		
— — —	Acting direction: Reverse		

SB..61P	Actuator	VPF.. PICV	Actuator and VPF.. PICV combination
			
Y, Z	Positioning signal		
H [1)]	Stroke		
V	Volumetric flow		

1): The feedback signal reflects the actual stroke, refer to the table below:

Positioning signal Y		Stroke H	Feedback signal U	
0-10 V	**4-20 mA**	**%**	**0-10 V**	**4-20 mA**
0.0	4.0	0.0	0.0	4.0
0.5	4.8	2.0	0.2	4.3
1.0	5.6	4.1	0.4	4.6
1.5	6.4	6.1	0.6	5.0
2.0	7.2	8.1	0.8	5.3
2.5	8.0	10.2	1.0	5.6
3.0	8.8	12.2	1.2	5.9
3.5	9.6	14.2	1.4	6.3
4.0	10.4	16.5	1.7	6.6
4.5	11.2	19.2	1.9	7.1
5.0	12.0	22.3	2.2	7.6
5.5	12.8	25.9	2.6	8.1
6.0	13.6	30.1	3.0	8.8
6.5	14.4	35.0	3.5	9.6
7.0	15.2	40.7	4.1	10.5
7.5	16.0	47.2	4.7	11.6
8.0	16.8	54.9	5.5	12.8
8.5	17.6	63.8	6.4	14.2
9.0	18.4	74.1	7.4	15.9
9.5	19.2	86.1	8.6	17.8
10.0	20.0	100.0	10.0	20.0

⚠ WARNING	
	**The direction of flow indicated (arrow on the valve body) is mandatory!** The valves should preferably be mounted in the return pipe where temperatures are lower (for heating circuits), and where the sealing gland is less affected by strain. Valve's factory default position (without actuator) = CLOSED.

Symbol

Symbol used in catalogs and application descriptions	Symbol used in diagrams
	There are no standard symbols for PICVs in diagrams

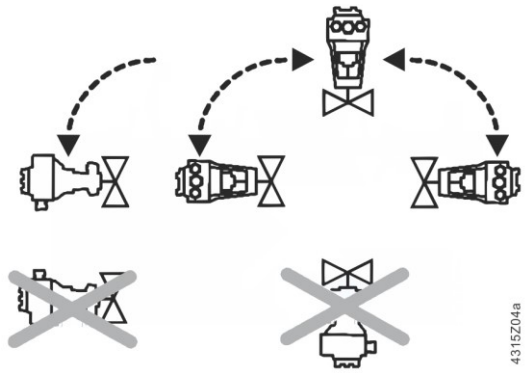
Recommendation

- A strainer or dirt trap should be fitted upstream of the valve to enhance reliability and service life.
- Remove dirt, welding beads etc. from valves and pipes.
- Do not insulate the actuator bracket, as air circulation must be ensured!
- If flow measurement section is used (VPF44../VPF54.. only), make sure the flow measuring device is installed in a low turbulence area. In general, use the 5 × DN / 10 × DN rule, whenever possible and maintain a distance of more than 10D from the pump.

Mounting

- PICV and actuator can easily be assembled on site. Neither special tools nor adjustments, besides flow rate presetting are required.
- The valve is supplied with Mounting Instructions A6V11464512.

Orientation



Direction flow

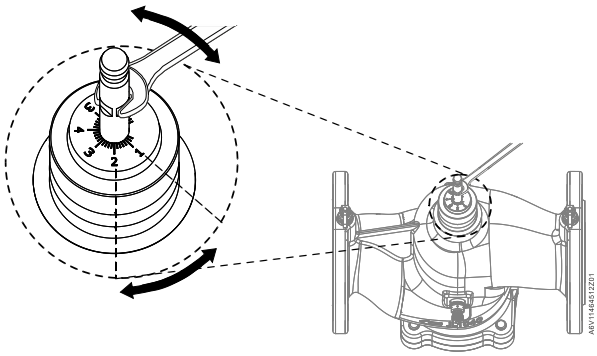
Pay attention to the valve's flow direction symbol during mounting.

Presetting

It is recommended to mount the actuator before the presetting is made.

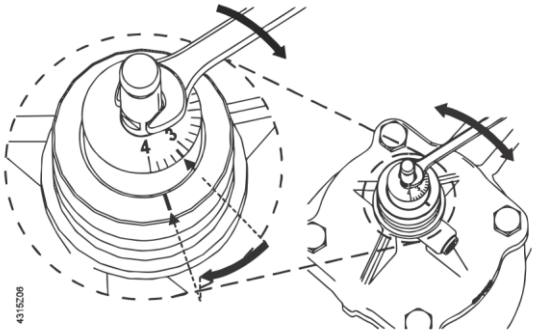
1. Mount actuator and fix valve neck coupling
2. Mount valve stem coupling and tighten slightly
3. Make presetting according to table under “Volumetric flow / dia presetting”. Do NOT adjust presetting to a dial reading lower than “0.6”.
4. Tighten stem coupling

VPF44../VPF54.. (☞ V̇ [m³/h], 8 mm)

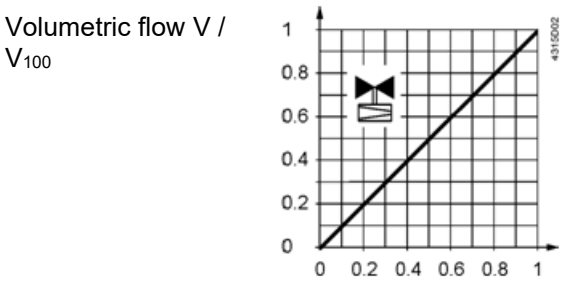


VPF44../VPF54.. has a symmetric pre-setting scale for easy commissioning. Identical pre-settings positions give identical flow rate.

VPF43../VPF53.. (☞ V̇ [m³/h], 8 mm)

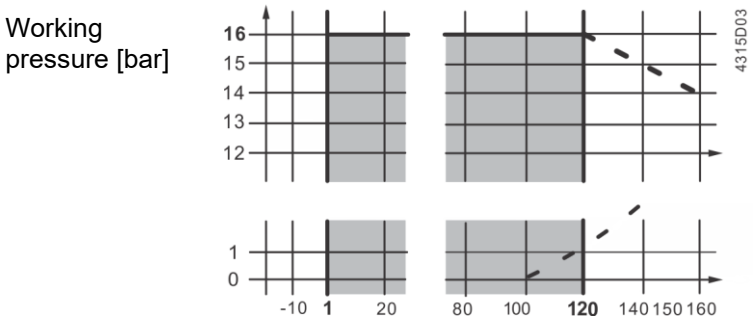


Valve characteristic

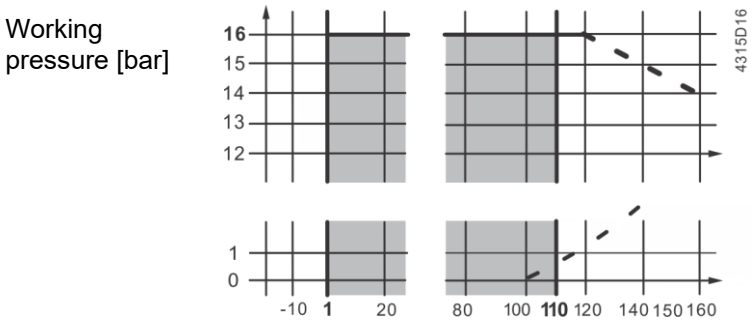


Working pressure and medium temperature

Medium temperature [°C] for VPF44../VPF54..



Medium temperature [°C] for VPF43../VPF53..



Working pressure and medium temperature staged as per ISO 7005.

⚠ WARNING	
	**Current local legislation must be observed.**

Commissioning

NOTICE	
!	● Consequences The valves must be commissioned with the actuator correctly fitted. Strong pressure impacts can damage closed PICVs. ● The valves must be open when flushing or pressure testing the system. Strong pressure impacts can damage closed PICVs. ● Differential pressure Pmax across the valve's control path is not allowed to exceed 600 kPa. ● Valve's factory default position (without actuator) = CLOSED.

Maintenance

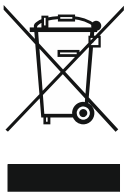
All VPF.. PICVs are maintenance-free. Maintenance for VPF44../VPF54.. allows easy exchange of the differential pressure controller (DPR).

⚠ WARNING	
	**When performing service work on the valve or actuator:** ● Switch off the pump and disconnect power supply. ● Close the shut-off valves in the piping network. ● Fully reduce pressure in the piping network and allow the pipes to cool down completely. ● Remove the electrical connections only if necessary.

Sealing gland

The stem sealing gland cannot be exchanged. In case of leakage the whole valve must be replaced.

Disposal

	The valve is considered an electronic device for disposal in accordance with European guidelines and may not be disposed of as domestic waste. ● Dispose of the valve through channels provided for this purpose. ● Comply with all local and currently applicable laws and regulations.

Warranty

Technical data on specific applications are valid only together with Siemens products listed under "Equipment combinations". Siemens rejects any and all warranties in the event that third-party products are used.

Technical data

Functional data			
PN class	PN 16 / PN 25 as per EN 1333		
Permissible operating pressure	1600 kPa (16 bar) / 2500 kPa (25 bar) as per ISO 7628 / EN 1333		
Valve characteristic	Linear as per VDI / VDE 2173		
Leakage rate	Class IV (0…0.01 % of volumetric flow V_{100}) to EN 1349		
Operating direction	Valve stem retracts (pushed down) to close Valve stem extends (pulled up) to open		
Permissible media	Low temperature hot water, medium temperature hot water, chilled water, water with anti-freeze Recommendation: water treatment to VDI 2035		
Medium temperature	PN 16, PN 25	DN 50…150: 1…120 °C DN 200 1…110 °C	
Rangeability	1:100		
Average flow accuracy	± 10 %	from Δp_{min} up to 70 kPa from Δp_{min} up to 105 kPa from Δp_{min} up to 600 kPa	(DN 50…80) (DN 100…150) (DN 200)
	± 5 %	from 70…600 kPa from 105…600 kPa	(DN 50…80) (DN 100…150)
Nominal stroke	DN 50, 65, 80: 20 mm DN 100, 125: 40 mm DN 150, 200: 43 mm		
Low-noise operation	To operate the valve at a low noise level, a differential pressure of 150 kPa should not be exceeded.		

* Tested in clean water conditions, represents the maximum deviation from the average measured flow

Materials	
Valve body	DN50…100 (PN16): Gray cast iron GJL-250 DN50…100 (PN25), DN125…200 (PN16/PN25): Nodular cast iron GJS-400-18RT
Stem, spring	Stainless steel
Sleeve	Brass
Regulator	Stainless steel
Seals	EPDM

Norms and standards		
VPF44../VPF54.. EU Conformity (CE)		A5W00159722A
UKCA (VPF44../VPF54..)		A5W00236773A
EAC conformity		VPF43../VPF44../VPF53../VPF54.. Eurasia conformity
Pressure Equipment Directive		PED 2014/68/EU
Pressure accessories		Scope: Article 1, section 1 Definitions: Article 2, section 5
Fluid group 2 (for VPF43../VPF53..)	DN 200 [3] (PN 16, PN 25)	Without CE-marking as per article 4, section 3 (sound engineering practice) [1]
Fluid group 2 (for VPF44../VPF54..)	DN 50 (PN 16)	Without CE-marking as per article 4, section 3 (sound engineering practice) [1]
	DN 65…150 (PN 16) DN 50…125 (PN 25)	Category I, module A, with CE-marking, as per article 14, section 2
	DN 150 (PN 25)	Category II, module A2, with CE-marking, as per article 14, section 2, notified body number 0035
Environmental conformity		The product environmental declaration CE1E4315en [2] (for VPF43../ VPF53..), A5W00159028A [2] (for VPF44../ VPF54..) contain data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).

1. Valves where PS x DN < 1000, do not require special testing and cannot carry the CE label.
2. The documents can be downloaded from http://siemens.com/bt/download.
3. Warm water temperature not greater than 110°C, do not require special testing and cannot carry the CE label.

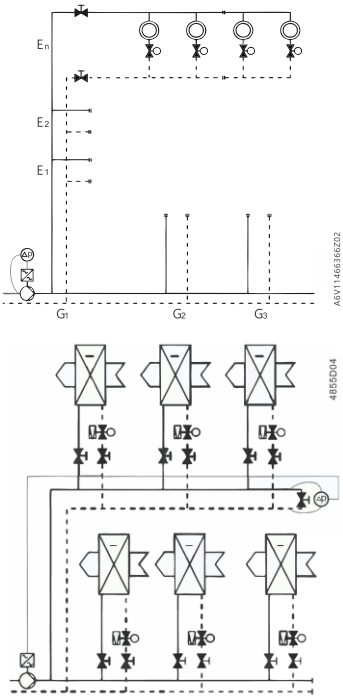
General ambient conditions			
	Operation	Transport	Storage
Temperature	1…55 °C	-30…65 °C	-15…50 °C
Humidity	5…95 % r. h.	<95 % r. h.	5…95 % r. h.

Dimensions/weight	
Dimensions	See Dimensions [▶ 24]
Weight	See Dimensions [▶ 24]
Flange connections	ISO 7005-2
Pressure test points (P / T points)	G ¼ inch (connection) 2 mm x 40 mm (measuring tips)

PICVs in HVAC systems combined with variable speed pumps provide even higher energy efficiency. When sizing the pump, it must be made certain that the most critical branch or consumer in the system – usually the remotest from the pump – gets enough pressure (pump head). Thus, it is recommended to use a variable speed pump in constant-pressure mode with end-point feedback, to maintain a minimum differential pressure across the critical valve.

Residential buildings

Residential buildings with for example self-contained flat heating systems:

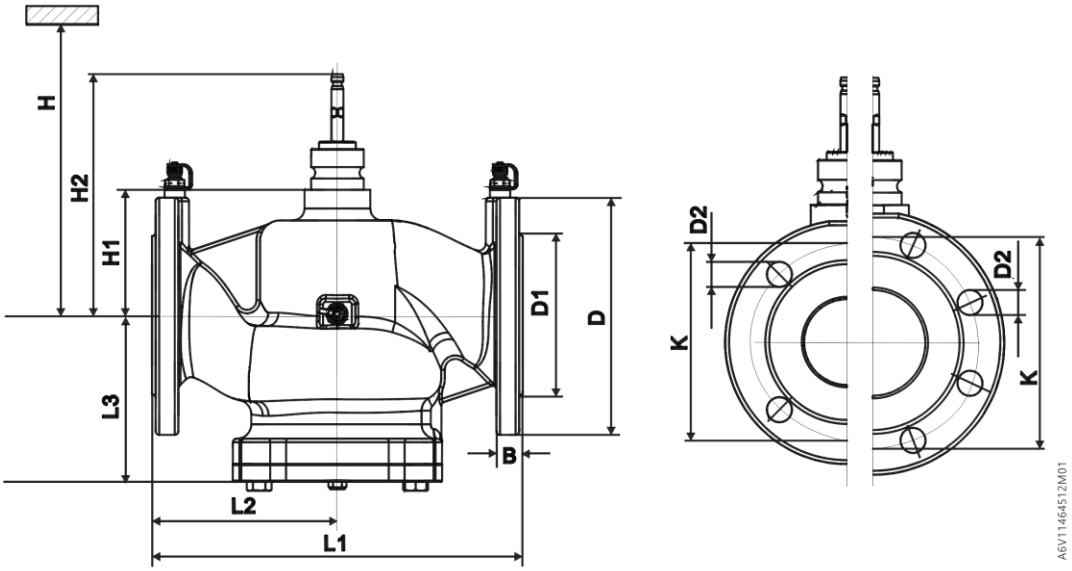


E = Floor

G = Group or zone Non-residential buildings Commercial buildings with for example Fan Coil Units or heat exchangers for heating or cooling

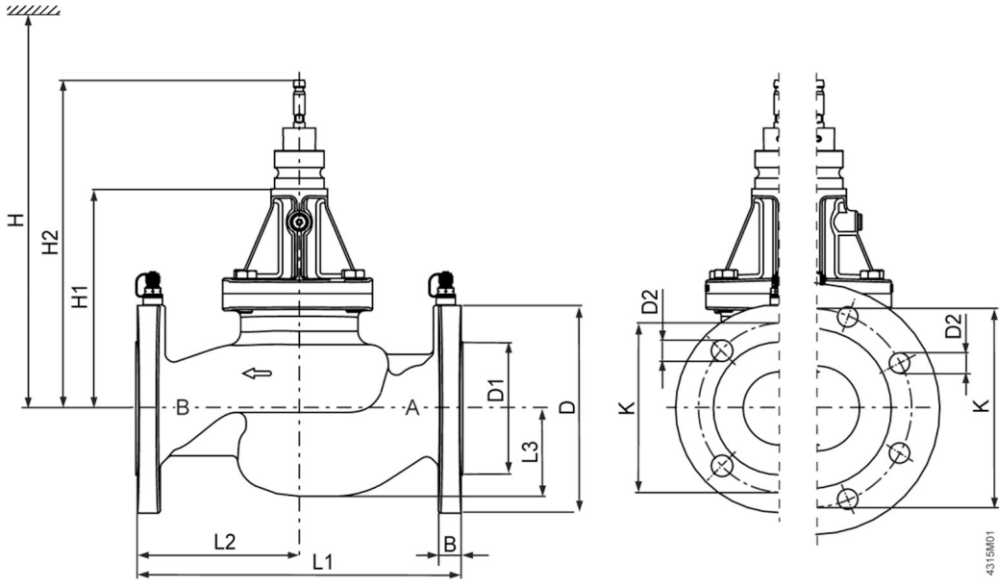
Dimensions

Dimensions in mm: VPF44../VPF54..



Product no.	DN	B	Ø D	Ø D1	Ø D2	L1	L2	L3	Ø K	H1	H2	H					Weight
												SAX..P	SAV..P	SQV..P	SBX..P	SBV..P	
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
VPF44..	50	17	165	99	19 (4x)	230	115	115	125	102.5	199	545	-	492	608.5	-	15
	65	17	185	118	19 (4x)	290	145	122	145	104	200.5	546	-	493	610	-	19
	80	19	200	132	19 (8x)	310	155	139	160	104.5	201	547	-	494	610.5	-	28
	100	21	220	156	19 (8x)	350	175	174.5	180	169	285.5	-	637	557	-	735	49
	125	19	250	184	19 (8x)	400	200	203	210	203.5	320	-	670	600	-	769.5	77
	150	19	285	211	23 (8x)	480	240	233	240	197	316.5	-	660	590	-	763	110
VPF54..	50	16	165	99	19 (4x)	230	115	115	125	102.5	199	545	-	492	608.5	-	15
	65	16	185	118	19 (8x)	290	145	122	145	104	200.5	546	-	493	610	-	20
	80	16	200	132	19 (8x)	310	155	139	160	104.5	201	547	-	494	610.5	-	29
	100	16	235	156	23 (8x)	350	175	174.5	190	169	285.5	-	637	557	-	735	50
	125	19	270	184	28 (8x)	400	200	203	220	203.5	320	-	670	600	-	769.5	79
	150	20	300	211	28 (8x)	480	240	233	250	197	316.5	-	660	590	-	763	115

Dimensions in mm: VPF43../VPF53..



Product number	DN	B	Ø D	Ø D1	Ø D2	L1	L2	L3	Ø K	H1	H2	H			Weight
												SAV..P	SQV..P	SBV..P	
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
VPF43..	200	28	380	266	23 (12x)	600	300	300	295	401	521	870	790	967	175
VPF53..	200	28	380	274	28 (12x)	600	300	300	310	401	521	870	790	967	175

Note:

- DN = Nominal size
- H = Total actuator height plus minimum distance to the wall or the ceiling for mounting, connection, operation, maintenance etc.
- H1 = Dimension from the pipe center to install the actuator (upper edge)
- H2 = Valve in the «OPEN» position means that the valve stem is fully extended.

Revision numbers

Product number	Valid from rev. no.	Product number	Valid from rev. no
VPF44.50F15	..B	VPF44.50F25	..B
VPF44.65F25	..B	VPF44.65F35	..B
VPF44.80F35	..B	VPF44.80F45	..B
VPF44.100F70	..A	VPF44.100F90	..A
VPF44.125F110	..A	VPF44.125F135	..A
VPF44.150F150	..A	VPF44.150F200	..A
VPF43.200F210	..A	VPF43.200F280	..A
VPF54.50F15	..A	VPF54.50F25	..A
VPF54.65F25	..A	VPF54.65F35	..A
VPF54.80F35	..A	VPF54.80F45	..A
VPF54.100F70	..A	VPF54.100F90	..A
VPF54.125F110	..A	VPF54.125F135	..A
VPF54.150F150	..A	VPF54.150F200	..A
VPF43.200F210	..A	VPF43.200F280	..A

Issued by
Siemens Switzerland Ltd
Smart Infrastructure
Global Headquarters
Theilerstrasse 1a
CH-6300 Zug
+41 58 724 2424
www.siemens.com/buildingtechnologies

© Siemens 2023
Technical specifications and availability subject to change without notice.

Document ID A6V14385544_enAP_b
Edition 2023-12-29

8.24

A700000014269758

The following 26 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`A700000014269758.pdf`
Pages	26

SIEMENS

Acvatix™

PICV PN16/PN25 with flanged connections

PN16: VPF43../VPF44.., PN25: VPF53../VPF54..



VPF44../VPF54.. VPF43../VPF53..

Pressure Independent Control Valves (PICV)

- With integrated pressure differential controller
- Valve body made of gray cast iron GJL-250 or nodular cast iron GJS-400
- Available in the range from DN 50 to 200
- Volumetric flow 15 to 280 m^3/h nominal, with presetting
- Equipped with pressure test points P/T
- Can be equipped with SAX..P.., SAV..P.. or SQV..P.. electromotoric actuators

Use

- For use in heating, ventilation and air conditioning systems, district heating, as a control valve
- For closed circuits

Type summary

	Product number	Stock number	DN	H_{100} [mm]	V_{min} [m^3/h]	V_{100} [m^3/h]	ΔP_{min} [kPa]
Standard flow rate	VPF44.50F15	S55266-V174	50	20	3.7	16.0	See "Standard flow rate" in Equipment combinations [▶ 4]
	VPF54.50F15	S55266-V152					
	VPF44.65F25	S55266-V176	65		4.5	24.4	
	VPF54.65F25	S55266-V154					
	VPF44.80F35	S55266-V178	80		6.8	35.7	
	VPF54.80F35	S55266-V156					
	VPF44.100F70	S55266-V142	100	40	12.2	69.6	
	VPF54.100F70	S55266-V158					
	VPF44.125F110	S55266-V144	125		15	112	
	VPF54.125F110	S55266-V180					
	VPF44.150F150	S55266-V146	150	43	19	150	
	VPF54.150F150	S55266-V182					
	VPF43.200F210	S55266-V148	200		95	210	
	VPF53.200F210	S55266-V150					
High flow rate	VPF44.50F25	S55266-V175	50	20	5.7	24.6	See "High flow rate" in Equipment combinations [▶ 4]
	VPF54.50F25	S55266-V153					
	VPF44.65F35	S55266-V177	65		6.4	37.7	
	VPF54.65F35	S55266-V155					
	VPF44.80F45	S55266-V179	80		8.5	49.0	
	VPF54.80F45	S55266-V157					
	VPF44.100F90	S55266-V143	100	40	14.8	90.9	
	VPF54.100F90	S55266-V159					
	VPF44.125F135	S55266-V145	125		18	132	
	VPF54.125F135	S55266-V181					
	VPF44.150F200	S55266-V147	150	43	26	208	
	VPF54.150F200	S55266-V183					
	VPF43.200F280	S55266-V149	200		130	280	
	VPF53.200F280	S55266-V151					

Notes:

When valve installed with stem horizontally, the flow rate will reduce by about 5 %.

DN = Nominal size

H_{100}= Nominal stroke

V_{100} = Volumetric flow through fully open valve (H_{100})

V_{min} = Smallest pre-settable volumetric flow through fully open valve (H_{100})

ΔP_{min} = Minimum differential pressure required across the valve's control path, so that the differential pressure regulator works reliably

Ordering

PICV valve, actuator must be ordered separately.

When ordering please specify the quantity, product name and type code.

Example:

Product number	Stock number	Designation
VPF44.65F25	S55266-V176	PICV PN 16 with flanged connections

Delivery

- PICVs, actuators and accessories are packed and supplied separately.
- The valves are supplied without counter-flanges and without flange gaskets.

Equipment combinations

Valves				Actuators					
				SAX..P..		SQV..P..		SAV..P..	
		DN	H100 [mm]	Δp_{max} [kPa]	Δp_s [kPa]	Δp_{max} [kPa]	Δp_s [kPa]	Δp_{max} [kPa]	Δp_s [kPa]
Standard flow rate	VPF44.50F15 VPF54.50F15	50	20	800	800	800	800	-	-
	VPF44.65F25 VPF54.65F25	65							
	VPF44.80F35 VPF54.80F35	80							
	VPF44.100F70 VPF54.100F70	100	40	-	-			800	800
	VPF44.125F110 VPF54.125F110	125							
	VPF44.150F150 VPF54.150F150	150	43						
	VPF43.200F210 VPF53.200F210	200							
High flow rate	VPF44.50F25 VPF54.50F25	50	20	800	800	800	800	-	-
	VPF44.65F35 VPF54.65F35	65							
	VPF44.80F45 VPF54.80F45	80							
	VPF44.100F90 VPF54.100F90	100	40	-	-			800	800
	VPF44.125F135 VPF54.125F135	125							
	VPF44.150F200 VPF54.150F200	150	43						
	VPF43.200F280 VPF53.200F280	200							

Note:

H_{100} = Nominal stroke

Δp_{max} = Maximum permissible differential pressure across valve's control path, valid for the entire actuating range of the motorized valve

Δp_s = Maximum permissible differential pressure at which the motorized valve will close securely against the pressure (close off pressure)

Actuator overview

Type	Stock no.	Stroke	Pos. force	Operating voltage	Positioning signal	Spring return time	Spring return direction	Positioning time	LED	Manual adjuster	Extra functions
SAX31P03	S55150-A118	20 mm	500 N	AC 230 V	3-position	-	-	30 s	-	Push and fix	1)
SAX61P03	S55150-A114			AC/DC 24 V	DC 0…10 V DC 4…20 mA 0…1000 Ω	-	-	30 s	√		2), 3)
SAX81P03	S55150-A116				3-position	-	-	30 s	-		1)
SQV91P30	S55150-A130	20 mm 40 mm	1100 N	AC/DC 24 V AC 230 V4)	3-position DC 0…10 V DC 4…20 mA	30 s	Pull to open or push to close5)	< 120 s5)	√	Turn and fix	1), 6)
SQV91P40	S55150-A131										
SAV31P00	S55150-A121	40 mm	1100 N	AC 230 V	3-position	-	-	120 s	-	Push and fix	1)
SAV61P00	S55150-A119			AC/DC 24 V	DC 0…10 V DC 4…20 mA 0…1000 Ω				√		2), 3)
SAV81P00	S55150-A120				3-position				-		1)
SAV61P00/MO 7)	S55150-A144	40 mm	1100 N	AC/DC 24 V	Modbus RTU	-	-	120 s	√	Push and fix	6)
SAX61P03/MO 8)	S55150-A143	20 mm	500 N	AC/DC 24 V	Modbus RTU	-	-	30 s	√	Push and fix	3), 6)

1) Optional accessories: Auxiliary switch, potentiometer

2) Position feedback, forced control, change of flow characteristic

3) Optional accessories: Auxiliary switch, sequence control, acting direction

4) Voltage adapter required, order separately

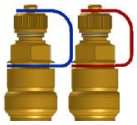
5) Selectable

6) Position feedback, forced control

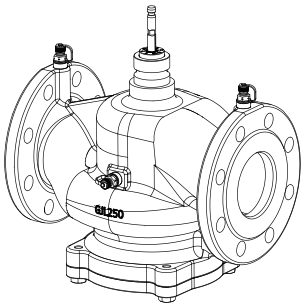
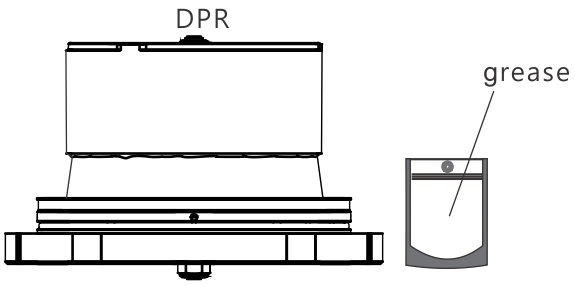
7) UL certified

8) UL certified and CE conform

Accessories

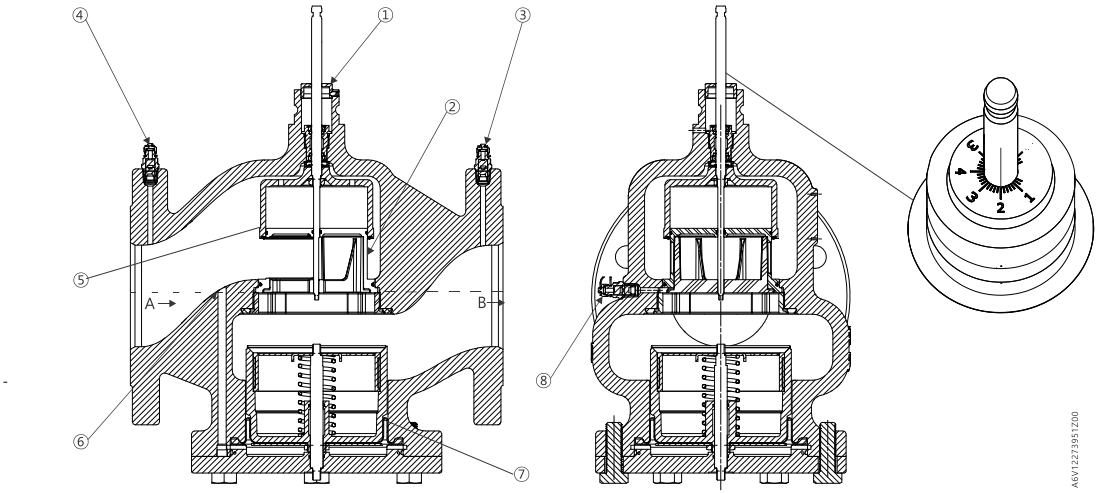
Product no.	Order number	Designation	Description
ALE10	ALE10		Electronic manometer excluding measuring lines and measuring tips. Measuring range 0 .. 700 kPa. A differential pressure of more than 1000 kPa will destroy the pressure sensor. For measuring the differential pressure between p_1, and P_2/p_3 of the PICVs (see diagram under "Functional principle"). Functions of the manometer: ● Start/stop ● Automatic zero position ● Backlit display ● Display: Out → outside the measuring range ● Holding function
ALE11	ALE11		Measuring lines and straight measuring tips for use with Siemens PICVs. Equipped with G ⅛" connection with 2 x 40 mm needles.
ALP45	ALP45		Spare nipples P/T port (set of 2). Set contains 1 piece each with a red and blue ribbon. Port: External threads G 1/8" to ISO 228 Connection to valve body: G 1/4" to ISO 228, including O-ring Length: 40 mm
ALP46 (only for p_1, p_3)	S55264-V115		Blanking plugs for P/T ports Connection to valve body: G ¼" to ISO 228, inclusive O-ring
ALP47 (only for p_1, p_3)	S55264-V116		Drain ball valve inclusive O-ring Port: External threads G ½" to ISO 228 Connection to valve body: G ¼" to ISO 228, inclusive O-ring Length: 48 mm
ALP48 (only for p_1, p_3)	S55264-V117		Combined P/T port and drain ball valve Port: External threads G ⅛" to ISO 228 Connection to valve body: G ¼" to ISO 228, inclusive O-ring Length: 80 mm
ALP49	S55264-V118		Long P/T ports (set of 2 pieces) Set contains 1 piece each with a red and blue ribbon. Port: External threads G ⅛" to ISO 228 Connection to valve body: G ¼" to ISO 228, inclusive O-ring Length: 120 mm

DPR assembly replacement

		
VPF44.50F15	ALR50F15	S55264-V155
VPF54.50F15		
VPF44.50F25	ALR50F25	S55264-V156
VPF54.50F25		
VPF44.65F25	ALR65F25-LP	S55264-V157
VPF54.65F25	ALR65F25-HP	S55264-V163
VPF44.65F35	ALR65F35-LP	S55264-V158
VPF54.65F35	ALR65F35-HP	S55264-V164
VPF44.80F35	ALR80F35	S55264-V159
VPF54.80F35		
VPF44.80F45	ALR80F45	S55264-V160
VPF54.80F45		
VPF44.100F70	ALR100F70	S55264-V161
VPF54.100F70		
VPF44.100F90	ALR100F90	S55264-V162
VPF54.100F90		

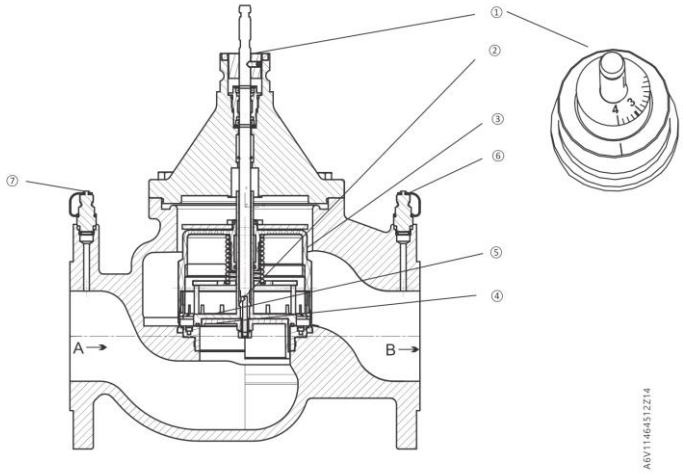
Technical design

VPF44../VPF54..



1	Ring with dial for presetting
2	Seat with variable presetting opening
3	Pressure test point (P/T) at outlet port B, blue ribbon, p_3
4	Pressure test point (P/T) at inlet port A, red ribbon, p_1
5	Control valve
6	Aperture for the differential pressure regulator is linked with inlet port A
7	Differential pressure controller - DPR
8	Pressure test point (P/T) at outlet of control valve, blue ribbon, p_2
A	Inlet port A
B	Outlet port B

VPF43../VPF53..



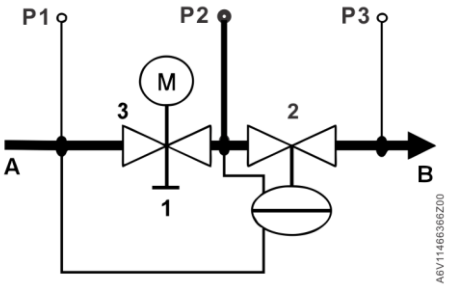
1	Ring with dial for presetting
2	Aperture for the differential pressure controller is linked with outlet port B
3	Differential pressure controller
4	Plug with variable presetting opening
5	Control valve
6	Pressure test point (P/T) at outlet port B, blue ribbon, p_3
7	Pressure test point (P/T) at inlet port A, red ribbon, p_1
A	Inlet port A
B	Outlet port B

Functional principle

The PICVs VPF43../VPF44../VPF53../VPF54.. combine three functions:

- a control valve for controlling the volumetric flow
- an adjustable mechanism with a dial for a pre-settable maximum volumetric flow
- a DPR for balancing pressure fluctuations in the hydraulic system respectively across the control valve

The mechanical series-connected differential pressure controller keeps the differential pressure ($p_1 – p_2$) constant across the control valve and thus the volumetric flow too. The desired maximum volumetric flow V100 can be preset with the adjusting mechanism. The controller (not shown) and the actuator regulate the volumetric flow and consequently the desired temperature in buildings, rooms or zones.



A	Inlet medium (inlet port A)
B	Outlet medium (outlet port B)
1	Ring with dial for presetting
2	Differential pressure controller (DPR)
3	Control valve with mounted actuator

p_1	P/T port with red ribbon, pressure test point at inlet port A of PICV
p_2	P/T port with blue ribbon, pressure at outlet port of control valve (3)
p_3	P/T port with blue ribbon, pressure test point at outlet port B of PICV

Medium flow

The medium entering the PICV (inlet port A) first passes through the control valve (3) with a linear characteristic and a stroke of 20 mm (DN 50…80) respectively 40 mm (DN 100…125) and 43 mm (DN 150…200). The actuator (not shown here) opens or closes accurately the control valve. Then, the medium flows through the variable presetting opening which is connected to the ring with dial (1) for presetting the desired maximum volumetric flow V_{100}.

Before leaving the PICV (outlet port B), the medium passes through a built-in mechanical differential pressure controller. This differential pressure controller is the heart of the PICV and ensures that the selected volumetric flow is maintained across the whole working range and independent of the inlet pressure P_1.

Pressure test points

The PICV VPF44../VPF54.. are equipped with three pressure test points (p_1, p_3, p_2) for measuring and monitoring the differential pressure across the control valve and PICV during commissioning or for analysis during operation. The PICV VPF43../VPF53.. are equipped with two pressure test points (p_1, p_3) for measuring and monitoring the differential pressure across the valve during commissioning or operation. For that purpose, the electronic manometer ALE10 can be used.

Manual control

Only possible with mounted actuator.

Advantages

The advantages of PICVs are that:

- Once the flow limiter (presetting) is set to the desired nominal flow, the hydraulic circuit is self-balanced, even when changes to the system are made, such as additions.
- For any heat or cold demand the PICV with mounted actuator can be set to the desired volumetric flow and will be relatively constant regardless of pressure fluctuations in the system.

Constant flow regardless of pressure changes in the system reduces hydraulic interdependence between hydraulic groups and leads to a more stable control.

Notes: PICV can't be used as flow limiting valve without an actuator mounted on top.

Sizing

Engineering Example

$$\dot{V} = \frac{Q[kW] \cdot 1000}{1.163 \cdot \Delta T[K]} \left[\frac{l}{h}\right]$$

Basis of design

1. Determine heat/cold demand Q [kW]
2. Determine temperature spread ΔT [K]
3. Calculate volumetric flow
4. Select suitable PICV VPF43../VPF44../VPF53../VPF54..
5. Determine dial setting using volumetric flow/dial presetting tables, see below.

Example

1. Heat demand Q = 150 kW
2. Temperature spread ΔT = 6 K
3. Volumetric flow

   $$\dot{V} = \frac{150\ kW \cdot 1000}{1.163 \cdot 6\ K} = 21'654\ l/h = 21.6\ m^3/h$$

   Hint: You can also determine the volumetric flow using the valve slide rule.
4. PN class: PN 16
5. Select PICV VPF44., PN 16
   Ideally, PICVs should be selected such that they operate at about 80% of their maximum flow, enabling them to deliver spare capacity, if required.
   Selections:
   VPF44.65F25 Δp_{min} = 25 kPa
   VPF44.65F35 Δp_{min} = 40.5 kPa
6. Determine dial setting using volumetric flow/dial presetting tables:
   VPF44.65F25 Volumetric flow 21.6 m^3/h
   Dial setting 3.7
   VPF44.65F35 Volumetric flow 21.6 m³/h
   Dial setting 2.5

Volumetric flow/dial presetting

Tables to determine the dial setting for a desired volumetric flow.
Δp_{min} [kPa] based on volumetric flow; interpolate missing values.

	Presetting range linear to VDI/VDE 2173
-	Presetting range not permitted

Standard flow rate

VPF44.50F15/VPF54.50F15, 15 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	3.7	4.2	4.9	5.6	6.3	7.0	7.7	8.4	9.4	10.5	11.5	12.7	13.6	14.3	14.8	15.2	15.6	16.0
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min}[kPa]				13	14	15	16	16	17	18	18	19	20	21	21	22	23	23	24	25	25

VPF44.65F25/VPF54.65F25, 25 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	4.5	5.3	6.2	7.1	7.9	8.7	9.9	11.1	12.5	13.8	15.3	16.7	17.9	19.1	20.4	21.6	23.0	24.4
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]				28	29	29	29	29	30	30	30	30	31	31	31	31	32	32	32	32	32

VPF44.80F35/VPF54.80F35, 35 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	6.8	8.4	9.6	10.7	12.2	13.7	15.5	17.3	19.4	21.4	23.3	25.1	27.2	29.3	31.2	33.2	34.5	35.7
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]				18	19	19	19	19	20	20	20	20	21	21	21	21	22	22	22	22	22

VPF44.100F70/VPF54.100F70, 70 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	12.2	14.8	17.3	19.8	22.5	25.2	29.1	33.0	37.1	41.2	46.2	51.1	56.3	61.5	64.3	67.2	68.4	69.6
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]				18	19	20	21	22	23	24	25	26	26	27	28	29	30	31	32	33	33

VPF44.125F110/VPF54.125F110, 110 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	15	19	22	26	31	36	40	45	52	57	65	73	83	89	96	103	109	112
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]				20	20	22	22	23	24	24	25	25	26	26	26	28	28	28	28	29	30

VPF44.150F150/VPF54.150F150, 150 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	19	23	28	33	39	45	51	58	66	75	84	94	104	111	120	129	139	150
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]				17	17	18	18	19	20	20	22	22	23	23	24	25	26	28	28	29	30

VPF43.200F210/VPF53.200F210, 210 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	-	-	95	100	105	112	118	124	132	140	149	157	165	173	182	192	200	210
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]						11	12	12	14	15	16	17	19	21	22	24	26	27	29	30	32

High flow rate

VPF44.50F25/VPF54.50F25, 25 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	5.7	6.9	7.8	8.8	9.9	11.1	12.3	13.5	15.0	16.5	18.1	19.7	21.0	22.2	22.9	23.5	24.0	24.6
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]				30	32	33	35	36	38	39	41	42	44	45	47	48	50	51	53	54	55

VPF44.65F35/VPF54.65F35, 35 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	6.4	7.8	8.8	10.1	11.2	12.3	14.2	16.1	18.1	20.2	22.4	24.6	26.5	28.5	30.6	32.7	35.2	37.7
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]				30	32	33	34	35	36	38	39	40	41	42	43	45	46	47	48	49	50

VPF44.80F45/VPF54.80F45, 45 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	8.5	10.5	12.2	13.9	16.0	18.0	20.2	22.4	24.7	27.0	30.2	33.4	36.5	39.6	42.5	45.4	47.2	49.0
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]				22	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

VPF44.100F90/VPF54.100F90, 90 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	14.8	18.2	21.3	24.4	27.6	30.8	35.4	39.9	43.7	47.4	55.7	64.0	70.8	77.5	82.3	87.1	89.0	90.9
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]				20	22	23	25	26	28	29	31	32	34	35	37	38	40	41	43	44	45

VPF44.125F135/VPF54.125F135, 135 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	18	23	25	30	36	41	45	51	59	65	74	85	94	100	109	120	126	132
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]				20	22	24	25	26	28	29	31	32	34	35	37	38	40	42	42	43	45

VPF44.150F200/VPF54.150F200, 200 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	26	34	38	45	53	63	69	79	91	102	116	131	143	153	167	183	194	208
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]				20	20	22	24	24	26	28	32	36	36	38	40	42	44	45	48	48	50

VPF43.200F280/VPF53.200F280, 280 m³/h nominal																					
$\dot{V}$ [m³/h]	-	-	-	-	-	130	137	145	153	162	170	180	189	199	209	220	232	243	256	267	280
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
Δp_{min} [kPa]						31	32	33	35	38	41	45	49	53	57	61	65	69	73	75	78

Notes: When valve installed with stem horizontally, the flow rate will reduce by about 5 %.

Product documentation

Topic	Title	Document ID
Mounting and installation	VPF43../VPF44../ VPF53../VPF54.. Mounting instructions	A6V12190279
Product environmental compatibility	VPF44../VPF54.. The product environmental declaration A5W00159028A contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).	A5W00159028A
	VPF43../VPF53.. The product environmental declaration CE1E4315en contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).	CE1E4315en
EU Conformity (CE)	VPF44../ VPF54..	A5W00159722A
	VPF43../ VPF53..	CE1T4315xx

Related documents such as the environmental declarations, declarations of conformity, etc., can be downloaded from the following Internet address:

www.siemens.com/bt/download

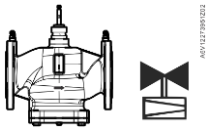
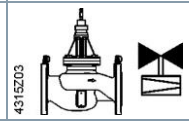
Notes

Safety

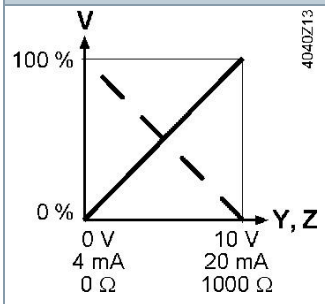
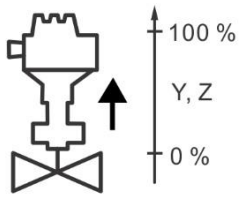
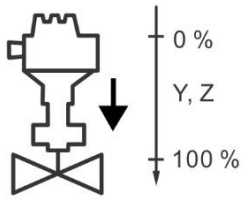
⚠ CAUTION	
	**National safety regulations** Failure to comply with national safety regulations may result in personal injury and property damage. ● Observe national provisions and comply with the appropriate safety regulations.

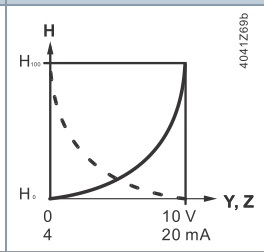
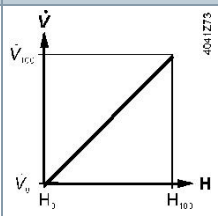
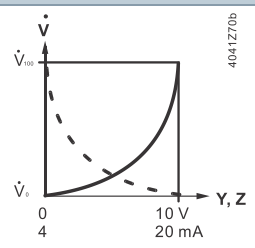
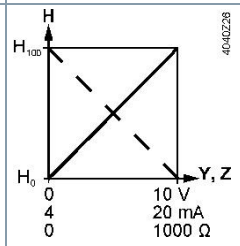
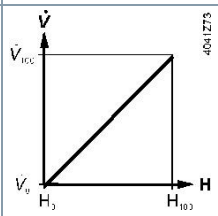
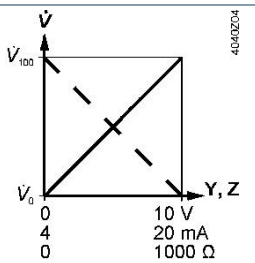
Engineering

Valve and actuator combination

Valve	Symbols / Direction of flow	Flow in control mode	Valve stem	
			Stem retracts	Stem extends
PICV VPF44../54..		Variable	Valve closes	Valve opens
PICV VPF43../53..				

Valve and actuator combination

SAX61P../SAV61P.. SQV91P..	Actuator set to Direct acting	Actuator set to Reverse acting
		
	Positioning signal Y: DC 0…10 V 4…20 mA Positioning signal Z: 0...1000 Ω	
Y, Z	Positioning signal	
V	Volumetric flow	
———	Acting direction: Direct	
— — —	Acting direction: Reverse	

SAX61P../SAV61P.. SQV91P..	Actuator	VPF.. PICV	Actuator and VPF.. PICV combination
Log			
Lin			
Y, Z	Positioning signal		
H	Stroke		
V	Volumetric flow		
———	Acting direction: Direct		
— — —	Acting direction: Reverse		

⚠ WARNING	
	**The direction of flow indicated (arrow on the valve body) is mandatory!** The valves should preferably be mounted in the return pipe where temperatures are lower (for heating circuits), and where the sealing gland is less affected by strain. Valve's factory default position (without actuator) = CLOSED.

Symbol

Symbol used in catalogs and application descriptions	Symbol used in diagrams
	There are no standard symbols for PICVs in diagrams

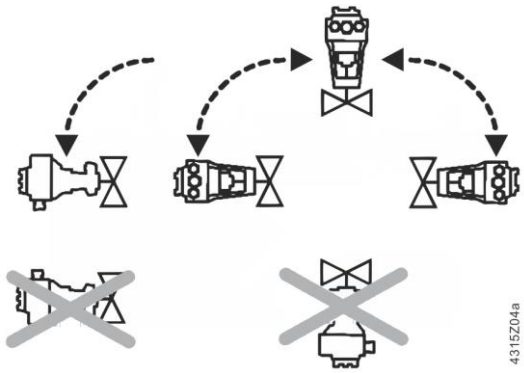
Recommendation

- A strainer or dirt trap should be fitted upstream of the valve to enhance reliability and service life.
- Remove dirt, welding beads etc. from valves and pipes.
- Do not insulate the actuator bracket, as air circulation must be ensured!
- If flow measurement section is used (VPF44../VPF54.. only), make sure the flow measuring device is installed in a low turbulence area. In general, use the 5 × DN / 10 × DN rule, whenever possible and maintain a distance of more than 10D from the pump.

Mounting

- PICV and actuator can easily be assembled on site. Neither special tools nor adjustments, besides flow rate presetting are required.
- The valve is supplied with Mounting Instructions A6V11464512.

Orientation



Direction flow

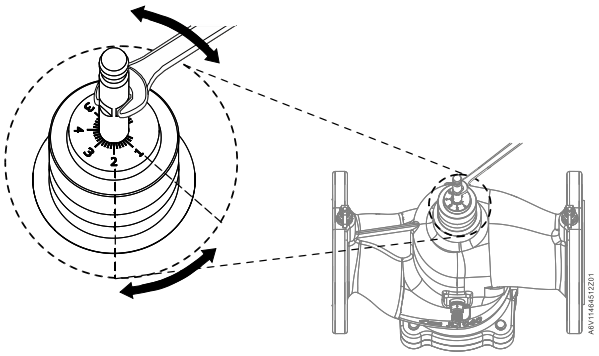
Pay attention to the valve's flow direction symbol during mounting.

Presetting

It is recommended to mount the actuator before the presetting is made.

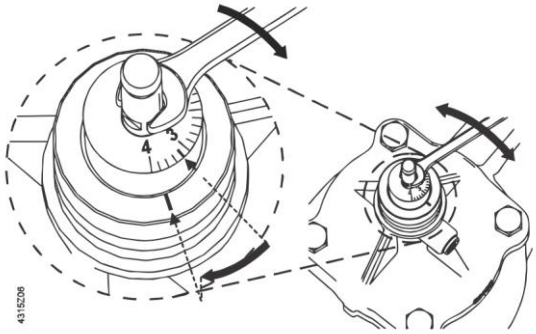
1. Mount actuator and fix valve neck coupling
2. Mount valve stem coupling and tighten slightly
3. Make presetting according to table under “Volumetric flow / dia presetting”. Do NOT adjust presetting to a dial reading lower than “0.6”.
4. Tighten stem coupling

VPF44../VPF54.. (☞ V̇ [m³/h], 8 mm)



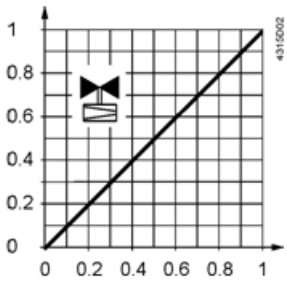
VPF44../VPF54.. has a symmetric pre-setting scale for easy commissioning. Identical pre-settings positions give identical flow rate.

VPF43../VPF53.. (☞ V̇ [m³/h], 8 mm)



Valve characteristic

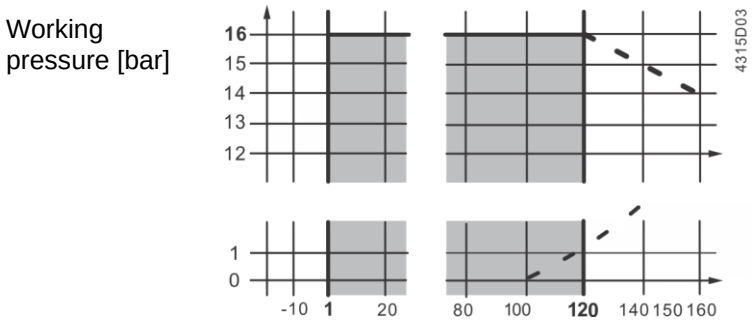
Volumetric flow V / V_{100}



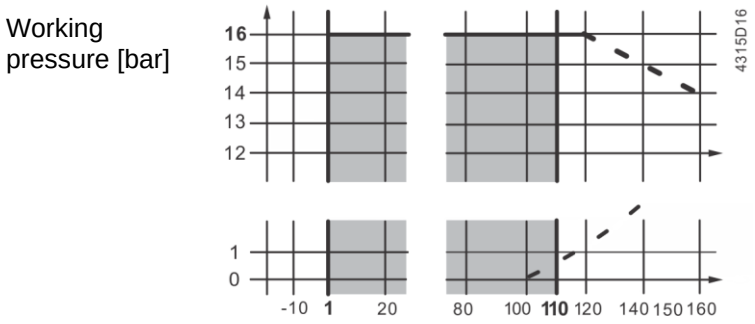
Stroke H / H_{100}

Working pressure and medium temperature

Medium temperature [℃] for VPF44../VPF54..



Medium temperature [℃] for VPF43../VPF53..



Working pressure and medium temperature staged as per ISO 7005.

⚠ WARNING	
	**Current local legislation must be observed.**

Commissioning

NOTICE	
!	● Consequences The valves must be commissioned with the actuator correctly fitted. Strong pressure impacts can damage closed PICVs. ● The valves must be open when flushing or pressure testing the system. Strong pressure impacts can damage closed PICVs. ● Differential pressure Pmax across the valve's control path is not allowed to exceed 800 kPa. ● Valve's factory default position (without actuator) = CLOSED.

Maintenance

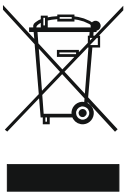
All VPF.. PICVs are maintenance-free. Maintenance for VPF44../VPF54.. allows easy exchange of the differential pressure controller (DPR).

⚠ WARNING	
	**When performing service work on the valve or actuator:** ● Switch off the pump and disconnect power supply. ● Close the shut-off valves in the piping network. ● Fully reduce pressure in the piping network and allow the pipes to cool down completely. ● Remove the electrical connections only if necessary.

Sealing gland

The stem sealing gland cannot be exchanged. In case of leakage the whole valve must be replaced.

Disposal

	The valve is considered an electronic device for disposal in accordance with European guidelines and may not be disposed of as domestic waste. ● Dispose of the valve through channels provided for this purpose. ● Comply with all local and currently applicable laws and regulations.

Warranty

Technical data on specific applications are valid only together with Siemens products listed under "Equipment combinations". Siemens rejects any and all warranties in the event that third-party products are used.

Technical data

Functional data			
PN class	PN 16 / PN 25 as per EN 1333		
Permissible operating pressure	1600 kPa (16 bar) / 2500 kPa (25 bar) as per ISO 7628 / EN 1333 Max. differential pressure: 800 kPa Min. differential pressure: see Volumetric flow/dial presetting [▶ 12]		
Valve characteristic	Linear as per VDI / VDE 2173		
Leakage rate	Class IV (0…0.01 % of volumetric flow V_{100}) to EN 1349		
Operating direction	Valve stem retracts (pushed down) to close Valve stem extends (pulled up) to open		
Permissible media	Low temperature hot water, medium temperature hot water, chilled water, water with anti-freeze Recommendation: water treatment to VDI 2035		
Medium temperature	PN 16, PN 25	DN 50…150: 1…120 °C DN 200 1…110 °C	
Rangeability	1:100		
Average flow accuracy*	± 10 %	from Δp_{min} up to 70 kPa from Δp_{min} up to 105 kPa from Δp_{min}up to 800 kPa	(DN 50…80) (DN 100…150) (DN 200)
	± 5 %	from 70…800 kPa from 105…800 kPa	(DN 50…80) (DN 100…150)
Nominal stroke	DN 50, 65, 80: 20 mm DN 100, 125: 40 mm DN 150, 200: 43 mm		
Low-noise operation	To operate the valve at a low noise level, a differential pressure of 150 kPa should not be exceeded.		

* Tested in clean water conditions, represents the maximum deviation from the average measured flow

Materials	
Valve body	DN50…100 (PN16): Gray cast iron GJL-250 DN50…100 (PN25), DN125…200 (PN16/PN25): Nodular cast iron GJS-400-18RT
Stem, spring	Stainless steel
Sleeve	Brass
Regulator	Stainless steel
Seals	EPDM

Norms and standards		
VPF44../VPF54.. EU Conformity (CE)		A5W00159722A
UKCA (VPF44../VPF54..)		A5W00236773A
EAC conformity		VPF43../VPF44../VPF53../VPF54.. Eurasia conformity
Pressure Equipment Directive		PED 2014/68/EU
Pressure accessories		Scope: Article 1, section 1 Definitions: Article 2, section 5
Fluid group 2 (for VPF43../VPF53..)	DN 200 [3] (PN 16, PN 25)	Without CE-marking as per article 4, section 3 (sound engineering practice) [1]
Fluid group 2 (for VPF44../VPF54..)	DN 50 (PN 16)	Without CE-marking as per article 4, section 3 (sound engineering practice) [1]
	DN 65…150 (PN 16) DN 50…125 (PN 25)	Category I, module A, with CE-marking, as per article 14, section 2
	DN 150 (PN 25)	Category II, module A2, with CE-marking, as per article 14, section 2, notified body number 0035
Environmental conformity		The product environmental declaration CE1E4315en [2] (for VPF43../ VPF53..), A5W00159028A [2] (for VPF44../ VPF54..) contain data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).

1. Valves where PS x DN < 1000, do not require special testing and cannot carry the CE label.
2. The documents can be downloaded from http://siemens.com/bt/download.
3. Warm water temperature not greater than 110°C, do not require special testing and cannot carry the CE label.

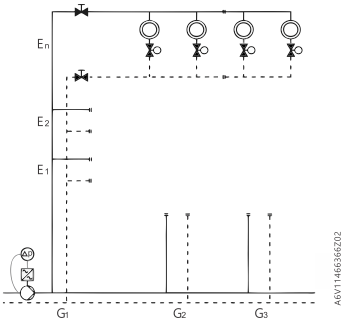
General ambient conditions			
	Operation	Transport	Storage
Temperature	1…55 °C	-30…65 °C	-15…50 °C
Humidity	5…95 % r. h.	<95 % r. h.	5…95 % r. h.

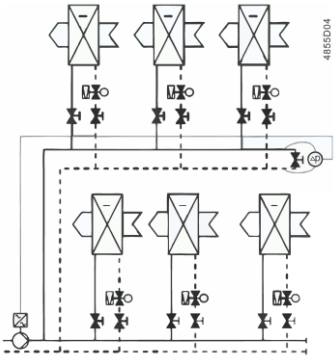
Dimensions/weight	
Dimensions	See Dimensions [▶ 23]
Weight	See Dimensions [▶ 23]
Flange connections	ISO 7005-2
Pressure test points (P / T points)	G ¼ inch (connection) 2 mm x 40 mm (measuring tips)

PICVs in HVAC systems combined with variable speed pumps provide even higher energy efficiency. When sizing the pump, it must be made certain that the most critical branch or consumer in the system – usually the remotest from the pump – gets enough pressure (pump head). Thus, it is recommended to use a variable speed pump in constant-pressure mode with end-point feedback, to maintain a minimum differential pressure across the critical valve.

Residential buildings

Residential buildings with for example self-contained flat heating systems:

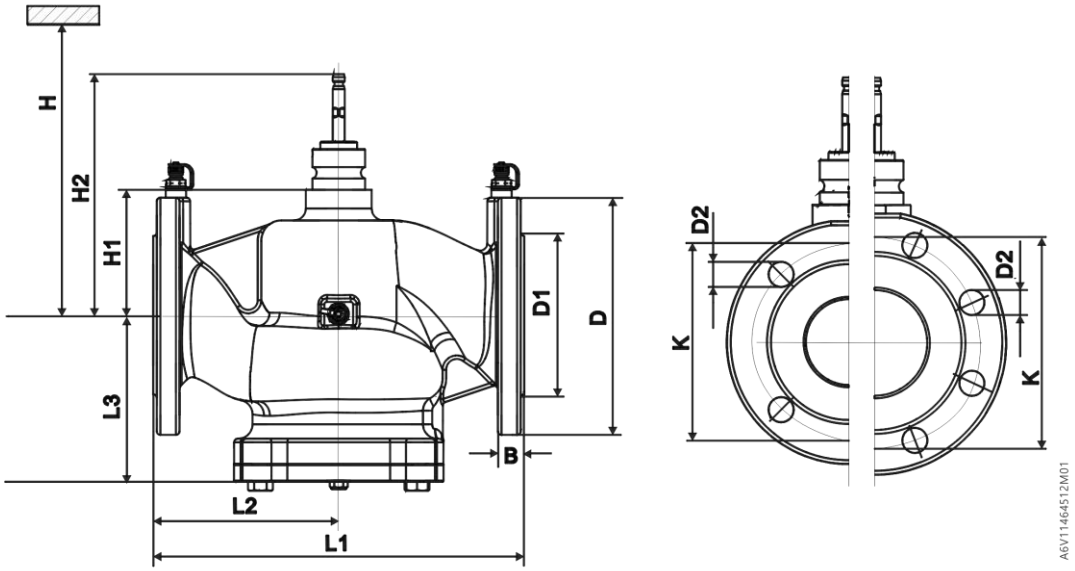




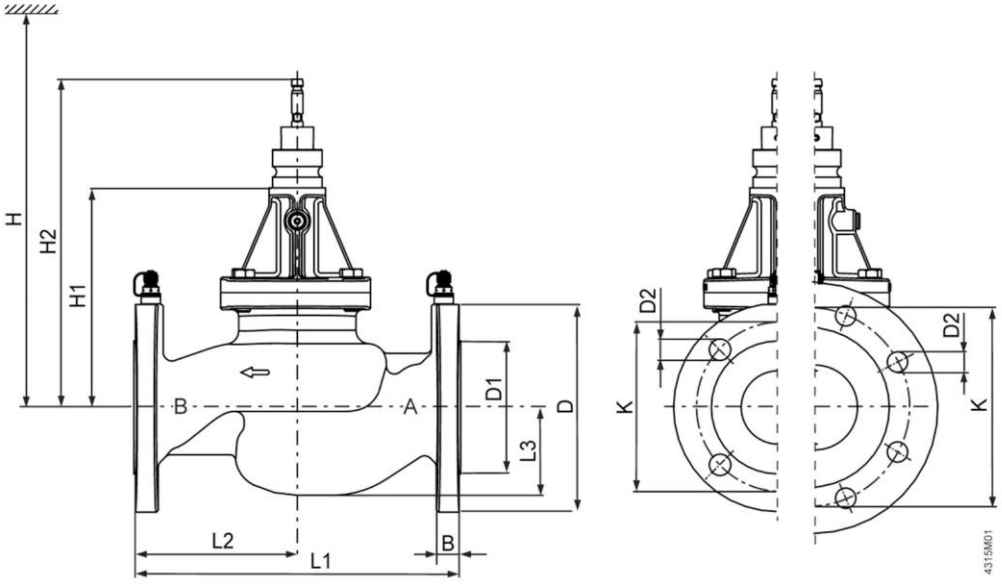
E = Floor

G = Group or zone Non-residential buildings Commercial buildings with for example Fan Coil Units or heat exchangers for heating or cooling

Dimensions in mm: VPF44../VPF54..



Dimensions in mm: VPF43../VPF53..



Note:

- DN = Nominal size
- H = Total actuator height plus minimum distance to the wall or the ceiling for mounting, connection, operation, maintenance etc.
- H1 = Dimension from the pipe center to install the actuator (upper edge)
- H2 = Valve in the «OPEN» position means that the valve stem is fully extended.

Revision numbers

Product number	Valid from rev. no.	Product number	Valid from rev. no
VPF44.50F15	..B	VPF44.50F25	..B
VPF44.65F25	..B	VPF44.65F35	..B
VPF44.80F35	..B	VPF44.80F45	..B
VPF44.100F70	..A	VPF44.100F90	..A
VPF44.125F110	..A	VPF44.125F135	..A
VPF44.150F150	..A	VPF44.150F200	..A
VPF43.200F210	..A	VPF43.200F280	..A
VPF54.50F15	..A	VPF54.50F25	..A
VPF54.65F25	..A	VPF54.65F35	..A
VPF54.80F35	..A	VPF54.80F45	..A
VPF54.100F70	..A	VPF54.100F90	..A
VPF54.125F110	..A	VPF54.125F135	..A
VPF54.150F150	..A	VPF54.150F200	..A
VPF43.200F210	..A	VPF43.200F280	..A

Issued by
Siemens Switzerland Ltd
Smart Infrastructure
Global Headquarters
Theilerstrasse 1a
CH-6300 Zug
+41 58 724 2424
www.siemens.com/buildingtechnologies

© Siemens 2023
Technical specifications and availability subject to change without notice.

Document ID A6V14362310_en--_b
Edition 2024-12-04

8.25

A700000014382073

The following 16 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`A700000014382073.pdf`
Pages	16



VVF43..
VVF43..K



VXF43..

ACVATIX™

2- and 3-port valves with flanged connections, PN 16

VVF43..
VXF43..

From the large-stroke valve line

- **High-performance valves for medium temperatures from -20…220 °C**
- **Valve body of nodular cast iron EN-GJS-400-18-LT or higher**
- **DN 65…250**
- **k_{vs} 50…630 m^3/h**
- **Flange type 21, flange design B**
- **VVF43..K with pressure compensation to handle high differential pressure**
- **Equipable with electro-motoric actuators SAV.. or electro-hydraulic actuators SKC..**

Use

In boiler, district heating and refrigeration plants, cooling towers, heating groups, and in air handling units as control or shutoff valves.
For use in closed or open hydraulic circuits (observe cavitation).

Type summary

	Valves PN 16	Actuators Stroke Positioning force Data sheet				SAV.. [3] 40 mm 1600 N N4503		SKC.. 40 mm 2800 N N4566	
		Stock number	DN	k_{vs} [m³/h]	S_V	Δp_s [kPa]	Δp_{max} [kPa]	Δp_s [kPa]	Δp_{max} [kPa]
Fluids Preferred flow direction A – AB with fluids for low noise operation and high kvs-values with all actuator types	**VVF43.65-50**	S55206-V100	65	50	> 100	450	400	700	650
	VVF43.65-63	S55206-V101	65	63					
	VVF43.80-80	S55206-V102	80	80		250	225	450	400
	VVF43.80-100	S55206-V103	80	100					
	VVF43.100-125	S55206-V104	100	125		160	125	300	250
	VVF43.100-160	S55206-V105	100	160					
	VVF43.125-200	S55206-V106	125	200		125	90	175	160
	VVF43.125-250	S55206-V107	125	250					
	VVF43.150-315	S55206-V108	150	315		80	60	125	100
	VVF43.150-400	S55206-V109	150	400					
Steam [1] Exclusive flow direction AB – A for steam. Also useful for maximum close-off pressure Δp_S and maximum differential pressure in operation (Δp_{max}) with fluids. Use with electro-hydraulic actuators only	**VVF43.65-50**	S55206-V100	65	50	> 100	-	-	1600	800
	VVF43.65-63	S55206-V101	65	63					
	VVF43.80-80	S55206-V102	80	80					750
	VVF43.80-100	S55206-V103	80	100					
	VVF43.100-125	S55206-V104	100	125					500
	VVF43.100-160 [2]	S55206-V105	100	150					
	VVF43.125-200	S55206-V106	125	200					300
	VVF43.125-250 [2]	S55206-V107	125	220					
	VVF43.150-315 [2]	S55206-V108	150	280					200
	VVF43.150-400 [2]	S55206-V109	150	360					
Fluids and Steam Compensated valves above DN 65 are optimized for a single flow direction for fluids and steam DN 65..150: AB – A DN 200/250: A – AB	**VVF43.65-63K**	S55206-V110	65	63	> 100	-	-	1600	800
	VVF43.80-100K	S55206-V111	80	100					
	VVF43.100-150K	S55206-V120	100	150					
	VVF43.125-220K	S55206-V121	125	220					
	VVF43.150-315K	S55206-V122	150	315					
	VVF43.200-450K	S55206-V123	200	450	>50			1200	
	VVF43.250-630K	S55206-V124	250	630				1000	

		Stock number	DN	k_{vs} [m³/h]	S_V	Δp_{max} [kPa] A⇒AB, B	Δp_{max} [kPa] AB⇒A, B	Δp_{max} [kPa] A⇒AB, B	Δp_{max} [kPa] AB⇒A, B
Fluids	**VXF43.65-50**	S55206-V125	65	50	> 100	400	100	650	200
	VXF43.65-63	S55206-V115	65	63					
	VXF43.80-80	S55206-V126	80	80		225	50	400	
	VXF43.80-100	S55206-V116	80	100					
	VXF43.100-125	S55206-V127	100	125		125		250	150
	VXF43.100-160	S55206-V117	100	160					
	VXF43.125-200	S55206-V128	125	200		90		160	100
	VXF43.125-250	S55206-V118	125	250					
	VXF43.150-315	S55206-V129	150	315		60		100	70
	VXF43.150-400	S55206-V119	150	400					

[1] Operate with opposite flow direction with steam
[2] Reduced k_{vs} value
[3] Usable up to a max. medium temperature of 130 °C

DN = Nominal size
k_{vs} = Flow nominal value of cold water (5...30 °C) through the fully opened valve (H_{100}) at a differential pressure of 100 kPa (1 bar)
S_v = Rangeability
Δp_s = Maximum permissible differential pressure at which the motorized valve still closes securely against the pressure
Δp_{max} = Maximum permissible differential pressure across the valve's throughport for the entire positioning range of the motorized valve

Note

When using a stem heating element with a medium temperature of below –5 °C, the stem sealing gland must be replaced. In this case, the sealing gland must be ordered separately.

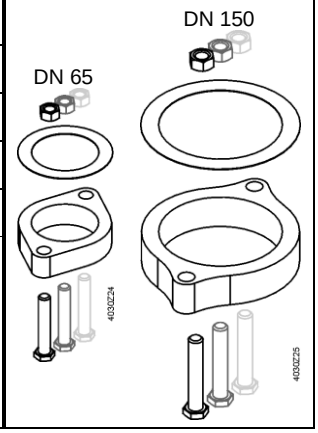
DN	Stock number
DN 65…150	4 679 5629 0

Spare parts, Rev.-Nr.

See page 16

Accessories

Product number	Stock number	Description	Note	Example
ASZ6.6	S55845-Z108	Stem heating element	Required for medium temperatures < 0 °C	
-	4 679 5629 0	Stem sealing gland	When using valves of the V..F43.. lines DN 65…150 with a stem heating element and a medium temperature below -5 °C, the stem sealing gland must be replaced. With the gland 467956290 the valve can be used with water, water with antifreeze and brines between -20 °C and 150 °C.	

Adapter-type	Stock number	Bolts included	Description	VXF41..	Example
ALF41B65	S55845-Z114	4x M16x90mm	Adapter for replacing 3-port valves VXF41.. by VXF43.. • Due to different dimensions of the bypass flange • Every valve to be replaced requires an adapter • Adapter is supplied with the required number and size of bolts and nuts as well as two suitable flat sealings Replace 3-port valves VXF41.., DN 15…50 by 3-port valves VXF53.. (data sheet N4405).	DN 65	
ALF41B80	S55845-Z115	8x M16x110mm		DN 80	
ALF41B100	S55845-Z116	8x M16x110mm		DN 100	
ALF41B125	S55845-Z117	8x M16x110mm		DN 125	
ALF41B150	S55845-Z118	8x M20x110mm		DN 150	

Equipment combinations

Product number	Description	Stroke	Positioning force	Operating voltage	Positioning signal	Spring return time	Positioning time	LED	Manual adjuster	Auxiliary functions
SAV31.00	S55150-A112	40 mm	1600 N	AC 230 V	3-position	-	120 s	-	Press and fix	[1], [2], [5]
SAV61.00 **SAV61.00U**	S55150-A110 S55150-A110-A100			AC/DC 24 V	DC 0...10 V DC 4...24 mA 0...1000 Ω			✓		[1], [3], [5], [6]
SAV81.00 **SAV81.00U**	S55150-A111 S55150-A111-A100				3-position			-		[1], [2], [5]
SKC32.60	SKC32.60	40 mm	2800 N	AC 230 V	3-position	-	120 s	-	Turn, Position is maintained	[1], [2], [5]
SKC32.61	SKC32.61					18 s				
SKC60	SKC60			AC 24 V	0…10 V 4…20 mA 0…1000 Ω	-	Opening: 120 s Closing: 20 s	✓		[1], [3], [5]
SKC62 **SKC62U**	SKC62 SKC62U					20 s				
SKC62UA	SKC62UA									[1], [4], [5]
SKC82.60 **SKC82.60U**	SKC82.60 SKC82.60U				3-position	-	120 s	-		[1], [2], [5]
SKC82.61 **SKC82.61U**	SKC82.61 SKC82.61U					18 s				

1) Auxiliary switch (optional)
2) Potentiometer (optional)
3) Position feedback, forced control, selection of valve characteristic
4) Direction of operation, stroke limit control, sequence control, signal addition (optional)
5) Stem heating element (optional)
6) Function module (optional)

Ordering

Example

Product number	Stock number	Description
VXF43.65-63	S55206-V115	3-port valve with flange, PN 16
SKC32.60	SKC32.60	Electro-hydraulic actuator

Delivery — Valves, actuators and accessories are packed and delivered as separate items.

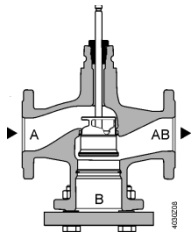
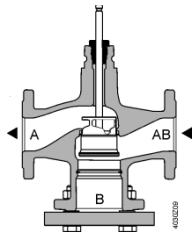
Note — Counter-flanges, bolts and gaskets must be provided on site.

Product documentation

• Mounting Instructions	M4030 74 319 0749 0	DN 65…150
	A6V10774961 A5W90000815	DN 200, DN 250
• Basic documentation	P4030	Contains background information and technical basic knowledge of valves

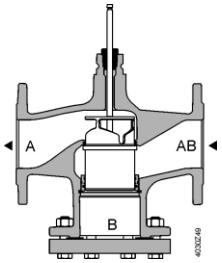
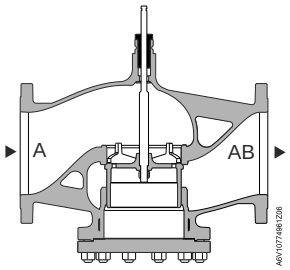
The illustrations below show the basic design of the valves. Constructional features, such as the shape of plugs, may differ.

2-port valves

Fluids	**Steam (Fluids possible)**
Closing against the pressure	Closing with the pressure
	
A → AB For use with all actuators	**A ← AB** Use with electro-hydraulic actuators only

2-port valves pressure compensated

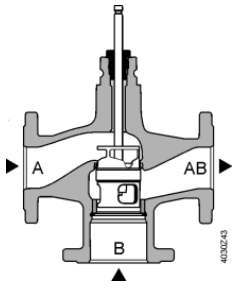
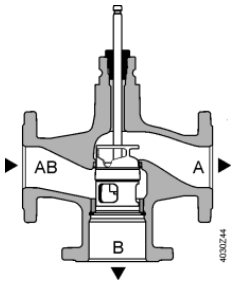
The VVF43..K valves use a pressure-compensated plug. This enables the same type of actuators to be used for the control of volumetric flow at higher differential pressures.

DN 65…150 Fluids and Steam	**DN 200, DN 250 Fluids and Steam**
Closing with the pressure	Closing against the pressure
	
A ← AB Use with electro-hydraulic actuators only	**A → AB** Use with electro-hydraulic actuators only

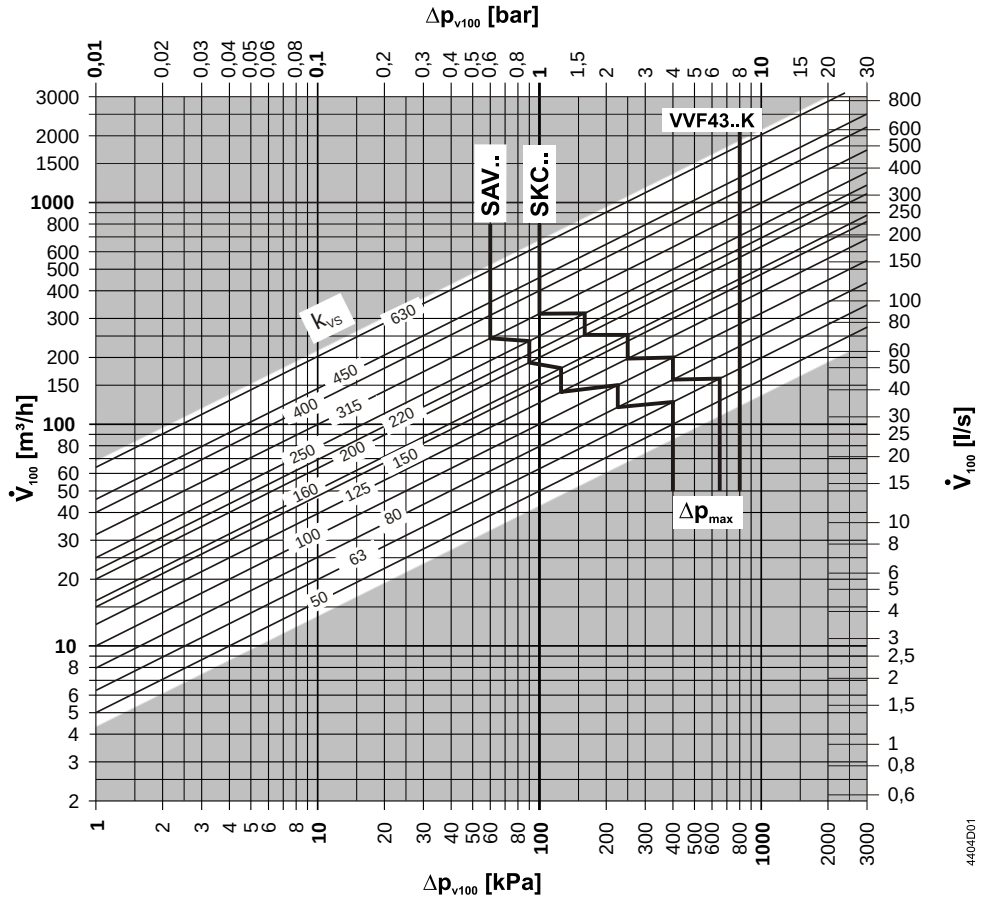
Note

2-port valves do not become 3-port valves by removing the blank flange!

3-port valves

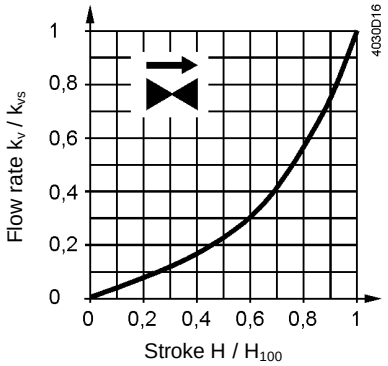
Fluids	
Mixing valve (preferred use)	Diverting valve
	
A ⇨ AB **B**	**AB → A** **B**

Flow chart



Δp$_{max}$ values apply for the mixing function. Δp$_{max}$ values for the diverting function see table „Type summary“, page 2

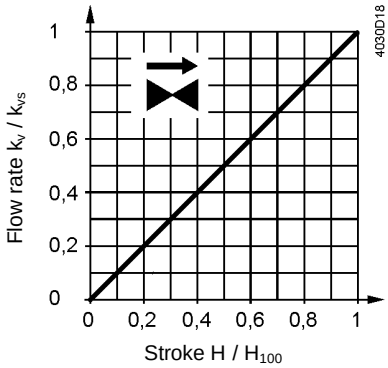
Valve characteristics
2-port valves



0…30 %: Linear
30…100 %: Equal percentage
n_{gl} = 3 to VDI / VDE 2173

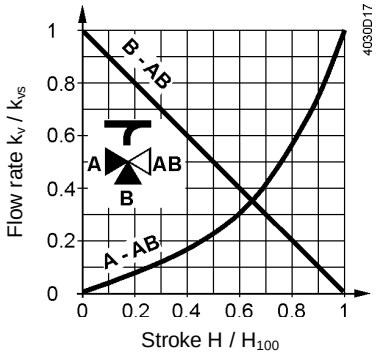
For high k_{vs} values the valve characteristic is optimized for maximum volumetric flow k_{V100}.

For product lines:
VVF43.125-200
VVF43.125-250
VVF43.125-220K
VVF43.150-315
VVF43.150-400
VVF43.150-315K



0…100 %: Linear

3-port valves



Throughport A-AB
0...30 %: Linear
30...100 %: Equal percentage
n_{gl} = 3 to VDI / VDE 2173

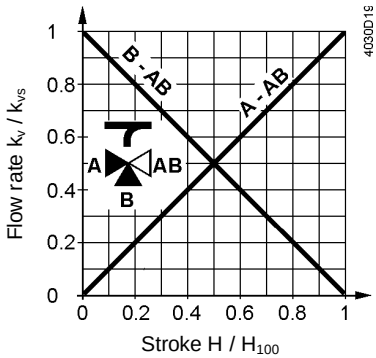
For high k_{vs} values the valve characteristic is optimized for maximum volumetric flow k_{V100}.

Bypass B-AB
0...100 %: Linear

Port AB = constant flow
Port A = variable flow
Port B = bypass (variable flow)

Mixing: Flow from port A and port B to port AB
Diverting: Flow from port AB to port A and port B

For product lines:
VXF43.125-250
VXF43.150-400

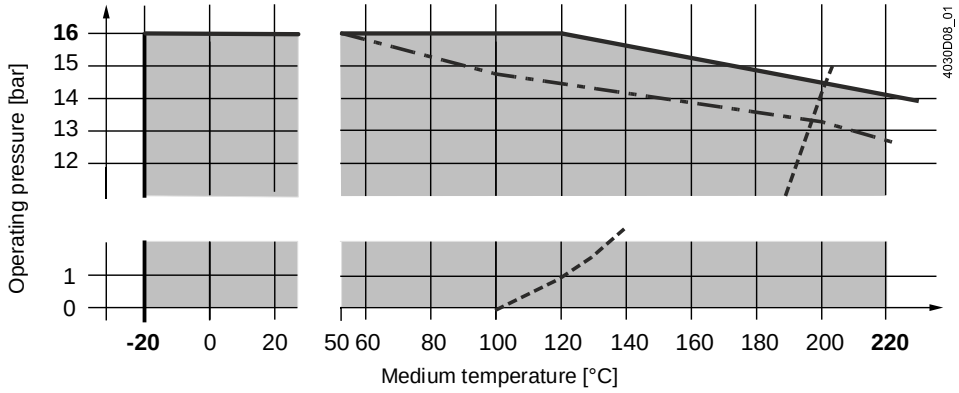


Throughport A-AB
0...100 %: Linear

Bypass B-AB
0...100 %: Linear

Operating pressure and medium temperature

Fluids
with V..F43..



--- Curve for saturated steam; steam forms below this line

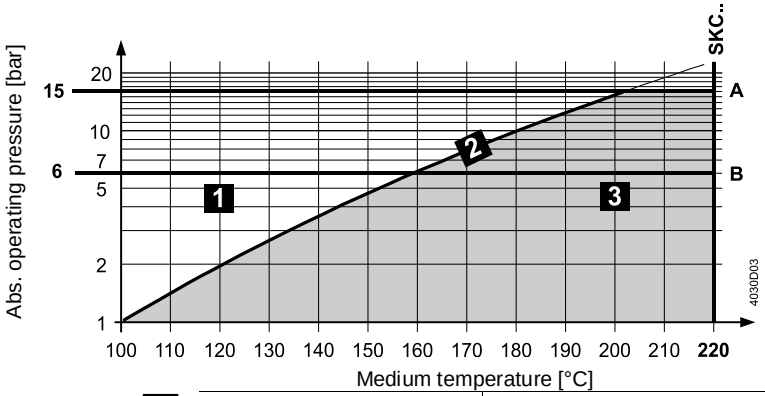
—·· Operating pressure according to EN 1092-1, valid for 2-port valves with blank flange

Operating pressure and operating temperatures according to ISO 7005, EN 1092 and EN 12284

Notes

All relevant local directives must be observed

Saturated steam
Superheated steam
with VVF43..



1	Water	-
2	Wet steam	To be avoided
3	Saturated steam Superheated steam	Permissible operating range
A	Subcritical pressure ratio	
B	Supercritical pressure ratio	

Medium compatibility and temperature ranges

Medium	Temperature range T_{min} [°C]	Temperature range T_{max} [°C]	Valve VVF43..	Valve VVF43..K	Valve VXF43..	Note
Cold water	1	25	■	■	■	-
Low-temperature hot water	1	130	■	■	■	-
High-temperature hot water [1]	130	150	■	■	■	-
	150	180	■	■	■	-
Water with antifreeze	-5	150	■	■	■	V..F43: With a medium temperature of below –5 °C, the stem sealing gland must be replaced by DN 65…150: 467956290
	-10	150	■	-[3]	■	
	-20	150	■	-[3]	■	
Cooling water [2]	1	25	■	■	■	-
Brines	-5	150	■	■	■	V..F43: With a medium temperature of below –5 °C, the stem sealing gland must be replaced by DN 65…150: 467956290
	-10	150	■	-[3]	■	
	-20	150	■	-[3]	■	
Saturated steam	100	150	■	■	-	-
	150	200	■	■	-	-
Superheated steam	120	150	■	■	-	-
	150	220	■	■	-	-
Heat transfer oils	20	220	■	■	■	On the basis of mineral oil
Super-clean water (demineralized and deionized water)	1	150	-	-	-	

[1] Differentiation due to saturated steam curve
[2] Open circuits
[3] VVF43..K can't be used with media below -5 °C due to the compensation sealing material

Fields of use

Fields of use		valves VVF43..	valves VXF43..
Generation	Boiler plants	■	■
	District heating plants	■	-
	Refrigeration plants	■	■
	Cooling towers [1]	■	■
Distribution	Heating groups	■	■
	Air handling units	■	■

[1] Open circuits

Engineering notes

Mounting location

Preferably mount the valves at the return, as the temperature is lower there and the strain on the stem sealing gland is lower.

Dirt trap

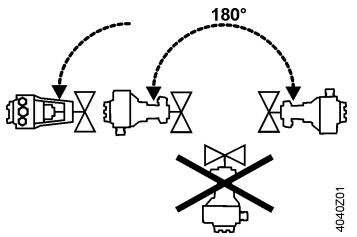
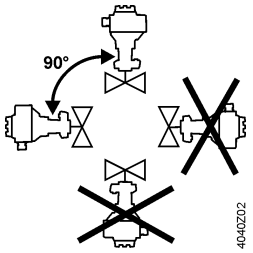
Mount a dirt filter or dirt trap before the valve to ensure proper functioning, and a long service life of the valve. Remove dirt, welding beads, etc. from the valves and pipes.

Cavitation

Cavitation can be avoided by limiting the pressure differential across the valve depending on the medium temperature and the prepressure.

Mounting notes

Mounting position

Indoors	Outdoors
	

Mounting positions apply to both 2- and 3-port valves.

Commissioning notes

⚠ **The valve may be put into operation only if actuator and valve are correctly assembled.**

Note

Ensure that actuator stem and valve stem are rigidly connected in all positions.

Function check

Valve	Throughport A→AB or AB→A	Bypass B→AB
Valve stem extends	Closes	Opens
Valve stem retracts	Opens	Closes

Maintenance notes

The valves are maintenance-free.

⚠ When servicing valves or actuators:

- Deactivate the pump and turn off the power supply
- Close the shutoff valves
- Fully reduce the pressure in the piping system and allow pipes to completely cool down

If necessary, disconnect the electrical wires.

Disposal

Do not dispose of the device as unsorted municipal waste.

- Special handling of individual components may be mandated by law or make ecological sense.
- Observe all local and currently applicable laws and regulations.

Warranty

Application-related technical data are guaranteed only when the valves are used in connection with the Siemens actuators listed under ”Equipment combinations”, page 3.
When used with actuators of other manufacture, any warranty by Siemens becomes void.

Technical Data

Functional data	PN class	PN 16
	Connection	Flange
	Operating pressure	See Section "Operating pressure and medium temperature", page 8
	Valve characteristics [1]	See section "Valve characteristics", page 7
	Leakage rate Throughport	DN 65…150: 0…0.01 % of k_{vs} value (Class IV) DN 200, DN 250: 0…0.02 % of k_{vs} value
	Bypass	0.5…2% of k_{vs} value with SKC.. 0.05% of k_{vs} value with SAV..
	Permissible media	See table "Medium compatibility and temperature ranges", page 9
	Medium temperature	-20…220 °C [2] VVF43..K: -5…220 °C
	Rangeability	DN 65…150: >100 DN 200, DN 250: >50
	Nominal stroke	40 mm
Materials	Valve body	DN 65…150: EN-GJS-400-18-LT DN 200, DN 250: ASTM A216WCB (GP240GH)
	Blank flange	DN 65…250: P265GH (EN 10028-2)
	Valve stem, seat, plug	Stainless steel
	Stem sealing gland	Stainless steel DN 65…150: FEPM (silicone-free) DN 200, DN 250: PTFE (not silicone-free)
	Compensation sealing	Stainless steel DN 65…150: FEPM (silicone-free) DN 200, DN 250: PTFE+carbon (not silicone-free)
	Adapter ALF41B..	Steel S235JRG2
Norms and standards	Pressure Equipment Directive	PED 2014/68/EU
	Pressure Accessories	Scope: Article 1, section 1 Definition: Article 2, section 5
	Fluid group 2:	
	DN 65…125	Category I, Module A, with CE-marking as per article 14, section 2
	DN 150	Category II, Module A2, with CE-marking, as per article 14, section 2 notified body number 0036
	DN 200	Category I, Management by Category II, Module A2, with CE-marking, as per article 14, section 2 notified body number 0035
	DN 250	Category II, Module A2, with CE-marking, as per article 14, section 2 notified body number 0035
	EU Conformity (CE):	
	DN 65…150	A5W00006523 [3]
	DN 200, DN 250	A5W90001026 [3]
	PN class	ISO 7268
	Operating pressure	ISO 7005, DIN EN 12284
	Flanges	ISO 7005
	Length of flanged valves	DIN EN 558-1, line 1
	Valve characteristic	VDI 2173

	Leakage rate	Throughport, bypass according to EN 60534-4 / EN 1349	
	Water treatment	VDI 2035	
Environmental conditions	Storage: IEC 60721-3-1	Class	1K3
		Temperature	-15…55 °C
		Rel. humidity	5…95% r.h.
	Transport: IEC 60721-3-2	Class	2K3, 2M2
		Temperature	-30…65 °C
		Rel. humidity	< 95% r.h.
	Operation: IEC 60721-3-3	Class	3K5, 3Z11
		Temperature	-15…55 °C
		Rel. humidity	5…95% r.h.
Environmental compatibility	The product environmental declaration CE1E4404en01 [3], CE1E4404en02 [3] and A5W90001031 [3] contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).		
Dimensions / Weight	Dimensions	See “Dimensions“, page 13 + 14	
	Weight	See “Dimensions“, page 13 + 14	

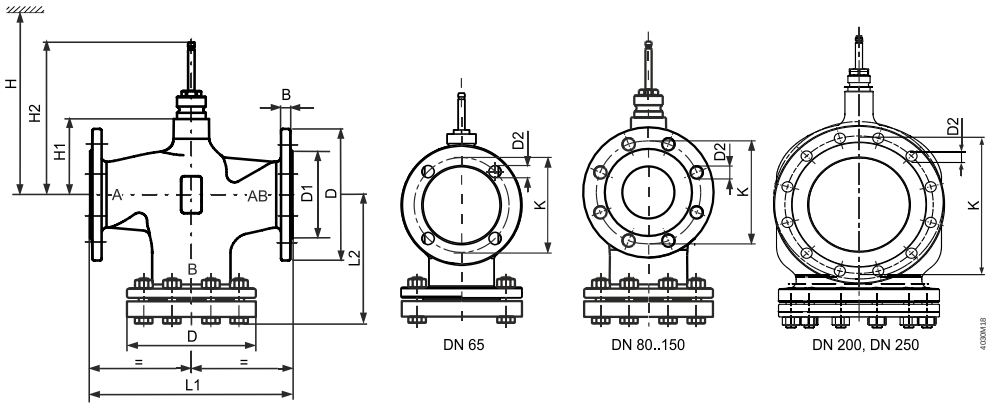
[1] For certain valve lines and high k_{vs} values, the valve characteristic is optimized for maximum volumetric flow k_{V100}

[2] For medium temperatures < -5 °C, the stem sealing gland must be replaced. The sealing gland must be ordered separately (Stock number: 4 679 5629 0).

[3] The documents can be downloaded from http://www.siemens.com/bt/download.

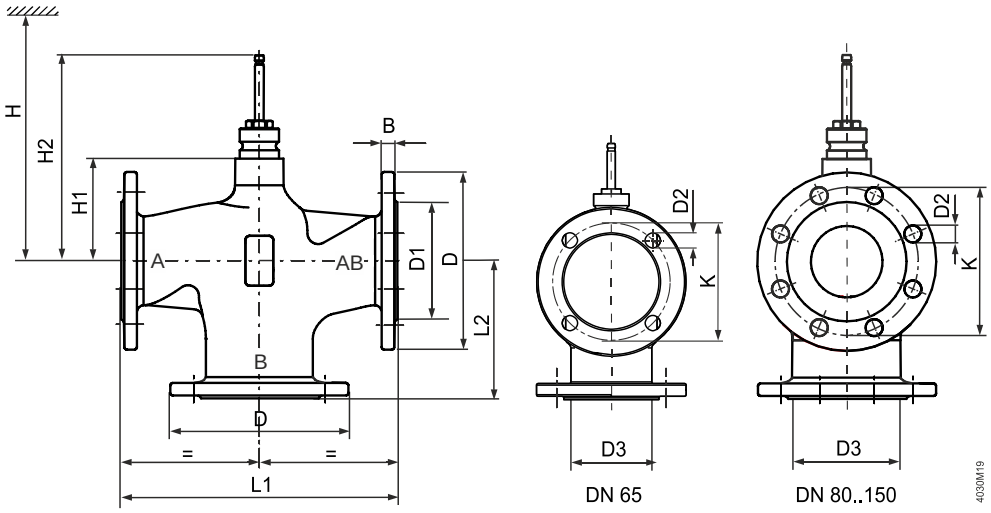
Dimensions

VVF43..



Product number	DN	kg	B	Ø D	Ø D1	Ø D2	L1	L2	Ø K	H1	H2	H	
												SAV..	SKC..
VVF43..	65	21.5	14	185	118	19 (4x)	290	178	145	115	231.5	580	690
	80	27.5	14	200	132	19 (8x)	310	190	160	115	231.5	580	690
	100	33.8	14	220	156	19 (8x)	350	206	180	146	262.5	611	721
	125	45.8	14	250	184	19 (8x)	400	233	210	159	275.5	624	734
	150	67.9	14	284	211	23 (8x)	480	275.5	240	186.5	303	652	762
VVF43..K	65	21.5	14	185	118	19 (4x)	290	178	145	115	231.5	-	690
	80	27.6	14	200	132	19 (8x)	310	190	160	115	231.5	-	690
	100	34.1	14	220	156	19 (8x)	350	206	180	146	262.5	-	721
	125	46.7	14	250	184	19 (8x)	400	233	210	159	275.5	-	734
	150	68.7	14	284	211	23 (8x)	480	275.5	240	186.5	303	-	762
	200	130	30	340	266	22 (12x)	600	265	295	243	359.5	-	818
	250	196	32	405	319	26 (12x)	730	290	355	275	391.5	-	850

VXF43..



Product number	DN	kg	B	Ø D	Ø D1	Ø D2	Ø D3 [1)]	L1	L2	Ø K	H1	H2	H	
													SAV..	SKC..
VXF43..	65	16.5	14	185	118	19 (4x)	86	290	145	145	115	231.5	580	690
	80	20.7	14	200	132	19 (8x)	100	310	155	160	115	231.5	580	690
	100	26.9	14	220	156	19 (8x)	123	350	175	180	146	262.5	611	721
	125	36.4	14	250	184	19 (8x)	149	400	200	210	159	275.5	624	734
	150	54.9	14	284	211	23 (8x)	174	480	240	240	186.5	303	652	762

[1)] Interior opening of the bypass port

Spare parts

Stem sealing gland

Series A, B and C			
Product No	**DN**	**Stock Number**	**Comments**
VVF43.. VXF43.. VVF43..K	DN 65…150	74 284 0061 0	Standard version with FEPM-O-ring for medium temperatures between -5 °C and 220 °C.
VVF43.. VXF43..	DN 65…150	4 284 8806 0	Water with antifreeze and brines between -20 °C and 150 °C

From series D			
Product No	**DN**	**Stock Number**	**Comments**
VVF43.. VXF43.. VVF43..K	DN 65…150	S55846-Z114	Standard version with FEPM-O-ring for medium temperatures between -5 °C and 220 °C.
VVF43.. VXF43..	DN 65…150	4 679 5629 0	Water with antifreeze and brines between -20 °C and 150 °C.

All series			
Product No	**DN**	**Stock Number**	**Comments**
VVF43.. K	DN 200, DN 250	4 679 5630 0	Standard version with PTFE sleeve for medium temperatures between -5 °C and 220 °C.

Revision numbers

Product number	Valid from rev. no.	Product number	Valid from rev. no.
VVF43.65-50	..D	**VXF43.65-50**	..D
VVF43.65-63	..D	**VXF43.65-63**	..D
VVF43.80-80	..D	**VXF43.80-80**	..D
VVF43.80-100	..D	**VXF43.80-100**	..D
VVF43.100-125	..D	**VXF43.100-125**	..D
VVF43.100-160	..D	**VXF43.100-160**	..D
VVF43.125-200	..D	**VXF43.125-200**	..D
VVF43.125-250	..D	**VXF43.125-250**	..D
VVF43.150-315	..D	**VXF43.150-315**	..D
VVF43.150-400	..D	**VXF43.150-400**	..D
VVF43.65-63K	..D		
VVF43.80-100K	..D		
VVF43.100-150K	..D		
VVF43.125-220K	..D		
VVF43.150-315K	..D		
VVF43.200-450K	..A		
VVF43.250-630K	..A		

Issued by
Siemens Switzerland Ltd
Smart Infrastructure
Global Headquarters
Theilerstrasse 1a
6300 Zug
Switzerland
Tel. +41 58-724 24 24
www.siemens.com/buildingtechnologies

© Siemens Switzerland Ltd, 2011-2024
Technical specifications and availability subject to change without notice.

8.26

AHU R.01 operation and maintenance manual

The following 132 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	HEN0203-AHUR01-OM
Asset	AHU R.01
Provided by	Trane UK Ltd
Source file	Trane (AL-KO) AT4F air handling unit operation and maintenance manual.pdf
Pages	132

AL-KO

QUALITY FOR LIFE

EN



CENTRAL VENTILATION AND AIR HANDLING UNITS

OPERATING AND ASSEMBLY INSTRUCTIONS FOR CENTRAL VENTILATION UNITS

AT4F SERIES

Legal

AL-KO THERM GMBH
Hauptstraße 248 - 250
D-89343 Jettingen-Scheppach
Germany
Phone: +49 8225 39 - 0
Fax: +49 8225 39 - 2113
E-mail: klima.technik@alko-air.com

Revision history

Version	Description	Date
1.0	3086448/October 2014	October 2014
_b	3086448_b/December 2016	December 2016
2.0	3086448_2.0/July 2021	July 2021

Table of contents

1 About this manual 7
1.1 Explanation of symbols 7
1.1.1 Safety instructions 7
1.2 Safety symbols 8
1.2.1 Abbreviations 10
1.3 Legal notices 10
2 Safety instructions 11
2.1 Intended use 11
2.2 Foreseeable misuse 11
2.3 General safety instructions 12
2.3.1 Safety instructions for operation 14
2.3.2 Safety instructions for maintenance 14
2.3.3 Personal safety instructions 14
2.4 Residual dangers 14
2.5 Training 15
3 Product description 16
3.1 Functional description 16
3.2 Technical data 16
3.2.1 Area for on-site connections/bushings 17
3.3 Sample AT4F type plates 18
4 Delivery, transport, storage 19
4.1 Delivery 19
4.2 Transport 19
4.2.1 Transport under difficult conditions 20
4.2.2 Fork-lift truck / pallet truck 20
4.2.3 Crane transport 21
4.2.3.1 Crane transport using transport tube 21
4.2.3.2 Crane transport using shackle 22
4.2.3.3 Crane transport using a base frame bracket 23
4.2.3.4 Crane transport using crane eyelets 24
4.3 Storage prior to assembly 25
4.4 Disposal of packaging 25
5 Assembly 26
5.1 Safety instructions for assembly 26
5.2 Preparations 27
5.2.1 Space requirements 27
5.2.2 Foundation 28
5.3 Assembly of separated housing 29
5.3.1 Housing separation point seal for indoor installation 30
5.3.2 Housing separation point sealing for outdoor installation (weather-proof) 30
5.3.3 Inside unit connections with split housing 31
5.4 Unit connection with unit arrangement one above the other and next to one another 32
5.4.1 Unit arrangement one above the other 32
5.4.2 Unit arrangement next to one another 34
5.4.2.1 Version of floor/roof assembly with unit frame profile 34
5.4.2.2 Version of floor/roof assembly without unit frame profile 35
5.5 Outdoor installation 37
5.5.1 Roof frame - floor assembly version with unit frame profile 37

5.5.1.1 Roof frame preassembled on-site ... 37
5.5.1.2 Factory-mounted base frame ... 38
5.5.2 Roof frame - floor assembly version without unit frame profile ... 38
5.5.2.1 Roof frame preassembled on-site ... 38
5.5.2.2 Factory-mounted base frame ... 39
5.5.2.3 Sealing of the unit separation points with solvent welding agent for weatherproof units ... 40
5.5.2.4 Sealing of the unit separation points with hot air welding for weatherproof units ... 46
5.6 Units with split plate heat exchanger (option) ... 47
5.7 Units with split rotary heat exchanger (option) ... 48
5.8 Additional installation instructions for hygiene units ... 48
5.9 Heat exchanger connection ... 49
5.9.1 Connection of hot water heater (option) ... 49
5.9.2 Connection of heater/pumps-cold water air cooler (option) ... 51
5.9.3 Connection of pumps/cold water/air cooler (option) ... 54
5.9.4 Steam register ... 56
5.9.5 Circulating coil system CCS (recuperative energy recovery) ... 57
5.9.6 Direct evaporator/condenser ... 58
5.10 Mechanical connection ... 59
5.10.1 Duct connection ... 59
5.10.2 Intake and exhaust hood (option) ... 60
5.10.3 Condensate drain connection via siphon ... 60
5.10.4 Humidifier media connections ... 62
5.10.5 Filling and venting ... 62
5.11 Electrical connection ... 63
5.11.1 Electric motor ... 64
5.11.1.1 Connection of three-phase motors ... 65
5.11.1.2 Circuit with frequency converter, wiring examples ... 68
5.11.1.3 Connection of EC fans ... 70
5.11.2 Connection of electric air heater ... 71
5.11.2.1 On-site retrofitting of electric air heaters ... 71
5.11.2.2 Frequent causes of error for accumulated heat with electric air heaters ... 72
5.11.3 LED lamp connection ... 72

6 Commissioning ... 73

6.1 Principles ... 73
6.2 Before a system start ... 74
6.2.1 Commissioning of the electric heating coil ... 75
6.2.2 Commissioning of fans ... 76
6.2.2.1 Commissioning of fans with belt drive ... 77
6.2.2.2 Commissioning of fan free-wheel with direct drive ... 77
6.2.3 Commissioning of rotary heat exchanger ... 78
6.2.4 Commissioning of circulating coil system CCS (recuperative energy recovery) ... 78
6.2.5 Commissioning of spray humidifier (air washer) ... 79
6.2.6 Commissioning of the contact humidifier ... 80
6.2.6.1 Fresh and circulation water systems in contact humidifier ... 81
6.2.7 Commissioning of high-pressure humidifier ... 81
6.2.8 Commissioning of steam humidifier ... 82
6.2.9 Commissioning of the combustion chamber ... 82
6.2.10 Commissioning of UV disinfection ... 83
6.3 Switching the installation on/off ... 83
6.4 After system start ... 83

7 Servicing and maintenance 84
7.1 Safety instructions for servicing and maintenance 84
7.1.1 Qualifications of personnel 86
7.2 Maintenance instructions in accordance with VDI 6022 and VDMA 24186 86
7.2.1 Initial and repeat inspections must only be performed by category A trained qualified staff according to VDI 6022 Sheet 1 86
7.2.2 Performing of hygiene checks during maintenance by Category B trained maintenance personnel in accordance with VDI 6022 Sheet 1 87
7.2.3 Maintenance schedule 88
7.3 Maintaining and cleaning components 94
7.3.1 Finned heat exchanger 95
7.3.1.1 Maintenance 96
7.3.1.2 Cleaning 96
7.3.1.3 Circulating coil system (heat exchanger with pipe circuits) 97
7.3.1.4 Steam register 98
7.3.1.5 Evaporator/condenser 98
7.3.2 UV disinfection 99
7.3.3 Combustion chamber 100
7.3.4 Plate heat exchanger 100
7.3.4.1 Maintenance 100
7.3.4.2 Cleaning 101
7.3.5 Rotary heat exchanger 102
7.3.5.1 Maintenance 102
7.3.5.2 Cleaning 103
7.3.5.3 Drive belt maintenance 104
7.3.6 Grease trap filter 104
7.3.7 Dampers 104
7.3.7.1 Maintenance 105
7.3.7.2 Cleaning 105
7.3.8 Sound absorber 105
7.3.9 Maintenance 105
7.3.9.1 Cleaning 105
7.3.10 Droplet eliminator 105
7.3.10.1 Maintenance 106
7.3.10.2 Cleaning 106
7.3.11 Humidifier 106
7.3.11.1 Spray humidifier (air washer) 106
7.3.11.2 Contact humidifier 107
7.3.11.3 High-pressure humidifier 108
7.3.11.4 Steam humidifier 109
7.3.12 Electric motor 110
7.3.12.1 Maintenance 111
7.3.12.2 Cleaning 111
7.3.13 Fans 111
7.3.13.1 Maintenance 112
7.3.13.2 Cleaning 112
7.3.13.3 Removing the fan for maintenance purposes 112
7.3.13.4 Fan with belt drive 113
7.3.13.5 EC fan 114
7.3.13.6 Fan free-wheel with direct drive 115

7.3.13.7 Check gap and overlap in fans 117
7.3.13.8 Tightening torques of the screw connections on the fan part 117
7.3.13.9 Maintenance or inspection of the taper-lock clamping bushes 118
7.3.14 Cooling system and heat pump 118
7.3.15 Electric air heater 119
7.4 Replacing components 119
7.4.1 Changing the filter 119
7.4.1.1 Replacing bag filters 120
7.4.1.2 Change the activated carbon filter 122
7.4.1.3 Replace the particulate air filter 122
8 Emergencies and malfunctions 123
8.1 Emergency 123
8.2 Help in the event of malfunctions 123
8.3 Contact for malfunctions 123
9 Shut-down 124
9.1 Decommissioning 124
9.2 Dismantling 124
9.3 Disposal 125
10 Spare parts 126
11 Certifications 127
11.1 EC Declaration of Incorporation conforming to 2006/42/EC 128
11.2 EC Declaration of Conformity conforming to 2006/42/EC 129

1 About this manual

- The German version is the original operating instructions. All further language versions are translations of the original operating instructions.
- Read these operating and assembly instructions carefully before assembly, commissioning and maintenance. This is the prerequisite for safe work and trouble-free handling.
- Observe the safety instructions and warnings in this documentation and on the product.
- This documentation is a permanent part of the described product, and must be handed over to the buyer if the product is sold.

1.1 Explanation of symbols

1.1.1 Safety instructions

DANGER



This signal word is used to indicate an immediately dangerous situation which, if not avoided, will result in death or severe injury.

WARNING



This signal word is used to indicate a potentially dangerous situation which, if not avoided, could result in death or severe injury.

CAUTION



This signal word is used to indicate a potentially dangerous situation which, if not avoided, could result in a minor injury.

ATTENTION



This signal word is used to indicate a potential risk of property damage.

NOTE



Special instructions for ease of understanding and handling.

1.2 Safety symbols

Meaning	Symbol
GENERAL DANGER SYMBOL If the required safety instructions are not observed, this can lead to death, severe injuries and serious property damage.	
IMPORTANT NOTE If this notice is not observed, problems can arise with the unit.	
OBSERVE THE OPERATING AND ASSEMBLY INSTRUCTIONS If you do not heed the notices in the operating and assembly instructions, this can lead to problems with the unit.	
INFORMATION Heeding this information makes working with the machine easier.	

Warning sign

The warning signs used in these operating and assembly instructions draw attention to specific hazards.

Meaning	Warning sign
Warning of danger of falling If the required safety instructions are not observed, this can result in death or serious injuries due to falling.	
Warning of danger of slipping If the required safety instructions are not observed, this can result in death or serious injuries due to slipping.	
Warning of electrical voltage If the required safety instructions are not observed, this can result in death or serious injuries due to hazardous electrical voltage.	
Warning against suspended loads If the required safety instructions are not observed, this can result in death or serious injuries due to suspended loads.	
Warning of falling objects If the required safety instructions are not observed, this can result in death or serious injuries due to falling objects.	
Warning of hot surfaces If the required safety instructions are not observed, this can result in death or serious injuries due to hot surfaces.	
Warning of danger of crushing If the required safety instructions are not observed, this can result in death or serious injuries due to crushing.	

Meaning	Warning sign
Warning of sharp objects If the required safety instructions are not observed, this can result in death or serious injuries due to sharp objects.	
Warning of hand injuries If the required safety instructions are not observed, this can result in death or serious injuries.	
Warning of poisonous substances If the required safety instructions are not observed, this can result in death or serious injuries due to poisonous substances.	

Prohibition sign

The prohibition signs in these operating and assembly instructions draw attention to instructions to be observed.

Meaning	Prohibition sign
Wear eye protection If you do not wear eye protection, there is a risk of eye injuries.	
Wear foot protection If you do not wear foot protection, there is a risk of foot injuries.	
Wear hand protection If you do not wear hand protection, there is a risk of hand injuries.	
Wear head protection If you do not wear head protection, there is a risk of head injuries.	
Wear a mask If you do not wear respiratory protection, this can lead to poisoning and chemical burns to the lungs.	
Isolate before maintenance or repair Failure to disconnect the unit from all energy sources before starting maintenance or repair work can result in serious injuries.	

1.2.1 Abbreviations

Abbreviation	Meaning
PPE	Personal protective equipment, such as cut-proof gloves, safety goggles, work gloves, ear protection, safety helmet, breathing mask
AC unit	Air handling unit
TA	Droplet eliminator
WRD	Heat recovery, diagonal (plate heat exchanger)
WS	Water column

1.3 Legal notices

All specified data serve solely to describe the product. No statement on a specific characteristic or suitability for a specific purpose can be derived from these data. The data do not exempt the user from his own judgement and checks.

2 Safety instructions

2.1 Intended use

The AT4F unit is intended only for processing and conveying respirable air, i.e. for ventilation and extraction of rooms and buildings or for maintaining the necessary room climate. The AT4F unit is suitable for operation in the temperature range from -20 °C to +40 °C.

The range of application of the AT4F unit is documented in the design data sheet and on the type plates. Deviating ranges of application must be coordinated with the manufacturer's plant in order not to affect the function of the installation.

For the intended use, the unit must be professionally installed and operated as intended. To do this, observe the "5 Assembly" on page 26 chapter and other relevant information. Furthermore, the intended use also includes compliance with the operating and maintenance conditions listed in these operating and assembly instructions (see chapters "6 Commissioning" on page 73 and "7 Servicing and maintenance" on page 84). The risk is borne solely by the user.

- The unit is an air handling unit for air conditioning.
- Only operate the AT4F unit when fully assembled.
- Set up the unit horizontally. Otherwise there is a risk that puddles may form, among other things.
- Use only original spare parts.
- Children and people who are not familiar with the unit may not use it.
- Observe the accident prevention regulations and fire protection regulations.

2.2 Foreseeable misuse

The AT4F unit may only be operated within the scope of the technical data specified by AL-KO THERM. Any use other or more extensive than that described in the section "2.1 Intended use" on page 11 is regarded as not in accordance with the intended use. The manufacturer cannot be held liable for damage resulting from this.

Possible misuse includes:

- Non-horizontal setup of the unit.
- Conveying media with impermissibly high or low temperatures.
- Conveying aggressive or heavily dust-containing media.
- Installation in an environment with aggressive media (e.g. sea air) or heavily dust-containing media (coast).
- Use in an explosive atmosphere.
- Installation of a non-permissible joint seal.
- Non-compliance with the static limits (customer supplied).

2.3 General safety instructions

⚠ WARNING



Risk of serious injury or death due to working without personal protective equipment!

Working on the AT4F unit without personal protective equipment can result in serious injury or death.

- Observe the safety instructions in this operating and assembly instructions.
- Use the personal protective equipment when working on the installation.
- Use other protective equipment according to the work carried out.

⚠ WARNING



Risk of severe injuries or death!

Working on the AT4F unit can result in serious injury or death.

- Only allow assembly, installation, commissioning, repair, maintenance and servicing work to be carried out by qualified staff.
- Disconnect the AT4F unit from the mains power supply on all poles and secure it to prevent restart before starting repair or maintenance work.
- Integrate weatherproof units into the lightning protection concept when installed outdoors.
- Avoid sparks and flying sparks in the intake area of the installation.
- Observe the working instructions and these operating and assembly instructions.
- Work with care.
- Use the personal protective equipment when working on the installation.
- Use other protective equipment according to the work carried out.

⚠ WARNING



Risk of injury due to falling, and falling modules.

When installing the modules or installing them on platforms or on the roof, persons may fall off and/or modules may fall down.

- Only allow assembly, installation, commissioning, repair, maintenance and servicing work to be carried out by qualified staff.
- Observe the assembly instructions in these operating and assembly instructions.
- Use only tested ladders, scaffolding or suitable platforms.
- Only use suitable lifting equipment.
- Only use approved fasteners when assembling the AT4F unit.
- Use the personal protective equipment when working on the installation.

⚠ WARNING



Risk of injury due to unauthorised opening.

- Keep the inspection doors/inspection covers closed during operation.
- Never open the unit during operation.
- Open the inspection doors/inspection covers using the relevant tool if necessary.
- Observe the hazard warnings on the inspection doors/inspection covers.

⚠ WARNING



Risk of poisoning when working with sealants, adhesives and pre-treatment agents.

- Do not touch the sealant, adhesive or pre-treatment agent.
- Work with care.
- Do not swallow the sealant, adhesive or pre-treatment agent.
- Ensure that there is adequate ventilation at the workplace.
- Observe the safety data sheets and work instructions in accordance with the Ordinance on Hazardous Substances.
- Use personal protective equipment during all work on the installation.

⚠ WARNING



Risk of injury from falling from ladders, scaffolding or work platforms.

- Only use suitable and tested ladders, steps, scaffolding and work platforms.
- Work with care.

Observe the safety instructions in these operating and assembly instructions to avoid injuries, fires and other hazards due to improper use and improper operation of the unit:

- The design and construction of the AT4F unit complies with the standards listed in the Declaration of Conformity or Declaration of Incorporation. A potential hazard can only be extensively ruled out if the other applicable standards for the overall system to be completed and installed by the plant manufacturer are adhered to.
- If installation is performed contrary to our regulations, and the defect/damage which has occurred is attributable to improperly modification, processing or any other treatment, all damage compensation or warranty claims are ruled out. The orderer must prove that improper installation did not cause the defect which has occurred.
- Safety and monitoring equipment must not be removed, bridged or disabled in any other way.
- All authorised persons must have read and understood the operating and assembly instructions in full before starting work on the unit and must observe them at all times.
- To avoid dangers during operation, all of the user's plant, operating and working instructions apply in addition to these operating and assembly instructions.

2.3.1 Safety instructions for operation

- The AT4F unit must only be operated with completely closed inspection doors/inspection covers.
- No unauthorised persons are permitted to have access to the AT4F unit during operation.
- The AT4F unit may only be operated in the performance range specified in the AL-KO THERM technical documents.
- The AT4F unit must be installed properly and used subject to precise observation of our operating and assembly instructions.
- Only operate the AT4F unit when it is fully assembled and with correctly fitted contact protection (optional). The AT4F unit may only be operated in a technically flawless condition. Malfunctions and damage that can affect safety must be rectified immediately and professionally. The design and construction of the AT4F unit complies with the standards listed in the Declaration of Conformity or Declaration of Incorporation.
- Avoid spark formation in the vicinity of the AT4F unit.
- Wear personal protective equipment (e.g. ear protection) during operation of the AT4F unit.

2.3.2 Safety instructions for maintenance

- Damaged parts are only permitted to be replaced with original spare parts.
- During repair and maintenance work, the AT4F unit is to be disconnected from the mains on all poles and secured against restart.
- General maintenance instructions in the operating and assembly instructions from AL-KO THERM must be observed under all circumstances.
- Observe the delay time of the fans. Observe a waiting time of at least 3 minutes, until the fan impellers are stationary, before opening the inspection doors.

2.3.3 Personal safety instructions

- The AT4F unit may only be operated by persons who are trained in operating it and expressly authorised to use it.
- Personal protective equipment is required for work on the AT4F unit.
- To avoid dangers during operation, all of the operator's plant, operating and working instructions apply in addition to these operating and assembly instructions.
- The operating and assembly instructions must be kept at a suitable, known place in the workplace.
- The operator of the AT4F unit must draw up operating procedures in an understandable form and in the language of the employees, taking the operating and assembly instructions and the operating conditions into consideration.

2.4 Residual dangers

The AT4F unit may present a danger if it is not operated by trained personnel and/or is used improperly or not according to its intended use.

Residual hazards are potential dangers that are not immediately obvious, e.g.:

- Injuries due to failure to observe the safety instructions, standards, directives or regulations.
- Injuries caused by uncoordinated work.
- Danger caused by working on the electrical installation, cables and connections.
- Transporting, unpacking and setting up the unit; these may result in crushing, cutting, puncture or impact injuries.
- Tipping of the unit; uneven and loose surfaces promote unit tipping.
- There is a risk of stumbling, slipping, falling and falling down when setting up the unit and the accessory parts.
- There is a danger of electric shock due to damaged and defective electrical components.
- Electrical connection cable: Danger due to stumbling, falling and slipping.
- Noise (hearing damage).
- Human misconduct: Non-observance of safety instructions, standards and regulations.
- Operation or transport without suitable safety measures.

2.5 Training

The operator of the AT4F unit must regularly train their personnel on the following topics:

- Observance of the operating and assembly instructions as well as the legal regulations.
- Intended use of the AT4F unit.
- Observance of all company, operating and working instructions at the operator's installation site.
- What to do in an emergency.
- Compliance with VDI 6022.

3 Product description

- The exact type designation can be found on the type plates. The type plates are usually affixed to the housing. When ordering spare parts or in case of other queries, please specify the type designation of the AT4F unit, the year of manufacture and the serial number, see chapter "3.3 Sample AT4F type plates" on page 18.
- The AT4F unit is suitable for operation in the temperature range from -20 °C to +40 °C.
- Depending on the requirements, all known air handling units are used in the AT4F Series for filtration, heating, cooling, silencing, humidification and dehumidification, heat recovery (rotary heat exchangers, plate heat exchangers, circulating coil systems or layered storage modules), etc.
- AT4F units are available as a weatherproof version or for indoor installation.
- The customer-specific unit design can be found in the respective data sheets and drawings.

NOTE



Our products are subject to continuous quality control, and comply with the applicable regulations.

3.1 Functional description

- Central ventilation and air handling units in the AT4F Series are highly efficient air handling units.
- The AT4F Series is used in many areas of human air conditioning, industrial applications, chemicals/pharmaceuticals, marine, hygiene, swimming pools, recreational facilities and many other sectors, as well as in the modernisation of old existing installations using highly efficient, state-of-the-art heat recovery and energy saving technologies.
- The sound emissions from the AT4F Series are minimised by an ingenious housing design and an optimised component layout tailored to the respective, intended use, and through the use of fan and drive units with highly efficient vibration isolation.
- The internally smooth housing design guarantees easy and fast unit cleaning of the units and compliance with the hygiene requirements.
- On request, the air handling units can also be supplied with integrated control and/or cooling technology, incl. wiring and installation of the field devices and sensors.

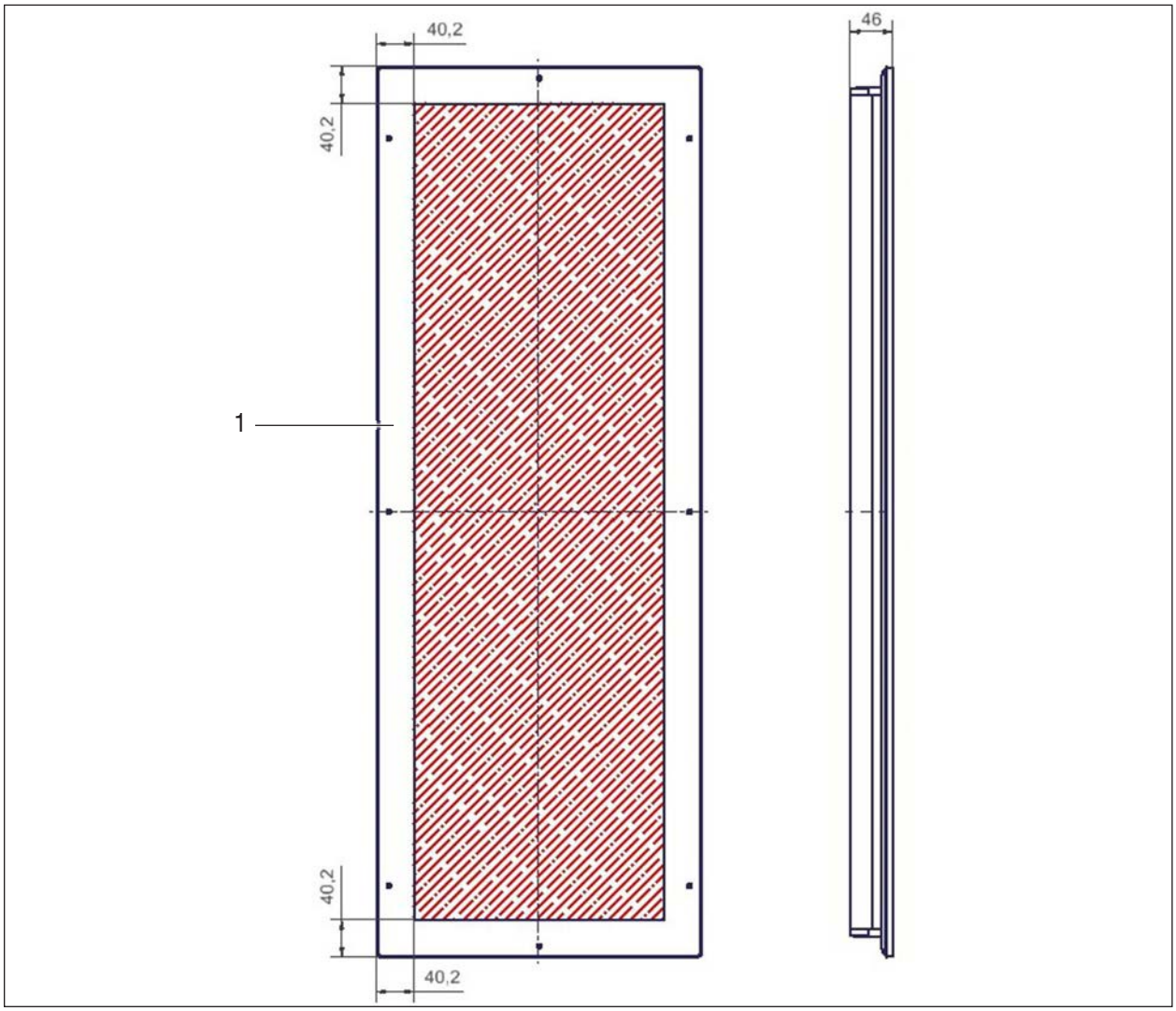
3.2 Technical data

ATTENTION



Read the documentation supplied with the unit. Information on the technical and electrical data can be found there.

3.2.1 Area for on-site connections/bushings



1	View outside

ATTENTION

Holes for connections/bushings may only be inserted in the cross-hatched area. Non-compliance leads to constructional damage to the panel!

3.3 Sample AT4F type plates

Each functional unit is assigned a separate type plate. The type plates contain both the order number, position details, year of manufacture, manufacturer's data as well as the design data. These type plates are attached to the outside of the unit.

Type plate

AL-KO THERM GMBH

Hauptstrasse 248-250
D-89343 Jettingen-Scheppach

Order #:	3214910	Housing:	H03/3
Type:	AT4-F 16x12/16x12 - Interior	Pos.: 11	Date:2018

fan	data per fan unit	
# units:	1	Supply air ☐
Air flow:	6.800 m^3/h	
Static increase of pressure:	868 Pa	
Total pressure:	0 Pa	
Nominal rated capacity:	2.90 kW	
Nominal rated speed(s):		
Nominal rated current:	4.50 A	
Nominal rated voltage:	380 .. 480 V	
Speed:	2.002 1/min	
Power Frequency:	50 Hz	
Max. speed:	2.140 1/min	
K factor:	240	

volume flow [m^3/h] = K factor x $\sqrt{\text{nozzle-pressure}}$ [Pa]

Fig. 1 Example of a type plate

4 Delivery, transport, storage

4.1 Delivery

- The unit dimensions are given in mm. Measurements such as AT4F 12x12 or AT4F 16x12 etc. are grid dimensions. 1 grid = 76.5 mm
- The breakdown of the scope of supply is shown in the unit drawing.
- Depending on their size, the AT4F Series central ventilation and air handling units are delivered either partially disassembled, fully disassembled or fully assembled or as components bolted to square transport timbers according to the breakdown of the scope of supply.

4.2 Transport

⚠ WARNING



Danger of death - Suspended loads.

For crane transport, all valid safety conditions according to DGUV regulation 52 Cranes and DGUV Control unit 100- 500 chapter 2.8 must be observed.

- Do not walk under suspended loads.
- Use the specified attachment and mounting points.
- Observe the weight specifications.
- Only use suitable lifting equipment.

⚠ CAUTION





Risk of injury due to the module tilting or tipping over.

Failure to observe the safety instructions, standards, directives and regulations leads to a risk of injury due to the unit tipping over.

- Observe the relevant standards, directives and regulations.
- Observe the instructions in these operating and assembly instructions.
- Use the specified attachment and mounting points.
- Observe the weight specifications.
- Only work on on-site surfaces that are suitable for installation preparations and lifting.

NOTE



Any paint damage that occurs during transport can be rectified with a touch-up pen.

A touch-up pen can be ordered from AL-KO THERM if necessary.

ATTENTION



- Uniform lifting of the unit components must be ensured.
- Transport is only permitted using the attachment points given below.
- Only approved lifting equipment with a sufficient load capacity may be used.
- The lifting equipment must be in perfect condition.
- The lifting gear must be checked for load-bearing capacity and damage before use.
- The protruding drip edges of AT4F units of weatherproof version must be protected by additional measures (e.g. spreader beams or spacers) during crane transport.
- Secure the load during transport.
- Use only suitable transport locks.
- If the maximum weights to be lifted are exceeded (per person), plan for a second person to help.
- The individual components of the installation may only be moved with the transport equipment provided for this purpose.
- Use only suitable transport devices and suitable industrial trucks.
- Maintenance doors must be kept closed at all times during transport.

- Ensure sufficient visibility during transport (accompanying persons, if necessary).
- No persons must be allowed to remain in the transport area.
- The unit must only be transported by trained and qualified personnel and in observance of the safety aspects.
- If transport units are used that require a driving licence, the personnel operating these units must have an applicable, valid driving licence for this.
- During transport, observe the instructions in these operating and assembly instructions and the relevant regulations on occupational safety and environmental protection.
- Transport the unit only when upright and secure the unit to prevent tipping and slipping.
- Avoid distorting the housing or other damage.
- Damage that results from improper packaging and transport are at the expense of the initiator.
- As described in chapter "4.2.2 Fork-lift truck / pallet truck" on page 20, the unit can be transported using a forklift or a crane.
- The AT4F unit is only to be transported, lifted and set up within the temperature usage limits (-20 °C to +40 °C).

4.2.1 Transport under difficult conditions

When transporting under aggravated conditions (e.g. on open vehicles, under unusual vibration stresses, transport by sea or in subtropical countries), additional packaging must be used that will protect the unit from these particular influences.

4.2.2 Fork-lift truck / pallet truck

The AT4F unit is supplied on squared timbers.

ATTENTION



- Always place the lifting forks of the forklift on the squared timbers.
- Pay attention to any protrusions (e.g. floor drains).

- Before lifting the units, close the inspection doors/inspection covers.
- Suitable fork lengths must be used to prevent damaging the unit.
- Use suitable wood intermediate layers.

4.2.3 Crane transport

All AT4F units have a crane transport option as standard. A distinction is drawn here between transport tube, shackle, base frame bracket or crane eyelet. The transport openings are sealed with covering caps when the units are delivered.

⚠ WARNING



Danger of death - Suspended loads and crane transport!

Observe the local and legal regulations and the rules of the professional associations.

- Do not walk under suspended loads.
- Do not work under suspended loads.
- Use the specified attachment and mounting points.
- Observe the weight specifications.
- Use suitable lifting equipment.
- Only use suitable industrial trucks and lifting equipment (crane).
- Only use suitable positioning tools.
- Attach suitable load securing equipment before lifting the load.
- Wear personal protective equipment.

4.2.3.1 Crane transport using transport tube

Transporting the unit using the transport tube is permissible up to a width of 49 grids and max. 2000 kg.

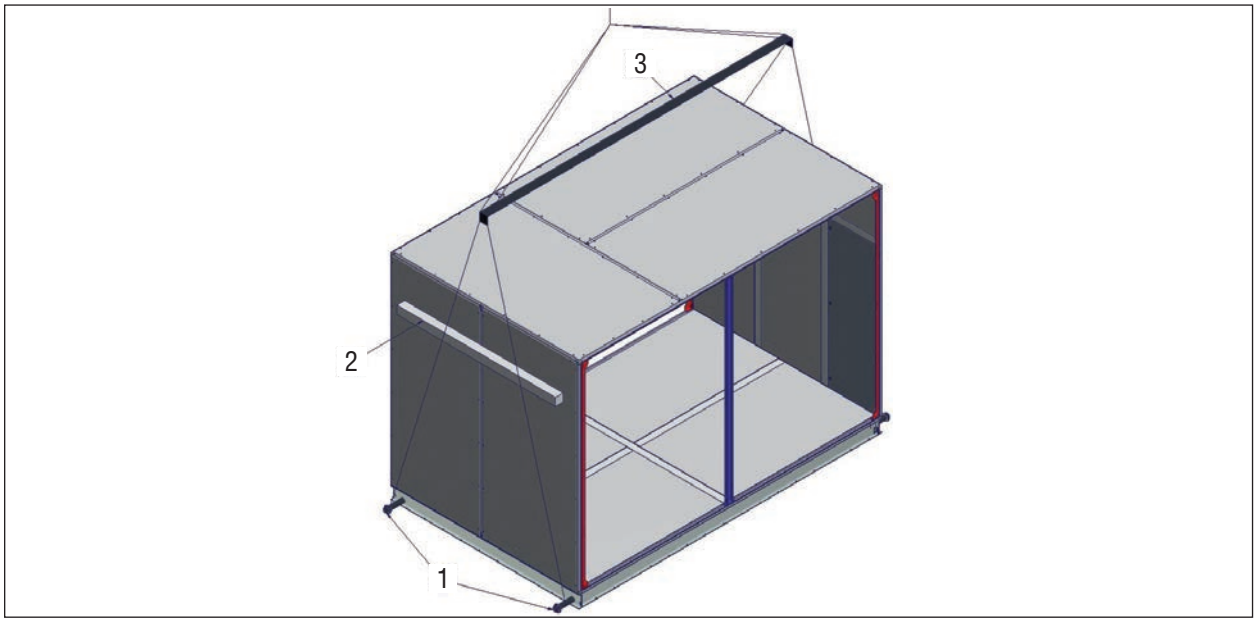


Fig. 2 Crane transport using transport tube

1	Transport tube with tube lock	3	Spreader beam (on-site)
2	Spacer (on-site)		

- Remove the covering caps.
- Slide the transport tubes (special accessories: 11/2" tubes conforming to DIN EN 10255) through the transport openings in the base frame and secure with the tube lock (lock pin with washer).
- Use lifting equipment the complies with the regulations.
- Fasten the slings (ropes, chains, lifting straps) to the transport tubes projecting out at the sides (protrusion on both sides at least 200 mm).
- With narrow and high unit components, ensure that tipping over of the component during transport is prevented.
- After transport, the transport openings are to be sealed with the covering caps.

Unit width (overall) in grid	Unit width (external)	Length (transport tube)	Projection of transport tube on each side
08	688.5 mm	1100 mm	200 mm
12	994.5 mm	1400 mm	
16	1300.5 mm	1700 mm	
20	1606.5 mm	2000 mm	
24	1912.5 mm	2300 mm	
28	2218.5 mm	2600 mm	
32	2524.5 mm	2900 mm	
41	3213 mm	3600 mm	
49	3825 mm	4200 mm	

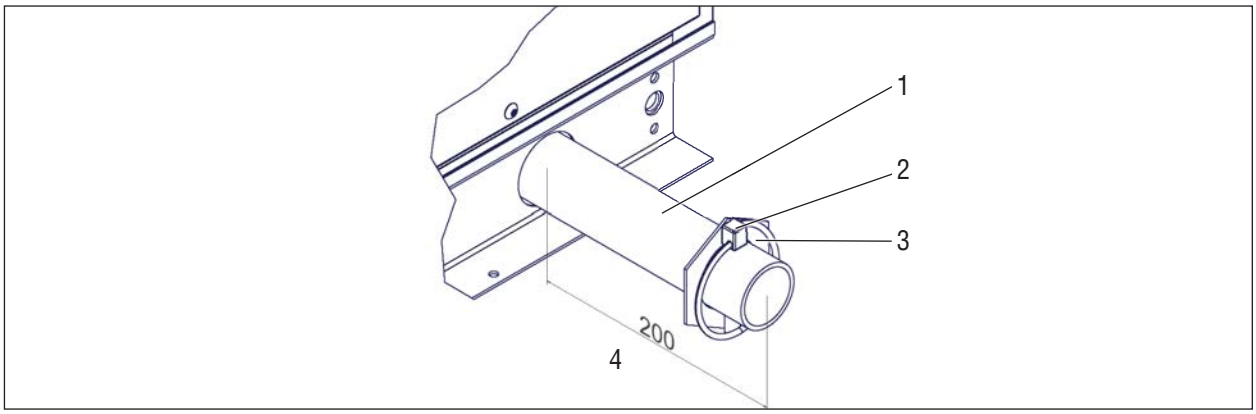


Fig. 3 Transport tube

1	Transport tube	3	Lock washer
2	Lock bolt	4	Projection of transport tube (200 mm)

4.2.3.2 Crane transport using shackle

Max. width for unit transport with shackle	Max. permissible weight of the individual components
49 grid	2500 kg

- On AT4F units, the shackle is screwed into the borehole in the base frame.
- Transport is only permitted using a spreader beam to protect the unit.
- On AT4F units in a weatherproof version, a tension plate is fitted on the fronts of the units to protect the drip edges. The shackle is then screwed into the hole in this plate. The projecting drip edges must be protected during crane transport with additional measures (e.g. on-site spreader beams or spacers).

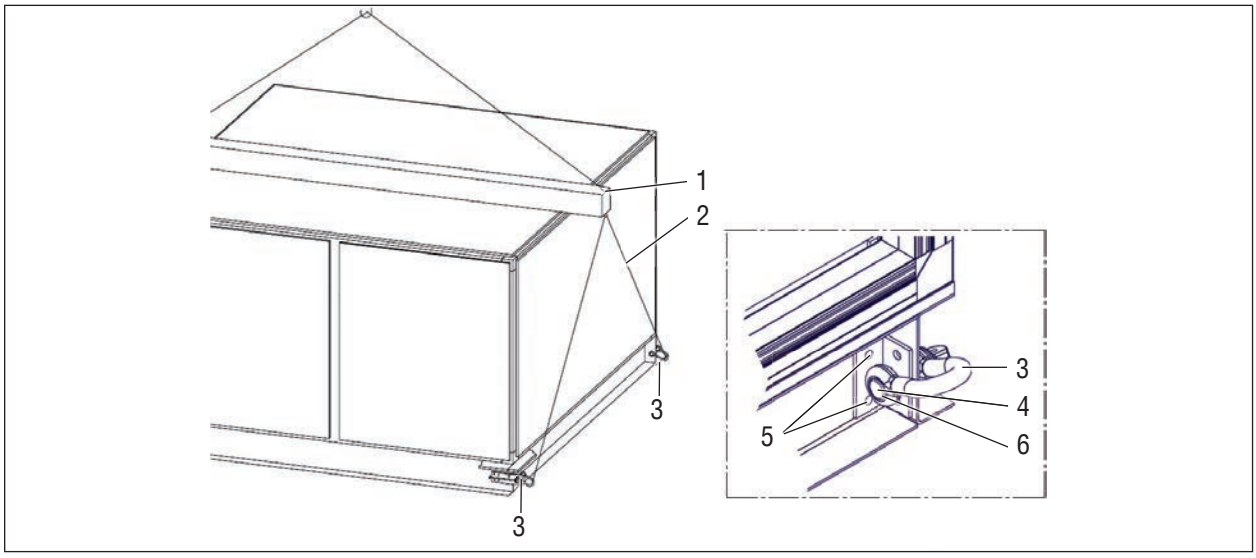


Fig. 4 Transport using shackle

1	Spreader beam (on-site)	4	Screw M12 x 30
2	Traction ropes (on-site)	5	Drilling screw 6.3 x 25
3	Shackle	6	Borehole for shackle

4.2.3.3 Crane transport using a base frame bracket

The AL-KO AT4F is supplied with a base frame that is suitable for crane transport. Transporting the unit using the base frame bracket is permissible up to an overall weight of max. 1500 kg!

All AT4F units are equipped as standard with a base frame with prefabricated mounting holes for the base frame bracket. Crane transport is also possible in the case of subsequent assembly of these base frame brackets.

⚠ WARNING



Danger of death - Suspended loads and crane transport!

Observe the local and legal regulations and the rules of the professional associations.

- Do not walk under suspended loads.
- Do not work under suspended loads.
- Use the specified attachment and mounting points.
- Observe the weight specifications.
- Only use suitable lifting equipment.
- Only use suitable industrial trucks and lifting equipment (crane).
- Only use suitable positioning tools.
- Attach suitable load securing equipment before lifting the load.
- Wear personal protective equipment.

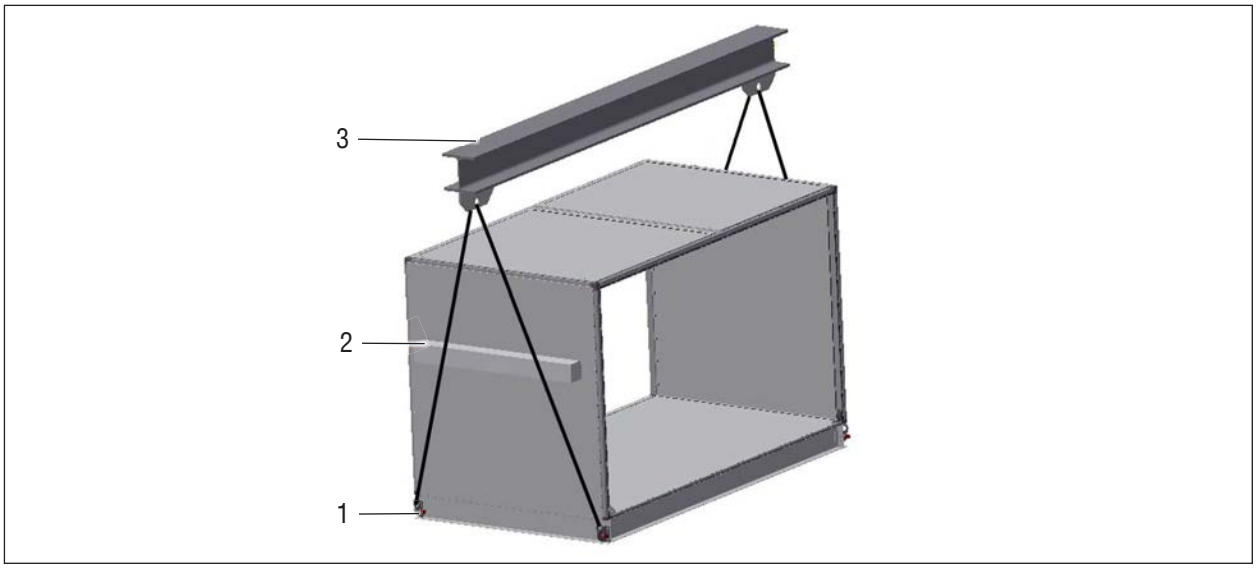


Fig. 5 Transport using a base frame bracket

1	Base frame bracket	3	Spreader beam, chains or slings (on-site)
2	Spacer (on-site)		

- Use lifting equipment that complies with the regulations.
- Secure attachment equipment (ropes, chains, lifting slings) to the base frame brackets protruding from the sides.
- In the case of narrow and high unit components, it is important to ensure that the component is not tilted during transport (additional protection).
- The angle between the two traction ropes, chains or lifting slings may not exceed 60° and the angle between the vertical frame profile and the traction rope, chain or lifting sling may not exceed 30°.

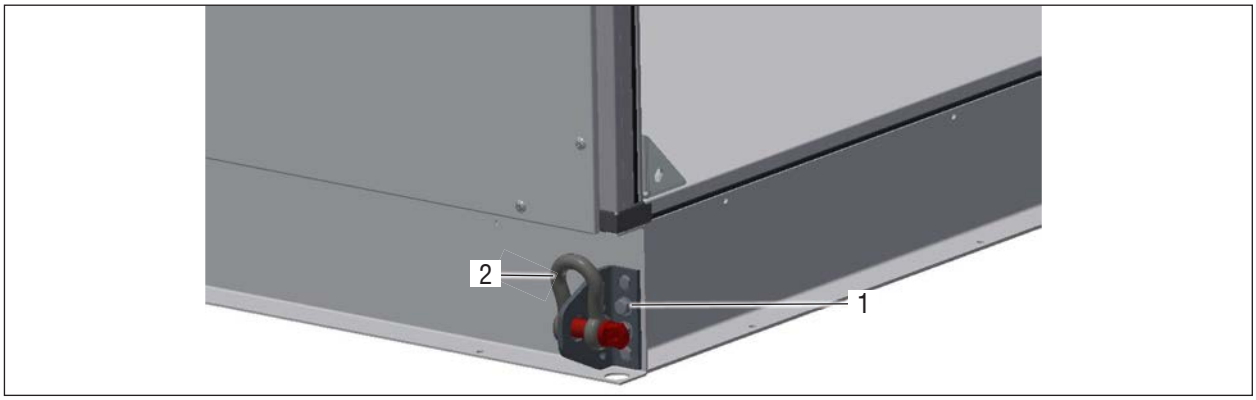


Fig. 6 Base frame bracket with shackle

1	Base frame bracket	2	Shackle (on-site)

Step	Action
1	Before lifting the units, seal the inspection doors/inspection covers.
2	Use only approved and tested transport harnesses to attach them to the intended mounting points.
3	For subsequent crane transport, you must attach the base frame brackets (1) to the base frame. Only use the fastening material supplied by us.

4.2.3.4 Crane transport using crane eyelets

Transporting the unit using crane eyelets is permissible up to a width of 49 grids!

Suspension on crane eyelets	Max. permissible weight of the individual components
Suspension via 4 crane eyelets	1500 kg
Suspension via 4 crane eyelets and additional 2 centre eyelets	2500 kg

Transport with crane eyelets:

- The attached crane eyelets and centre eyelets must be used for the transport of all components.
- All crane eyelets and centre eyelets on the unit must be used and **evenly** loaded! A crane harness (spreader beam and chain hoist) is to be used for 6 suspension options and above!
- An **angle of more than 45° and less than 80°** must be maintained between rope and unit roof.
- On the crane eyelets and centre lugs, a shackle (not supplied) must be attached on-site. To do this, a hole diameter of 22 mm is provided for.
- The crane eyelets and centre eyelets must be removed before beginning the unit connection assembly work.
- After removing the crane eyelets, the openings are to be sealed airtight with sealing plugs d = 12 mm (included as accessories).

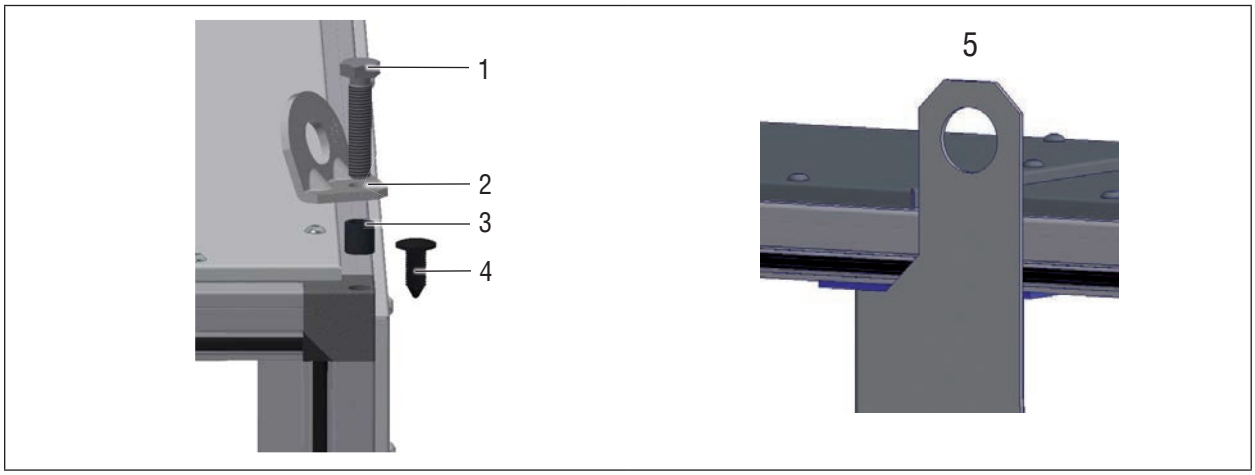


Fig. 7 Crane eyelets

1	Hexagon head bolt M12x80 (min. Strength class 10.9)	4	Sealing plug (insert after removing the crane eyelets)
2	Crane eyelet	5	Centre lug (present depending on the roof construction)
3	Bushing		

4.3 Storage prior to assembly

- Store the individual functional parts in a dry and weatherproof location in their original packaging.
- Store the functional parts in the temperature range of -20 °C to +40 °C.
- Cover open pallets with tarpaulins, and protect the functional parts from dirt (e.g. chips, stones, wire, etc.).
- Frequent and, above all, abrupt temperature changes must be avoided during storage. This is especially harmful if moisture is able to form condensation.
- To avoid bearing damage, the fan must be rotated monthly if at a standstill for more than one month.
- For storage periods of more than 1 year, check the ease of movement of the fans' bearings (by turning by hand) before assembly.
- Avoid distorting the housing or other damage during storage.
- Damage resulting from improper packaging and storage are at the expense of the initiator.

4.4 Disposal of packaging



When disposing of the packaging, comply with the relevant local environmental and recycling regulations in your country and community that are applicable at the time when the activity is undertaken.

5 Assembly

5.1 Safety instructions for assembly

⚠ WARNING



Risk of injury due to impact, cutting or stabbing during assembly/installation of the modules.

- Have installation, commissioning, servicing and maintenance work carried out only by qualified staff.
- Electrical connections must only be undertaken by a certified electrician under consideration of the valid DIN and VDE regulations as well as the directives of the local energy supply company.
- Observe the working instructions and these operating and assembly instructions.
- Work with care.
- Use the personal protective equipment when working on the installation.
- Use other protective equipment according to the work carried out (cut-proof gloves).

⚠ WARNING





Risk of injury when installing the unit modules on platforms or on the roof.

When assembling the unit modules, the tool/housing material can fall off in the event of careless operation.

Due to the working height, there is a risk of falling.

- Use only suitable industrial trucks and lifting equipment (crane) and suitable positioning aids.
- Only use suitable and tested ladders, steps, scaffolding and work platforms.
- Work with care.
- Wear personal protective equipment.

⚠ CAUTION





Risk of crushing the limbs and cutting injuries on sharp edges during assembly/installation of the modules.

- Have installation, commissioning, servicing and maintenance work carried out only by qualified staff.
- Use assembly aids when installing the modules and components.
- Work with care.
- Wear personal protective equipment (cut-proof gloves).

ATTENTION



Before installation and commissioning, it is essential to read and observe the operating and assembly instructions.

- The AT4F unit is delivered with its components pre-assembled. Depending on the size and design of the AT4F unit, this can be supplied in different disassembly conditions.

5.2 Preparations

- Observe the condition of the substrate at the installation site.
- Check the individual components for transport damage.
- Select the installation site with regard to good accessibility for servicing and maintenance work.
- Ensure that the components and the connection cables at the installation site cannot be either damaged or contaminated by oil or other materials.
- Check that fuses, contactors and circuit boards are securely in place in the switch cabinet (optional).
- Secure any loosened assemblies.
- The fresh air intake must be designed in accordance with the applicable standards and should be located away from exhaust air outlets or exhaust openings (kitchen, laundry, etc.).
- If possible, the exhaust air must be discharged via a roof hood away from fresh air inlets, windows, balconies, etc.
- Connect the AC unit and the equipotential bonding conductor (fig. 8) on the unit to the duct system.



Fig. 8 Potential equalisation mounted on the unit

ATTENTION



Components that come loose during transport can lead to malfunctions or damage.

5.2.1 Space requirements

- Sufficient space must be available to operate and maintain the AT4F unit (see VDI 2050 "Requirements on central technical systems").
- In general, it must be ensured during assembly that the AT4F unit remains freely accessible for maintenance purposes.
- During and installation, in particular of the connecting pipework, it must be ensured that the inspection doors can always be opened and that the swivel range is kept clear.
- According to VDI 6022, the extensibility of system components such as heat exchangers, droplet eliminators, etc., must be guaranteed.
- The installation height of the siphon for condensate drain lines (optional) must be taken into account when setting up the unit, see chapter "5.10.3 Condensate drain connection via siphon" on page 60.

5.2.2 Foundation

ATTENTION



The installation site must be designed for the loads of the entire AC unit.

A check by a structural engineer may be necessary.

- The units must be set up on flexurally rigid, horizontal foundations (DIN 18202) or substructures. The foundation can be designed as a full foundation or a strip foundation.
- Unevenness of the substrate must be compensated using appropriate measures (e.g. documents, etc.).
- Particularly in the case of the rotary heat exchanger and the dampers, attention must be paid to a horizontal and distortion-free setup.
- In the case of strip foundations, cross beams must additionally be installed for support at the beginning and end of the unit and at the component separating points on units that are over 2 m wide.
- The implementation of the foundations must meet the on-site requirements for the acoustics (structure-borne sound insulation underlay) and the professional water drainage of the condensate.
- The unit must be professionally connected to the foundation in accordance with the on-site conditions. Points to be considered here include the wind loads, in particular for weatherproof units.

5.3 Assembly of separated housing

ATTENTION



Before installation and commissioning, it is essential to read and observe the operating and assembly instructions.

- The assembly instructions of the modules can be found in the supplied unit drawing.
- Installation of the AT4F units starts with the unit component containing the air outlet (duct connection).
- The duct connection must be distortion-free and free of load on the AC unit.

ATTENTION



The installation sequence of the individual unit components can be seen from the order-related drawing and must be adhered to under all circumstances.

ATTENTION



On delivery, the accessories are in the correspondingly marked unit component.

- For vibration absorption, AL-KO THERM recommends that the AT4F units are underlaid with suitable insulation strips (not included). Observe the specifications from the insulation strip manufacturer.
- Make sure that the natural frequency of the sub-construction is sufficiently far away from the excitation frequency of certain components such as e.g. fans, motors, etc.
- AL-KO THERM recommends placing damping strips underneath the unit face ends, component separating points and in the longitudinal direction above a component length of approx. 1200 mm.
- To avoid structure-borne sound transmission, AL-KO THERM recommends using elastic nozzles as a connection between the unit and the air duct.

NOTE



To meet the requirements of VDI 6022, all unit separation points must be sealed with microbially inert sealing material in the base area.

ATTENTION



AT4F units must be levelled to ensure proper function.

The unit frames must be parallel and horizontal to each other under all circumstances.

Do not walk on the upper side of the unit without protection against damage (scaffolding or covers).

Before and after assembly, carefully cover units up to commissioning to avoid damage and soiling.

ATTENTION



When installing downwards (roof opening), all details must be clarified with the factory in advance.

With a weatherproof version, the lightning protection is to be ensured on-site.

According to VDI 3803-1, units for weatherproof installation must not take on any static loading or replace the function of the building roof.

5.3.1 Housing separation point seal for indoor installation

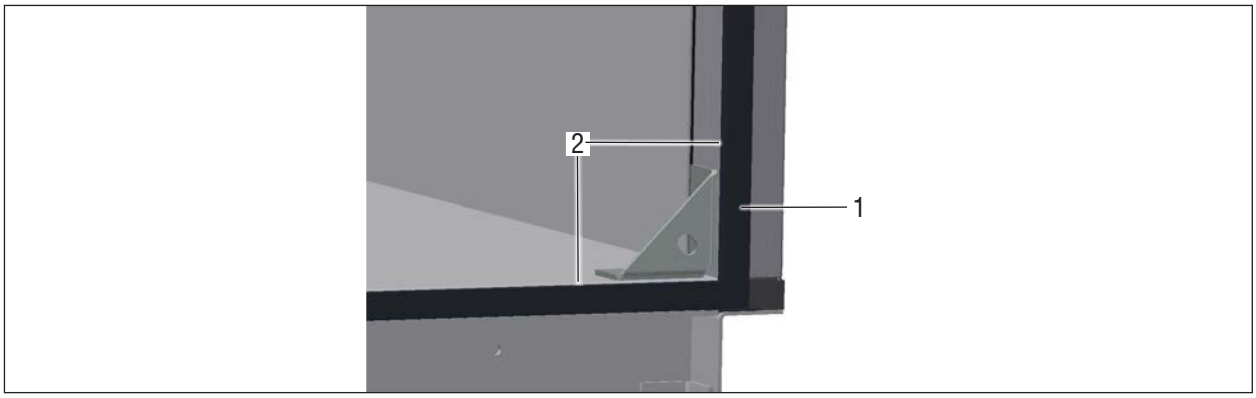


Fig. 9 Sealing of separation points

1	Sealing tape 8 x 15 mm	2	Unit inside edge

Step	Action
1	Stick the supplied sealing tapes (1) to the face ends of the unit components flush with the inner edge of the unit (2).

5.3.2 Housing separation point sealing for outdoor installation (weather-proof)

Also observe the instructions in chapter "5.5.1 Roof frame - floor assembly version with unit frame profile" on page 37.

- With outdoor installation, an additional sealing strip (3 x 15) must be applied to the housing frame.

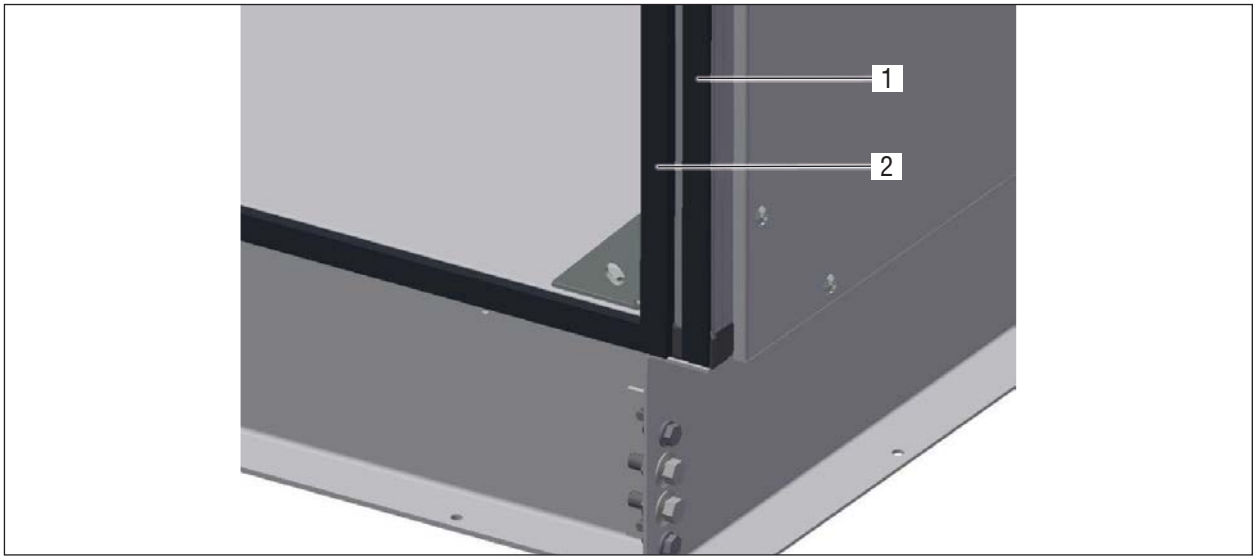


Fig. 10 Separation point sealing with outdoor installation

1	Additional sealing tape 3 x 15	3	Unit outer edge
2	Sealing tape 8 x 15		

Step	Action
1	Attach the additional sealing strip (1) to the left and right of the housing frame, flush with the outer edge of the housing (3).

5.3.3 Inside unit connections with split housing

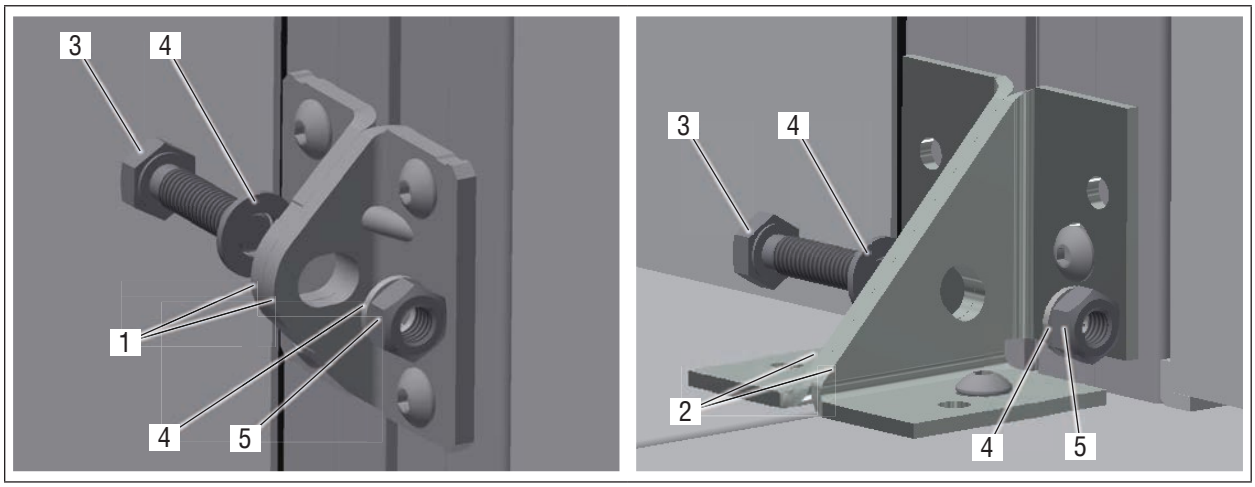


Fig. 11 Unit connections with split housing

1	Unit connections, horizontal/vertical centre	4	Washer
2	Gusset plates	5	Hexagon nut
3	Hexagon head bolt		

ATTENTION

The unit connections are used exclusively to fix the unit in its final position. They must not be used to draw the individual components together.

In the case of units with several housings, the individual housings must be assembled on-site. To do this, proceed as follows:

Step	Action
1	Position the unit modules as close to each other as possible.
2	Align the unit modules in the final housing position.
3	Draw the aligned unit modules together using suitable equipment (e.g. belts). NOTE: The unit connections are used exclusively to fix the final housing position!
4	After pulling the units together, connect them via the unit connections: Insert the hexagon head bolt (3) with washer (4) into unit connections (1) or gusset plates (2) and fix using a washer (4) and hexagon nut (5).
5	With unit versions conforming to VDI 6022, unit separation points are additionally equipped on the inside with microbially inert sealing material.

5.4 Unit connection with unit arrangement one above the other and next to one another

5.4.1 Unit arrangement one above the other

ATTENTION

The unit base frame must be additionally sealed all round with a microbially inert sealing material in the area of the mixing chambers (air-side connection) between upper and lower unit.

ATTENTION

With a length offset between the upper and lower unit components, the base frame cross profile must be screwed onto the housing cover.

With AT4F units in a weatherproof version, the base frame cross profile must also be properly sealed with a microbially inert sealing material.

Unit arrangement one above the other without length offset

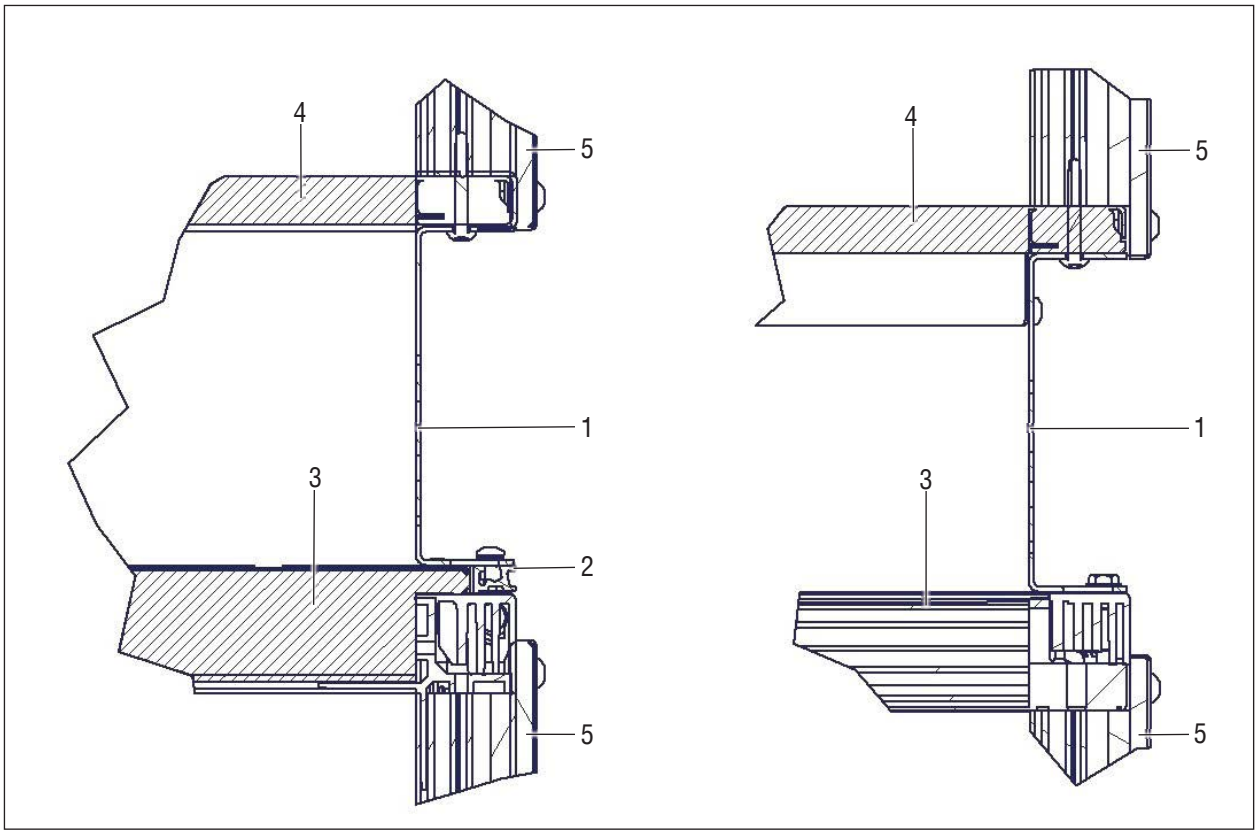


Fig. 12 Unit arrangement roof assembly with unit frame profile (left) and without unit frame profile (right)

1	Base frame	4	Floor (top unit)
2	Base frame compensation profile	5	Panel
3	Roof (lower unit)		

Unit arrangement one above the other with length offset

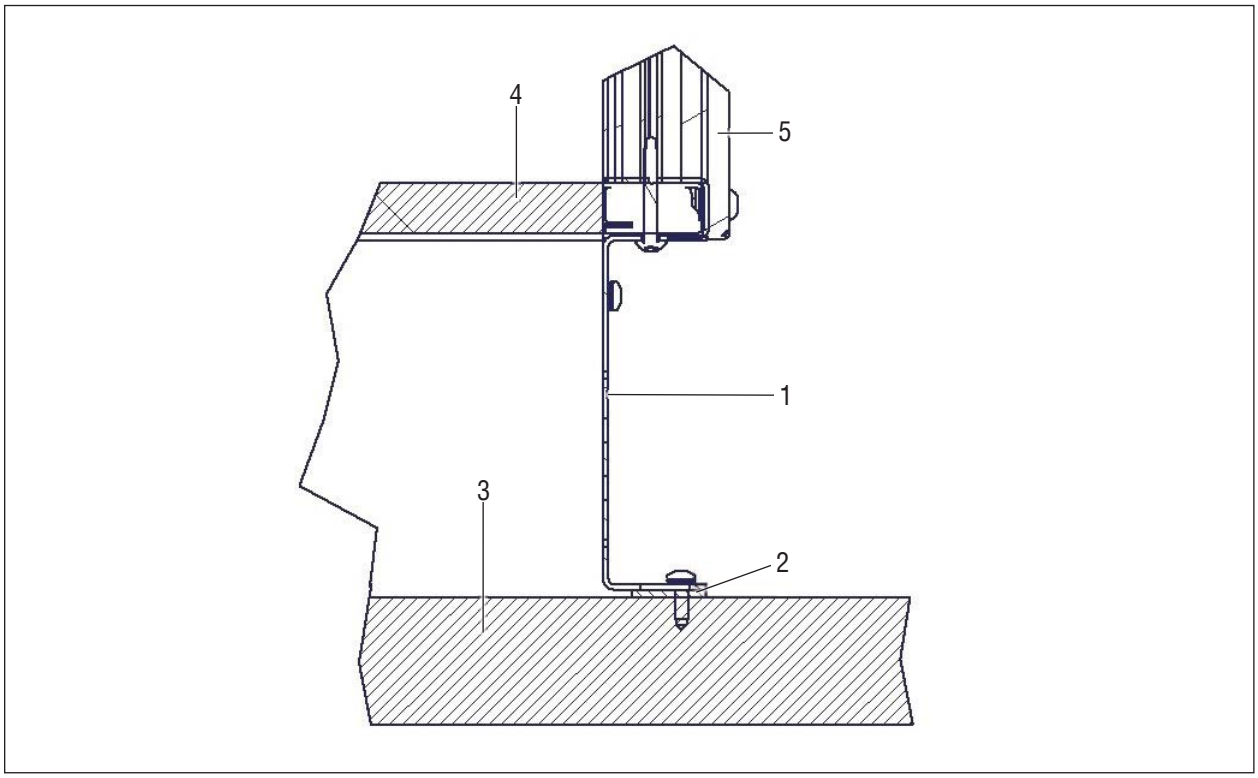


Fig. 13 Unit arrangement one above the other with length offset

1	Base frame	4	Floor (top unit)
2	Microbially inert sealing material (with weatherproof units)	5	Panel
3	Roof (lower unit)		

Step	Action
1	With weatherproof units, install the microbially inert sealing material (2) around the circumference before installing the top unit (4).
2	Place the top unit (4) on the roof of the lower unit (3) using crane transport.
3	Screw the base frame (1) to the roof of the lower unit (3) using drilling screws.

5.4.2 Unit arrangement next to one another

5.4.2.1 Version of floor/roof assembly with unit frame profile

Unit arrangement next to one another without mixing chamber

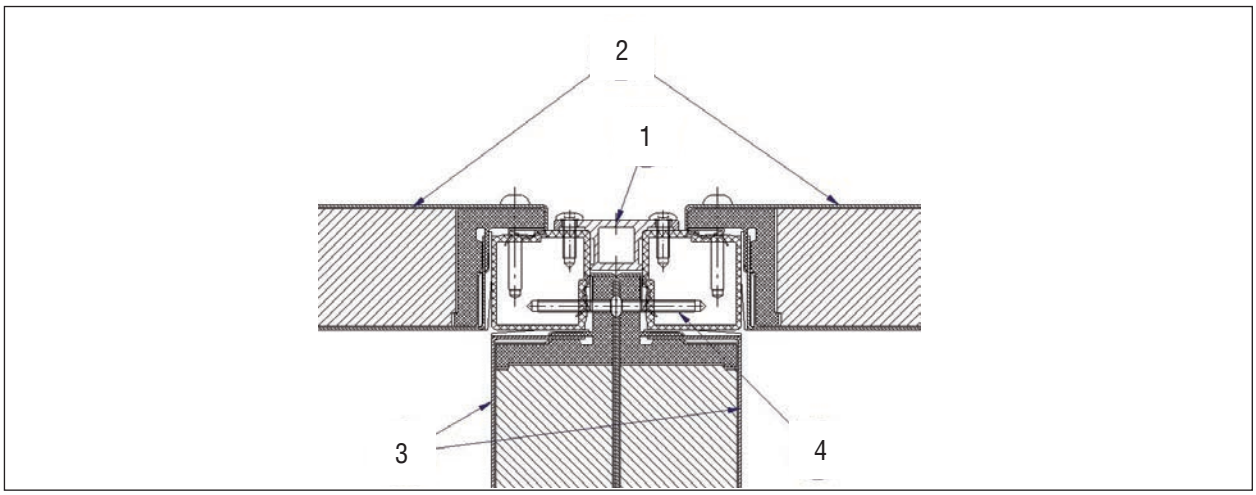


Fig. 14 Unit arrangement next to one another without mixing chamber

1	Spacer rail	3	Panel (side)
2	Panel (roof)	4	Countersunk drilling screw

Unit arrangement next to one another with mixing chamber

ATTENTION

A sealing strip (3) must be adhered around the circumference in addition to the spacer rail in the area of the mixing chambers (air-side connection). This must be tested for leakage following installation.

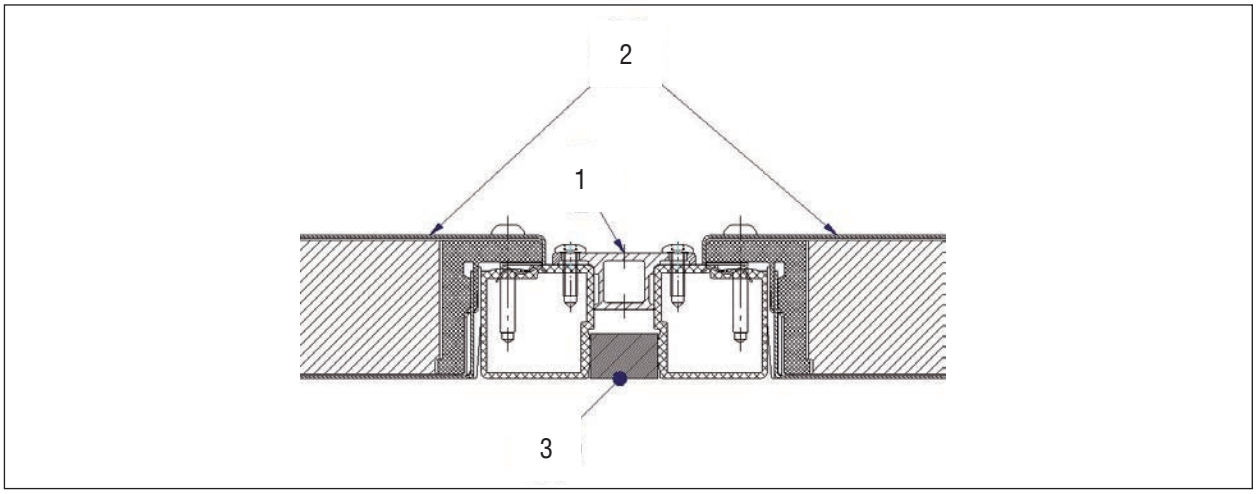


Fig. 15 Unit arrangement next to one another with mixing chamber

1	Spacer rail	3	Sealing strips
2	Panel (roof)		

Step	Action
1	Loosen the screws on the factory-fitted spacer rail (1).
2	Fit sealing strips (3) to the upper and lower inner frame edges.
3	Set down the unit components next to it using a forklift or crane.
4	Fix the spacer rail (1) using the countersunk drilling screws.

5.4.2.2 Version of floor/roof assembly without unit frame profile

Unit arrangement next to one another without mixing chamber

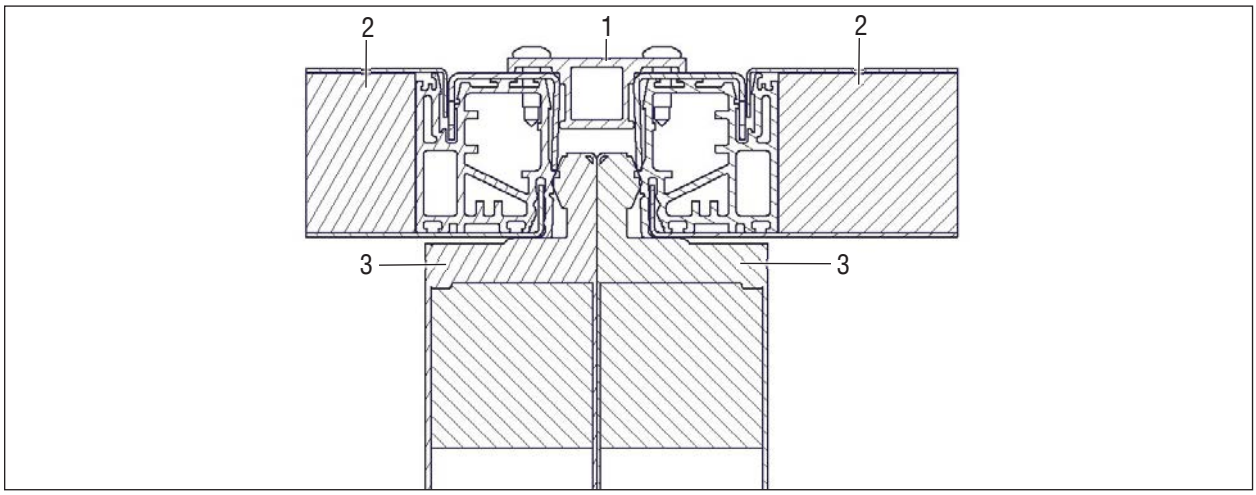


Fig. 16 Unit arrangement next to one another without mixing chamber

1	Spacer rail	3	Panel (side)
2	Panel (roof)		

Unit arrangement next to one another with mixing chamber

ATTENTION

A sealing strip (3) must be adhered around the circumference in addition to the spacer rail in the area of the mixing chambers (air-side connection). This must be tested for leakage following installation.

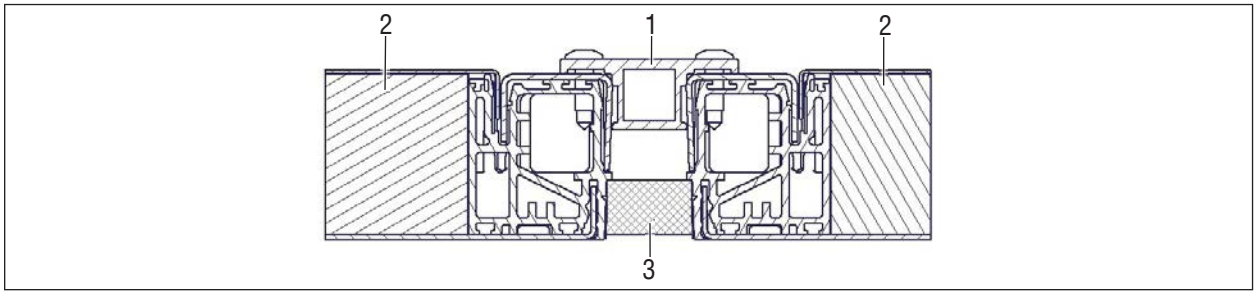


Fig. 17 Unit arrangement next to one another with mixing chamber

1	Spacer rail	3	Sealing strips
2	Panel (roof)		

Step	Action
1	Loosen the screws on the factory-fitted spacer rail (1).
2	Fit sealing strips (3) to the upper and lower inner frame edges.
3	Set down the unit components next to it using a forklift or crane.
4	Fix the spacer rail (1) using the countersunk drilling screws.

ATTENTION

With a length offset between the left and right unit components, the facing bracket must be screwed onto the housing cover.

With AT4F units in a weatherproof version, the facing bracket must also be sealed with a microbially inert sealing material.

With AT4F units in a weatherproof version, the supplied screws are additionally equipped with an EPDM sealing washer.

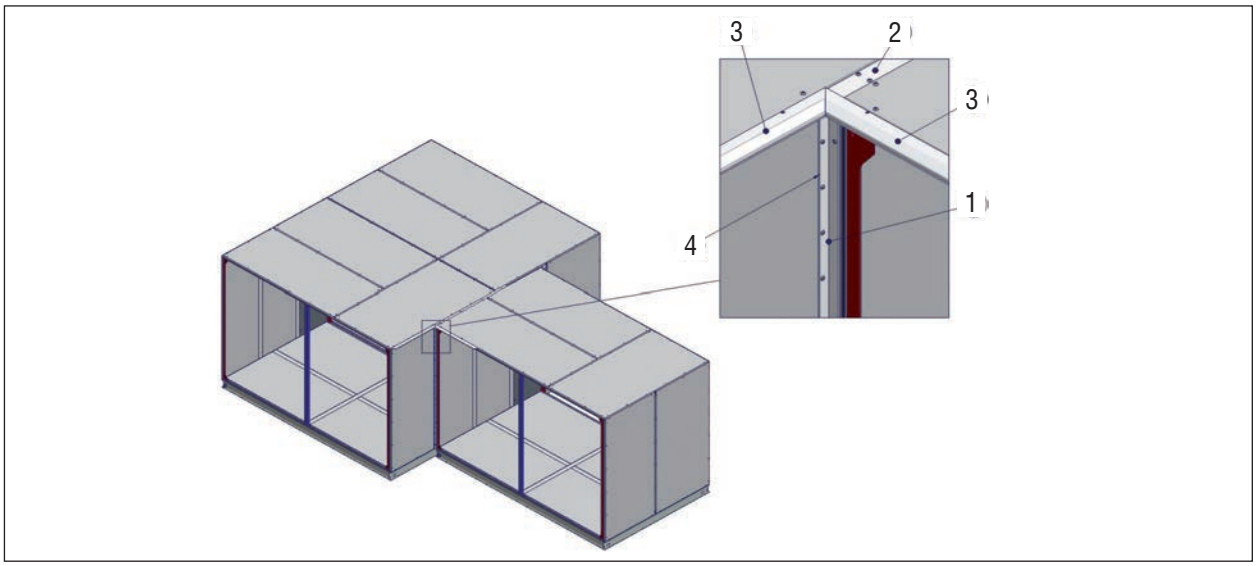


Fig. 18 Unit arrangement next to one another

1	Facing bracket	3	Drip edge (with weatherproof units)
2	Spacer rail	4	Microbially inert sealing material (with weatherproof units)

ATTENTION

If a humidifier is installed, recessed foundations are required on-site to compensate for the height difference between the humidifier tray and the base frame of the adjoining unit components.

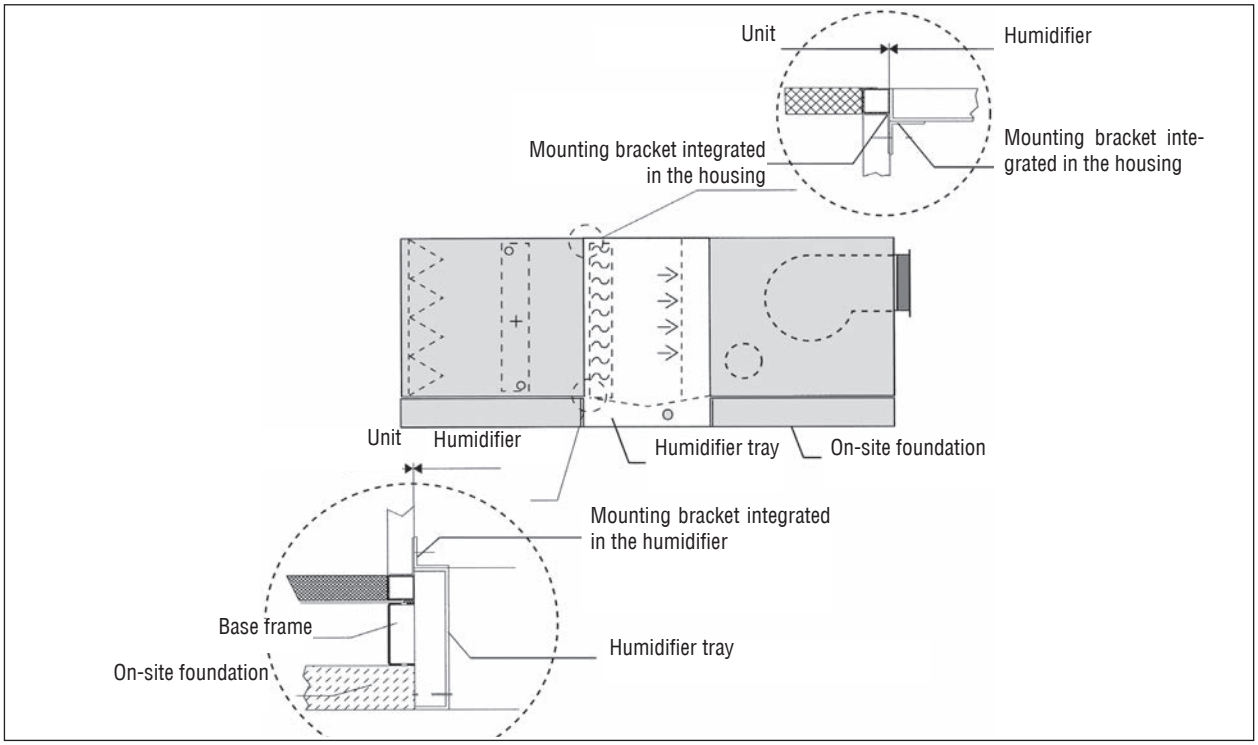
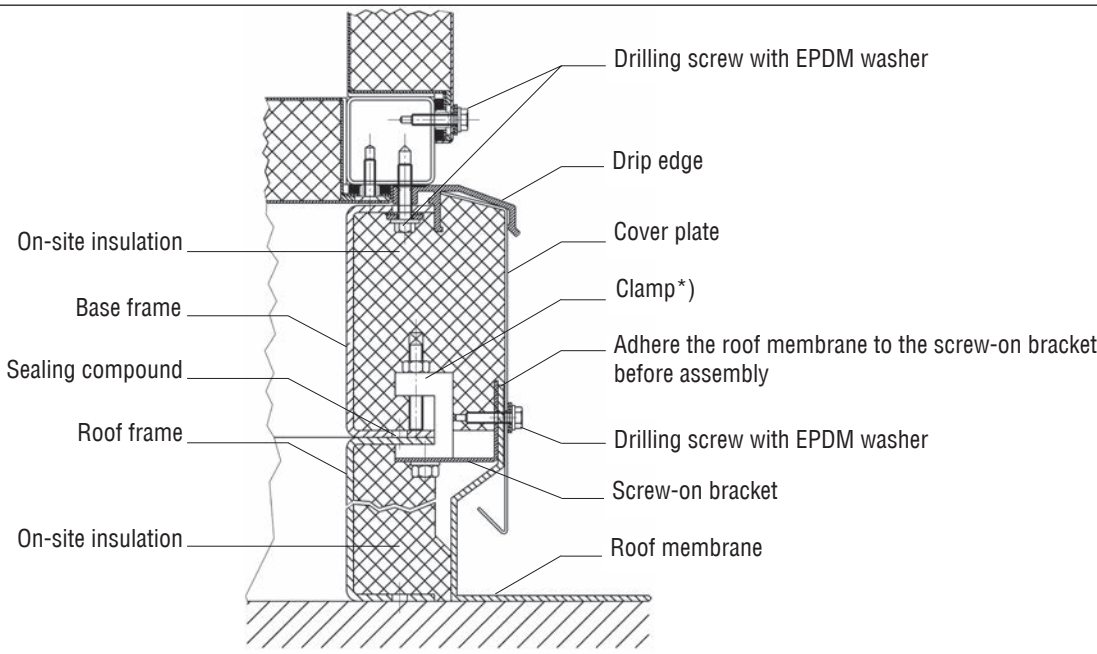


Fig. 19 Unit arrangement next to one another with humidifier

5.5 Outdoor installation

5.5.1 Roof frame - floor assembly version with unit frame profile

5.5.1.1 Roof frame preassembled on-site



*) Number of clamps per component at least 2 pieces, but max. distance between the clamps 700 mm.

Fig. 20 Roof frame preassembled on-site

Step	Action
1	Place the roof frame onto the foundation.
2	Screw the roof frame onto the foundation.
3	Seal the transport openings in the roof frame with the covering caps (if present).
4	Apply the sealing compound to the roof frame.
5	Place the units onto the roof frame via crane transport.
6	Screw the units to the roof frame.
7	Seal the transport openings in the base frame with the covering caps (if present).
8	Screw the clamp to the screw-on bracket and then screw onto the roof frame – base frame connection.
9	Attach the on-site insulation in the area of the roof frame and base frame.
10	Pull up the on-site roofing membrane for sealing on the roof frame and glue the raised roofing membrane onto the screw-on bracket. NOTE: If no covering plate is used, the roofing membrane must be pulled up to below the drip edge and glued to it.
11	Hang the covering plate on the drip edge and screw the suspended covering plate to the screw-on bracket (optional accessory).

5.5.1.2 Factory-mounted base frame

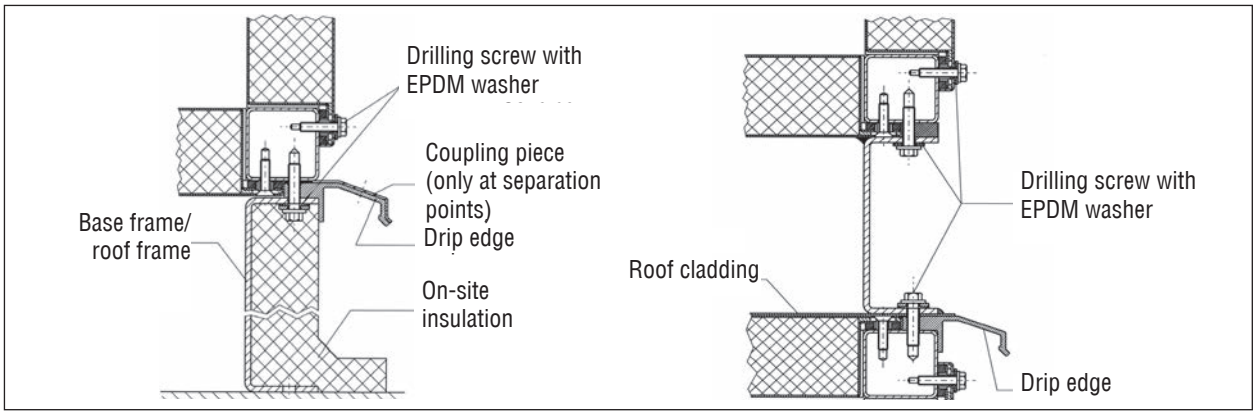


Fig. 21 Factory-mounted base frame

Step	Action
1	Seal the transport openings in the base frame/roof frame with the covering caps.
2	Pull up the on-site roofing membrane for sealing on the base frame/roof frame and glue the raised roofing membrane under the drip edge.
3	With separated modules, position the unit modules as close to each other as possible.
4	Align the unit modules in the final housing position.
5	Draw the aligned unit modules together using suitable equipment (e.g. belts). NOTE: The unit connections are used exclusively to fix the final housing position!
6	Screw the units to one another after pulling together.
7	Seal the unit separation points with microbially inert sealing material.

5.5.2 Roof frame - floor assembly version without unit frame profile

5.5.2.1 Roof frame preassembled on-site

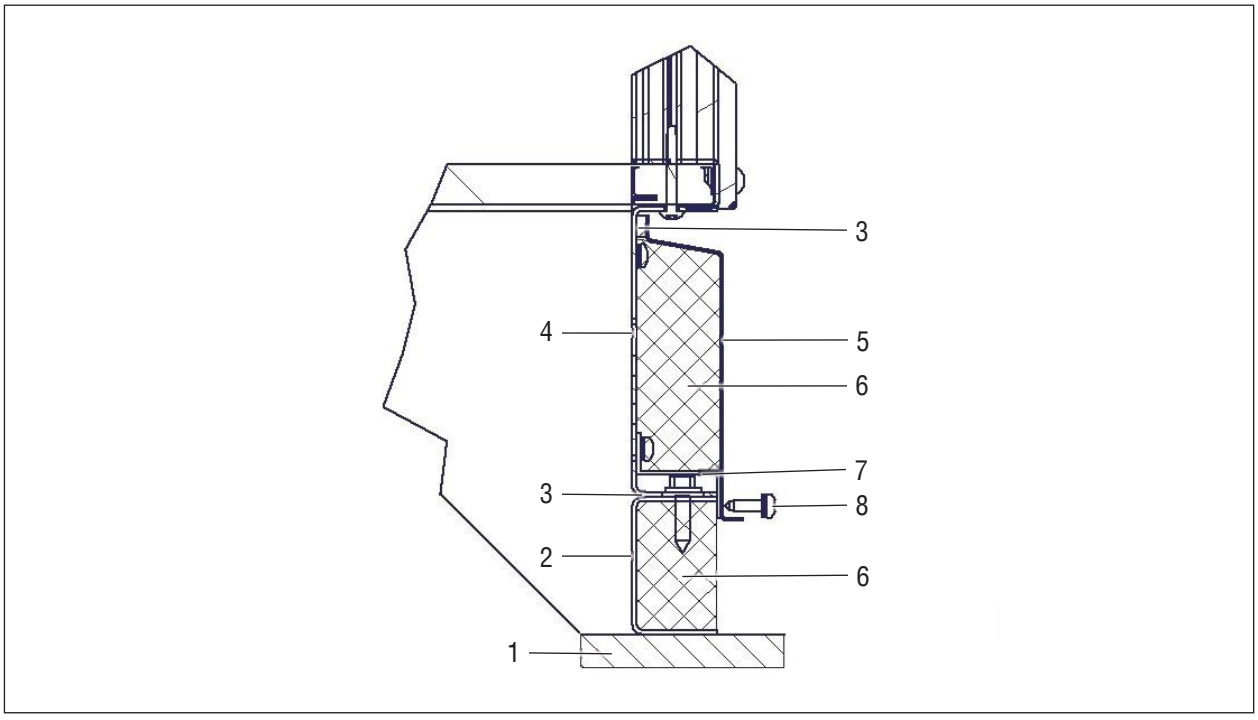


Fig. 22 Roof frame preassembled on-site

1	Foundation	5	Sheet metal apron (on-site installation)
2	Roof frame	6	On-site insulation
3	Sealing compound	7	Z-bracket (on-site installation)
4	Base frame	8	Drilling screw with EPDM washer

Step	Action
1	Place the roof frame (2) onto the foundation (1).
2	Screw the roof frame (2) onto the foundation(1).
3	Apply the sealing compound (3) to the roof frame (2).
4	Place the units onto the roof frame (2) via crane transport.
5	Screw the unit base frame (4) to the roof frame.
6	Screw the supplied Z bracket (7) to the base frame (4).
7	Attach the on-site insulation (6) in the area of the roof frame (2) and base frame (4).
8	Pull up the on-site roof membrane for sealing on the roof frame (2) and glue the raised roofing membrane onto the Z bracket (7). NOTE: If no sheet metal apron (5) is used, the roof membrane must be pulled up to below the upper base frame member (4) and glued to it.
9	For the installation of the sheet metal apron (5, optional accessories), apply the sealing compound (3) in advance to the corners of the upper base frame member (4). Then press the upper flange of the sheet metal apron (5) into the sealing compound (3).
10	Screw the sheet metal apron (5) onto the Z bracket (7). To do this, use the drilling screws with the EPDM washer (8). The openings for this are pre-punched.

5.5.2.2 Factory-mounted base frame

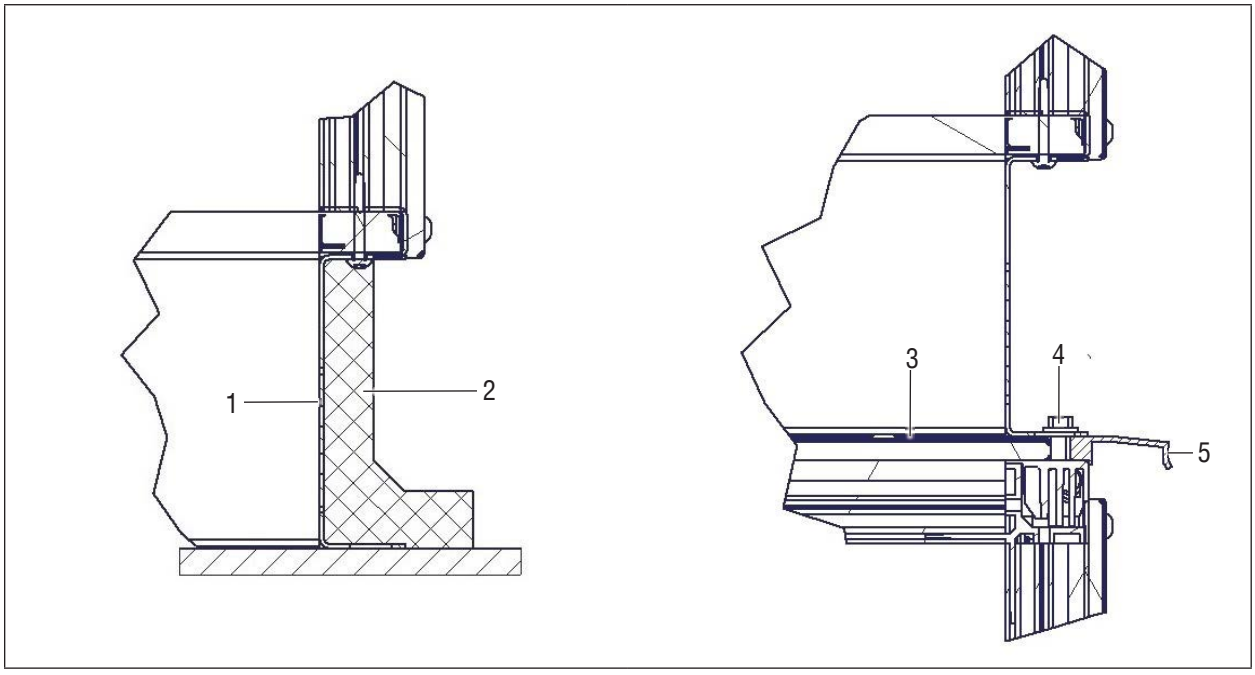


Fig. 23 Factory-mounted base frame, right with units arrangement on top of one another

1	Base frame	4	Drilling screw with EPDM washer
2	On-site insulation	5	Drip edge
3	Roof cladding		

Step	Action
1	With separated modules, position the unit modules as close to each other as possible.
2	Align the unit modules in the final housing position.
3	Draw the aligned unit modules together using suitable equipment (e.g. belts). NOTE: The unit connections are used exclusively to fix the final housing position!
4	Screw the units to one another after pulling together.
5	Seal the unit separation points with microbially inert sealing material.
6	Pull up the on-site roof membrane for sealing into the base frame (1) and glue the raised roofing membrane onto the upper member of the base frame (1).

5.5.2.3 Sealing of the unit separation points with solvent welding agent for weatherproof units

⚠ WARNING



Ignition hazard due to highly flammable solvent welding agent

Liquid and vapour of the solvent welding agent are highly flammable.

- Keep ignition sources and naked flame away from the solvent welding agent.
- Observe the safety instructions on the containers. For further information, you can request the current EC safety data sheets from AL-KO THERM.

⚠ WARNING



Danger to health from inhalation of toxic fumes of the solvent welding agent

Fumes and liquid of the solvent welding agent cause severe eye irritation.

Inhalation of the fumes may cause drowsiness and light-headedness.

- Use suitable respiratory protection and safety goggles when working with the solvent welding agent.
- Observe the safety instructions on the containers. For further information, you can request the current EC safety data sheets from AL-KO THERM.

⚠ WARNING



Risk of serious injury or death if working without personal protective equipment

Working on the AT4F unit without personal protective equipment can result in serious injury or death.

- Observe the safety instructions in this operating and assembly instructions.
- Use the personal protective equipment when working on the installation.
- Use other protective equipment according to the work carried out.

ATTENTION



Welding of the roof membrane must be started immediately after the unit installation to avoid damage.

NOTE



For outside temperatures > 10 °C, the solvent welding agent or hot air dryer can be used. At lower outside temperatures, welding with the hot air dryer is to be used to seal the unit separation points.

Check the housing seal carefully

Sealing of the roof membrane at the unit separation points

⚠ WARNING



Danger to health from inhalation of toxic fumes of the solvent welding agent

Fumes and liquid of the solvent welding agent cause severe eye irritation.

Inhalation of the fumes may cause drowsiness and light-headedness.

- Use suitable respiratory protection and safety goggles when working with the solvent welding agent.
- Observe the safety instructions on the containers. For further information, you can request the current EC safety data sheets from AL-KO THERM.

ATTENTION



Welding of the roof sheeting must be started immediately after the unit installation to avoid damage.

Unit separation point, straight

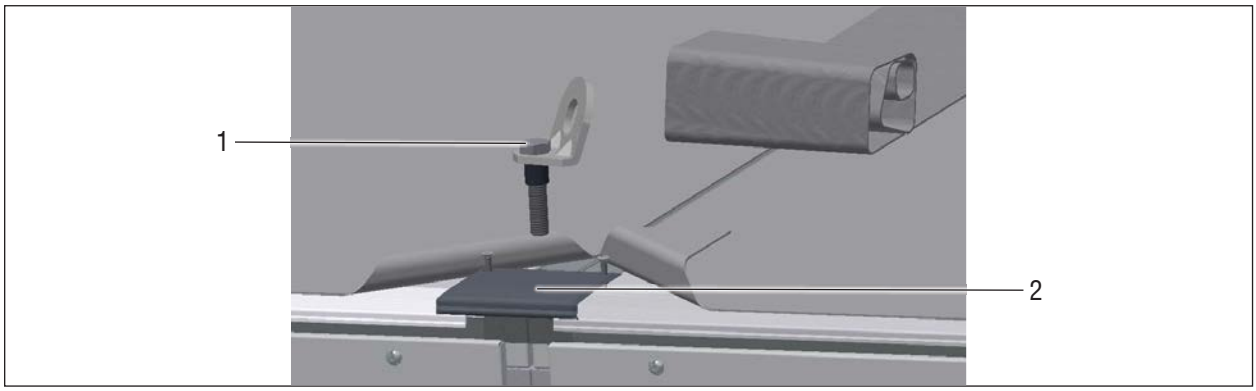


Fig. 24 Unit separation point, straight

1	Crane eyelet	2	Coupling piece fastened with 4.2 screws x 22

Step	Action
1	Check that the seal is correctly attached. See operating and installation instructions for AT4F series, chapter 5.6 Outdoor installation.
2	Remove the crane eyelet, if present (1).
3	Clean the unit roof in the unit separation area. The unit separation area must be dust-free and dry.
4	Screw on the coupling piece (2) above the drip edge.

Unit separation point, lateral offset

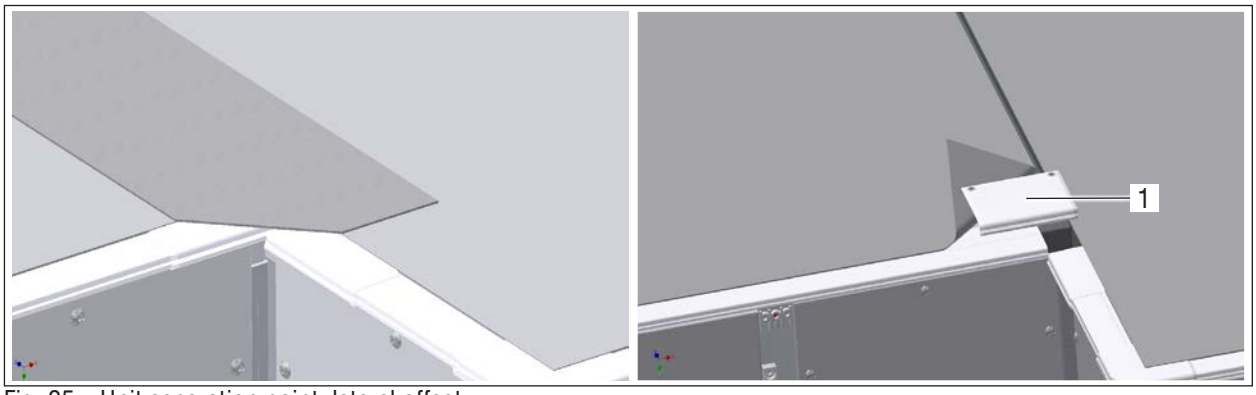


Fig. 25 Unit separation point, lateral offset

1	Coupling piece fastened with 4.2 screws x 22		

Step	Action
1	Screw on the coupling piece (1) above the drip edge.

Sealing of the unit separation points with foil strips

WARNING

Danger to health from inhalation of toxic fumes of the solvent welding agent

Fumes and liquid of the solvent welding agent cause severe eye irritation.

Inhalation of the fumes may cause drowsiness and light-headedness.

- Use suitable respiratory protection and safety goggles when working with the solvent welding agent.
- Observe the safety instructions on the containers. For further information, you can request the current EC safety data sheets from AL-KO THERM.

ATTENTION

Welding of the foil strips must be started immediately after the unit installation to avoid damage.

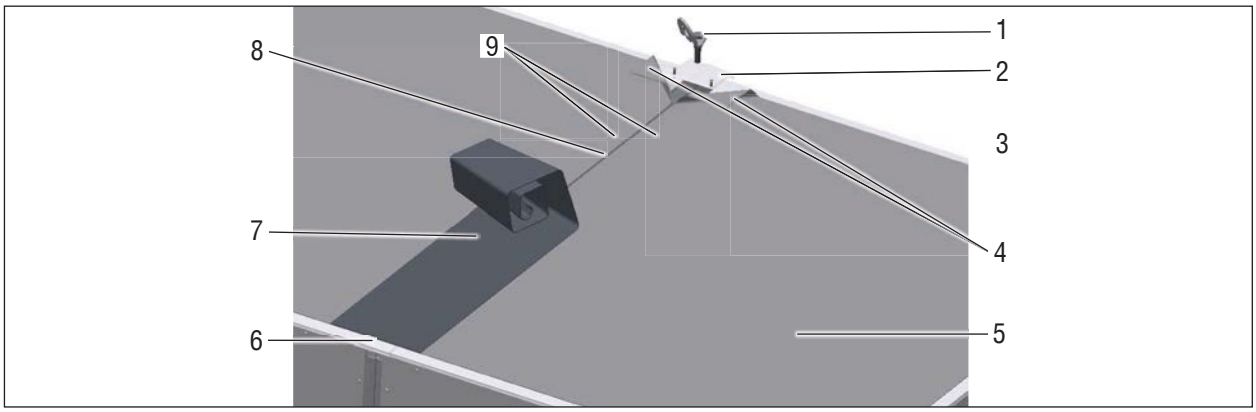


Fig. 26 Sealing of the unit separation points with foil strips

1	Crane eyelet	6	Drip edge coupling piece fitted
2	Drip edge coupling piece (screws 4.2 x 22)	7	Foil strips
3	Drip edge	8	Unit separation line
4	Free roof membrane flaps	9	Solvent welding agent application area
5	Roof membrane		

Step	Action
1	Check that the seal is correctly attached. See operating and installation instructions for AT4F series, chapter 5.6 Outdoor installation.
2	Clean the unit roof in the unit separation area using a cloth. The unit separation area must be dust-free and dry.
3	Remove the crane eyelet, if present (1).
4	For units with panel and integrated frame: Screw the drip edge coupling piece (6) to the unit separation point.
5	Clip the coupling piece at the unit separation point under the drip edge.
6	Fold away the free roof membrane flaps (4).
7	Apply the solvent welding agent using the brush in the coupling piece area (2) and in the drip edge area (3) up to the affixed roof membrane (5) to seal on the free roof membrane flaps (4).
8	Press the free roof membrane flaps (4) on securely.
9	Then apply the solvent welding agent again only in the area of the foil strips (7) (depending on the strip width).
10	Then position the foil strips (7) flush with the roof membrane attachment and roll them out.
11	Press down the joints well to avoid wrinkles.

NOTE

For outside temperatures > 10 °C, the solvent welding agent or hot air dryer can be used.
At lower outside temperatures, welding with the hot air dryer is to be used to seal the unit separation points.
Check the housing seal carefully.

Weatherproof units with height offset

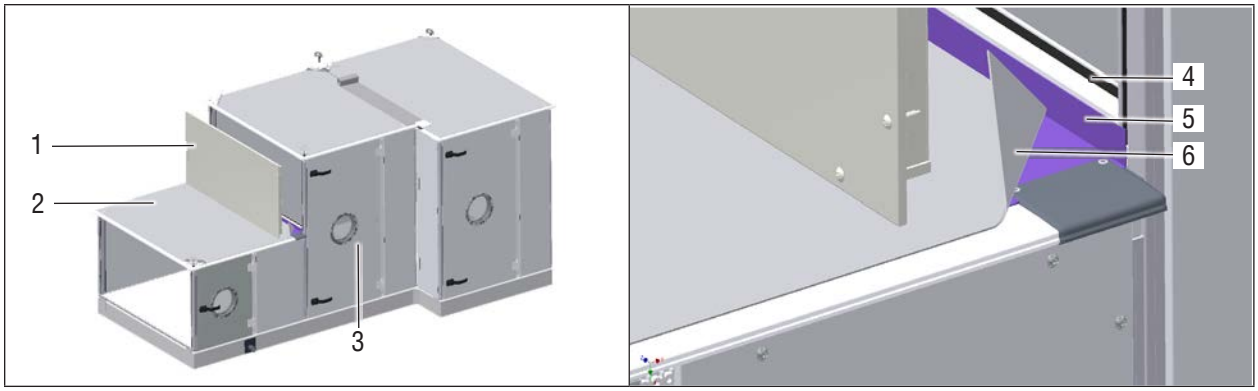


Fig. 27 Weatherproof units with height offset

1	Panel	4	Microbially inert sealing material
2	Lower component	5	Foil bracket
3	Higher component	6	Roof membrane

Step	Action
1	Before placing the components together, unscrew the panel (1) of the higher component (3).
2	Position the lower component (2).
3	Align the components.
4	Screw the components together (see chapter "5.3 Assembly of separated housing" on page 29).
5	Insert the foil bracket (5) under the roof membrane (6) and then onto the component (3).
6	Weld the foil bracket (5) to the roof membrane (6) (see chapter "5.5.2.3 Sealing of the unit separation points with solvent welding agent for weatherproof units" on page 40).
7	Seal the vertical sides and the upper horizontal edge of the foil bracket (5) with microbially inert sealing material (4).
8	Screw the unscrewed panel (1) back on. Ensure that pressure is also applied to the foil bracket (5).

Weatherproof unit with dual-function unit stacked on top

This arrangement can also occur in units with heat recovery diagonally with plate heat exchanger (WRD) or rotary heat exchanger.

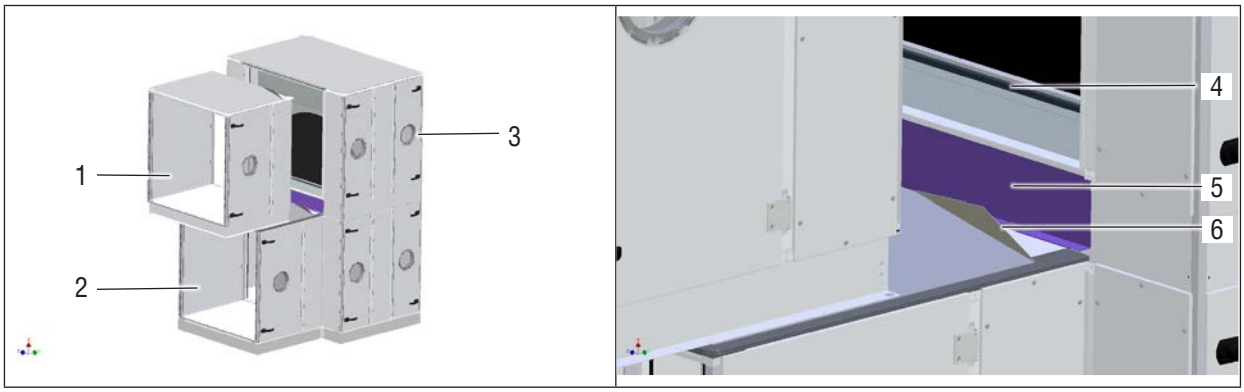


Fig. 28 Weatherproof units with dual-function units, stacked one above the other

1	Component, upper unit	4	Microbially inert sealing material
2	Component, lower unit	5	Foil bracket
3	Component with dual-function unit	6	Roof membrane

Step	Action
1	Position the component lower unit (2) and the component with dual-function unit (3) next to one another.
2	Align the components.
3	Screw the components together (see chapter "5.3 Assembly of separated housing" on page 29).
4	Insert the foil bracket (5) under the roof membrane (6) and then onto the component (3).
5	Weld the foil bracket (5) to the roof membrane (6) (see chapter "5.5.2.3 Sealing of the unit separation points with solvent welding agent for weatherproof units" on page 40).
6	Seal the vertical sides and the upper horizontal edge of the foil bracket (5) with microbially inert sealing material (4).
7	Position the component upper unit (1) onto the component with dual-function unit (3).
8	Align the components.
9	Screw the components together (see chapter "5.3 Assembly of separated housing" on page 29).

Sealing the drip edge corner

- In the case of weatherproof units, the roof membrane is factory-sealed only up to the countersunk holes at the drip edge corner.
- With the drip edge corner, the roof membrane is welded on-site (see chapter "5.5.2.3 Sealing of the unit separation points with solvent welding agent for weatherproof units" on page 40).
- If a crane eyelet is fitted, remove it beforehand.

Transport device corner

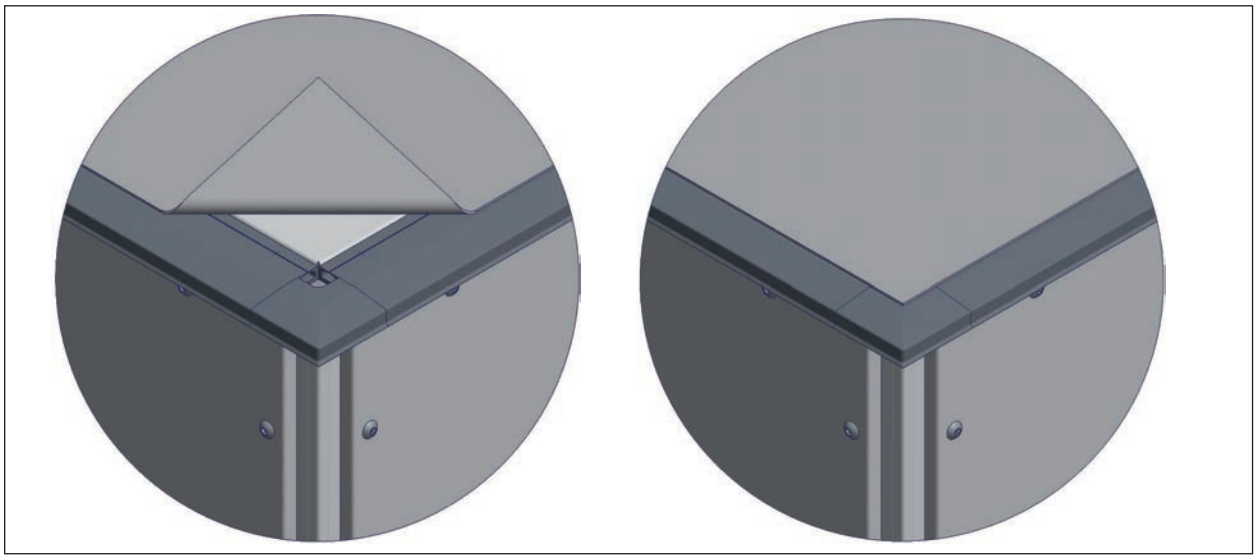


Fig. 29 Weatherproof units with transport device corners on roof assembly with unit frame profile

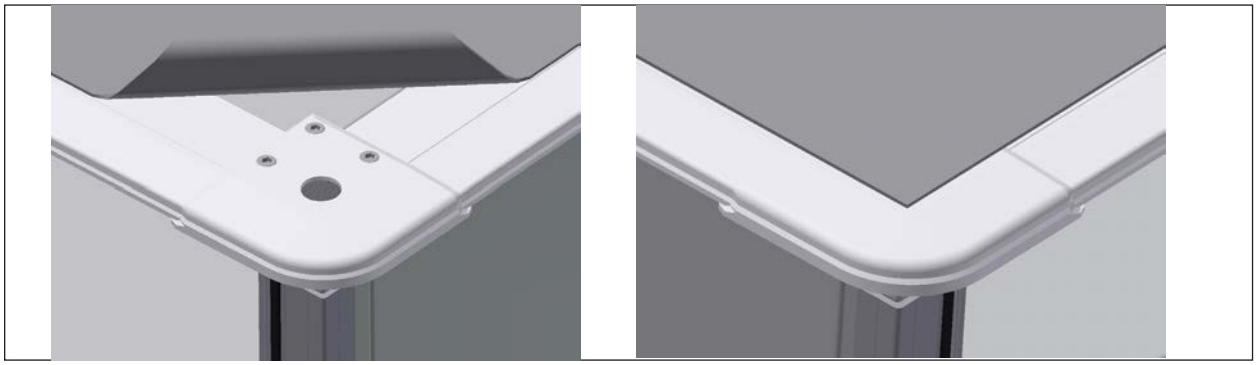


Fig. 30 Weatherproof units with transport device corners on roof assembly without unit frame profile

5.5.2.4 Sealing of the unit separation points with hot air welding for weatherproof units

⚠ WARNING

Risk of burns from hot air and hot foil

Contact with hot air and hot, molten foil may cause burns to the limbs, especially the hands.

- When hot air welding, use your personal protective equipment and suitable protective gloves to protect your hands against burns.

Seal welding

Required temperature of the hot air	Required hot air nozzle	Pressure roller material
450 °C	angled and approx. 40 mm wide	Silicone or metal

Hot air welding of sheets

- The sheets are continuously seal-welded backwards in one operation.

Hot air welding of blanks up to approx. 33 cm wide

- Blanks are first tacked and then seal-welded.

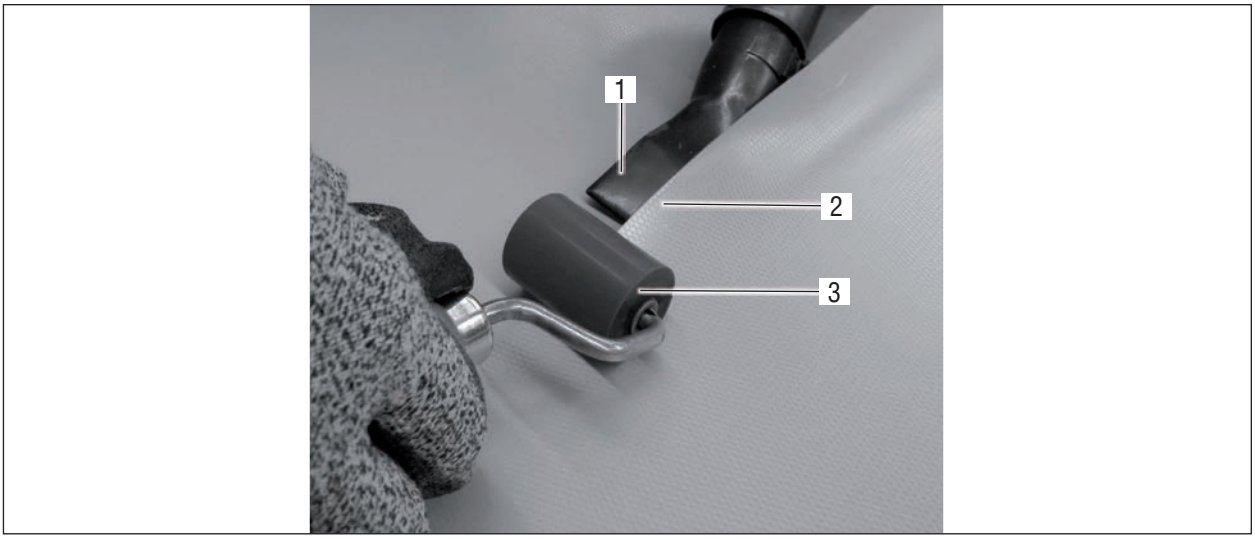


Fig. 31 Sealing of the roof membrane via hot air welding

1	Hot air nozzle	3	Pressure roller
2	Seam overlap		

Step	Action
1	Guide the nozzle of the hand welding unit (1) between the two foil sheets in the seam overlap (2). Align the angle of the nozzle approx. 45° to the edge of the membrane and approx. 30° to the roof surface.
2	Weld the foils together backwards.
3	Ensure that the lower and upper web edges are blown and plastified simultaneously. NOTE: Only insert the nozzle deeply enough that only the seam overlap is plastified.
4	Press the plastified overlap regions together with the pressure roller (3).
5	Feed the pressure roller (3) continuously.

5.6 Units with split plate heat exchanger (option)

ATTENTION

Plate heat exchangers must be assembled exactly according to the assembly instructions. The assembly instructions can be requested from customer services if necessary.

Assembly may only be performed by trained qualified staff.

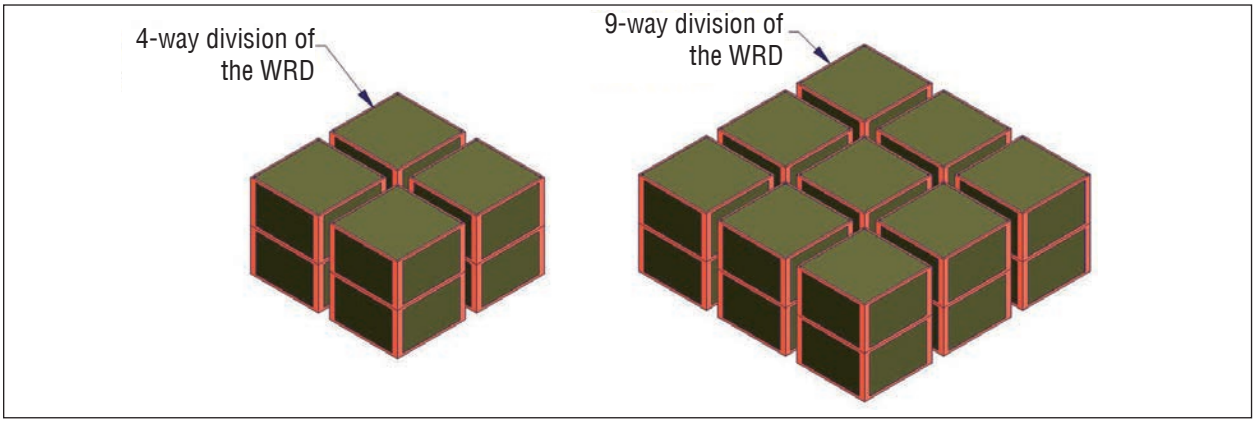


Fig. 32 Units with split plate heat exchanger

- Larger housings with plate heat exchangers are supplied in a split or disassembled version for ease of handling and transport. In this case, the plate exchangers can be supplied in one piece, split into slies or split into cubes. However, this depends on the conditions on the construction site and must be clarified in advance with the manufacturer's factory.
- These components are then assembled on-site. For this purpose, separate assembly instructions are included with the documentation.

5.7 Units with split rotary heat exchanger (option)

ATTENTION

Rotary heat exchangers must be assembled exactly according to the manufacturer's data. The assembly instructions can be requested from customer services if necessary.

Assembly may only be performed by trained qualified staff.

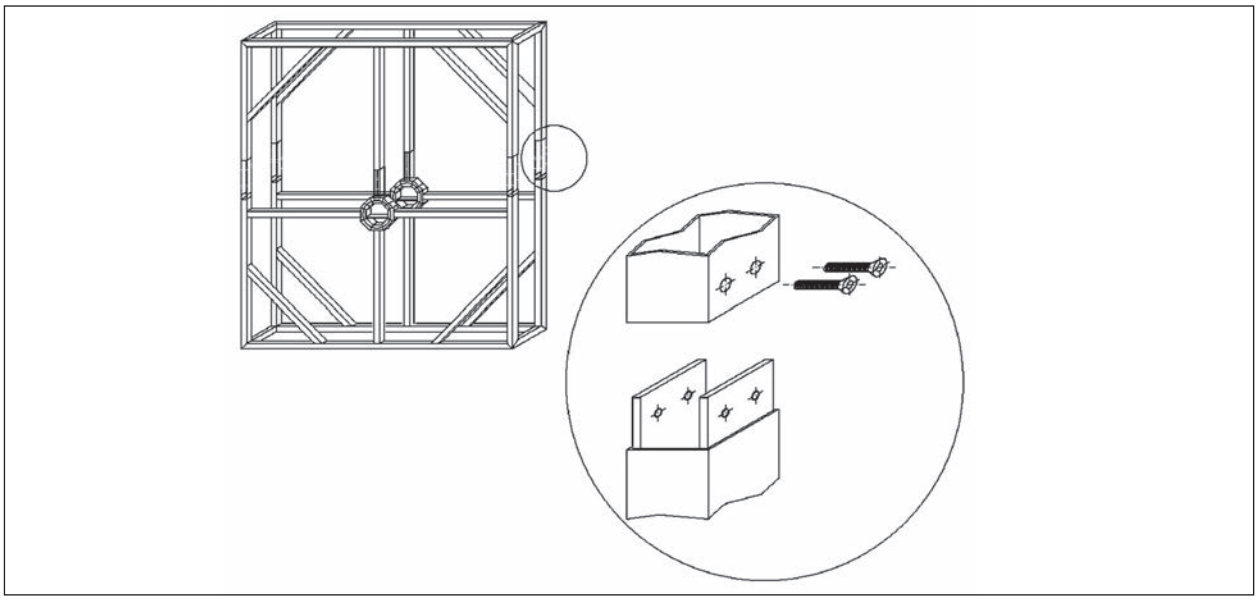


Fig. 33 Units with split rotary heat exchanger

- From a wheel diameter of 2500 mm, the rotary heat exchanger is split.
- These components are then assembled on-site.

5.8 Additional installation instructions for hygiene units

ATTENTION

After installing and connecting the individual unit components together, the unit separating points incl. unit connecting angles inside the unit must be sealed with microbially inert sealing material.

- During the installation of pipes and supply lines on site, take care that the function and operation of the unit components that can be pulled out to the side are not impaired.
- Directly connecting the water drains of the "hygiene unit" to the drain system is not permissible.

5.9 Heat exchanger connection

NOTE

Vent and drain valves must be provided on-site in the pipeline.

ATTENTION

Ensure in general that the unit remains accessible for maintenance purposes. During installation, particularly of the connecting pipework, ensure that the inspection doors can always be opened.

According to VDI 6022, the retractability of the heat exchangers (and any droplet eliminators) must be ensured up to a clear unit height of 1.6 m.

5.9.1 Connection of hot water heater (option)

For heating the supply air, a pump hot water air heater (PWW) can be used. Extraction and emptying of the heat exchanger must be carried out on-site.

- The feed and return lines are to be professionally connected on-site.

NOTE

Do not mix up the feed and return lines when connecting the pipelines.

The medium inlet is located on the air outlet side "Fig. 35 Counterflow principle for heat exchanger connection" on page 50

ATTENTION

Counter-hold using a suitable tool (e.g. pipe wrench) during connection of the heat exchangers in order to avoid damage.

The limitation of the permissible heating medium temperature of the heat exchanger is to be implemented on-site by the owner/operator.

Install pipes and connections in such a way that the heat exchangers remain freely accessible for maintenance.

- Maximum working pressure: 16 bar
- Maximum hot water flow temperature: 120 °C

- Valves and actuators must be installed professionally. Please note here whether a 2-way or 3-way valve version is to be set up.
- For electrical connection of the actuator, see the circuit diagram.

Requirements for water	Maximum working pressure	Maximum hot water flow temperature
free of corroding properties free of oxygen free of carbon dioxide	16 bar	120 °C

2-way valve and 3-way valve versions

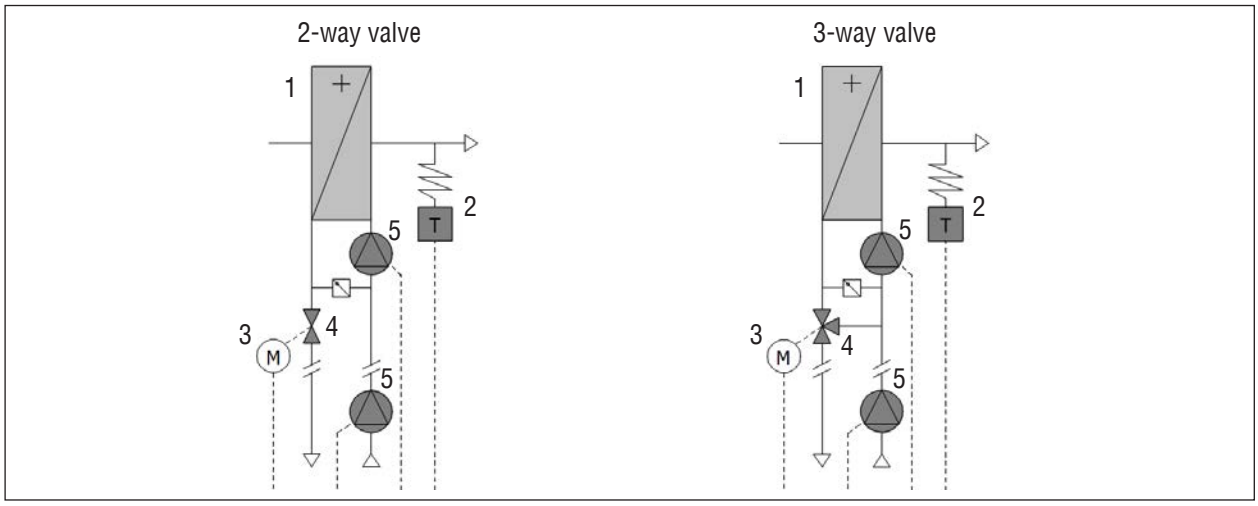


Fig. 34 2-way valve and 3-way valve connection versions

1	PWW heater	4	Valve
2	Frost monitor	5	Recirculation pump (on-site)
3	Valve actuator		

Counterflow principle for heat exchanger connection

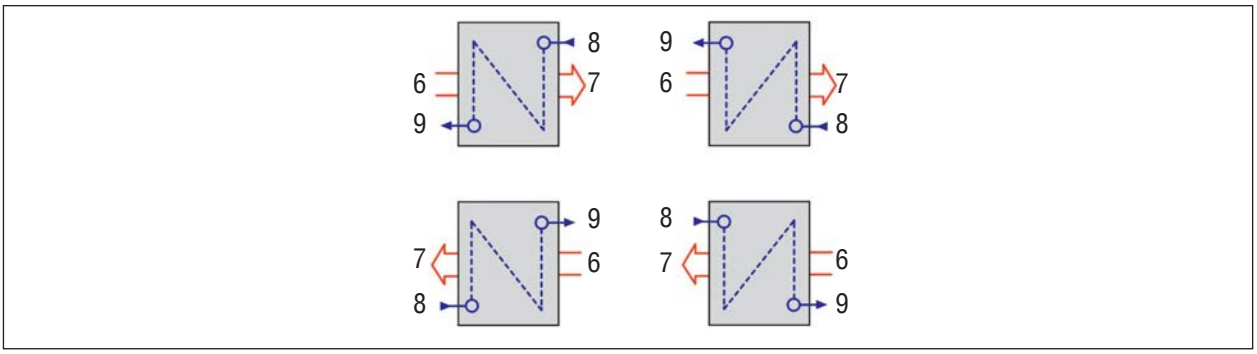


Fig. 35 Counterflow principle for heat exchanger connection

6	Air inlet	8	Media inlet
7	Air outlet	9	Media outlet

Step	Action
1	Connect the heat exchanger using the counterflow principle (water flow direction opposite the air flow direction in the unit).
2	Connect the pre flow up or down depending on the air direction.
3	Carefully vent the heat exchanger.
4	Check all of the piping for leaks.

ATTENTION

If the device version control has been selected, neither the valve nor the valve actuator are supplied. In this case, these are on-site services.

NOTE

The figure shows schematics only of the hydraulic connection of the heater. The exact hydraulic connection must be carried out at the discretion of the heating specialist.

If the heat exchanger is the last component in front of the on-site duct, a duct-side inspection opening must be provided directly on the register. This is used for inspection and cleaning.

Function

The heater is included in the control system for the room or supply air temperature. The heat output is metered by regulating the corresponding actuating valve.

ATTENTION

Measures for decommissioning:

At temperatures below freezing, the heat exchanger must be either drained and blown out with compressed air, or filled with a commercially available antifreeze with corrosion inhibiting additive due to the risk of freezing and corrosion.

5.9.2 Connection of heater/pumps-cold water air cooler (option)

A pump hot water heater (PWW) and pump cold water air cooler (PCW) can be provided for the additional heating and cooling of the supply air.

To avoid condensate transfer into the duct, a droplet eliminator (DE) is installed behind the cooler. If the air speed is sufficiently low, this DE can optionally be deselected.

- The supply and return lines of both heat exchangers must be professionally connected.

NOTE

Do not mix up the feed and return lines when connecting the pipelines.

The medium inlet is located on the air outlet side "Fig. 37 Counterflow principle for heat exchanger connection" on page 53.

ATTENTION

Counter-hold using a suitable tool (e.g. pipe wrench) during connection of the heat exchangers in order to avoid damage.

Install pipes and connections in such a way that the heat exchangers remain freely accessible for maintenance.

- Maximum working pressure: 16 bar
- Maximum hot water flow temperature: 120 °C

- Valves and actuators must be installed professionally. It should be noted here whether a version with 2-way valves, 3-way valves or with a combination of 2-way and 3-way valves is being used.
- For the electrical connection of the actuators, see the circuit diagram.

2-way valve, 3-way valve and combined 2-way and 3-way valve versions

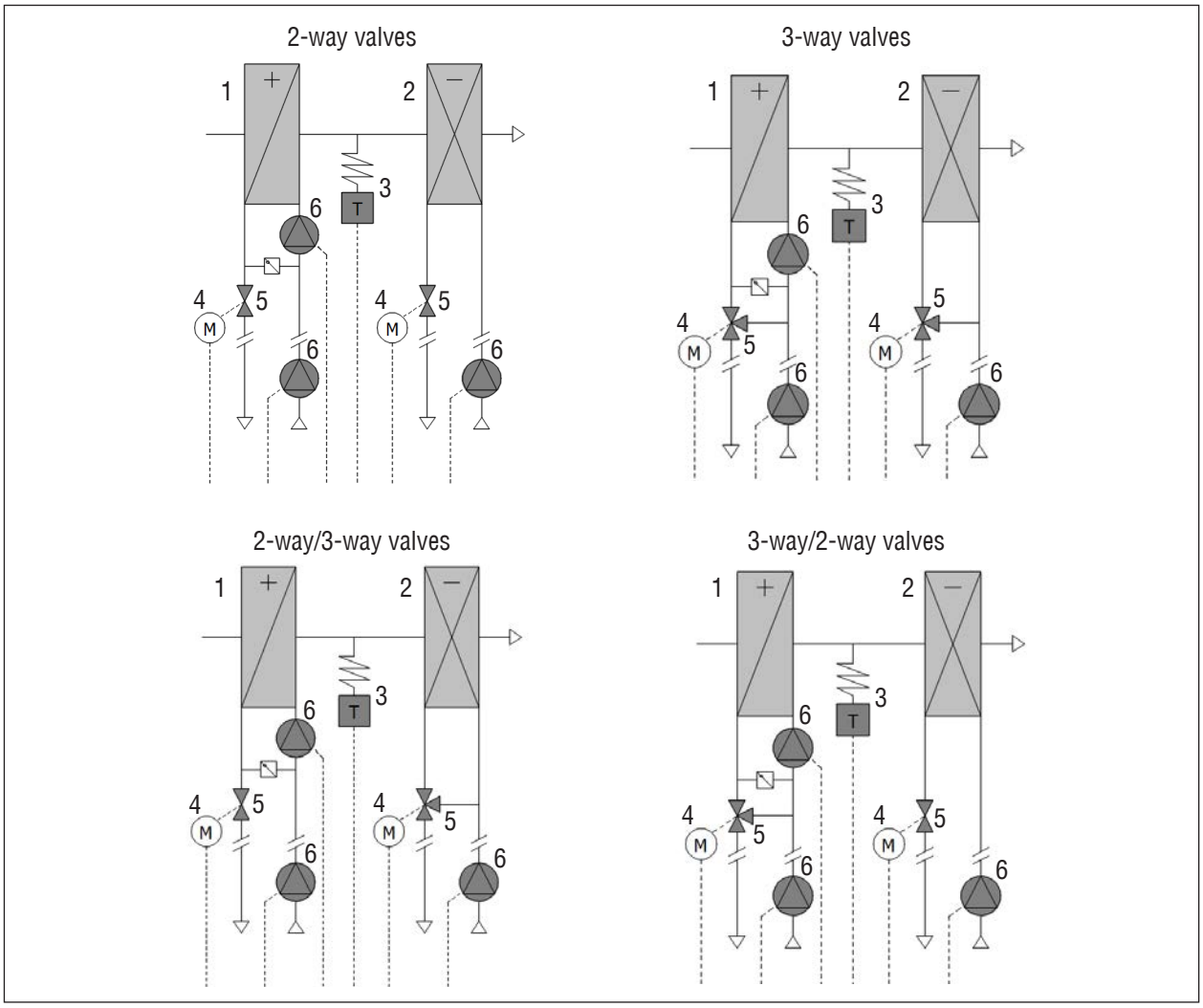


Fig. 36 2-way valve and 3-way valve connection versions

1	PWW heater	4	Valve actuator
2	PCW cooler	5	Valve
3	Frost monitor	6	Recirculation pump (on-site)

Counterflow principle for heat exchanger connection

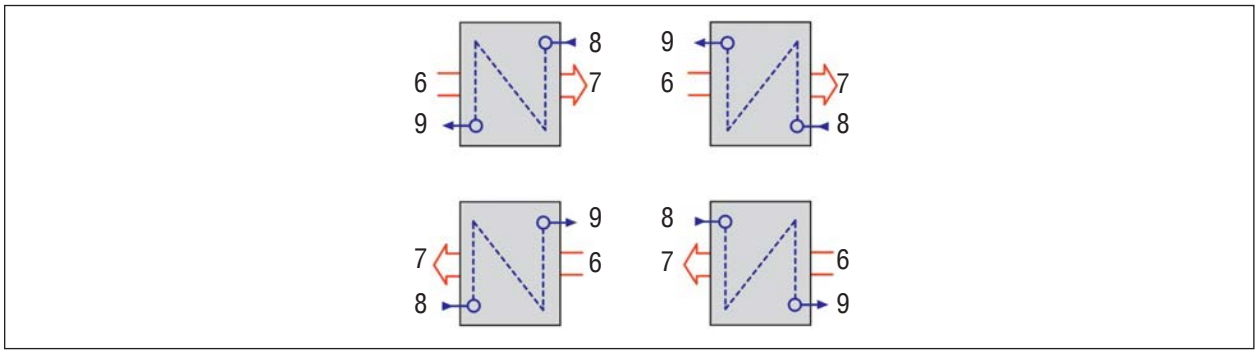


Fig. 37 Counterflow principle for heat exchanger connection

6	Air inlet	8	Media inlet
7	Air outlet	9	Media outlet

Step	Action
1	Connect the heat exchanger using the counterflow principle (water flow direction opposite the air flow direction in the unit).
2	Connect the pre flow up or down depending on the air direction.
3	Carefully vent the heat exchanger.
4	Check all of the piping for leaks.

ATTENTION

If the device version control has been selected, neither the valve nor the valve actuator are supplied. In this case, these are on-site services.

NOTE

The figure shows schematics only of the hydraulic connection of the heater.and the cooler. The exact hydraulic connection must be carried out at the discretion of the heating specialist.

If the heater/cooler module is the last component before the on-site duct, a duct-side inspection opening must be provided directly on the register/droplet eliminator. This is used for inspection and cleaning.

Function

Heater and cooler are integrated into the temperature control. The temperature is set by controlling the cold water and hot water actuating valves.

ATTENTION

At temperatures below freezing, the heat exchanger must be either drained and blown out with compressed air, or filled with a commercially available antifreeze with corrosion inhibiting additive due to the risk of freezing and corrosion.

On-site siphon

ATTENTION

The drain pipe and the siphon are to be kept frost-proof on-site.

- A siphon is also required on-site for the cooler and for the direct evaporator.
- Each pan drain must be fitted with a separate siphon.

5.9.3 Connection of pumps/cold water/air cooler (option)

For additional cooling of the supply air, a pump cold water air cooler (PKW) can be used.

To avoid condensate transfer into the duct, a droplet eliminator (DE) is installed behind the cooler.

- The supply and return lines of both heat exchangers must be professionally connected.

NOTE

Do not mix up the feed and return lines when connecting the pipelines.

The medium inlet is located on the air outlet side ("Fig. 39 Counterflow principle for heat exchanger connection" on page 55).

ATTENTION

Counter-hold using a suitable tool (e.g. pipe wrench) during connection of the heat exchangers in order to avoid damage.

Install pipes and connections in such a way that the heat exchangers remain freely accessible for maintenance.

- Maximum working pressure: 16 bar
- Maximum hot water flow temperature: 120 °C

- Valves and actuators must be installed professionally. Please note here whether a version with a 2-way or 3-way valve is to be implemented.
- For the electrical connection of the actuators, see the circuit diagram.

2-way valve and 3-way valve versions

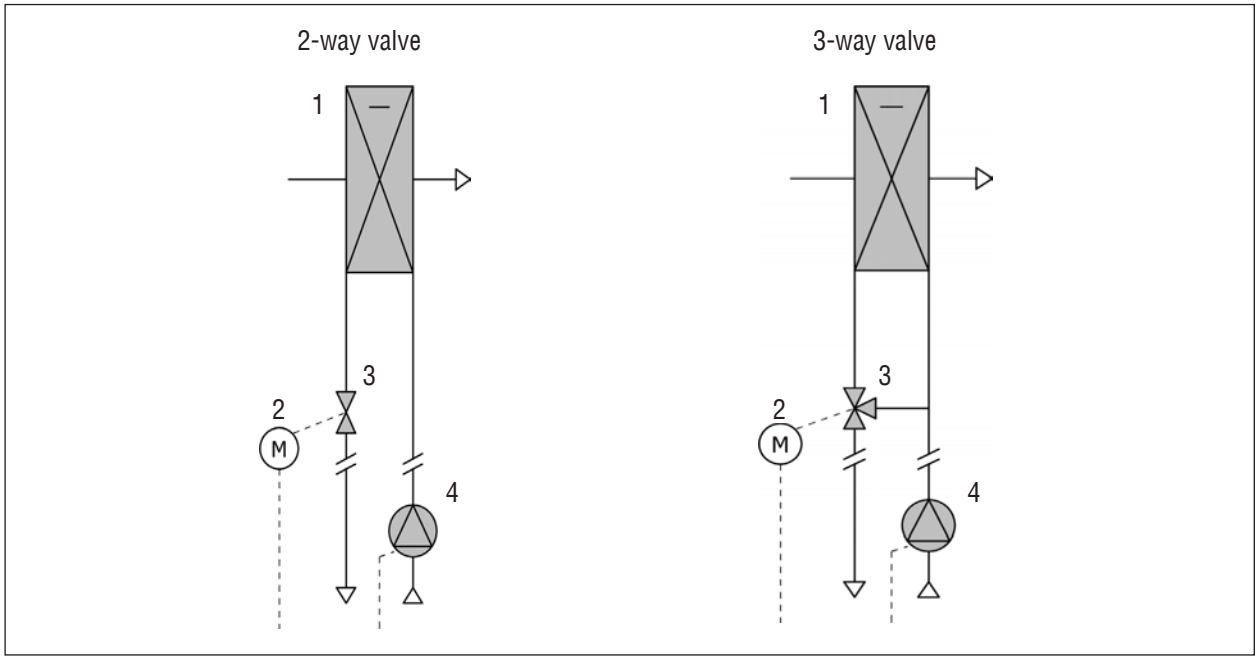


Fig. 38 2-way valve and 3-way valve connection versions

1	PCW cooler	3	Valve
2	Valve actuator	4	Recirculation pump (on-site)

Counterflow principle for heat exchanger connection

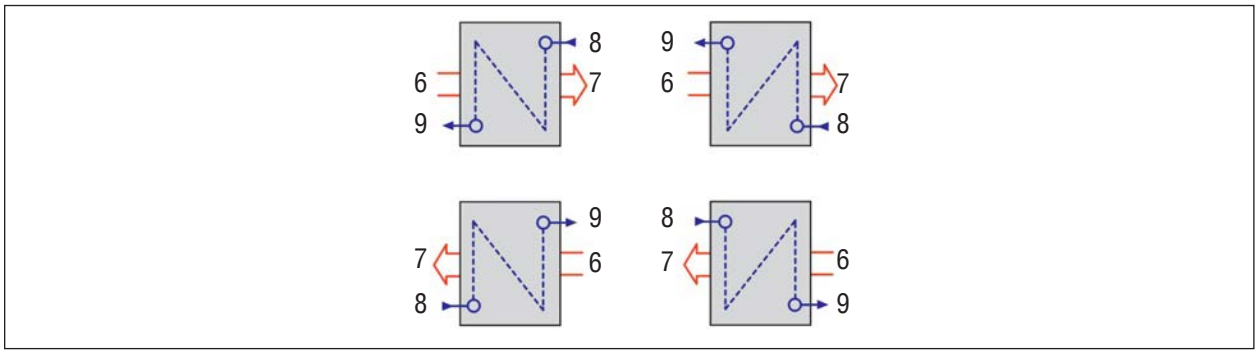


Fig. 39 Counterflow principle for heat exchanger connection

6	Air inlet	8	Media inlet
7	Air outlet	9	Media outlet

Step	Action
1	Connect the heat exchanger using the counterflow principle (water flow direction opposite the air flow direction in the unit).
2	Connect the pre flow up or down depending on the air direction.
3	Carefully vent the heat exchanger.
4	Check all of the piping for leaks.

ATTENTION

If the device version control has been selected, neither the valve nor the valve actuator are supplied. In this case, these are on-site services.

NOTE

The figure shows schematics only of the hydraulic connection of the cooler. The exact hydraulic connection must be carried out at the discretion of the heating specialist.

If the cooler module is the last component before the on-site duct, a duct-side inspection opening must be provided directly on the register/droplet eliminator. This is used for inspection and cleaning.

Function

Coolers are integrated into the temperature control. The temperature is set by controlling the cold water actuating valves.

ATTENTION

At temperatures below freezing, the heat exchanger must be either drained and blown out with compressed air, or filled with a commercially available antifreeze with corrosion inhibiting additive due to the risk of freezing and corrosion.

On-site siphon

ATTENTION

The drain pipe and the siphon are to be kept frost-proof on-site.

- A siphon is also required on-site for the cooler and for the direct evaporator.
- Each pan drain must be fitted with a separate siphon.

5.9.4 Steam register

⚠ WARNING



Danger of burns/scalds during filling of the heat exchanger with steam.

Danger due to contact with leaking media lines and hot surfaces.

- Perform a visual inspection of the pipelines and connections before filling.
- Wear personal protective equipment.
- Only use steam registers with pre-welding flanges for the corresponding pressure level.
- Comply with the Pressure Equipment Directive and the corresponding standards.
- the steam register is pressurised.

⚠ WARNING





Danger of bursts/explosions during filling of the heat exchanger with steam

The steam register is pressurised. Damage to the heat exchanger can cause a risk of bursting and an explosion. This is associated with a loud bang.

- Wear your personal protective equipment during filling of the heat exchanger.
- Observe the operating and assembly instructions as well as the working instructions.
- Work with care.
- Secure the hazardous areas. Only trained persons are permitted in this area.
- Operate the heat exchanger and the steam register only at the permissible operating points.
- Check the steam register for visible damage.
- Comply with the Pressure Equipment Directive and the corresponding standards.

⚠ WARNING



Danger of slipping due to puddle formation.when filling or leaking of the heat exchanger.

- Clean away puddles and even small spills immediately.
- Use suitable absorbent materials such as cloths or binders.
- Dispose of the used cloths or binders in accordance with the applicable regulations.
- Wear personal protective equipment.
- Dispose of the ingested spills in a professional manner, in accordance with local regulations.

Step	Action
1	Connect the heat exchanger using the counterflow principle (water flow direction opposite the air flow direction in the unit).
2	Connect the pre flow up or down depending on the air direction.
3	Carefully vent the heat exchanger.
4	Check all of the piping for leaks.

5.9.5 Circulating coil system CCS (recuperative energy recovery)

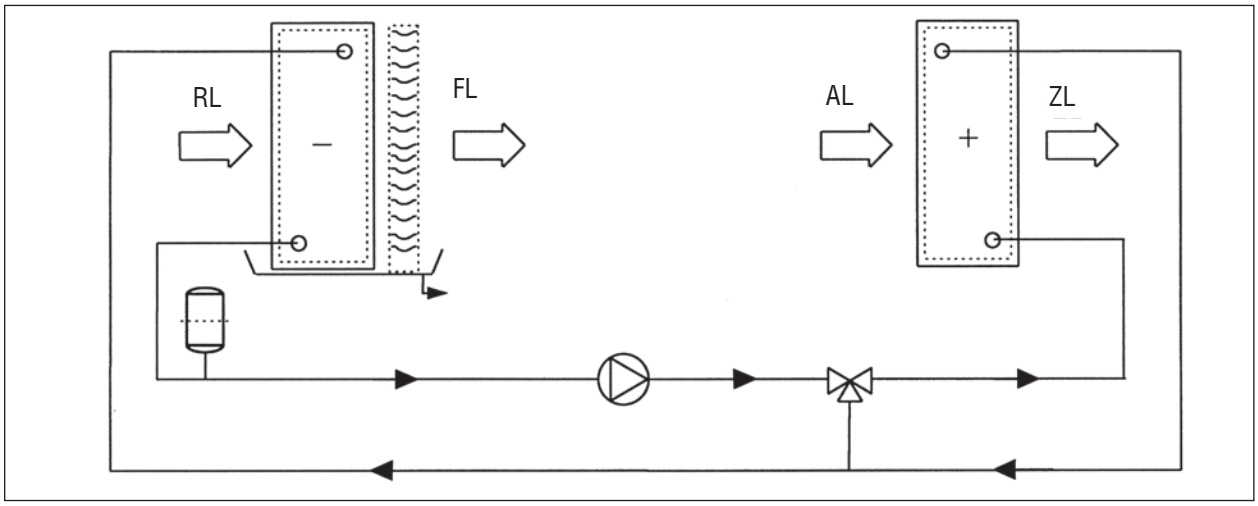


Fig. 40 Schematic diagram of a circulating coil system

With heat exchangers in a circulating coil system, the pipe circuits themselves cannot be emptied.

For this reason, the circulating coil system is only to be operated with a frost-proof water/glycol mixture and tested for leak-tightness after assembly.

If the system does have to be drained, the pipe circuits can be blown out with compressed air, although water still remains in the heat exchanger even in this case.

ATTENTION

When using high-performance circulating coil systems, observe the manufacturer's operating instructions.

ATTENTION

During commissioning, observe chapter "5.10.5 Filling and venting" on page 62.

Step	Action
1	Connect the heat exchanger using the counterflow principle (water flow direction opposite the air flow direction in the unit).
2	Connect the pre flow up or down depending on the air direction.
3	Carefully vent the heat exchanger.
4	Check all of the piping for leaks.

- Piping must be provided on-site.
- Circulating pump must be dimensioned according to the technical data sheet.
- Heat exchangers must be connected in the counterflow principle.
- Antifreeze concentration must correspond to the specifications on the technical data sheet.
- The pre flow is at the top or bottom, depending on the air direction.
- We recommend the use of the antifrogen N with a mixture of 25 – 35 %.

5.9.6 Direct evaporator/condenser

Additional information for the use of direct evaporators:

ATTENTION

The direct evaporator must be installed by an authorised refrigeration company.
Only safety refrigerants according to DIN 8960 are permitted to be used as refrigerants.
Observe the operating instructions for cooling systems and heat pumps.

ATTENTION

For the refrigerant supply line, the cutout may have to be provided on-site.

On-site siphon

ATTENTION

The drain pipe and the siphon are to be kept frost-proof on-site.

- A siphon is also required on-site for the cooler and for the direct evaporator.
- Each pan drain must be fitted with a separate siphon.

Air direction when installing a direct evaporator

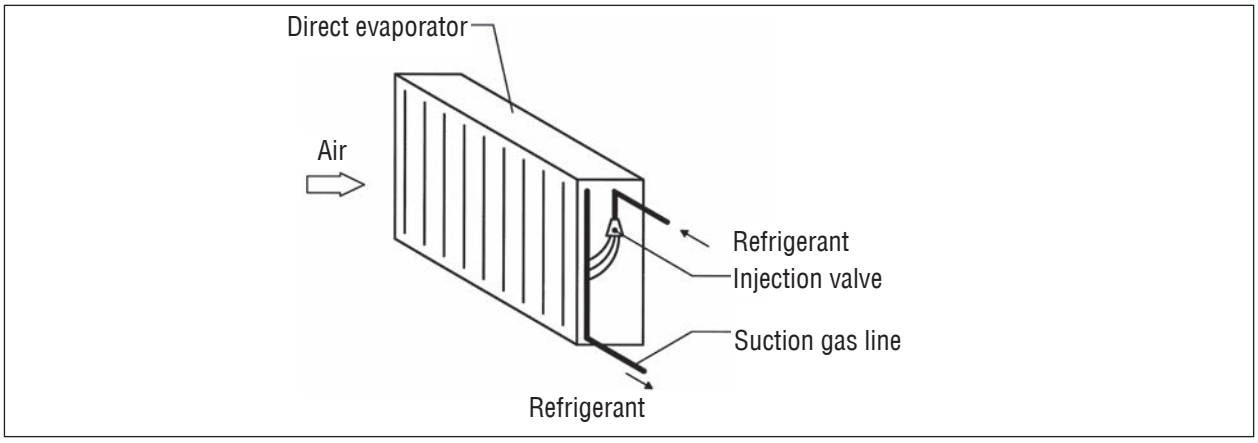


Fig. 41 Air direction when installing a direct evaporator

5.10 Mechanical connection

⚠ WARNING



Risk of crushing

When installing the duct connections as well as fittings and other intake and exhaust options, the damper must be closed. When closing the multi-leaf damper, there is a risk of crushing injuries to the hands.

- Do not reach into the damper when closing the multi-leaf damper.
- Wear the personal protective equipment.

⚠ WARNING



Risk of injury due to impact, cutting or stabbing during assembly of the duct connections.

- Have installation, commissioning, servicing and maintenance work carried out only by qualified staff.
- Observe the working instructions and these operating and assembly instructions.
- Work with care.
- Use the personal protective equipment when working on the installation.
- Use other protective equipment according to the work carried out (cut-proof gloves).

5.10.1 Duct connection

The duct system of the ventilation directs the outdoor air to the air handling unit and as supply air into the building. The exhaust air is passed through the unit and to the outside as exhaust air for heat recovery.

Duct connectors (option)

For the AT4F air handling units, the duct connection is determined according to the order.

Optionally, both sound-decoupled sockets (connection frames) and canvas nozzles can be included.

- The connection of the ventilation ducts to the unit must be carried out professionally.
- The duct connection must be distortion-free and free of load on the AT4F air handling unit.
- Establish pre-assembled equipotential bonding on the duct.

Requirements for the duct system

For the sake of efficiency, energy consumption and air performance of the unit, the pipe system must be designed for slow flow speeds and low pressure drop.

- All connections between the ventilation ducts and air handling unit must be designed and secured to fit exactly.
- Inspection openings must be provided.

Condensation protection/thermal insulation

Outdoor air and exhaust air ducts must always be well insulated to protect against condensation.

- Careful insulation of all ventilation ducts leading directly to the unit and in cold rooms/zones is particularly important.

5.10.2 Intake and exhaust hood (option)

- For a weatherproof version, an optional intake and exhaust hood can be ordered.
- For units without a factory-delivered intake hood, a drain tray at the unit inlet is on site in the duct.
- To avoid short-circuit currents, these position and orientation of the intake and outlet ends must be adjusted, depending on the local conditions, using the on-site duct sections. The applicable rules/standards regarding the fresh air intake and the exhaust air outlet must be complied with in this regard.

5.10.3 Condensate drain connection via siphon

- In accordance with VDI 6022, a water drain and siphon is provided on a condensate pan (recommended with backflow protection).
- Condensate drain lines must be connected to the drain system with a siphon. Direct connection of water drains to the drain system is not permitted.

ATTENTION

The drain pipe and the siphon are to be kept frost-proof on-site.

NOTE

The standing height of the respective siphon must be designed for the underpressure or overpressure of the air handling unit to prevent suction or blowing out of air from the closed drain pipe. For a weatherproof version, pipe trace heating is to be provided. The pipeline must be protected against environmental influences.

Snake siphon (overpressure or vacuum)

The snake siphon is a siphon to be filled for draining AC units in the area of the cooler, humidifiers or other wet areas with overpressure relative to the environment.

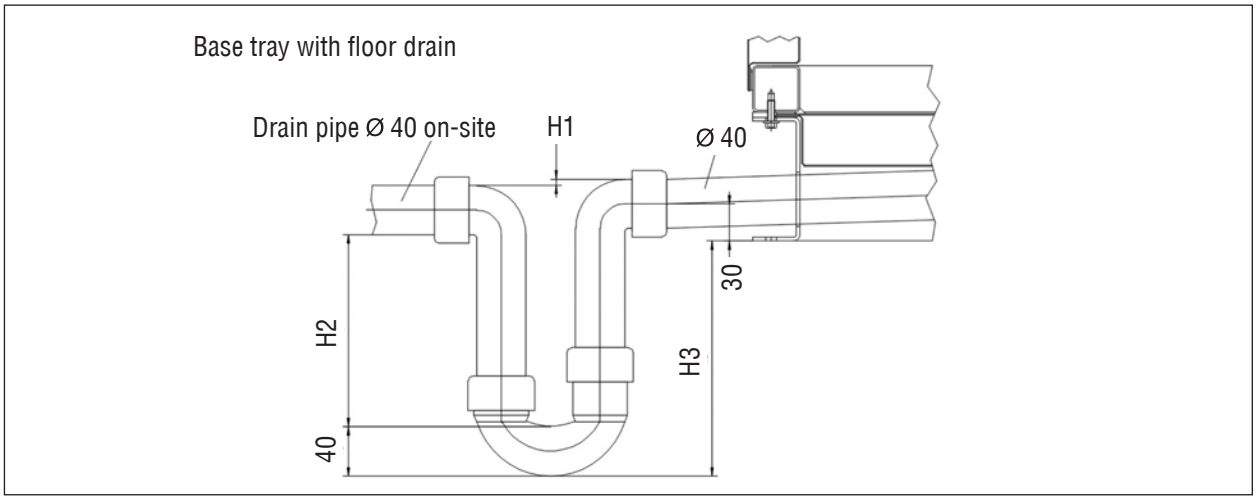


Fig. 42 Connection of the condensate drain with snake siphon

Ball siphon (overpressure)

The ball siphon is a self-filling siphon for draining coolers, steam humidifiers and other wet areas with vacuum relative to the environment. An inserted float ball prevents the suction of air in the dry operating condition, so that the first condensate produced can fill the siphon. The ball continues to act as a check valve in the event of pressure surges in the system and prevents empty suction.

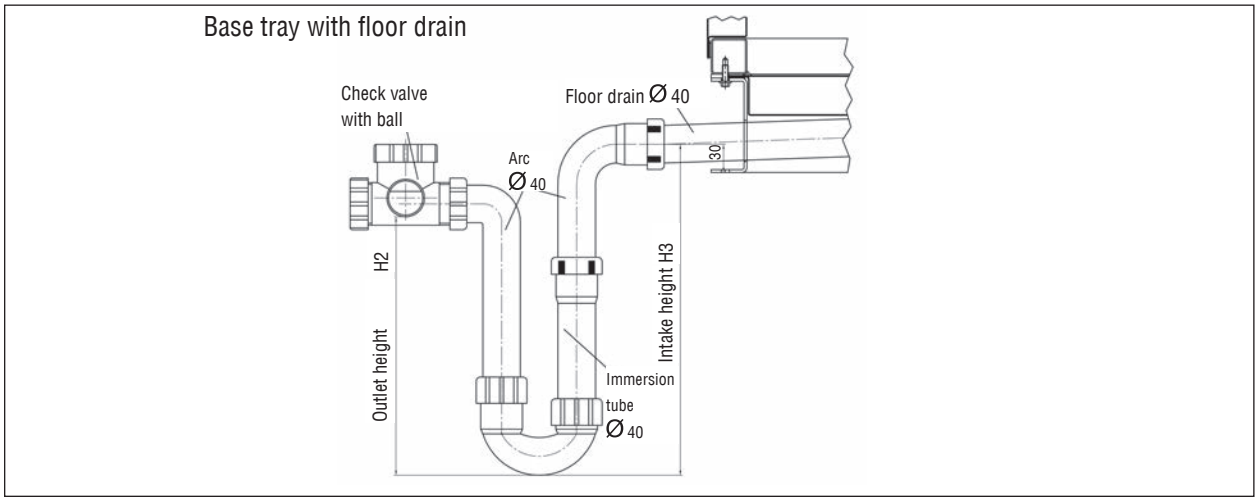


Fig. 43 Connection of the condensate drain with ball siphon with overpressure

Dimensioning of snake siphon (overpressure or vacuum) and ball siphon (overpressure)

Below 600 Pa observe min. dimensions H1 - H3.

10 Pa = 1 mmWS (water column)

Height	minimal	maximal	Overpressure up to 1900 Pa	Vacuum up to 1300 Pa
H1	0 mm	190 mm	50 mm	mmWS + 50 mm
H2	55 mm	245 mm	1.5 * mmWS + 25 mm	mmWS / 2 + 50 mm
H3	100 mm	270 mm	H2 + 40 mm	H1 + H2 - 10 mm

Ball siphon (vacuum)

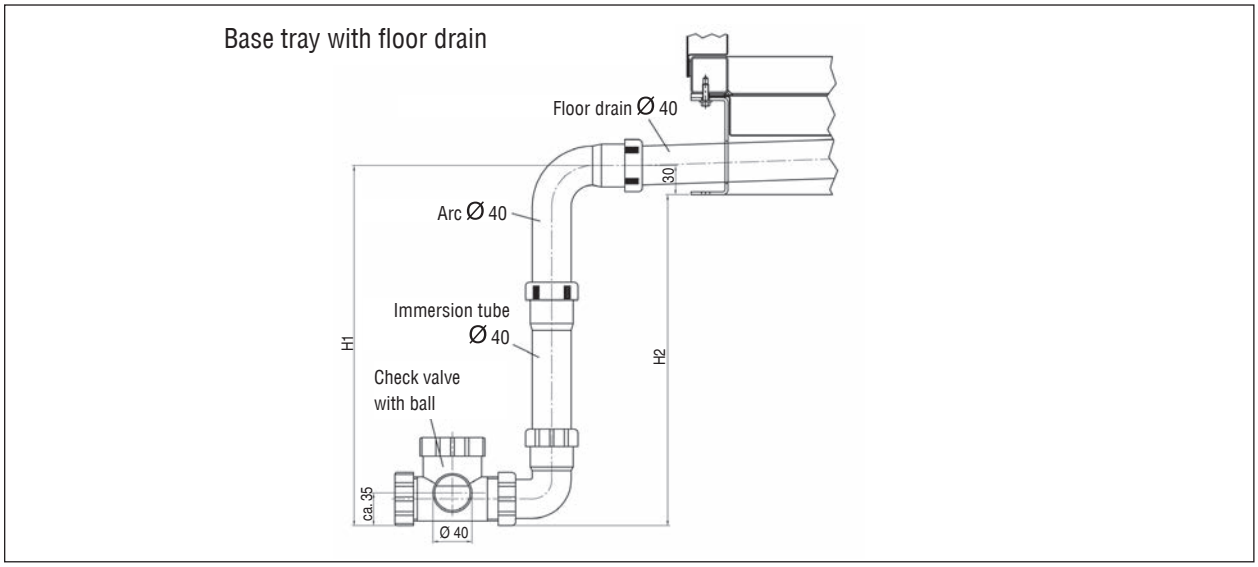


Fig. 44 Connection of the condensate drain with ball siphon with vacuum

Dimensioning of ball siphon (vacuum)

Height	minimal	maximal	Vacuum up to 3200 Pa
H1	30 mm	350 mm	mmWS + 30 mm
H2	0 mm	320 mm	mmWS

NOTE

The installation height of the siphon must be taken into account when setting up the unit.
Observe minimum dimensions H1-H3.

5.10.4 Humidifier media connections

Via these connections, the transmission media provided on-site is introduced into the humidifier.

- Please refer to the manufacturer's documentation.

5.10.5 Filling and venting

⚠ WARNING



Danger of burns/scalds during filling.

Danger due to contact with leaking media lines and hot surfaces.

- Perform a visual inspection of the pipelines and connections before filling.
- Wear personal protective equipment.

⚠ WARNING



Risk of poisoning when filling with glycol.

- Work with care.
- Avoid skin and eye contact with glycol, do not swallow glycol and observe the safety data sheet.
- Use only approved containers.
- Perform a visual inspection of the pipelines and connections before filling.
- Wear personal protective equipment.

⚠ WARNING



Danger of slipping due to puddle formation.

- Clean away puddles and even small spills immediately.
- Use suitable absorbent materials such as cloths or binders.
- Dispose of the used cloths or binders in accordance with the applicable regulations.
- Wear personal protective equipment.
- Dispose of the ingested spills in a professional manner, in accordance with local regulations.

ATTENTION



- At temperatures below freezing, the heat exchanger must be filled with a commercially available anti-freeze with corrosion inhibiting additive due to the risk of freezing and corrosion.
- The glycol content must be prepared according to the manufacturer's data.
- The glycol mixture is to be renewed after a certain operating time in accordance with the manufacturer's data.

- The glycol/water mixture must already be mixed before filling. Otherwise, subsequent mixing is not guaranteed.
- The pipe system must be resistant to the glycol/water mixture used.
- The pipeline system must be carefully and completely vented via the ventilation unit provided on-site.

5.11 Electrical connection

DANGER



Hazard due to electric current.

Incorrect connection to the power supply or incorrect installation of electrical components can result in electric shock.

- Only have the electrical connection carried out by an approved electrician.
- Perform the connection exactly according to the circuit diagram and the assignment plan.
- Observe the valid DIN and VDE regulations.
- Observe the directives of the local energy supply company.
- Use the personal protective equipment when working on the installation.
- Use other protective equipment according to the work carried out.
- Do not operate the unit with defective or damaged cables or plugs.
- Regularly check the connection cables for damaged areas.
- Use only the permissible tool.
- Shut off the power supply for maintenance work and secure it to prevent restart.
- Observe the electrical safety regulations.

WARNING



Risk of injuries due to incorrect or faulty connection.

- Electrical connections must only be undertaken by a certified electrician under consideration of the valid DIN and VDE regulations as well as the directives of the local energy supply company.
- Only have assembly, servicing and maintenance carried out by qualified staff.
- Wear personal protective equipment.

ATTENTION



Main switch or repair switch

It must be possible to shut off the supply line on all poles via a main switch and/or a repair switch.

The operating and assembly instructions for the individual field devices must be observed.

- For the electrical connection, see also the points under "2.3 General safety instructions" on page 12.
- Check that the data on the type plate matches the connection data.
- After completion of the electrical connection work, a safety inspection of the installation must be carried out in accordance with VDE 0701 Part 1 and VDE 0702.

5.11.1 Electric motor

ATTENTION



Electric motors with a nominal output of 3 kW or more must be operated with star-delta starting. Increased switching frequencies ("cycling") of the motors lead to premature malfunctions.

- Wire the motor according to the supplied circuit diagrams.
- Measure the power consumption on all three phases and compare the measured values with the values on the motor type plate.

ATTENTION



- Wiring must be carried out according to DIN VDE 0100-100, DIN EN 60204-1 (DIN VDE 0113) and DIN EN 50156-1 (DIN VDE 0116).
- Motor wiring must be designed so that the motor can be moved to the V-belt tension.
- The power consumption may only be measured with the maintenance doors and maintenance panels closed due to the risk of overloading the motor. The power consumption must not exceed the specified nominal current.
- With multistep motors, operation via a frequency converter is not permitted.
- If the motor is speed-controlled, the frequency converter can also be used to evaluate the PTC thermistor.
- All other motors must be protected with an overload circuit breaker.
- For adjustable motors, the maximum power consumption of the transformer and the motor must not be exceeded. For adjustable motors, the motor protection must be dimensioned accordingly.
- All electrical clamping points must be retightened.
- If the motor is operated via a FC or EC technology, the combination can be secured using a residual current circuit breaker. For this purpose, an all-current sensitive residual current circuit must be selected.

NOTE



The operating and assembly instructions of the motor manufacturer must be observed.

5.11.1.1 Connection of three-phase motors

ATTENTION

Do not switch the upper speed directly. Observe the wiring diagram in the motor terminal box for motors with PTC thermistor or thermal contact.

Circuit for one speed

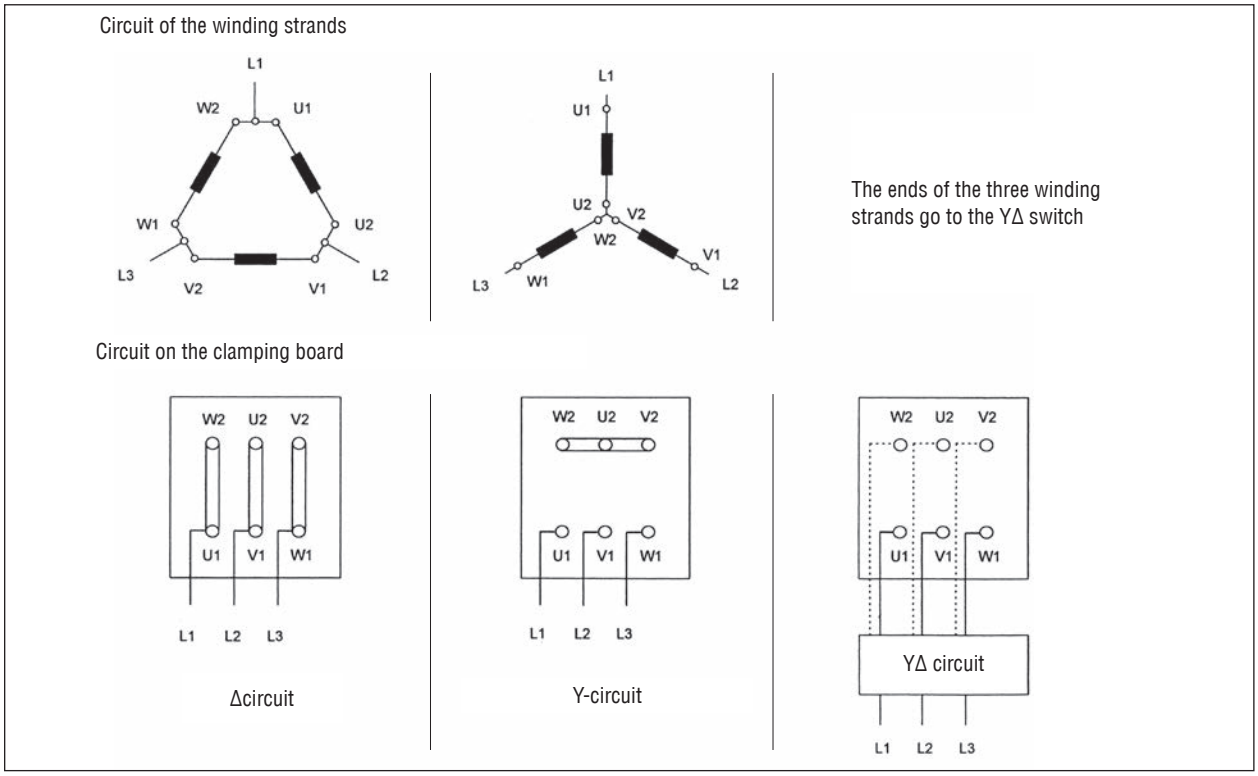


Fig. 45 Circuit of three-phase motors for one speed

Circuits for two speeds in the ratio 1 : 2 (winding in the Dahlander pole changing)

Version e.g. for 1500/3000 rpm or 4-/2-pole or 750/1500 rpm or 8-/4-pole

In motors with Dahlander pole changing, the six winding ends 1U, 1V, 1W and 2U, 2V, 2W are connected to the six terminals of the terminal board of a normal motor terminal box.

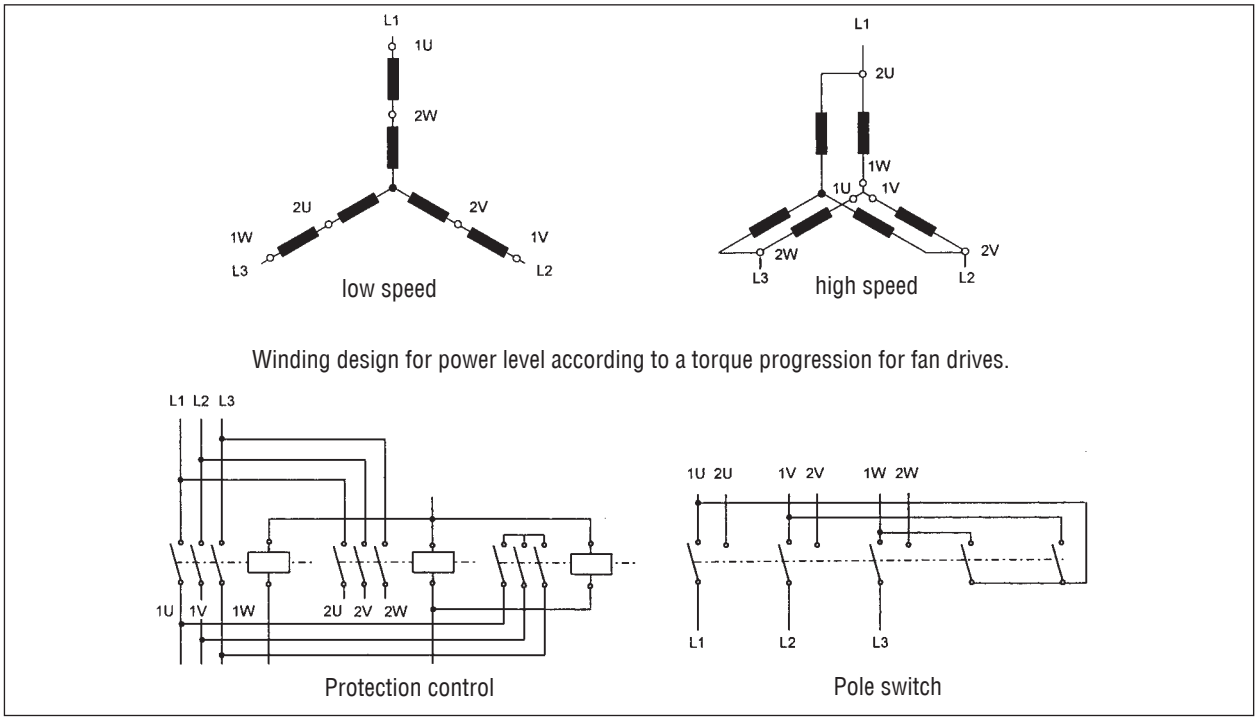


Fig. 46 Circuit of three-phase motors for two speeds in the ratio 1 : 2

Circuit for two speeds (two separate windings)

Version e.g. for 1000/1500 rpm or 6-/4-pole or 750/1000 rpm or 8-/6-pole

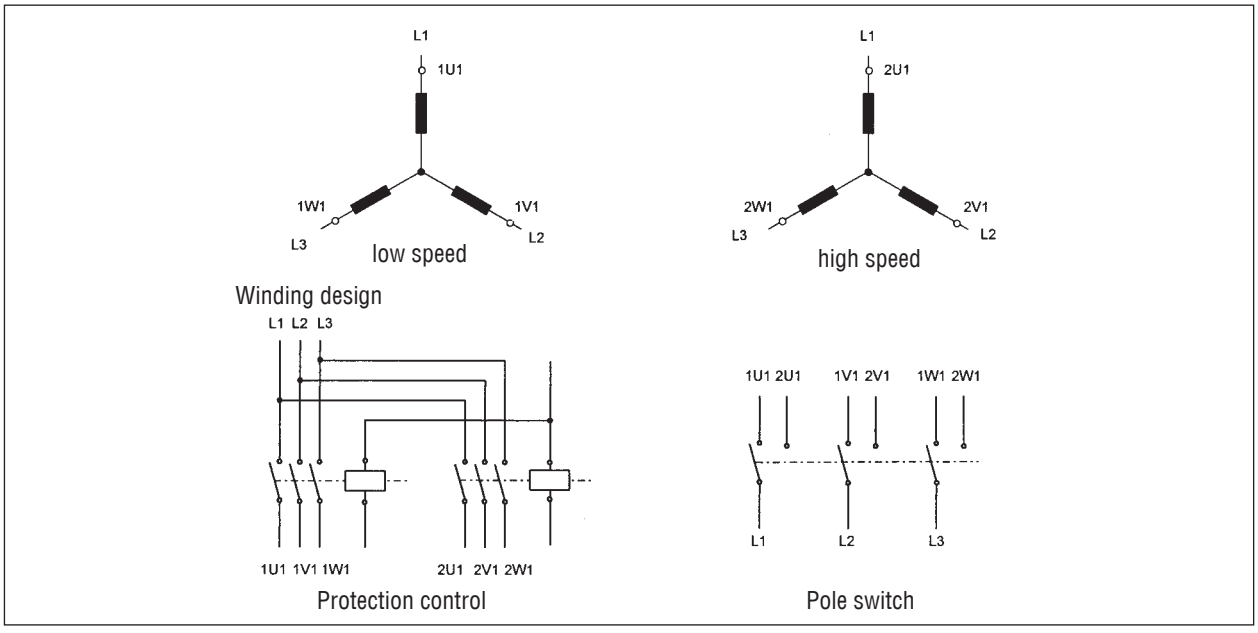


Fig. 47 Circuit of three-phase motors for two speeds

Circuits for three speeds

(two separate windings, one in Dahlander pole changing, nine terminals are required here). Version for fan drives 750/1000/1500 rpm or 8-/6-/4-pole; 750/1500 rpm in Dahlander pole changing.

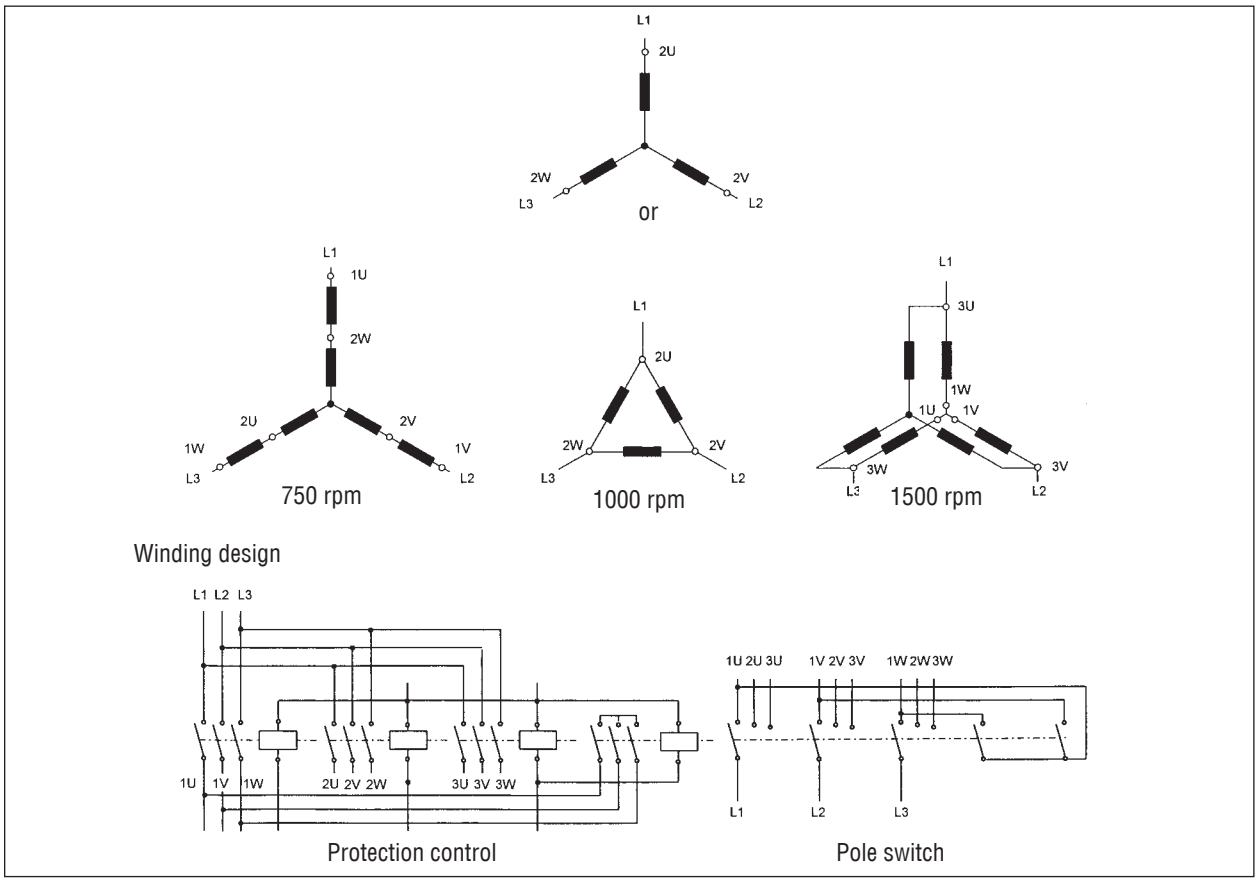


Fig. 48 Circuit of three-phase motors for three speeds

5.11.1.2 Circuit with frequency converter, wiring examples

Wiring example: FC wiring (FC 102) with external repair switch and pressure transmitter

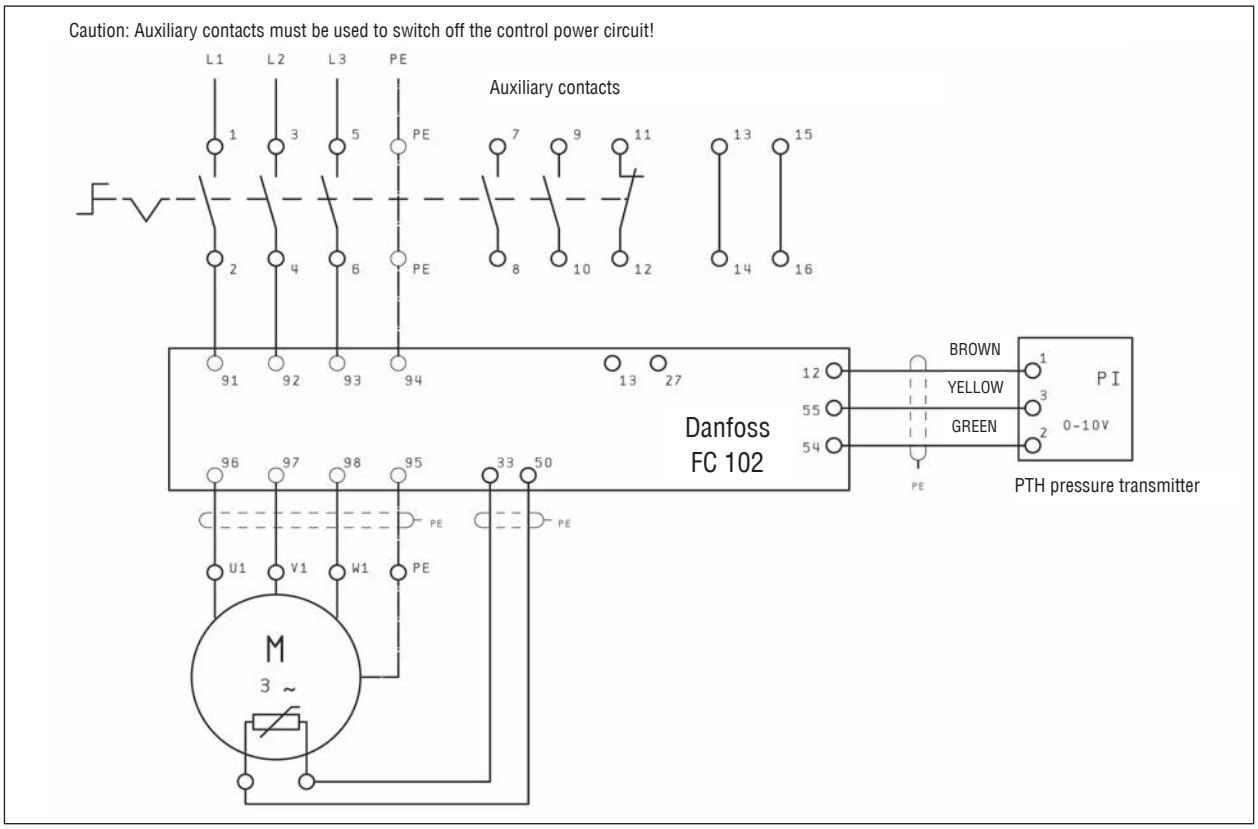


Fig. 49 Circuit of three-phase motors with frequency converter (FC 102) and external repair switch

Wiring example: FC wiring (FC 102) with integrated repair switch and pressure transmitter

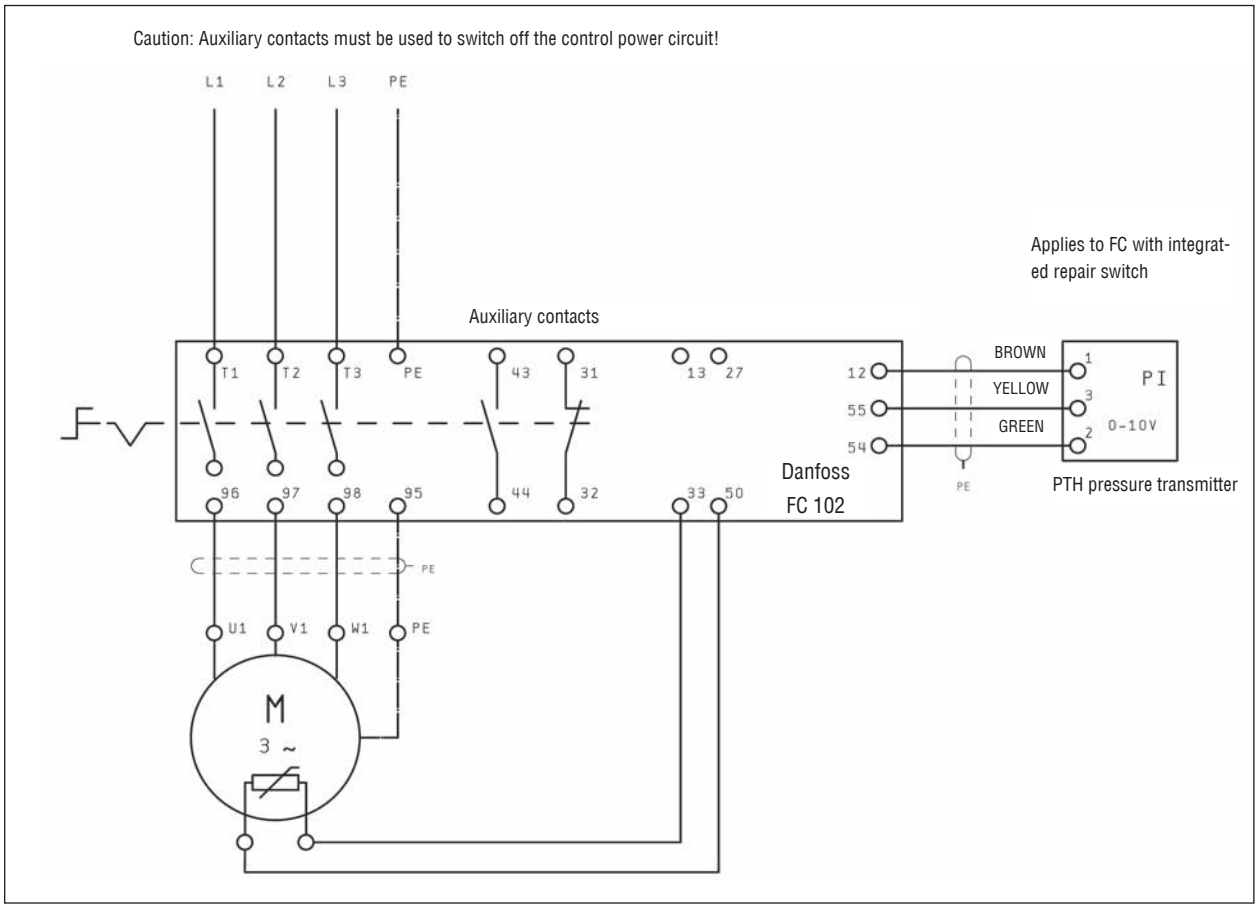


Fig. 50 Circuit of three-phase motors with frequency converter (FC 102) and integrated repair switch.

The following must be noted when operating with frequency converter:

1. The fan motor combination must be suitable for operation via frequency converters.
2. The motor must be protected against overload, e.g. PTC thermistor. A motor protection switch with bimetallic release is not suitable.
3. Under no circumstances may the permitted maximum speed of the fan and the motor be exceeded.
4. Observe the operating instructions of the frequency converter manufacturer.
5. Installation in accordance with the EMC Directive must be guaranteed.
6. If the motor is operated via a FC or EC technology, the combination can be secured using a residual current circuit breaker. For this purpose, an all-current sensitive residual current circuit must be selected.

5.11.1.3 Connection of EC fans

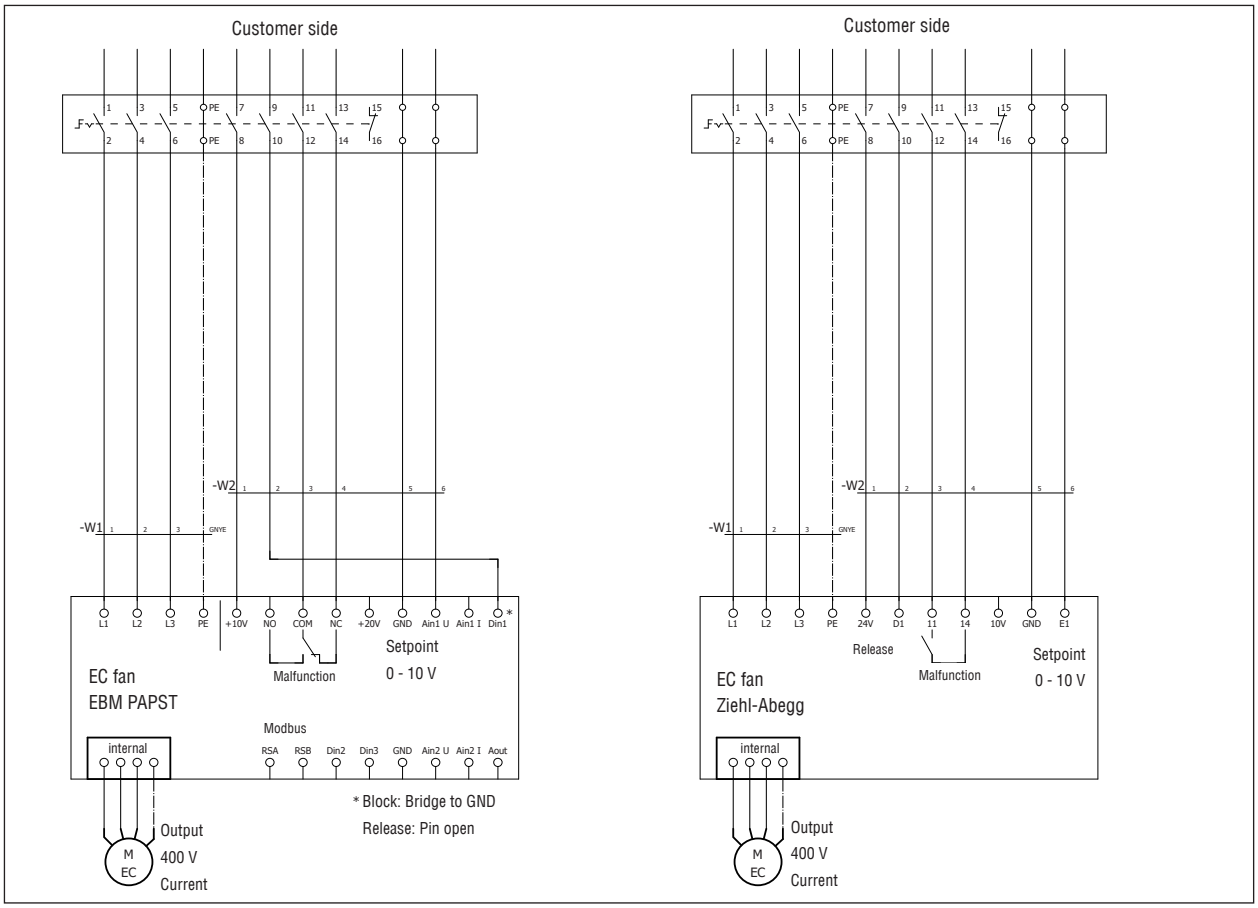


Fig. 51 Connection of EC fans from EMB Papst (left) or Ziehl-Abegg (right)

ATTENTION

The connection diagrams in fig. 49 are intended for illustration only. The actual connection diagram for the specific installation is to be found in the installation documentation and applied.

- The motors are generally equipped with internally connected temperature monitors.
- If the motor is operated via a FC or EC technology, the combination can be secured using a residual current circuit breaker. For this purpose, an all-current sensitive residual current circuit must be selected.

The following must be observed when operating EC fans:

1. The EC motor has integrated protection functions that automatically switch off the motor in case of a fault. No upstream motor protection device is required.
2. Enter the release for the EC motor via the control signal or via the control input 0-10 V (system-related).
3. Do not switch on and off the motor (e.g. in cyclic operation, operational switching) via the mains. In the event of an accident (e.g. fire), the motor can be switched off on the mains side.
4. To avoid electromagnetic interference, care must be taken to ensure a sufficient distance between the mains and control lines.
5. Observe the operating and assembly instructions from the EC fan manufacturer.
6. Installation in accordance with the EMC Directive must be guaranteed.

5.11.2 Connection of electric air heater

⚠ WARNING



Risk of injuries due to incorrect or faulty connection.

- Only have the electrical connection carried out by an approved electrician.
- Only have assembly, servicing and maintenance carried out by qualified staff.
- Wear personal protective equipment.

⚠ CAUTION



Risk of burns due to contact with the hot electric air heater.

- Wait until the hot electric air heater has cooled down.
- Wear personal protective equipment.

⚠ CAUTION



Risk of fire due to foreign objects on the electric heating coil

- Before commissioning, check the electric heating coil for foreign objects.

Special instructions for electric air heaters:

- For the use of an electric air heater, DIN VDE 0100-420 must be observed.
- A separate mains supply is required for the electric air heater.
- Always carry out the electrical connection of the air heater according to the circuit diagram.
- Observe the operating instructions of the electric air heater manufacturer.
- The electric air heater may only be operated in combination with a flow monitor (positioning and adjustment is carried out on-site).
- The temperature monitor and the safety temperature limiter are to be integrated into the control circuit of the electric air heater.
- In the case of speed-controlled fans, the power of the electric air heater must be reduced accordingly.
- After any power failure or fault messages, the installation is to be checked for damage and replacement measures must be taken where necessary.

ATTENTION



It is critical to avoid accumulated heat in the area of the electric air heater.

Damage caused by excessively high temperatures due to accumulated heat is excluded from the warranty.

5.11.2.1 On-site retrofitting of electric air heaters

When retrofitting on site, the following distances to other components must be observed:

Clear unit height (grid)	Clear unit height (mm)	Distance to other components
to BG 16	to 1224 mm	300 mm
greater than BG 16	---	450 mm

5.11.2.2 Frequent causes of error for accumulated heat with electric air heaters

Cause	Remedy
No air volume flow	Heater groups may only be released when a sufficient air flow is conveyed via the heater —> Use of a volume flow monitor AL-KO THERM recommends the integration of the electric air heater control into the repair switch circuit (auxiliary switch)
Insufficient air volume flow through controlled fans	The heating capacity must also be adjusted in accordance with the reduced air volume flow —> Infinitely variable control of the heating energy or switching of heating groups according to the specified air volume flow
Temperature monitor is not connected	During commissioning, the function of the temperature-related shutdown must be checked
Safety temperature limiter is not connected	During commissioning, the shutdown function must be checked
No fan delay	It is imperative that the fans have a delay of min. 5 minutes after switching off the electric heating. Alternatively, the fan delay can also be controlled using a thermostat.
Incorrect commissioning – Checking the electric heater without sufficient air flow due to closed flaps or false air, for example	Ensure that there is always a sufficient air volume flow at the heating coil during testing
Air temperatures above 60 °C	Ensure that the air temperatures do not exceed 60 °C at any time. The air temperature in normal operation (continuous operation) must not exceed 40 °C

5.11.3 LED lamp connection

DANGER



Hazard due to electric current.

Incorrect connection to the power supply or incorrect installation of electrical components can result in electric shock.

- Only have the electrical connection carried out by an approved electrician.
- Perform the connection exactly according to the circuit diagram and the assignment plan.
- Observe the valid DIN and VDE regulations.
- Observe the directives of the local energy supply company.
- Use the personal protective equipment when working on the installation.
- Use other protective equipment according to the work carried out.
- Do not operate the unit with defective or damaged cables or plugs.
- Regularly check the connection cables for damaged areas.
- Use only the permissible tool.
- Shut off the power supply for maintenance work and secure it to prevent restart.
- Observe the electrical safety regulations.

WARNING



Risk of injuries due to incorrect or faulty connection.

- Electrical connections must only be undertaken by a certified electrician under consideration of the valid DIN and VDE regulations as well as the directives of the local energy supply company.
- Only have assembly, servicing and maintenance carried out by qualified staff.
- Wear personal protective equipment.

- For the line protection of the lamp wiring, a max. prefuse of 2 A is required.
- The LED lamp is pre-wired to a junction box at the factory. The cross connection between the junction box or junction box to the light switch is to be wired on-site.

6 Commissioning

ATTENTION



Commissioning protocol

During commissioning, all functions are checked, logged and signed by the operator. Transfer of the operating and assembly instructions is also confirmed on signing. These documents must be attached to the unit documentation.

6.1 Principles

⚠ WARNING





Accident and injury risk due to human misconduct

Failure to observe the safety instructions, standards, directives and regulations leads to a risk of injury.

- Disconnect the AT4F unit from the mains power supply on all poles and secure it to prevent restart before starting any repair or maintenance work.
- Wear personal protective equipment.
- The maintenance instructions in the operating and assembly instructions for the AL-KO THERM AT4F Series central ventilation units must be observed under all circumstances.
- Have installation, commissioning, servicing and maintenance work carried out only by qualified staff.
- Observe standards and directives.

ATTENTION



AL-KO THERM generally recommends the replacement of all installed filters after a short period of operation of the AC unit in order to remove any dirt that may have entered the filters during the installation phase and after commissioning.

NOTE



Observe the operating and assembly instructions for the individual field devices/components.

Before commissioning, always ensure the following:

- that the unit has been installed as described in these operating and assembly instructions (see chapter "5 Assembly" on page 26).
- All filter elements are properly installed. Check the tight fit of all installed filters, in particular the fine dust filters.
- that the duct system and the water and drain pipe are properly connected to the unit.
- The fresh air inlet is at a sufficient distance from contamination sources (kitchen hood extraction, central dust extraction, etc.).
- that the electrical installations have been implemented completely and professionally.
- that all media connections have been professionally connected and are leak-tight.

6.2 Before a system start

⚠ WARNING



To be carried out by the person responsible:

- After carrying out the work, ensure that there are no longer any persons in the installation.
- Before commissioning the installation, ensure that all factory-installed protective measures are functioning correctly.

⚠ WARNING



Risk of injuries due to fan delay.

- Only open the inspection doors only when the fans are switched off and stationary.
- Observe the delay time of the fans. Observe a waiting time of 3 minutes, until the fan impellers are stationary, before opening the inspection doors.
- Never brake the impellers of the fans by hand or using an object.

⚠ WARNING



Risk of injury from fan during fan test run.

- Never disassemble or bypass safety installations.
- Work with care.
- Remove any loose parts in the air handling unit.
- Eliminate tripping hazards.
- Maintain the safety distance.
- Do not remain in the debris shadow when the fan starts up.
- Wait until the fan impeller has come to a standstill.
- Perform a vibration measurement of the fan impeller. If the permissible vibrations are exceeded, no commissioning may take place. Observe the table with the respective vibration values (see chapter "3.2 Technical data" on page 16). Contact our customer service if necessary.

  Phone: +49 8225 39 - 2574
  E-mail: service.center@al-ko.com
  Web: www.al-ko.com

- Carry out a visual inspection for cracks in the impeller.
- Wear personal protective equipment (ear protection).
- Never brake the impellers of the fans by hand or using an object.

⚠ CAUTION



Risk of fire due to foreign objects on the electric heating coil

- Before commissioning, check the electric heating coil for foreign objects.

ATTENTION



Hygienic and toxological concerns may arise during 100% recirculation air operation due to the contamination of the waste air with pollutant gases. A minimum outdoor air volume flow must therefore be ensured during recirculation air operation.

ATTENTION



Check seals before commissioning and apply seals when fans are running.

Before starting up the system, check:

- Mechanical function of the multi-leaf dampers.
- Tight fit of all installed filters.

NOTE



AL-KO THERM generally recommends the replacement of all installed filters after a short period of operation of the AC unit to remove any dirt that may have entered the filters during the installation phase and after commissioning (see chapter "7.4 Replacing components" on page 119).

Use only original spare parts.

Customer Service
Phone: +49 8225 39 - 2574
E-mail: service.center@al-ko.com
Web: www.al-ko.com

- Before commissioning the rotary heat exchanger, make sure that no objects or excessively compressed seals impede the free running of the thermal mass.
- Bypass damper for mechanical function (plate heat exchanger).
- Fan on foreign objects and easy running.
- Heat exchangers for contamination, damage and leakage of the media connections.
- Each condensate drain must be connected to the drain system by a separate siphon. Direct connection of water drains to the drain system is not permitted.
- Fully assemble the unit and commission it according to the commissioning protocol.
- Inspection doors/inspection covers must be closed.

6.2.1 Commissioning of the electric heating coil

ATTENTION



Electric heating coil

Check safety chain: Test the function of the flow monitor and temperature monitor and adjust these if necessary. This is the only way to ensure safe operation of the air handling unit.

- Observe the operating instructions of the manufacturer.

6.2.2 Commissioning of fans

⚠ WARNING



Risk of injury caused by impeller breakage

Operation with impermissibly high vibration values, in particular with fans without spiral housing, can result in impeller breakage, which can lead to serious property damage and personal injuries.

- Perform a vibration measurement of the fan impeller regularly and document the checks. If the permissible vibrations are exceeded, no operation may take place. Observe the table with the respective vibration values.
- When operating with a frequency converter, the frequency converter should generally be operated without overmodulation.
- During commissioning, determine the resonance speeds and eliminate them, e.g. by hiding the frequencies on the frequency converter.
- Do not operate fans in the range of the resonance speed (and its multiples) of the fan motor system.
- Operation with impermissibly high vibration values can result in impeller breakage, which can lead to serious property damage and personal injuries. AL-KO THERM recommends continuous monitoring using a vibration sensor (available as an option).

ATTENTION



- Danger of motor overloading with an incorrect direction of rotation.
- Power consumption must not exceed the specified nominal current.
- Maximum motor speed must not be exceeded.
- Maximum fan speed must not be exceeded.
- Above a rated motor output of 3 kW: Star-delta starting.

- Observe the operating instructions of the manufacturer.

6.2.2.1 Commissioning of fans with belt drive

- Remove transport locks from the fan base frame.
- Inspect the duct system and fan for foreign objects.
- Check the impeller moves freely by turning it by hand.
- Check the fan rotation direction (see arrow on fan housing) by briefly switching on the motor (caution with open door).
- If necessary, reverse the motor polarity and correct the rotation direction.
- Measure the power consumption with closed maintenance doors and compare to the nominal current specified on the motor type plate.
- Perform a protective earthing conductor test.
- Check for loose components (correctly tightened taper-lock clamping bushes, screws on the motor substructure/ pressure bulkhead, see chapter "7.3.13.4 Fan with belt drive" on page 113

Belt drive commissioning

- Check the belt tension and re-tighten if necessary.
- Check alignment (flush) of the V-belt pulleys.
- Check the belt drive and set the required belt tension.
- Check the frictional seating of the pulleys and their exact alignment (parallelism).
- After approx. 1 hour, check the V-belt pulley, motor and fan screws and, if necessary, retighten, check the belt tension and, if necessary, tighten, see the clamping specification for the belt drives.

ATTENTION



Incorrectly tensioned belt drives can cause bearing damage to the fan and the electric motor. From a standstill time of 3 months, the belt drives must be relaxed or removed to avoid bearing damage, otherwise the warranty will be voided.

If the belt drive is changed without AL-KO THERM design, the limit speeds of the fan and the limit value diagrams for the belt tension forces in the respective technical catalogue must be observed.

6.2.2.2 Commissioning of fan free-wheel with direct drive

- Remove transport locks from the fan base frame.
- The unit must be inspected for transport damage before commissioning.
- The impeller must not touch the fan inlet nozzle. Check the impeller moves freely by turning it by hand.
- Check the fan rotation direction (see arrow on fan housing) by briefly switching on the motor (caution with open door).
- If necessary, reverse the motor polarity and correct the rotation direction.
- Measure the power consumption with closed maintenance doors and compare to the nominal current specified on the motor type plate.
- Perform a protective earthing conductor test.
- Check for loose components (correctly tightened taper-lock clamping bushes, screws on the motor substructure/ pressure bulkhead), see chapter "7.3.13.4 Fan with belt drive" on page 113

6.2.3 Commissioning of rotary heat exchanger

Before commissioning (especially with horizontal rotors), make sure that no objects or excessively compressed seals are blocking free running.

- Check drive V-belt for tension.
- Check correct position of the belts.
- Further information can be found in the manufacturer's documentation.

Observe the rotation direction of the rotary heat exchanger in conjunction with a flushing chamber (optional):

Make sure that the thermal mass always rotates from the exhaust air via the flushing chamber into the supply air. This rotation direction of the thermal mass is identified by a marking.

ATTENTION



Check the rotation direction during commissioning.

Check the seals

ATTENTION



Check seals before commissioning and apply seals when fans are running.

The seals must be pushed as close to the thermal mass as possible, but direct grinding must be avoided.

The rotary heat exchangers are equipped with low-maintenance brush seals, but the seal can still be impaired by transport or installation.

- Check the seals for damage and correct seating.

NOTE



Observe the manufacturer's documentation.

6.2.4 Commissioning of circulating coil system CCS (recuperative energy recovery)

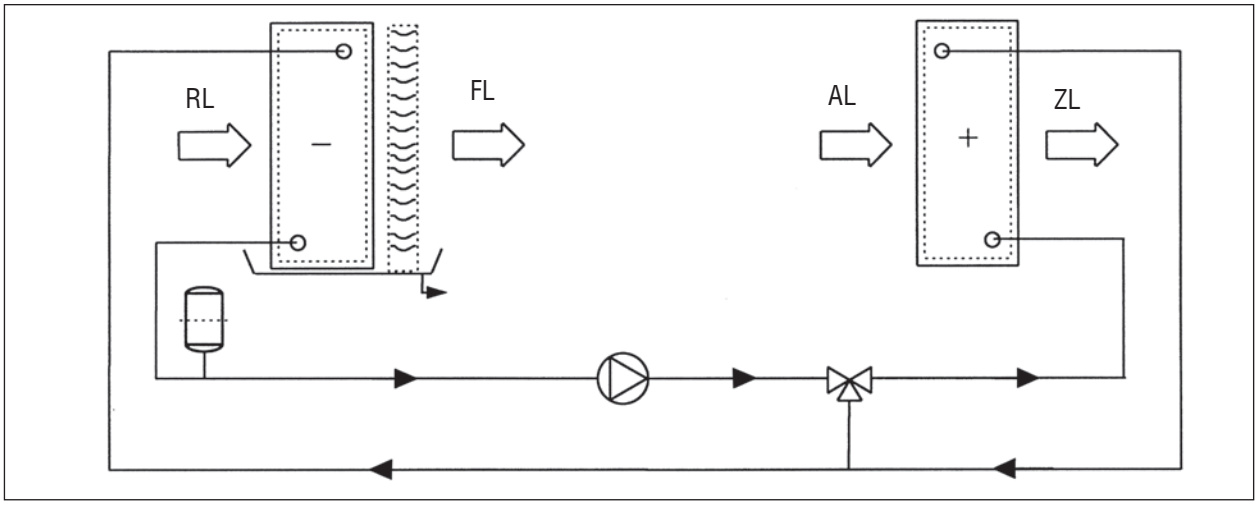


Fig. 52 Schematic diagram of a circulating coil system

ATTENTION



When using high-performance circuit heat recovery systems, observe the manufacturer's operating instructions.

ATTENTION



During commissioning, observe chapter "5.10.5 Filling and venting" on page 62.

- Piping must be provided on-site.
- Circulating pump must be dimensioned according to the technical data sheet.
- Heat exchangers must be connected in the counterflow principle.
- In the case of two-part heat exchangers, their pipe or screw connections are to be retightened in the air handling unit and tested for leak-tightness.
- Antifreeze concentration must correspond to the specifications on the technical data sheet.
- The pre flow is at the top or bottom, depending on the air direction.
- We recommend the use of the antifrogen N with a mixture of 25 – 35 %.
- During the pressure test, the entire installation must be checked for leakage.
- It is to be rinsed until no more residual particles and scale are flushed out.

6.2.5 Commissioning of spray humidifier (air washer)

ATTENTION



If a spray humidifier (air washer) is installed, a siphon must be installed on-site, see chapter "5.10.3 Condensate drain connection via siphon" on page 60.

NOTE



AL-KO THERM recommends the installation of electric dry run protection for the water circulation pump.

Install the spray humidifier as the last component in the air handling unit directly at the entry to the duct network.

NOTE



Observe the manufacturer's documentation.

- Inspect the spray humidifier for completeness and possible transport damage.
- Remove any coarse soiling from the humidifier tray and check the proper seating of the pump screen.
- Check the spray direction and proper seating of the vaporiser nozzles.
- Fill the humidifier tray to approx. 10 mm below the upper edge of the siphon or overflow nozzle and then set the float of the float valve to this water level.
- Check the function of the drain and overflow and clean the dirt trap and siphon.
- Check the direction of rotation of the water circulation pump.
- Check the screw and flange connections of the pump pressure line for leaks.
- In the case of a manual blow-down procedure, adapt the blow-down rate indicated by the manufacturer to the quality of the water used.
- Check the installation of the water filter.
- Check the droplet eliminator for dielectric strength.
- The specified water quality must be maintained at all times and corrected at regular intervals.
- If the volume flow rate is reduced (e.g. when using a frequency converter), be sure to also reduce the pump output.

ATTENTION



The rotation direction of the water circulation pump may only be checked with the washer tray full. The water level in the humidifier tray must be sufficient to prevent any dry running of the water circulation pump.

The blow-down rate is reduced by 50 % when using fully desalinated water. When using droplet eliminators made from plastic profiles, a slight breakthrough of water may occur for a short time in exceptional cases as the surface is not yet weathered due to the production method. Weathering occurs after approx. 24 operating hours.

6.2.6 Commissioning of the contact humidifier

NOTE



Observe the manufacturer's documentation.

6.2.6.1 Fresh and circulation water systems in contact humidifier

ATTENTION



- A pressure reducer, a water filter (150 µm) and a shut-off valve are to be installed on-site upstream of supply solenoid valve. Constant water pressure between 1.5 and 6.0 bar.
- When connecting to the drinking water mains, a pipe separator installation type 2 is required in accordance with EN 1717 "Technical regulations for drinking water installation".
- The pan drain must be connected to the drain system on-site via a siphon. In accordance with VDI 6022, an open drain is required downstream of the siphon in the on-site drain pipe.
- The water quality for the contact humidifier must be ensured according to the manufacturer's data.

- Check the assembly of the contact humidifier. Are all water distribution hoods hooked in and locked with the safety snap closures?
- Check installation of the contact humidifier and assembly of accessories.
- Check water and wastewater installation.
- Check the electrical connections.
- Fill the siphon with water.
- The water tank must be clean and free of any foreign objects. Metal chips, in particular, can lead to corrosion and damage.
- Adjust the water pressure on the pressure reducer.
- Open the shut-off valve and solenoid valves and check all connections for leaks.
- Adjust the water flow rates (l/min) to the individual cassettes on the balancing valves.

Additionally for circulation water system

- Check the rotation direction of the circulation pump.
- Adjust the desalination rate.
- Adjust the cleaning rinse run.
- Adjust the water intake amount on the pressure reducer.

6.2.7 Commissioning of high-pressure humidifier

ATTENTION



- Prescribed maintenance interval 2x per year
- Before starting the maintenance work, the installation is to be taken out of operation.
- Oil change of the pump after the first 50 operating hours. Then every 500 operating hours.
- Gear oil according to manufacturer's data

NOTE



Observe the manufacturer's documentation.

- Check the assembly of the high-pressure humidifier.
- Check installation of the high-pressure humidifier and assembly of accessories.
- Check water and wastewater installation.
- Check the electrical connections.
- Fill the siphon with water.
- The water tank must be clean and free of any foreign objects. Metal chips, in particular, can lead to corrosion and damage.
- Check the construction of the pump unit and wiring of HD connections. Check the pressure and adjust if necessary.

6.2.8 Commissioning of steam humidifier

ATTENTION



The water quality for the steam humidifier must be ensured according to the manufacturer's data.

NOTE



Observe the manufacturer's documentation.

- Inspect the steam humidifier for soiling, damage and corrosion.
- Check the steam and condensate pipe for leakage.
- Check the function of the steam distributor.
- Check the function of the solenoid valves.
- Check the measuring and control devices.

Steam humidifier with separate steam generator:

- Check the function of the water supply and water level.
- Measure power consumption.

Steam humidifier without separate steam generator:

- Check the function of the control valve.
- Readjust the stuffing box of the control valve.

NOTE



The company AL-KO THERM does not assume any warranty for on-site steam humidifier installations or on-site housing bushings as well as improper treatment of the base tray and improperly connected drainage connections. This also applies to improperly operated humidifiers or humidifier output.

6.2.9 Commissioning of the combustion chamber

NOTE



Observe the manufacturer's documentation.

- Check the tightness of all media connections.
- Carry out commissioning according to the manufacturer's data.

6.2.10 Commissioning of UV disinfection

⚠ WARNING



Risk of injury to eyes and skin due to UV radiation.

- Work on the unit may only be carried out by authorised persons.
- De-energise the unit before opening it for maintenance work.
- Avoid direct eye contact with the UV lamp.

NOTE



Observe the manufacturer's documentation.

- Carry out commissioning according to the manufacturer's data.

6.3 Switching the installation on/off

⚠ WARNING



Risk of severe injuries or death.

Working on the AT4F unit can result in serious injury or death.

- After switching off via the main switch, no safety functions of the unit are then guaranteed (e.g. frost protection).
- Never use the main switch to switch it on and off during operation.
- Use the main switch only for repair purposes.

- The main switch connects the installation to the mains power supply. This means that all control and regulating modules are ready for operation.

6.4 After system start

NOTE



Further information on the control of the AT4F unit can be found in the AL-KO THERM operating manual/functional description for "Control ART TECH LEVEL II".

⚠ WARNING



Risk of injuries due to fan delay.

- Only open the inspection doors only when the fans are switched off and stationary.
- Observe the delay time of the fans. Observe a waiting time of at least 3 minutes, until the fan impellers are stationary, before opening the inspection doors.
- Never brake the impellers of the fans by hand or using an object.

- Check the valves of the heat exchangers to see if they are in the correct position. If this is not the case, the direction of rotation of the valve actuators must be changed if necessary.
- Set the time, date, average and low air performance, and program the weekly schedule.

7 Servicing and maintenance

7.1 Safety instructions for servicing and maintenance

⚠ WARNING





Risk of injuries.

- Disconnect the AT4F unit from the mains power supply on all poles and secure it to prevent restart before starting any repair or maintenance work.
- Close the media supply (water, gas, etc.) before all repair and maintenance work.
- Follow the applicable safety rules.
- Have installation, commissioning, servicing and maintenance work carried out only by qualified staff.

To be carried out by the person responsible:

- After carrying out the work, ensure that there are no longer any persons in the installation.
- Before restarting the installation, ensure that all factory-installed protective measures are functioning correctly.

⚠ WARNING



Risk of cuts

There is a risk of cutting injuries during cleaning and maintenance of the AT4F unit.

- Wear personal protective equipment (cut-proof gloves).

⚠ WARNING



Risk of slipping! Leaked medium/condensate

- Immediately take up the spill quantity and dispose of it properly.

⚠ WARNING



Risk of injury from falling from ladders, scaffolding or work platforms.

- Only use suitable and tested ladders, steps, scaffolding and work platforms.
- Work with care.

⚠ WARNING



Risk of injuries due to fan delay

- Only open the inspection doors only when the fans are switched off and stationary.
- Observe the delay time of the fans. Observe a waiting time of at least 3 minutes, until the fan impellers are stationary, before opening the inspection doors.
- Never brake the impellers of the fans by hand or using an object.

⚠ CAUTION



Risk of burns as a result of contact with hot surfaces and media (plate heat exchanger, heat exchanger and electric heating coil)

- Wait until the hot surfaces have cooled down.
- Wear personal protective equipment.

NOTE



The owner of an AC installation is obliged to have the system maintained regularly by qualified staff.

AL-KO THERM recommends that maintenance is carried out in accordance with German VDI 6022 and VDMA 24186.

In addition, a hygiene inspection in compliance with VDI 6022 is required every 3 years.

Upon conclusion of a maintenance contract, AL-KO THERM undertakes these tasks.

Customer Service
Phone: +49 8225 39 - 2574
E-mail: service.center@al-ko.com
Web: www.al-ko.com

ATTENTION



Only use original consumables and spare parts. This is the only way to ensure safe operation.

Otherwise the warranty will be voided.

A spare parts list can be found as part of the unit documentation.

Customer Service
Phone: +49 8225 39 - 2574
E-mail: service.center@al-ko.com
Web: www.al-ko.com

7.1.1 Qualifications of personnel

Constant adherence to the hygiene requirements and execution of the operation and maintenance measures required for this in AC installations necessitate corresponding personnel qualifications. Demanding operating activities as part of maintenance as well as inspections and repairs must only be performed by trained qualified staff.

- Special training courses for "simple hygiene activities" (also called category B) and "demanding hygiene activities" (also called category A) are offered for these activities.
- Only qualified staff who have successfully completed this training is authorised to perform hygiene activities.

The tasks involved in maintenance measures are described in greater detail in the following table:

Grouping of the measures (according to VDMA)		
Inspection Objectives of the measures (according to DIN 31 051)	**Maintenance Objectives of the measures (according to DIN 31 051)**	**Repair Objectives of the measures (according to DIN 31 051)**
Determining and assessing the actual condition	Maintaining the nominal condition	Restoring the nominal condition
Individual measures	**Individual measures**	**Individual measures**
Checking, measuring, assessing	Checking, adjusting, replacing, adding, lubricating, preserving, cleaning	Repairing, replacing
Execution by	**Execution by**	**Execution by**
Technicians, engineers, skilled trades-persons	Trained personnel (limited deployment), Specialists, qualified personnel	Specialists, qualified personnel
Required training on hygiene in accordance with VDI 6022 Sheet 4	**Required training on hygiene in accordance with VDI 6022 Sheet 4**	**Required training on hygiene in accordance with VDI 6022 Sheet 4**
Category A	Category B	Category B

7.2 Maintenance instructions in accordance with VDI 6022 and VDMA 24186

- The owner/operator is obliged to have the installation maintained regularly by qualified staff.
- The operating and assembly instructions for the installed parts must be observed under all circumstances (request them if necessary).

7.2.1 Initial and repeat inspections must only be performed by category A trained qualified staff according to VDI 6022 Sheet 1

Inspections necessitate particular specialist training or technician qualification in the field of supply technology as well as category A training. Hygiene inspections have to be performed regularly to meet these requirements.

Hygiene inspection intervals

- For AC units with humidifier every 2 years
- For AC units without humidifier every 3 years.

We recommend that hygiene specialists are called in for these inspections.

The hygiene inspections include at least the following activities:

- Inspection of the central AC unit, including all components and the rooms supplied via the unit.
- If hygiene deficiencies are discovered: Measurement of physical climate parameters (temperature, humidity, air velocity) at representative points of the AC unit.
- Determination of the total microbial content and the concentration of legionella in the circulated water of humidifier systems.
- In the case of visually noticeable hygiene deficiencies, the causes must be identified and eliminated. If required for determination, perform additional microbiological investigations, e.g. determination of the supply air colony count, semi-quantitative surface investigations or differentiation according to microbe types.

As the result of the hygiene inspection, documentation of the hygiene status of the inspected AC unit and written notification of the inspection result to the owner, including a list of necessary measures, must be drawn up. The date of any necessary follow-up inspection must be defined depending on the urgency of the measures to be performed.

Critical findings exist in the following cases:

- On repeated exceeding of the total microbial counts in the humidifier water (guideline value 1000 CFU/ml)
- On repeated contamination of the humidifier water with moulds
- On Legionella infestation in the humidifier water
- On occurrence of higher microbial counts downline of air conditioning systems than upline
- On visible mould infestation or other microbial coatings

In the event of a critical finding, a hygienist or further specialist personnel must be consulted, and the company physician must be involved.

7.2.2 Performing of hygiene checks during maintenance by Category B trained maintenance personnel in accordance with VDI 6022 Sheet 1

The aim of the hygiene checks to be performed regularly by the maintenance personnel is to determine and eliminate hygiene deficiencies on the air conditioning systems at an early stage through frequent visual inspections or random microbiological self-checks.

The regular hygiene checks include the following measures:

- Visual inspection of the relevant AC area for hygiene deficiencies such as e.g. microbial growth or soiling, rust formation, calcium deposits and damage.
- Check of the total colony count in the circulated water of air humidifiers.

Table 6 in Section 5.5 of VDI 6022 Sheet 1 specifies the type and scope of the checks to be performed, any measures required to eliminate ascertained hygiene deficiencies and the time intervals within which the respective hygiene checks are to be performed.

7.2.3 Maintenance schedule

Hygiene requirements and maintenance, servicing of air conditioning systems in accordance with VDI 6022 and VDMA 24186

	Activity/unit components	Measure / remark	Inspections to be performed at monthly intervals				
			1	3	6	12	24
1	**Hygiene inspection**		**1**	**3**	**6**	**12**	**24**
		To be performed by trained qualified staff in accordance with VDI 6022 Sheet 4	AC systems without humidification: every 3 years AC systems with humidification: every 2 years				
2	**Outdoor air intakes and exhaust air outlets**		**1**	**3**	**6**	**12**	**24**
2.1	Check for soiling, damage and corrosion	Clean completely and repair				X	
3	**Unit housing**		**1**	**3**	**6**	**12**	**24**
3.1	Inspect for soiling, damage and corrosion on the air side	Clean and repair				X	
3.2	Check for water formation (condensate, leaks)	Clean and identify the cause			X		
3.3	Check function of drains	Clean, if necessary				X	
3.4	Check flexible connections for leaks					X	
3.5	Doors and locks for ease of movement and leaktightness	Repair				X	
4	**Air filter**		**1**	**3**	**6**	**12**	**24**
4.1	Check for impermissible soiling, damage (leaks) and odours	Air filters must have a filtration efficiency appropriate to the filter class over their entire operating duration. If there is noticeable soiling or leakage, the filter must be replaced. Replace the air filter concerned if the last change of the filter stage is less than six months ago, otherwise replace the whole filter stage		X			
4.2	Check differential pressure	If the maximum differential pressure is exceeded replace the filter stage	X				
4.3	Latest filter change with non-regenerative air filters, otherwise thorough cleaning					X	
	1st filter stage					X	
	2nd filter stage						X
4.4	Check the hygiene condition					X	
5	**Humidifier**		**1**	**3**	**6**	**12**	**24**
		Measures must be taken to ensure that water cannot get behind the humidifier unit at any time during operation.					
5.1	**Evaporation and rotary spray humidifier**	**The infeed water must satisfy a minimum of the Drinking Water Standards, and must not exceed a total hardness of 7° dH**	**1**	**3**	**6**	**12**	**24**
5.1.1	Check for soiling, damage and corrosion	Clean and repair	X				
5.1.2	Determine the colony count in the humidifier water (dip slides)	With colony counts > 1000 CFU/ml: Wash with cleaning agent, rinse and dry the tray, disinfect if necessary	14 - day				
5.1.3	Inspect the vaporiser nozzles for deposits	Clean nozzles or replace, if necessary	X				
5.1.4	Check the dirt trap for condition and function	Clean and repair		X			

	Activity/unit components	Measure / remark	Inspections to be performed at monthly intervals				
			1	3	6	12	24
5.1.5	Check for flocculation in the bottom of the air humidifier tray	Clean drip tray	X				
5.1.6	Inspect the circulation pump for soiling and coating formation in the intake line	Clean pump circuit		X			
5.1.7	Check function of blow-down device	Adjust the blow-down device			X		
5.1.8	Check the function of the conductivity measuring cell	Repair	X				
5.1.9	Check function of disinfection system	Repair			X		
5.1.10	Check function of water supply and distribution	Repair			X		
5.1.11	Check water level	Top up			X		
5.1.12	Adjust water level regulation facility					X	
5.1.13	Check function of drain and overflow	Repair		X			
	Droplet eliminator		**1**	**3**	**6**	**12**	**24**
5.1.14	Inspect on the air side for soiling and damage	Function-preserving cleaning of all surfaces, including drip trays; dismantle the droplet eliminator, if necessary	X				
5.1.15	Inspect the droplet eliminator for coating formation	Function-preserving cleaning in the event of visible encrustation, dismantle droplet eliminator if necessary	X				
5.1.16	Check function of water drain and odour trap	Clean and repair				X	
5.2	**Steam humidifier with separate steam humidifier and without separate steam humidifier**	**To be operated in such a way that no condensate can enter the air line system. Steam must not contain any harmful substances.**	**1**	**3**	**6**	**12**	**24**
5.2.1	Inspect for soiling, damage and corrosion	Clean and repair, disinfect if necessary		X			
5.2.2	Check for condensate deposit in the humidifier chamber	Determine the causes and eliminate them, clean the steam humidifier	X				
5.2.3	Wash with cleaning agent, rinse and dry the humidifier chamber, disinfect if necessary				X		
5.2.4	Check the dirt trap for condition and function	Clean and repair			X		
5.2.5	Check the steam lance for deposits	Clean			X		
5.2.6	Check the condensate drain	Clean and repair		X			
5.2.7	Check function of control valve	Repair			X		
5.2.8	Check the hygiene condition	Wall surface, pans			X		
5.2.9	Check the steam cylinder for deposits	If necessary, regenerate or replace			X		
5.2.10	Check steam pipes and condensate line for leaks and damage	Repair			X		
5.3	**Ultrasonic, atomizing and hybrid humidifier**		**1**	**3**	**6**	**12**	**24**
5.3.1	Check for soiling, incrustation, damage and corrosion	Clean and repair, disinfect if necessary		X			
5.3.2	Clean water tank				X		
5.3.3	Check function of electrical system	Repair			X		
5.3.4	Check function of the energy converter (only for ultrasonic humidifiers)	Replace			X		
5.3.5	Check function of water supply and distribution	Repair			X		

	Activity/unit components	Measure / remark	Inspections to be performed at monthly intervals				
			1	3	6	12	24
5.3.6	Check pump (only for atomizing and hybrid humidifiers)	Repair			X		
5.3.7	Check the hygiene condition	Wall surfaces and pans			X		
6	**Droplet eliminator**		**1**	**3**	**6**	**12**	**24**
6.1.1	Inspect on the air side for soiling and damage	Function-preserving cleaning of all surfaces, including drip trays; dismantle the droplet eliminator, if necessary	X				
6.1.2	Inspect the droplet eliminator for coating formation	Function-preserving cleaning in the event of visible encrustation	X				
6.1.3	Check function of water drain and odour trap	Clean and repair				X	
7	**Heat exchangers, general**		**1**	**3**	**6**	**12**	**24**
		If cleaning in installed state is not sufficient, the heat exchanger must be pulled out and cleaned accordingly					
7.1.1	Check for soiling, damage and corrosion	Clean and repair		X			
7.1.2	Check wet cooler, condensate drip tray and droplet eliminator for soiling, corrosion and function	Repair		X			
7.1.3	Check function of siphon	Repair		X			
7.1.4	Check the hygiene condition					X	
7.2	**Air heater**		**1**	**3**	**6**	**12**	**24**
7.2.1	Inspect on the air side for soiling, damage and corrosion	Repair		X			
7.2.2	Clean to preserve function (air-side)					X	
7.2.3	Check function of flow and return flow					X	
7.2.4	Venting					X	
7.3	**Electric air heater**		**1**	**3**	**6**	**12**	**24**
7.3.1	Check for scale deposits and corrosion	Clean and repair			X		
7.3.2	Clean to preserve function (air-side)					X	
7.3.3	Check functionality	Repair				X	
7.3.4	Check control and safety equipment for correct function	Repair				X	
7.4	**Air cooler (air/liquid) dehumidifier evaporator (air/refrigerant)**	**The siphon with backflow protection must be dimensioned according to the pressure conditions and located in such a way that the condensate can drain off without delay**	**1**	**3**	**6**	**12**	**24**
7.4.1	Inspect for soiling, damage and corrosion	Clean and repair			X		
7.4.2	Inspect wet cooler, condensate pan and droplet eliminator for soiling, corrosion and function. Check function of siphon	Repair		X			
7.4.3	Clean wet cooler, droplet eliminator and drip trays					X	
7.4.4	Check function of flow and return flow					X	
7.4.5	Venting	(with liquid only)				X	
7.4.6	Check for icing	(at the evaporator only) only possible during operation				X	
7.4.7	Check the hygiene condition					X	

	Activity/unit components	Measure / remark	Inspections to be performed at monthly intervals				
			1	3	6	12	24
	Droplet eliminator		**1**	**3**	**6**	**12**	**24**
7.4.8	Inspect for soiling damage and coating formation	Function-preserving cleaning of all surfaces, including drip trays; dismantle the droplet eliminator, if necessary	X				
7.4.9	Inspect the droplet eliminator for coating formation	Function-preserving cleaning in the event of visible encrustation	X				
7.4.10	Check function of water drain and odour trap	Clean and repair				X	
8	**Heat recovery, general**		**1**	**3**	**6**	**12**	**24**
		Heat exchangers and their accessories must be checked periodically for airborne contamination, corrosion and damage.					
8.1.1	Check for soiling, damage and corrosion	Clean and repair			X		
8.1.2	Leaktightness between exhaust and outdoor air Check	Repair		X			
8.1.3	Inspect condensate pan and droplet eliminator for soiling, corrosion and function	Repair		X			
8.1.4	Check function of siphon	Repair		X			
8.1.5	Clean wet cooler, droplet eliminator and drip tray				X		
8.1.6	Check the hygiene condition					X	
8.2	**Rotary heat exchanger**		**1**	**3**	**6**	**12**	**24**
8.2.1	Inspect on the air side for soiling and corrosion	Clean and repair			X		
8.2.2	Function-preserving cleaning	The rotors can be cleaned off using compressed air. In this process, the air jet must act on the thermal mass at right angles.				X	
8.2.3	Check rotor for unbalance					X	
8.2.4	Check bearings for noise	The ball bearings used are low-maintenance and designed for running times of up to 100,000 hours. They can generally be used up to 120 °C				X	
8.2.5	Grease bearings using a relubrication	Only with bearings with relubrication device				X	
8.2.6	Check the function of the sealing element	The brush seals on the thermal mass are factory-set			X		
8.2.7	Check for hygienic condition					X	
8.2.8	Check drive elements					X	
8.3	**Cross-flow heat exchanger**		**1**	**3**	**6**	**12**	**24**
8.3.1	On the air side, check for soiling, damage and corrosion	Clean and repair			X		
8.3.2	Clean to preserve function (air-side)					X	
8.3.3	Check function of cleaning equipment	Repair, if available				X	
8.3.4	Check for hygienic condition					X	
	Droplet eliminator		**1**	**3**	**6**	**12**	**24**
8.3.5	Inspect on the air side for soiling and damage	Function-preserving cleaning of all surfaces, including drip trays; dismantle the droplet eliminator, if necessary	X				
8.3.6	Inspect the droplet eliminator for coating formation	Function-preserving cleaning in the event of visible encrustation, dismantle droplet eliminator if necessary	X				

	Activity/unit components	Measure / remark	Inspections to be performed at monthly intervals				
			1	3	6	12	24
8.3.7	Check function of water drain and odour trap	Clean and repair				X	
9	**Sound absorber**		**1**	**3**	**6**	**12**	**24**
		Sound absorbers are to be inspected externally at periodic intervals for soiling, damage and corrosion. If it is not possible to see inside the sound absorbers, they must be removed.					
9.1	Inspect sound absorbers for soiling, damage and corrosion	Repair				X	
9.2	Inspect the inner air line surface for soiling and corrosion at two to three representative points	Determine the cause and clean the corresponding air line sections				X	
10	**Dampers**		**1**	**3**	**6**	**12**	**24**
10.1	Check for soiling, damage and corrosion	Clean and repair				X	
10.2	Check the mechanical function	Repair				X	
10.3	Actuators	Function check				X	
11	**Fire prevention dampers if installed in the unit**		**1**	**3**	**6**	**12**	**24**
		The test certificate must also be observed See also VDMA 24186 Part 7					
11.1	Check flaps for ease of movement	Repair				X	
11.2	Check engagement device for soiling and function	Clean, if necessary				X	
11.3	Check trigger element for soiling and function	Replace trigger element if necessary				X	
11.4	Check seals for soiling and damage	Clean and repair				X	
11.5	Actuators, position indicator	Function check				X	
12	**Fans**		**1**	**3**	**6**	**12**	**24**
		The fan and drive units must be checked periodically for soiling, damage and corrosion					
12.1	Check for soiling, damage and corrosion Check the impeller, particularly welding seams, for possible cracking.	Clean and repair			X		
12.2	Function-preserving cleaning of the water drain and parts of the fan that come into contact with air					X	
12.3	Vibration check!				X		
12.4	Check bearings for noise					X	
12.5	Grease bearings using a relubrication device					X	
12.6	Check flexible connection for leaks	Repair				X	
12.7	Check function of vibration dampers	Repair				X	
12.8	Drive elements	See item 12					
12.9	Instrument and control facilities	Check the function of pressure/volume flow controllers				X	
13.	**Drive elements**		**1**	**3**	**6**	**12**	**24**
13.1	**Electric motors**		**1**	**3**	**6**	**12**	**24**
13.1.1	Check the exterior for dirt, secure fitting, damage, and corrosion	Clean and repair				X	

	Activity/unit components	Measure / remark	Inspections to be performed at monthly intervals				
			1	3	6	12	24
13.1.2	Check the direction of rotation (initial commissioning)						
13.1.3	Re-tighten connection terminals					X	
13.1.4	Measure tension	Measured data must be documented in the measurement log				X	
13.1.5	Measure power consumption	Measured data must be documented in the measurement log				X	
13.1.6	Measure phase symmetry	Measured data must be documented in the measurement log				X	
13.1.7	Check bearings for noise					X	
13.1.8	Grease bearings using a relubrication device					X	
13.1.9	Check the function of the protection device	Repair				X	
13.2	**Belt drive**		**1**	**3**	**6**	**12**	**24**
13.2.1	Inspect for soiling, damage and wear	Replace if necessary			X		
13.2.2	Function-preserving cleaning	Scope of services must be defined and agreed upon				X	
13.2.3	Check for tension and alignment	Readjust			X		
13.2.4	Replace belt					X	
13.2.5	Check the function of the protection device	Repair				X	

7.3 Maintaining and cleaning components

All installed components are either freely accessible for cleaning or can be pulled out of the unit or removed after opening the inspection doors/removing the inspection cover.

- Coarse dirt in the housing can be removed using an industrial vacuum cleaner.
- Remove other dirt with a damp cloth.

Cleaning

- Only lukewarm water, possibly with a mild detergent without perfume, should be used for cleaning. Do not use mechanical aids, e.g. sharp tools, grinding stones, wire brushes, files, steel wool made of unalloyed or low-alloy carbon steel, etc.

Disinfection

- If disinfection is necessary with air handling units, a check must be performed at a suitable and non-critical point before using disinfectants to ensure that the disinfectant does not cause damage to the seals, surfaces, etc.

ATTENTION



Only lukewarm water, possibly with a mild detergent without perfume, should be used for cleaning of the inspection glass.

No cleaning agents and disinfectants that attack the materials used in the HV unit are permitted to be used.

The following points are to be observed for the use of disinfectants and for carrying out the disinfection:

- Specifications from the safety data sheet of the disinfectant must be complied with.
- The disinfectant must be used according to the manufacturer's instructions (e.g. concentration, exposure time, etc.).
- Remove the disinfectant completely.
- Dispose of the disinfectant and the necessary aids correctly.
- Disinfectants containing chloride in combination with a strong continuous action of moisture (e.g. areas around spray humidifiers) can cause corrosion damage to (even coated) materials and may not be used in this application.

Also observe the following:

- Do not use a high-pressure cleaner for cleaning or disinfection.
- Detergents or disinfectants must not penetrate into electrical or mechanical system parts.
- If necessary, completely reinstall the protective and safety installations or coverings removed for cleaning or disinfection and check their functionality.

(Subsequent) damage resulting from a nonetheless carried out or incorrect application of corresponding disinfection or cleaning are at the expense of the initiator.

Hygiene checks

The aim of the hygiene checks to be performed regularly is to determine and eliminate hygiene deficiencies on the air conditioning systems at an early stage through frequent visual inspections or random microbiological self-checks.

The regular hygiene checks include the following measures:

- Visual inspection of the relevant unit area for hygiene deficiencies such as e.g. microbial growth or soiling, rust formation, calcium deposits and damage.
- If soiled components are detected during the hygiene checks, these must be cleaned immediately.
- If necessary for cleaning, the inspection glasses of the AT4F unit series can be easily removed and have two lenses.
- If housing covers sealed with sealing material are removed for maintenance purposes, the inside of the housing must be sealed again following maintenance using microbially inert sealing material.

7.3.1 Finned heat exchanger

These include the pump hot water and pump cold water heat exchangers, as well as the evaporators, condensers and steam registers.

⚠ WARNING



Risk of cuts

During maintenance and cleaning of the heat exchanger there is a risk of cuts.

- Wear personal protective equipment (cut-proof gloves).

⚠ CAUTION



Risk of burns as a result of contact with hot surfaces and media (plate heat exchanger, heat exchanger and electric heating coil)

- Wait until the hot surfaces have cooled down.
- Wear personal protective equipment.

⚠ CAUTION



Risk of slipping! Leaked medium/condensate

- Immediately take up the spill quantity and dispose of it properly.

ATTENTION



At temperatures below freezing, the heat exchanger must be either **drained** and blown out with compressed air, or filled with a commercially available antifreeze with corrosion inhibiting additive due to the risk of freezing and corrosion.

ATTENTION



The use of high-pressure water cleaners with conventional single-jet nozzles is not permitted due to the risk of damage.

The heat exchanger is essentially maintenance-free. Regular cleaning of the heat exchangers is necessary in order to ensure their proper function.

Fins of the finned heat exchanger

Dents in the fins of the heat exchanger have no influence on the function of the system as a whole – as long as the pipes of the fin unit are not damaged – and do not constitute grounds for complaints. The fins can be "combed out" on-site. If necessary, the corresponding tool can be obtained from the manufacturer.

NOTE



For the following heat exchanger designs, additional points are to be observed:

Chapter "7.3.1.3 Circulating coil system (heat exchanger with pipe circuits)" on page 97

Chapter "5.9.5 Circulating coil system CCS (recuperative energy recovery)" on page 57

7.3.1.1 Maintenance

- Inspect the heat exchangers on the air side for soiling, damage and corrosion.
- Check connections and screw fittings.
- Check function of flow and return lines.
- Check the venting valve and filling of the heat exchangers.
- Check the function of the frost protection thermostat.
- Check antifreeze concentration and top up if necessary.
- Inspect the siphon and top up, if necessary.
- Check function of water drain and odour trap.
- Inspect the droplet eliminator and clean, if necessary.

NOTE



During prolonged standstills, corrosion can be caused in the heat exchangers by sulphate-reducing bacteria. These sulphides primarily attack the solder seams as well as the copper base material.

We recommend the following measures to reduce this type of copper corrosion:

- Use of sulphate-free water in the whole circuit
- Ensure that the circuit has no leaks
- Avoid prolonged standstills of the filled circuit
- Avoid frequent topping up of fresh water
- Use of material-compatible inhibitors or use of biocides

7.3.1.2 Cleaning

Only methods that do not damage the fins may be used for cleaning of the heat exchanger registers.

	Cleaning methods	Can be used for all types of finned heat exchanger
1	Compressed air	All heat exchanger registers
2	Steam cleaners	Steel galvanised heat exchanger registers only
3	High-pressure water cleaner **only** with THD multi-jet method	All heat exchanger registers

ATTENTION



When using compressed air and steam jet units, ensure a sufficient distance and that the jet is aligned parallel to the fins.

NOTE



Complete removal of the deposits in heat exchangers is not possible using compressed air. Thorough cleaning cannot be guaranteed, particularly in deep registers, using only compressed air and steam cleaners.

As a result, the dirt deposits are compacted in the depths of the heat exchangers instead of being removed. The consequences are increased pressure losses, a lack of hygiene, odours, material attack, etc.

- The use of high-pressure water cleaners using conventional spray nozzles is not permitted as these can damage the delicate fins and thorough cleaning, particularly in the deeper heat exchanger registers, cannot always be achieved.
- Heat exchanger registers should therefore only by cleaned with high-pressure water cleaners using the THD multi-jet method. This ensures damage-free deep cleaning of the heat exchanger registers. This applies to all heat exchanger register types.
- The cleanability of the AL-KO THERM heat exchanger registers using the THD multi-jet method was demonstrated by the Institute for Air Hygiene Berlin during the hygiene conformity evaluation for the AL-KO air handling units (see figure THD multi-jet method).
- The use of the THD multi-jet method includes the correction of any bent fins to restore the optimum flow and performance of the heat exchangers ("fluidic renovation").

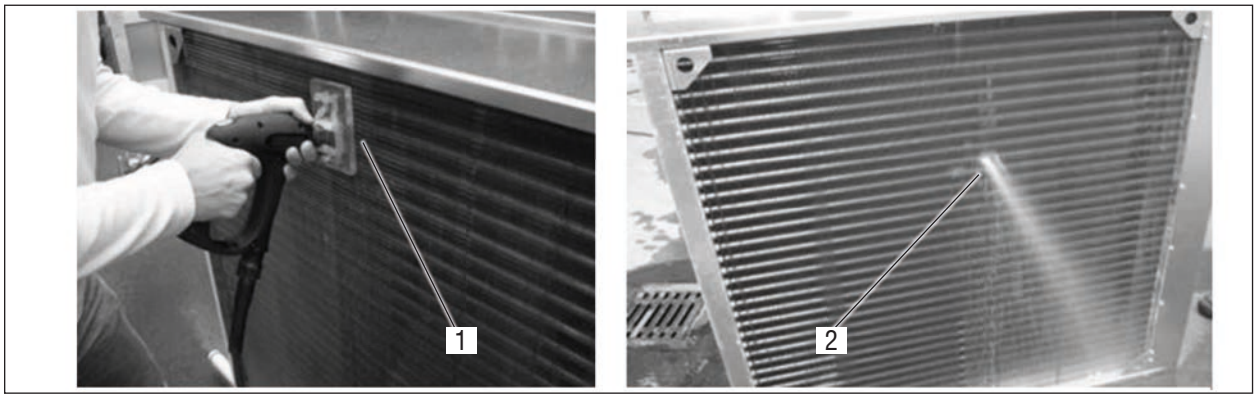


Fig. 53 THD multi-jet method

1	THD multi-jet method/front	2	THD multi-jet method/back

For further information on the THD multi-jet method:
THD
Technischer Hygiene Dienst GmbH
Am Kleingewerbegebiet 3
15745 Wildau
Phone.: +49 / (0)30 / 66 76 57 75-0
Fax.: +49 / (0)30 / 66 76 57 75-5
E-mail: info@thd-berlin.de
Web: www.thd-berlin.de

7.3.1.3 Circulating coil system (heat exchanger with pipe circuits)

With heat exchangers in a circulating coil system, the pipe circuits themselves cannot be emptied.

For this reason, the circulating coil system is only to be operated with a frost-proof water/glycol mixture and tested for leak-tightness after assembly.

If the system does have to be drained, the pipe circuits can be blown out with compressed air, although water still remains in the heat exchanger even in this case.

ATTENTION



When using high-performance circulating coil systems, observe the manufacturer's operating instructions.

ATTENTION



The maintenance work for the heat exchangers must be carried out at regular intervals.

- Antifreeze concentration must correspond to the specifications on the technical data sheet.
- We recommend the use of the antifrogen N with a mixture of 25 – 35 %.

7.3.1.4 Steam register

⚠ WARNING



Danger of bursting due to pressure

The steam register is pressurised. Damage to the heat exchanger can cause a risk of bursting and an explosion. This is associated with a loud bang.

- Observe the operating and assembly instructions as well as the working instructions.
- Work with care.
- Secure the hazardous areas. Only trained persons are permitted in this area.
- Operate the heat exchanger only at the permissible operating points.
- Check the steam register for visible damage.
- Comply with the Pressure Equipment Directive and the corresponding standards.

⚠ WARNING



Risk of slipping! Leaked condensate

- Immediately take up the spill quantity and dispose of it properly.

⚠ CAUTION



Risk of burns as a result of contact with hot surfaces and media (plate heat exchanger, heat exchanger and electric heating coil)

- Wait until the hot surfaces have cooled down.
- Wear personal protective equipment.

ATTENTION



Observe the manufacturer's documentation.

- Carry out maintenance and cleaning work according to the manufacturer's data.

7.3.1.5 Evaporator/condenser

⚠ WARNING



Danger of bursting due to pressure

The evaporator/condenser is pressurised. Damage to the heat exchanger can cause a risk of bursting and an explosion. This is associated with a loud bang.

- Observe the operating and assembly instructions as well as the working instructions.
- Work with care.
- Secure the hazardous areas. Only trained persons are permitted in this area.
- Only operate the evaporator/condenser in the permissible operating points.
- Check the evaporator/condenser for visible damage.
- Comply with the Pressure Equipment Directive and the corresponding standards.

⚠ WARNING



Risk of slipping! Leaked condensate

- Immediately take up the spill quantity and dispose of it properly.

⚠ CAUTION



Risk of burns as a result of contact with hot surfaces and media (plate heat exchanger, heat exchanger and electric heating coil)

- Wait until the hot surfaces have cooled down.
- Wear personal protective equipment.

ATTENTION



Observe the manufacturer's documentation.

- Carry out maintenance and cleaning work according to the manufacturer's data.

7.3.2 UV disinfection

⚠ WARNING



Risk of injury to eyes and skin due to UV radiation.

- Work on the unit may only be carried out by authorised persons.
- De-energise the unit before opening it for maintenance work.
- Avoid direct eye contact with the UV lamp.

⚠ CAUTION



Risk of burns due to contact with hot surfaces and media

- Wait until the hot surfaces have cooled down.
- Wear personal protective equipment.

ATTENTION



Observe the manufacturer's documentation.

- Carry out maintenance and cleaning work according to the manufacturer's data.

7.3.3 Combustion chamber

⚠ CAUTION



Risk of burns due to contact with hot surfaces and media

- Wait until the hot surfaces have cooled down.
- Wear personal protective equipment.

ATTENTION



Observe the manufacturer's documentation.

- Carry out maintenance and cleaning work according to the manufacturer's data.

7.3.4 Plate heat exchanger

⚠ WARNING



Risk of cuts

During maintenance and cleaning of the plate heat exchanger there is a risk of cuts.

- Wear personal protective equipment (cut-proof gloves).

⚠ WARNING



Risk of slipping! Leaked condensate

- Immediately take up the spill quantity and dispose of it properly.

⚠ WARNING



Risk of injury from falling from ladders, scaffolding or work platforms.

- Only use suitable and tested ladders, steps, scaffolding and work platforms.
- Work with care.

⚠ CAUTION



Risk of burns as a result of contact with hot surfaces and media (plate heat exchanger, heat exchanger and electric heating coil)

- Wait until the hot surfaces have cooled down.
- Wear personal protective equipment.

7.3.4.1 Maintenance

- Check plates for soiling.
- Remove dust and fibrous materials or similar, clean condensate drain.
- Check water drain and siphon of the drain tray and top up if necessary.
- Check the damper connection, drive and control functions.

7.3.4.2 Cleaning

- Dry dusts or fibrous materials can be removed using compressed air.
- Remove oil and grease deposits using hot water, steam or grease-dissolving cleaning agents.
- Remove damp, greasy and greasy deposits with a high-pressure cleaner and steam or hot water.

The heat exchanger can be cleaned using a hot water high pressure cleaner.
The following parameters are to be observed here:

Nozzle	Flat jet nozzle
Pressure	max. 20 bar
Water volume	max. 450 l/h
Water temperature	max. 70 °C
Distance to heat exchanger*	min. 30 cm
Nozzle direction	90° offset to foil embossing or fins

* The minimum distance to the heat exchanger is a recommendation. The minimum distance must be selected in such a way that complete and thorough cleaning without damage is ensured.

Cleaning direction: from the exhaust air side to the outgoing exhaust air side

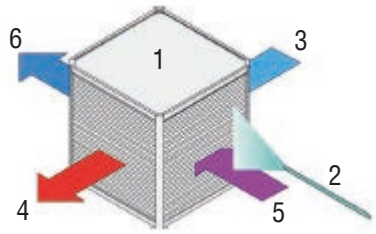


Fig. 54 Cleaning direction for plate heat exchanger

1	Plate heat exchanger	4	Supply air
2	High pressure flat jet nozzle	5	Exhaust air
3	Outdoor air	6	Exhaust air

ATTENTION

The specified values must be adhered to, otherwise the plate heat exchanger may be damaged.

NOTE

To remove stubborn dirt, cleaning agents can also be used (e.g. all-purpose cleaner, biodegradable).

It must then be rinsed using plenty of fresh water.

Do not use aluminium cleaners! These are acidic and attack the surface of the plate heat exchanger.

7.3.5 Rotary heat exchanger

⚠ WARNING



Risk of injuries.

- Disconnect the AT4F unit from the mains power supply on all poles and secure it to prevent restart before starting any maintenance or cleaning work.

⚠ WARNING



Risk of cuts

During maintenance and cleaning of the rotary heat exchanger there is a risk of cuts.

- Wear personal protective equipment (cut-proof gloves).

⚠ WARNING



Risk of injury from falling from ladders, scaffolding or work platforms.

- Only use suitable and tested ladders, steps, scaffolding and work platforms.
- Work with care.

⚠ CAUTION



Risk of burns as a result of contact with hot surfaces and media (plate heat exchanger, heat exchanger and electric heating coil)

- Wait until the hot surfaces have cooled down.
- Wear personal protective equipment.

7.3.5.1 Maintenance

ATTENTION



Check seals before commissioning.

Check drive elements and control elements.

Observe the rotor manufacturer's documentation.

ATTENTION



To avoid bearing damage, the thermal mass must be rotated periodically (monthly) in the event of a prolonged standstill.

- Check drive elements and control elements.
- Clean the rotor regularly using compressed air, water, steam or grease-dissolving cleaning agents.
- Check the seal for wear, damage and correct seating.
- Further information can be found in the manufacturer's documentation.

7.3.5.2 Cleaning

ATTENTION



The contamination must be reduced from the outset by using filters.

- The rotors can be cleaned off using compressed air/water. In this process, the jet must act on the thermal mass at right angles.
- Optionally, the rotary heat exchanger can be equipped with a cleaning device.
- Observe the rotor manufacturer's instructions.
- As access for cleaning the thermal mass of the rotary heat exchanger, you can use the inspection doors/inspection covers of the upstream and downstream functional units.
- The cleaning of the thermal mass must be selected depending on the material used!

The thermal mass of the rotary heat exchanger is made of wound aluminium foil. On the basis of the counterflow principle, self-cleaning takes place in most cases, which prevents contamination of the thermal mass.

If this self-cleaning is not sufficient, the thermal mass can be stored at appropriate intervals (depending on the degree of contamination) with compressed air or in the case of stubborn contamination with high-pressure units (medium only water without chemical additives) can be cleaned.

ATTENTION



Only use compressed air or water without chemical additives as the medium. The air or water jet must act on the thermal mass at right angles, otherwise there is a risk of damage.

The residual water must be blown out of the rotor after cleaning.

Rotation direction of the thermal mass

Make sure that the thermal mass always rotates from the exhaust air via the flushing chamber into the supply air. This rotation direction of the thermal mass is identified by a marking.

ATTENTION



Check seals before commissioning and apply seals when fans are running.

ATTENTION



To avoid bearing damage, the thermal mass must be rotated periodically (monthly) in the event of a prolonged standstill.

7.3.5.3 Drive belt maintenance

- Check drive V-belt for tension.
- Check drive V-belt for wear.
- Check correct position of the drive V-belts.
- Further information can be found in the manufacturer's documentation.

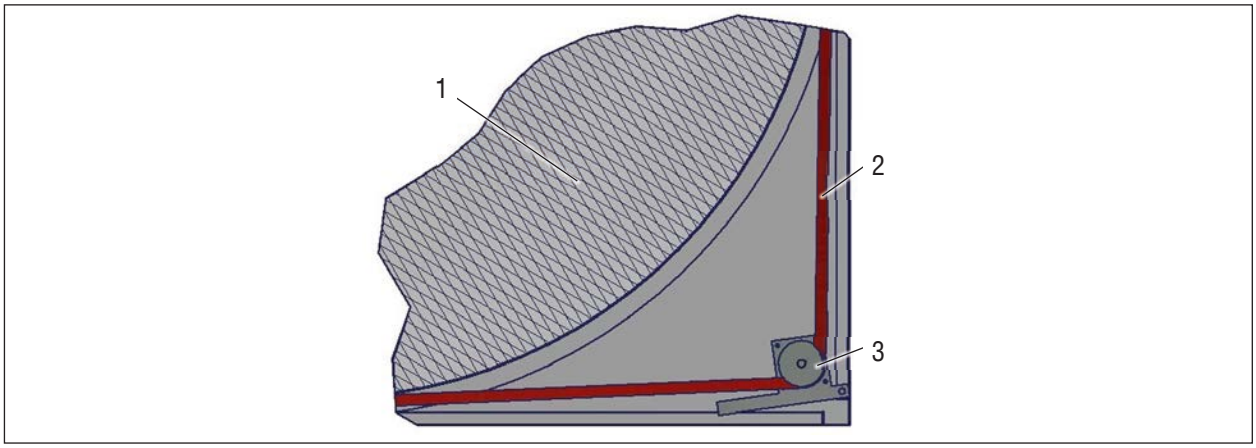


Fig. 55 Drive V-belt installation situation

1	Rotary heat exchanger	3	V-belt pulley
2	Drive V-belt		

- Check the tension of the drive V-belt
  - The drive V-belt can stretch, particularly within the first 400 operating hours.
  - If the drive belt stretches too much, it must be shortened.
  - This can be carried out by simply removing links. Please refer to the relevant manufacturer's documentation.

7.3.6 Grease trap filter

The grease trap filter must be cleaned with hot water (> 80 °C) or steam if soiled by grease or dust or after reaching the recommended end pressure difference (type plate). Servicing and assembly are generally carried out on the dusty air side.

Cleaning the filter elements up to unit size 16 x 16

Step	Action
1	Pull the filter element with the mounting frame including the collecting troughs out of the unit.
2	Unfasten the clamping bracket on the filter frame and clean the filter element including the collecting tray.

Cleaning the filter elements from unit size 20 x 16

Step	Action
1	Detach the clamping bracket from the filter frame.
2	Remove the filter element and clean it.
3	Clean collecting tank

7.3.7 Dampers

⚠ WARNING



Risk of crushing

When closing the multi-leaf damper, there is a risk of crushing injuries to the hands.

- Do not reach into the damper when closing the multi-leaf damper.
- Wear the personal protective equipment.

7.3.7.1 Maintenance

- Inspect the multi-leaf dampers for soiling, damage and corrosion.
- Check the mechanical function of the multi-leaf dampers.
- Lubricate the damper bearing and joints if necessary using appropriate lubricants.
- Check the end position of the flap actuators and adjust, if necessary.

7.3.7.2 Cleaning

- Clean the multi-leaf dampers at regular intervals.

7.3.8 Sound absorber

⚠ WARNING



Risk of cuts

During maintenance and cleaning of the sound attenuator splitters there is a risk of cuts.

- Wear personal protective equipment (cut-proof gloves).

7.3.9 Maintenance

- Check the sound absorbers for soiling and damage at regular intervals.

7.3.9.1 Cleaning

- Sound attenuator splitters (optional) can be taken out/removed from the unit for cleaning.

NOTE



Following extended operating intervals, clean the sound attenuator splitters (optional) using an industrial vacuum cleaner.

7.3.10 Droplet eliminator

⚠ WARNING



Risk of cuts

There is a risk of cutting injuries during cleaning and maintenance of the droplet eliminator.

- Wear personal protective equipment (cut-proof gloves).

- The droplet eliminator can be pulled out of the housing to the side for cleaning and maintenance purposes.

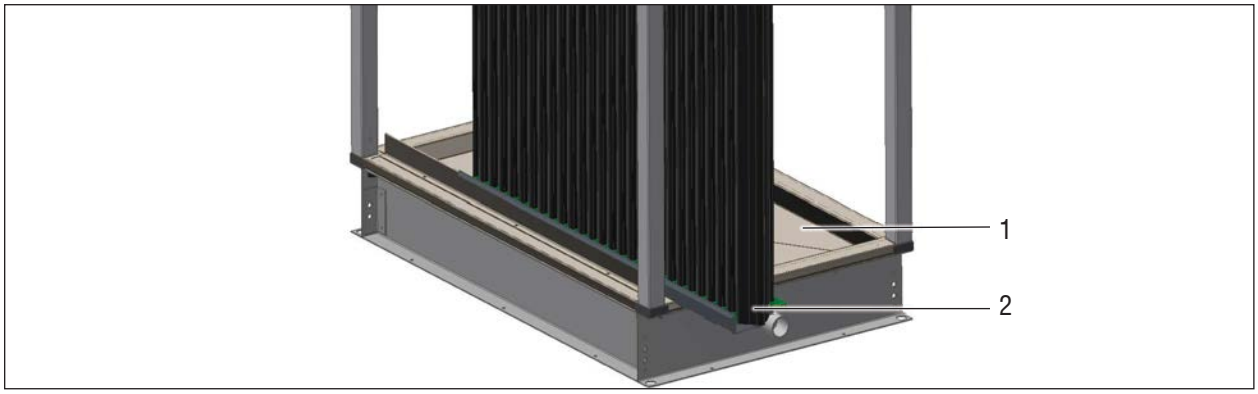


Fig. 56 Droplet eliminator installation situation

1	Condensate collecting pan	2	Droplet eliminator

7.3.10.1 Maintenance

- Inspect the droplet eliminator for soiling, damage and corrosion.
- Inspect the water drain and odour trap.
- Check water drain and siphon of the drain tray and top up if necessary.

ATTENTION



During installation of the pipelines on site, ensure that the droplet eliminator can still be pulled out to the side.

7.3.10.2 Cleaning

- Clean the droplet eliminator and condensate collecting pan using compressed air, water, steam or grease-dissolving cleaning agents.

7.3.11 Humidifier

⚠ CAUTION



Health hazards due to germs

Check the humidifiers for microbial contamination.

If germs are present, the unit must be switched off and subjected to hygienic cleaning. It is mandatory to carry out this hygiene cleaning.

Observe the operating instructions of the manufacturer.

7.3.11.1 Spray humidifier (air washer)

Maintenance

- Inspect the spray humidifier for soiling, damage and corrosion.
- Inspect the siphon and top up, if necessary.
- Inspect the float valve.
- Check the installation of the water filter.
- Check the screw and flange connections of the pump pressure line for leaks
- The specified water quality must be maintained at all times and corrected at regular intervals.

ATTENTION



Observe the humidifier manufacturer’s maintenance, commissioning and assembly instructions. Clean the spray humidifier with foaming cleaning agent.

Cleaning

- Clean the spray humidifier unit, including the nozzles and manifolds, at least once a year.
- Inspect the desludging device and clean, if necessary.
- Inspect and clean the droplet eliminator/rectifier.
- Observe the manufacturer's documentation.

ATTENTION



Observe the humidifier manufacturer’s maintenance, commissioning and assembly instructions. Clean the spray humidifier with foaming cleaning agent.

7.3.11.2 Contact humidifier

Maintenance

ATTENTION



Observe the manufacturer's documentation.

Fresh water system of the contact humidifier

ATTENTION



The water quality for the contact humidifier must be ensured according to the manufacturer's data.

- Check humidifier for function, damage and soiling.
- Check water flow rates.
- The specified water quality must be maintained at all times.
- The operator must document the maintenance work in writing.

Circulation water system for contact humidifier

ATTENTION



The water quality for the contact humidifier must be ensured according to the manufacturer's data.

- Check humidifier for function, damage and soiling.
- Check water flow rates.
- Check the desalination rate.
- The specified water quality must be maintained at all times.
- The operator must document the maintenance work in writing.

Cleaning

ATTENTION



Observe the manufacturer's documentation.

Fresh water system of the contact humidifier

ATTENTION



The water quality for the contact humidifier must be ensured according to the manufacturer's data.

- Only products from the humidifier manufacturer are approved for disinfection, cleaning and water treatment!
- The operator must document the maintenance work in writing.

Circulation water system for contact humidifier

ATTENTION



The water quality for the contact humidifier must be ensured according to the manufacturer's data.

- Only products from the humidifier manufacturer are approved for disinfection, cleaning and water treatment!
- The operator must document the maintenance work in writing.

7.3.11.3 High-pressure humidifier

Maintenance

ATTENTION



Observe the manufacturer's documentation.

Use gear oil according to manufacturer's data.

- Check the high-pressure nozzles. Visual inspection of the spray cone.
- Oil check or oil change (especially during extended standstill times) of the high-pressure pump.
- Check the ratio, toothed belt and tooth discs.
- Functional check of safety installations (solenoid valves, pressure gauge, pressure switch).
- Check the setting values of the controller. If necessary, correct

Cleaning

ATTENTION



Observe the manufacturer's documentation.

- Cleaning the interior with water. For heavier soiling, an alkaline cleaning agent can be used.
- Water with drinking water quality should be used as a minimum for rinsing. Make sure there is sufficient fresh water flushing.
- If necessary, clean or replace the nozzles. Rinse with water.
- Rinsing of the HP hose, the manifold and the nozzle assemblies with the above cleaning agent. Rinse sufficiently with fresh water (permeate) and clean with compressed air.
- Flushing of the inlet filter with sufficient fresh water (permeate). If necessary, replace the filter insert.

7.3.11.4 Steam humidifier

Maintenance

ATTENTION



Observe the manufacturer's documentation.

ATTENTION



The water quality for the steam humidifier must be ensured according to the manufacturer's data.

- Inspect the steam humidifier for soiling, damage and corrosion.
- Check the steam and condensate pipe for leakage.
- Check the function of the steam distributor.
- Check the function of the solenoid valves.
- Check the measuring and control devices.

Additional maintenance work for steam humidifier with separate steam generator:

- Check the function of the water supply and water level.
- Measure power consumption.
- Check the steam cylinder for deposits and replace if necessary.

Additional maintenance work for steam humidifier without separate steam generator:

- Check the function of the control valve.
- Readjust the stuffing box of the control valve.

Cleaning

ATTENTION



Observe the manufacturer's documentation.

ATTENTION



The water quality for the steam humidifier must be ensured according to the manufacturer's data.

- Clean the steam humidifier and dirt trap regularly.

7.3.12 Electric motor

DANGER



Hazard due to electric current.

Incorrect connection to the power supply or incorrect installation of electrical components can result in electric shock.

- Only have the electrical connection carried out by an approved electrician.
- Perform the connection exactly according to the circuit diagram and the assignment plan.
- Observe the valid DIN and VDE regulations.
- Observe the directives of the local energy supply company.
- Use the personal protective equipment when working on the installation.
- Use other protective equipment according to the work carried out.
- Do not operate the unit with defective or damaged cables or plugs.
- Regularly check the connection cables for damaged areas.
- Use only the permissible tool.
- Shut off the power supply for maintenance work and secure it to prevent restart.
- Observe the electrical safety regulations.

WARNING





Risk of injuries.

- Disconnect the AT4F unit from the mains power supply on all poles and secure it to prevent restart before starting any repair or maintenance work.
- Follow the applicable safety rules.
- Have installation, commissioning, servicing and maintenance work carried out only by qualified staff.

To be carried out by the person responsible:

- After carrying out the work, ensure that there are no longer any persons in the installation.
- Before restarting the installation, ensure that all factory-installed protective measures are functioning correctly.

WARNING



Risk of injuries due to incorrect or faulty connection.

- Electrical connections must only be undertaken by a certified electrician under consideration of the valid DIN and VDE regulations as well as the directives of the local energy supply company.
- Only have assembly, servicing and maintenance carried out by qualified staff.
- Wear personal protective equipment.

ATTENTION



Observe the motor manufacturer's documentation.

Only use lubricants according to the manufacturer's data.

7.3.12.1 Maintenance

The electric motors are usually equipped with permanently lubricated motor bearings.

In the case of electric motors with relubricatable motor bearings, these must be regularly checked and, if necessary, relubricated. Use only lubricants specified by the motor manufacturer.

- Check motor for dirt, damage and corrosion.
- Check motor mounting and retighten all fastening screws.
- Check the bearing and re-lubricate if necessary.
- Check the function of the protective devices.
- All fastening screws/electrical connections must be retightened.

7.3.12.2 Cleaning

- Clean the motor and motor substructure regularly.

7.3.13 Fans

⚠ WARNING



Risk of injury from fan during fan test run

- Never disassemble or bypass safety installations.
- Work with care.
- Remove any loose parts in the air handling unit.
- Eliminate tripping hazards.
- Maintain the safety distance.
- Remain in the debris shadow when the fan starts up.
- Wait until the fan impeller has come to a standstill.
- Carry out a visual inspection for cracks in the impeller.
- Wear personal protective equipment (ear protection).

⚠ WARNING



Risk of injury caused by impeller breakage

Operation with impermissibly high vibration values, in particular with fans without spiral housing, can result in impeller breakage, which can lead to serious property damage and personal injuries.

- Perform a vibration measurement of the fan impeller regularly and document the checks. If the permissible vibrations are exceeded, no operation may take place. Observe the table with the respective vibration values.
- When operating with a frequency converter, the frequency converter should generally be operated without overmodulation.
- Do not operate fans in the range of the resonance speed (and its multiples) of the fan motor system.

⚠ WARNING



Risk of injuries due to fan delay

- Switch off the unit on all poles and secure it against restart.
- Only open the inspection doors only when the fans are switched off and stationary.
- Observe the delay time of the fans. Observe a waiting time of at least 3 minutes, until the fan impellers are stationary, before opening the inspection doors.
- Never brake the impellers of the fans by hand or using an object.

7.3.13.1 Maintenance

- Check fan impeller for soiling and unbalance.
- Check fan gap and overlap, see chapter "7.3.13.7 Check gap and overlap in fans" on page 117.
- Check the bearing and re-lubricate if necessary.
- Retighten all fastening screws, see chapters "7.3.13.8 Tightening torques of the screw connections on the fan part" on page 117 and "7.3.13.9 Maintenance or inspection of the taper-lock clamping bushes" on page 118.
- Check the function of the vibration absorbers.
- Check the drainage function if necessary.
- Inspect the fan for soiling, damage and corrosion.

7.3.13.2 Cleaning

- Clean the fan unit at regular intervals.

7.3.13.3 Removing the fan for maintenance purposes

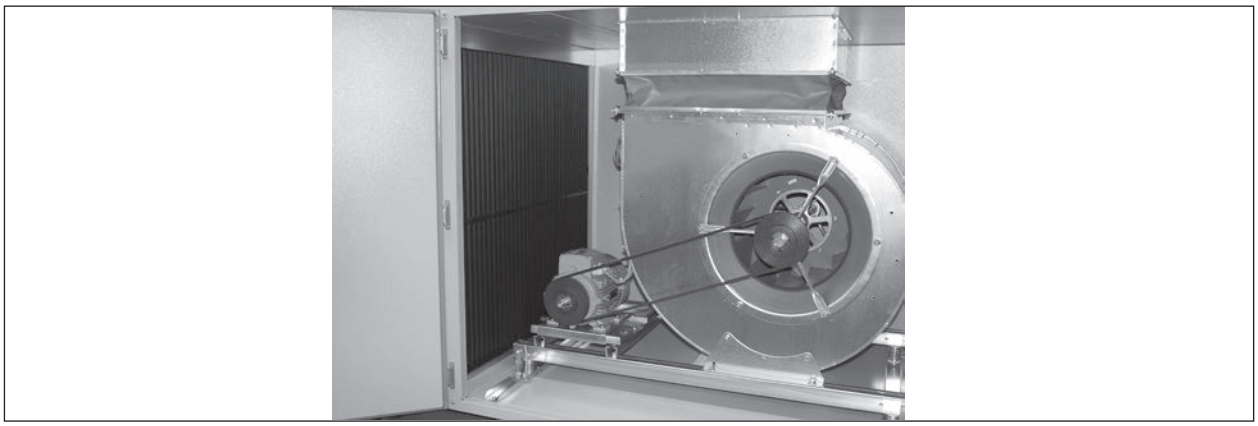


Fig. 57 Removal opening for fan, in this case, fan with belt drive

The fan unit can be removed laterally for maintenance purposes:

- Unfasten the fastening screws of the fan unit.
- Detach the canvas nozzle.
- Take out the fan unit out of the housing to the side.

ATTENTION



Avoid damage to the housing coating by carefully pulling out the fan unit.

NOTE



For easier removal and installation of fans, motor removal rails are available as options.

7.3.13.4 Fan with belt drive

- Inspect V-belt drive for soiling, damage and wear.
- Check V-belt tension and retighten if necessary.
- Check alignment of the V-belt pulleys.
- Clean the V-belt drive at regular intervals.

ATTENTION

When replacing V-belts in multi-groove drives, the entire V-belt set must always be replaced.

Clamping specification for V-belt drive

The correct belt tension is achieved when with the individual test force F_p a belt deflection b according to the technical data sheet has been reached. Alternatively, it can also be adjusted using frequency measurement.

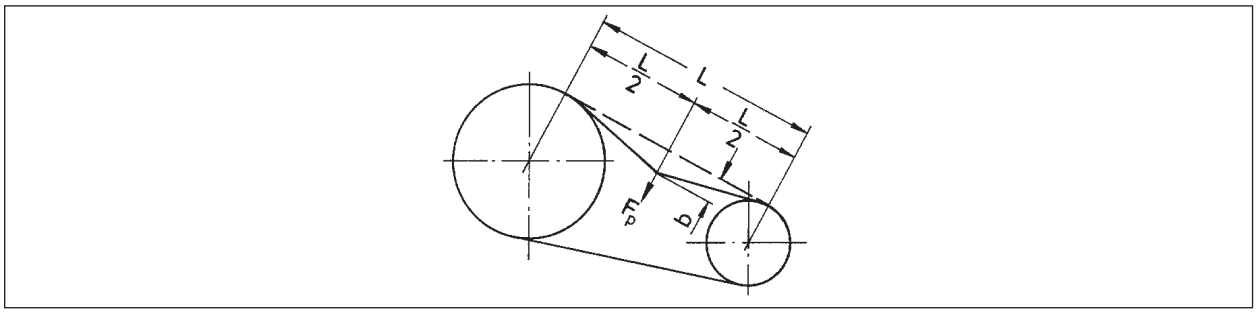


Fig. 58 Checking the belt tension on the V-belt drive

L	Span length	F_p	Test load in N from AL-KO document or type plate
b	Belt deflection under the test force F_p		

Clamping specification for flat-belt drive

The correct belt tension has been reached when the measuring mark distance L_{Mu} has increased by the overlay elongation E*. The adjustment should be made in two steps with a time interval of a few hours to avoid overloading the bearings.

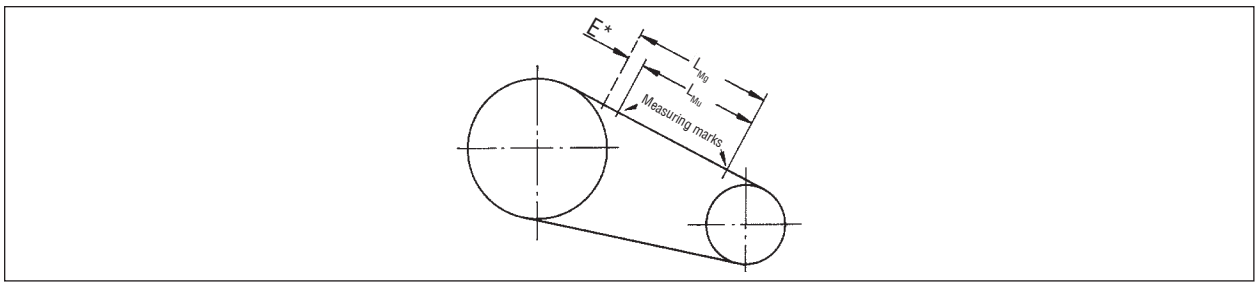


Fig. 59 Checking the belt tension on the flat belt drive

L_{Mu}	Measuring mark distance on the unclamped flat belt
L_{Mg}	Measuring mark distance on the correctly clamped flat belt
E*	Overlay elongation in mm from supplied document

Changing the V-belt pulley

ATTENTION

Ensure that the motor disc and fan drive pulley are precisely flush.

Fit and tension the belt according as prescribed.

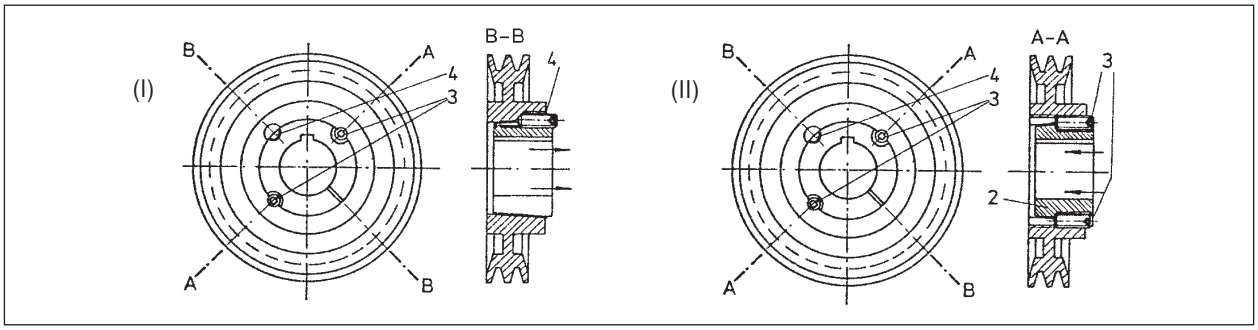


Fig. 60 Fastening of the V-belt pulley

3	Screws	4	Threaded bore

Unfasten the V-belt pulley

Step	Action
1	Unscrew the screws.
2	Insert the screw hexagonal bolt into the threaded hole.
3	Push the clamping bush out of the conical bore.
4	V-belt pulley can then be gently pushed out of the shaft.

Fasten the V-belt pulley

Step	Action
1	Unscrew the screw hexagonal bolt from the threaded hole.
2	Pull V-belt pulley and clamping bush together by means of threaded pins or screw hexagonal bolts. Observe the tightening torques specified under the "Maintenance and inspection of the taper-lock bushings" point. Too high a tightening torque leads to damage to the taper-lock clamping bush.

7.3.13.5 EC fan

⚠ CAUTION

Risk of burns due to contact with hot surfaces.

- Wait until the hot surfaces have cooled down.
- Wear personal protective equipment.
- Observe the manufacturer's documentation.

- Check fan for hygienic condition, dirt, damage, corrosion, and a secure fastening.
- Check the function of the protection devices.

7.3.13.6 Fan free-wheel with direct drive

⚠ WARNING



Risk of injury caused by impeller breakage

Operation with impermissibly high vibration values, in particular with fans without spiral housing, can result in impeller breakage, which can lead to serious property damage and personal injuries.

- Perform a vibration measurement of the fan impeller regularly and document the checks. If the permissible vibrations are exceeded, no operation may take place. Observe the table with the respective vibration values.
- When operating with a frequency converter, the frequency converter should generally be operated without overmodulation.
- Do not operate fans in the range of the resonance speed (and its multiples) of the fan motor system.

NOTE



AL-KO recommends continuous monitoring using a vibration sensor (available as an option).

Table of vibration values

Installation	Machine group	Good	Usable	Still permissible
Rigid up to 15 kW	K	0.7 mm/s	1.8 mm/s	4.5 mm/s
Rigid from 15 kW	M	1.1 mm/s	2.8 mm/s	7.1 mm/s
Vibration-isolated	T	2.8 mm/s	7.1 mm/s	18 mm/s

Maintenance

- Perform maintenance at least once per year.
- Check fan gap and overlap, see chapter "7.3.13.7 Check gap and overlap in fans" on page 117.
- Check fan for soiling, vibration, damage, loose screws and corrosion.
- Check the impeller, particularly welding seams, for possible cracking every 6 months.
- Check the function of the safety installations (door catch, protective grille).

Operating point setting

- The operating point can be approached accurately with an adjustable fan speed.
- When controlling the speed, make sure that the maximum fan speed and the permissible motor currents are not exceeded.
- The nozzle gap must not be adjusted.

Air volume determination

Optionally, the fans are equipped with a volume flow measuring device. The pressure difference between the static pressure in the suction-side chamber and the pressure at the inlet nozzle is measured via a pressure measuring point on the inlet nozzle. This differential pressure (effective pressure) has a fixed relationship to the volume flow. Detailed description on request.

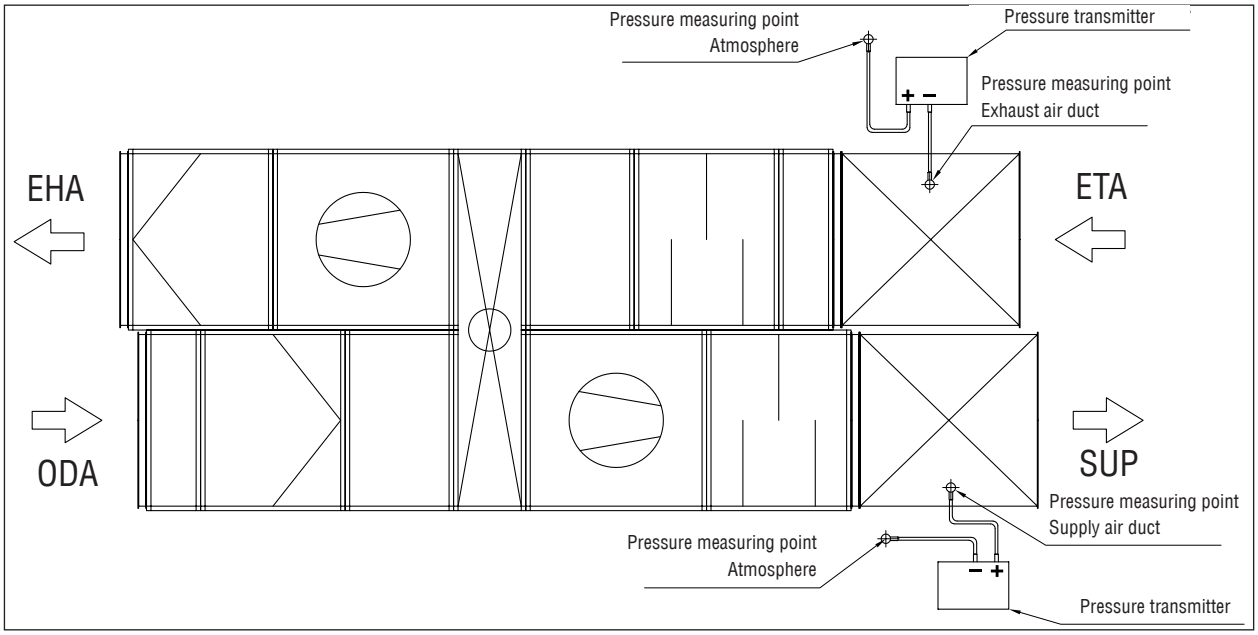


Fig. 61 Wiring diagram for volume flow measurement

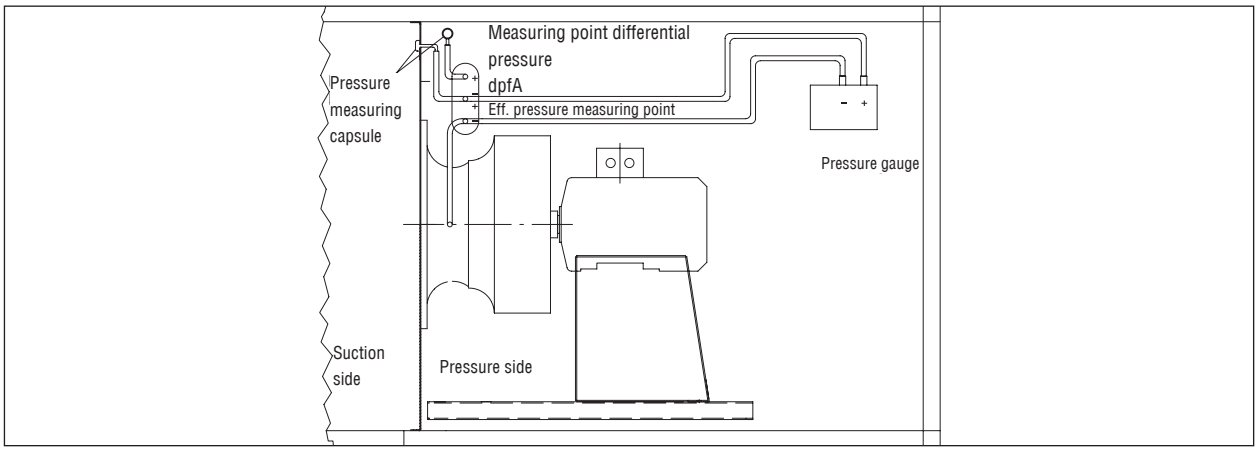


Fig. 62 Air volume determination via measuring differential pressure

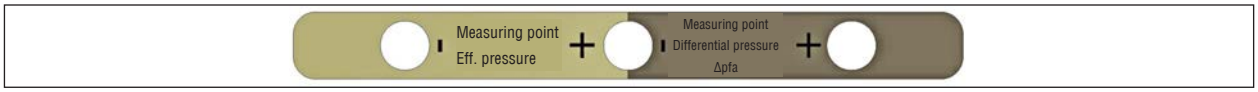


Fig. 63 Pressure measuring point stickers

7.3.13.7 Check gap and overlap in fans

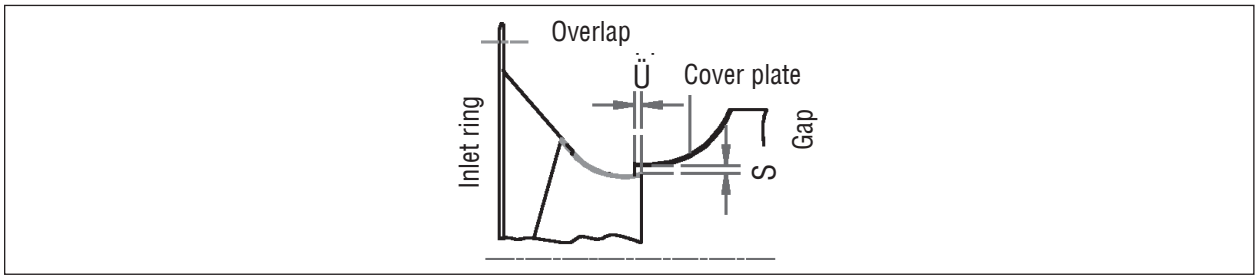


Fig. 64 Gap dimension and overlap

Step	Action
1	Visually and manually check the gap dimension at four points offset by 90° by feeling with the fingertips.
2	Check if the impeller is rubbing: The impeller must not rub, and the gap should be as large as possible around the circumference.
3	Perform a visual check of the overlap: Normally, a check for "zero" is carried out – i.e. an overlap must be present, it should be "greater than 0".
4	Visually check that a gap is present: When manually rotating the impeller from multiple viewing angles, no gap must be visible.
	If in doubt, check the presence of a gap using a sheet of paper. The test is passed if the paper cannot be pushed between the inlet nozzle and the cover plate.

ATTENTION



The exact gap dimensions can be requested from the respective fan manufacturer.

7.3.13.8 Tightening torques of the screw connections on the fan part

ATTENTION



After approx. 1 hour, check the screw connections on the fan base and, if necessary, tighten evenly with the screw tightening torques specified in the table below using a torque wrench.

Thread dimension	Screw thread tightening torque (Nm)
M6	10
M8	25
M10	49
M12	85

7.3.13.9 Maintenance or inspection of the taper-lock clamping bushes

- Clean and degrease all bare surfaces such as the hole and the conical surface of the taper-lock clamping bush as well as the conical hole of the disc. Insert the taper-lock clamping bush into the hub and bring all the connection holes to coincide (half threaded holes must face half smooth holes).
- Threaded pin (size 1008 – 3030) or cylinder screws (size 3535 – 5050) are lightly covered with threadlocker and screwed in – do not tighten the screws yet!
- Clean and degrease shaft. Slide the disc onto the shaft using a taper-lock clamping bush.
- If a feather key is used, it must first be inserted into the groove of the shaft. There must be back clearance between the feather key and the bore groove.
- Using the torque wrench, set screws or hexagon socket head cap screws, tighten evenly with the tightening torques specified in the table.

Bushing	Screw tightening torques (Nm)	Screws	
		Quantity	Size
1008/1108	6	2	1/4" BSW
1310/1315	20	2	3/8" BSW
1210/1215	20	2	3/8" BSW
1610/1615	20	2	3/8" BSW
2012	31	2	7/16" BSW
2517	48	2	1/2" BSW
3020/3030	90	2	5/8" BSW
3535	112	3	1/2" BSW
4040	170	3	5/8" BSW
4545	192	3	3/4" BSW
5050	271	3	7/8" BSW

7.3.14 Cooling system and heat pump

ATTENTION



Observe the requirements in the separately supplied operating instructions for cooling systems and heat pumps.

7.3.15 Electric air heater

Frequent causes of error for accumulated heat with electric air heaters

Cause	Remedy
No air volume flow	Heater groups may only be released when a sufficient air flow is conveyed via the heater —> Use of a volume flow monitor AL-KO THERM recommends the integration of the electric air heater control into the repair switch circuit (auxiliary switch)
Insufficient air volume flow through controlled fans	The heating capacity must also be adjusted in accordance with the reduced air volume flow —> Infinitely variable control of the heating energy or switching of heating groups according to the specified air volume flow
Temperature monitor is not connected	During commissioning, the function of the temperature-related shutdown must be checked
Safety temperature limiter is not connected	During commissioning, the shutdown function must be checked
No fan delay	It is imperative that the fans have a delay of min. 5 minutes after switching off the electric heating. Alternatively, the fan delay can also be controlled using a thermostat.
Incorrect commissioning – Checking the electric heater without sufficient air flow due to closed flaps or false air, for example	Ensure that there is always a sufficient air volume flow at the heating coil during testing
Air temperatures above 60 °C	Ensure that the air temperatures do not exceed 60 °C at any time. The air temperature in normal operation (continuous operation) must not exceed 40 °C

- After any power failure or fault messages, the installation is to be checked for damage and replacement measures must be taken where necessary.
- Observe the manufacturer's documentation.

7.4 Replacing components

7.4.1 Changing the filter

⚠ WARNING



Risk to health when changing the filters due to dust load and microbial contamination.

- Switch off the unit on all poles and secure it against restart.
- Adhere to the maintenance plan.
- Wear the personal protective equipment (dust mask) during a filter change.
- Use other protective equipment according to the work carried out.

Special instructions for operating the units

ATTENTION



The built-in filter elements fulfil a safety function and may only be operated up to the final pressure losses stated on the data sheet.

NOTE



Do not wash and reuse used air filters; always replace them. Otherwise, the hygienic requirements will not be met.

ATTENTION



Only use original consumables and spare parts. This is the only way to ensure safe operation.

Otherwise the warranty will be voided.

A spare parts list can be found as part of the unit documentation.

Customer Service
Phone: +49 8225 39 - 2574
E-mail: service.center@al-ko.com
Web: www.al-ko.com

- The filter elements must be approved according to ISO 16890.
- The filter elements must be monitored for the final pressures and checked for damage on a regular basis.
- Use only original spare parts.
- Technical data, e.g. final pressures, can be found in the data sheets of the filter manufacturer.

7.4.1.1 Replacing bag filters

ATTENTION



The filter bags should generally be replaced when the permissible end pressure difference indicated on the type plate is reached.

The filter bags must be disposed of in accordance with the currently valid and applicable local regulations.

- Inspect all filter classes at regular intervals for soiling and damage and replace, if necessary.
- Replace the 1st filter stage every 12 months at the latest.
- Replace the 2nd filter stage every 24 months at the latest.

Bag filters can be replaced either on the dust-air side or on the clean-air.

The filters are delivered packed in a cardboard box.

A filter quick change device is optionally available for all filter classes up to a clear unit height of 1836 mm.

Replacing the filter bags when fastening the clamps:

NOTE

When inserting the filter bags, make sure that they are installed centrally and firmly clamped to the seal by all four filter clamps.

Step	Action
1	Disconnect the clamps in the filter frame by unhooking.
2	Pull the filter bags out individually.
3	Check the filter gaskets, inspect and replace any damaged gaskets.
4	Install new filter bags into the filter frame.
5	Close the clamps in the filter frame by hooking and check that they are secure.



Fig. 65 Filter mounting frame, left filter clamp

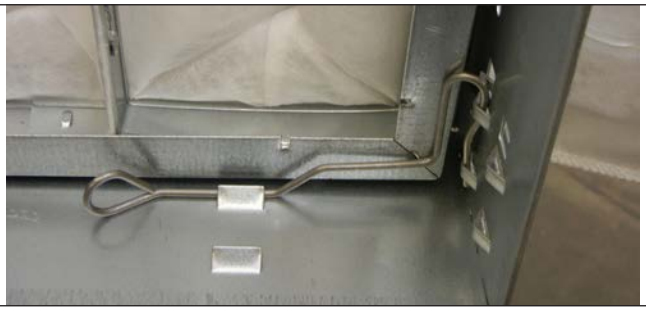


Fig. 66 Filter mounting frame, right filter clamp



Fig. 67 Filter mounting frame with filter clamps

Replace the filter bags with quick change device:

Step	Action
1	Release the clamping device by simply pulling it out using pull-out lever that is supplied loose.
2	Pull the filter bags out of the unit individually.
3	Check the filter gaskets, inspect and replace any damaged gaskets.
4	Install new filter bags.
5	Close the clamping device by pushing it in.

7.4.1.2 Change the activated carbon filter

The activated carbon must be replaced after reaching saturation. Servicing and assembly are generally carried out on the clean air side.

In general, activated carbon cartridges are delivered packed in a cardboard box in the marked components.

Changing the filter cartridge

Step	Action
1	Release the bayonet closure on the base plate (key for optional accessories) and remove the filter cartridge.
2	Clean the sealing surfaces of the filter wall/base plate.
3	Reattach new filter cartridges to the base plate using the bayonet closure.
4	Check the filter insert for secure fitting.

7.4.1.3 Replace the particulate air filter

ATTENTION



The particulate air filters should generally be replaced when the permissible end pressure difference indicated on the type plate is reached.

Servicing and assembly are generally carried out on the dusty air side.

Replacing the filter elements:

Step	Action
1	Unfasten the screws on the filter frame and remove the filter element.
2	Clean the sealing surfaces of the filter wall/filter frame.
3	Insert new filter element and secure.

ATTENTION



AL-KO THERM does not assume any warranty for damage due to improper handling of the particulate air filter during assembly and disassembly.

8 Emergencies and malfunctions

8.1 Emergency

ATTENTION



In case of fire, used building materials can develop toxicologically hazardous substances.

To protect against any released pollutants, rooms must only be entered with breathing masks.

Safety of persons has priority over safety of property.

8.2 Help in the event of malfunctions

⚠ WARNING



Risk of injury due to incorrectly implemented measures.

Incorrect or incorrectly executed measures can put the installation in a potentially dangerous state. There is then a risk of injuries and even electric shock.

- Only allow work on electrical equipment inside the switch cabinet (e.g. test work, replacement of fuses) to be carried out by qualified staff.
- Only allow diagnosis, troubleshooting and recommissioning to be carried out by authorised persons.
- Use the personal protective equipment when working on the installation.
- Use other protective equipment according to the work carried out.

NOTE



Further information on "General malfunctions" of the AT4F unit can be found in the AL-KO THERM operating manual/functional description for "Control ART TECH LEVEL II".

8.3 Contact for malfunctions

For all questions that you have in connection with our products, please contact the manufacturer of your ventilation installation, one of our branches or directly to:

AL-KO THERM GmbH	Phone:	(+49) 82 25 / 39 - 0
Hauptstraße 248-250	Fax:	(+49) 82 25 / 39 - 2113
D-89343 Jettingen-Scheppach	E-mail:	klima.technik@al-ko.com
Germany	Web:	www.al-ko.com
Customer Service	Phone:	(+49) 82 25 / 39 - 2574
	E-mail:	service.center@al-ko.com

9 Shut-down

9.1 Decommissioning

Disconnect the installation from the power supply before beginning work (all-pole shutdown) and secure it against unauthorised restart.

⚠ WARNING



Risk of injury due to pressurised parts.

- When decommissioning, note that certain installation parts are pressurised.
- Comply with the safety rules!

ATTENTION



In winter, there is a general freezing hazard for all components. If necessary, take suitable measures such as fully draining the liquid media. At temperatures below freezing, the heat exchanger must be either drained and blown out with compressed air, or filled with a commercially available antifreeze with corrosion inhibiting additive due to the risk of freezing and corrosion.

- If the installation is decommissioned for a long period of time, the instructions for the individual components must be observed.
- The information from the component manufacturers must also be followed (request this information if necessary).
- Before recommissioning, observe chapters "6 Commissioning" on page 73 and "7 Servicing and maintenance" on page 84.

9.2 Dismantling

- Dismantling must be carried out according to the currently valid and applicable occupational safety and accident prevention regulations.

⚠ WARNING



Risk of injury from falling from ladders, scaffolding or work platforms.

- Only use suitable and tested ladders, steps, scaffolding and work platforms.
- Work with care.

⚠ WARNING



Risk of poisoning when draining the media.

The unit may contain media that are hazardous to health, such as coolants.

- The drained media may only be filled and stored in approved containers.
- Work with care.
- Avoid skin and eye contact with the media, do not swallow media and observe the safety data sheets.
- Wear personal protective equipment.
- Absorb spills immediately.

⚠ WARNING





Risk of injury when dismantling electrical and thermal components.

- Only have disassembly work carried out by trained qualified staff.
- Before starting work, disconnect the installation from the central supply line.
- When dismantling, note that certain parts of the installation are pressurised.
- Fix the impellers of the fans.
- Work with care.
- Use only suitable means of transport when transporting installation parts.
- Use the personal protective equipment when working on the installation.
- Absorb spills immediately.

⚠ WARNING





Danger to health when removing the filter inserts.

- When removing filters, wear the personal protective equipment (dust mask).
- Use other protective equipment according to the work carried out.
- Avoid contact with the dust.

9.3 Disposal

⚠ WARNING



Risk of poisoning when disposing of the media.

The unit may contain media that are hazardous to health, such as coolants.

- Work with care.
- Avoid skin and eye contact with the media, do not swallow media and observe the safety data sheets.
- Wear personal protective equipment.
- When disposing of the media, comply with the relevant local environmental and recycling regulations in your country and community that are applicable at the time when the activity is undertaken.
- The drained media may only be filled and stored in approved containers.



Do not dispose of worn-out units, spent batteries or rechargeable batteries in domestic waste.
When disposing of the unit, operating equipment and accessories, proceed according to the relevant local environmental and recycling regulations in your country and community that are applicable at the time when the activity is undertaken.

10 Spare parts

ATTENTION



Only use original consumables and spare parts. This is the only way to ensure safe operation.

Otherwise the warranty will be voided.

A spare parts list can be found as part of the unit documentation.

ATTENTION



If third-party spare parts are installed or changes are made without consultation with the manufacturer, a new conformity assessment must be carried out by a qualified person. After carrying out the evaluation, it must be documented in accordance with the Machinery Directive.

The Declaration of Conformity and Incorporation are invalidated in the event of a modification to the AC unit that is not coordinated with AL-KO THERM.

The warranty may also be invalidated.

NOTE



The valid spare parts list can be found as part of the unit documentation created on the basis of the order.

AL-KO THERM GmbH	Phone:	(+49) 82 25 / 39 - 0
Hauptstraße 248-250	Fax:	(+49) 82 25 / 39 - 2113
D-89343 Jettingen-Scheppach	E-mail:	klima.technik@al-ko.com
Germany	Web:	www.al-ko.com
Customer Service	Phone:	(+49) 82 25 / 39 - 2574
	E-mail:	service.center@al-ko.com

11 Certifications

The following EC Installation Declaration and EC Declaration of Conformity will be issued per order, according to their validity.

If both the order number and the position of the unit are specified, the issued document must be assigned to the respective unit.

11.1 EC Declaration of Incorporation conforming to 2006/42/EC

EG- EINBAUERKLÄRUNG

EC DECLARATION OF INCORPORATION
DÉCLARATION DE MONTAGE CE

Hersteller / *Manufacturer / Fabricant:* **AL-KO THERM GMBH I Hauptstraße 248-250 I 89343 Jettingen-Scheppach I Germany**

Im Sinne der EG- Maschinenrichtlinie 2006/42/EG, Anhang II, Teil 1, Abschnitt B
As defined in EC Machinery Directive 2006/42/EC, Annex II, Part 1, Section B
Au sens de la directive Machines CE 2006/42/CE, annexe II, partie 1, section B

Unvollständige Maschine / *Partly completed machinery / Machine incomplète:* **RLT**/Space air technical devices / Air d'espace les appareils echniques
Serie / *Series / Série:* AT4F
Auftrags-Nr. / *Order no. / N° de commande:* XXXXXXXXXXXXXXXXX **Position**/ *position/ la position:*

Hiermit erklären wir, dass die oben genannte unvollständige Maschine den folgenden EG/EU- Richtlinien entspricht:
We hereby declare that the above-mentioned partly completed machinery conforms to all relevant provisions of the following EC/EU directives:
Nous déclarons par la présente que le Machine incomplète susnommé répond à toutes les dispositions pertinentes de la directive CE/UE suivante:

Maschinenrichtlinie 2006/42/EG / *Machinery Directive 2006/42/EC / Directive Machines CE 2006/42/CE.*
Elektromagnetische Verträglichkeit 2014/30/EU / *Electromagnetic Compatibility 2014/30/EU / Compatibilité électromagnétique 2014/30/UE:*
Druckgeräterichtlinie 2014/68/EU / *Pressure Equipment Directive 2014/68/EU / Directive sur les appareils sous pression 2014/68/UE:*

Angewandte harmonisierte Normen / *Applied harmonized standards / Normes harmonisées appliquées:*

- DIN EN ISO 12100-1/-2,	Sicherheit von Maschinen – Allgemeine Gestaltungsleitsätze – Risikobeurteilung und Risikominderung *Safety of machinery - General principles for design - Risk assessment and risk reduction* *Sécurité des machines – Principes généraux de conception – Appréciation et réduction du risque*
- DIN EN 60204-1,	Sicherheit von Maschinen – Elektrische Ausrüstung von Maschinen – Teil 1: Allgemeine Anforderungen *Safety of machinery - Electrical equipment of machines - Part 1: General requirements* *Sécurité des machines – Equipement électrique des machines – Partie 1 : exigences générales*
- DIN EN 349,	Sicherheit von Maschinen - Mindestabstände zur Vermeidung des Quetschens von Körperteilen *Safety of machinery - Minimum gaps to avoid crushing of parts of the human body* *Sécurité des machines – Distances minimales pour prévention des contusions de parties du corps humain*
- DIN EN ISO 13857,	Sicherheit von Maschinen – Sicherheitsabstände gegen das Erreichen von Gefährdungsbereichen mit den oberen und unteren Gliedmaßen *Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs* *Sécurité des machines – Distances de sécurité empêchant l'entrée dans les zones dangereuses des membres supérieurs et inférieurs*
- DIN EN 61000-6-1,	Störfestigkeit für Wohnbereich, Geschäfts- und Gewerbebereiche sowie Kleinbetriebe *Immunity standard for residential, commercial and light-industrial environments* *Résistance au brouillage pour le domaine d'habitation, les locaux commerciaux et professionnels ainsi que les petites exploitations*
- DIN EN 61000-6-2,	Störfestigkeit für Industriebereiche *Immunity standard for industrial environments* *Résistance au brouillage pour les zones industrielles*
- DIN EN 61000-6-3,	Störaussendung für Wohnbereich, Geschäfts- und Gewerbebereiche sowie Kleinbetriebe *Emission standard for residential, commercial and light-industrial environments* *Émission au brouillage pour le domaine d'habitation, les locaux commerciaux et professionnels ainsi que les petites exploitations*
- DIN EN 61000-6-4,	Störaussendung für Industriebereiche *Emission standard for industrial environments* *Émission d'interférences pour les zones industrielles*
- DIN EN 378-2,	Kälteanlagen und Wärmepumpen – Sicherheitstechnische und umweltrelevante Anforderungen – Teil 2: Konstruktion, Herstellung, Prüfung, Kennzeichnung und Dokumentation *Refrigerating systems and heat pumps - Safety and environmental requirements - Part 2: Design, construction, testing, marking and documentation* *Installations frigorifiques et pompes à chaleur – Exigences techniques de sécurité et pertinentes écologiquement – Partie 2 : construction, fabrication, contrôle, marquage et documentation*

Zusätzlich angewendete Normen / *Additional applied standards / Normes appliquées supplémentaires :*

- DIN EN 1886,	Lüftung von Gebäuden – Zentrale raumlufttechnische Geräte – Mechanische Eigenschaften und Messverfahren *Ventilation for buildings - Air handling units - Mechanical performance* *Ventilation des bâtiments – Appareils centraux techniques à air conditionné – Propriétés mécaniques et procédés de mesure*
- DIN EN 13053,	Lüftung von Gebäuden; Zentrale raumlufttechnische Geräte – Leistungskenndaten für Geräte, Komponenten und Baueinheiten *Ventilation for buildings - Air handling units - Rating and performance for units, components and sections* *Ventilation des bâtiments ; appareils centraux techniques à air conditionné – Données caractéristiques de puissance pour les appareils, les composants et les unités de montage*
- VDMA 24167,	Ventilatoren – Sicherheitsanforderungen *Fans - Safety requirements* *Ventilateurs – Exigences de sécurité*
- VDI 6022,	Hygieneanforderungen an Raumlufttechnische Anlagen und -Geräte *Hygiene requirements for ventilation and air-conditioning systems and units* *Exigences hygiéniques applicables aux installations et appareils techniques à air conditionné*

Die Inbetriebnahme unseres Produktes bleibt so lange untersagt, bis festgestellt wurde, dass die Ausführung der Anlage/ Maschine, in welcher der Einbau erfolgen soll oder von dem es ein Teil sein wird, mit den entsprechenden Rechtsvorschriften übereinstimmt.
Our product is not cleared for commissioning and use until it has been determined that the product is going to be integrated into a facility/machine and/or is used as part of an assembly, which agree with all applicable laws and regulations.
La mise en service de ce produit est interdite tant qu'il n'a pas été constaté, que le modèle de l'installation/ la machine, dans lequel il doit être incorporé, ou dont il deviendra une partie, est conforme aux dispositions légales correspondantes.

Bevollmächtigter für die Zusammenstellung der technischen Unterlagen:
Authorized representative in charge of the technical document compilation:
Personne autorisée à constituer le dossier technique
Anschrift siehe Hersteller / *see manufacturer's address above / Adresse, voir fabricant*

Jettingen-Scheppach, 01.07.2019

Leiter der Abteilung Entwicklung
Head of Development Department
Chef du département de développement

Dr. Christian Stehle
Geschäftsführer / *Managing Director / Directeur général*

11.2 EC Declaration of Conformity conforming to 2006/42/EC

EG-KONFORMITÄTSERKLÄRUNG

EC DECLARATION OF CONFORMITY
DÉCLARATION DE CONFORMITÉ CE

AL-KO QUALITY FOR LIFE

Hersteller / *Manufacturer / Fabricant:* **AL-KO THERM GMBH I Hauptstraße 248-250 I 89343 Jettingen-Scheppach I Germany**

Im Sinne der EG- Maschinenrichtlinie 2006/42/EG, Anhang II, Teil 1, Abschnitt A
As defined in EC Machinery Directive 2006/42/EC, Annex II, Part 1, Section A
Au sens de la directive Machines CE 2006/42/CE, annexe II, partie 1, section A

Maschine / *Machine / Machine:* **RLT**/Space air technical devices / Air d'espace les appareils techniques
Serie / *Series / Série:* AT4F
Auftrags-Nr. / *Order no. / N° de commande:* XXXXXXXXXXXXXXXXXXX **Position** / *position/ la position:*

Hiermit erklären wir, dass die oben genannte Maschine alle sicherheitstechnischen Anforderungen der folgenden anwendbaren EG/EU- Richtlinien erfüllt:
We hereby declare that the above-mentioned machine conforms to all relevant safety-provisions of the following EG/EC directives:
Nous déclarons par la présente que la machine susmentionnée corresponde à toutes les des exigences de sécurité pertinentes de la directive CE/UE suivante:

Maschinenrichtlinie 2006/42/EG / *Machinery Directive 2006/42/EC / Directive Machines CE 2006/42/CE:*
Elektromagnetische Verträglichkeit 2014/30/EU / *Electromagnetic Compatibility 2014/30/EU / Compatibilité électromagnétique 2014/30/UE:*
Druckgeräterichtlinie 2014/68/EU / *Pressure Equipment Directive 2014/68/EU / Directive sur les appareils sous pression 2014/68/UE:*

Angewandte harmonisierte Normen / *Applied harmonized standards / Normes harmonisées appliquées:*

- DIN EN ISO 12100-1/-2,	Sicherheit von Maschinen – Allgemeine Gestaltungsleitsätze – Risikobeurteilung und Risikominderung *Safety of machinery - General principles for design - Risk assessment and risk reduction* *Sécurité des machines – Principes généraux de conception – Appréciation et réduction du risque*
- DIN EN 60204-1,	Sicherheit von Maschinen – Elektrische Ausrüstung von Maschinen – Teil 1: Allgemeine Anforderungen *Safety of machinery - Electrical equipment of machines - Part 1: General requirements* *Sécurité des machines – Equipement électrique des machines – Partie 1 : exigences générales*
- DIN EN 349,	Sicherheit von Maschinen - Mindestabstände zur Vermeidung des Quetschens von Körperteilen *Safety of machinery - Minimum gaps to avoid crushing of parts of the human body* *Sécurité des machines – Distances minimales de prévention des contusions de parties du corps humain*
- DIN EN ISO 13857,	Sicherheit von Maschinen – Sicherheitsabstände gegen das Erreichen von Gefährdungsbereichen mit den oberen und unteren Gliedmaßen *Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs* *Sécurité des machines – Distances de sécurité empêchant l'entrée dans les zones dangereuses des membres supérieurs et inférieurs*
- DIN EN 61000-6-1,	Störfestigkeit für Wohnbereich, Geschäfts- und Gewerbebereiche sowie Kleinbetriebe *Immunity standard for residential, commercial and light-industrial environments* *Résistance au brouillage pour le domaine d'habitation, les locaux commerciaux et professionnels ainsi que les petites exploitations*
- DIN EN 61000-6-2,	Störfestigkeit für Industriebereiche *Immunity standard for industrial environments* *Résistance au brouillage pour les zones industrielles*
- DIN EN 61000-6-3,	Störaussendung für Wohnbereich, Geschäfts- und Gewerbebereiche sowie Kleinbetriebe *Emission standard for residential, commercial and light-industrial environments* *Émission au brouillage pour le domaine d'habitation, les locaux commerciaux et professionnels ainsi que les petites exploitations*
- DIN EN 61000-6-4,	Störaussendung für Industriebereiche *Emission standard for industrial environments* *Émission d'interférences pour les zones industrielles*
- DIN EN 378-2,	Kälteanlagen und Wärmepumpen – Sicherheitstechnische und umweltrelevante Anforderungen – Teil 2: Konstruktion, Herstellung, Prüfung, Kennzeichnung und Dokumentation *Refrigerating systems and heat pumps - Safety and environmental requirements - Part 2: Design, construction, testing, marking and documentation* *Installations frigorifiques et pompes à chaleur – Exigences techniques de sécurité et pertinentes écologiquement – Partie 2 : construction, fabrication, contrôle, marquage et documentation*

Zusätzlich angewendete Normen / *Additional applied standards / Normes appliquées supplémentaires:*

- DIN EN 1886,	Lüftung von Gebäuden – Zentrale raumlufttechnische Geräte – Mechanische Eigenschaften und Messverfahren *Ventilation for buildings - Air handling units - Mechanical performance* *Ventilation des bâtiments – Appareils centraux techniques à air conditionné – Propriétés mécaniques et procédés de mesure*
- DIN EN 13053,	Lüftung von Gebäuden; Zentrale raumlufttechnische Geräte – Leistungskenndaten für Geräte, Komponenten und Baueinheiten *Ventilation for buildings - Air handling units - Rating and performance for units, components and sections* *Ventilation des bâtiments ; appareils centraux techniques à air conditionné – Données caractéristiques de puissance pour les appareils, les composants et les unités de montage*
- VDMA 24167,	Ventilatoren – Sicherheitsanforderungen *Fans - Safety requirements* *Ventilateurs – Exigences de sécurité*
- VDI 6022,	Hygieneanforderungen an Raumlufttechnische Anlagen und -Geräte *Hygiene requirements for ventilation and air-conditioning systems and units* *Exigences hygiéniques applicables aux installations et appareils techniques à air conditionné*
- 1253/2014/EU	Ökodesignrichtlinie / *Ecodesign Directive / Directive de design écologique*

Bei einer mit uns nicht abgestimmten Änderung der Maschine verliert diese Erklärung ihre Gültigkeit.
Any modification of this machine without confirmation shall automatically annul this declaration.
En cas de modification de la machine non convenue avec nous, la présente déclaration perd sa validité.

Bevollmächtigter für die Zusammenstellung der technischen Unterlagen:
Authorized representative in charge of the technical document compilation:
Personne autorisée à constituer le dossier technique
Anschrift siehe Hersteller / *see manufacturer's address above / Adresse, voir fabricant*

Jettingen-Scheppach, 01.07.2019

Leiter der Abteilung Entwicklung
Head of Development Department
Chef du département de développement

Dr. Christian Stehle
Geschäftsführer / *Managing Director / Directeur général*

Notes

© Copyright 2021
AL-KO THERM GMBH I Jettingen-Scheppach I Germany
All rights reserved for AL-KO THERM GMBH, as well as in the event of applications for industrial property rights. This documentation or excerpts thereof may not be copied or forwarded to third parties without the express consent of AL-KO THERM GMBH. We reserve the right to make technical changes that do not impair the function.

3086448_2.0/July 2021

AL-KO THERM GMBH I Headquarters **I** Hauptstraße 248 - 250 **I** D-89343 Jettingen-Scheppach **I** Germany
Phone +49 8225 39-0 **I** Fax +49 8225 39-2113 **I** klima.technik@al-ko.com **I** **www.al-ko.com**

8.27

Armacell Class O Tech Data

The following 25 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`Armacell Class O Tech Data.pdf`
Pages	25

AF/ArmaFlex® Class 0



THE FLEXIBLE & SUSTAINABLE INSULATION SYSTEM FOR ENERGY EFFICIENCY & CONDENSATION CONTROL – TRUSTED FOR OVER 40 YEARS

- Closed cell material
- Built in water vapour barrier reducing the risk of corrosion under insulation (CUI)
- FM and UL approved
- Built-in Microban® antimicrobial protection reduces mould and bacteria growth
- Low thermal conductivity value (0.033 W/m • K @ 0°C)
- Euroclass B/B_L-s3, d0
- BRE Green Guide A rating
- CE marked, EN 14304
- Highest system reliability when installed with ArmaFix pipe supports and ArmaFlex adhesives
- Available in handy self-seal tube format to speed up install times



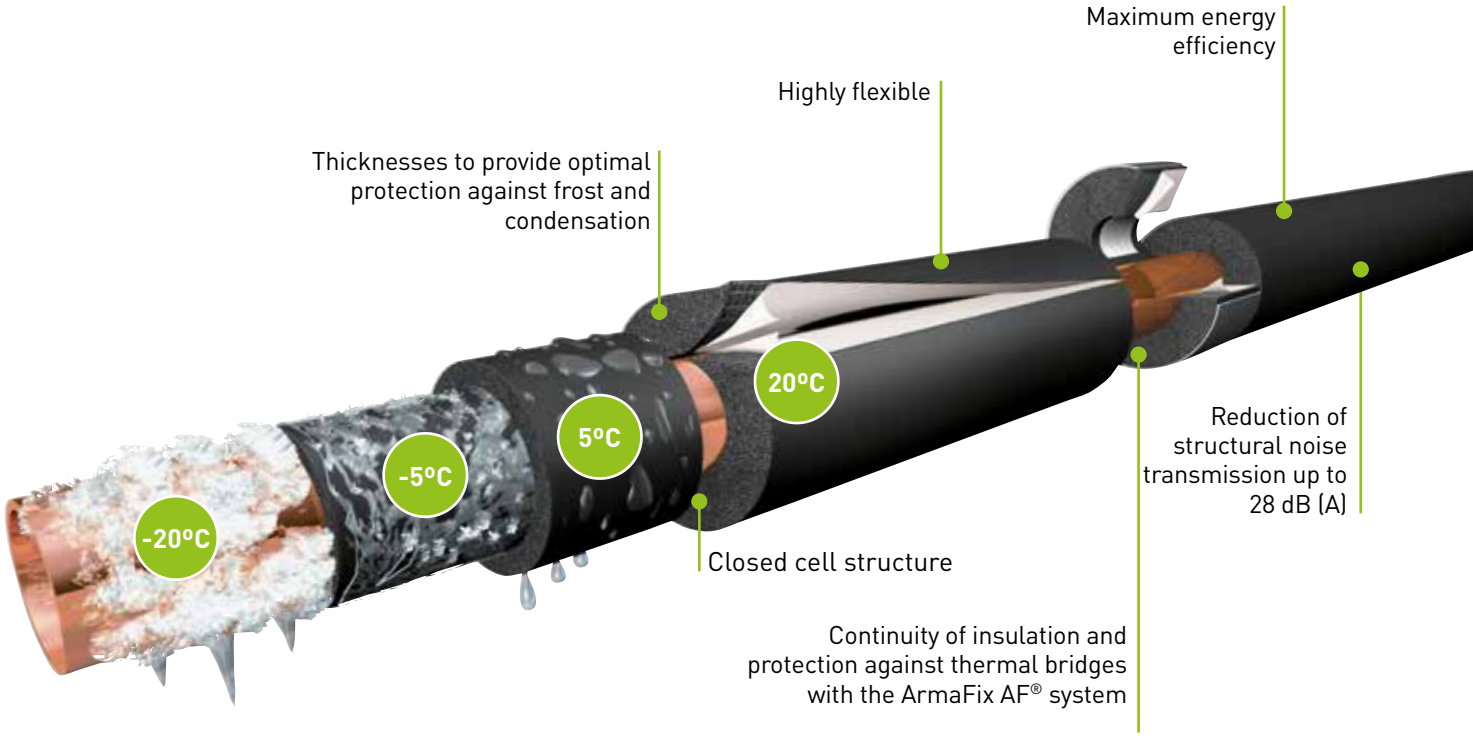






CE
FM APPROVED
RAL GÜTEZEICHEN Dämmstoffe aus Schaumkunststoffen FEF / PEF
BSI REGISTERED
UKAS ENVIRONMENTAL MANAGEMENT 003
Green Guide Rating BREEAM A
CONDENSATION CONTROL #1 CHOICE FOR ENERGY EFFICIENCY
EPD Environmental Product Declaration
PROTECTION THAT LIVES ON MICROBAN®

PROPERTIES



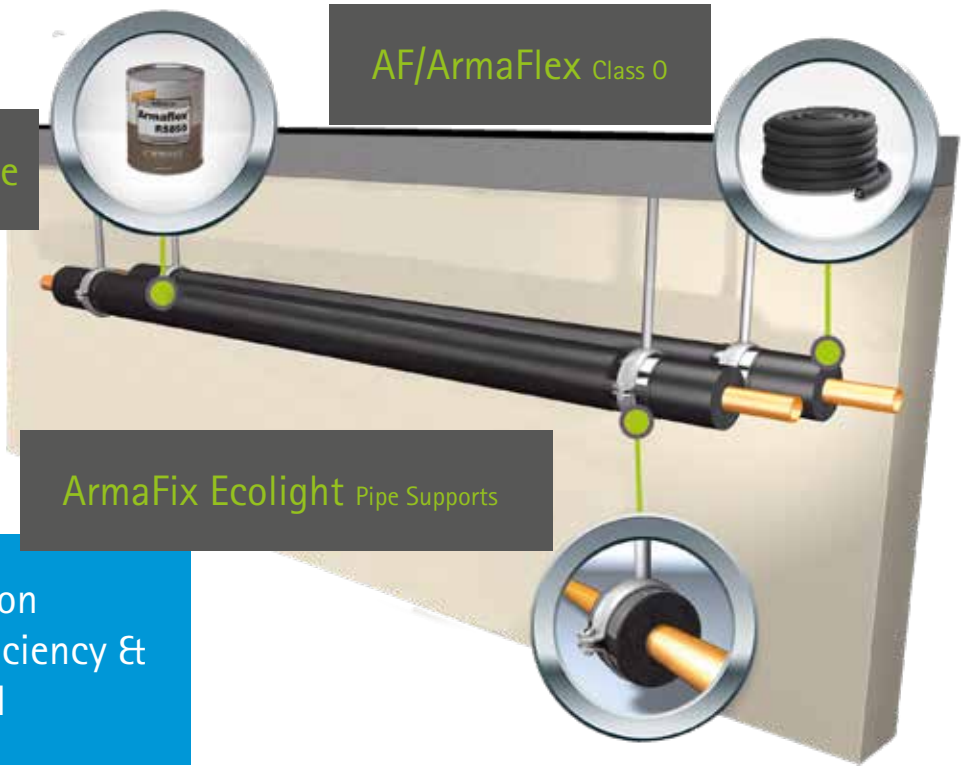
PROTECTION THAT LIVES ON MICROBAN®

- **Euroclass B_L-s3, d0**
- **λ 0°C ≤ 0,033 W/(m·K)**
- **μ ≥ 10,000**

for more information consult technical data

Green Guide Rating BREEAM A

COMPLETE SYSTEM



The complete insulation system for energy efficiency & condenstation control

RANGE

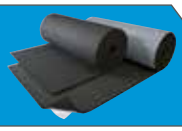
TUBE

Tubes, self-adhesive tubes (self-seal), AC coils, 15m coils



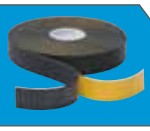
SHEET

Sheet, self-adhesive sheet, continuous sheet (rolls), self-adhesive continuous sheet (rolls)



TAPE

Self-adhesive tape



RECOMMENDED PRODUCTS

For a complete installation



ArmaFix Ecolight



ArmaFlex RS850 adhesive



ArmaFlex Cleaner



ArmaFinish 99

TECHNICAL DATA

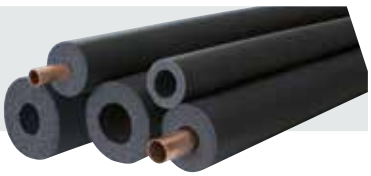
Flexible closed-cell thermal insulation with high resistance to water vapour diffusion, low thermal conductivity and built-in Microban® antimicrobial protection.

Material type	Flexible, closed-cell insulation material with built-in Microban® antimicrobial protection.
Colour	Black
Material information	Self-adhesive coating: pressure-sensitive adhesive coating on modified acrylate basis with mesh structure. Covered with polyethylene film.
Applications	Insulation/protection to control condensation, reduce energy loss and protect against frost on pipes, air ducts, vessels (incl. elbows, fittings, flanges etc). Suitable for hot and cold water services, chilled water lines, heating systems, air conditioning ductwork and refrigerated pipework.
Special features	MCCP-free
Safety & environment	Type III Environmental product Declaration (EPD): Declaration # EPD-ARM-20150110-IBB1-DE, Insitut Bauen und Umwelt e,V. (IBU).
Assembly	Lightweight and flexible. Closed cell structure means no additional vapour barrier is required.
Remarks	Declaration Of Performance (DOP) is available in accordance with Article 7(3) of regulation (EU) No 305/2011

Property	Value/Assessment	Test Ref	Standards & Remarks
Temperature Range			
Max service temperature	+110˚C (+85˚C if sheet or tape is glued to a flat object)	EU 5709	Tested acc to EN 14706, EN 14707 & EN 14304
Min service temperature	-50˚C (for temperatures below -50 ˚C please contact our technical department)		
Thermal Conductivity			
Tubes 6-19mm Sheet & tape 3-32mm	λ 0˚C ⩽ 0.033 W/(m·K) [33+0.1 · ϑ_m + 0.0008 · ϑ_m^2]/1000	EU 5709	Declared acc. to EN ISO 13787. Tested acc. to EN12667 & EN ISO 8497
Tubes 25-32mm	λ 0˚C ⩽ 0.036 W/(m·K) [36+0.1 · ϑ_m + 0.0008 · ϑ_m^2]/1000		
Water Vapour Diffusion Resistance			
Tubes 6-19mm Sheet 6-32mm	μ ⩾ 10,000	EU 5709	Tested acc.to EN 12086 & EN 13469
Tubes 25-32mm	μ ⩾ 7,000		
Fire Performance			
Tubes	B_L-s3, d0	EU 5709	Classified acc. to EN 13501-1. Tested acc. to EN 13823 & EN ISO 11925-2
Sheets & tapes	B-s3, d0		
Surface Spread of Flames	Class 1	GB 6935 & GB 6936	Tested acc. to BS 476 Part 7:1997
Fire Propagation	Total Index Performance (I) ⩽ 12 Sub Index (i_1) ⩽ 6		Tested acc. to BS 476 Part 6:1989
Fire performance acc. to Building Regulations	Class 0		
Fire Class	FM Approved	D5551	Tested acc.to UBC26-3 Class No. 4924
Fire resistance on metal pipes	EI30 - EI120	EU5584	Classified acc. to EN 13501-2. Tested acc.to EN1366-3
Marine approval	DNV-GL Approval	EU5928	Tested acc. to IMO 2010 FTP code
Practical fire behaviour	Self-extinguishing, does not drip & does not spread flames		
Other technical features			
Dimensions & tolerances	In accordance with EN 14304, table 1	EU 5709	Tested acc. to EN 822, EN 823 & EN 13467
UV resistance	For protection against UV radiation use ArmaFinish 99 paint. Alternatively use HT/ArmaFlex, ArmaFlex Tuffcoat or Arma-Chek Silver		
Health apects	ODP & GWP rating 0		
Storage & shelf life	Self-adhesive tapes, sheets & tubes	1 year	
Antimicrobial behaviour	Built-in Microban® active antimicrobial protection	No fungal growth observed	

TUBE

Length - 2m
Colour - Black
Antimicrobial protection - Microban®



Pipe max. Outside Ø (mm)	Inner tube. Ø min (mm)	Inner tube. Ø max (mm)	6mm INSULATION THICKNESS			9mm INSULATION THICKNESS		
			Code	m/carton		Code	m/carton	
6	7	9	AF-CO-06X006	544		AF-CO-09X006	352	
10	11	13	AF-CO-06X010	400		AF-CO-09X010	280	
12	13	15	AF-CO-06X012	336		AF-CO-09X012	240	
15	16	18	AF-CO-06X015	266		AF-CO-09X015	192	
20	21	23	-	-		AF-CO-09X020	156	
22	23	25	-	-		AF-CO-09X022	140	
28	29	31.5	-	-		AF-CO-09X028	98	
35	36	38.5	-	-		AF-CO-09X035	84	
42	43	46	-	-		AF-CO-09X042	60	
48	49	51.5	-	-		AF-CO-09X048	56	
54	55	58	-	-		AF-CO-09X054	54	
60	61	64	-	-		AF-CO-09X060	42	

Pipe max. Outside Ø (mm)	Inner tube. Ø min (mm)	Inner tube. Ø max (mm)	13mm INSULATION THICKNESS			19mm INSULATION THICKNESS		
			Code	m/carton		Code	m/carton	
6	7	9	AF-CO-13X006	226		-	-	
10	11	13	AF-CO-13X010	188		AF-CO-19X010	104	
12	13	15	AF-CO-13X012	162		AF-CO-19X012	92	
15	16	18	AF-CO-13X015	136		AF-CO-19X015	78	
18	19	21	AF-CO-13X018 •	118		AF-CO-19X018 •	70	
20	21	23	AF-CO-13X020	112		AF-CO-19X020	70	
22	23	25	AF-CO-13X022	104		AF-CO-19X022	64	
25	26	28	AF-CO-13X025 •	84		AF-CO-19X025 •	54	
28	29	31.5	AF-CO-13X028	78		AF-CO-19X028	50	
32	33	35.5	AF-CO-13X032 •	60		AF-CO-19X032 •	40	
35	36	38.5	AF-CO-13X035	60		AF-CO-19X035	40	
42	43	46	AF-CO-13X042	56		AF-CO-19X042	32	
48	49	51.5	AF-CO-13X048	40		AF-CO-19X048	30	
54	55	58	AF-CO-13X054	42		AF-CO-19X054	24	
60	61	64	AF-CO-13X060	36		AF-CO-19X060	24	
64	65	67	AF-CO-13X064 •	34		AF-CO-19X064 •	20	
67	68	71	AF-CO-13X067	34		AF-CO-19X067	20	
76	77	80	AF-CO-13X076	28		AF-CO-19X076	18	
80	81	84	AF-CO-13X080	28		AF-CO-19X080	16	
89	90	93	AF-CO-13X089	22		AF-CO-19X089	16	
93	94	97	AF-CO-13X093 •	20		AF-CO-19X093 •	16	
108	110	114	AF-CO-13X108 •	18		AF-CO-19X108 •	12	
114	116	120	AF-CO-13X114 •	18		AF-CO-19X114 •	12	

TUBE

Length - 2m, **Colour** - Black, **Antimicrobial protection** - Microban®



Pipe max. Outside Ø (mm)	Inner tube. Ø min (mm)	Inner tube. Ø max (mm)	25mm INSULATION THICKNESS			32mm INSULATION THICKNESS		
			Code	m/carton		Code	m/carton	
12	13	15	AF-CO-25X012	50		-	-	
15	16	18	AF-CO-25X015	48		AF-CO-32X015	32	
20	21	23	AF-CO-25X020	40		-	-	
22	23	25	AF-CO-25X022	40		AF-CO-32X022	32	
28	29	31.5	AF-CO-25X028	32		AF-CO-32X028	24	
35	36	38.5	AF-CO-25X035	24		AF-CO-32X035	18	
42	43	46	AF-CO-25X042	24		AF-CO-32X042	16	
48	49	51.5	AF-CO-25X048	22		AF-CO-32X048	12	
54	55	58	AF-CO-25X054	18		AF-CO-32X054	12	
60	61	64	AF-CO-25X060	18		AF-CO-32X060	12	
67	68	71	AF-CO-25X067	16		AF-CO-32X067	12	
76	77	80	AF-CO-25X076	14		AF-CO-32X076	10	
80	81	84	AF-CO-25X080	12		-	-	
89	90	93	AF-CO-25X089	12		AF-CO-32X089	8	
93	94	97	AF-CO-25X093 •	12		-	-	
108	110	114	AF-CO-25X108 •	8		-	-	
114	116	120	AF-CO-25X114 •	8		AF-CO-32X114 •	6	

LARGE DIAMETER TUBES

Length - 2m, **Colour** - Black, **Antimicrobial protection** - Microban®



Pipe max. Outside Ø (mm)	Inner tube Ø min (mm)	Inner tube Ø max (mm)	AF-2				AF-3			
			Insulation thickness (mm)	Code	m/carton		Insulation thickness (mm)	Code	m/carton	
125	127	131	15	AF-2-125	12		19	AF-3-125	12	
140	142	146	15.5	AF-2-140	8		19	AF-3-140	80	
160	162	166	16	AF-2-160	8		19	AF-3-160	8	

Pipe max. Outside Ø (mm)	Inner tube Ø min (mm)	Inner tube Ø max (mm)	AF-4				AF-5			
			Insulation thickness (mm)	Code	m/carton		Insulation thickness (mm)	Code	m/carton	
125	127	131	23.5	AF-4-125	12		31.5	AF-5-125	6	
140	142	146	24.5	AF-4-140	10		32	AF-5-140	6	
160	162	166	25	AF-4-160	6			-	-	
168	170	174	25	AF-4-168	4		45	AF-5-168	4	

DOMESTIC BUILDING SERVICES COMPLIANCE GUIDE

Length - 2m, **Colour** - Black, **Antimicrobial protection** - Microban®



Thickness required to meet Domestic Building Services Compliance Guide / Part L max permissible heat losses					
Pipe max. outside Ø (mm)	**Max Permissible Heat Loss (W/m)**	**Thickness**	**Code**	**m/carton**	
8	7.06	13	AF-CO-13X010	188	
10	7.23	13	AF-CO-13X010	188	
12	7.35	19	AF-CO-19X012	92	
15	7.89	19	AF-CO-19X015	78	
22	9.12	25	AF-CO-25X022	40	
28	10.07	25	AF-CO-25X028	32	
35	11.08	25	AF-CO-25X035	24	
42	12.19	25	AF-CO-25X042	24	
54	14.12	32	AF-CO-32X054	12	

Other information and remarks		
Length tolerance for tubes	±1.5%	
Thickness tolerance for tubes	⩽ 8mm	± 1mm
	9 - 18mm	± 1.5mm
	19 - 31mm	± 2.5mm
	> 31mm	± 3mm
All AF/ArmaFlex Class 0 tubes available as SLIT items. Add 0.12 p/m net after discount has been applied. For ordering add -SLT to above codes e.g. AF-CO-19X010-SLT		
• Not a stock item		

SELF-ADHESIVE TUBE (SELF SEAL)

Length - 2m, **Colour** - Black, **Antimicrobial protection -** Microban®



Pipe max. Outside - Ø (mm)	Inner tube Ø min (mm)	Inner tube Ø max (mm)	9mm INSULATION THICKNESS			13mm INSULATION THICKNESS		
			Code	m/carton		Code	m/carton	
15	16	18	AF-CO-09X015-A	192		AF-CO-13X015-A	136	
20	21	23	AF-CO-09X020-A •	156		AF-CO-13X020-A	112	
22	23	25	AF-CO-09X022-A	140		AF-CO-13X022-A	104	
28	29	31.5	AF-CO-09X028-A	98		AF-CO-13X028-A	78	
35	36	38.5	AF-CO-09X035-A	84		AF-CO-13X035-A	60	
42	43	46	AF-CO-09X042-A	60		AF-CO-13X042-A	56	
48	49	51.5	AF-CO-09X048-A •	56		AF-CO-13X048-A	40	
54	55	58	AF-CO-09X054-A	54		AF-CO-13X054-A	42	
60	61	64	AF-CO-09X060-A •	42		AF-CO-13X060-A	36	
67	68	71				AF-CO-13X067-A •	34	
76	77	80				AF-CO-13X076-A	28	
89	90	93				AF-CO-13X089-A	22	

Pipe max. Outside - Ø (mm)	Inner tube Ø min (mm)	Inner tube Ø max (mm)	19mm INSULATION THICKNESS			25mm INSULATION THICKNESS		
			Code	m/carton		Code	m/carton	
15	16	18	AF-CO-19X015-A	78		AF-CO-25X015-A	48	
20	21	23	AF-CO-19X020-A •	70		AF-CO-25X020-A •	40	
22	23	25	AF-CO-19X022-A	64		AF-CO-25X022-A	40	
28	29	31.5	AF-CO-19X028-A	50		AF-CO-25X028-A	32	
35	36	38.5	AF-CO-19X035-A	40		AF-CO-25X035-A	24	
42	43	46	AF-CO-19X042-A	32		AF-CO-25X042-A	24	
48	49	51.5	AF-CO-19X048-A	30		AF-CO-25X048-A	22	
54	55	58	AF-CO-19X054-A	24		AF-CO-25X054-A	18	
60	61	64	AF-CO-19X060-A	24		AF-CO-25X060-A	18	
67	68	71	AF-CO-19X067-A •	20		AF-CO-25X067-A •	16	
76	77	80	AF-CO-19X076-A	18		AF-CO-25X076-A	14	
89	90	93	AF-CO-19X089-A	16		AF-CO-25X089-A	12	

Other information and remarks		
Length tolerance for tubes	±1.5%	
Thickness tolerance for tubes	⩽ 8mm	± 1mm
	9 - 18mm	± 1.5mm
	19 - 31mm	± 2.5mm
	> 31mm	± 3mm

• Not a stock item

15M COILS

Colour - Black , **Antimicrobial protection** - Microban®, supplied in clear polyethylene bag



Pipe max. Outside - Ø (mm)	Inner tube Ø min (mm)	Inner tube Ø max (mm)	6mm INSULATION THICKNESS			9mm INSULATION THICKNESS		
			Code	m/carton		Code	m/carton	
6	7	9				AF-CO-09X006/E-15	180	
10	11	13	AF-CO-06X010/E-15	210		AF-CO-09X010/E-15	150	
12	13	15	AF-CO-06X012/E-15	180		AF-CO-09X012/E-15	135	
15	16	18	AF-CO-06X015/E-15 •	135		AF-CO-09X015/E-15	135	
20	21	23				AF-CO-09X020/E-15	105	
22	23	25				AF-CO-09X022/E-15	90	
28	29	31.5				AF-CO-09X028/E-15	75	

Pipe max. Outside - Ø (mm)	Inner tube Ø min (mm)	Inner tube Ø max (mm)	13mm INSULATION THICKNESS		
			Code	m/carton	
6	7	9	AF-CO-13X006/E-15	135	
10	11	13	AF-CO-13X010/E-15	105	
12	13	15	AF-CO-13X012/E-15	90	
15	16	18	AF-CO-13X015/E-15	90	
20	21	23	AF-CO-13X020/E-15	90	
22	23	25	AF-CO-13X022/E-15	75	
28	29	31.5	AF-CO-13X028/E-15	60	

AC COILS

Length - 2m, **Colour** - Black , **Antimicrobial protection -** Microban®, supplied in a specially designed carton for easy dispense



Pipe max. Outside - Ø (mm)	6mm INSULATION THICKNESS			9mm INSULATION THICKNESS		
	Code	m/carton		Code	m/carton	
6				AF-CO-09X006/E	70	
10	AF-CO-06X010/E	75		AF-CO-09X010/E	50	
12				AF-CO-09X012/E	45	
15	AF-CO-06X015/E	55		AF-CO-09X015/E	40	
20				AF-CO-09X020/E	34	
22				AF-CO-09X022/E	30	
28				AF-CO-09X028/E	26	

AC COILS

Length - 2m, **Colour** - Black , **Antimicrobial protection** - Microban®, supplied in a specially designed carton for easy dispense



Pipe max. Outside - Ø (mm)	13mm INSULATION THICKNESS		
	Code	m/carton	
6	AF-CO-13X006/E	45	
10	AF-CO-13X010/E	35	
12	AF-CO-13X012/E	32	
15	AF-CO-13X015/E	32	
20	AF-CO-13X020/E	28	
22	AF-CO-13X022/E	26	
28	AF-CO-13X028/E	20	

SHEET

Length - 2m, Width - 0.5m, **Colour** - Black , **Antimicrobial protection** - Microban®



Code	Thickness (mm)	m²/carton	
AF-CO-10MM	10	13	
AF-CO-13MM	13	9	
AF-CO-19MM	19	7	
AF-CO-25MM	25	5	
AF-CO-32MM	32	4	

SELF-ADHESIVE SHEET

Length - 2m, **Width** - 0.5m, **Colour** - Black , **Antimicrobial protection** - Microban®



Code	Thickness (mm)	m²/carton	
AF-CO-10MM/A •	10	13	
AF-CO-13MM/A •	13	9	
AF-CO-19MM/A •	19	7	
AF-CO-25MM/A •	25	5	
AF-CO-32MM/A •	32	4	

CONTINUOUS SHEET (ROLLS)

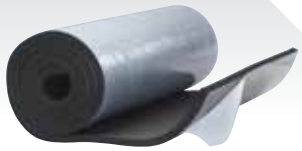
Width - 1m, **Colour** - Black, **Antimicrobial protection** - Microban®



Code	Thickness (mm)	Roll Length (m)	m²/carton	
AF-03MM/E •	3	30	30	
AF-CO-06MM/E	6	15	15	
AF-CO-10MM/E	10	10	10	
AF-CO-13MM/E	13	8	8	
AF-CO-19MM/E	19	6	6	
AF-CO-25MM/E	25	4	4	
AF-CO-32MM/E	32	3	3	
AF-50MM/E	50	5	5	

SELF-ADHESIVE CONTINUOUS SHEET (ROLLS)

Width - 1m, **Colour** - Black, **Antimicrobial protection** - Microban®



Code	Thickness (mm)	Roll Length (m)	m²/carton	
AF-03MM/EA •	3	30	30	
AF-CO-06MM/EA •	6	15	15	
AF-CO-10MM/EA •	10	10	10	
AF-CO-13MM/EA •	13	8	8	
AF-CO-19MM/EA •	19	6	6	
AF-CO-25MM/EA •	25	4	4	
AF-CO-32MM/EA •	32	3	3	
AF-50MM/EA •	50	5	5	

Other information and remarks		
Length tolerance for tubes and sheet	± 1.5 to 5%	
Thickness tolerance for sheets	⩽ 6mm	± 1mm
	7 - 19mm	± 1.5mm
	> 19mm	± 2mm
• Not a stock item.		

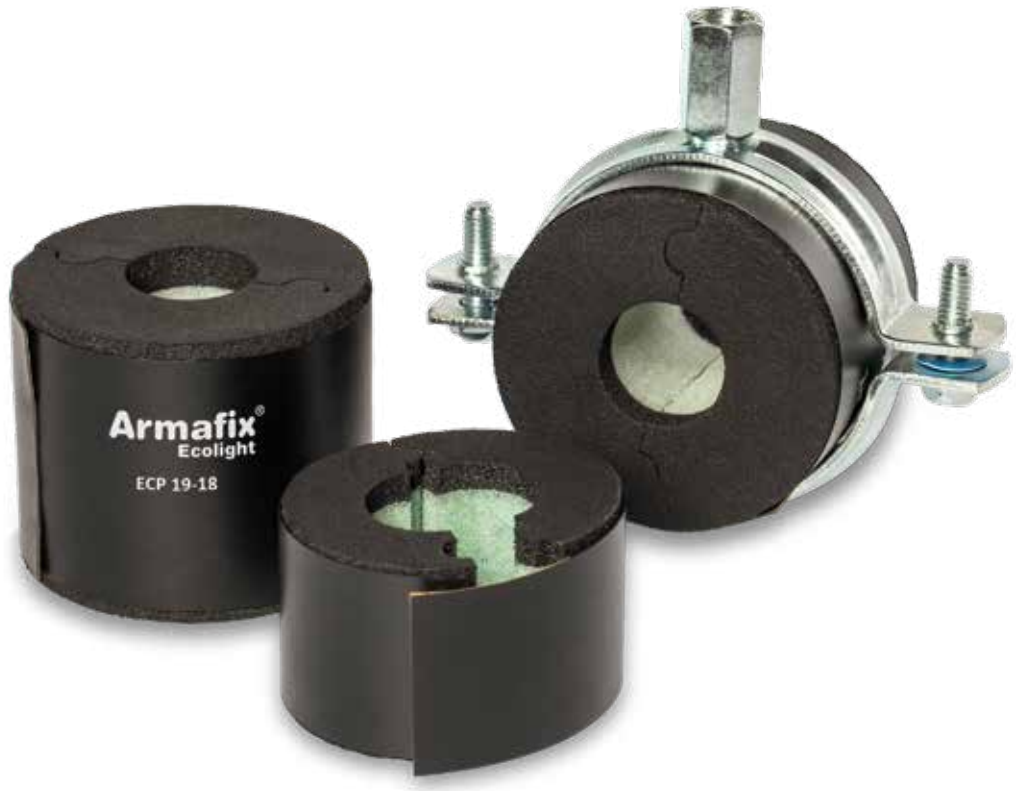
TAPE

Colour - Black, **Antimicrobial protection** - Microban®



Code	Width (mm)	Length (m)	Thickness (mm)	Rolls/carton	
AF-TAPE-MC	50	15	3	12	

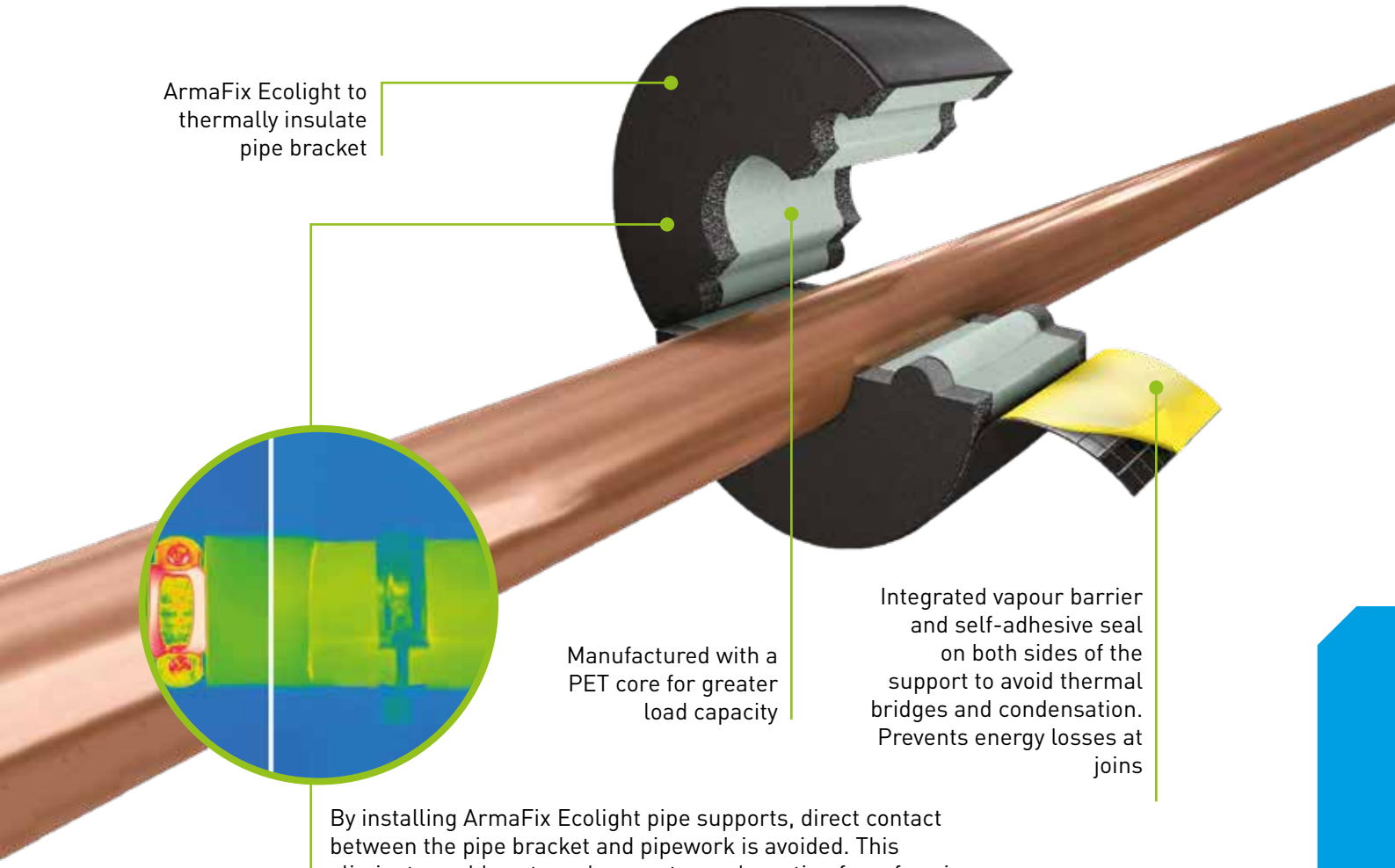
ArmaFix® Ecolight



ECO-FRIENDLY PIPE SUPPORTS FOR A COMPLETE INSULATION SYSTEM

- Available in 13, 19, 25, 32 & 40mm insulation thickness
- Light weight pipe support system with a density of 95 - 105kg/m³
- Thermal Conductivity 0.033 W/(m · k)
- Temperature range -30°C up to +80°C
- Fire rating to match ArmaFlex insulation
- Energy saving & condensation control
- Self seal closing seams for fast application
- Prevents thermal bridging at pipe fixings for HVAC applications
- Dust and fibre free
- PET Material is made using 100% recycled PET bottles
- Compatible with ArmaFlex black elastomeric ranges
- ArmaFix clamps available with M8/M10 mounting nut

PROPERTIES



By installing ArmaFix Ecolight pipe supports, direct contact between the pipe bracket and pipework is avoided. This eliminates cold spots and prevents condensation from forming on chilled water and refrigeration lines. By helping to control condensation, the risk of corrosion and secondary damage to surrounding goods and equipment can be prevented

RECYCLED PET FOAM

Made using 100% recycled plastic bottles, diverting thousands of tonnes of plastic from landfill.



CLAMPS

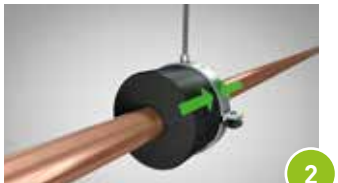
ArmaFix clamps are available to match the ArmaFix Ecolight sizes.



INSTALLATION GUIDE



1 Install the support around the pipe, seal the surface using adhesive & remove the backing strip.



2 Close the seam applying firm pressure & push the pipe support into the middle of the clamp.



3 Tighten the screws & before installing the tube, glue the edges of the pipe support to the pipe.



4 Wet seal the butt joins using the adhesive. Install the insulation either side of the support & fit under slight compression.

PIPE SUPPORTS & CLAMPS



RECOMMENDED PRODUCTS

For a complete installation



ArmaFlex 520 adhesive



ArmaFlex RS850 adhesive



AF/ArmaFlex Class 0

TECHNICAL DATA

Pipe support for refrigeration and air conditioning applications to prevent condensation at fixing points. PET load bearing segments with outer ArmaFlex layer for system compatibility with adjoining insulation.

Material type	PET foam bearing segments with outer ArmaFlex insulation for connection to adjoining tube sections. Outside cladding made from PVC foil.
Colour	Black
Material information	Traces of silicon can be found on the protective film used on the self-adhesive closures. Please contact our customer services for details
Applications	An integral component for ArmaFlex insulation systems, providing thermal isolation of pipework in air conditioning and refrigeration appications.
Remarks	When used in applications with intermittent temperatures, expansion of the insulation should be taken into account during installation (application temperature above 10˚C)

Property	**Value/Assessment**	**Standards & Remarks**
Temperature Range		
Max service temperature	+80˚C	
Min service temperature	0˚C	
Thermal Conductivity		
	0.033 W/m•K) @ 0°C	Declared acc. to EN ISO 13787 Tested acc. to EN12667 & EN ISO 8497
Water Vapour Diffusion Resistance		
	μ ≥ 10,000	Tested acc.to EN 12086 & EN 13469
Fire Performance		
Reaction to fire	Euroclass E Euroclass Bs3 d0 (when installed with an Bs3 d0 rated pipe insulation). Equivalent to Class O rating in the UK	Classified acc. to EN 13501-1 Tested acc. to EN 13823 & EN ISO 11925-2
Acoustic Performance		
Reduction of structure-borne sound transmission	According to insulation material used	
Other technical features		
Density	95 - 105 kg/m^3 (pipe bearing segments)	
Storage & shelf life	Products with self-adhesive closures to be installed within 1 year	

ArmaFix Clamps	
Description	Pipe clamp with quick release closing and combination mounting nut
Material type	Steel with an electrolytic zinc coating to protect the clamp from corrosion.
Colour	Silver
Material information	Clamp supplied with combination nut for fixing to threaded rod.
Applications	For use alongside ArmaFlex insulation at pipe hanging points to eliminate thermal bridging on refrigeration and air-conditioning installations.
Fire Performance	The insulation layer does not affect the fire performance of the steel clamp
Screw connections	M8 / M10 combination nut
Tension screws	M6 / M8
Clamp	Width 20mm - 30mm, Thickness 1.5mm - 3mm

PIPE SUPPORTS AND CLAMPS



Pipe max. Outside - Ø (mm)	Max permissable distance (m)	13mm INSULATION THICKNESS			CLAMPS 13mm		
		Code	Pieces/carton		Code	Pieces/carton	
6	2	ECP-13X006	25		PCX 025/030	25	
10	2	ECP-13X010	25		PCX 025/030	25	
12	2	ECP-13X012	25		PCX 025/030	25	
15	2	ECP-13X015	25		PCX 033/037	25	
18	2	ECP-13X018	25		PCX 033/037	25	
22	2	ECP-13X022	25		PCX 042/046	25	
28	3	ECP-13X028	25		PCX 047/052	25	
32	3	ECP-13X032	25		PCX 047/052	25	
35	3	ECP-13X035	25		PCX 054/058	25	
42	3	ECP-13X042	25		PCX 063/068	25	
48	4	ECP-13X048	20		PCX 068/073	10	
54	4	ECP-13X054	20		PCX 068/073	10	
60	4	ECP-13X060	20		PCX 082/085	10	
64	4	ECP-13X064	20		PCX 082/085	10	
76	5	ECP-13X076	20		PCX 092/099	10	
89	6	ECP-13X089	15		PCX 108/112	10	
102	6	ECP-13X102	15		PCX 125/130	10	
114	6	ECP-13X114	15		PCX 133/137	10	

Pipe max. Outside - Ø (mm)	Max permissable distance (m)	19mm INSULATION THICKNESS			CLAMPS 19mm		
		Code	Pieces/carton		Code	Pieces/carton	
6	2	ECP-19X006	25		PCX 038/041	25	
10	2	ECP-19X010	25		PCX 038/041	25	
12	2	ECP-19X012	25		PCX 038/041	25	
15	2	ECP-19X015	25		PCX 047/052	25	
18	2	ECP-19X018	25		PCX 047/052	25	
22	2	ECP-19X022	25		PCX 054/058	25	
28	3	ECP-19X028	25		PCX 059/063	25	
32	3	ECP-19X032	25		PCX 059/063	25	
35	3	ECP-19X035	25		PCX 063/068	10	
42	3	ECP-19X042	20		PCX 068/073	10	
48	4	ECP-19X048	20		PCX 072/080	10	
54	4	ECP-19X054	20		PCX 082/085	10	
60	4	ECP-19X060	20		PCX 088/092	10	
64	4	ECP-19X064	20		PCX 088/092	10	
76	5	ECP-19X076	20		PCX 099/103	10	
89	6	ECP-19X089	15		PCX112/118	10	
102	6	ECP-19X102	15		PCX133/137	10	
114	6	ECP-19X114	15		PCX137/142	10	

Pipe max. Outside - Ø (mm)	Max permissable distance (m)	25mm INSULATION THICKNESS			CLAMPS 25mm		
		Code	Pieces/carton		Code	Pieces/carton	
6	2	ECP-25X006	25		PCX 047/052	25	
10	2	ECP-25X010	25		PCX 047/052	25	
12	2	ECP-25X012	25		PCX 047/052	25	
15	2	ECP-25X015	25		PCX 059/063	25	
18	2	ECP-25X018	25		PCX 059/063	25	
22	2	ECP-25X022	25		PCX 063/068	25	
28	3	ECP-25X028	20		PCX 068/073	25	
32	3	ECP-25X032	20		PCX 068/073	25	
35	3	ECP-25X035	20		PCX 072/080	25	
42	3	ECP-25X042	20		PCX 082/085	25	
48	4	ECP-25X048	20		PCX 088/092	10	
54	4	ECP-25X054	20		PCX 092/099	10	
60	4	ECP-25X060	20		PCX 099/103	10	
64	4	ECP-25X064	20		PCX 099/103	10	
76	5	ECP-25X076	20		PCX 112/118	10	
89	6	ECP-25X089	15		PCX 133/137	10	
102	6	ECP-25X102	15		PCX 137/142	10	
114	6	ECP-25X114	15		PCX 159/164	10	

Pipe max. Outside - Ø (mm)	Max permissable distance (m)	32mm INSULATION THICKNESS			CLAMPS 32mm		
		Code	Pieces/carton		Code	Pieces/carton	
6	2	ECP-32X006	25		PCX 063/068	25	
10	2	ECP-32X010	25		PCX 063/068	25	
12	2	ECP-32X012	25		PCX 063/068	25	
15	2	ECP-32X015	20		PCX 072/080	10	
18	2	ECP-32X018	20		PCX 072/080	10	
22	2	ECP-32X022	20		PCX 072/080	10	
28	3	ECP-32X028	20		PCX 088/092	10	
32	3	ECP-32X032	20		PCX 092/099	10	
35	3	ECP-32X035	20		PCX 092/099	10	
42	3	ECP-32X042	20		PCX 099/103	10	
48	4	ECP-32X048	20		PCX 108/112	10	
54	4	ECP-32X054	20		PCX 112/118	10	
60	4	ECP-32X060	20		PCX 112/118	10	
64	4	ECP-32X064	20		PCX 125/130	10	
76	5	ECP-32X076	20		PCX 133/137	10	
89	6	ECP-32X089	15		PCX 145/152	10	
102	6	ECP-32X102	15		PCX 159/164	10	
114	6	ECP-32X114	15		PCX 168/173	10	
140	6	ECP-32X140	15		PCX 199	10	
168	6	ECP-32X168	15		PCX 222	10	

Pipe max. Outside - Ø (mm)	Max permissable distance (m)	40mm INSULATION THICKNESS			CLAMPS 40mm		
		Code	Pieces/carton		Code	Pieces/carton	
6	2	ECP-40X006	20		PCX 082/085	10	
10	2	ECP-40X010	20		PCX 082/085	10	
12	2	ECP-40X012	20		PCX 082/085	10	
15	2	ECP-40X015	20		PCX 088/092	10	
18	2	ECP-40X018	20		PCX 092/099	10	
22	2	ECP-40X022	20		PCX 092/099	10	
28	3	ECP-40X028	20		PCX 099/103	10	
32	3	ECP-40X032	20		PCX 108/112	10	
35	3	ECP-40X035	20		PCX 122/118	10	
42	3	ECP-40X042	20		PCX 125/130	10	
48	4	ECP-40X048	20		PCX 133/137	10	
54	4	ECP-40X054	20		PCX 133/137	10	
60	4	ECP-40X060	20		PCX 133/137	10	
64	4	ECP-40X064	20		PCX 137/142	10	
76	5	ECP-40X076	20		PCX 145/152	10	
89	6	ECP-40X089	15		PCX 164/169	10	
102	6	ECP-40X102	15		PCX 168/173	10	
114	6	ECP-40X114	15		PCX 199	10	

ArmaFlex RS850

NON-DRIP ADHESIVE FOR FASTER & CLEANER APPLICATIONS.

- Minimum solvent emissions when idle
- Ideal for hard to access areas
- Extended shelf-life
- Reduced solvent content to meet requirements for sustainable building projects
- Superior bonding with Armaflex
- Thixotropic gel based adhesive
- Low viscosity, air drying adhesive



Non-drip one component adhesive in gel form. Specifically developed for ArmaFlex insulation materials based on synthetic rubber.	
Material type	Thixotropic contact adhesive on polychloroprene basis.
Colour	Beige
Material special info	Gel form
Applications	Application on pipes, ducts and tanks with service temperature up to +70˚C. Gluing of all flexible ArmaFlex insulation materials (except HT/ArmaFlex & ArmaFlex Ultima).
Special features	Specially formulated adhesive for uniform and safe seam bonding of ArmaFlex insulation materials.
Assembly	Please observe our installation instructions/product data sheets. Application temperature: ideally +20˚C, not below 0˚C. At temperatures below +5˚C or high humidity approx above 80%), increased condensation may form on the surfaces to be glued or adhesive films. In these cases bonding is poor or impossible. This can be tested by using absorbent paper (blotting or crepe paper). Work should not be carried out on operating plant or areas expossed to strong sunlight. Shake and stir well before use. Apply thinly to the areas to be bonded with a brush or spatula. For contact adhesion press together with force during the contact adhesion time. Detailed application guidance is avalable.
Remarks	The adhesive achieves its final strength after 24 hours. The system should never be operated during this time and any self-adhesive tape or protective coating (exception: ArmaFinish 99), should only be applied after the time has elapsed.

Temperature Range	
Max service temperature	+70˚C
Min service temperature	-40˚C
Performance	
Coverage (guidance only)	Minimum consumption with the adhesive applied to both surfaces: **ArmaFlex tubes** (thickness > consumption unslit > consumption slit) • 10mm > 1,120m per litre > 140m per litre • 20mm > 280m per litre > 70m per litre • 30mm > 175m per litre > 45m per litre • 40mm > 130m per litre > 35m per litre **ArmaFlex Sheets** • 3-4 m^2 per litre
Storage & shelf life	
36 months in an unopened container. Store between 0˚C and 35˚C in a dry place. Do not store with explosive substances or spontaneosly combusting substances. Store as cool as possible but protected from frost. Cold or frozen adhesive (under 5˚C) will become fully useable if slowly acclimatised up to working temperature (approx 20˚C)	
Preparation of surfaces	
Clean surfaces and ArmaFlex Ultima surface with Armaflex Cleaner. Compatibility with bases: • Very good adhesion to metallic surfaces. • The adhesive's compatibility with colour coated surfaces needs to be tested. • Incompatible with asphalt, bitumen, red lead (linseed oil-based), polystyrene and plasticated PVC	
Woking time at 20 ˚C	
Wet adhesion time	Up to 2 minutes
Drying time	2 min
Contact adhesion	10 - 15 mins
Setting	24 hours
The open time depends on the quantity as well as indoor climate conditions. Before operating plant the setting time needs to be allowed to elapse.	
Other technical features	
Flash point	approx -17 ˚C
Expolsion limits	**Lower:** approx 1.1 Vol %, **Upper:** approx 11.5 Vol %
Hazard class	Highly flammable, Regulation of inflammable liquids.
Ageing stability	Very good
Resistance to weathering	Very good
Recycling	Allocation of a waste code number, according to the European Waste Catalouge, should be carried out in agreement with the regional waste disposal company. For details see relevant Safety Data Sheet. Packaging must be emptied of all residues. Packaging with traces of cured product can be recycled. Packaging with uncured product must be recycled into new product.
Transport classes	Depending on the type of transport

ARMAFLEX RS850



Code	Description	Pieces/carton	£/pc
ADH-RS850/0.5	ArmaFlex RS850 0.5 Litre can	6	25.44

ArmaFinish 99

THE ELASTIC PAINT DESIGNED FOR PROTECTION & COVERING OF ARMAFLEX

- Resistant to weathering and ageing
- Coating remains elastic
- Drip-free paint
- Specially developed for covering Armaflex®
- Protection of Armaflex® insulation materials



ARMAFINISH 99 UV resistant paint that remains permanently elastic, resistant to weathering and with good ageing resistance.	
Colour	Black, White (RAL 9001) OR GREY (RAL 7037)
Material type	Non-drip
Material special info	Normal consumption: 0.55 Litres per M^2 when two coats applied (corresponds to a dry film thickness of 0.26mm)
Applications	Protection of ArmaFlex insulation materials when installed outdoors and for marking purposes when used indoors.
Assembly	ArmaFlex insulation (except HT/ArmaFlex & ArmaFlex Ultima, see product data sheets) installed outdoors, should be covered with two coats. Application temperature: +10˚C to +30 ˚C, Drying time: 2 hours (+20 ˚C), Max relative humidity: 80%. It's necessary to allow 2 hours between each coat and the second coat must be applied within 7 days. The paint may be applied with a brush or roller and tools cleaned with with water or ArmaFlex cleaner.
Remarks	Unprotected ArmaFlex must not be exposed to weathering for more than 3 days and ArmaFinish 99 paint should be applied as soon as possible. The protective coating should be inspected at regular intervals. After 2 years at the latest a further two coats should be applied.

Technical features	
Storage & shelf life	12 months in unopened container. Once open keep container tightly closed in a cool, well ventilated place and potect from frost.
Explosion limits	None
Recycling	Allocation of a waste code number, according to the European Waste Catalogue, should be carried out in agreement with the regional waste disposal company. For details see relevant Safety Data Sheet. Cans must be emptied prior to recycling. Cans containing adhesive must be recycled into new product.

ARMAFINISH 99 PAINT

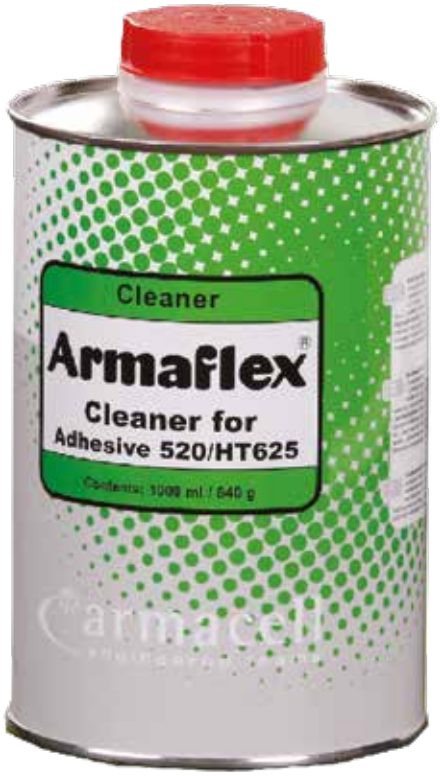


Code	Description	Pices/carton
FINISH/BK-2.5	Protective paint for ArmaFlex, black, 2.5 Litres	4
FINISH/WH-2.5	Protective paint for ArmaFlex, White, 2.5 Litres	4
FINISH/GY-2.5	Protective paint for ArmaFlex, grey, 2.5 Litres	4

ArmaFlex Cleaner

SURFACE CLEANER FOR ARMAFLEX INSTALLATIONS

- Ensures a clean surface before the use of ArmaFlex® Adhesives
- Removal of dirt from surfaces
- Cleaning of brushes and tools contaminated with ArmaFlex® adhesive



ARMAFLEX Cleaner Special cleaner for use with all ArmaFlex adhesives	
Colour	Clear
Material special info	Liquid
Applications	Cleaning of surfaces where ArmaFlex is to be installed.
Assembly	To ensure a perfect adhesion all contaminated sufaces, including ArmaFlex, must be cleaned. In addition the cleaner can be used to sufaces where ArmaFinish 99 is being applied.
Remarks	Can also be used to clean tools.

Technical features	
Storage & shelf life	12 months sealed in original container. Keep container tightly closed in a cool, well ventilated place. Protect from heat & direct sunlight. Do not store together with explosive substances or spontaneously combusting subtances.
Preparation of surfaces	Clean surfaces and ArmaFlex surface with ArmaFlex Cleaner. Compatibility with bases: • Very good adhesion to metallic sufaces. • The adhesive's compatibility with colour coated sufaces needs to be tested. • Incompatible with asphalt, bitumen and red lead (linseed oil-based)
Flash point	approx -20 °C
Explosion limits	Lower: approx 1% Vol, Upper: approx 13 % Vol. Regulation of inflammable liquids.
Recycling	Allocation of a waste code number, according to the European Waste Catalouge, should be carried out in agreement with the regional waste disposal company. For details see relevant Safety Data Sheet. Packaging must be emptied of all residues. Cans must be emptied prior to recycling. Cans containing adhesive must be recycled into new product.
Transport classes	Dependent on the transport sector

ARMAFLEX CLEANER



Code	Description	Pices/carton
CLEANER/1.0	Special cleaner for use with ArmaFlex Adhesive	4

8.28

Armitage Shanks Accessible WC

The following page is the document exactly as received and checked. It is bookmarked in the PDF.

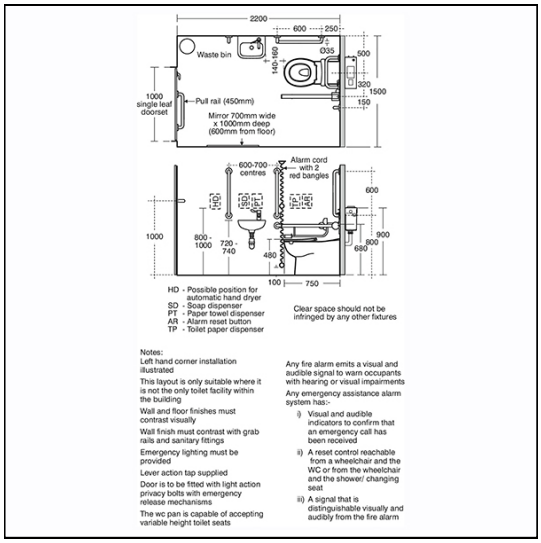
Reference	
Asset	General
Provided by	Not recorded
Source file	`Armitage Shanks Accessible WC.pdf`
Pages	1

Doc M Contour 21+ Back To Wall Pack LH

ILLUSTRATED

S0685 Doc M Contour 21+ back to wall left hand corner pack, rimless WC pan, water saving delay fill Conceala cistern with spatula lever, grab rails, hinged support rail with toilet roll holder, seat no cover with retaining buffers, copper tails on TMV3 mixer tap





ILLUSTRATED PRODUCT DETAILS

Weights

S0685 69.65 KG

Materials

S0685 Mixed Material

Finishes

S0685 White (AC)

Capacity

S0685 6.0 litres

Flow rates

S0685 4 Litres per minute @ 3 bar pressure

FINISH OPTIONS

(AC) White

(LI) Blue

(LJ) Grey

(MY) Stainless Steel

(RN) Charcoal

(GQ) Red

Standards

Vitreous china to BS 3402

BS 8300 compliant

Special Notes

Doc M packs are available both right and left hand corner arrangement, illustrated is left hand arrangement. Supplied with layout drawings, detailing the fixing positions necessary for Doc M compliance. Pan incorporates full outlet pipe that extends beyond the pan to allow for easier installation and inspection of pipe seal once installed.
White:Ral=9016, LRV=87
Blue:Ral=5011, LRV=6
Red:Ral=3020, LRV=12
Grey:Ral=7005, LRV=19
Charcoal:Ral=7016, LRV=8

ACCREDITATIONS

FEATURES

Ideal Standard (UK) Ltd. makes every effort to ensure that the information provided on its website is accurate. However, we cannot guarantee this, and accept no liability for any information or advice given via its website.

8.29

Armitage Shanks Ambulant WC

The following page is the document exactly as received and checked. It is bookmarked in the PDF.

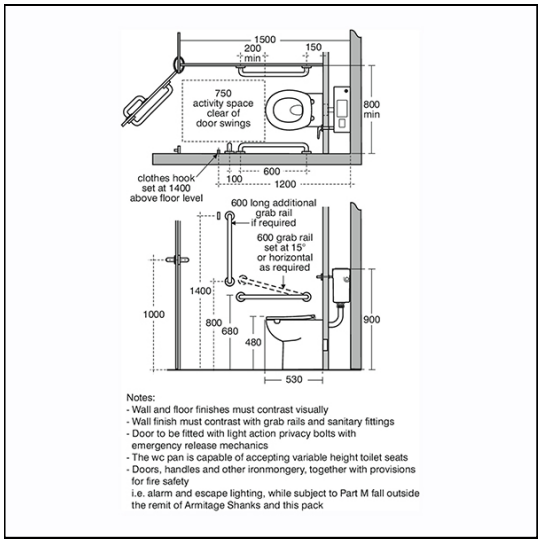
Reference	
Asset	General
Provided by	Not recorded
Source file	`Armitage Shanks Ambulant WC.pdf`
Pages	1

Doc M Contour 21+ Ambulant Care back to wall pack

ILLUSTRATED

S0681 Doc M Ambulant care WC pack with Contour 21+ rimless back-to-wall WC, floor fixing kit, conceala cistern with lever, grab rails, seat no cover with retaining buffers and white plastic clothes hook





ILLUSTRATED PRODUCT DETAILS

Weights

S0681 69.65 KG

Materials

S0681 Vitreous China

Finishes

S0681 White (AC)

Capacity

S0681 6.0 litres

FINISH OPTIONS

(AC) White

(LI) Blue

(LJ) Grey

(MY) Stainless Steel

(RN) Charcoal

(GQ) Red

Special Notes

Levers can be fitted on left or right of cisterns. All washrooms must have at least one ambulant accessible wc compartment. Supplied with layout drawings, detailing the fixing positions necessary for Doc M compliance. See seat and rail pages for individual items colour options.

White:Ral=9016, LRV=87
Blue:Ral=5011, LRV=6
Red:Ral=3020, LRV=12
Grey:Ral=7005, LRV=19
Charcoal:Ral=7016, LRV=8

FEATURES

Ideal Standard (UK) Ltd. makes every effort to ensure that the information provided on its website is accurate. However, we cannot guarantee this, and accept no liability for any information or advice given via its website.

8.30

Armitage Shanks Cleaners Sink

The following page is the document exactly as received and checked. It is bookmarked in the PDF.

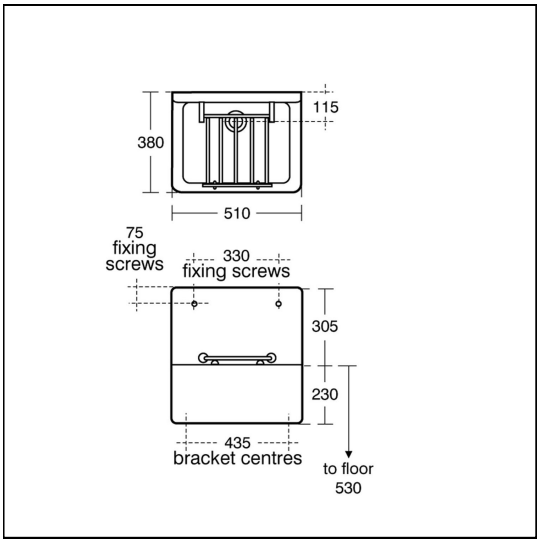
Reference	
Asset	General
Provided by	Not recorded
Source file	`Armitage Shanks Cleaners Sink.pdf`
Pages	1

Alder Sink & Bucket Grating

ILLUSTRATED

S5900	Alder sink 51cm x 38cm high back and fitted stainless steel bucket grating
S9101	Domex screws (pair)
B1457	Alterna 21 bib taps 1/2"lever handles with anti-vandal outlet (pair)
B1688	Nimbus 21 exposed bib tap wall mount with self centralising installation (pair)
S9233	Leg 350mm stainless steel with 355mm screw to wall Aluminium alloy bearer, 305mm stud (pair)
S8726	Waste 1½" unslotted strainer waste, 80mm tail. brass
S8925	Trap 1½" plastic resealing bottle with 75mm seal, multi-purpose outlet





OPTIONS

B1673	Nimbus 21 1/2" bib taps with anti-vandal outlet (pair)
B1686	Nimbus 21 concealed bib tap wall mount with self centralising installation (pair)
S9221	Brackets build-in Aluminium alloy, 355mm overall, 305mm stud (pair)
S8915	Trap 1½" plastic bottle with 75mm seal, multi-purpose outlet
A5900	TMV thermostatic mixing valve, 15mm

FEATURES

ILLUSTRATED PRODUCT DETAILS

Weights

S5900	31.00 KG
S9101	0.22 KG
S9233	1.51 KG
S8726	0.39 KG
S8925	0.33 KG

Materials

S5900	Fireclay
S9101	Metal
B1457	Chrome Plated Brass
B1688	Chrome Plated Brass
S9233	Stainless Steel
S8726	Brass
S8925	Plastic

Finishes

S5900	White (01)
S9101	White (01)
B1457	Chrome (AA)
B1688	Chrome (AA)
S9233	Stainless Steel (MY)
S8726	Chrome (AA)
S8925	Neutral/No Finish (67)

Standards

Sink to BS 1206

Special Notes

Multi-purpose outlet suitable for plastic and BS copper pipe.

Consideration may need to be given to safe hot water delivery and the use of an appropriate temperature reduction device see A5900AA

Ideal Standard (UK) Ltd. makes every effort to ensure that the information provided on its website is accurate. However, we cannot guarantee this, and accept no liability for any information or advice given via its website.

8.31

Armitage Shanks Contour 21 BTW WC

The following 2 pages are the document exactly as received and checked. It is bookmarked in the PDF.

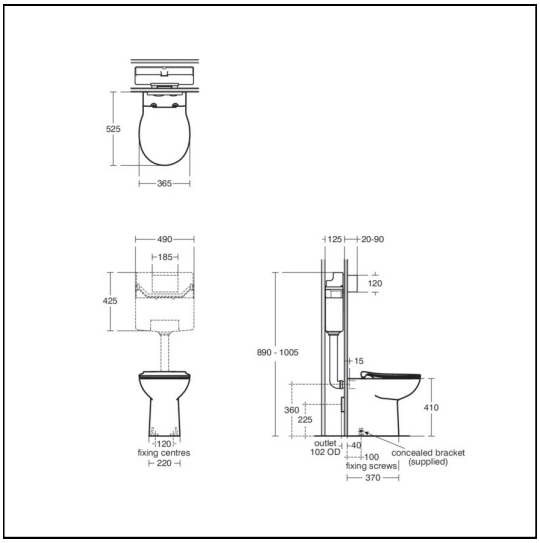
Reference	
Asset	General
Provided by	Not recorded
Source file	`Armitage Shanks Contour 21 BTW WC.pdf`
Pages	2

Contour 21+ Back-to-Wall Rimless Toilet

ILLUSTRATED

S0439	Contour 21+ back-to-wall rimless toilet bowl with raised horizontal outlet and anti-microbial glaze
R0317	ProSys 120 depth WC cistern, mechanical, front actuation
S0670	Contour 21+ toilet seat and cover, slim, slow close
R0115	Oleas M1 mechanical dual flushplate Ideal Standard - chrome





OPTIONS

R0099	ProSys electronic conversion kit for infra-red actuated flushplates (Septa Pro E1 & E2) (120 depth frames and cisterns only)
R0137	Septa Pro inspection plate white
S1347	Conceala 3 single flush 6 litre cistern, side inlet, lever operated, easy adjustable to low water volumes, internal overflow, flushpipe and lever included
S3324	Conceala 3 single flush 6 litre cistern, side inlet, pneumatic actuation, easy adjustable to low water volumes (4.5 or 4 litres), internal overflow, flushpipe included, no button/flushplate.
S3326	Conceala 3 dual flush 6/4 litre cistern, side inlet, pneumatic actuation, easy adjustable to low water volumes (4.5/3 or 4/2.6 litres), internal overflow, flushpipe included, no button/flushplate
S4066	Contour 21 toilet seat only, top fixing hinges and retaining buffers
S4065	Contour 21 toilet seat and cover, top fixing hinges
E4463	Karisma pneumatic flush plate, dual flush, unbranded for Conceala 3 cisterns
S0767	Oleas M2 mechanical dual flushplate Armitage Shanks - chrome
S0858	Septa Pro M1 mechanical metal dual flushplate Armitage Shanks
S0772	Septa Pro E1 electronic (infrared) & manual metal dual flushplate Armitage Shanks
S0773	Septa Pro E2 electronic (infrared) metal dual flushplate Armitage Shanks
S1083	Conceala 3 pneumatic finger push button, single flush
S1085	Conceala 3 pneumatic palm push button
S4305	Panekta outlet connector to convert horizontal outlet wcs to P trap
S4300	Panekta outlet connector to convert horizontal outlet wcs to S or turned P trap

FEATURES



ILLUSTRATED PRODUCT DETAILS

Weights

S0439	23.90 KG
R0317	2.92 KG
R0115	0.34 KG

Materials

S0439	Vitreous China
R0317	Mixed Material

Finishes

S0439	☐	White With SmartGuard (HY)
R0317	☐	Neutral/No Finish (67)
S0670	☐	White (01)

E: info@idealspec.co.uk | T: 0870 122 8822 | F: 0870 122 8282 | www.idealspec.co.uk

Ideal Standard (UK) Ltd. makes every effort to ensure that the information provided on its website is accurate. However, we cannot guarantee this, and accept no liability for any information or advice given via its website.

Contour 21+ Back-to-Wall Rimless Toilet

S0670 Plastic
R0115 Mixed Material

R0115 White (AC)

Designer

Robin Levien, RDI

FINISH OPTIONS

(AC) White

(AA) Chrome

(JG) Brushed Chrome

(A6) Black

Standards

WC bowl to BS EN 997 & BS EN 33

Special Notes

WC bowl screwed to floor using concealed brackets (supplied). When using a lever the concealed cistern should be raised to 565mm from floor to underside of cistern. Oleas, Solea, Altes & Symfo are compatible with Prosys cisterns only. Please see flushplate section for full finish/colour options.

Ideal Standard (UK) Ltd. makes every effort to ensure that the information provided on its website is accurate. However, we cannot guarantee this, and accept no liability for any information or advice given via its website.

8.32

Armitage Shanks Contour 21 Basin Tap

The following page is the document exactly as received and checked. It is bookmarked in the PDF.

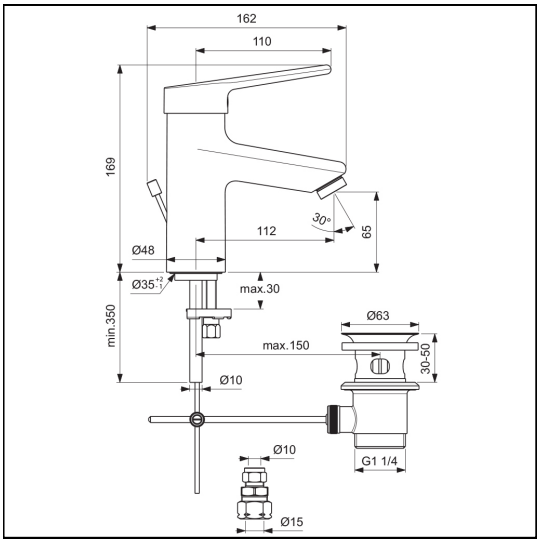
Reference	
Asset	General
Provided by	Not recorded
Source file	Armitage Shanks Contour 21 Basin Tap.pdf
Pages	1

Contour 21+ Single Lever One Hole Basin Mixer With Pop-up Waste

ILLUSTRATED

BC119 Contour 21+ single lever one hole basin mixer with pop-up waste and copper tails





ILLUSTRATED PRODUCT DETAILS

Weights

BC119 1.91 KG

Materials

BC119 Chrome Plated Brass

Finishes

BC119 Chrome (AA)

Flow rates

BC119 5 Litres per minute @ 3 bar pressure

Designer

Artefakt Industriekultur

Standards

Manufactured in accordance to BS EN 817

Special Notes

Suitable for balanced supplies. Inlets 15mm copper tails. Consideration should be given to safe hot water delivery and the use of an appropriate temperature reduction device, please see A5900AA (for use with 15mm pipework) or A5901AA (for use with 22mm pipework). Fitted with a 5 litre per minute outlet flow regulator. Minimum pressure 1 bar.

ACCREDITATIONS

FEATURES

Ideal Standard (UK) Ltd. makes every effort to ensure that the information provided on its website is accurate. However, we cannot guarantee this, and accept no liability for any information or advice given via its website.

8.33

Armitage Shanks Contour 21 Under Counter Basins in WC

The following page is the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	Armitage Shanks Contour 21 Under Counter Basins in WC.pdf
Pages	1

Contour 21 50cm Under-Countertop Washbasin, With Overflow, Unglazed Rim

ILLUSTRATED

S2496	Contour 21 50cm under-countertop washbasin with overflow, unglazed rim
A4852	Sensorflow 21 compact washbasin mounted spout with integral sensor, 3.7 litre per minute aerated spray outlet, combined inlet servicing valve and filter, mains
S8722	Waste 1¼" brass strainer waste, 80mm slotted tail
S8910	Trap 1¼" plastic bottle, 75mm seal, multi-purpose outlet



OPTIONS

A4851	Sensorflow 21 compact washbasin mounted spout integral sensor servicing valve and filter, copper tube inlets, battery
A4853	Sensorflow 21 compact washbasin mounted spout with integral sensor, 3.7 litre per minute aerated spray outlet, combined inline servicing valve and filter, link

ILLUSTRATED PRODUCT DETAILS

Sizes

S2496 w:550 x d:350

Weights

S2496	8.59 KG
A4852	1.60 KG
S8722	0.22 KG
S8910	0.20 KG

Materials

S2496	Fine Fireclay
A4852	Chrome Plated Brass
S8722	Chrome Plated Metal
S8910	Plastic

Finishes

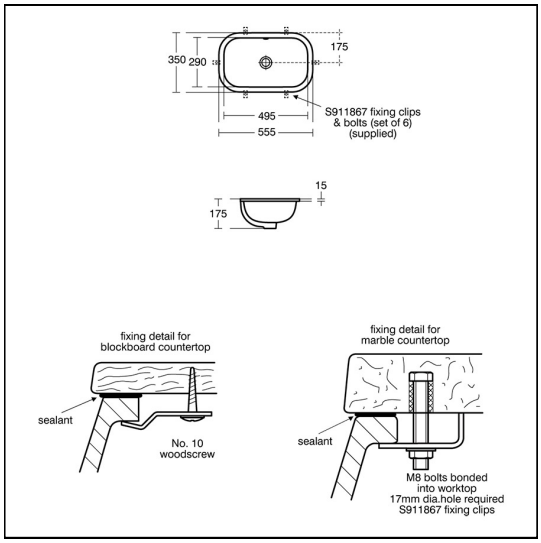
S2496	White (01)
A4852	Chrome (AA)
S8722	Chrome (AA)
S8910	Neutral/No Finish (67)

Capacity

S2496 5.7 litres

Flow rates

A4852 3.7 Litres per minute @ 3 bar pressure





FINISH OPTIONS

(AA) Chrome

(GN) Ultra Steel

Standards

Vitreous china to BS 3402. Washbasin to BS EN 14688 & BS EN 31

Special Notes

This washbasin is not suitable for separate pillar taps. Washbasin mounted on underside of countertop using S9118 fixing clips. Joint sealed using waterproof sealant (not supplied).

Consideration should be given to safe hot water delivery and the use of an appropriate temperature reduction device see A5900AA

Ideal Standard (UK) Ltd. makes every effort to ensure that the information provided on its website is accurate. However, we cannot guarantee this, and accept no liability for any information or advice given via its website.

8.34

Armitage Shanks Contour 21 Unisex Doc M Shower Pack

The following page is the document exactly as received and checked. It is bookmarked in the PDF.

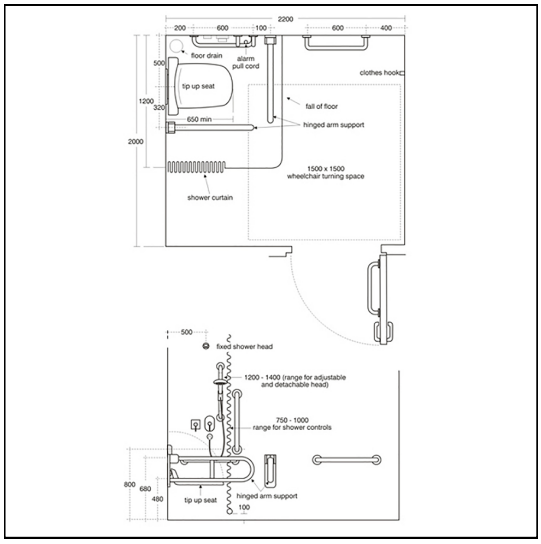
Reference	
Asset	General
Provided by	Not recorded
Source file	`Armitage Shanks Contour 21 Unisex Doc M Shower Pack.pdf`
Pages	1

Doc M Contour 21 Shower Room Pack

ILLUSTRATED

S6960 Shower room pack with folding shower seat and back support in grey, 3 x 60cm grab rails, 2 x hinged rails and 2 x 45cm grab rails, lever operated thermostatic mixer for concealed supplies, shower handset holder, handset & hose, fixed short projection shower head, lever operated diverter, shower curtain and shower rail





ILLUSTRATED PRODUCT DETAILS

Weights

S6960 69.65 KG

Materials

S6960 Mixed Material

Finishes

S6960 White (AC)

Flow rates

S6960 7.5 Litres per minute @ 3 bar pressure

FINISH OPTIONS

(AC) White

(LI) Blue

(LJ) Grey

(RN) Charcoal

(MY) Stainless Steel finish

Special Notes

For LRV and RAL numbers see Doc M introduction.
Fixing heights: Floor to top of shower seat 480mm. Floor to centre of back rest of rail 800mm. Floor to centre of horizontal grab rail 800mm

White:Ral=9016, LRV=87
Blue:Ral=5011, LRV=6
Red:Ral=3020, LRV=12
Grey:Ral=7005, LRV=19
Charcoal:Ral=7016, LRV=8

ACCREDITATIONS

Local Authority BUILDING CONTROL LANTAC APPROVED

FEATURES

Ideal Standard (UK) Ltd. makes every effort to ensure that the information provided on its website is accurate. However, we cannot guarantee this, and accept no liability for any information or advice given via its website.

8.35

Armitage Shanks Contour 21 Urinal Config

The following 2 pages are the document exactly as received and checked. It is bookmarked in the PDF.

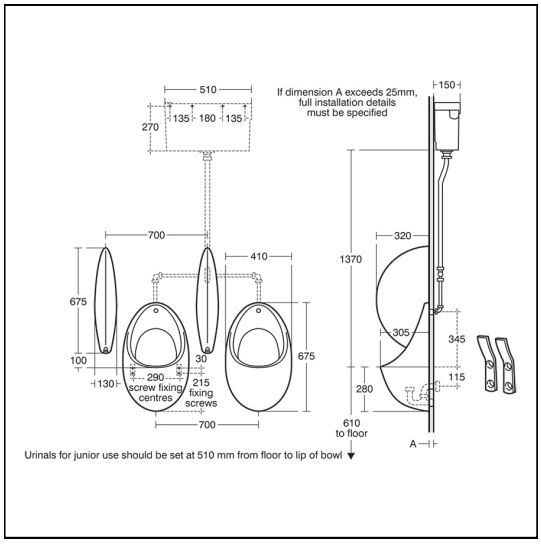
Reference	
Asset	General
Provided by	Not recorded
Source file	Armitage Shanks Contour 21 Urinal Config.pdf
Pages	2

Contour Urinal Fully Concealed

ILLUSTRATED

S6110	(UR H) Contour urinal in vitreous china, 67cm, concealed
S8850	Waste 1½" plastic domed strainer waste, 45mm unslotted tail
S8970	Trap 1½" plastic P with 75mm seal, multi-purpose outlet suitable for plastic and BS copper pipe
S9275	Urinal concealed hangers, Steel
S6286	Spreader, back inlet for vitreous china bowl urinal
S9276	Toggle bolts to suit maximum 25mm panel thickness









OPTIONS

S1155	Conceala 4.5 litre auto cistern with cover, auto syphon and petcock
S1156	Conceala 9 Litre auto cistern with cover, auto syphon and petcock
S1157	Conceala auto cistern 13.6 litre with cover auto syphon and petcock
S8770	Waste 1½" strainer waste brass with stainless steel dome
A7058	Sensorflow 21 urinal flush, Low Pressure Valve, panel mounted, mains
A7059	Sensorflow 21 urinal flush, low pressure valve, panel mounted, link
A7001	Sensorflow 21 urinal flush, high pressure valve, panel mounted, mains
A7002	Sensorflow 21 urinal flush, high pressure valve, panel mounted, link
S6226	Flushpipes concealed for 1 bowl urinal
S6227	Flushpipes concealed for 2 bowl urinals
S6228	Flushpipes concealed for 3 bowl urinals
S6229	Flushpipes concealed for 4 bowl urinals
S6230	Flushpipes concealed for 5 bowl urinals
S6120	(UR H) Urinal division Vitreous China with hanger and screw

ILLUSTRATED PRODUCT DETAILS

Weights

S6110	16.00 KG
S8850	0.20 KG
S8970	1.00 KG
S9275	1.00 KG
S6286	0.01 KG
S9276	2.00 KG

Materials

S6110	Vitreous China
S8850	Plastic
S8970	Plastic
S9275	Metal
S6286	Metal
S9276	Metal

Finishes

S6110	White (01)
S8850	Neutral/No Finish (67)
S8970	Neutral/No Finish (67)
S9275	Neutral/No Finish (67)
S6286	Chrome (AA)
S9276	Neutral/No Finish (67)

Special Notes

See auto cistern and flush pipe selector page, for selection of multi bowl

FEATURES

E: info@idealspec.co.uk | T: 0870 122 8822 | F: 0870 122 8282 | www.idealspec.co.uk

Ideal Standard (UK) Ltd. makes every effort to ensure that the information provided on its website is accurate. However, we cannot guarantee this, and accept no liability for any information or advice given via its website.

Contour Urinal Fully Concealed

and pipework ranges. For sensor flush see Sensorflow 21 urinal flushing device page

Ideal Standard (UK) Ltd. makes every effort to ensure that the information provided on its website is accurate. However, we cannot guarantee this, and accept no liability for any information or advice given via its website.

8.36

Armitage Shanks Portman Basin Config - Not inc Tap

The following 2 pages are the document exactly as received and checked. It is bookmarked in the PDF.

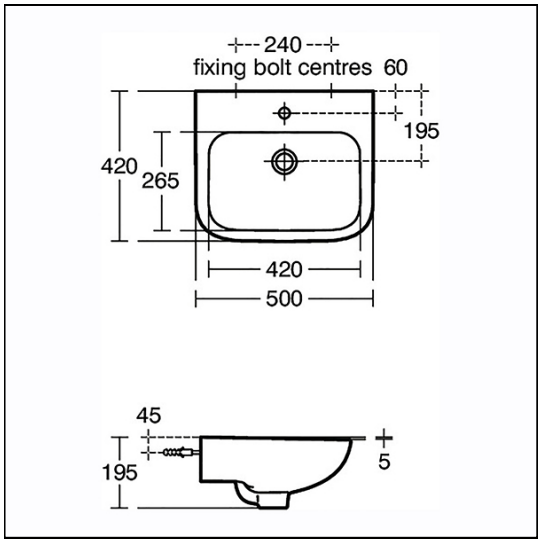
Reference	
Asset	General
Provided by	Not recorded
Source file	`Armitage Shanks Portman Basin Config - Not inc Tap.pdf`
Pages	2

Portman 21 Washbasin 50cm 1 Taphole With Overflow No Chainstay Hole

ILLUSTRATED

S2311	Portman 21 washbasin 50cm, 1 taphole with overflow, no chainstay hole
A6697	Contour 21+ 1 hole thermostatic basin mixer, single sequential lever with copper tails
S8722	Waste 1¼" brass strainer waste, 80mm slotted tail
S8920	Trap 1¼" plastic resealing bottle, 75mm seal, multi-purpose outlet







OPTIONS

E0157	Wall fixing set
E0062	Basin fixing set for IPS panels or block walls
B8263	Avon 21 1 hole washbasin mixer , self closing push button, variable temperature control with 15mm female connector flexible hoses on inlets. Flow regulated to 3.7 litres per minute maximum to comply with Water Technology List requirements.
A6698	Contour 21+ 1 hole thermostatic basin mixer, single sequential lever with flexible tails
A6790	Contour 21+ Outline 1 hole thermostatic basin mixer, single sequential lever with flexible tails
S8733	Waste 1¼" brass anti theft swivel plug waste, 80mm slotted tail
A5900	TMV thermostatic mixing valve, 15mm
S8900	Trap 1¼" metal bottle, 75mm seal, outlet screwed 1¼" BSP male with compression nut and ring
S9137	Bracket concealed with clamps and centre waste support for Portman 21 washbasins 60 and 50cm

ILLUSTRATED PRODUCT DETAILS

Sizes

S2311 w:50 x d:42

Weights

S2311	12.73 KG
A6697	2.10 KG
S8722	0.22 KG
S8920	2.00 KG

Materials

S2311	Vitreous China
A6697	Chrome Plated Brass
S8722	Chrome Plated Metal
S8920	Plastic

Finishes

S2311	White (01)
A6697	Chrome (AA)
S8722	Chrome (AA)
S8920	Neutral/No Finish (67)

Capacity

S2311 6.0 litres

Flow rates

A6697 3.9 Litres per minute @ 3 bar pressure

Special Notes

Special notes
Recommended fixing heights (floor to front rim);
Nursery use 600mm
Infant use 700mm
Junior use 750mm
Senior/adult use 780-800mm.

FEATURES

E: info@idealspec.co.uk | T: 0870 122 8822 | F: 0870 122 8282 | www.idealspec.co.uk

Ideal Standard (UK) Ltd. makes every effort to ensure that the information provided on its website is accurate. However, we cannot guarantee this, and accept no liability for any information or advice given via its website.

Portman 21 Washbasin 50cm 1 Taphole With Overflow No Chainstay Hole

Washbasin wall mounted using E015767 wall fixing set or panel mounted using E006267 fixing set.
Alternatively washbasin can be wall or panel mounted using S9137 or S9138 wall brackets

Ideal Standard (UK) Ltd. makes every effort to ensure that the information provided on its website is accurate. However, we cannot guarantee this, and accept no liability for any information or advice given via its website.

8.37

Armitage Shanks Sensor flow 21 Urinal Flush Sensor

The following page is the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	Armitage Shanks Sensor flow 21 Urinal Flush Sensor.pdf
Pages	1

Sensorflow 21 Urinal Flush Sensor, High Pressure Valve, Panel Mounted, Mains

ILLUSTRATED

A7001 Sensorflow 21 urinal flush, high pressure valve, panel mounted, mains

ILLUSTRATED PRODUCT DETAILS

Weights

A7001 1.51 KG

Finishes

A7001 Chrome (AA)

Materials

A7001 Chrome Plated Brass

FINISH OPTIONS

(AA) Chrome

(GN) Ultra Steel

Special Notes

Check Local requirements for back flow prevention.

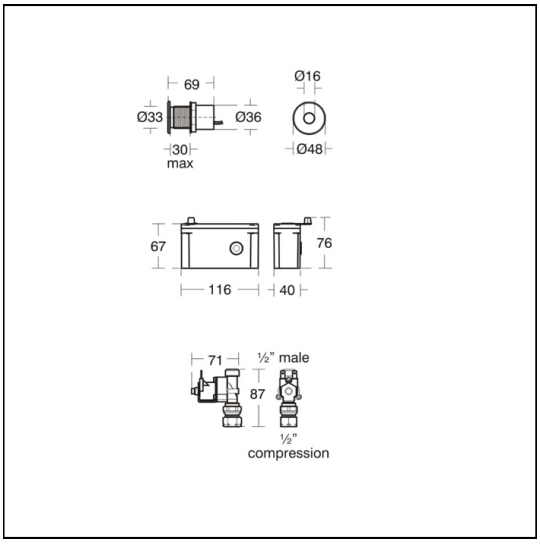
Suitable for water systems from 1 bar to 6 bar.

Includes 30 l/min regulator to prevent flooding. Should be removed on flow pressure between 0.5bar and 1bar.

Default 4sec run time, adjustment at installation.

Ensures full coverage without exceeding 1.5 litres per activation. Mains powered Sensorflow products must be connected to a continuous permanent power supply of these require 220-240 volts and each 1 having its own fuse spur.





ACCREDITATIONS

FEATURES

Ideal Standard (UK) Ltd. makes every effort to ensure that the information provided on its website is accurate. However, we cannot guarantee this, and accept no liability for any information or advice given via its website.

8.38

Aspen Mini Aqua (003)

The following page is the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	Aspen Mini Aqua (003).pdf
Pages	1



Silent+ Mini Aqua®



CONDENSATE REMOVAL PUMP

The Silent+ Mini Aqua keeps its sleek and slender form offering unparalleled installation flexibility. It fits neatly into trunking and inside mini split units. Packed with our proven 5th Gen Technology, it's unbeatable silence – a barely audible 16dB(A)*, combined with intelligent, adaptive flow rates – further extends pump life, maximises reliability and improves energy efficiency. Quietly brilliant.

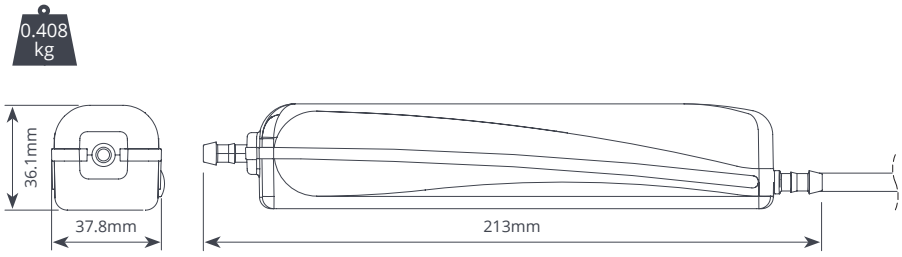
- 30L/h max. flow
- 10m max. rec. head
- As low as 16dB(A)*

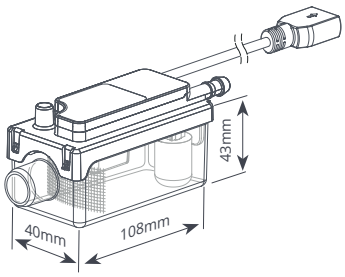
Key Features

- Slim profile
- Proven 5th Gen Technology: Capacitance Sensing & Rotary Diaphragm = Silence & Power
- Low maintenance
- Plug and play**
- 3 year warranty

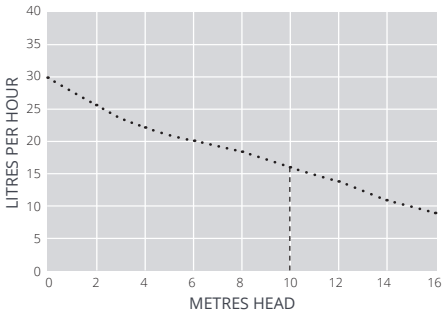
Suitability

- Up to 40kW / 136,000Btu/h
- Ducted units; floor standing & chassis units; high wall mini split systems
- ***Perfect for...*** smaller commercial and domestic applications, where silence is needed





SPECIFICATIONS	
Max. flow	30L/h @ 0m head
Max. rec. head	10m
Min. dB(A) @ 1m	16dB(A)*
Power supply	100-250VAC, 0.18A, 2.4W, 50/60 Hz
Rated	Continuous
Class	II ⧈
Max. unit output	40kW 136,000Btu/h)
Max. ambient temp	40°C (104°F)
IP Protection	IP24
Inlet o/d	Ø16mm (5/8")
Outlet o/d	Ø6mm (1/4")
Safety switch	5.0 A Normally closed
Self priming	✓



OPTIONS	
Silent+ Mini Aqua	FP3420

IN THE BOX

Silent+ Mini Aqua 5th Gen pump • Reservoir (inc. filter and lid) • 1.5m plug and play cable** • 1.5m clear PVC tube • 150mm clear vent hose • 220mm blue inlet hose • Drain connector kit: straight connector and rubber elbow • Quick start guide

SUGGESTED XTRA ACCESSORIES		
Description		Part No.
S+ Mini Pump spare filters (x10)		FP3330
Barbed anti-siphon device		FP3336/1
Reservoir copper mesh filter (x10)		FP3460
S+ Aqua mounting bracket		FP3462

Visit aspenpumps.com for more installation accessories.

Download full manual at aspenpumps.com

* assuming solid wall construction with a 2kW unit

** not backwards compatible

Information correct at time of going to press. Not all products are available in all regions.

8.39

Bray Butterfly Valves

The following 2 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`Bray Butterfly Valves.pdf`
Pages	2

SERIES 3W/3L
RESILIENT SEATED BUTTERFLY VALVES

OVERVIEW

The Bray Series 3W/3L features an optimized molded-in seat, a profiled disc sealing edge, and stem bearings. These features provide optimized performance and efficient automation solutions for a long cycle life without compromising bubble tight sealing.

APPLICATIONS
- HVAC
- Chilled Water
- Desalination
- Sour Gas (NACE)
- Steam
- Vacuum

MEDIA
- Acids
- Alkalis
- Corrosive Chemicals
- Dry Chlorine (Gas or Liquid)
- Gases
- Hydrogen
- Oxygen
- Water

SPECIFICATIONS

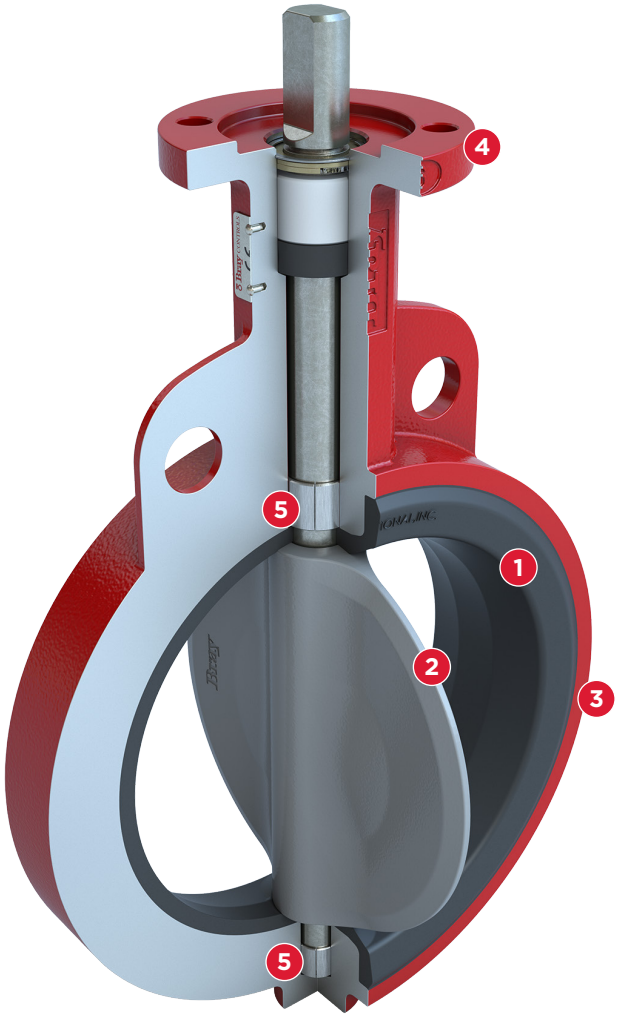
Size Range	NPS 2 to 24	
	DN 50 to 600	
Temperature Range	-20°F to 250°F	
	-29°C to 121°C	
Maximum Operating Pressure	High Pressure Disc	250 psi 17.2 bar
	Standard Disc	NPS 2-12 (DN 50-300) 175 psi (12 bar)
		NPS 14-24 (DN 350-600) 150 psi (10.3 bar)
	Low Pressure Disc	50 psi 3.4 bar
Body Style	3W - One-piece wafer	
	3L - One-piece lug	
Leakage Rate	Bubble tight	
Vacuum Rating	1 to 0.001 micron	

FEATURES AND BENEFITS

The Series 3W/3L resilient seated butterfly valves offer:

1. **MOLDED-IN SEAT:** Tightly controlled molding process produces accurate and repeatable dimensions, which leads to consistently lower torques over the valve's lifetime.
2. **PRECISION PROFILED DISC SEALING EDGE:** Extends the valve life by reducing seat wear.
3. **ROBUST FLANGE SEALING:** Tear-dropped shaped seat face enables tight sealing with a wide variety of industrial flanges.
4. **ISO 5211 TOP FLANGE:** Direct mounting capability between the valve and Bray actuation reduces package height and complexity.
5. **UPPER AND LOWER STEM BEARINGS:** Reduce operating torque and increase reliability in high cycle applications.
6. **END OF LINE CAPABILITY:** Lug style valve allows for sealing at full rated pressure even when the downstream flange is removed.





© 2021 BRAY INTERNATIONAL, INC. ALL RIGHTS RESERVED. BRAY.COM

DESIGN STANDARDS

Valve Design	API 609 Category A
	EN 593
	MSS SP-67
Top Flange	ISO 5211
Flange Drilling	ASME B16.5 Class 125/150
	EN 1092-1 PN 6 | 10 | 16
	JIS 10K
	AS 2129 Table D & E
Seat Tightness Test	API 598
	EN 12266-1
	ISO 5208
	MSS SP-61
Face-to-Face	API 609
	EN 558 Series 20

MATERIAL OPTIONS[1]

Body	Cast Iron
	Ductile Iron
Disc	Nylon 11 Coated Ductile Iron
	316 Stainless Steel
	Aluminum Bronze
	Duplex Stainless Steel 4A
Stem	416 Stainless Steel
	Stainless Steel (EN 1.4057)
Seat	EPDM
	BUNA-N
	HT-EPDM

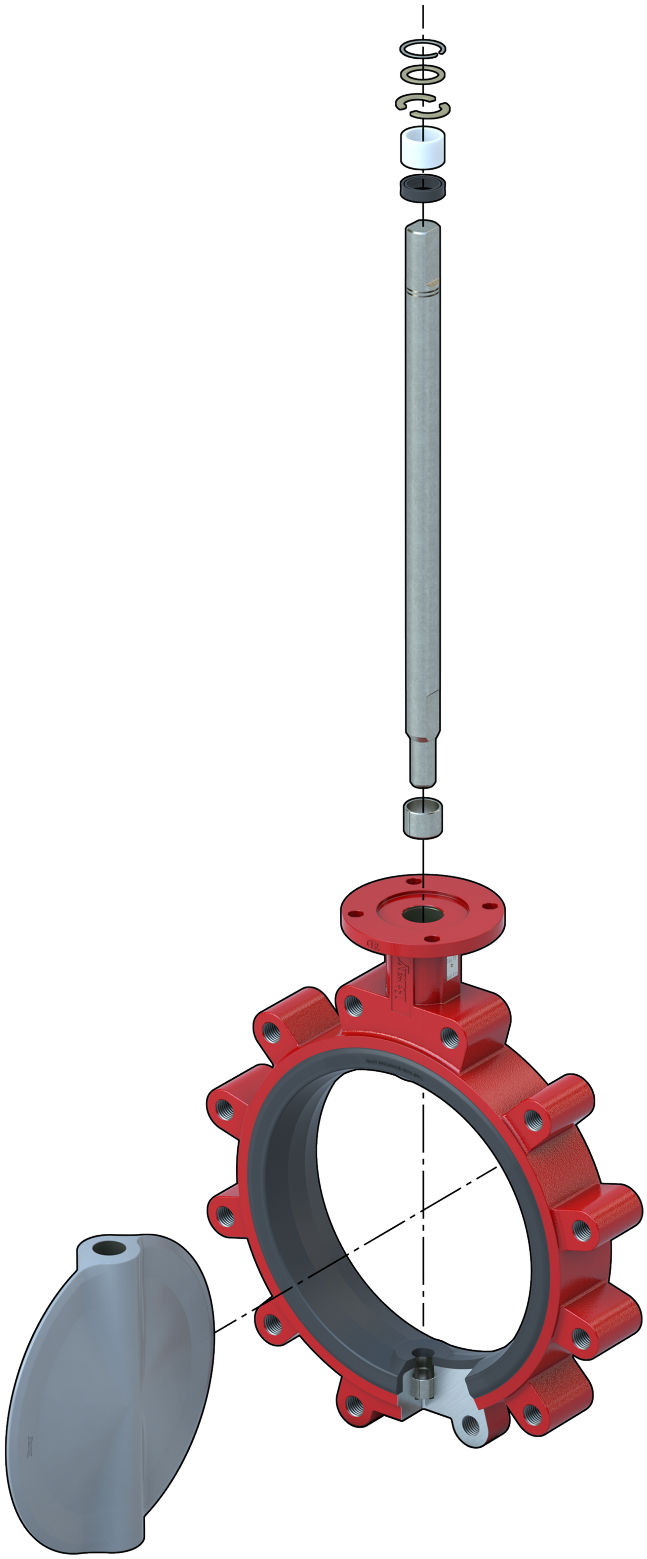
NOTES
[1]Materials available in ASME and EN grades

CERTIFICATIONS AND APPROVALS

Certifications	CE/PED
	ANSI/NSF 61 & 372
Approvals	EC 1935
	FDA Food Contact Approved
	ABS Type Approval
	Bureau Veritas Type

Additional information is available in the 3W/3L Technical Sales Manual.

EXPLODED VIEW



© 2021 BRAY INTERNATIONAL, INC. ALL RIGHTS RESERVED. BRAY.COM

8.40

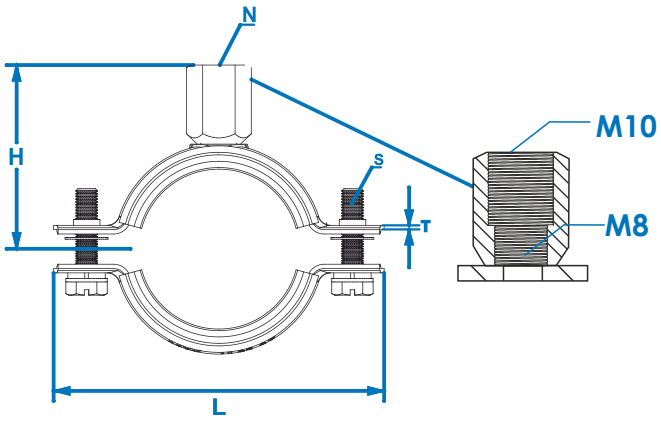
Brymec Rubber Lined Pipe Clamps TDS

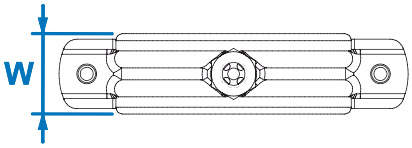
The following page is the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`Brymec Rubber Lined Pipe Clamps TDS.pdf`
Pages	1

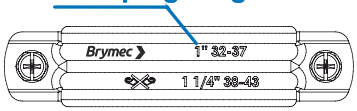
Rubber Lined Pipe Clamps







Clamping range with rubber



Features and Benefits

- Double screw clamp for efficient installation of all pipe work
- The EPDM rubber installation reduces noise and vibration and also guards against stress due to thermal expansion of pipe
- Dual thread M8/M10
- Electrolytically zinc plated steel
- Plastic anti-loss washer on screws

Product Codes and Dimensions

Stock No.	Clamping Range (mm)	Steel Pipe Size	Length (L) (mm)	Height (H) (mm)	Sheet (TxW) (mm)	Screw (S)	Nut (N)	Static Load (kN)
04093	13-20	1/4"	54.5	32	1x20	M5	M8/M10	1.3
04094	17-23	3/8"	58.5	34	1x20	M5	M8/M10	1.3
04096	21-26	1/2"	62.5	36	1x20	M5	M8/M10	1.3
04095	26-30	3/4"	68.5	39	1x20	M5	M8/M10	1.3
04099	33-37	1"	76	42.5	1x20	M5	M8/M10	1.3
04100	40-46	1 1/4"	91.5	47	1.2x20	M5	M8/M10	1.6
04101	44-50	1 1/2"	97	50	1.25x20	M6	M8/M10	1.5
04113	50-55		103	52	1.5x20	M6	M8/M10	1
04102	53-59		105	53.5	1.2x20	M5	M8/M10	1.6
04103	60-66	2"	112	57	1.2x20	M5	M8/M10	1.6
04104	62-67		113	58	2x20	M6	M8/M10	1.3
04131	67-77		126	62	1.5x25	M6	M8/M10	2.3
04105	75-84	2 1/2"	134	66	1.5x25	M6	M8/M10	2.3
04132	83-93		142	70	1.5x25	M6	M8/M10	2.3
04106	87-96	3"	145	71.5	1.5x25	M6	M8/M10	2.3
04107	98-108		156	74	1.75x23	M6	M8/M10	2.5
04108	109-119	4"	170	84	1.5x25	M6	M8/M10	2.3
04109	122-135		184	90.5	2x25	M6	M8/M10	2.6
04110	128-139		190	93.5	2x25	M6	M8/M10	2.6
04111	135-148	5"	197	97	2x25	M6	M8/M10	2.6
04112	158-170	6"	222	109.5	2x25	M6	M8/M10	2.6
04133	165-168		226	107	2.5x20	M6	M8/M10	2.1
04134	194-205		257	127	2x25	M6	M8/M10	2.6