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 3 of 9: Manufacturers' literature

Documents 8.41 to 8.81

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

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SECTION 8

8

Manufacturers' literature

Documents 8.41 to 8.81 are in this volume, each exactly as received and checked.

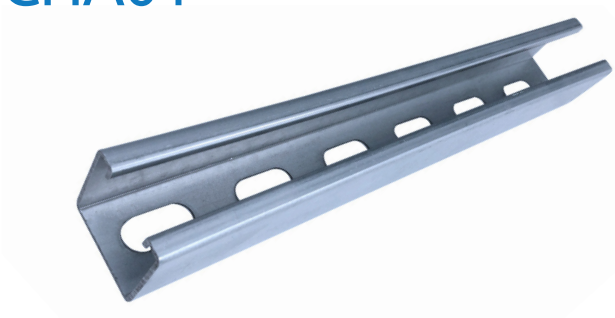
8.41

Brymec Steel Channel TDS

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

Reference	
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Source file	`Brymec Steel Channel TDS.pdf`
Pages	2

Steel Channel
CHA01



Product Description

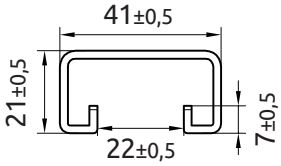
- Slotted or Unslotted Channels - mild steel pre-galvanised cold formed section to EN10130
- Used as core component with associated brackets to create a support system for multiple services.

Material Specifications

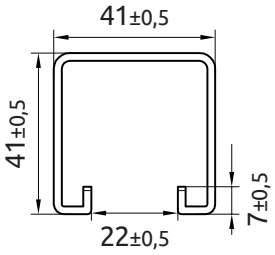
Description	Materials
Body	Mild Steel
Finish	Pre-Galv
Strip Thickness	1.5 or 2.5mm
Length	3m or 6m
Zinc Thickness: 2.5mm	Z275
Zinc Thickness: 1.5mm	Z100

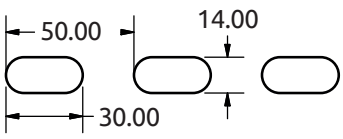
Product Codes and Dimensions

Shallow Channel – 41mm x 21mm			
Stock No.	**Description**	**Gauge**	**Length**
12003	Slotted	1.5mm	3m
12001	Plain	1.5mm	3m
12016	Slotted	2.5mm	3m
12012	Slotted	1.5mm	6m



Deep Channel – 41mm x 41mm			
Stock No.	**Description**	**Gauge**	**Length**
12006	Slotted	2.5mm	3m
12004	Plain	2.5mm	3m
12005	Slotted Back-to-Back	2.5mm	3m
12008	Plain Back-to-Back	2.5mm	3m
12018	Slotted	1.5mm	3m
12014	Slotted	2.5mm	6m
12013	Plain	2.5mm	6m
12007	Slotted Back-to-Back	2.5mm	6m
12009	Plain Back-to-Back	2.5mm	6m



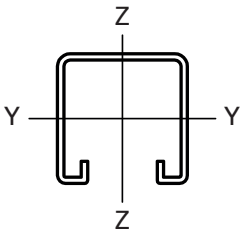


Brymec.com
Unit C, Redlands, Coulsdon, Surrey CR5 2HT
Tel: 0333 000 55 55 **Email:** sales@brymec.com **Web:** brymec.com

STRUT Channel - technical data

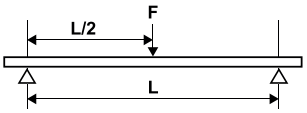
Static calculation chart

Type	Weight	Moment of inertia cm⁴		Section modulus cm³	
	(kg/m)	ly	lz	Wy	Wz
41 x 21-1.5	1.15	0.78	3.70	0.72	1.80
41 x 41-1.5	1.65	4.46	6.20	2.12	3.00
41 x 21-2.5	1.78	1.01	5.40	0.93	2.61
41 x 41-2.5	2.61	6.26	9.30	2.97	4.50



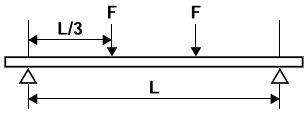
Maximum allowable load of the construction channel

Load at 1 point



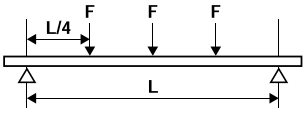
L (mm)	41 x 21		41 x 41	
	1.5 mm	2.5 mm	1.5 mm	2.5 mm
3,000	40	51	226	317
6,000	–	13	56	79

Equal concentrated loads at 2 points



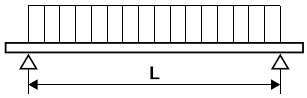
L (mm)	41 x 21		41 x 41	
	1.5 mm	2.5 mm	1.5 mm	2.5 mm
3,000	23	30	133	186
6,000	–	–	33	47

Equal concentrated loads at 3 points



L (mm)	41 x 21		41 x 41	
	1.5 mm	2.5 mm	1.5 mm	2.5 mm
3,000	17	22	95	133
6,000	–	–	24	33

Uniform load



L (mm)	41 x 21		41 x 41	
	1.5 mm	2.5 mm	1.5 mm	2.5 mm
3,000	63	82	362	507
6,000	16	20	90	127

Maximum force (N) at one point.
Values indicated in charts refer only to construction channel strength.
Maximal allowable load of remaining construction elements should be verified separately.

Brymec.com
Unit C, Redlands, Coulsdon, Surrey CR5 2HT
Tel: 0333 000 55 55 Email: sales@brymec.com Web: brymec.com

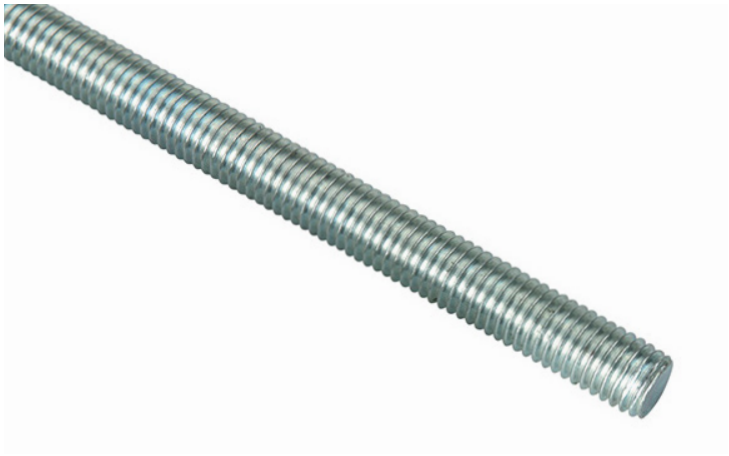
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Brymec Threaded Rod TDS

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Reference	
Asset	General
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Source file	`Brymec Threaded Rod TDS.pdf`
Pages	1

Threaded Rod / Studding



Features and Benefits

Continuous threaded rods - an everyday requirement for service support systems. Threaded rods have countless applications such as providing support for pipework and cabling found in commercial and industrial buildings.

Available in full 3m lengths - or cut to various lengths from stock standard BZP or galvanised/stainless steel for additional corrosion resistance.

Technical Data

- Bright Zinc Plated (BZP)
- 4.8 Grade Mild Steel
- Complies with DIN976

Product Codes and Dimensions

Stock Code	Diameter (mm)	Length (mm)	Thread Angle	Pitch (mm)	Thread Angle
11711	M6	3000	60 Degree	1.00	60°
11702	M8	1000	60 Degree	1.25	60°
11712	M8	3000	60 Degree	1.25	60°
11703	M10	1000	60 Degree	1.50	60°
11713	M10	3000	60 Degree	1.50	60°
11704	M12	1000	60 Degree	1.75	60°
11714	M12	3000	60 Degree	1.75	60°
11705	M16	1000	60 Degree	2.00	60°
11715	M16	3000	60 Degree	2.00	60°
11706	M20	1000	60 Degree	2.50	60°
11716	M20	3000	60 Degree	2.50	60°

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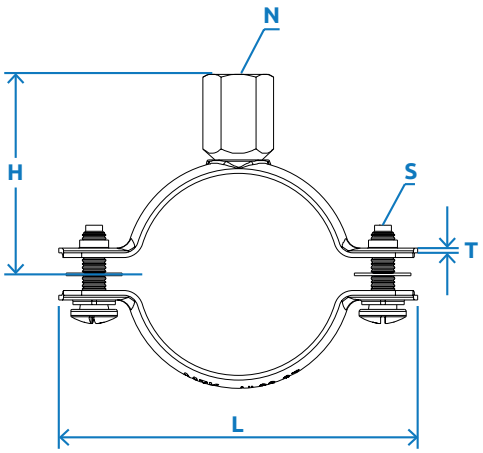
Brymec Unlined Pipe Clamps TDS

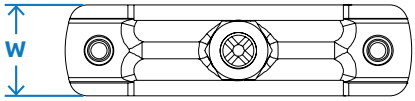
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Unlined Pipe Clamps
Double Screw Pipe Clips

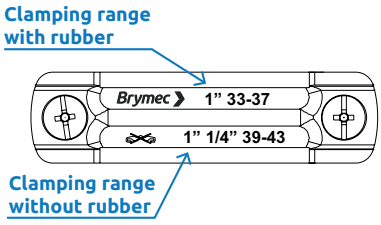






Features and Benefits

- Zinc Plated Steel
- Combination nut to suit M8 and M10 studding
- Plastic anti-loss washer on screws



Product Codes and Dimensions

Stock No.	Clamping Range (mm)	Steel Pipe Size	Length (L) (mm)	Height (H) (mm)	Thickness (T) (mm)	Width (W) (mm)	Screw (S)	Nut (N)	Static Load (kN)
04001	19-23	1/2"	54.5	32	1	20	M5	M8 / M10	1.3
04002	26-30	3/4"	62.5	36	1	20	M5	M8 / M10	1.3
04003	32-35	1"	68.5	39	1	20	M5	M8 / M10	1.3
04004	41-48	1 1/4"	85	42.5	1	20	M6	M8 / M10	1
04005	45-51	1 1/2"	91.5	47	1.2	20	M5	M8 / M10	1.6
04006	54-58	2"	99	50.5	1.2	20	M5	M8 / M10	1.6
04007	61-67	-	105	53.5	1.2	20	M5	M8 / M10	1.6
04008	67-71	2 1/2"	112	57	1.2	20	M5	M8 / M10	1.6
04000	74-82	-	126	62	1.5	25	M6	M8 / M10	2.3
04010	83-93	3"	133	66	1.5	23	M6	M8 / M10	2
04011	93-101	-	145	71.5	1.5	25	M6	M8 / M10	2.3
04013	102-109	-	153	75.5	1.5	25	M6	M8 / M10	2.3
04014	109-117	4"	161	79.5	1.5	25	M6	M8 / M10	2.3
04015	116-125	-	170	84	1.5	25	M6	M8 / M10	2.3
04016	113-123	-	165	79	1.75	23	M6	M8 / M10	2.5
04017	129-141	-	184	90.5	2	25	M6	M8 / M10	2.6
04018	136-146	5"	190	93.5	2	25	M6	M8 / M10	2.6
04019	142-154	-	197	97	2	25	M6	M8 / M10	2.6
04021	154-162	-	203	101	2	25	M6	M8 / M10	2
04022	158-169	6"	213	105	2	25	M6	M8 / M10	2.6
04023	173-183	-	227	114	2.5	25	M6	M8 / M10	3.3
04024	184-194	-	239	120	2.5	25	M6	M8 / M10	3.3
04025	195-205	-	249	232	2.5	25	M6	M8 / M10	3.3
04026	210-220	8"	272	130	2.5	25	M6	M8 / M10	3.6

8.44

COM1T - DZR Brass Commissioning Valve - FxF BSP TDS

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Pages	1

DZR Brass Commissioning Valve - FxF BSPP

COM1T

Brymec Warranty



Features and Benefits

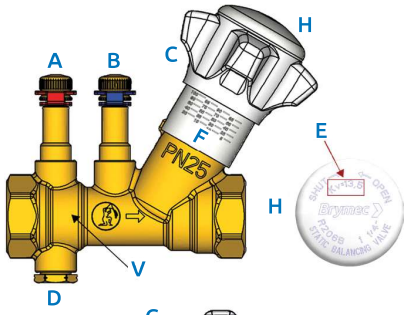
- Drain connection ¼"F - ISO 228
- Sensor holder for needle Ø3mm and length 30-40mm
- Closing function
- Presetting possibility
- Venturi flowmeter for flow rate measurement by means of pressure probes

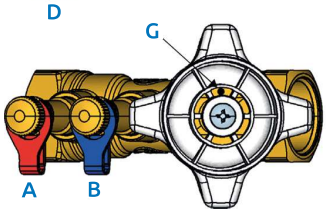
Technical Data

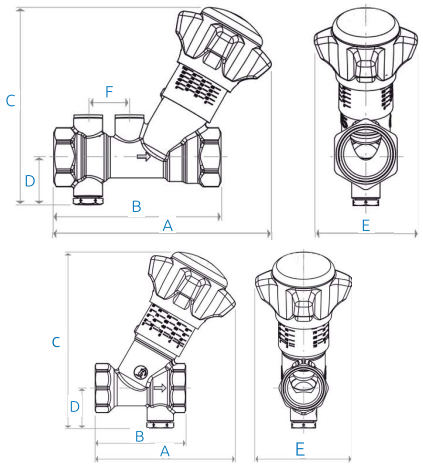
- Temp. Range: 5°C to 110 °C
- Max. Working Pressure: 25 bar (2500 kPa)

Components & Materials Specification

- Handwheel: ABS, white colour
- Body: dezincification resistant brass DZR (EN 12165 - CW602N)







ITEM	DESCRIPTION
A	High pressure probe
B	Low pressure probe
C	Handwheel
D	Drain ¼" F
E	Kv of the Venturi flow meter
F	Scale for 0 -100% setting (20 positions)
G	Presetting screw (limiting the stroke)
H	Removable head (for presetting) with imprinted the Venturi Kv
V	Venturi flow meter

Product Codes & Dimensions

STOCK NO.	CONNECTIONS	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	Kv	Kv Venturi
38897	½ LF	93	54	117	24	64	-	2.1	*
38891	½"	131	95	119	25	64	25	2.7	4.0
38892	¾"	131	101	118	28	64	25	5.5	7.5
38893	1"	131	110	122	32	64	25	7.0	11.0
38894	1 ¼"	137	120	129	35	64	25	9.5	13.5
38895	1 ½"	163	140	166	39	64	25	18.8	24
38896	2"	169	154	172	45	70	25	25.5	31

* ½" LF close coupled to fixed orifice plate. Request metering station datasheet for details

8.45

Trane CXAF 150 HE XLN heat pump product report, ASHP 0.01 and 0.02

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

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Asset	General
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Source file	`Trane CXAF 150 HE XLN heat pump product report, ASHP 0.01 and 0.02.pdf`
Pages	2

Unit Overview

Range	Sintesis Advantage	
Chiller model	Air-Water Heat Pump Scroll	
Model	CXAF 150 HEat XLN EC R454B	
Unit Application	Process (cool=-20C/50C \ heat=-15C/35C)	
Compressor type	Scroll	
Refrigerant Type	Full charge R454B	
Eta s,c / SEER	196.00 % / 4.96	Compliant
Eta s,h / SCOP	153.00 % / 3.91	
SEPR HT	5.78	Compliant
SEPR MT	3.94	Compliant
Type of free cooling	No Free Cooling	
Type of pump	Dual pump std pressure	
Pump configuration	HDM VAR	
Electrical supply	400V/50Hz/3Ph	



Note: Pictures are not binding, unit may be depicted with accessories upon request.

Project conditions

	Cooling	Heating
Outdoor air dry bulb temperature	35.0 C	-4.0 C
Relative humidity		90 %
Fluid entering temperature	12.0 C	38.0 C
Fluid leaving temperature	7.0 C	45.0 C
Evap fluid type	Water	Water
Fouling Factor	0.017615 m2-deg C/kW	0.017615 m2-deg C/kW
Elevation	0.0 m	0.0 m

Unit performance data

	Cooling	(1)	Heating	(2)
Gross capacity	482.59 kW		383.74 kW	
Net capacity	482.93 kW		383.65 kW	
Gross unit power	167.88 kW		147.06 kW	
Gross EER / COP	2.87 EER (kW/kW)		2.61 COP (kW/kW)	
Net EER / COP	2.91 EER (kW/kW)		2.62 COP (kW/kW)	
Design flow rate	23.05 L/s		13.19 L/s	
Evaporator Pressure drop (Design)	24.6 kPa		8.7 kPa	
Evaporator Min Flow	11.60 L/s		11.60 L/s	
Evaporator Max Flow	53.20 L/s		53.20 L/s	

Acoustic data

Outdoor sound power level	91 dBA	(4)
Outdoor sound pressure level	59 dBA	(3)

	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Sound power spectrum (Lwa)	92 dB	88 dB	89 dB	86 dB	79 dB	78 dB	69 dB

Hydraulic module Info

Type of pump	Dual pump std pressure
Pump Regulation Type	Constant Speed Pump AFD Adjust.
Design flow rate	23.05 L/s
Available head - user side	129.2 kPa
Pump power absorbed	6.61 kW

General data - refrigerant circuit

Refrigerant Type	Full charge R454B	
Refrigerant GWP (AR4)	466.00	
Number of circuits	2	
Number of compressors (circuit 1 / 2)	3 / 3	
Compressor type	Scroll	
Compressor regulation type	Fixed Speed	
Oil charge per circuit	26 kg	
Refrigerant charge per circuit	54 kg	54 kg

General data - fan section

Number of outdoor fans	10
Fan type	EC fans
Total condenser air flow	55.01 m3/s

Electrical Information

Electrical supply	400V/50Hz/3Ph
Power factor capacitor	Without
Current	267.51 A
Compressor soft starter	Included
Start-up current	522.00 A
Max amps	406.00 A
Maximum power at maximum current	252.00 kW
Displacement power factor (cos-phi)	0.90

Dimensions and weight

Length	6207 mm
Width	2200 mm
Height	2530 mm
Unit shipping weight	4789 kg
Operating weight	5005 kg

Note: Dimensions and weight include sound attenuation, hydraulic module, heat recovery and/or free cooling.

Applicable standards

(1) According to EN14825:2018, considering average climate

(2) According to EN14511:2018

(3) Average sound pressure at 10 meter distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level

(4) Sound power measurements in accordance with ISO 9614:2009 (part 1)

(5) Performance rating out of scope of Eurovent certification program

Eurovent certification does not apply to SEPR HT / SEPR MT values

More information

Ecodesign datasheet	https://www.trane.com/litweb/Litweb.aspx?
Model Number	CXAF150DE**RCXE3WWNBNBX1XB1EBXF1XLXXFXXXX1EXBAXX2XAXXBA2XX

8.46

Trane CXAX 035 SE LN heat pump product report, ASHP 0.03

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Reference	
Asset	General
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Source file	`Trane CXAX 035 SE LN heat pump product report, ASHP 0.03.pdf`
Pages	2

Unit Overview

Range	CONQUEST		
Model	CXAX 35 SE LN		
Unit application	Heat pump		
Compressor type	Scroll		
Refrigerant type	Full charge R454B		
Operating map	Low ambient		
Seasonal space energy efficiency (Eta s,c) / SEER (1)	171 %	4.36	Compliant
SEPR HT	5.65		Compliant
SEPR MT	3.56		Compliant
Heat recovery	Without		
Type of pump	Dual pump standard pressure		
Electrical supply	400V-50Hz-3Ph		



Project conditions

	Cooling	Heating
Outdoor air dry bulb temperature	35.0 C	-4.0 C
Relative humidity		90 %
Fluid entering temperature	12.0 C	38.0 C
Fluid leaving temperature	7.0 C	45.0 C
Fluid type	Water	Water
Fluid Freezing Point	0.0 C	0.0 C
Fouling Factor	0.017620 m2-deg K/kW	0.017620 m2-deg K/kW
Elevation	0.0 m	0.0 m

Unit performance data

	Cooling	(1)	Heating	(1)
Gross capacity	91.01 kW		72.07 kW	
Net capacity	91.27 kW		71.81 kW	
Total absorbed power	32.00 kW		30.01 kW	
Gross EER / COP	2.74 EER (kW/kW)		2.39 COP (kW/kW)	
Net EER / COP	2.83 EER (kW/kW)		2.37 COP (kW/kW)	
Design flow rate	4.40 L/s		2.50 L/s	
Waterside Heat Exchanger Pressure drop	26.1 kPa		8.1 kPa	
Evaporator Min Flow	2.3 L/s		2.3 L/s	
Evaporator Max Flow	7.0 L/s		7.0 L/s	

Acoustic data

Outdoor sound power level	85 dBA	(4)
Outdoor sound pressure level	54 dBA	(3)

	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Outdoor Sound spectrum (Lw)	91 dB	83 dB	81 dB	82 dB	77 dB	66 dB	57 dB

Hydraulic module data

Type of pump	Dual pump standard pressure
Smart flow control	Pump flow controlled by VFD
Design flow rate	4.40 L/s
Available head - user side	114.4 kPa
Pump power absorbed	1.22 kW

General data - refrigerant circuit

Refrigerant type	Full charge R454B
Refrigerant GWP (AR4)	466
Number of circuits	2
Number of compressors per circuit	2
Unit minimum load	20.00 %
Refrigerant charge per circuit	10 kg
Oil charge per circuit	6 kg

General data - fan section

Number of fans	2
Fan type	AC Axial & VFD
Total nominal airflow	28042.70 m3/hr

Electrical data

Electrical supply	400V-50Hz-3Ph
Compressor soft starter	Soft starter
Start-up current	147.00 A
Maximum running current	81.00 A
Maximum power at maximum current	48.00 kW
Displacement power factor (cos-phi)	0.855

Dimensions and weight

Length	2327 mm
Width	2250 mm
Height	1747 mm
Operating weight	1049 kg



Note: Dimensions and weight include sound attenuation, hydraulic module, heat recovery and/or free cooling - if selected. Image is for illustration purposes only, options may not be shown.

Applicable standards

(1) According to EN14825:2018, considering average climate; SEER Compliance 2021, SCOP Compliance 2017, SEPR HT Compliance 2021, SEPR MT Compliance 2018

(2) According to EN14511:2018

(3) Average sound pressure at 10 meter distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level

(4) Sound power measurements in accordance with ISO 9614:2009 (part 1)

More information

Model Number	CXAX035E1**1BXCXX2XBA3BXXBXXXA4AXX7BXX4X4XXD1XXXXX	**Video QR code**
Ecodesign datasheet	https://www.trane.com/litweb/Litweb.aspx?#/category/bd13efa5-a5bf-4f0a-afb4-9eab178d9081/range/b74e96bd-4126-4223-8f8e-b32ceedbf233/model/dc7016f4-41b0-4fbb-91cc-06ced1b6c39f/section/fbf546b8-23dd-4f18-bfbe-f3041ad1268f	

8.47

Cable worls Standard SY Data Sheet

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	`Cable worls Standard SY Data Sheet.pdf`
Pages	3

ELAND CABLES®

Veriflex® SY PVC (YSLYSY) Control Cable



Eland Product Group: V02

APPLICATION

Veriflex® steel wire braided flexible connecting cables for instrumentation and control equipment, for tooling machinery production lines, and in flexible applications for free movement without tensile load. Suitable for use in dry, moist and wet rooms. The galvanised steel wire braid serves as protection against mechanical traverse loads and acts as a magnetic screen against interference. These cables are not used for outdoor or underground installation.

CHARACTERISTICS

Voltage Rating
300/500V

Temperature Rating
Fixed: -40°C to +80°C
Flexed: -5°C to +70°C

Minimum Bending Radius
Fixed: 4 x overall diameter
Flexed: 12.5 x overall diameter

CONSTRUCTION

Conductor
Class 5 flexible plain copper

Insulation
PVC (Polyvinyl Chloride)

Inner Sheath
PVC (Polyvinyl Chloride)

Armour
GSWB (Galvanised Steel Wire Braid)

Sheath
PVC (Polyvinyl Chloride)

Core Identification
● Black with ○ White number
From 3 cores: ● Black with ○ White number + ◐ Green/Yellow
Colour-coded cores available upon request

Sheath Colour
○ Transparent

BSI KITEMARK™ TESTED

bsi. Cable Testing Verification KITEMARK™
KM 662609

Cables are tested and verified by The Cable Lab® to confirm they meet the quality standards required of the BSI Cable Testing Verification Kitemark™.

STANDARDS

VDE 0207-363-3, VDE 0482-332-1-2, VDE 819-102 (TM54)

Flame Retardant according to BS EN/IEC 60332-1-2

UKAS LABORATORY TESTED

This product is subject to the Quality Assurance protocols of The Cable Lab®, a UKAS accredited ISO 17025 cable testing laboratory. Testing includes vertical flame, conductor resistance, tensile & elongation, and dimensional consistency, verified to published standards and approved product drawings.

UKAS TESTING 8578

bsi. ISO 9001 Quality Management FS 672069 | ISO 14001 Environmental Management EMS 672067 | OHSAS 18001 Occupational Health and Safety Management OHS 672066

REGULATORY COMPLIANCE

This cable meets the requirements of the Low Voltage Directive 2014/35/EU and the RoHS Directive 2011/65/EU. RoHS compliance has been tested and confirmed by The Cable Lab® as meeting the requirements of the BSI RoHS Trusted Kitemark™.

bsi. RoHS Trusted KITEMARK™ KM 634267 | RoHS | CE | CPR COMPLIANT EN 50575

DIMENSIONS

ELAND PART NO.	NO. OF CORES	NOMINAL CROSS SECTIONAL AREA mm²	NOMINAL THICKNESS OF INSULATION mm	NOMINAL OUTER SHEATH THICKNESS mm	NOMINAL OVERALL DIAMETER mm	NOMINAL WEIGHT kg/km
V0202012CL00000	2	0.75	0.40	0.8	7.2	79.3
V0202022CL00000	2	1	0.40	0.8	7.6	91
V0202032CL00000	2	1.5	0.40	0.8	8.2	110
V0202042CL00000	2	2.5	0.50	0.8	9.4	147
V0203012CL00000	3	0.75	0.40	0.8	7.5	91.3
V0203021CL000	3	1	0.40	0.8	7.9	104
V0203031CL000	3	1.5	0.40	0.8	8.6	129
V0203041CL000	3	2.5	0.50	0.9	10.1	185
V0203051CL000	3	4	0.60	1	12	269
V0203061CL000	3	6	0.65	1.1	13.5	354
V0203071CL000	3	10	0.75	1.3	16.9	579
V0203081CL000	3	16	0.75	1.5	19	785
V0203091CL000	3	25	0.90	1.8	23.5	1211
V0203101CL000	3	35	0.95	2	26.7	1642
V0204011CL000	4	0.75	0.40	0.8	8	107
V0204021CL000	4	1	0.40	0.8	8.5	124
V0204031CL000	4	1.5	0.40	0.8	9.2	151
V0204041CL000	4	2.5	0.50	0.9	11.1	230
V0204051CL000	4	4	0.60	1.1	13.2	332
V0204061CL000	4	6	0.65	1.2	14.8	442
V0204071CL000	4	10	0.75	1.5	18.8	735
V0204081CL000	4	16	0.75	1.6	20.9	988
V0204091CL000	4	25	0.90	2	26	1536
V0204101CL000	4	35	0.95	2.2	30	2098
V0204111CL000	4	50	1.25	2.6	35.3	2968
V0204121CL000	4	70	1.25	3	40.5	3822
V0204131CL000	4	95	1.60	3.6	49.4	5369
V0205011CL000	5	0.75	0.40	0.8	8.5	120
V0205021CL000	5	1	0.40	0.8	9.1	140
V0205031CL000	5	1.5	0.40	0.9	10.1	182
V0205041CL000	5	2.5	0.50	1	12.1	266
V0205051CL000	5	4	0.60	1.1	14.2	382
V0205061CL000	5	6	0.65	1.3	16.5	525
V0205071CL000	5	10	0.75	1.6	20.6	873
V0205081CL000	5	16	0.75	1.8	23.4	1207
V0205091CL000	5	25	0.90	2.2	29	1875
V0205101CL000	5	35	0.95	2.4	32.9	2577
V0207011CL000	7	0.75	0.40	0.8	9.1	147
V0207021CL000	7	1	0.40	0.9	9.9	181
V0207031CL000	7	1.5	0.40	0.9	11	226
V0207041CL000	7	2.5	0.50	1.1	13.2	338
V0212011CL00000	12	0.75	0.40	1	10.9	237
V0212021CL00000	12	1	0.40	1	12.7	280
V0212031CL00000	12	1.5	0.40	1.10	14.2	365
V0218011CL00000	18	0.75	0.40	1.10	13.7	322
V0218021CL00000	18	1	0.40	1.20	14.9	396
V0218031CL00000	18	1.5	0.40	1.30	16.8	521

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International T +44 20 7241 8740 | F +44 20 7241 8700 | international@elandcables.com

ELAND PART NO.	NO. OF CORES	NOMINAL CROSS SECTIONAL AREA mm²	NOMINAL THICKNESS OF INSULATION mm	NOMINAL OUTER SHEATH THICKNESS mm	NOMINAL OVERALL DIAMETER mm	NOMINAL WEIGHT kg/km
V0225011CL00000	25	0.75	0.40	1.30	16	438
V0225021CL00000	25	1	0.40	1.40	17.6	544
V0225031CL00000	25	1.5	0.40	1.50	19.6	708

ELECTRICAL CHARACTERISTICS

NOMINAL CROSS SECTIONAL AREA mm²	CURRENT CARRYING CAPACITES 30°C CONTINOUS LOADING A	MAXIMUM RESISTANCE OF CONDUCTOR AT 20°C ohms/km
0.75	12	26
1	15	19.5
1.5	18	13.3
2.5	26	7.98
4	34	4.95
6	44	3.3
10	61	1.91
16	82	1.21
25	108	0.78
35	135	0.554
50	168	0.386
70	207	0.272
95	223	0.206

The information contained within this datasheet is for guidance only and is subject to change without notice or liability. All the information is provided in good faith and is believed to be correct at the time of publication. When selecting cable accessories, please note that actual cable dimensions may vary due to manufacturing tolerances.

8.48

ATT-TYPE A product datasheet

The following 11 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	HEN0203-ATTTYPEA-DS
Asset	ATT-TYPE A
Provided by	Caice Acoustic Air Movement Ltd
Source file	Caice attenuator technical submittal.pdf
Pages	11

Hensall Mechanical Services Ltd
Roall Hall
Roall Lane
Eggborough
Goole
North Yorkshire
United Kingdom
DN14 0NY

Our Reference
134055/99/1/5

Subject
Elmwood Leisure Centre

27 May 2025

For the attention of David Rushbrook,

Please find attached our attenuator technical submittal, which is based on the following information:

Schedule numbers	:	HEN0203-HEN-00-XX-SCH-M-5707 P01
Specification sections	:	
Drawing numbers	:	

- Unless detailed otherwise, attenuators are based upon our standard constructional specification, available at

https://caice.co.uk/wp-content/uploads/2022/12/Product-Specification-for-Standard-Attenuators.pdf

We trust this meets with your approval, however if you require any further details or clarification then please do not hesitate to contact us.

Yours faithfully,

Emma Davey
Senior Contracts Engineer (Attenuators)
Direct Dial 01756 708766
E-Mail emma.davey@caice.co.uk

Telephone
0118 918 6470
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www.caice.co.uk

Caice Acoustic Air Movement Ltd.
Riverside House
3 Winnersh Fields
Gazelle Close
Winnersh
Wokingham
RG41 5QS

Registered office and head office

Company Registration Number
2790667
VAT Registration Number
GB614683632

Attenuator Schedule

Elmwood Leisure Centre

Schedule Date
23/05/2025
Caice Reference
134055/Q00001

Notes

1. All products shall be supplied by Caice or equal and approved, as per their file reference 134055, contact Joel Abbassi on joel.abbassi@caice.co.uk or call 07500082233.
2. The Contractor shall order the attenuators scheduled below, and shall send finalised drawings and equipment noise levels to the attenuator supplier to check the selections prior to manufacture.
3. The attenuator supplier shall then undertake acoustic calculations to ensure that the attenuators achieve the specified noise criteria, based upon the finalised information.
4. A Technical Submittal comprising acoustic calculations and a finalised schedule of attenuators shall then be issued to the Consultant for final approval.
5. If an alternative attenuator supplier is proposed then the Contractor shall allow for them to undertake witnessed tests to prove their claimed insertion loss performance in a UKAS accredited BS EN ISO 7235: 2009 test facility, for two sample units. This shall be undertaken prior to order.
6. Pressure losses are stated in accordance with ISO 7235, which is based on laminar airflow conditions. The system designer shall make allowance for increased attenuator pressure losses where turbulent airflow conditions exist on the attenuator entry or exit.
7. Unless stated otherwise all attenuators shall be constructed as follows: Galvanised sheet steel casings with 30mm profile flanges that are fully compliant with DW/TM1 at a high pressure rating (+2000/-750Pa). Profile flanges shall be compatible with Doby, Mez & Metu flanging systems. Elements shall be installed in the vertical plane, with side elements provided as standard, and all elements shall have aerodynamic inlet and outlet fairings. Element facings shall be constructed from expanded galvanised steel mesh with fibre glass tissue bonded to the inner face. Mineral wool infill shall be overpacked to minimise voids due to settlement. Attenuator ends shall be protectively wrapped, and all attenuators shall be delivered to site on pallets and individually labelled.

Product Reference	Product Description	Product Code	Dimensions (mm) Width	Height	Length	Volume (m^3/s)	Pressure Loss (Pa)	Quantity	Features
ATT.R.01	AHU R.05 FAI	Rectangular LG01H/3C/L/S	600	550	600	1.80	26	1	Rectangular attenuator & Horizontal elements
ATT.R.02	AHU R.05 EXH	Rectangular SG01H/3C/L/S	600	800	600	1.65	12	1	Rectangular attenuator & Horizontal elements
ATT.R.03	AHU R.05 EXT	Rectangular LG01H/3C/L/S	600	600	600	1.65	23	1	Rectangular attenuator & Horizontal elements
ATT.R.04	AHU R.05 SUP	Rectangular SG01H/3C/L/S	600	600	1200	1.80	26	1	Rectangular attenuator & Horizontal elements
ATT.R.05	AHU R.09 FAI	Rectangular LG01H/3C/L/S	1000	600	600	1.86	8	1	Rectangular attenuator & Horizontal elements
ATT.R.06	AHU R.09 EXH	Rectangular LG01V/3C/L/S	650	800	600	1.86	11	1	Rectangular attenuator

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Attenuator Schedule

Elmwood Leisure Centre

Schedule Date
23/05/2025
Caice Reference
134055/Q00001

Product Reference	Product Description	Product Code	Dimensions (mm) Width	Height	Length	Volume (m³/s)	Pressure Loss (Pa)	Quantity	Features
ATT.R.07	AHU R.09 EXT	Rectangular LG01H/3C/L/S	650	600	600	1.86	25	1	Rectangular attenuator & Horizontal elements
ATT.R.08	AHU R.09 SUP	Rectangular LG01H/3C/L/S	650	600	1050	1.86	27	1	Rectangular attenuator & Horizontal elements
ATT.R.09	AHU R.04 FAI	Rectangular LG01H/3C/L/S	1000	550	600	0.99	3	1	Rectangular attenuator & Horizontal elements
ATT.R.10	AHU R.04 EXH	Rectangular LG01V/3C/L/S	550	800	600	0.99	5	1	Rectangular attenuator
ATT.R.11	AHU R.04 EXT	Rectangular LG01H/3C/L/S	550	550	600	0.99	17	1	Rectangular attenuator & Horizontal elements
ATT.R.12	AHU R.04 SUP	Rectangular SG01V/3C/L/S	550	550	600	0.99	20	1	Rectangular attenuator
ATT.2.01	AHU R.06 FAI	Rectangular LG01H/3C/L/S	1000	400	600	0.88	6	1	Rectangular attenuator & Horizontal elements
ATT.2.02	AHU R.06 EXH	Rectangular LG01V/3C/L/S	500	500	600	0.88	15	1	Rectangular attenuator
ATT.2.03	AHU R.06 EXT	Rectangular LG01H/3C/L/S	500	400	600	0.88	24	1	Rectangular attenuator & Horizontal elements
ATT.2.04	AHU R.06 SUP	Rectangular SG01H/3C/L/S	500	400	600	0.88	19	1	Rectangular attenuator & Horizontal elements
ATT.2.05	AHU R.03 FAI	Rectangular SG01H/3C/L/S	1000	1000	600	3.11	22	1	Rectangular attenuator & Horizontal elements
ATT.2.06	AHU R.03 EXH	Rectangular SG01V/3C/L/S	1000	1000	600	3.33	38	1	Rectangular attenuator
ATT.2.07	AHU R.03 EXT	Rectangular LG01H/3C/L/S	1000	500	600	3.33	30	1	Rectangular attenuator & Horizontal elements
ATT.2.08	AHU R.03 SUP	Rectangular SG01H/3C/L/S	1000	500	750	3.11	28	1	Rectangular attenuator & Horizontal elements

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Attenuator Schedule

Elmwood Leisure Centre

Schedule Date
23/05/2025
Caice Reference
134055/Q00001

Product Reference	Product Description	Product Code	Width	Dimensions (mm) Height	Length	Volume (m³/s)	Pressure Loss (Pa)	Quantity	Features
ATT.R.13	AHU R.07 FAI	Rectangular SG01V/3C/L/S	2448	1224	600	7.24	4	1	Rectangular attenuator
ATT.R.14	AHU R.07 EXH	Rectangular SG01V/3C/L/S	2448	1224	600	7.24	25	1	Rectangular attenuator
ATT.R.15	AHU R.07 EXT ****	Rectangular SG01V/3C/L/S	2448	1224	1200	7.24	39	1	Rectangular attenuator
ATT.R.16	AHU R.07 SUP ****	Modular MG02H/3C/L/S	2448	1224	1200	7.24	17	1	Modular attenuator, Horizontal elements & Unit delivered in 2 sections, split 2 in width
ATT.R.17	AHU R.08 FAI	Rectangular SG01V/3C/L/S	1836	918	600	3.23	3	1	Rectangular attenuator
ATT.R.18	AHU R.08 EXH	Rectangular SG01H/2C/L/S	1836	918	600	3.23	9	1	Rectangular attenuator, Horizontal elements & Medium pressure rating (+1000/-750Pa)
ATT.R.19	AHU R.08 EXT	Rectangular SG01H/2C/L/S	1836	918	600	3.23	6	1	Rectangular attenuator, Horizontal elements & Medium pressure rating (+1000/-750Pa)
ATT.R.20	AHU R.08 SUP	Rectangular SG01V/3C/L/S	1836	918	600	3.23	4	1	Rectangular attenuator
ATT.R.21	AHU R.01 FAI	Rectangular SG01H/3C/L/S	1400	1400	600	11.41	36	1	Rectangular attenuator & Horizontal elements
ATT.R.22	AHU R.01 EXH	Rectangular SG01V/3C/L/SM/B1	1400	1400	600	11.98	39	1	Rectangular attenuator & Polyester powder paint finish on internal surfaces BS 00 A05 (goose grey satin)
ATT.R.23	AHU R.01 EXT	Rectangular SG01H/3C/L/SM/B1	1400	1400	750	11.41	37	1	Rectangular attenuator, Horizontal elements & Polyester powder paint finish on internal surfaces BS 00 A05 (goose grey satin)
ATT.R.24	AHU R.01 SUP	Rectangular SG01V/3C/L/SM/B1	1400	1400	750	11.41	37	1	Rectangular attenuator & Polyester powder paint finish on internal surfaces BS 00 A05 (goose grey satin)
ATT.R.25	AHU R.02 FAI	Rectangular SG01H/3C/L/S	1000	450	600	2.67	43	1	Rectangular attenuator & Horizontal elements
ATT.R.26	AHU R.02 EXH	Rectangular LG01H/3C/L/SM/B1	800	400	600	1.76	37	1	Rectangular attenuator, Horizontal elements & Polyester powder paint finish on internal surfaces BS 00 A05 (goose grey satin)

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Attenuator Schedule

Elmwood Leisure Centre

Schedule Date
23/05/2025
Caice Reference
134055/Q00001

Product Reference	Product Description	Product Code	Dimensions (mm) Width	Height	Length	Volume (m³/s)	Pressure Loss (Pa)	Quantity	Features
ATT.R.27	AHU R.02 SUP	Rectangular SG01H/3C/L/SM/B1	1000	450	600	2.67	28	1	Rectangular attenuator, Horizontal elements & Polyester powder paint finish on internal surfaces BS 00 A05 (goose grey satin)
ATT.R.28	AHU R.02 EXT	Rectangular LG01H/3C/L/SM/B1	800	400	600	1.76	37	1	Rectangular attenuator, Horizontal elements & Polyester powder paint finish on internal surfaces BS 00 A05 (goose grey satin)

Direct Telephone 01756 708766
Direct E-Mail emma.davey@caice.co.uk

Product Code Definitions

Elmwood Leisure Centre

Quotation Date
23/05/2025
Caice Reference
134055/Q00001

Attenuator

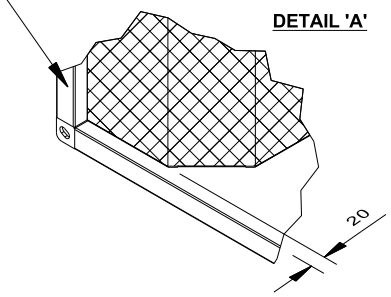


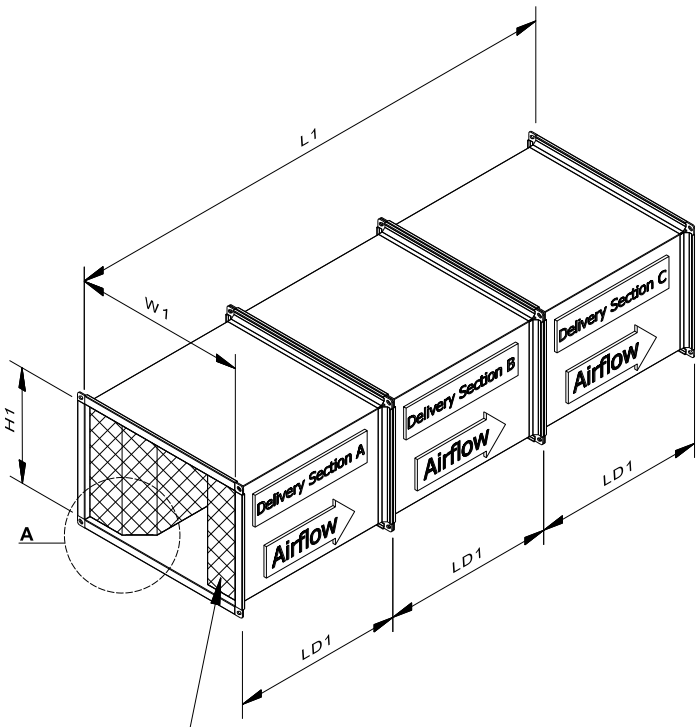
Code Section	Code	Definition
Model	L	Rectangular attenuator with LINING elements
	S	Rectangular attenuator with SPLITTER elements
	M	Rectangular attenuator made in MODULES with splitter elements
Material	G	Standard gauge galvanised sheet steel
Delivery Sections	01	Number of sections delivered to site
Element Type	V	Elements installed in the vertical plane
	H	Elements installed in the horizontal plane
Pressure Rating	2	Medium pressure (+1000/-750Pa)
	3	High pressure (+2000/-750Pa)
End Connections	C	30mm profile flanges (profile flanges are compatible with Doby, Mez & Metu flanges)
Packing	L	Lightweight pallet wrapping on casing ends (EG/IG units are palletised and wrapped on the pallet)
Optional Features	S	Side elements (for EG/IG units these are supplied with steel backing)
	M	Infill protected by Melinex polyester film
Paint Options	B1	Base colour - polyester powder paint internal surfaces only - BS 00 A05 (goose grey satin)

LG Lining Attenuator with Profile Flanges

Elmwood Leisure Centre (134055/Q00001)

Profile flanges suitable for MEZ, DOBY or METU flanging systems. See table below for flange size.





Lining elements set back in casing by 20mm and provided with aerodynamic fairings on inlet and outlet as shown. However if item has non-standard elements refer to Attenuator Product Code Definitions for details.

Lining elements shown installed in the vertical plane. Refer to item Product Code for actual orientation.

Notes

Assembly of multiple piece items must be in accordance with the delivery section and airflow label layouts, typically as shown opposite. Assembly by others.

Where LD1 exceeds 1250 each delivery section has an intermediate central flange.

See NDL in table below for number of delivery sections in length per item.

Nuts, bolts, flange clamps and gasket between flanges by others.

Tolerances on W1 & H1 +/- 2mm.

All dimensions in mm.

Identification labels stating Product Reference and Description provided on all delivery sections.

Attenuators may be delivered in 1, 2, 3 or 4 sections in length (3 shown).

Delivery section and airflow labels only provided on multiple piece items.

W1 and H1 dimensions are inside case.

Tolerances on LD1 +/- 3mm.

Product Reference	Product Code	Primary Dimensions			Delivery Data		Flange Size (mm)	Paint Colour	Weight (kg)	Qty
		W1	H1	L1	LD1	NDL				
ATT.R.01	LG01H/3C/L/S	600	550	600	600	1	30	(Not painted)	23	1
ATT.R.03	LG01H/3C/L/S	600	600	600	600	1	30	(Not painted)	24	1
ATT.R.05	LG01H/3C/L/S	1000	600	600	600	1	30	(Not painted)	33	1
ATT.R.06	LG01V/3C/L/S	650	800	600	600	1	30	(Not painted)	30	1
ATT.R.07	LG01H/3C/L/S	650	600	600	600	1	30	(Not painted)	26	1
ATT.R.08	LG01H/3C/L/S	650	600	1050	1050	1	30	(Not painted)	41	1
ATT.R.09	LG01H/3C/L/S	1000	550	600	600	1	30	(Not painted)	33	1
ATT.R.10	LG01V/3C/L/S	550	800	600	600	1	30	(Not painted)	28	1
ATT.R.11	LG01H/3C/L/S	550	550	600	600	1	30	(Not painted)	24	1
ATT.2.01	LG01H/3C/L/S	1000	400	600	600	1	30	(Not painted)	28	1

LG Lining Attenuator with Profile Flanges

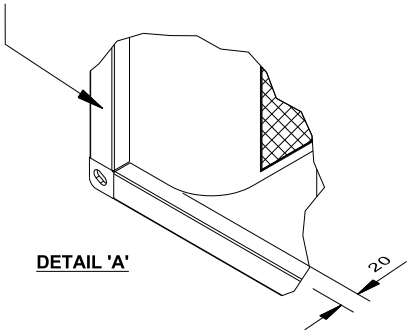
Elmwood Leisure Centre (134055/Q00001)

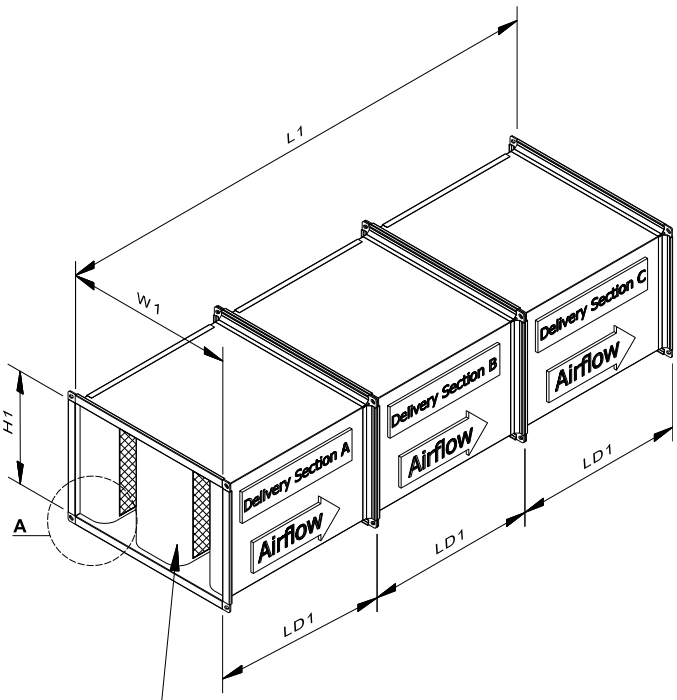
Product Reference	Product Code	Primary Dimensions			Delivery Data		Flange Size (mm)	Paint Colour	Weight (kg)	Qty
		W1	H1	L1	LD1	NDL				
ATT.2.02	LG01V/3C/L/S	500	500	600	600	1	30	(Not painted)	20	1
ATT.2.03	LG01H/3C/L/S	500	400	600	600	1	30	(Not painted)	17	1
ATT.2.07	LG01H/3C/L/S	1000	500	600	600	1	30	(Not painted)	29	1
ATT.R.26	LG01H/3C/L/SM/B1	800	400	600	600	1	30	BS 00 A 05 (goose grey s	24	1
ATT.R.28	LG01H/3C/L/SM/B1	800	400	600	600	1	30	BS 00 A 05 (goose grey s	24	1

SG Splitter Attenuator with Profile Flanges

Elmwood Leisure Centre (134055/Q00001)

Profile flanges suitable for MEZ, DOBY or METU flanging systems. See table for flange size.





Splitter elements set back in casing by 20mm and provided with aerodynamic bullnoses on inlet and outlet as shown. However if item has non-standard elements refer to Attenuator Product Code Definitions for details.

Splitter elements shown installed in the verical plane. Refer to item Product Code for actual orientation.

Notes

Assembly of multiple piece items must be in accordance with the delivery section and airflow label layouts, typically as shown opposite. Assembly by others.

Where LD1 exceeds 1250 each delivery section has an intermediate central flange.

See NDL in table below for number of delivery sections in length per item.

Nuts, bolts, flange clamps and gasket between flanges by others.

Tolerances on W1 & H1 +/- 2mm.

All dimensions in mm.

Identification labels stating Product Reference and Description provided on all delivery sections.

Attenuators may be delivered in 1, 2, 3 or 4 sections in length (3 shown).

Delivery section and airflow labels only provided on multiple piece items.

W1 and H1 dimensions are inside case.

Tolerances on LD1 +/- 3mm.

Product Reference	Product Code	Primary Dimensions			Delivery Data		Flange Size (mm)	Paint Colour	Weight (kg)	Qty
		W1	H1	L1	LD1	NDL				
ATT.R.02	SG01H/3C/L/S	600	800	600	600	1	30	(Not painted)	37	1
ATT.R.04	SG01H/3C/L/S	600	600	1200	1200	1	30	(Not painted)	48	1
ATT.R.12	SG01V/3C/L/S	550	550	600	600	1	30	(Not painted)	29	1
ATT.2.04	SG01H/3C/L/S	500	400	600	600	1	30	(Not painted)	21	1
ATT.2.05	SG01H/3C/L/S	1000	1000	600	600	1	30	(Not painted)	63	1
ATT.2.06	SG01V/3C/L/S	1000	1000	600	600	1	30	(Not painted)	65	1
ATT.2.08	SG01H/3C/L/S	1000	500	750	750	1	30	(Not painted)	40	1
ATT.R.13	SG01V/3C/L/S	2448	1224	600	600	1	30	(Not painted)	119	1
ATT.R.14	SG01V/3C/L/S	2448	1224	600	600	1	30	(Not painted)	171	1

SG Splitter Attenuator with Profile Flanges

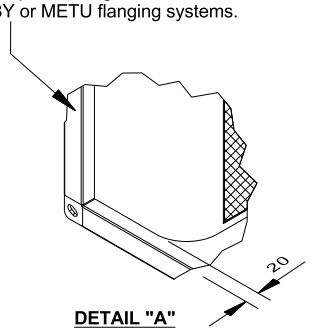
Elmwood Leisure Centre (134055/Q00001)

Product Reference	Product Code	Primary Dimensions			Delivery Data		Flange Size (mm)	Paint Colour	Weight (kg)	Qty
		W1	H1	L1	LD1	NDL				
ATT.R.15	SG01V/3C/L/S	2448	1224	1200	1200	1	30	(Not painted)	310	1
ATT.R.17	SG01V/3C/L/S	1836	918	600	600	1	30	(Not painted)	85	1
ATT.R.18	SG01H/2C/L/S	1836	918	600	600	1	30	(Not painted)	99	1
ATT.R.19	SG01H/2C/L/S	1836	918	600	600	1	30	(Not painted)	97	1
ATT.R.20	SG01V/3C/L/S	1836	918	600	600	1	30	(Not painted)	90	1
ATT.R.21	SG01H/3C/L/S	1400	1400	600	600	1	30	(Not painted)	100	1
ATT.R.22	SG01V/3C/L/SM/B1	1400	1400	600	600	1	30	BS 00 A 05 (goose grey sati	90	1
ATT.R.23	SG01H/3C/L/SM/B1	1400	1400	750	750	1	30	BS 00 A 05 (goose grey sati	121	1
ATT.R.24	SG01V/3C/L/SM/B1	1400	1400	750	750	1	30	BS 00 A 05 (goose grey sati	121	1
ATT.R.25	SG01H/3C/L/S	1000	450	600	600	1	30	(Not painted)	36	1
ATT.R.27	SG01H/3C/L/SM/B1	1000	450	600	600	1	30	BS 00 A 05 (goose grey sati	34	1

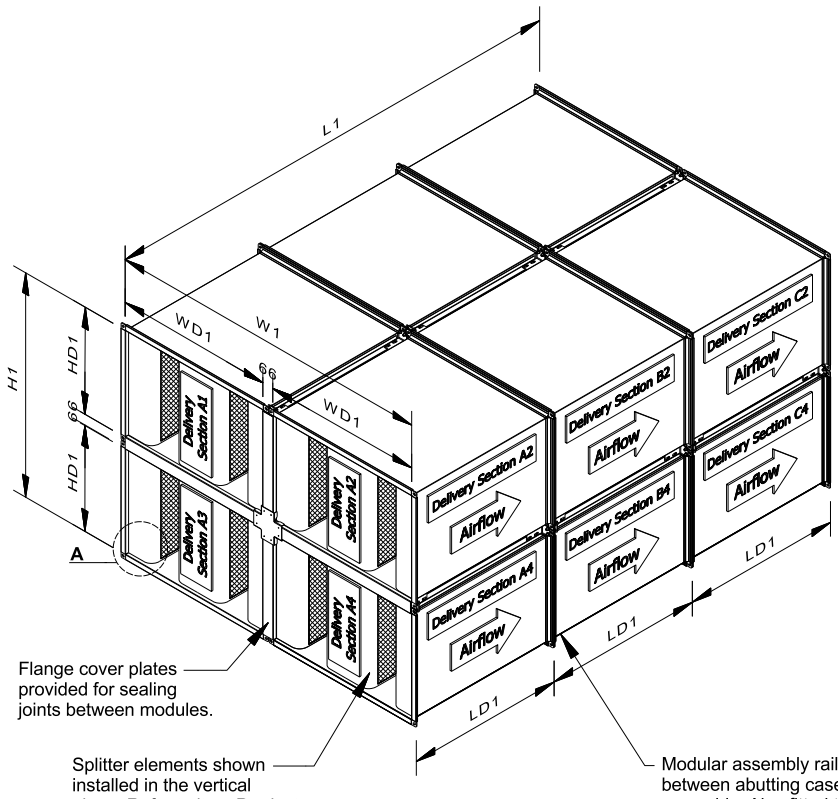
MG Modular Attenuator

Elmwood Leisure Centre (134055/Q00001)

30mm profile flanges suitable for MEZ, DOBY or METU flanging systems.



Splitter elements set back in casing by 20mm and provided with aerodynamic bullnoses on inlet and outlet as shown. However if item has non-standard elements refer to Attenuator Product Code Definitions for details.



Flange cover plates provided for sealing joints between modules.

Splitter elements shown installed in the vertical plane. Refer to item Product Code for actual orientation.

Modular assembly rails fitted between abutting cases for assembly. Also fitted to bottom cases as feet.

Notes

See NDW, NDH and NDL in table below for number of delivery sections in width, height and length respectively per item.

Assembly by others must be in accordance with our Modular Attenuator Joining Instructions provided.

Fixings provided except, nuts, bolts, flange clamps, and gasket between flanges.

Attenuators may be delivered in any number of sections (12 shown below).

Tolerances on WD1 & HD1 +/- 2mm.

All dimensions in mm.

Identification labels stating Product Reference and Description to be provided on all delivery sections.

Where LD1 exceeds 1200 each delivery section to have an intermediate central flange.

Delivery section and airflow labels affixed as shown to assist with assembly.

W1 and H1 dimensions are inside case.

Tolerances on LD1 +/- 3mm.

Product Reference	Product Code	Primary Dims			Delivery Data						Paint Colour	Weight (kg)	Qty
		W1	H1	L1	WD1	HD1	LD1	NDW	NDH	NDL			
ATT.R.16	MG02H/3C/L/S	2448	1224	1200	1191	1224	1200	2	1	1	(Not painted)	306	1

8.49

Chapter AirValves.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	`Chapter AirValves.book.pdf`
Pages	1

Socket

ILVRU



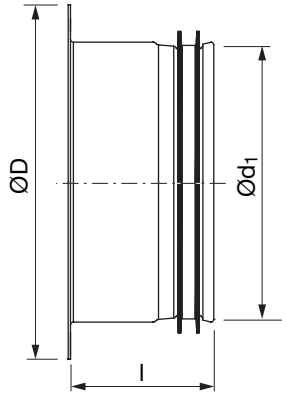
Description

Socket without groove for unit with flexible spring wings.
Supplied with Safe gasket in the far end.
Connects to duct.

Materials and finish

Material
Galvanized sheet metal.

Dimensions



Ød1 nom	ØD [mm]	l [mm]	m [kg]
100	125	51	0,07
125	151	48	0,11
160	186	45	0,16

Ordering example

	ILVRU	125
Product		
Dimension Ød1		

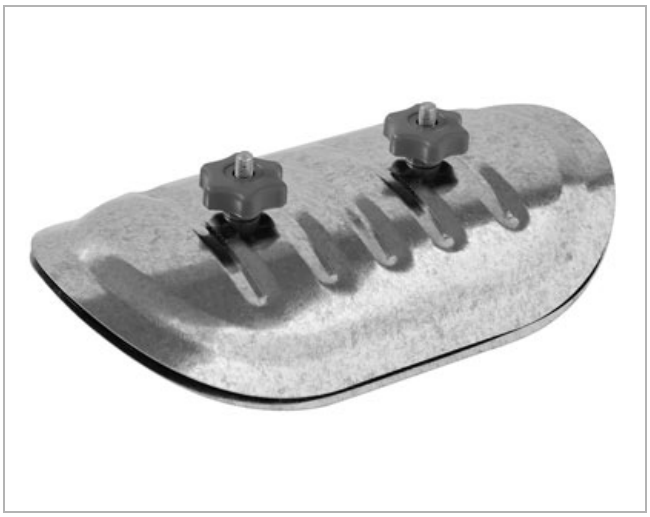
8.50

Curved Access doors

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	`Curved Access doors.pdf`
Pages	2

Curved Access Door ACC



Description

- This unique range of curved duct access doors are designed to provide inexpensive and trouble free access to fire and volume control dampers and associated ventilation and air conditioning equipment mounted within ductwork.
- Correctly installed, these doors provide an airtight seal up to 2500 Pa. In this respect they exceed the requirements of HVCA DW144 specification, classes A, B and C.
- The range of six sizes have been carefully selected to provide suitably sized apertures relative to the size of ducting selected.
- Doors are available to suit duct diameters from 76mm to 2000mm diameter.
- Every door is supplied complete with a self adhesive template which eliminates the need for any measuring or marking out.

Specification

Door Panels- Corrosion resistant galvanised mild steel.

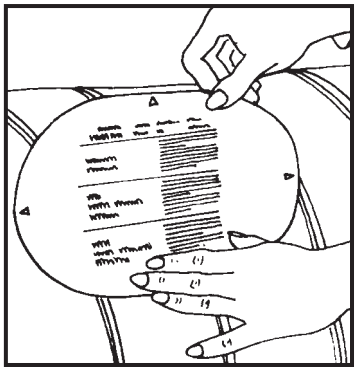
Locking Knob- Polyamid.

Bolts/Nuts Gasket- Zinc plated mild steel.

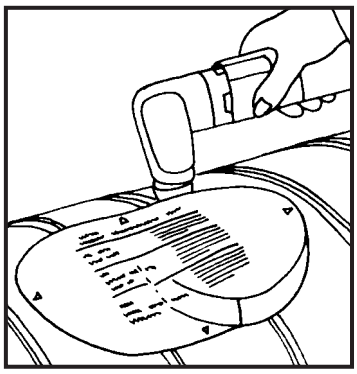
Gasket- Inert neoprene cellular sponge gasket which will not support combustion in its installed state.

Door panels are available in aluminium and stainless steel to special order.

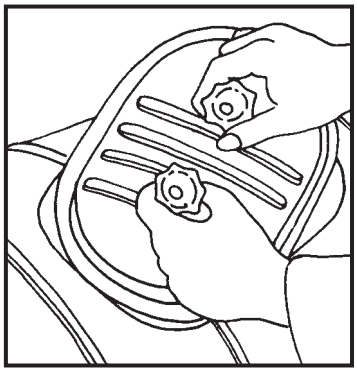
Installataion



1.
Stick self adhesive template on to duct (a template is provided with each door).



2.
Cut out aperture (there is a tolerance of +3mm).



3.
Install door by unscrewing the hand knobs until thread is level with top of bolt. Using both hands place the door in the hole at an angle, turn straight and pull out slightly to align. Then tighten knobs.

sales@lindab.co.uk

Access Door

ACC

Model	Duct Dia.							
ACC18 180 x 80	76-85 Size 8	86-95 Size 9	96-105 Size 10	106-120 Size 11	121-130 Size 12	131-150 Size 14	151-170 Size 16	
ACC21 250 x 150	130-155 Size 15	156-190 Size 18	191-240 Size 20	241-300 Size 25	301-360 Size 31			
ACC32 300 x 200	260-300 Size 28	301-340 Size 31	341-380 Size 35	381-420 Size 40	421-470 Size 45	471-530 Size 50		
ACC43 400 x 300	370-420 Size 40	421-470 Size 45	471-530 Size 50	531-600 Size 56	601-670 Size 63	671-750 Size 71	751-850 Size 80	851-950 Size 90
ACC54 500 x 400	520-600 Size 56	601-670 Size 63	671-750 Size 71	751-850 Size 80	851-950 Size 90	951-1060 Size 100	1061-1180 Size 112	1181-1320 Size 125
ACC64 600 x 450	1000 Size 100	1120 Size 112	1250 Size 125	1400 Size 140	1600 Size 160	1800 Size 180	2000 Size 200	

N.B. When ordering please state type and size ie. ACC18 - size 8.

8.51

Data Sheet Brymec 040687 - Split Band Clip 300-303mm - code B4093302

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

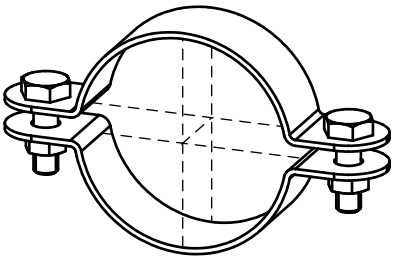
Reference	
Asset	General
Provided by	Not recorded
Source file	Data Sheet Brymec 040687 - Split Band Clip 300-303mm - code B4093302.pdf
Pages	1

IH100 Split Band Clip Over Insulation > 154 OD

(P 04 15)

for steel, copper and insulated pipes 159 - 320 mm

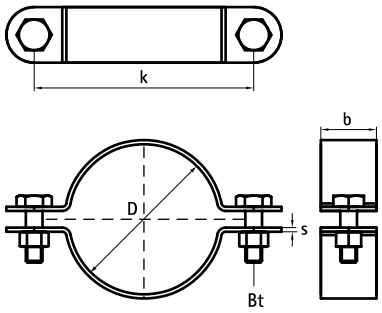




Features and benefits

- standard finish: zinc plated
- also available in:
  - self colour
  - hot dip galvanized

Part No.	D (mm)	Bolt	b x s (mm)	k (mm)	Pack 1
B4093159	159	M12 x 40 mm	40 x 3.0	209	20
B4093168	168	M12 x 40 mm	40 x 3.0	218	20
B4093172	172	M12 x 40 mm	40 x 3.0	222	20
B4093180	180	M12 x 40 mm	40 x 3.0	230	20
B4093190	190	M12 x 40 mm	40 x 5.0	248	10
B4093196	196	M12 x 40 mm	40 x 5.0	254	10
B4093202	202	M12 x 40 mm	40 x 5.0	260	10
B4093212	212	M12 x 40 mm	40 x 5.0	270	10
B4093220	220	M12 x 40 mm	40 x 5.0	278	10
B4093225	225	M12 x 40 mm	40 x 5.0	283	10
B4093232	232	M12 x 40 mm	40 x 5.0	290	10
B4093240	240	M12 x 40 mm	40 x 5.0	298	10
B4093250	250	M12 x 40 mm	40 x 5.0	308	10
B4093260	260	M12 x 40 mm	40 x 5.0	318	10
B4093270	270	M12 x 40 mm	40 x 5.0	328	10
B4093280	280	M16 x 50 mm	50 x 6.0	368	5
B4093302	302	M16 x 50 mm	50 x 6.0	390	5
B4093320	320	M16 x 50 mm	50 x 6.0	408	5



8.52

DataSheet_AirDirt

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	`DataSheet_AirDirt.pdf`
Pages	3

AIR & DIRT SEPARATOR
DATA SHEET



Core values, quality products

AIR & DIRT SEPARATOR Data Sheet

Core values, quality products

Flanged Microbubble Air & Dirt Separator:

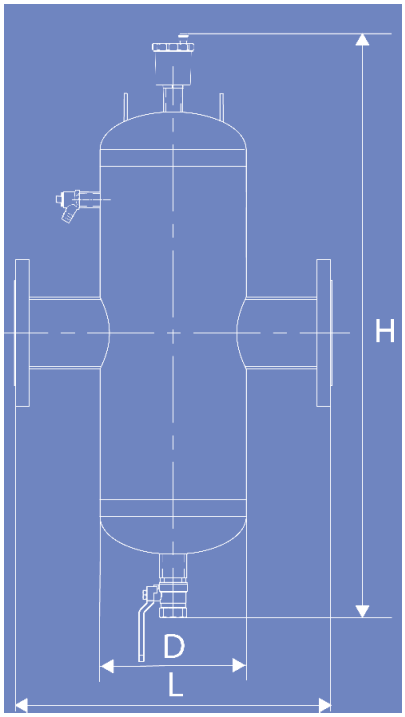
For use in sealed heating and cooling systems. CORE Air & Dirt Separators protect against damage caused by the deposit of dirt particles, and large amounts of dissolved and undissolved air.

Advantages of using Air & Dirt Separators reduction in:

- Corrosion of pipe and fixings.
- Dependance on chemicals.
- Unwanted dirt build up in radiators, vessels & pipe.

CORE Air & Dirt separators are essential when refurbishing older systems or when an open system is converted to a closed system.

- Flanged connection EN 1092-1 PN16.
- Extremely low flow resistance.
- Flow Rate up to 1.5 m/s.
- 5 Year Warranty.



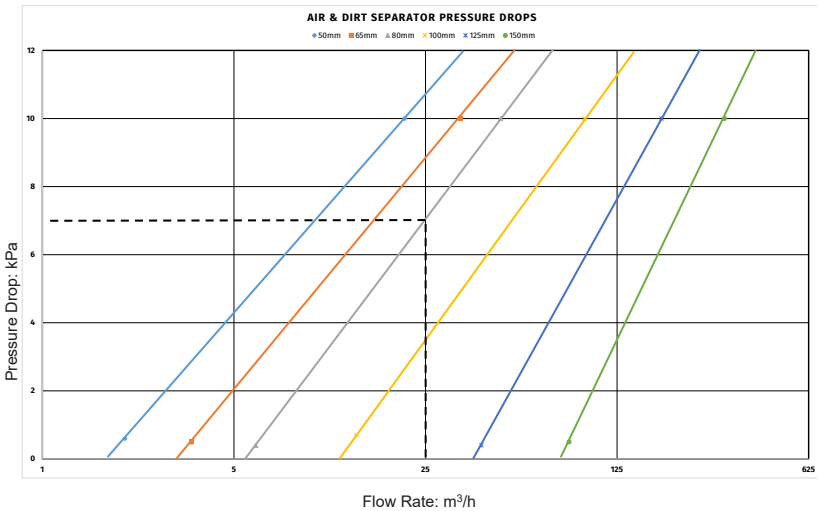
Specifications:

- Maximum working pressure: 10 bar.
- Mild Steel Body with Stainless steel filament internals.
- Brass valves, automatic air vent & blow down valve.
- Suitable for systems with a maximum flow temperature of 110 °C.
- Suitable for addition of glycol-based anti-freeze up to 50%.
- In accordance with Pressure Equipment Directive 2014/68/EU Cat SEP and Pressure Equipment (Safety) Regulations 2016.

Pipe Size	Length L	Body Dia D	Height H	Flange	Weight (Empty)
50mm	430mm	168mm	478mm	PN16	20kg
65mm	430mm	168mm	478mm	PN16	22kg
80mm	490mm	220mm	669mm	PN16	35kg
100mm	490mm	220mm	669mm	PN16	40kg
125mm	630mm	325mm	841mm	PN16	65kg
150mm	630mm	325mm	841mm	PN16	100kg
200mm*	810mm	410mm	1155mm	PN16	103kg

*200mm dimensions not including valves

Pressure Drop Chart



Example: When the water flow is 25m^3/h pressure drop for the DN80 Air & Dirt Separators:

1. From the 'Flow' axis at 25m^3/h, move vertically to the DN 80 curve.

2. Move left from the point of intersect to meet the "Pressure Drop" axis, for this example Pressure Drop will be 7kPa

AIR & DIRT SEPARATOR
Data Sheet

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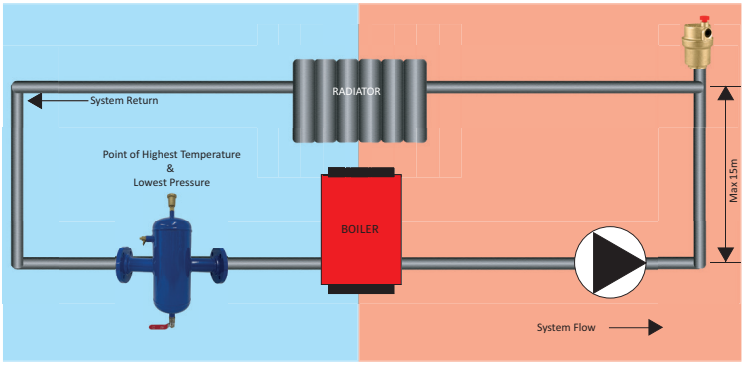
Location

1. Microbubbles are easily released from circulating water, where the highest temperature and lowest pressure conditions occur in the system.

2. The separators should normally be fitted where water is at the highest temperature and the lowest pressure point available.

3. The examples shown below are typical installation layouts, but other acceptable locations for the separator exist.

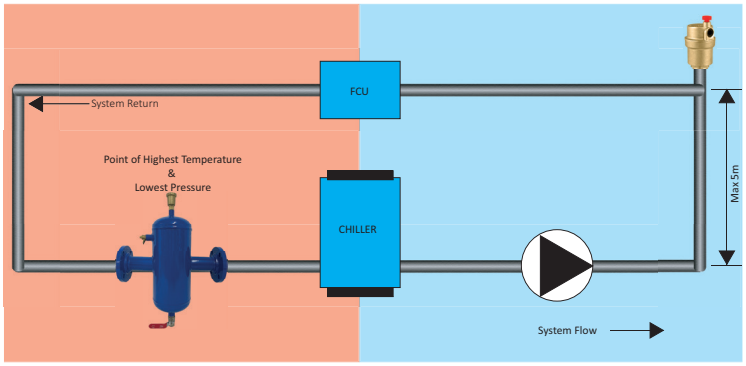
System Set up Hot Water



PLEASE NOTE
The static head must not exceed 15m for a heating system and 5m for a cooling/chilled water system.

The efficiency of the unit will be reduced if the system static head exceeds those indicated, or system or flow velocity exceeds 1.5m/s.

System Set up Cold Water



4. When selecting the position for the separator please be aware that pressure also has a major effect on the release of microbubbles.

5. Where lower temperatures are involved in cooling applications, system pressure becomes the determining factor for the position of the separator.

6. CORE Air & Dirt separators should be installed in horizontal pipework, the direction of flow is optional.

8.53

DataSheet_CORE_Stainless_Steel

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	`DataSheet_CORE_Stainless_Steel.pdf`
Pages	3

STAINLESS STEEL DOSING POT
Technical Data Sheet

Product Overview:

Our CORE Dosing Pot is a high-quality stainless steel vessel which is fatigue resistant due to its design. The Pot fully complies with the latest BSRIA BG50/2013 recommendations regarding avoiding dead legs.

The unit is supplied with loose components, so connections can be fitted in an orientation best suited to the system.

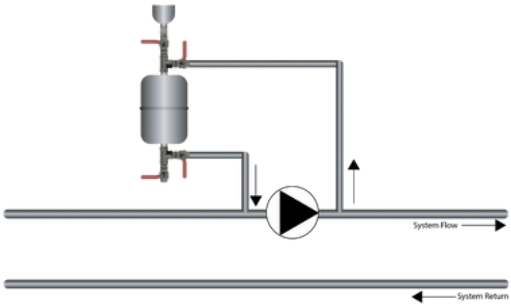


Sizing and Installation:

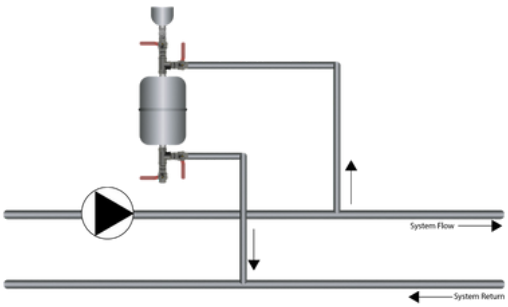
Dosing pots are generally installed in closed systems to enable water
treatments and other chemicals to be added to the system without the need to shut a system down, or part thereof.

The size of the dosing pot installed in a system is not critical as multiple doses of chemicals can be put into the system to reach the correct concentration.

The benefits of using a smaller unit, is
that it is easier to physically handle and also allows for more accurate dosing. However, the time on site for performing multiple doses has to be considered.
This factor should influence your decision when selecting dosing pots.



BSRIA Compliant if installed
in this configuration



Not BSRIA Compliant if installed in this configuration - But Acceptable

STAINLESS STEEL DOSING POT
Technical Data Sheet

SPECIFICATIONS

SIZES:
3.5L, 6L, 11L, 18L & 25L

MATERIALS:

1. 304 Polished Stainless Steel Body & Tundish.
2. 304 Stainless Steel Ball Valves and Fittings.
3. 1/2" Brass Air Vent.
4. 304 Stainless steel multipoint welded backplate - 2 per dosing pot.

OPERATING PARAMETERS

1. Maximum Working Temperature - 110 °C.
2. Maximum Working Pressure:

- 3.5L, 6L & 11L - 10Bar.
- 18L & 25L - 7Bar.

PRESSURE EQUIPMENT DIRECTIVE:

All Chempots are designed and manufactured in accordance with PED2014/68/EU - Category SEP.

We recommend using the CORE range of chemicals with this dosing pot.

DOSING ADVICE FOR ALL CHEMICALS EXCEPT GLYCOL

1. Take the combined kW output of the Boilers/Chillers.
2. For a heating system, multiply the kW output by 12 to give an estimated system volume in litres, e.g. for a 500kW heating system: Multiply 500 x 12 = 6,000 litres; then multiply by 0.40% = 24. ADD 24 litres of CORE Inhibitor.
3. For a chilled/cooling system, multiply the kW output by 15 to give an estimated system volume in litres, e.g. for a 250kW chilled system: Multiply 250 x 15 = 3,750 litres; then multiply by 0.40% = 15. ADD 15 litres of CORE Inhibitor.

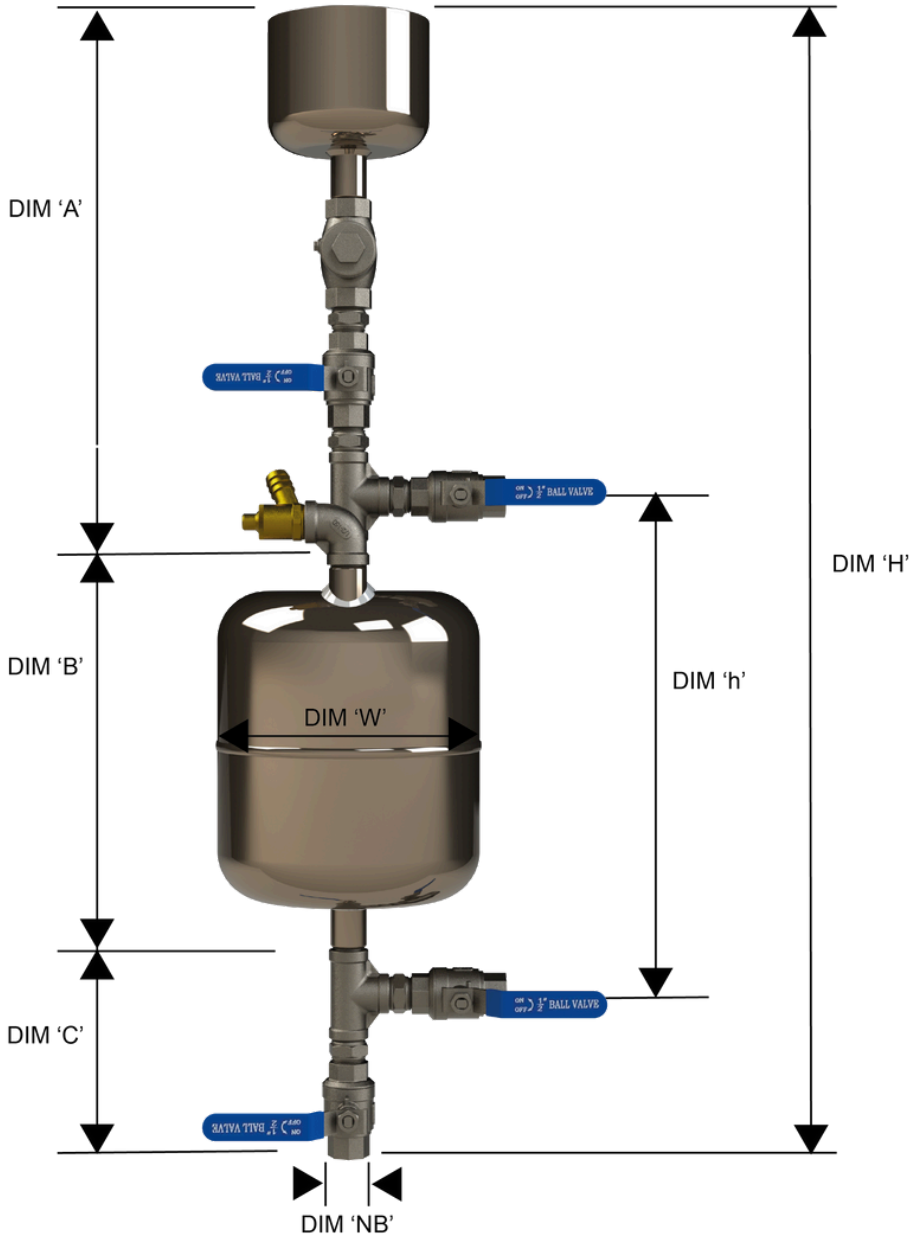
Contact your nearest SBS branch for Glycol dosage information.



Core values, quality products

STAINLESS STEEL DOSING POT
Technical Data Sheet

PLEASE NOTE: ALL DIMENSIONS ARE FOR GUIDANCE ONLY



SIZE	Connection Size (NB)	DIM A	DIM B	DIM C	DIM W	DIM H	DIM h	Weight (Full)	Max Working Pressure
3.5L	1/2"	285mm	260mm	130mm	162mm	675mm	310mm	9kgs	10Bar
6L	1/2"	285mm	260mm	130mm	215mm	675mm	310mm	14kgs	10Bar
11L	1/2"	285mm	410mm	130mm	215mm	825mm	460mm	21kgs	10Bar
18L	1/2"	285mm	460mm	130mm	260mm	875mm	510mm	30kgs	7Bar
25L	1/2"	285mm	590mm	130mm	260mm	1005mm	640mm	40kgs	7Bar

8.54

Delibie Basin Tap - Securitherm

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	`Delibie Basin Tap - Securitherm.pdf`
Pages	2

SECURITHERM thermostatic basin mixer

Ref. H9600610

Single hole thermostatic sequential mixer, H. 95mm L. 120mm



DESCRIPTION

SECURITHERM thermostatic basin mixer - Ref. H9600610

Deck-mounted SECURITHERM thermostatic basin mixer.
Thermostatic sequential mixer: opens and closes with cold water.
No risk of cross flow between hot and cold water.
No non-return valve on the inlets.
Anti-scalding failsafe: shuts off automatically if cold or hot water supply fails.
Securitouch thermal insulation prevents burns.
Single hole mixer with straight spout H. 95mm L. 120mm fitted with a hygienic flow straightener for no impurity retention and resistance to thermal shocks.
Scale-resistant thermostatic sequential cartridge for single control of flow rate and temperature.
Temperature can be adjusted from cold water up to 40°C with maximum temperature limiter set at 40°C.
Thermal and chemical shocks are possible.
Body and spout with smooth interiors and low water volume.
Flow rate limited to 5 lpm at 3 bar.
No manual contact thanks to Hygiene control lever L. 146mm.
No pop-up waste.
Supplied with copper tails and stopcocks in chrome-plated brass.
Fixing reinforced by 2 stainless steel rods.
Mixer ideal for healthcare facilities, retirement and care homes, hospitals and clinics.
Mixer suitable for people with reduced mobility.
30-year warranty.
Also available with PEX flexibles.

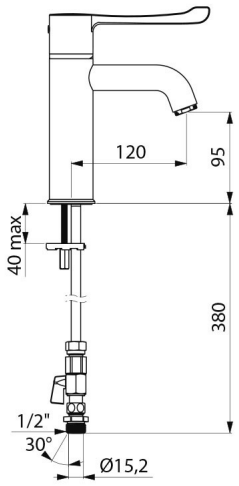
ADVANTAGES

- Sequential: opens/closes with cold water
- Maximum hygiene: no non-return valves
- SECURITHERM: optimal anti-scalding safety
- Securitouch: thermal insulation prevents burns

TECHNICAL CHARACTERISTICS

SECURITHERM thermostatic basin mixer - Ref. H9600610

Connector	M1/2'' Ø 15mm
Technology	SECURITHERM Securitouch sequential mixer
Drop height	95mm
Spout length	120mm
Flow rate	5 lpm
Temperature limiter	Yes
Finish	Chrome-plated brass
Norms	WRAS



Warranty	
Repairability	

8.55

Delibie Eye Wash Station

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	`Delibie Eye Wash Station.pdf`
Pages	2

Eye wash and safety shower combination

Ref. 9203

Free-standing



DESCRIPTION

Eye wash and safety shower combination - Ref. 9203

Free-standing eye wash and safety shower combination with manual or foot control equipped with:
Frost-free system as standard.
304 stainless steel basin Ø 250mm with green finish.
Eye wash spray heads fitted with protective caps in shock-resistant green ABS; will eject automatically when activated.
Flow rate 20 lpm at 3 bar dynamic pressure, aerators have stainless steel double filters.
Circular shower head Ø 250mm in green, shock-resistant ABS.
Flow rate 96 lpm at 3 bar dynamic pressure.
Water supply F1".
Pipework made from galvanised steel, grey powder-coated finish. Triangular pull handle in green powder-coated brass. Hand and foot controls in green powder-coated galvanised steel.
Fixed to the floor by a brass base plate (screws not included).
Supplied with identification signs for first aid equipment: "Safety Shower" and "Eye Wash".
30-year warranty.
Operation:
1/4-turn, nickel plated brass valves open and close quickly.
Simultaneous Eye Wash and Shower:
Water flows simply by pulling on the triangular handle.
The flow will continue even when the handle is released.
The flow will stop when the handle is returned to its original position.
Eye Wash only:
Water flow is operated by the foot pedal or the hand control. The eye wash will continue to flow when the pedal or hand control is released.
The water flow will stop when the hand control is pulled towards the user or the foot pedal is raised.
30-year warranty.
The water does not shut off automatically, allowing the injured person to have both hands free (to remove their clothing, keep their eyes open, etc.).

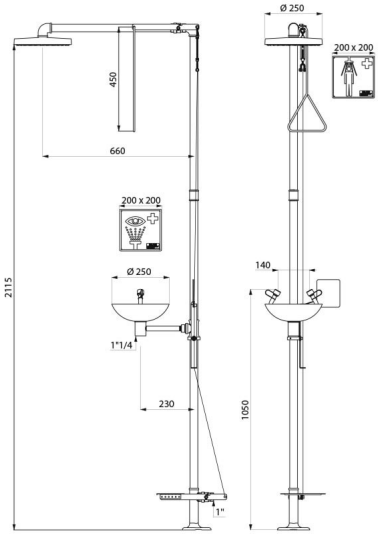
ADVANTAGES

- Frost-free system provided as standard
- Rapid flow rate for full decontamination
- Maintenance without removing the equipment
- Gentle spray and quick and easy to activate

TECHNICAL CHARACTERISTICS

Eye wash and safety shower combination - Ref. 9203

Supply	F1"
Height	2207mm
Length	660mm
Drop height	2115mm
Flow rate	96 lpm at 3 bar dynamic pressure
Norms	
Warranty	



8.56

Delibie Tempomatic Sensor 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	Delibie Tempomatic Sensor Basin Tap.pdf
Pages	1

TEMPOMATIC 4 electronic tap

Ref. 44000615

Integrated batteries, stopcock Ø 15mm



DESCRIPTION

TEMPOMATIC 4 electronic tap - Ref. 44000615

Deck-mounted electronic basin tap:
Battery-operated with integrated 123 6V Lithium batteries.
Reduced stagnation solenoid valve and electronic unit integrated into the body of the tap.
Flow rate pre-set at 3 lpm at 3 bar, can be adjusted from 1.4 - 6 lpm.
Scale-resistant flow straightener.
Duty flush (~60 seconds every 24 hours after last use).
Presence detection sensor at the end of the spout optimises detection.
Chrome-plated stainless steel body.
Cap fixed in place by two concealed screws.
PEX flexible Ø 15mm for compression fittings with stopcock, filter and non-return valve.
Fixing reinforced by two stainless steel rods.
Anti-blocking security.
Suitable for people with reduced mobility.
30-year warranty.

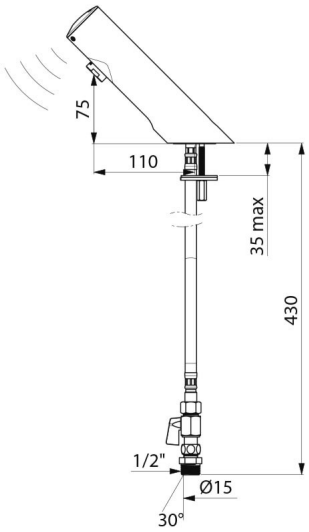
ADVANTAGES

- Exceptional water savings: 90%
- Hygiene: no manual contact
- Batteries integrated in tap body
- Integrated solenoid valve

TECHNICAL CHARACTERISTICS

TEMPOMATIC 4 electronic tap - Ref. 44000615

Supply	6V batteries
Connector	M1/2'' Ø 15mm
Technology	Electronic
Drop height	70mm
Spout length	105mm
Flow rate	3 lpm
Norms	WRAS
Warranty	30 YEAR WARRANTY
Repairability	50 YEARS REPAIRABILITY



8.57

EF B.01 operation and maintenance manual

The following 9 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	HEN0203-EFB01-OM
Asset	EF B.01
Provided by	Ventilation Direct Ltd
Source file	S&P Silent Design extract fan data, EF B.01 and B.02.pdf
Pages	9



SILVER and WHITE version.



SWAROVSKI version.

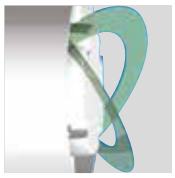
Range of axial extractors with airflow rates of 85 m^3/h, for connection to 100 mm diameter circular ducting.
Motor mounted on silent-elastic-blocks which absorb the vibrations and allow offering very low noise level. All the fans are manufactured from injection moulded plastic, fitted with automatic shutter and single phase 230V-50Hz, class B low consumption motor equipped with thermal overload protection. All the fans are class II insulation, IP45 rated and suitable to operate with air temperature up to 40ºC.

QUIET MARK
Validated mark of approval
noise abatement society

IP45
WATER PROTECTED!

Lp 26,5 db
LOW NOISE!

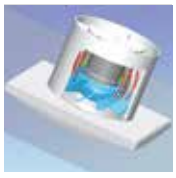
8W!
ENERGY EFFICIENT!



Back draft shutter
To prevent air entry and limit heat leakage when the extractor is not operating. It opens due to the pressure of the air.



Silent-blocks
Motor mounted on "Silent-elastic-block" to prevent vibration and noise transmission.



SILENT-100 DESIGN



USUAL EXTRACTOR

Quiet operation
In usual extract fans the vibrations are transmitted to the surrounding areas while in SILENT extractor fans the vibrations are absorbed by the Silent Blocks.

SWAROVSKI versions: Elegant and innovative design.
Supplied with a front grille with a swarovski bar.



WHITE



CHAMPAGNE



SILVER



Models 3C



Interchangeable colour bars
Interchangeable colour bars. 4 colours to match the decor of the room: blue, red, green and yellow.



Black Grey Champagne Gold



SILENT-100 CZ DESIGN 4C: Different colours available.
4C models incorporate 5 interchangeable colour bars (transparent, blue, green, red and yellow).



Ivory Red Marble white Marble black



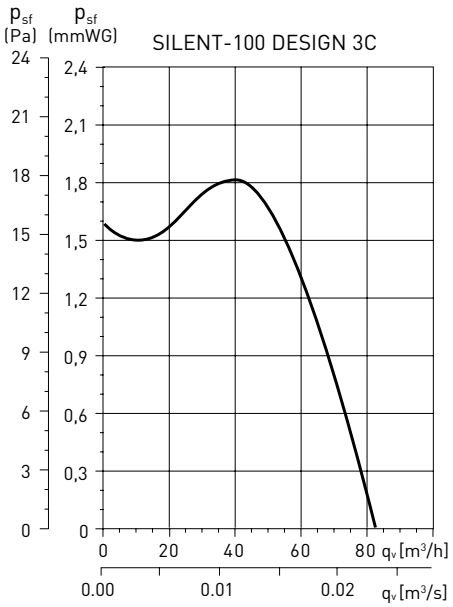
BARCELONA

MODEL FEATURES

	CZ DESIGN 3C	CRZ DESIGN 3C	CHZ DESIGN 3C
PILOT LIGHT	●	●	●
BACKDRAFT SHUTTER	●	●	●
ADJUSTABLE RUN-ON-TIMER (1-30MIN)		●	●
ADJUSTABLE HUMIDISTAT			●
BALL BEARINGS	●	●	●
KIT BAR LIGHTS 4 COLOURS	●	●	●
WIRING DIAGRAM*	2, 3	4, 5	1, 4

* See section of Wiring Diagrams.

PERFORMANCE CURVE

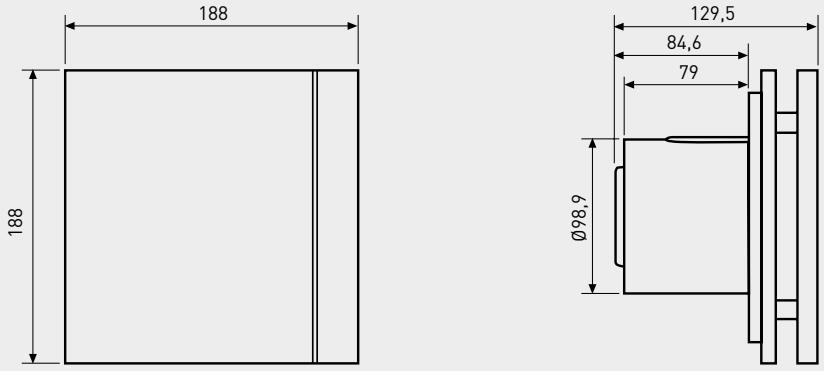


TECHNICAL CHARACTERISTICS

Model	Absorbed power at free discharge (W)	Voltage (V) 50 Hz	Sound pressure level* (dB(A))	Airflow at free discharge (m³/h)	Insulation/ IP	Ø duct (mm)	Weight (kg)
SILENT-100 DESIGN 3C	8	230	26,5	85	Class II / IP45	100	0,65
KIT SILENT-100 DESIGN 12V** 3C	12	12	26,5	80	Class III / IP57	100	0,65

* Sound pressure level measured at 3 m at free air conditions.
** Delivered with CT-12/14 transformer.

DIMENSIONS (mm)



ACCESSORIES



GSA-M0 100
Flexible aluminium ducting.



GRA-75
Aluminium exterior grille.



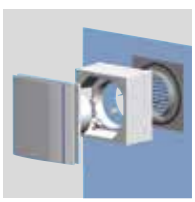
FIXED SHUTTER AND TELESCOPIC DUCT
(200 to 420 mm).



CX-80/125
Worm drive ducting clip.



PER-100W
Back draft shutter.



WINDOW KIT 100
Accessory to allow SILENT-100 in a window.





KIT SILENT-100 DESIGN 12VDC ECOWATT + CT-12/6

Range of axial extractors with airflow rates of 85 m^3/h, high-performance, low consumption Brushless motors, for connection to 100 mm diameter circular ducting. Motor mounted on silent-elastic-blocks which absorb the vibrations and allow offering very low noise level. All the fans are manufactured from injection moulded plastic, fitted with automatic shutter and single phase 230V-50/60Hz, low consumption motor equipped with thermal overload protection. All the fans are class II insulation, IP45 rated and suitable to operate with air temperature up to 40ºC.
With consumption of only 5W, the SILENT ECOWATT series extractors are especially recommended toilets, bathrooms and installations where the extractor will require long working hours resulting in a considerable reduction in energy costs.

Smart VentilationSystems

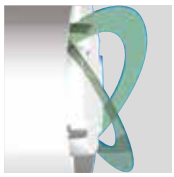
QUIET MARK
Validated mark of approval
noise abatement society

IP45
WATER PROTECTED!

Lp 26,5 db
LOW NOISE!

5W!
ENERGY EFFICIENT!

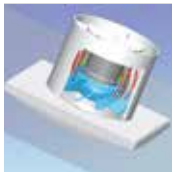
SILENT-100 DESIGN 12VDC ECOWATT + CT-12/6
Kit made up of SILENT-100 DESIGN 12VDC ECOWATT fan, fitted with 12VDC brushless motor and designed for operation at SELV, and a transformer CT-12/6.



Back draft shutter
To prevent air entry and limit heat leakage when the extractor is not operating. It opens due to the pressure of the air.



Silent-blocks
Motor mounted on "Silent-elastic-block" to prevent vibration and noise transmission.



SILENT-100 DESIGN ECOWATT

Quiet operation
In usual extract fans the vibrations are transmitted to the surrounding areas while in SILENT extractor fans the vibrations are absorbed by the Silent Blocks.



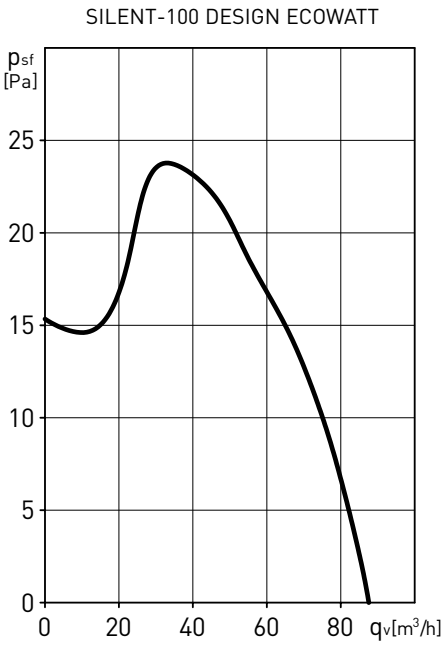
Interchangeable colour bars
Interchangeable colour bars. 4 colours to match the decor of the room: blue, red, green and yellow.

MODEL FEATURES

	CZ	CRZ	CHZ
DC MOTOR	●	●	●
PILOT LIGHT	●	●	●
BACKDRAFT SHUTTER	●	●	●
ADJUSTABLE RUN-ON-TIMER		●	●
ADJUSTABLE HUMIDISTAT			●
WIRING DIAGRAM*	2, 3	4, 5	1, 4

* See section of Wiring Diagrams.

PERFORMANCE CURVE

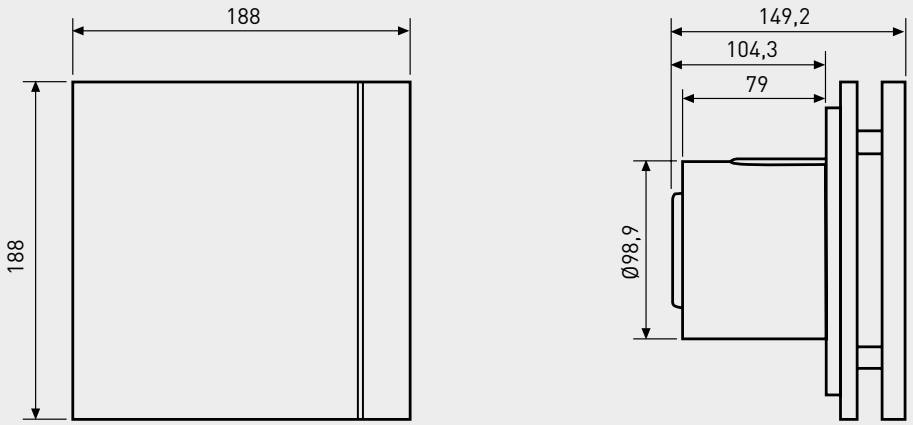


TECHNICAL CHARACTERISTICS

Model	Speed (rpm)	Absorbed power at free discharge (W)	Voltage (V) 50/60 Hz	Sound pressure level* (dB(A))	Airflow at free discharge (m³/h)	Insulation/ IP	Ø duct (mm)	Weight (kg)
SILENT-100 DESIGN ECOWATT	2100	5	230	26,5	85	Class II / IP45	100	0,65
KIT SILENT-100 DESIGN 12VDC ECOWATT	2100	8	230	29	90	Class III/IP57 / Class IIIP21**	100	0,65 / 0,48**

* Sound pressure level measured at 3 m at free air conditions.
** SILENT/CT-12/6.

DIMENSIONS (mm)



ACCESSORIES



GSA-M0 100
Flexible aluminium ducting.



GRA-75
Aluminium exterior grille.



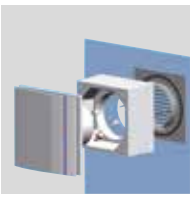
FIXED SHUTTER AND TELESCOPIC DUCT
(200 to 420 mm).



CX-80/125
Worm drive ducting clip.



PER-100W
Back draft shutter.



WINDOW KIT 100
Accessory to allow SILENT-100 in a window.





SILVER versions can be supplied with an aesthetical silver front grille.



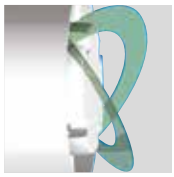
Different styles with the colour bars.

Range of axial extractors with airflow rates of 175 m^3/h, for connection to 120 mm diameter circular ducting.
Motor mounted on silent-elastic-blocks which absorb the vibrations and allow offering very low noise level. All the fans are manufactured from injection moulded plastic, fitted with automatic shutter and single phase 230V-50Hz, class B low consumption motor equipped with thermal overload protection. All the fans are class II insulation, IP45 rated and suitable to operate with air temperature up to 40ºC.

IP45
WATER PROTECTED!

Lp 35 db
LOW NOISE!

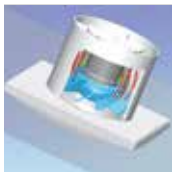
16W!
ENERGY EFFICIENT!



Back draft shutter
To prevent air entry and limit heat leakage when the extractor is not operating. It opens due to the pressure of the air.



Silent-blocks
Motor mounted on "Silent-elastic-block" to prevent vibration and noise transmission.



SILENT-200 DESIGN-3C



USUAL EXTRACTOR

Quiet operation
In usual extract fans the vibrations are transmitted to the surrounding areas while in SILENT extractor fans the vibrations are absorbed by the Silent Blocks.



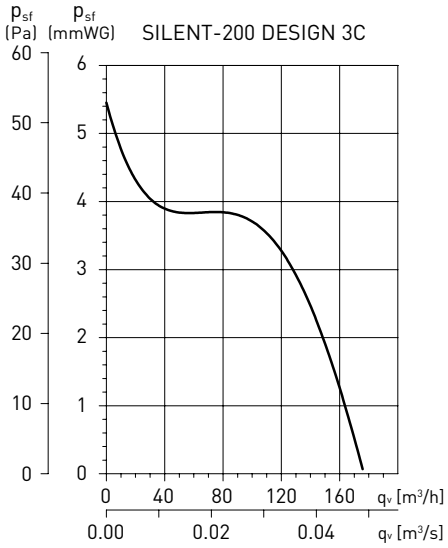
Interchangeable colour bars
Interchangeable bar lights let the fan blend in with every setting.
4 colours to match the decor of the room: blue, red, green and yellow.

MODEL FEATURES

	CZ DESIGN 3C	CRZ DESIGN 3C	CHZ DESIGN 3C
PILOT LIGHT	●	●	●
BACKDRAFT SHUTTER	●	●	●
ADJUSTABLE RUN-ON-TIMER (1-30MIN)		●	●
ADJUSTABLE HUMIDISTAT			●
BALL BEARINGS	●	●	●
KIT BARS 4 COLOURS	●	●	●
WIRING DIAGRAM*	2, 3	4, 5	1, 4

* See section of Wiring Diagrams.

PERFORMANCE CURVE

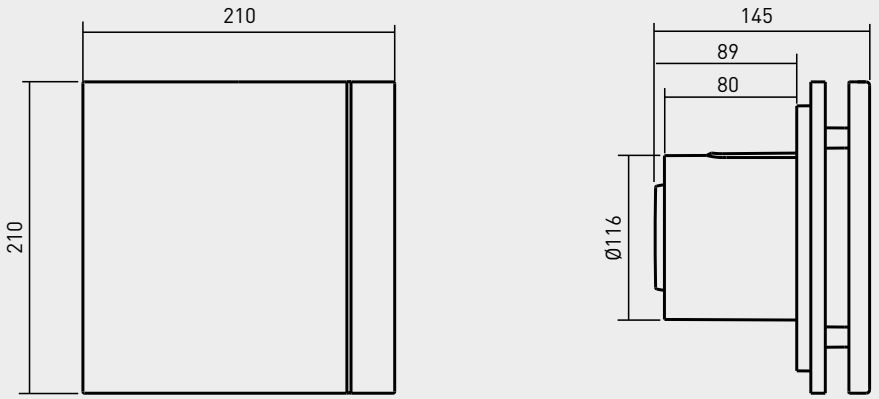


TECHNICAL CHARACTERISTICS

Model	Absorbed power at free discharge (W)	Voltage (V) 50 Hz	Sound pressure level* (dB(A))	Airflow at free discharge (m³/h)	Insulation/ IP	Ø duct (mm)	Weight (kg)
SILENT-200 DESIGN-3C	16	230	35	175	Class II / IP45	120	0,88

* Sound pressure level measured at 3 m at free air conditions.

DIMENSIONS (mm)



ACCESSORIES



GSA-M0 125
Flexible aluminium ducting.



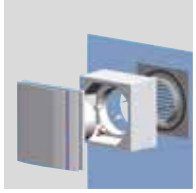
GRA-75
Aluminium exterior grille.



CX-80/125
Worm drive ducting clip.



PER-100W
Back draft shutter.



WINDOW KIT 200
Accessory to allow SILENT-200 in a window.





SILVER version.
All versions available with Silver front cover.

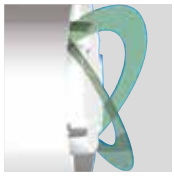


Different styles with the colour bars.

Range of axial extractors with airflow rates up to 300 m^3/h, for connection to 150-160 mm diameter circular ducting. Motor mounted on silent-elastic-blocks which absorb the vibrations and allow offering very low noise level (SILENT-300 DESIGN). All the fans are manufactured from injection moulded plastic, fitted with automatic shutter and single phase 230V-50Hz, class B low consumption motor equipped with thermal overload protection.
All the fans are class II insulation, IP45 rated and suitable to operate with air temperature up to 40ºC.
Version SILENT-300 PLUS DESIGN for increase performance.
Versions with electronic timer (CRZ) or ajustable hygrostat (CHZ).

IP45

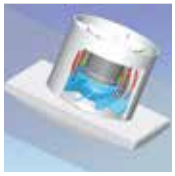
WATER PROTECTED!



Back draft shutter
To prevent air entry and limit heat leakage when the extractor is not operating. It opens due to the pressure of the air.



Silent-blocks
Motor mounted on "Silent-elastic-block" to prevent vibration and noise transmission. (SILENT-300 DESIGN)



SILENT-300 DESIGN-3C



USUAL EXTRACTOR

Quiet operation
In usual extract fans the vibrations are transmitted to the surrounding areas while in SILENT extractor fans the vibrations are absorbed by the Silent Blocks.



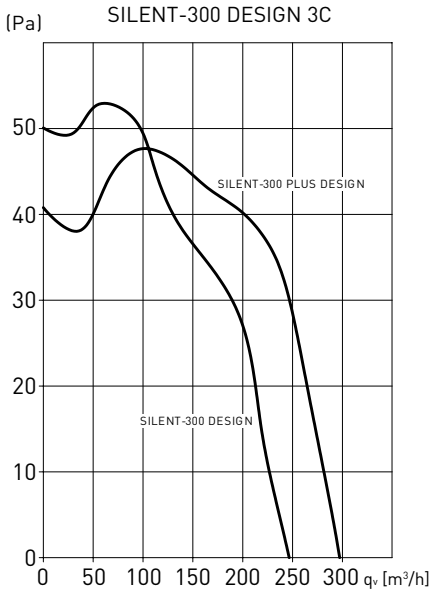
Interchangeable colour bars
Interchangeable bar lights let the fan blend in with every setting.
4 colours to match the decor of the room: blue, red, green and yellow.

MODEL FEATURES

	CZ DESIGN 3C	CRZ DESIGN 3C	CHZ DESIGN 3C
PILOT LIGHT	●	●	●
BACKDRAFT SHUTTER	●	●	●
ADJUSTABLE RUN-ON-TIMER (1-30MIN)		●	●
ADJUSTABLE HUMIDISTAT			●
BALL BEARINGS	●	●	●
SILVER FRONT COVER	●	●	●
WIRING DIAGRAM*	2, 3	4, 5	1, 4

* See section of Wiring Diagrams.

PERFORMANCE CURVES

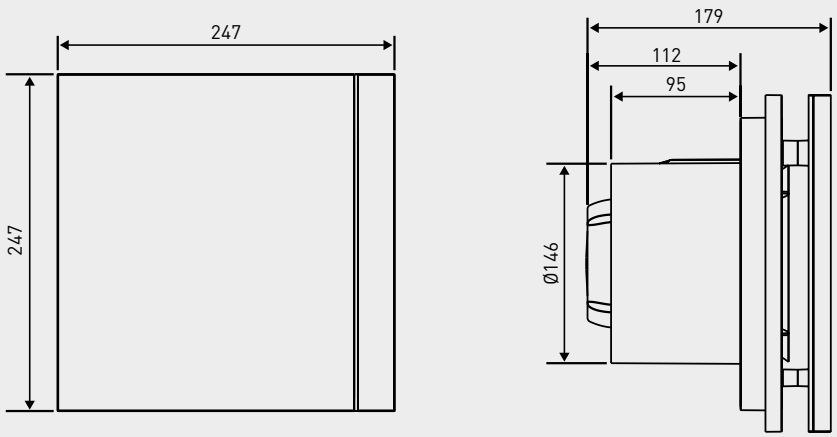


TECHNICAL CHARACTERISTICS

Model	Maximum absorbed power (W)	Voltage (V) 50 Hz	Sound pressure level* (dB(A))	Airflow at free discharge (m³/h)	Insulation/ IP	Ø duct (mm)	Weight (kg)
SILENT-300 DESIGN	26	230	38	250	Class II/IP45	150-160	1,5
SILENT 300 PLUS DESIGN	22	230	42	300	Class II/IP45	150-160	1,9

* Sound pressure level measured at 3 m at free air conditions.

DIMENSIONS (mm)



ACCESSORIES



GSA-M0 150
Flexible aluminium ducting.



GRA-150
Aluminium exterior grille.



REB
Single phase electronic speed controllers.



CX-125/215
Worm drive ducting clip.



PER-160W
Back draft shutter.

8.58

EF B.03 operation and maintenance manual

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

Reference	HEN0203-EFB03-OM
Asset	EF B.03
Provided by	Ventilation Direct Ltd
Source file	S&P TD Mixvent in-line fan data, EF B.03 and B.04.pdf
Pages	12



Range of low profile in-line mixed flow duct fans manufactured in tough reinforced plastic (from 160 to 800 models) or with metal casing steel finished in a tough epoxy-polyester paint coating (from 1000 to 6000 models).
The unique design of the support bracket allows the motor and impeller assembly to be fitted or removed without dismantling the adjacent ducting.

Motors
Models 160-2000:
Class B, with ball bearings and safety thermal overload protection. IP44.
Direct 2 or 3 speed connection and also suitable for voltage speed control.
Electrical supply:
Single phase 230V-50Hz.
(models from 160 to 350)
Single phase 230V-50/60Hz.
(models from 500 to 2000)

Models 4000 and 6000: Class F, with ball bearings and safety thermal overload protection. IP54.
Suitable for voltage speed control.
Electrical supply:
Single phase 230V-50/60Hz.
Three phase 400V-50/60Hz
(model 4000) or
400V-50Hz (model 6000)



Additional information
Three phase models adjustable by inverter control.

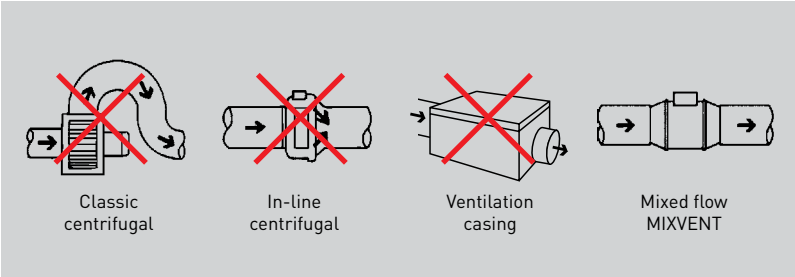
TD-MIXVENT-T models
TD-MIXVENT versions fitted with a run-on-timer adjustable within 1 and 30 minutes and one speed or 3-speed motor (depending on the model) not suitable for speed control.

The MIXVENT-TD fans offer the ideal in-line duct fan solution for a wide range of general residential or commercial ventilation application into.



LOW PROFILE





The low profile of the MIXVENT-TD fans makes them the most effective solution for installations where the space of installation is limited such as false ceilings.

EASY TO MOUNT



Fix the support bracket.



Place the impeller and motor assembly.



Carry out the wiring connections.



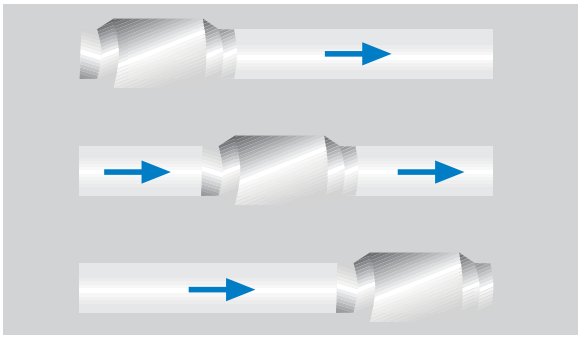
Connect the ducts.

EASY MAINTENANCE



The unique design of the support bracket allows the motor and impeller assembly to be fitted or removed **without dismantling the adjacent ducting**.

FLEXIBLE MOUNTING POSITION



Can be mounted at any place of the air duct.

MODELS TD-MIXVENT-T



Models MIXVENT-TD-T (from 160 to 800 models) are fitted with an adjustable timer between 1 and 30 minutes and are supplied with a one-speed or 3-speed motor (depending on the model) not suitable for speed control.

MODEL 160



Model TD-160/100N SILENT offer very low noise level, with a motor mounted on silent-elastic-blocks which absorb the vibrations.

DESIGN CHARACTERISTICS

	160	250	350	500	800	800N	1000	1300	2000	4000	6000
POLYPROPYLENE CASING	●	●	●	●	●	●					
STEEL CASING							●	●	●	●	●
ABS IMPELLER	●	●	●	●	●	●					
ALUMINIUM IMPELLER							●	●	●	●	●(1)
PROTECTION CLASS	II	II	II	II	II	II	I	I	I	I	I
THERMAL PROTECTION BY FUSE	●	●	●								
MANUAL RESETTING THERMAL PROTECTOR (PTC)				●	●	●	●	●	●	●	●
BALL BEARINGS GREASED FOR LIFE	●	●	●	●	●	●	●	●	●	●	●
1 SPEED CONTROLLABLE MOTOR										●	●
2 SPEED CONTROLLABLE (2) MOTOR	●	●	●								
3 SPEED CONTROLLABLE (2) MOTOR				●	●	●	●	●	●		

(1) Model from one piece die cast aluminium impeller.
(2) Models with Run-On-Timer fitted (TD-MIXVENT-T) are not controllable.

TECHNICAL CHARACTERISTICS SPEED

TD-MIXVENT	Speed (r.p.m.)	Maximum absorbed power (W)	Maximum absorbed current (A)	Maximum airflow (m^3/h)	Sound pressure level* (dB(A))	Min-Max air Temperature (°C)	Weight (kg)	Duct diameter (mm)	3-speed switch	Speed controller	Wiring diagram (nº) **
TD-160/100 N SILENT	2400	29	0,17	180	24	-20/+40	1,4	100	COM-2 REGUL-2	RMB-1,5 REB-1	9, 10
	2200	18	0,11	150	22						
TD-250/100	2140	28	0,12	250	34	-20/+40	2	100	COM-2 REGUL-2	RMB-1,5 REB-1	9, 10
	1700	22	0,1	200	28						
TD-350/125	2050	25	0,11	330	33	-20/+40	2	125	COM-2 REGUL-2	RMB-1,5 REB-1	9, 10
	1590	20	0,09	250	28						
TD-500/150 3V	2590	53	0,21	560	35	-20/+60	2,7	150	COM-3 INTER 4P	RMB-1,5 REB-1	53, 54
	2150	44	0,19	470	31						
	1820	41	0,18	390	26						
TD-500/160 3V	2590	53	0,21	560	35	-20/+60	2,7	160	COM-3 INTER 4P	RMB-1,5 REB-1	53, 54
	2150	44	0,19	470	31						
	1820	41	0,18	390	26						
TD-800/200N 3V	2190	103	0,5	890	38	-20/+60	4,9	200	COM-3 INTER 4P	RMB-1,5 REB-1	53, 54
	1870	93	0,47	750	34						
	1660	88	0,45	660	31						
TD-800/200 3V	2480	132	0,55	1.040	40	-20/+60	4,9	200	COM-3 INTER 4P	RMB-1,5 REB-1	53, 54
	2290	133	0,56	940	37						
	2080	131	0,55	850	34						
TD-1000/250 3V	2790	130	0,46	960	38	-40/+60	9,4	250	COM-3 INTER 4P	RMB-1,5 REB-1	55, 56
	2620	99	0,31	910	37						
	2510	91	0,28	850	37						
TD-1300/250 3V	2690	214	0,80	1.400	45	-40/+60	9,4	250	COM-3 INTER 4P	RMB-1,5 REB-1	55, 56
	2510	177	0,65	1.300	42						
	2370	163	0,60	1.220	37						
TD-2000/315 3V	2710	287	0,97	1.800	49	-40/+60	14	315	COM-3 INTER 4P	RMB-1,5 REB-2,5	55, 56
	2420	223	0,79	1.630	40						
	2130	173	0,64	1.430	40						
TD-4000/355	1360	407	1,69	3.750	41	-40/+40	19	355	-	RMT-1,5 REB-2,5	15, 16
TD-6000/400	1400	580	2,42	5.100	43	-40/+40	26	400	-	RMB-3,5 REB-5	17, 18
TD-4000/355 TRIF	1150	309	0,66	3160	41	-40/+70	19	355	-	RMT-1,5 VFTM TRI 0,37	21
TD-6000/400 TRIF	1400	691	1,49	5.330	44	-40/+60	26	400	-	RMT-2,5 VFTM TRI 0,55	21

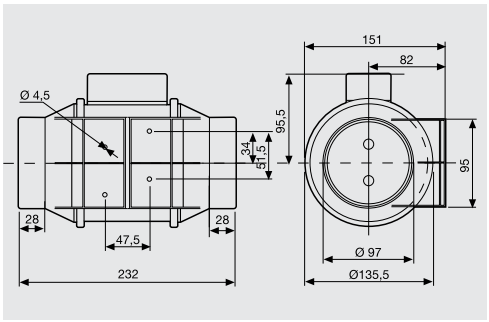
* Sound pressure level radiated at 3 m at free air conditions with rigid ducts at the inlet and at the outlet.
** See section of Wiring Diagrams.

TD-MIXVENT (models TD-MIXVENT withrun-on timer)	Speed (r.p.m.)	Maximum absorbed power (W)	Maximum absorbed current (A)	Maximum airflow (m^3/h)	Sound pressure level* (dB(A))	Min-Max air Temperature (°C)	Weight (kg)	Duct diameter (mm)
TD-160/100 NT SILENT	2400	29	0,17	180	24	-20/+40	1,4	100
TD-250/100 T	2140	28	0,12	250	34	-20/+40	2	100
TD-350/125 T	2050	26	0,11	330	33	-20/+40	2	125
TD-500/150 T 3V	2590	53	0,21	560	35	-20/+60	2,7	150
	2150	44	0,19	470	31			
	1820	41	0,18	390	26			
TD-500/160 T 3V	2590	53	0,21	560	35	-20/+60	2,7	150
	2150	44	0,19	470	31			
	1820	41	0,18	390	26			
TD-800/200 T 3V	2480	132	0,55	1.040	40	-20/+60	4,9	200
	2290	133	0,56	940	37			
	2080	131	0,55	850	34			

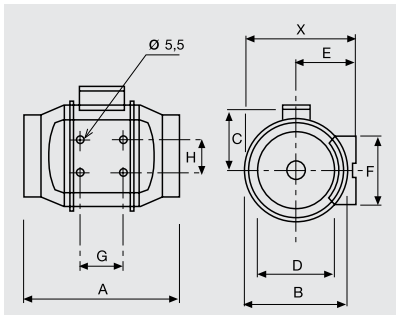
* Sound pressure level radiated at 3 m at free air conditions with rigid ducts at the inlet and at the outlet.

DIMENSIONS (mm)

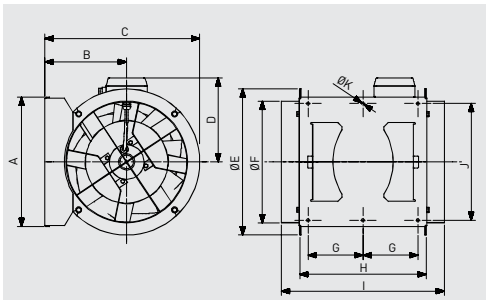
TD-160/100 N SILENT



TD-250 to TD-2000



TD-4000 / TD-6000



Model	X	A	Ø B	C	Ø D	E	F	G	H
TD-250/100	188	303	176	115	97	100	90	80	60
TD-350/125	188	258	176	115	123	100	90	80	60
TD-500/150	212	295	200	127	147	112	130	80	60
TD-500/160	212	295	200	127	157	112	130	80	60
TD-800/200N	232,5	302	217	141	198	124	140	100	94
TD-800/200	232,5	302	217	141	198	124	140	100	94
TD-1000/250	291	386	272	192	248	155	168	145	140
TD-1300/250	291	386	272	192	248	155	168	145	140
TD-2000/315	356	450	336	224	312	188	210	182	178

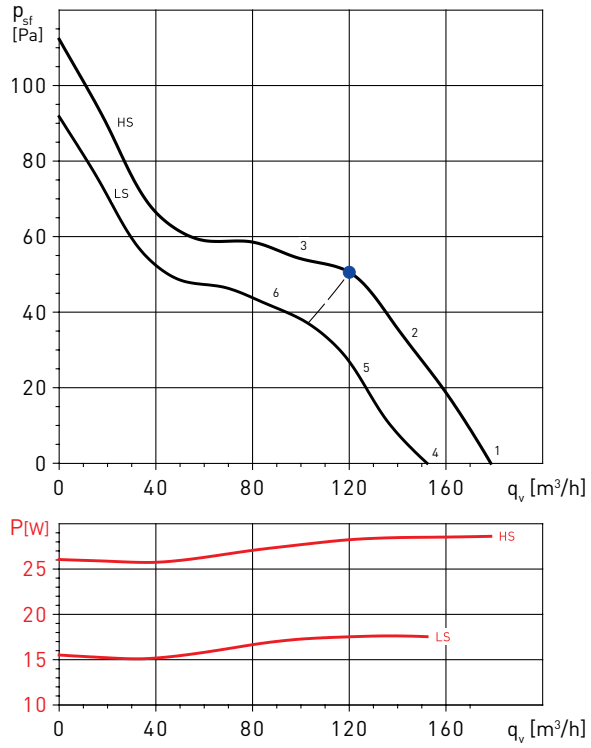
Model	A	B	C	D	Ø E	Ø F	G	H	I	J	Ø K
TD-4000/355	377	238	451	224	426	354	150	368	474	340	8.5
TD-6000/400	407	249	249	267	487	399	160	425	547	370	8.5

PERFORMANCE CURVES

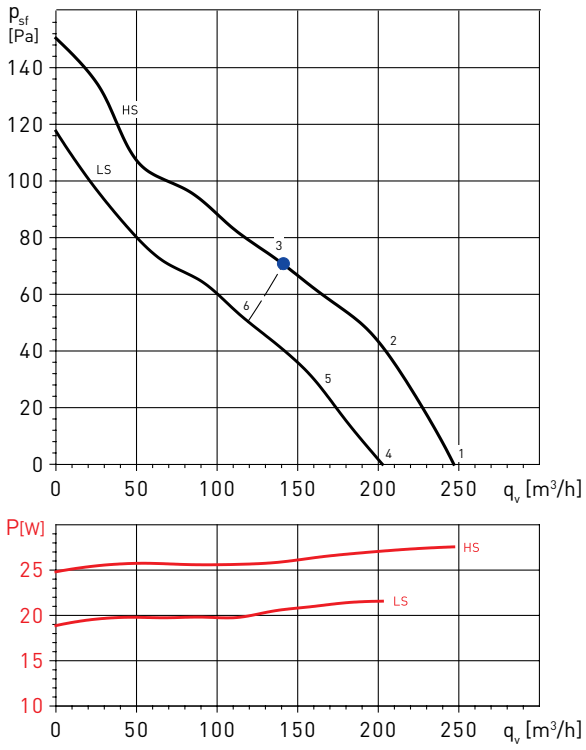
- q_v: Airflow in m^3/h.
- p_{sf}: Static pressure in Pa.
- Dry air at 20ºC and 760 mmHg.
- Performance data in accordance with ISO 5801 and AMCA 210-99 Standards.
- SFP: Specific fan power in W/m3/s (blue curves).

HS : High speed
MS: Medium speed
LS: Low speed

TD-160/100N SILENT



TD-250/100



Sound power level spectrums in dB(A)

Working point		63	125	250	500	1.000	2.000	4.000	8.000	LwA
1	Inlet	22	34	41	47	53	49	40	31	56
	Outlet	22	43	38	50	51	47	41	32	55
	Break-Out	21	27	41	35	36	40	33	22	45
2	Inlet	21	36	39	47	52	48	39	30	55
	Outlet	22	42	37	50	50	46	41	31	54
	Break-Out	20	29	39	35	35	39	32	21	44
3	Inlet	24	37	41	48	52	47	39	30	55
	Outlet	27	42	38	50	51	45	40	31	55
	Break-Out	23	30	41	36	35	38	32	21	45
4	Inlet	22	31	37	45	51	46	38	29	53
	Outlet	22	38	34	48	49	45	39	29	53
	Break-Out	19	27	36	33	35	38	31	21	42
5	Inlet	21	33	37	45	50	46	37	28	53
	Outlet	22	38	35	48	48	44	38	29	52
	Break-Out	18	29	36	33	34	38	30	20	42
6	Inlet	23	34	39	45	50	45	37	28	53
	Outlet	26	38	36	48	49	44	38	28	53
	Break-Out	20	30	38	33	34	37	30	20	43

Sound power level spectrums in dB(A)

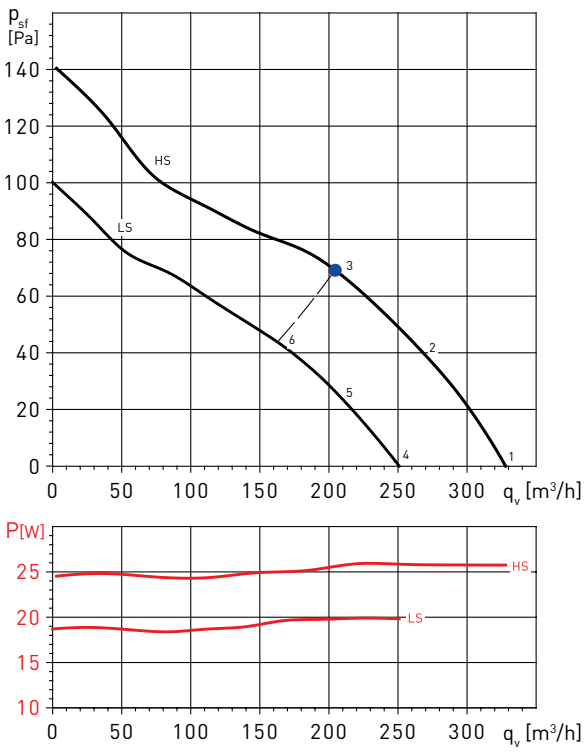
Working point		63	125	250	500	1.000	2.000	4.000	8.000	LwA
1	Inlet	28	32	51	54	54	48	38	28	58
	Outlet	20	28	51	53	53	49	39	29	58
	Break-Out	18	21	50	44	48	46	31	20	54
2	Inlet	24	31	50	51	54	48	39	30	57
	Outlet	21	28	51	52	51	49	38	29	57
	Break-Out	16	21	51	44	48	45	32	22	54
3	Inlet	26	32	47	53	54	51	42	32	58
	Outlet	26	33	49	55	52	50	40	30	58
	Break-Out	17	22	47	45	49	47	34	23	53
4	Inlet	23	27	46	48	49	43	33	23	53
	Outlet	15	23	45	48	48	44	33	24	53
	Break-Out	13	16	45	39	43	41	26	15	48
5	Inlet	19	26	46	47	49	44	35	26	53
	Outlet	17	24	46	47	47	44	33	24	52
	Break-Out	11	16	46	39	44	41	27	17	49
6	Inlet	22	29	44	49	51	47	38	29	55
	Outlet	23	29	46	51	49	47	37	27	55
	Break-Out	14	19	44	41	45	44	31	20	50

PERFORMANCE CURVES

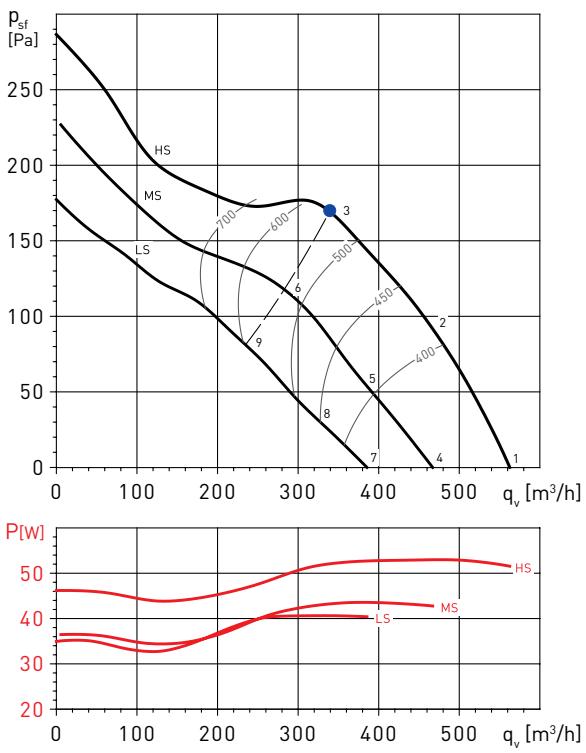
- q_v: Airflow in m^3/h.
- p_{sf}: Static pressure in Pa.
- Dry air at 20ºC and 760 mmHg.
- Performance data in accordance with ISO 5801 and AMCA 210-99 Standards.
- SFP: Specific fan power in W/m3/s (blue curves).

HS : High speed
MS: Medium speed
LS: Low speed

TD-350/125



TD-500/150 3V



Sound power level spectrums in dB(A)

Working point		63	125	250	500	1.000	2.000	4.000	8.000	LwA
1	Inlet	28	34	51	55	56	51	42	32	60
	Outlet	25	31	50	54	55	52	43	33	59
	Break-Out	19	24	49	45	49	47	34	23	54
2	Inlet	24	33	50	53	55	52	43	34	59
	Outlet	26	31	51	54	55	52	43	34	59
	Break-Out	16	24	48	43	48	46	34	23	53
3	Inlet	26	34	48	54	56	53	45	36	60
	Outlet	27	33	49	56	54	52	43	34	60
	Break-Out	18	26	46	45	49	48	36	25	54
4	Inlet	22	29	46	49	50	46	36	27	54
	Outlet	19	26	45	49	50	47	37	28	54
	Break-Out	13	19	43	39	44	42	29	17	48
5	Inlet	19	27	45	47	50	46	38	29	54
	Outlet	20	26	46	49	50	47	38	29	54
	Break-Out	11	19	43	38	43	41	28	18	48
6	Inlet	21	29	43	50	51	49	41	32	55
	Outlet	22	29	45	51	50	48	39	29	55
	Break-Out	13	21	42	40	45	44	31	21	49

Sound power level spectrums in dB(A)

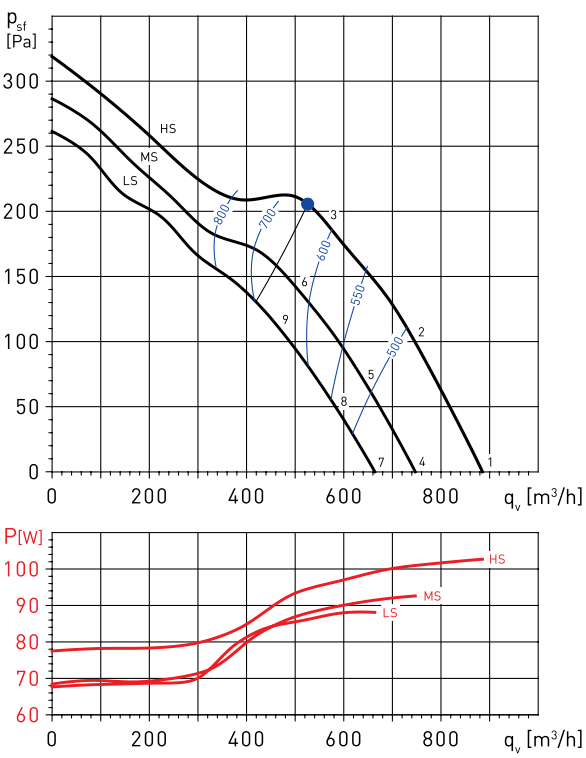
Working point		63	125	250	500	1.000	2.000	4.000	8.000	LwA
1	Inlet	28	38	52	58	60	58	51	41	64
	Outlet	34	37	51	57	61	59	52	42	64
	Break-Out	19	31	46	45	50	51	39	27	55
2	Inlet	25	36	50	55	59	58	51	42	63
	Outlet	33	36	51	57	61	59	51	43	64
	Break-Out	17	30	45	43	49	49	37	26	54
3	Inlet	26	37	50	56	59	59	52	43	64
	Outlet	29	35	50	58	59	57	50	41	64
	Break-Out	18	31	44	44	49	50	38	27	54
4	Inlet	24	34	48	54	56	54	47	37	60
	Outlet	30	33	47	53	57	55	48	38	60
	Break-Out	15	27	42	41	46	47	35	23	51
5	Inlet	20	32	46	51	54	54	47	38	59
	Outlet	29	32	47	53	56	55	47	38	60
	Break-Out	13	26	41	39	45	45	33	22	49
6	Inlet	22	33	46	53	55	55	49	40	60
	Outlet	25	31	46	54	56	54	47	38	60
	Break-Out	15	27	41	40	45	46	35	24	50
7	Inlet	19	30	44	50	51	50	42	33	56
	Outlet	25	29	42	48	52	50	43	34	56
	Break-Out	11	23	38	37	42	42	30	19	46
8	Inlet	16	28	42	46	50	50	42	33	54
	Outlet	24	28	43	48	52	50	43	34	56
	Break-Out	9	22	37	34	40	41	29	18	45
9	Inlet	18	29	42	49	51	51	44	36	56
	Outlet	21	27	42	50	52	50	42	34	56
	Break-Out	11	23	37	36	41	42	31	20	46

PERFORMANCE CURVES

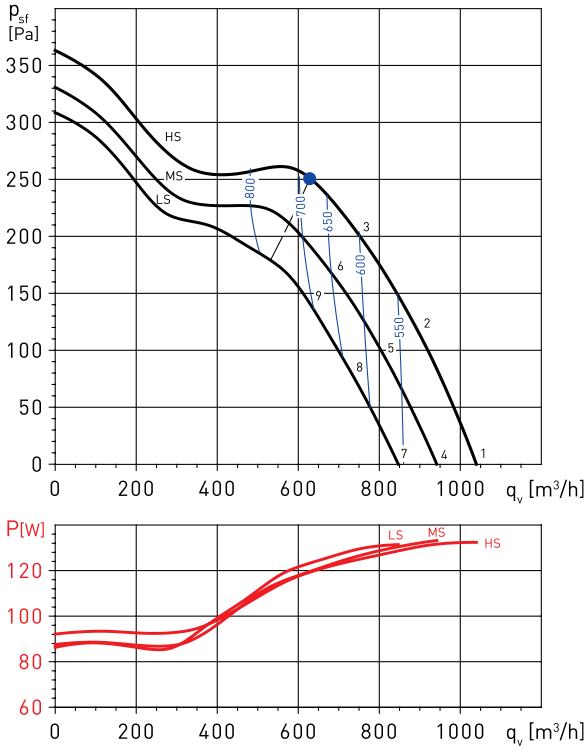
- q_v: Airflow in m^3/h.
- p_{sf}: Static pressure in Pa.
- Dry air at 20ºC and 760 mmHg.
- Performance data in accordance with ISO 5801 and AMCA 210-99 Standards.
- SFP: Specific fan power in W/m3/s (blue curves).

HS : High speed
MS: Medium speed
LS: Low speed

TD-800/200N 3V



TD-800/200 3V



Sound power level spectrums in dB(A)

Working point		63	125	250	500	1.000	2.000	4.000	8.000	LwA
1	Inlet	28	41	52	61	63	64	58	49	68
	Outlet	43	44	52	60	66	65	60	50	70
	Break-Out	19	36	44	45	51	53	43	30	56
2	Inlet	25	39	50	57	61	64	57	48	67
	Outlet	39	41	51	59	65	64	58	50	69
	Break-Out	18	35	42	42	49	51	40	28	54
3	Inlet	26	39	51	58	61	63	58	49	67
	Outlet	31	37	51	60	64	62	57	48	68
	Break-Out	19	35	43	43	49	51	41	29	54
4	Inlet	24	37	48	56	59	60	54	45	64
	Outlet	38	40	48	56	62	61	56	46	66
	Break-Out	15	32	40	41	47	49	39	26	52
5	Inlet	21	36	46	53	57	60	54	45	63
	Outlet	36	37	48	56	62	61	55	46	65
	Break-Out	14	32	38	39	45	48	37	25	51
6	Inlet	22	36	48	55	58	60	55	46	64
	Outlet	28	34	48	57	61	59	54	45	65
	Break-Out	16	32	40	40	46	48	38	26	51
7	Inlet	21	35	46	54	56	58	52	42	62
	Outlet	36	37	45	53	59	59	54	44	63
	Break-Out	12	29	37	38	44	46	36	24	49
8	Inlet	19	33	44	51	55	58	51	42	61
	Outlet	33	35	45	53	59	58	53	44	63
	Break-Out	12	29	36	36	43	45	34	22	48
9	Inlet	20	33	45	52	56	57	52	44	61
	Outlet	25	31	45	54	59	57	51	43	62
	Break-Out	13	30	37	38	44	45	35	24	49

Sound power level spectrums in dB(A)

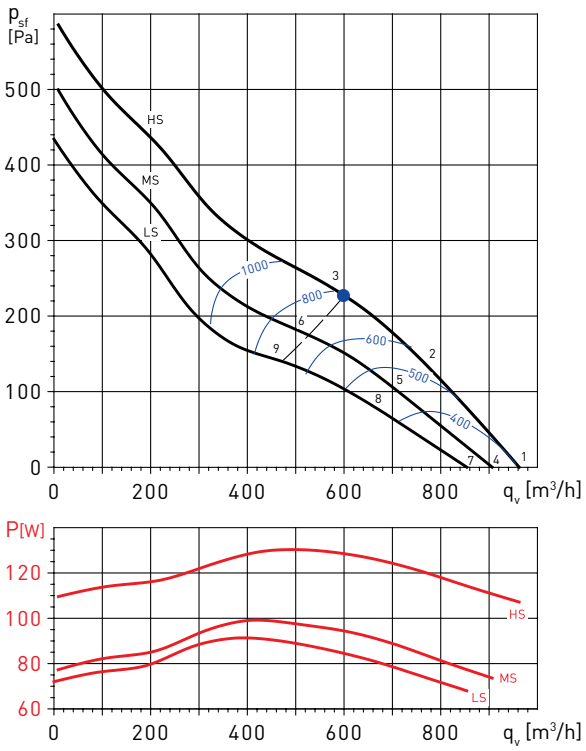
Working point		63	125	250	500	1.000	2.000	4.000	8.000	LwA
1	Inlet	27	42	52	61	64	66	60	51	69
	Outlet	46	46	53	61	68	68	63	53	72
	Break-Out	20	38	43	46	52	54	44	32	57
2	Inlet	24	40	49	57	62	65	59	50	68
	Outlet	41	42	51	60	66	65	60	52	70
	Break-Out	19	38	42	43	49	52	42	30	55
3	Inlet	25	40	51	58	62	64	60	51	68
	Outlet	32	38	52	61	67	65	60	51	70
	Break-Out	19	37	42	43	49	51	41	30	54
4	Inlet	24	39	49	58	61	63	58	48	67
	Outlet	43	43	50	58	65	65	61	51	69
	Break-Out	17	36	41	43	49	51	42	29	54
5	Inlet	22	37	47	55	59	63	56	48	65
	Outlet	38	39	48	57	64	63	58	49	67
	Break-Out	16	35	39	40	47	50	39	27	52
6	Inlet	23	38	49	56	60	62	58	49	66
	Outlet	30	36	50	59	65	63	58	49	68
	Break-Out	17	35	40	41	47	49	39	28	52
7	Inlet	22	37	47	56	58	61	55	46	64
	Outlet	41	41	47	56	63	63	58	48	67
	Break-Out	15	33	38	40	47	49	39	27	52
8	Inlet	19	35	44	52	56	60	54	45	63
	Outlet	35	36	45	54	61	60	55	47	65
	Break-Out	14	33	36	38	44	47	37	25	50
9	Inlet	21	36	47	54	58	61	56	47	64
	Outlet	28	34	48	57	63	61	56	47	66
	Break-Out	15	33	38	39	45	47	37	26	50

PERFORMANCE CURVES

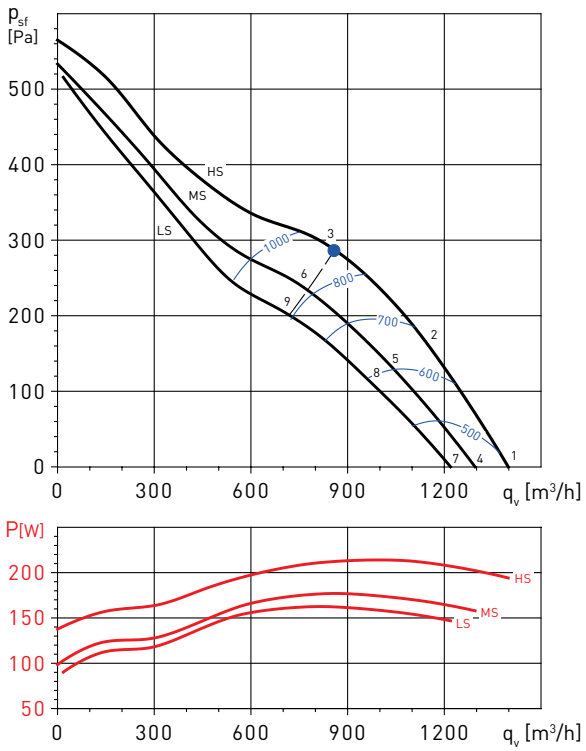
- q_v: Airflow in m^3/h.
- p_{sf}: Static pressure in Pa.
- Dry air at 20ºC and 760 mmHg.
- Performance data in accordance with ISO 5801 and AMCA 210-99 Standards.
- SFP: Specific fan power in W/m3/s (blue curves).

HS : High speed
MS: Medium speed
LS: Low speed

TD-1000/250 3V



TD-1300/250 3V



Sound power level spectrums in dB(A)

Working point		63	125	250	500	1.000	2.000	4.000	8.000	LwA
1	Inlet	35	46	61	67	73	70	63	55	76
	Outlet	55	50	64	72	74	75	67	58	79
	Break-Out	20	31	43	44	56	55	44	40	59
2	Inlet	35	50	62	66	72	68	62	53	75
	Outlet	46	45	67	72	74	74	67	57	79
	Break-Out	21	36	45	44	56	55	45	39	59
3	Inlet	36	55	65	65	70	67	61	52	74
	Outlet	40	49	69	73	73	74	67	57	79
	Break-Out	22	41	48	43	54	54	44	39	58
4	Inlet	34	44	60	66	72	69	62	53	75
	Outlet	53	48	63	71	73	73	65	57	78
	Break-Out	19	30	41	42	54	54	43	38	58
5	Inlet	33	48	61	64	70	66	60	51	73
	Outlet	45	44	65	71	72	73	65	55	77
	Break-Out	19	34	44	42	54	53	43	37	57
6	Inlet	34	53	63	63	68	65	59	50	72
	Outlet	38	47	67	71	71	72	65	55	77
	Break-Out	20	39	46	41	52	52	42	36	56
7	Inlet	33	44	59	65	71	68	61	53	74
	Outlet	53	48	62	70	72	73	65	56	77
	Break-Out	18	29	41	42	54	53	42	38	57
8	Inlet	31	46	59	62	69	65	58	49	71
	Outlet	43	42	63	69	70	71	63	53	75
	Break-Out	17	32	42	40	52	51	41	35	55
9	Inlet	31	50	60	60	65	63	56	47	69
	Outlet	35	44	64	68	68	69	62	52	74
	Break-Out	17	36	43	38	49	49	39	34	53

Sound power level spectrums in dB(A)

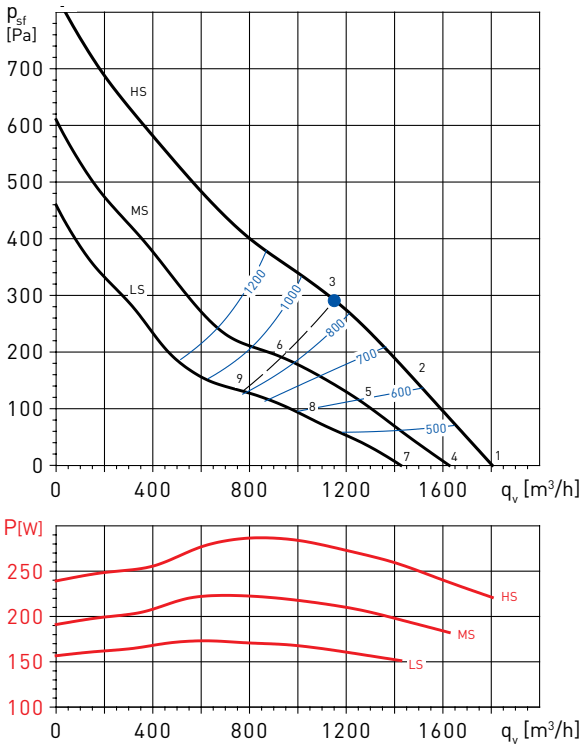
Working point		63	125	250	500	1.000	2.000	4.000	8.000	LwA
1	Inlet	37	39	65	69	76	73	66	59	79
	Outlet	48	56	68	74	79	78	70	62	83
	Break-Out	29	40	47	56	62	60	52	46	65
2	Inlet	37	47	66	69	75	71	65	57	78
	Outlet	43	48	70	75	80	78	70	61	84
	Break-Out	29	47	48	55	61	59	51	44	64
3	Inlet	38	53	67	67	73	69	63	54	76
	Outlet	40	41	72	76	72	75	67	58	80
	Break-Out	30	53	50	53	59	57	49	42	63
4	Inlet	34	36	62	66	73	70	63	56	76
	Outlet	45	53	65	70	76	75	67	59	80
	Break-Out	26	36	44	52	59	57	49	43	62
5	Inlet	33	43	62	65	71	67	61	53	74
	Outlet	39	44	66	71	76	74	66	57	80
	Break-Out	25	43	44	51	57	55	47	40	60
6	Inlet	34	48	63	62	68	65	59	50	72
	Outlet	36	37	67	72	67	71	63	54	76
	Break-Out	26	49	46	48	54	53	45	38	58
7	Inlet	33	47	62	61	67	64	57	49	70
	Outlet	35	36	66	71	66	70	62	53	75
	Break-Out	25	48	45	47	53	52	44	37	57
8	Inlet	31	40	59	62	69	65	58	51	71
	Outlet	36	42	64	68	74	72	63	55	77
	Break-Out	23	41	42	48	55	52	45	38	58
9	Inlet	32	46	60	60	66	62	56	48	69
	Outlet	34	35	65	69	65	68	61	51	74
	Break-Out	24	46	43	46	52	50	43	35	56

PERFORMANCE CURVES

- q_v: Airflow in m^3/h.
- p_{sf}: Static pressure in Pa.
- Dry air at 20ºC and 760 mmHg.
- Performance data in accordance with ISO 5801 and AMCA 210-99 Standards.
- SFP: Specific fan power in W/m3/s (blue curves).

HS : High speed
MS: Medium speed
LS: Low speed

TD-2000/315 3V



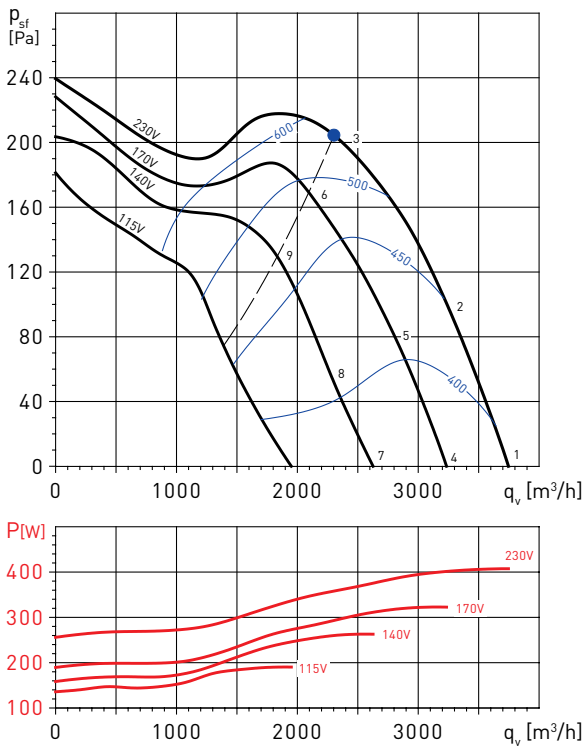
Sound power level spectrums in dB(A)

Working point		63	125	250	500	1.000	2.000	4.000	8.000	LwA
1	Inlet	39	46	68	71	78	75	68	62	81
	Outlet	44	59	72	77	84	82	74	66	87
	Break-Out	35	42	51	59	66	64	58	51	69
2	Inlet	39	51	68	70	77	73	66	60	80
	Outlet	39	52	72	77	84	81	71	64	87
	Break-Out	36	48	51	58	65	62	56	48	68
3	Inlet	41	57	69	68	75	71	64	56	78
	Outlet	42	48	74	78	73	77	68	59	82
	Break-Out	36	51	50	54	61	58	53	43	64
4	Inlet	38	45	67	70	77	74	67	61	80
	Outlet	43	58	71	76	82	81	73	65	86
	Break-Out	34	41	49	58	65	63	57	50	68
5	Inlet	37	49	66	68	75	71	64	58	78
	Outlet	37	50	70	75	82	79	69	62	85
	Break-Out	34	46	49	56	63	60	54	46	66
6	Inlet	37	53	65	64	71	67	61	53	74
	Outlet	38	44	70	74	69	73	65	56	78
	Break-Out	32	47	47	50	57	54	49	39	60
7	Inlet	37	53	65	64	71	67	61	53	74
	Outlet	38	44	70	74	69	73	65	56	78
	Break-Out	32	47	47	50	57	54	49	39	60
8	Inlet	34	46	63	65	72	68	61	54	74
	Outlet	34	47	67	72	79	75	66	59	81
	Break-Out	30	43	46	53	60	57	51	43	63
9	Inlet	33	49	61	60	67	63	57	49	70
	Outlet	34	40	66	70	65	69	61	52	74
	Break-Out	28	43	42	46	53	50	45	35	56

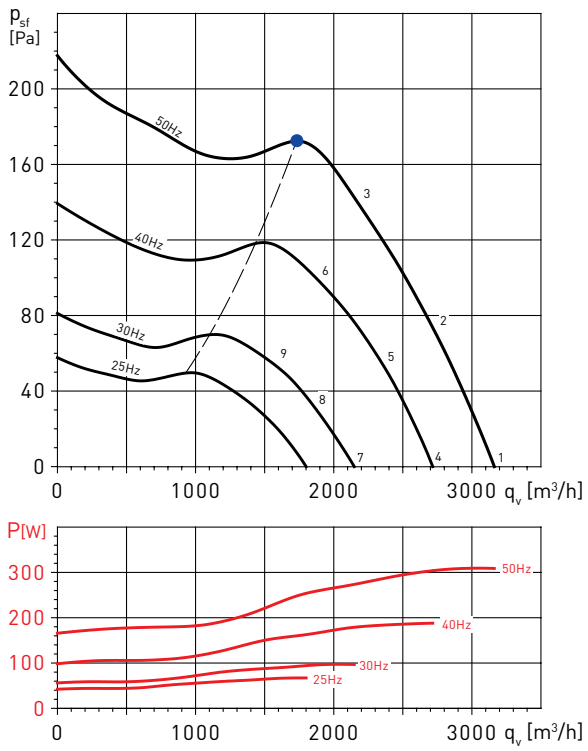
PERFORMANCE CURVES

- q_v: Airflow in m^3/h.
- p_{sf}: Static pressure in Pa.
- Dry air at 20ºC and 760 mmHg.
- Performance data in accordance with ISO 5801 and AMCA 210-99 Standards.
- SFP: Specific fan power in W/m3/s (blue curves).

TD-4000/355



TD-4000/355 TRI



Sound power level spectrums in dB(A)

Working point		63	125	250	500	1.000	2.000	4.000	8.000	LwA
1	Inlet	34	61	62	68	73	72	67	57	77
	Outlet	64	66	65	70	74	72	65	57	78
	Break-Out	27	55	51	49	58	52	47	39	61
2	Inlet	33	59	60	66	71	70	64	55	75
	Outlet	58	61	63	69	72	70	63	53	76
	Break-Out	23	51	49	47	56	50	45	36	59
3	Inlet	48	67	68	71	69	68	62	54	76
	Outlet	47	63	66	69	70	68	61	52	75
	Break-Out	28	56	51	46	54	47	41	34	59
4	Inlet	32	58	59	65	70	70	64	55	74
	Outlet	61	63	63	68	71	69	63	55	75
	Break-Out	24	53	48	46	56	49	45	36	59
5	Inlet	30	56	58	64	68	68	62	53	73
	Outlet	55	59	61	67	70	67	61	51	74
	Break-Out	21	49	47	45	54	47	42	34	57
6	Inlet	47	66	67	70	69	67	61	53	75
	Outlet	46	62	65	68	70	67	61	52	74
	Break-Out	27	56	50	45	53	46	41	33	59
7	Inlet	27	53	54	60	65	65	59	50	69
	Outlet	56	58	58	63	66	64	58	50	71
	Break-Out	19	48	43	41	51	44	40	31	54
8	Inlet	26	51	53	59	64	63	57	48	68
	Outlet	51	54	56	62	65	63	56	46	69
	Break-Out	16	44	42	40	49	42	38	29	52
9	Inlet	43	62	63	66	65	63	57	49	71
	Outlet	42	58	61	64	65	63	56	47	70
	Break-Out	23	51	46	41	49	42	37	29	55

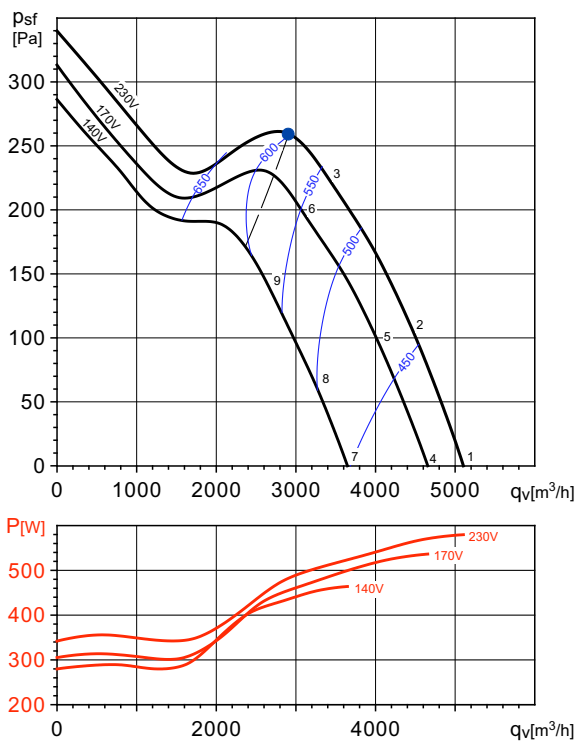
Sound power level spectrums in dB(A)

Working point		63	125	250	500	1.000	2.000	4.000	8.000	LwA
1	Inlet	31	60	59	65	70	69	64	53	74
	Outlet	60	62	62	67	71	69	62	53	75
	Break-Out	27	59	50	47	56	49	46	36	62
2	Inlet	30	58	57	63	68	67	62	52	72
	Outlet	53	58	59	65	68	66	59	49	72
	Break-Out	23	54	47	45	53	47	43	33	58
3	Inlet	46	65	67	70	67	64	60	50	74
	Outlet	41	61	63	66	67	65	58	49	72
	Break-Out	26	58	51	45	52	44	41	32	60
4	Inlet	27	55	54	60	65	64	59	48	69
	Outlet	55	57	57	62	66	64	57	49	70
	Break-Out	22	54	45	42	51	44	41	31	57
5	Inlet	25	53	52	58	63	62	57	47	67
	Outlet	49	53	54	60	63	61	55	44	67
	Break-Out	18	49	42	40	48	42	38	29	53
6	Inlet	41	60	62	65	62	59	55	45	69
	Outlet	37	56	58	61	62	60	54	45	67
	Break-Out	21	53	46	40	47	39	36	27	55
7	Inlet	20	49	48	53	59	58	53	42	63
	Outlet	49	51	50	56	60	58	51	42	64
	Break-Out	16	48	39	36	45	38	35	25	51
8	Inlet	19	47	46	52	57	56	51	41	61
	Outlet	42	47	48	54	57	55	48	38	61
	Break-Out	12	42	36	34	42	35	32	22	46
9	Inlet	35	54	56	59	56	53	49	39	63
	Outlet	30	50	52	55	56	54	47	38	61
	Break-Out	15	47	40	34	41	33	30	21	49

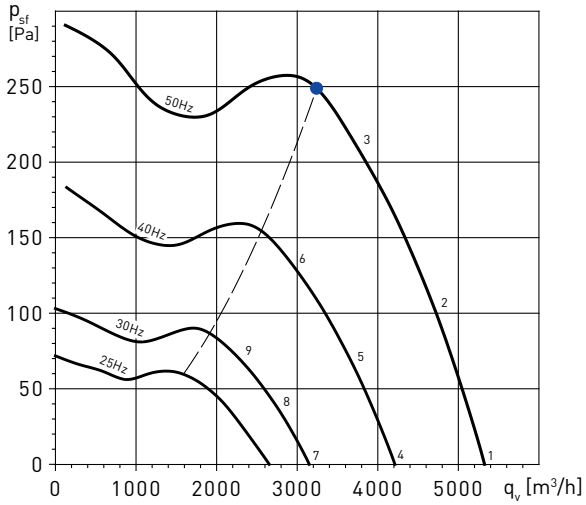
PERFORMANCE CURVES

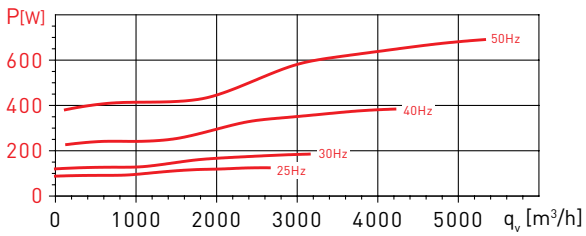
- q_v: Airflow in m^3/h.
- p_{sf}: Static pressure in Pa.
- Dry air at 20ºC and 760 mmHg.
- Performance data in accordance with ISO 5801 and AMCA 210-99 Standards.
- SFP: Specific fan power in W/m3/s (blue curves).

TD-6000/400



TD-6000/400 TRI





Sound power level spectrums in dB(A)

Working point		63	125	250	500	1.000	2.000	4.000	8.000	LwA
1	Inlet	42	63	68	75	79	79	72	63	83
	Outlet	72	74	73	77	80	78	72	65	85
	Break-Out	25	46	51	54	62	56	49	40	64
2	Inlet	41	63	68	75	78	77	70	60	82
	Outlet	64	66	70	77	79	77	69	60	83
	Break-Out	24	46	51	54	61	54	47	37	63
3	Inlet	52	69	67	70	74	72	65	55	78
	Outlet	50	67	69	72	73	71	64	54	78
	Break-Out	35	52	50	49	57	49	42	32	60
4	Inlet	40	61	66	73	77	77	70	61	82
	Outlet	70	72	71	75	78	76	70	63	83
	Break-Out	23	44	49	52	60	54	47	38	62
5	Inlet	39	61	66	73	76	75	68	58	81
	Outlet	62	64	68	75	77	75	67	58	82
	Break-Out	22	44	49	52	59	52	45	35	61
6	Inlet	51	68	66	69	73	71	64	54	77
	Outlet	49	66	68	71	72	70	63	53	77
	Break-Out	34	51	49	48	56	48	41	31	58
7	Inlet	35	56	61	68	72	72	65	56	77
	Outlet	65	67	66	70	73	71	65	58	78
	Break-Out	18	39	44	47	55	49	42	33	57
8	Inlet	35	57	62	69	72	71	64	54	76
	Outlet	58	60	64	71	73	71	63	54	77
	Break-Out	18	40	45	48	55	48	41	31	57
9	Inlet	47	64	62	65	69	67	60	50	73
	Outlet	45	62	64	67	68	66	59	49	73
	Break-Out	30	47	45	44	52	44	37	27	55

Sound power level spectrums in dB(A)

Working point		63	125	250	500	1.000	2.000	4.000	8.000	LwA
1	Inlet	41	62	68	75	80	80	72	66	84
	Outlet	72	75	74	77	80	79	72	66	85
	Break-Out	26	47	52	53	63	56	49	43	65
2	Inlet	40	62	68	75	79	78	71	64	83
	Outlet	65	67	71	76	79	77	69	61	83
	Break-Out	24	46	53	52	62	55	48	41	64
3	Inlet	51	69	68	72	74	75	65	60	79
	Outlet	56	66	70	74	75	73	66	57	80
	Break-Out	33	53	52	48	57	52	42	38	61
4	Inlet	37	57	63	70	75	75	68	61	79
	Outlet	67	70	69	72	75	74	67	61	80
	Break-Out	21	42	48	48	58	51	45	38	60
5	Inlet	35	57	64	70	74	74	66	59	78
	Outlet	61	62	66	72	74	72	64	56	78
	Break-Out	19	41	48	47	57	50	43	36	59
6	Inlet	46	64	63	67	69	70	60	55	74
	Outlet	51	61	65	69	71	68	61	52	75
	Break-Out	28	49	47	43	52	47	37	33	56
7	Inlet	30	51	56	64	69	69	61	55	73
	Outlet	61	63	63	66	69	67	61	55	74
	Break-Out	15	36	41	42	52	45	38	32	54
8	Inlet	29	51	57	64	68	67	60	53	72
	Outlet	54	56	60	65	68	65	58	50	72
	Break-Out	13	35	42	41	51	44	37	30	52
9	Inlet	40	58	57	60	63	64	54	49	68
	Outlet	45	55	59	63	64	62	55	46	69
	Break-Out	22	42	41	37	46	41	31	27	49



KITS TD-MIXVENT
The TD ventilation kits enable the simple and fast installation of a complete ventilation system. The kits provide efficient extraction for bathrooms, toilets, washrooms and any other applications that require the removal of bad odours, stuffy and humid air.

KIT TD-160/100 N SILENT includes:
1 TD-160/100 N SILENT fan
+ 4 m of flexible aluminium ducting GSA
+ 1 interior circular air valve BOR-100
+ 1 exterior mounted grille GR-100
+ 1 adhesive duct tape BA

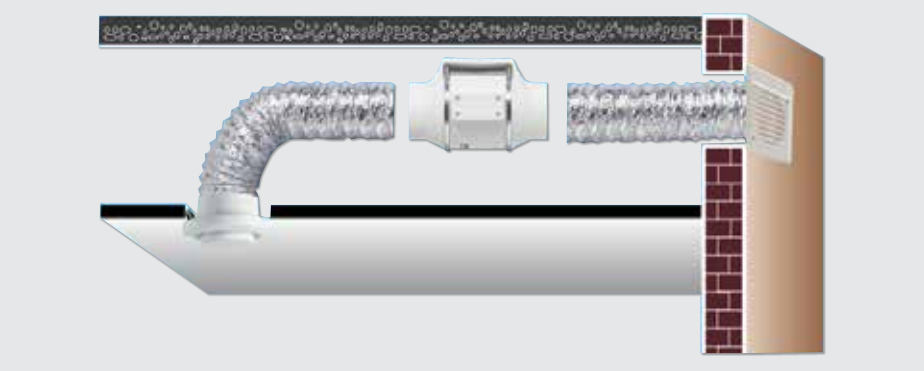
KIT TD-250/100 includes:
1 TD-250/100 fan
+ 4 m of flexible aluminium ducting GSA
+ 1 interior circular air valve BOR-100
+ 1 exterior mounted grille GR-100
+ 1 adhesive duct tape BA

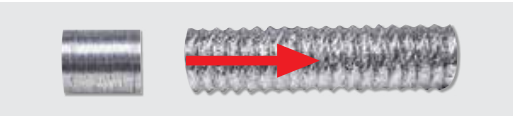
KIT TD-160/100 NT SILENT includes:
1 TD-160/100 NT SILENT fan
+ 4 m of flexible aluminium ducting GSA
+ 1 interior circular air valve BOR-100
+ 1 exterior mounted grille GR-100
+ 1 adhesive duct tape BA

KIT TD-250/100T includes:
1 TD-250/100 T fan
+ 4 m of flexible aluminium ducting GSA
+ 1 interior circular air valve BOR-100
+ 1 exterior mounted grille GR-100
+ 1 adhesive duct tape BA

The TD-T extractors are fitted with an adjustable Run-On-Timer between 1 and 30 minutes, keeping the fan in operation for the selected period of time after being switched off.

INSTALLATION AND MOUNTING









ACCESSORIES INCLUDED IN KIT



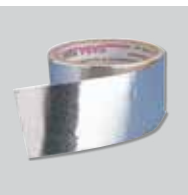
GSA-M0 100
100 mm diameter of flexible aluminium ducting.



GR-100
Exterior mounted grille.



BOR-100
Interior circular air valve.



BA-50
Adhesive aluminium duct tape (10 m).

8.59

FLD.fm

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	`FLD.fm.pdf`
Pages	1

Non-insulated flexible duct FLD



Description

Multiple layer product made up of aluminium/PET laminate formed into a flexible duct supported by a bronze coated wire helix.

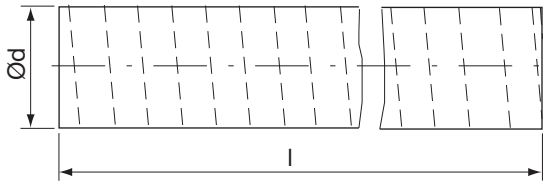
Classification

M1

Technical data

Duct materials	Aluminium/PET laminate Fire retardant adhesive Bronze coated bead wire
Temperature range	-30 to +140°C
Maximum air velocity	30 m/s
Packing	Individual box

Dimensions



Ød nom	O πd m	A πd²/4 m²	l [mm]	Max. pressure Pa
80	0,251	0,005	10000	+3000
100	0,320	0,008	10000	+3000
125	0,399	0,013	10000	+3000
150	0,478	0,018	10000	+3000
160	0,509	0,021	10000	+3000
180	0,565	0,025	10000	+3000
200	0,638	0,032	10000	+3000
224	0,707	0,040	10000	+3000
250	0,798	0,051	10000	+3000
315	0,990	0,078	10000	+3000
400	1,28	0,129	10000	+3000

Ordering example

FLD	162	10000	AP
Product			
Dimension Ød			
Length l			
Material			

Lindab reserves the right to make changes without prior notice

8.60

EPH 0.06 installation and user instructions

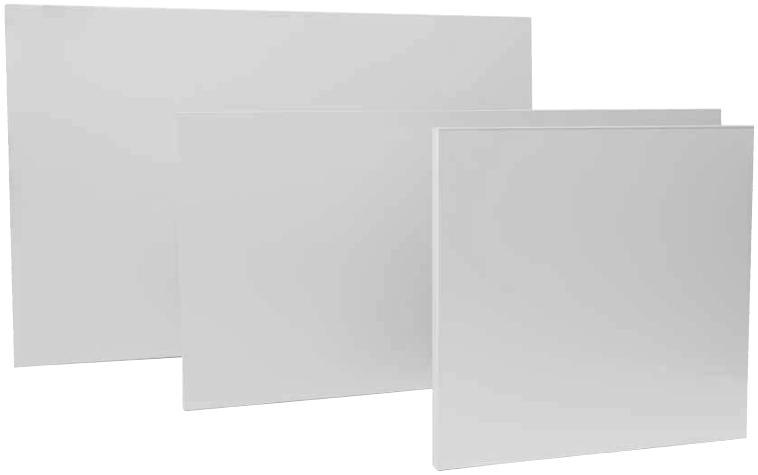
The following 2 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	HEN0203-EPH006-OM
Asset	EPH 0.06
Provided by	Rexel UK Ltd
Source file	Flexel Ecosun panel heater data sheet.pdf
Pages	2

DOMESTIC PANEL

ECOSUN UB

universal infrared heating panel



ECOSUN UB is a universal infrared heating panel suitable for both wall and ceiling mounting.

The ECOSUN UB infrared panel combines high energy efficiency with an improved heating comfort when compared to other traditional heating systems.

Slimline and energy efficient, these heaters can be used as a complete heating system or as spot heaters for individual areas.

The UB range of slimline white panels are designed to compliment any environment and are equally appropriate in domestic, commercial and industrial applications.

Features

- The panel is manufactured from galvanised steel with a white polyester powder finish which provides a durable semi-smooth surface which is easy to clean.
- The rear of the panel is fully insulated to maximise infrared emissions from the front panel surface.
- Suitable for wall or ceiling mounting
- Ceiling mounting frame comes with the panel as standard

Technical Detail

- 1.0m heat resistant cable attached
- Thermal over-load protection
- Mounting heights for ceiling products: 2.5m min to 4.0m max
- Colour: White (RAL 9016)

Product Codes

Product Code	Power (W)	Dimensions (mm)	Price (£) ex VAT
300UB	300	592x592x30	155.70
600UB	600	1192x592x30	222.28
850UB	850	1192x800x30	256.76



Ceiling mounted UB infrared panels



Wall mounted UB infrared heating panel

8.61

FLOPLAST PVC-U DATA SHEET

The following 6 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	FLOPLAST PVC-U DATA SHEET.pdf
Pages	6

FloPlast
building the future

SAFETY DATA SHEET
PVC-U

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/PREPERATION AND OF THE COMPANY/UNDERTAKING

1.1 PRODUCT IDENTIFIER

PRODUCT NAME	UNPLASTICISED POLY (VINYL CHLORIDE)
PRODUCT No.	FloPlast RAINWATER, SOIL, DRAINAGE (UNDERGROUND), OVERFLOW WASTE SYSTEM and LARGE AIR ADMITTANCE VALVES

1.2 RELEVANT IDENTIFIED USES OF THE SUBSTANCE OR MIXTURE AND USES ADVISED AGAINST

APPLICATION OF THE SUBSTANCE / PREPERATION RAINWATER, OVERFLOW WASTE, SOIL AND DRAIN

1.3 DETAILS OF THE SUPPLIER

SUPPLIER FloPlast LTD
CASTLE ROAD
EUROLINK BUSINESS PARK
SITTINGBOURNE
KENT
ME10 3FP
01795 431731
technical@floplast.co.uk

EMERGENCY TELE: 01795 431731 (08:00HRS – 17:30HRS)

SECTION 2: HAZARD IDENTIFICATION

CLASIFICATION OF SUBSTANCES

PVC-U pipes and fittings as finished product are not regarded as hazardous to health, and exhibit no chemical hazards when used under normal circumstances for the stated application(s). However, fine particles released on cutting may cause irritation to the eyes and respiratory tract.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

This material is not classified as hazardous to Health or the Environment under current EU legislation.

The Full Text for all R-Phrases and Hazard Statements are Displayed in Section 16.

SECTION 4: FIRST AID MEASURES

4.1 DESCRIPTION OF FIRST AID MEASURES

After inhalation: Move the exposed person to fresh air at once.
Get medical attention if any discomfort continues.
Unlikely route of exposure as the product does not contain volatile substances.

After skin contact: Contact with molten product may cause burns. Cool with plenty of cold water.
Do not attempt to remove the solidified plastic without consulting a trained first aider.
Contact with the product at room temperature is unlikely to cause irritation however, obtain medical attention if any discomfort develops.

After eye contact: Promptly wash eyes with plenty of water while lifting the eye lids.
Continue to rinse for at least 15 minutes.
Get medical attention if any discomfort continues.

After ingestion: Unlikely route of exposure.
Get medical attention should discomfort develop.

4.2 INFORMATION FOR DOCTOR:

4.2.1 Most important symptoms and effects, both acute and delayed

No further relevant information available.

4.2.2 Indication of any immediate medical attention and special treatment needed

No further relevant information available.

SECTION 5: FIRE FIGHTING MEASURES

5.1 EXTINGUISHING MEDIA

Extinguish with foam, carbon dioxide, dry powder or water fog.
Do not use water jet as an extinguisher, as this will spread the fire.

5.2 SPECIAL HAZARDS ARISING FROM THE SUBSTANCE OR MIXTURE

Avoid breathing fire vapours. Beware, risk of formation of toxic and corrosive gases.
Keep run-off water out of sewers and water sources.
Dike for water control. If risk of water pollution occurs, notify appropriate authorities.

5.3 ADVICE FOR FIREFIGHTERS

Self contained breathing apparatus and full protective clothing must be worn in case of a large fire.

5.4 ADDITIONAL INFORMATION

Beware, risk of formation of toxic and corrosive gases.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 PERSONAL PRECUATIONS, PROTECTIVE EQUIPMENT AND EMERGANCY PROCEDURES

Not applicable.

6.2 ENVIRONMENTAL PRECAUTIONS

Do not allow to enter drains, sewers or watercourses.
Avoid release to the environment.

6.3 METHODS AND MATERIAL FOR CONTAINMENT AND CLEANING UP

Not applicable.

6.4 REFERENCE TO OTHER SECTIONS

See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: HANDLING AND STORAGE

7.1 PRECAUTIONS OF SAFE HANDLING

Avoid dust formation if cutting.
Avoid eating, drinking and smoking when using the product.
Observe good industrial hygiene practices.
Gloves should be worn if edges are sharp where pipes have been broken.

7.2 CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPTABILITIES

Products should preferably be stored in dry covered conditions away from direct sources of heat, including sunlight.
During storage it must be recognised that the packaging and pallets may themselves be a fire risk, and are generally a much more likely route for rapid fire spread.

7.3 SPECIFIC END USE(S)

No further relevant information available.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 CONTROL PARAMETERS

8.1.1 Occupational Exposure Limits

Name	STD	TWA – 8 Hrs		STEL – 15 Min	
Total Inhalable Dust	WEL		10 mg/m^{-3}		20 mg/m^{-3}
Total Respirable Dust	WEL		4 mg/m^{-3}		

8.1.2 Decomposition Products With Occupational Exposure Limits

Cas No.	Name	STD	TWA – 8 Hrs	STEL – 15 Min
7647-01-0	Hydrogen Chloride	WEL	2mg/m^{-3}	2mg/m^{-3}
630-08-0	Carbon Monoxide	WEL	35mg/m^{-3}	232mg/m^{-3}
75-01-04	Vinyl Chloride		3mg/m^{-3}	

8.2 PROTECTIVE EQUIPMENT

8.2.1 General protective and hygienic measures:

Appropriate workwear

Provide adequate general and local exhaust ventilation.

8.2.2 Respiratory protection:

No specific recommendation made, but respiratory protection may still be required under exceptional circumstances when excessive dust formation occurs. Seek advice.

8.2.3 Protection of hands:



Protective gloves recommended

For prolonged or repeated skin contact use suitable protective gloves.

8.2.4 Eye protection:



Eye protection

Wear protective goggles to prevent any possibility of eye contact especially when cutting.

8.2.5 Skin protection:

Standard industrial protective clothing

8.2.5 Body protection:

Not necessary

8.2.6 Engineering Measures

Provide adequate general and local exhaust ventilation.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES

9.1.1 Appearance:

Form:	Solid plastic articles
Colour:	White, Black, Grey, Brown, Caramel, Sand or Terracotta
Odour:	Odourless
Flash point:	>350°C
Decomposition Temperature:	>110°C
Relative Density:	Approx. 1.45
Solubility:	Insoluble in water

SECTION 10: STABILITY AND REACTIVITY

10.1 REACTIVITY

10.2 CHEMICAL STABILITY

Stable under normal temperature conditions and recommended use.

10.3 THERMAL DECOMPOSITION/CONDITIONS TO BE AVOIDED

No further relevant information available.

10.4 POSSIBILITY OF HAZARDOUS REACTIONS

No further relevant information available.

10.5 CONDITIONS TO AVOID

Avoid excessive heat for prolonged periods of time.

10.6 INCOMPATIBLE MATERIALS

No further relevant information available.

10.7 HAZARDDOUS DECOMPOSITION PRODUCTS

None under normal conditions.

Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapours, including those listed in section 8.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 ACUTE TOXICITY

11.2 PRIMARY IRRITANT EFFECT

11.2.1 on the skin:

No harmful effects expected

11.2.2 on the eye:

#
Dust formed during cutting may cause irritation.

11.2.3 Sensitization:

Material is practically inert from a physiological point of view.

11.2.4 Inhalation:

Dust formed during cutting may be irritating to the respiratory tract.

11.2.4 Ingestion:

No harmful effects expected.

11.3 ADDITIONAL TOXICOLOGICAL INFORMATION

No further relevant information available.

SECTION 12: ECOLOGICAL INFORMATION

12.1 ECOTOXICITY

The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that inappropriate, large or frequent disposal might have a harmful or damaging effect on the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 WASTE TREATMENT METHODS

13.1.1 Recommendations

Disposal of waste materials in accordance with local Waste regulations

When handling waste, consideration should be made to the safety precautions applying to handling of the product.

Recycle where it is practical to do so.

13.2 UNCLEANED PACKAGING

13.2.1 Recommendation

Disposal of waste materials in accordance with local Waste regulations

When handling waste, consideration should be made to the safety precautions applying to handling of the product.

Recycle where it is practical to do so.

SECTION 14: TRANSPORT INFORMATION

The product is not covered by international regulation on the transport of dangerous goods (IMDG, IATA, ADR/RID).

SECTION 15: REGULATORY INFORMATION

15.1 SAFETY, HEALTH AND ENVIRONMENTAL REGULATIONS/LEGISLATION SPECIFIC FOR THE SUBSTANCE OR MIXTURE

15.2 LABELLING ACCORDING TO EU REGULATIONS

The product has been classified as non hazardous to the latest EEC regulations.

15.3 CODE LETTER AND HAZARD DESIGNATION OF PRODUCT

15.4 RISK PHRASES

Not classified

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15.5 SAFETY PHRASES

P13 Safety data sheet available for professional user on request.

15.6 EU DIRECTIVES

CLP Regulations.

Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

15.7 APPROVED CODE OF PRACTICE

Safety Data Sheets for Substances and Preparations. Classification and Labelling of Substances and Preparations Dangerous for Supply.

15.8 GUIDANCE NOTES

Workplace Exposure Limits EH40.

SECTION 16: OTHER INFORMATION

The safety data sheet has been complied using current information supplied by the distributors of the raw materials. For further information consult the product data sheet or contact FloPlast's Technical Department.

Issued By	Neil Harrison
Department	Quality/Environmental/Health and Safety
Revision Date	10th June 2016
Revision	3

Risk Phrases in Full

NC Not classified.

INFORMATION FOR DOWNSTREAM USERS ONLY; NAMELY,

Any natural or legal person established within the community, other than the manufacturer or the importer, who uses a substance, either on its own or in a preparation, in the course of his industrial or professional activities. A distributor or a consumer is not a downstream user.

DISCLAIMER

This information relates only to the specific material as supplied and may not be valid for such material if used in combination with any other material(s) or in any other process. Such information is, to the best of the company's knowledge and belief, accurate and reliable as of the date indicated. The data should not be construed as guaranteeing specific properties of the product described or its suitability for a particular application, nor does it make any warranty, either express or implied of merchantability for the product itself. It is the user's responsibility to satisfy himself as to the suitability and completeness of such information for his own particular use.

8.62

FOX.PSU-3 060_24

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	FOX.PSU-3 060_24.pdf
Pages	1

FOXTAM SWITCH MODE POWER SUPPLIES

NEW

TYPE: FOX.PSU-3 xxx/xx



PRODUCT GROUP Q

FEATURES

- Din rail mounted
- High stability
- Input voltage range 85-264VAC/120-370VDC
- 12VDC & 24VDC outputs
- Output voltage adjustable
- Output confirmation relay contact*
- Pair of common output terminals*
- Built in short circuit & overload protection
- LED indication

*See description

DESCRIPTION

A range of Din rail mounted switch mode power supplies available in either a 12VDC or 24VDC output, the output also being adjustable. Available in three different housing sizes, of a "narrow in width but greater in height housing style", that differs from our FOX.PSU-2 range. The input voltage is universal covering a span of 85-264VAC & 120-370VDC. The FOX.PSU-3 power supplies feature built in short circuit protection with auto reset. Also featured is a SPNO contact output rated 1 Amp/30VDC max which closes as a confirmation that a DC output is present (not FOX.PSU-3 020/xx). The power supplies also have a pair of common output terminals (not FOX.PSU-3 020/xx).

TECHNICAL SPECIFICATIONS

Input

Primary voltage:	85-264VAC & 120-370VDC
Frequency range:	47-63Hz

Output

Indication:	Via green LED
Voltage adjustment:	Via potentiometer, see ordering information
Voltage tolerance:	±1% max with 0-100% load
Ripple:	12VDC output ≤120mV 24VDC output ≤150mV
Start up time:	FOX.PSU-3 020/xx Max 1 Sec FOX.PSU-3 060/xx Max 0.5 Sec FOX.PSU-3 100/xx Max 3 Secs
Output confirmation:	Via SPNO contact, max 1 Amp/30VDC (not types FOX.PSU-3 020/xx)

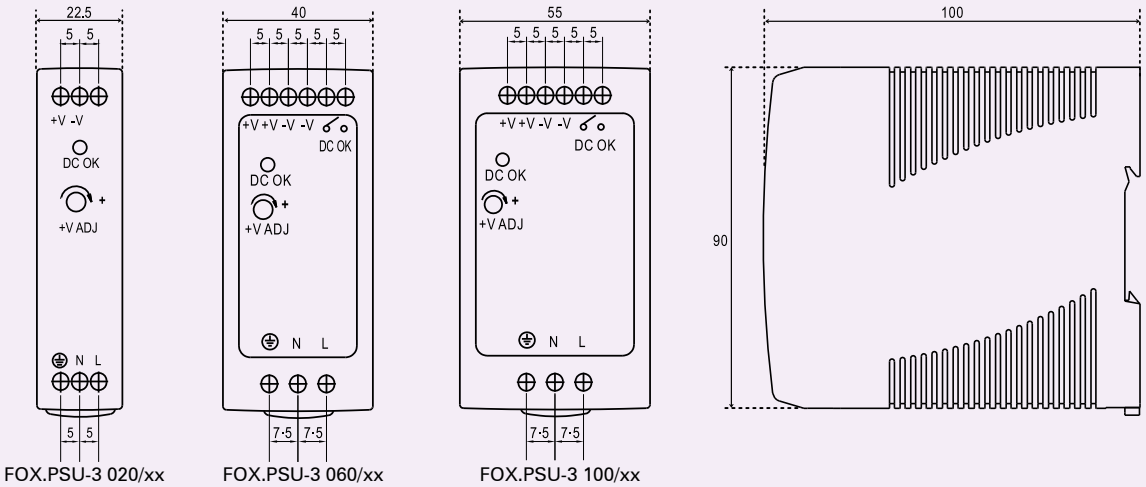
General

Operating temperature:	-20°C to +70°C (FOX.PSU-3 100/xx +60°C)
Storage temperature:	-40°C to +85°C
Operating humidity:	20-90%RH
CE marked:	Yes
RoHS compliant:	Yes

ORDERING INFORMATION

TYPE	OUTPUT	OUTPUT ADJUSTMENT
FOX.PSU-3 020/12VDC	12VDC / 1.67 Amps	10.8 - 13.2V
FOX.PSU-3 060/12VDC	12VDC / 5 Amps	12 - 15V
FOX.PSU-3 100/12VDC	12VDC / 7.5 Amps	12 - 15V
FOX.PSU-3 020/24VDC	24VDC / 1 Amp	21.6 - 26.4V
FOX.PSU-3 060/24VDC	24VDC / 2.5 Amps	24 - 30V
FOX.PSU-3 100/24VDC	24VDC / 4 Amps	24 - 30V

DIMENSIONS & CONNECTIONS



POWER SUPPLIES

8.63

FOX.TX 0100-1

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	FOX.TX 0100-1.pdf
Pages	1

FOXTAM CONTROLS

FOXTAM CONTROL PANEL TRANSFORMERS

FEATURES



- PRIMARY VOLTAGE MULTI TAP 0-230-400-415-440V
- 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
- CE MARKED

DESCRIPTION

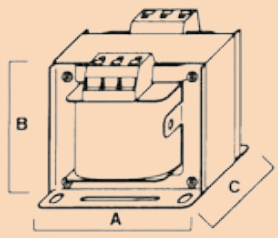
Quality double wound isolating transformers for general "Control Panel" applications, giving excellent on load and off load performance and stability. Benefiting from a multi tap primary 0-230-400-415-440V with no confusing terminal links required, likewise the secondary taps are also without requiring 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 and 100VA 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

According to:	EN61558-2-4/2-6	**Protection Class:**	Class 1
CE Marked:	Yes	**Insulation:**	4KV between windings
Terminals:	IP20		2KV between windings & chassis Earth
Copper:	Class F/H	**Tropicalised:**	Yes
Lamination Loss:	1.5W/Kg	**Frequency:**	50/60Hz
Thermic Class:	Class F	**Continuously Rated:**	Yes

DIMENSIONS

TYPE		1			2			3		
P/No	A	B	C	A	B	C	A	B	C	kg
FOX.TX 0030	77	77	75	77	77	75	77	77	75	1.0
FOX.TX 0050	77	76	80	77	76	80	77	76	80	1.2
FOX.TX 0100	86	84	80	86	87	80	86	84	80	1.6
FOX.TX 0160	86	84	80	86	87	80	86	84	80	1.6
FOX.TX 0200	97	92	98	97	92	91	97	92	91	2.5
FOX.TX 0320	122	110	95	121	110	88	120	111	94	4.0
FOX.TX 0400	122	113	98	121	110	95	120	118	108	4.5
FOX.TX 0500	122	111	108	120	118	114	120	130	118	5.4
FOX.TX 0630	154	150	120	150	133	112	150	138	128	7.7
FOX.TX 0800	150	154	160	150	135	128	150	154	158	9.1
FOX.TX 1000	150	150	140	150	139	168	150	139	168	11.1
FOX.TX 1600	198	225	180	198	198	150	198	198	155	17.0
FOX.TX 2000	198	260	211	198	198	180	198	198	180	18.5
FOX.TX 2500	198	260	245	198	198	199	198	198	197	23.5
FOX.TX 3200	242	278	240	242	240	200	242	240	200	27.0



Dimensions are to the extremities

Types:
1 = 0-12-24V secondary
2 = 0-115-230V secondary
3 = 0-55-110V secondary

8.64

AS 0.01 product datasheet

The following 15 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	HEN0203-AS001-DS
Asset	AS 0.01
Provided by	Ventilation Direct Ltd
Source file	KE Fibertec air sock submission, AS 0.01 and 0.02.pdf
Pages	15

KE FIBERTEC

AIR THE WAY YOU WANT

KE Fibertec UK Ltd
Unit 5 – Fareham Innovation Centre
4 Meteor Way
PO13 9FU Lee-on-the-Solent
Tel. +44 (0) 2380 740751
info@ke-fibertec.co.uk
www.ke-fibertec.com/UK

Hensall Mechanical Services Limited
Roall Hall
Roall Lane
DN14 0NA Eggborough

Quote

Thanks for the interest. Hereby a quote on textile based ventilation solution from KE Fibertec.

Project:	Elmwood Leisure Centre
Quote number:	3247832-1

Hensall Mechanical Services Limited
Roall Hall
Roall Lane
DN14 0NA Eggborough

KE FIBERTEC
AIR THE WAY YOU WANT

KE Fibertec UK Ltd
Unit 5 – Fareham Innovation Cent
4 Meteor Way
PO13 9FU Lee-on-the-Solent
Tel. +44 (0) 2380 740751
info@ke-fibertec.co.uk
www.ke-fibertec.com/UK

Quote number:	Version:	Project:	Date:	Page:
3247832	1	Elmwood Leisure Centre	29/01/2025	2 of 10

Description:		Price:
Pool : System # 1	GBP	3,474.08
Pool : System # 2	GBP	3,294.87
Price	GBP	6,768.95
Freight and forwarding	GBP	222.67
Total VAT excl.	GBP	6,991.62
Optional Safe360 stainless steel internal rings	+GBP	+1,485.37

Delivery time:	Delivery conditions:	Payment conditions:	Valid until:
4 Weeks	DAP	Current Month + 30 Days	28/02/2025
From final approval	*Acc.to Incoterms 2020*	*Subject to positive credit evaluation*	

Furthermore we refer to the General Terms of Sale And Delivery of KE Fibertec AS, rev. 01/2020.

Best regards
Mark Berry
Senior Technical Sales Engineer

KE FIBERTEC

AIR THE WAY YOU WANT

KE Fibertec UK Ltd
Unit 5 – Fareham Innovation Cent
4 Meteor Way
PO13 9FU Lee-on-the-Solent
Tel. +44 (0) 2380 740751
info@ke-fibertec.co.uk
www.ke-fibertec.com/UK

Quote number:	Version:	Project:	Date:	Page:
3247832	1	Elmwood Leisure Centre	29/01/2025	3 of 10

Description:		Price:
Weight of Textile ducts	kg	92
Weight of Mounting components	kg	62

QUOTE

KE FIBERTEC
AIR THE WAY YOU WANT

Quote number:	Version:	Project:	Date:	Page:
3247832	1	Elmwood Leisure Centre	29/01/2025	4 of 10

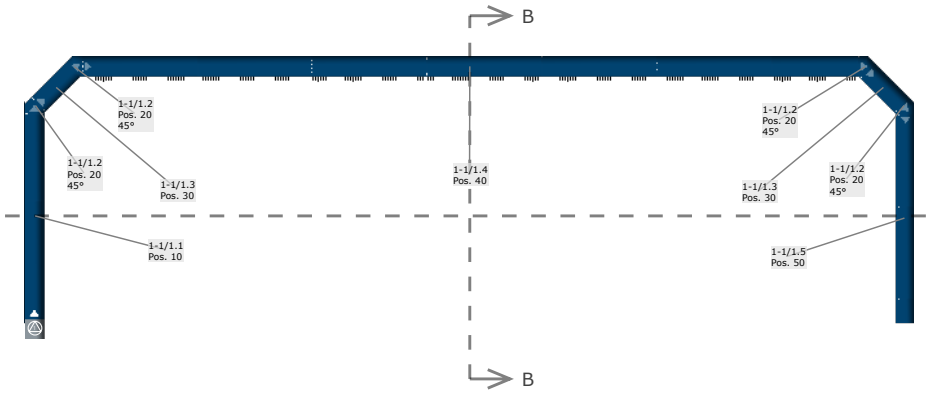
Item	Qty	Product	Dimension	Material	Color	Air Supply	Suspension
Pool: System # 1							
1-1/1.1	1	KE-Lowimpulse Sys...	Ø900,L=8909 mm	ZeroWeave	910	None	1 SafeBulb
1-1/1.2	4	KE-Elbow	Ø900mm	ZeroWeave	910	None	1 SafeBulb
1-1/1.3	2	KE-Lowimpulse Sys...	Ø900,L=2125 mm	ZeroWeave	910	None	1 SafeBulb
1-1/1.4	1	KE-DireJet System	Ø900,L=33798 mm	ZeroWeave	910	Nozzle	1 SafeBulb
1-1/1.5	1	KE-DireJet System	Ø900,L=9097 mm	ZeroWeave	910	Nozzle	1 SafeBulb
1-1M	1	Mounting kit	KE-Mounting, Safetrack, Stainless				
Pool: System # 2							
1-2/1.1	1	KE-Lowimpulse Sys...	Ø900,L=9180 mm	ZeroWeave	910	None	1 SafeBulb
1-2/1.2	2	KE-Bending 90˚	Ø900mm	ZeroWeave	910	None	1 SafeBulb
1-2/1.3	1	KE-DireJet System	Ø900,L=35245 mm	ZeroWeave	910	Nozzle	1 SafeBulb
1-2/1.4	1	KE-DireJet System	Ø900,L=9220 mm	ZeroWeave	910	Nozzle	1 SafeBulb
1-2M	1	Mounting kit	KE-Mounting, Safetrack, Stainless				

OVERVIEW AND TECHNICAL DATA

KE FIBERTEC
AIR THE WAY YOU WANT

Quote number:	Version:	Project:	Date:	Page:
3247832	1	Elmwood Leisure Centre	29/01/2025	5 of 10

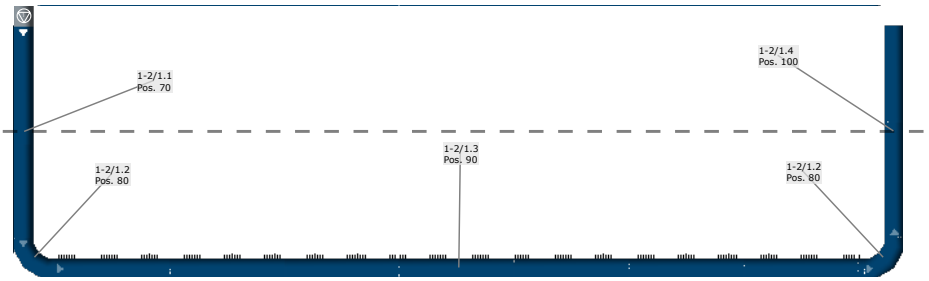
Pool: System # 1 (x1)



Technical information

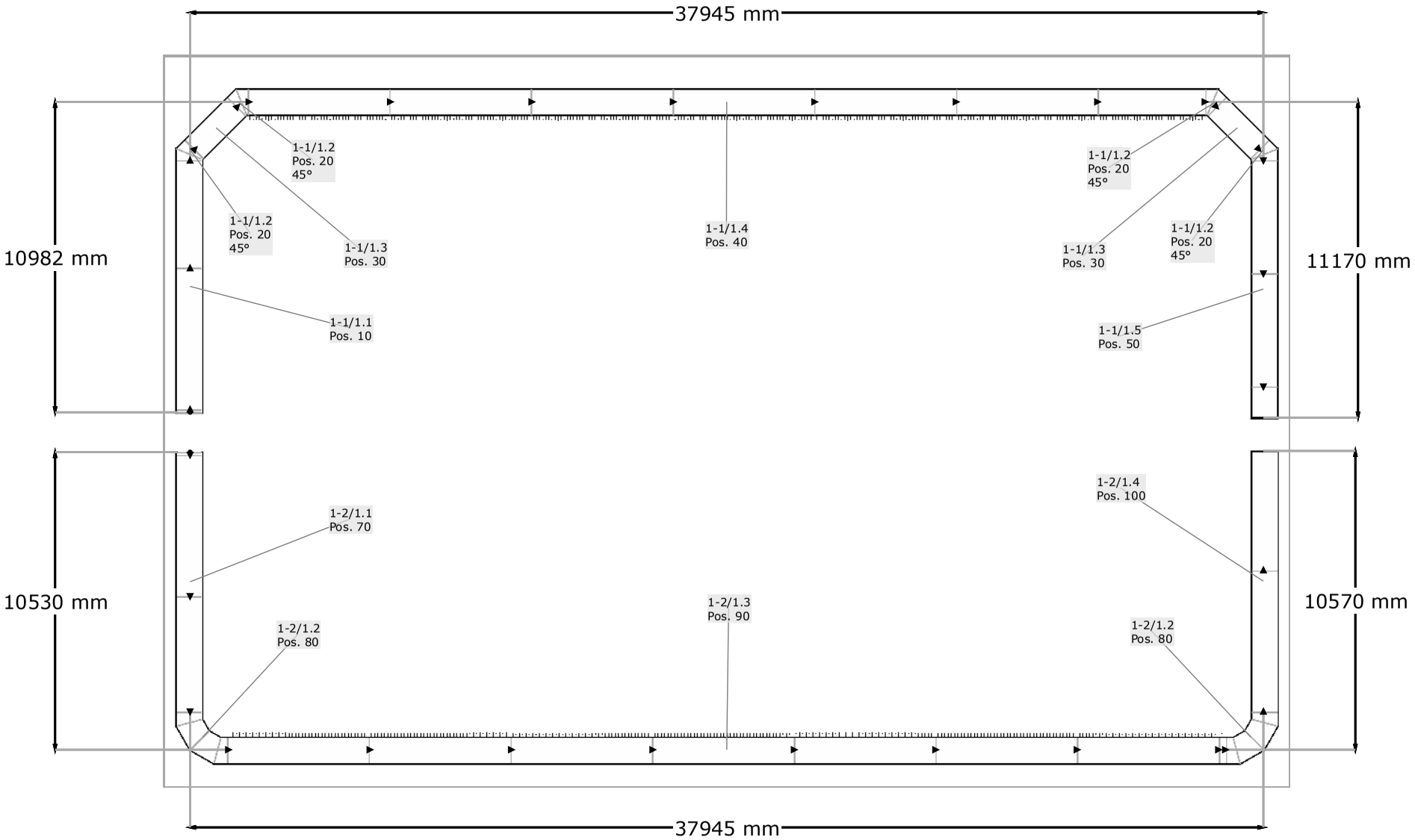
Total air quantity:		15.324 m³/h
Total pressure loss (Pt):		142 Pa
Ext. static pressure (ESP):		115 Pa
Room Temperature:		30,0 °C
Delivery Temperature:		15,0/40,0 °C
LwA (sound power level):		59 dB(A)
Min. static pressure:		112 Pa
Max. static pressure:	(50)	118 Pa
Critical (Fluttering):	(20)	1,76 > 1,00
Velocity max. textile:	(30)	0,10 m/sec
Max Velocity (Cool/Heat):		0,70/1,50 m/sec
Distance to near zone:		2925 mm
Temperature Gradient:		2,8 °C
Temperature in near zone:	(40)	N/A

Pool: System # 2 (x1)



Technical information

Total air quantity:		14.807 m³/h
Total pressure loss (Pt):		129 Pa
Ext. static pressure (ESP):		104 Pa
Room Temperature:		30,0 °C
Delivery Temperature:		15,0/40,0 °C
LwA (sound power level):		58 dB(A)
Min. static pressure:		114 Pa
Max. static pressure:	(100)	120 Pa
Critical (Fluttering):	(80)	2,58 > 1,00
Velocity max. textile:	(70)	0,10 m/sec
Max Velocity (Cool/Heat):		0,60/1,25 m/sec
Distance to near zone:		2925 mm
Temperature Gradient:		2,8 °C
Temperature in near zone:	(90)	N/A



Top View

10 (1-1/1.1)

Ø900 mm
None
100%: 0m³/m²/h

30 (1-1/1.3)

Ø900 mm
None
100%: 0m³/m²/h

Hidden Clamp | Edge Cord | Special

U-Zip Ex. | I-Zip In. | Metu-Zip In. | Nozzle/Holes

SRD | Service Zip | Service Zip

Customer: Hensall Mechanical Services Limited

Name:

Date: 29/01/2025

Order no.:

Description: Elmwood Leisure Centre Pool

KE FIBERTEC

AIR THE WAY YOU WANT

Quote no.: 3247832-1

Draw no.: P-3247832-29-W1-1

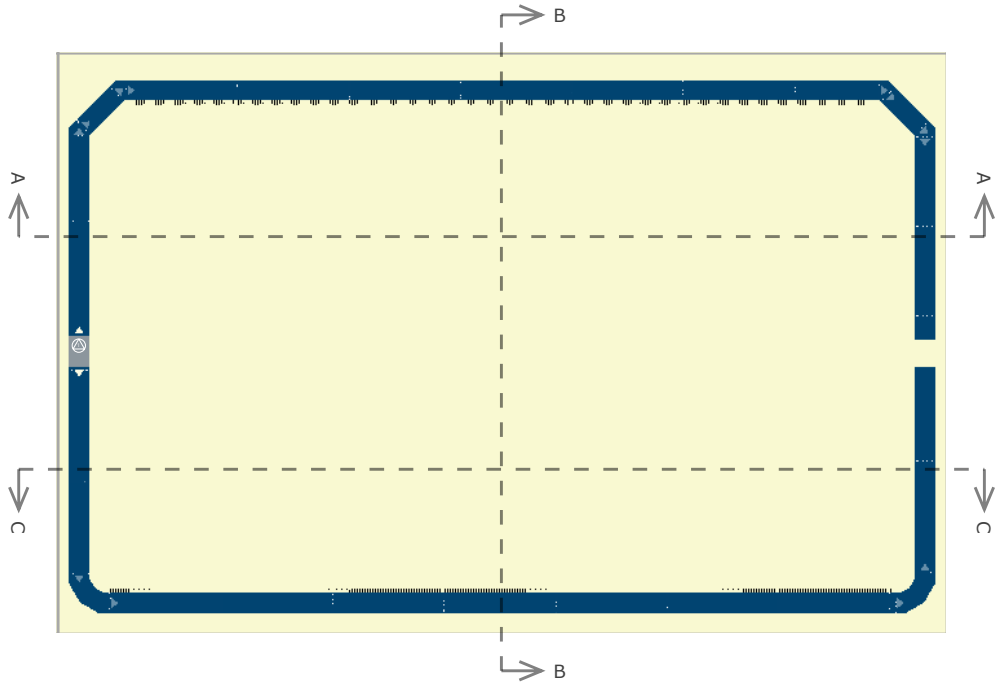
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CROSS SECTION OVERVIEW

KE FIBERTEC
AIR THE WAY YOU WANT

Quote number:	Version:	Project:	Date:	Page:
3247832	1	Elmwood Leisure Centre	29/01/2025	7 of 10

Pool



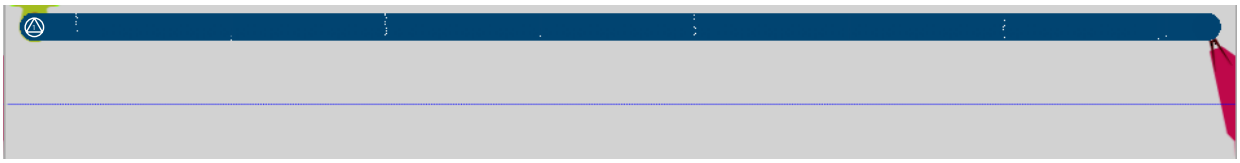
AIRFLOW VISUALIZATION

KE FIBERTEC
AIR THE WAY YOU WANT

Quote number:	Version:	Project:	Date:	Page:
3247832	1	Elmwood Leisure Centre	29/01/2025	8 of 10

Heating, Cross section A-A, Pool

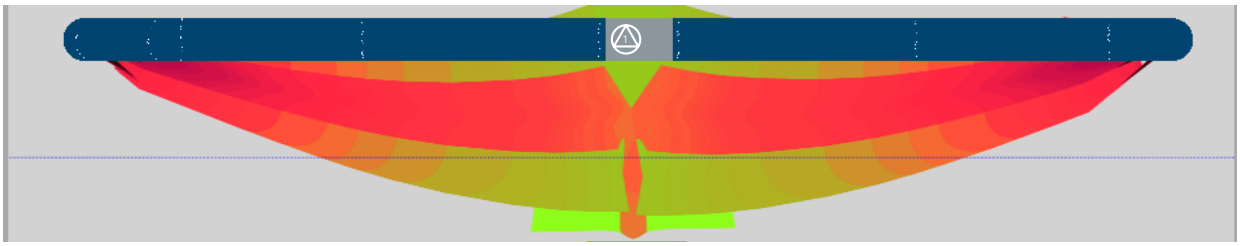
Velocity profile [m/sec]



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Heating, Cross section B-B, Pool

Velocity profile [m/sec]



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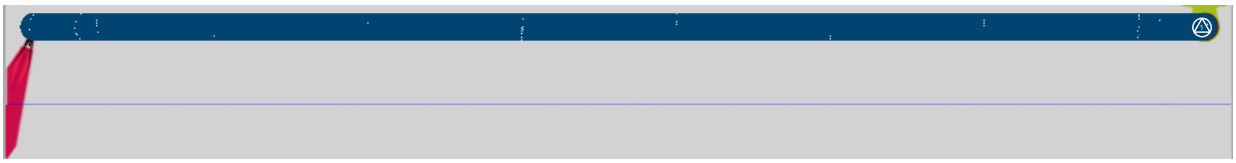
AIRFLOW VISUALIZATION

KE FIBERTEC
AIR THE WAY YOU WANT

Quote number:	Version:	Project:	Date:	Page:
3247832	1	Elmwood Leisure Centre	29/01/2025	9 of 10

Heating, Cross section C-C, Pool

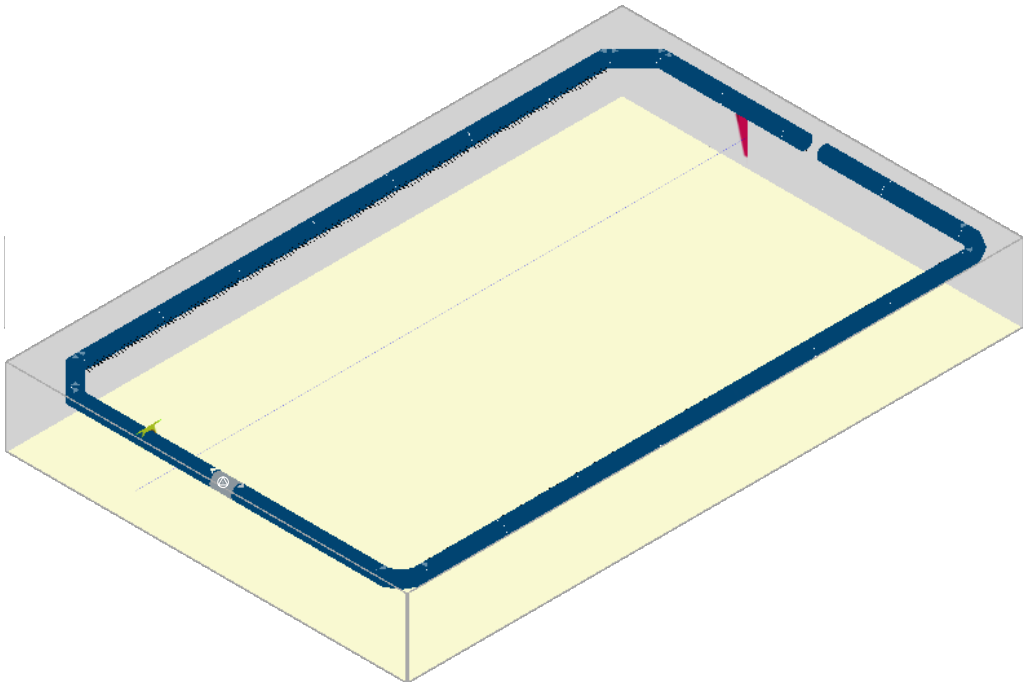
Velocity profile [m/sec]



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Heating, Cross section A-A, Pool

Velocity profile [m/sec]



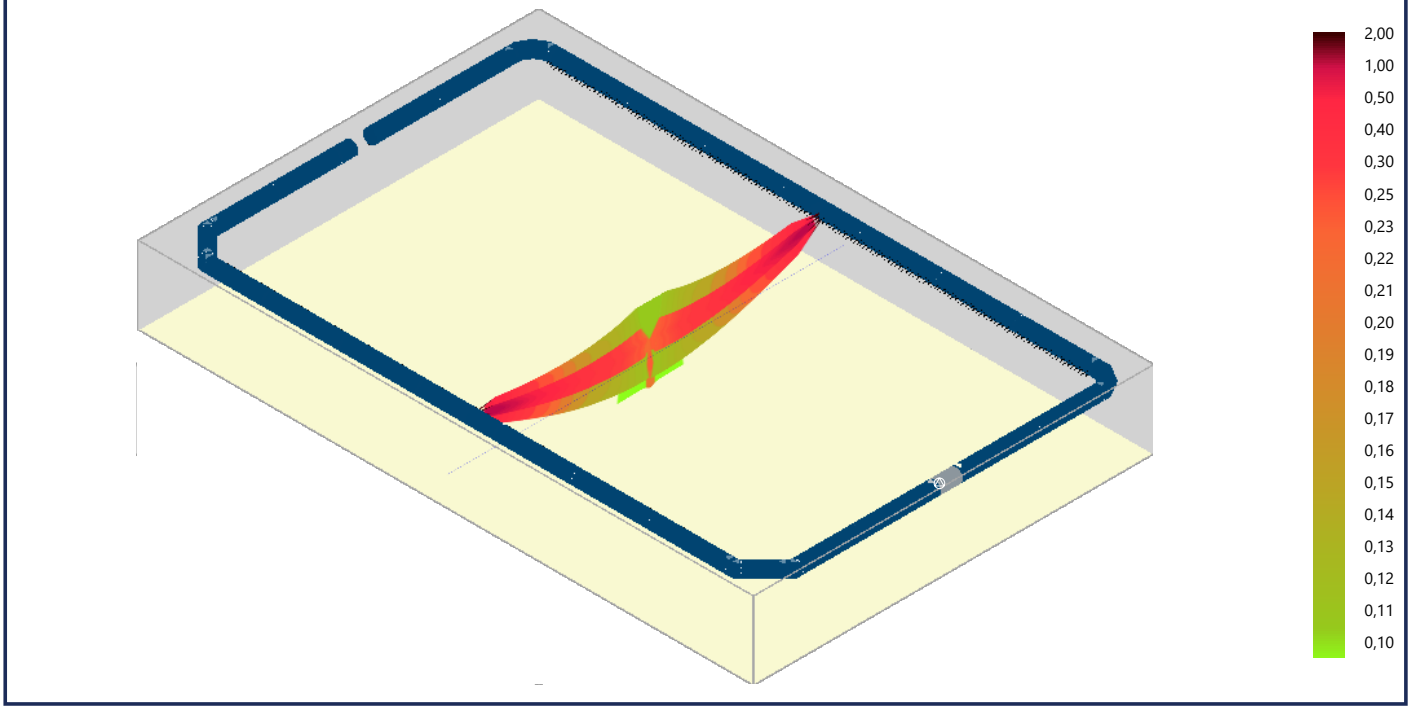
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AIRFLOW VISUALIZATION

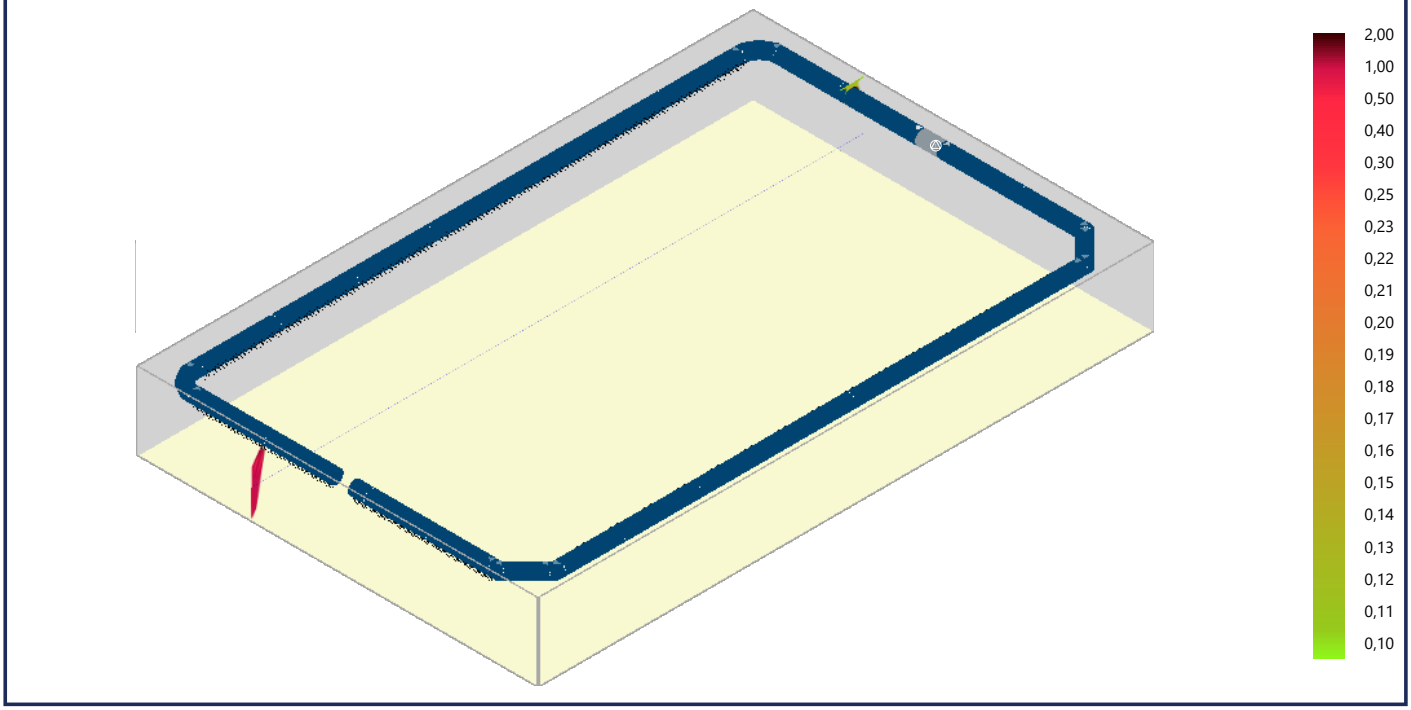
KE FIBERTEC
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Quote number:	Version:	Project:	Date:	Page:
3247832	1	Elmwood Leisure Centre	29/01/2025	10 of 10

Heating, Cross section B-B, Pool — Velocity profile [m/sec]



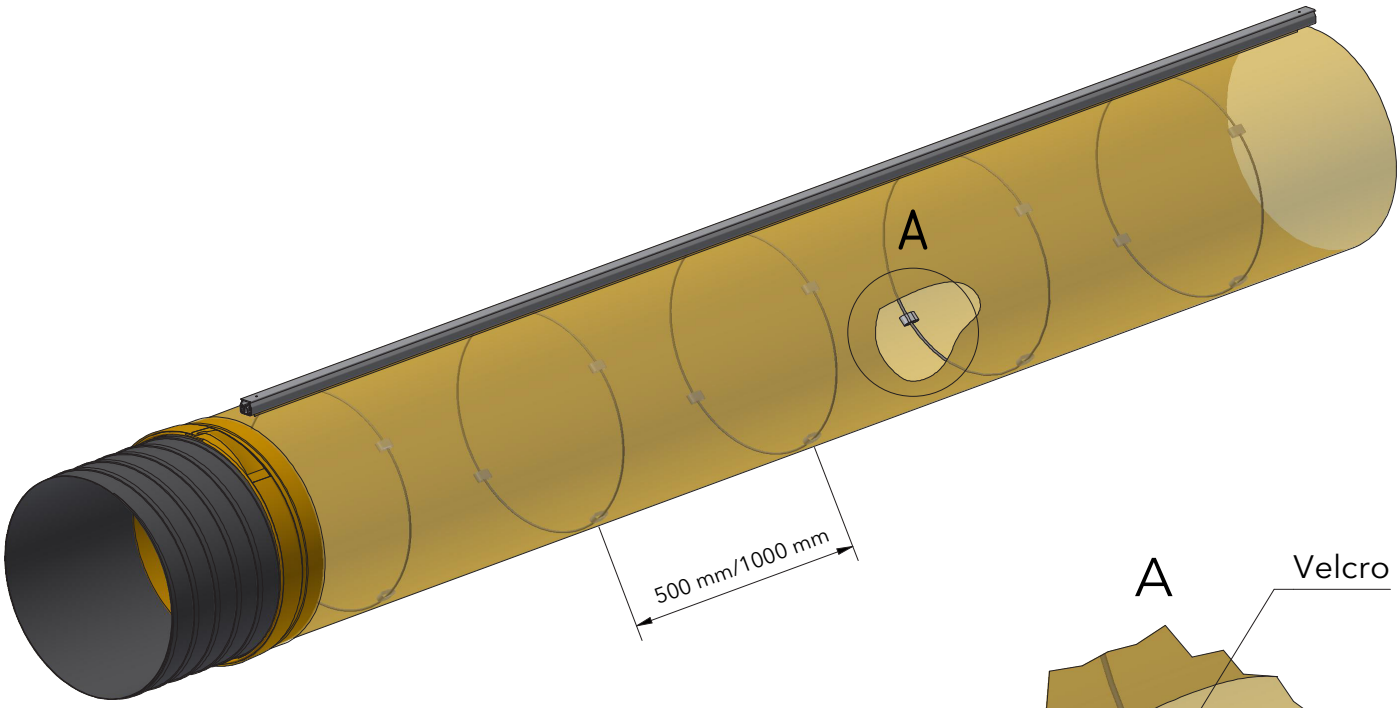
Heating, Cross section C-C, Pool — Velocity profile [m/sec]

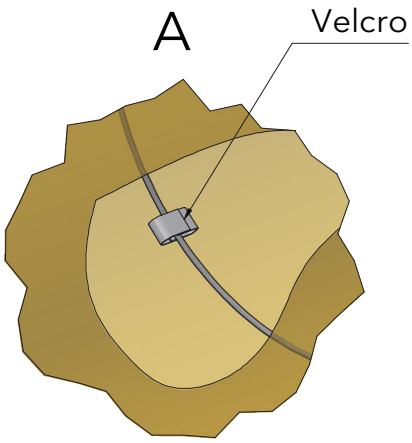


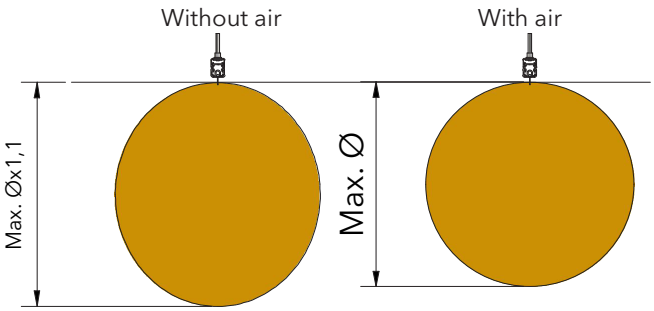
Mounting System
Safe 360

KE FIBERTEC

AIR THE WAY YOU WANT







Advantages of Safe 360:

- The Safe 360 concept consists of stainless steel rings placed internally in the fabric duct that will keep the textile duct 90% expanded
- Eliminates inflation popping when air is turned on
- The textile duct does not collapse onto any constructions beneath
- Minimum wrinkles in fabric
- Preserves the good properties of the textile duct, e.g. low weight, draft-free air distribution and good indoor climate

Installation in single SafeTrack for sizes Ø200 to Ø1270 mm. Rings up to Ø510 mm are preinstalled from the factory, however, for sizes >500 mm installation must be done on site.

Safe 360 can be upgraded with SafeStretch.

06/2023

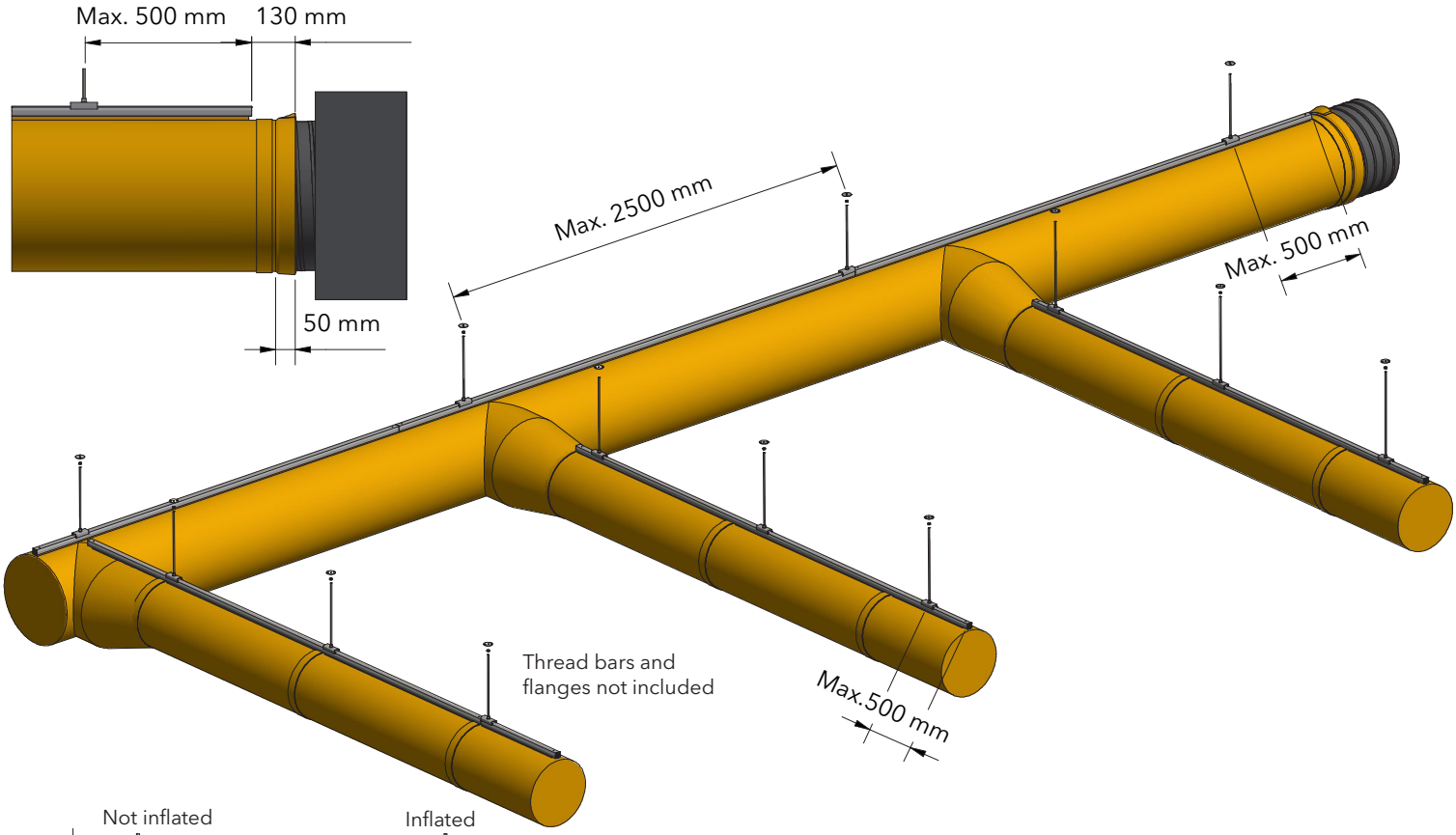
KE Fibertec UK Ltd
Unit 5 - Fareham Innovation Centre
4 Meteor Way
Lee-on-the-Solent
Hampshire PO13 9FU

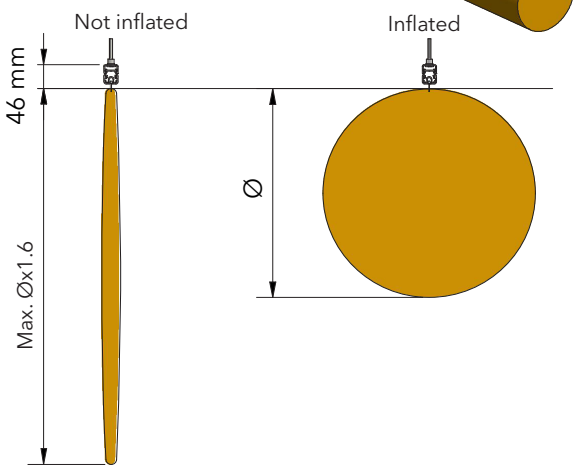
T: +44 (0)2380 740751
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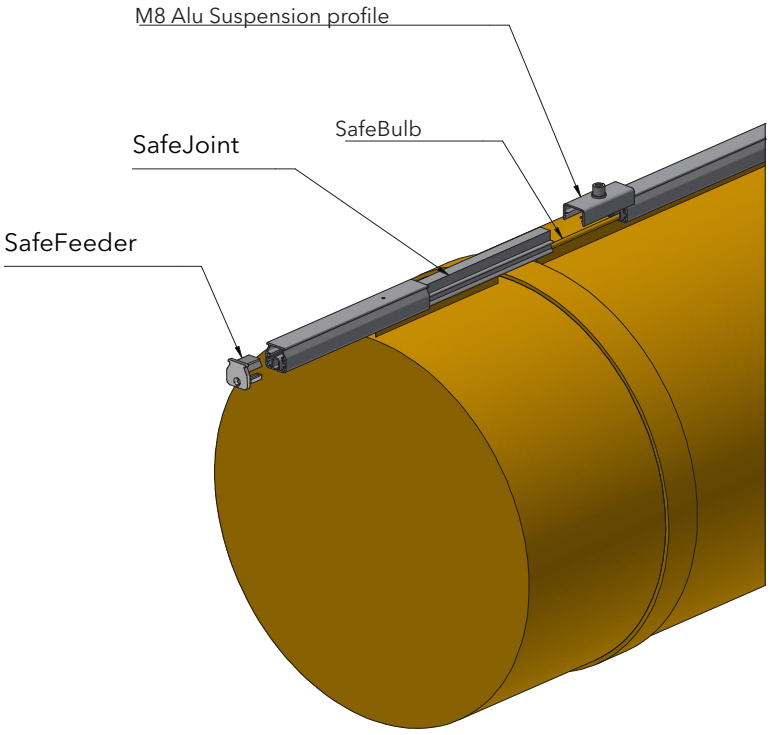
Mounting System
SafeTrack (Single) M8

KE FIBERTEC

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The SafeTrack is supplied in cut lengths to match the textile duct and is packed with the necessary components and marked individually with exact indication of placement.

Single SafeTrack suspension is suitable for textile ducts up to Ø900 mm. KE Fibertec suggests double-suspended SafeTrack for larger ducts than Ø900 mm. For ducts exceeding Ø900 mm SafeStrap-Up is recommended. From Ø1200 mm and up triple-suspended SafeTrack is recommended.

Thread bars for the ceiling are as standard supplied in lengths of 1 metre. Other lengths must be specified when placing the order and must be cut to size on site.

Not included in the delivery: M8 thread bars, M8 thread flanges, and screws for ceiling attachment.

06/2023

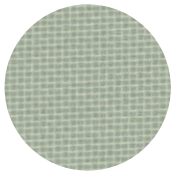
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ZeroWeave®
Airtight textile duct material

KE FIBERTEC

AIR THE WAY YOU WANT



ZeroWeave is the right solution for applications where you need to move large volumes of air over a long distance and still maintain optimum air mixing. ZeroWeave can be combined with all KE Fibertec's hole pattern types and nozzle configurations.

ZeroWeave is an airtight, low-maintenance material with a wide range of application possibilities such as supermarkets, large sports arenas, swimming pools, high-bay industrial facilities, and rooms with high dust generation or limited accessibility.

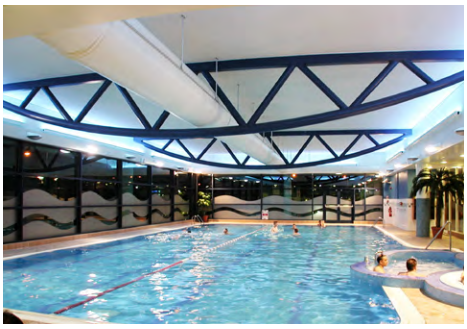
- ZeroWeave is an airtight material so the filter efficiency is zero. All the air is distributed through holes or nozzles
- No PVC, halogens or other harmful substances. The material can be lasercut to improve the finished quality
- Fire tested acc. to EN13501 B-S1-d0 without any finishing treatment
- No condensation issues when used in environments below 90% RH
- Washing not needed in order to maintain functionality. Only for hygienic and aesthetic reasons.

AVAILABLE COLOURS - PANTONE/RAL

WHITE	LIGHT GREY	DARK BLUE
11-0601- TP / 9010	14-4201-TP / 7047	19-3864-TP / 5002

KE NO.	DESIGNATION	PERMEABILITY/ 120 Pa [m³/m²/h]	DATASHEET
ZW	Flame retardant Polyester fabric with PU-coating*	0	27

*) Approved in acc. with EN 13501-1, B-s1,d0







04/2021

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FACTS

KE FIBERTEC

AIR THE WAY YOU WANT

Upcycling of all material waste

KE Fibertec collects and upcycles all textile material waste that is cut by the laser cutters. The surplus materials are used in the production of sound-absorbing ceiling panels. The weaving mill upcycles all residual yarns, which are rewound and used to produce bulb cords for mounting the textile ducts. Empty yarn cones are granulated and sent to the production of new plastic components.

50% lower carbon footprint

Our carbon footprint has been reduced by 50% (Scope 1 and 2) since 2018, despite revenue growth of over 30%. Our Scope 3 footprint has been reduced by 25% in the same period.

Sustainable packaging & less waste

KE Fibertec provides mounting rails cut to size to optimise installation time and reduce waste on site. The customised textile ducts reduce both transport volume and weight, resulting in lower CO2 emissions during transport. In addition, KE Fibertec has introduced new sustainable packaging that reduces our carbon footprint by 62%.

4-5x lower carbon footprint

Achieve 4-5 times lower carbon footprint* with textile ducts and extra points for your LEED, DGNB and BREEAM certification. Our EPDs with dynamic CO2 data offer complete insight into each component's impact on the carbon footprint.

* compared to a round steel duct.
Source: Industry-specific EPD, VELTEK Denmark

100% water savings

Switching to yarn dyeing of our textiles has resulted in a significant reduction in water consumption for dyeing, equivalent to more than 1 million litres of water annually. For special colours, we can now offer transfer printing directly on the textile material and without the use of water.

Solar panels & wind power

The weaving mill has installed a solar cell system, which supplies approx. 35% of the annual electricity consumption and up to 60% in the summer period. In addition to this 100% wind power is used as a supplement to the solar cell production at our Danish factories.

C2C approved materials

All materials are Cradle to Cradle approved and certified according to the C2C standard with the following results: Material Health (Bronze), Material Reutilization (Gold), Renewable Energy (Gold), Water Stewardship (Bronze) and Social Fairness (Gold). If you want a take-back scheme on end-of-life products, choose our CradleVent® product.

UN Global Goals certification

With an SDG17 certification through Bureau Veritas, we have taken the next step in our work to create decent conditions for all, not only in Denmark, but throughout our supply chain.

www.ke-fibertec.co.uk

Warranty Conditions
(extract)

KE FIBERTEC
AIR THE WAY YOU WANT

KE Fibertec AS offers four different types of warranty. An overview of the complete warranty terms and conditions is available at ke-fibertec.com/download/terms. The terms there will always take precedence.

Period of warranty in years (from date of invoice)						
	Materials[1) 4)]	Zips / bulbs[4)]	DireJet nozzles and other accessories[4)]	Suspension material[4)]	Design and technical function	InTex® electronics batteries[3)]
GreenWeave, GW Antistatic, Nomex, MultiWeave and InTex® monitoring *combined with a maintenance agreement with KE Fibertec*[2)]	15 years	15 years	15 years	15 years	1 year	2 years[3)]
GreenWeave, GW Antistatic, Nomex and MultiWeave *without a maintenance agreement with KE Fibertec*	10 years	10 years	10 years	10 years	1 year	2 years[3)]
ZeroWeave	5 years	5 years	5 years	5 years	1 year	N/A
FBS panels	10 years	10 years	N/A	10 years	1 year	N/A

[1)] We refer to the general KE material specifications regarding tolerances and properties. [2)] See separate warranty conditions for InTex® concerning rules of maintenance agreements. [3)] We do not offer any warranty on batteries. [4)] TBV systems installed in aggressive environments such as swimming pool facilities, dairies, galvanizing plants etc. are covered by the standard 5 year warranty. The extended 10 year product warranty only applies by written agreement with KE Fibertec.

Design warranty on technical operation

KE provides a 1-year design warranty on the technical operation of the system (pulsations, pressure loss and air velocity in the occupied zone) provided that this has been specifically stated in the order confirmation. In all cases, KE reserves the right to perform measurements on the ventilation system on its own before accepting a design warranty claim.

Liability for defective performance

If defects are found in KE's delivery in relation to what has been stated in the order confirmation, KE's liability for defective performance will apply for a period of 12 months from the start-up date, but no longer than 18 months from date of invoice. Within the above period KE undertakes to rectify all defects in the delivered goods by repair or replacement as KE deems fit. KE's obligation to remedy defects is subject to the customer being able to prove that the delivered systems are defective and is able to document that the TBV systems have been stored, installed and put into operation properly and in compliance with the provided mounting instruction and Intro leaflet found in the "INFO" carton.

Product warranty

If - against expectations - a defect should occur on a KE Fibertec TBV system within the warranty period stated in the table, KE Fibertec must be notified at once in order to minimize the damage. The product warranty covers repairs or replacement (according to KE's choice) of the defective duct system inclusive of freight, if any, to the installation site. The warranty is void if the TBV system is incorrectly installed, repaired or modified by third party or by failure to maintain the duct systems according to KE Fibertec's washing and maintenance instructions. The warranty does not cover printed artwork/logos, labels or changes in colour, by grey shading or normal ageing.

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8.65

Horne Shower Column T105A

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	`Horne Shower Column T105A.pdf`
Pages	2

HORNE®

Product datasheet:
T105A

T105A DUAL CONTROL SHOWER PANEL

HORNE TSV1 SHOWER PANEL WITH DUAL CONTROL THERMOSTATIC MIXING VALVE AND VANDAL RESISTANT SHOWER HEAD
Includes integral Type 3 Approved thermostatic shower valve pre-plumbed within a white (RAL 9010) epoxy-polyester painted aluminium panel with hand controls and vandal resistant shower head in chromium plated finish.



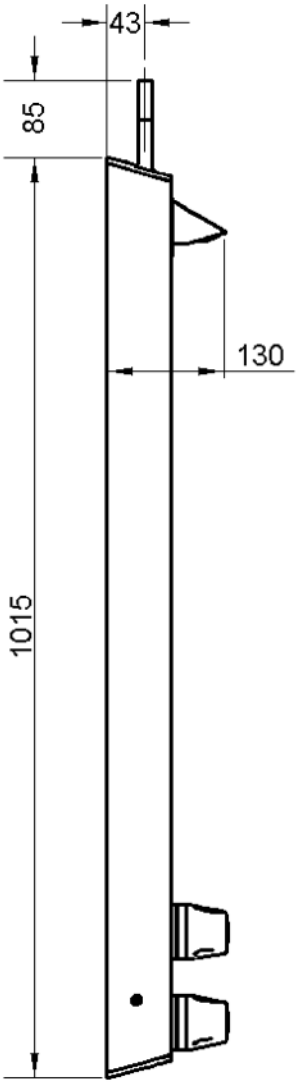
FEATURES & BENEFITS

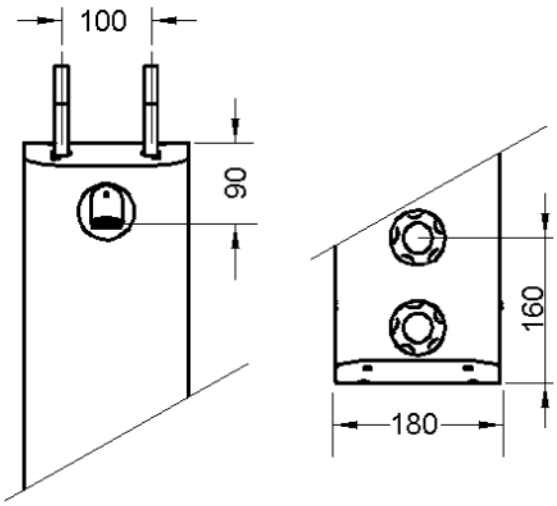
- Robust, anodised and painted (RAL 9010) panel and fittings ensure long lifespan
- Pressure & tested pre-plumbed assembly
- Integral Type 3 Approved shower valve - dual control
- Fixed vandal resistant shower head
  - Large size spray plate
  - Two directional spray settings
  - Easy to clean and maintain
- Integral 8 L/min flow regulator for water and energy conservation
- Low level integral isolating service valves for ease of maintenance
- Highly suitable for retrofit applications
- Fast and easy installation
- Optional accessory:
  - Pipe cover in same profile as panel

The TSV1-3 thermostatic shower valve is Type 3 and UK Water Regulation 4 Approved.

Product datasheet: T105A

Dimensions in mm Original Drawing Ref: 10340





The **T105A** shower panel is pre-plumbed with an integral dual control Type 3 approved thermostatic mixing valve, which features:

- Low level isolating servicing valves
- Integral fine mesh strainers provide essential protection to internal mechanism of the valve and ancillary fittings
- Angle pattern inlets enable easy access to the strainers
- Integral check valves prevent cross migration of water supplies
- Flushing facility to allow water supplies to be flushed clean during commissioning

Operating Conditions (Type 3 TMV):

- Range of temperature adjustment up to pre-set maximum, usually 41°C at the showerhead
- Range of hot water supply temperature: 55 — 65°C
- Maximum static pressure: 10 bar
- Minimum differential between hot water temp. and mixed water temp.: 5°C
- Range of maintained water supply pressures: 0.2—5 bar

Unequal pressures are usually acceptable if gravity -pressure supplies one of the inlets: minimum 0.2 Bar. When both supplies are pumped, pressures should be nominally balanced.

HORNE ENGINEERING LTD, PO BOX 7, Rankine Street, Johnstone, PA5 8BD.
Tel: +44 (0)1505 321455 Fax: +44 (0)1505 336287
Email: sales@horne.co.uk web: www.horne.co.uk

Certificate No. FM 1224

Horne Engineering Ltd reserves the right to alter design or specification without notice.

8.66

Horne Shower Column T108T42L

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	`Horne Shower Column T108T42L.pdf`
Pages	2

HORNE®

Product datasheet: T108T42L

INCLUSIVE DESIGN SHOWER PANEL WITH DUAL CONTROL THERMOSTATIC SHOWER VALVE, ILTDU AND PIPE COVER

Includes integral Type 3 Approved thermostatic shower valve pre-plumbed within a white epoxy-polyester powder-coated aluminium panel with lever hand controls, single function handset, hose and riser rail, integral **In-line Thermal Disinfection Unit**, and 465mm Pipe Cover.



FEATURES & BENEFITS

- Durable, anodised and powder-coated (RAL 9010, LRV=84) panel & robust fittings ensure long lifespan
- Integral healthcare-approved shower valve with BS 8300 compliant lever controls
- In-Line Thermal Disinfection Unit with easy operation for periodic disinfection of pipework, valve and downstream fittings using local hot water supply
- 465mm Pipe Cover in same profile as panel with key access point for ILTDU operation
- Robust riser rail in with inclusive design hand-set holder
- Single function handset with easy-clean and anti-kink 1.25m hose (PVC liner)
- Integral 8 L/min flow regulator for water and energy conservation
- Low-level integral servicing valves for ease of maintenance and performance testing
- Fast and easy installation, for new or retrofit applications
- Pressure tested assembly, to 16 bar
- Optional accessory: 2 metre hose - part number SA-108B

The TSV1-3 thermostatic shower valve is Type 3 and UK Water Reg 4 Approved.
The integral ILTDU is UK Water Reg 4 Approved.

HORNE®

Product datasheet: T108T42L

The **T108T42L** shower panel is pre-plumbed with an integral dual control Type 3 approved thermostatic mixing valve, which features:

- Low-level isolating servicing valves
- Integral fine mesh strainers provide essential protection to internal mechanism of the valve and ancillary fittings
- Angle pattern inlets enable easy access to the strainers
- Integral check valves prevent cross migration of water supplies
- Flushing facility to allow water supplies to be flushed clean during commissioning

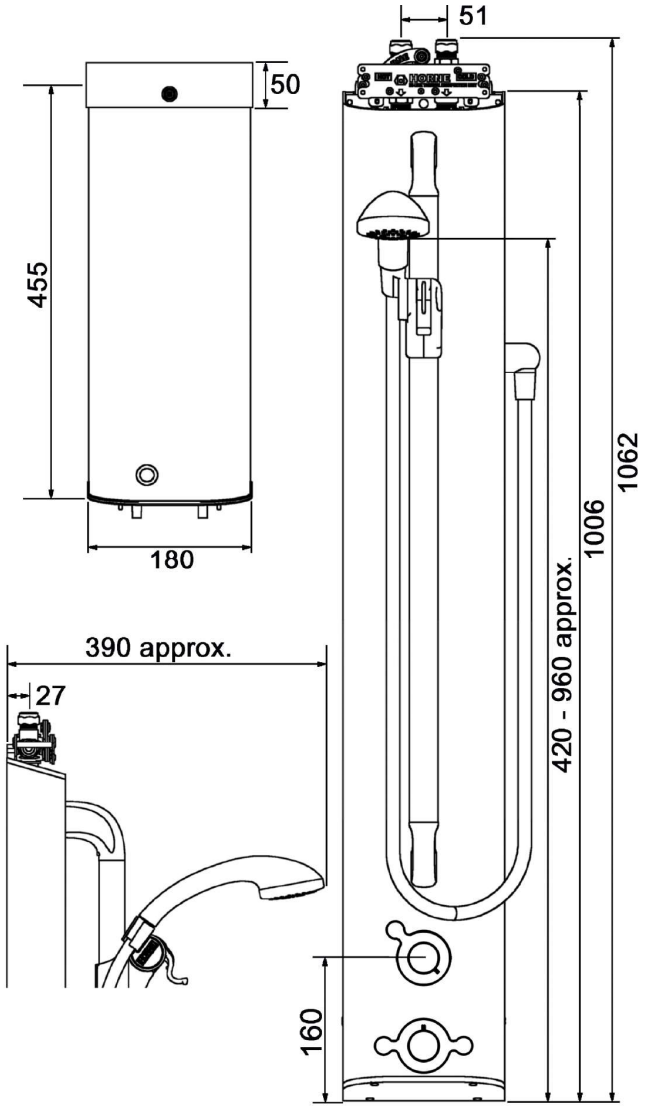
Operating Conditions (Type 3 TMV):

- Range of temperature adjustment up to pre-set maximum, usually 41°C at the shower head
- Range of hot water supply temperature: 55 — 65°C
- Maximum static pressure: 10 bar
- Minimum differential between hot water temp. and mixed water temp.: 5°C
- Range of maintained water supply pressures: 0.2-5 bar

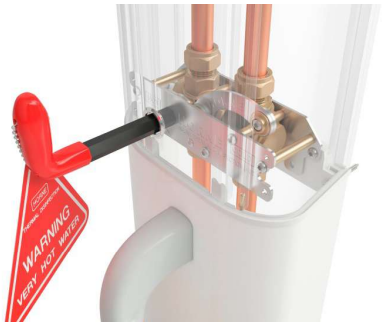
Unequal pressures are usually acceptable if gravity-pressure supplies one of the inlets: minimum pressure 0.2 Bar. When both supplies are pumped, pressures should be nominally balanced.

Dimensions in mm

Original Drawing Ref: 11352



TOTAL HEIGHT OF PANEL + PIPECOVER
= 1006 + 2 + 455 + 50 - (OVERLAP)
- OVERLAP IS VARIABLE, 20-40mm
- 455 LENGTH CAN BE CUT TO SUIT



Thermal Disinfection using the ILTDU

For an explanation of its operating principals and further information on the recommended disinfection procedure, please refer to our ILTDU brochure and instructions.

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Email: sales@horne.co.uk web: www.horne.co.uk

Certificate No. FM 1224

Horne Engineering Ltd reserves the right to alter design or specification without notice.

8.67

AHU R.01 datasheet and technical submittal

The following 94 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	HEN0203-AHUR01-DS
Asset	AHU R.01
Provided by	Trane UK Ltd
Source file	Trane AHU technical data, AHU R.01 to R.09.pdf
Pages	94

Branch office:

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Lawrence House, 1A Jays Close
Basingstoke, RG22 4LT
Tel.: +44 8457 165162
trane.co.uk

James Dean / External

Manufacturer

AL-KO THERM GMBH
Hauptstrasse 248-250
D-89343 Jettingen-Scheppach
alko-airtechnology.com

Tel.:

Data sheet

Project: **238351 - 001-00-489136**
Order #:
Proj. descr.: ElmwoodLeisure Centre
Unit: AHU.R.01 - (Rev 05 // Recirc + Sectional, No Controls - 14.02.2025)
Piece: 1
Type: AT4-F 49x20/49x20 - Interior

Pos.: **1**
GS-pos.:

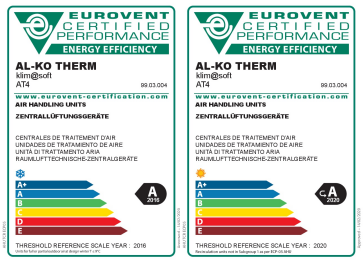
Quotation

Date Printed: 21.02.2025
Edition Date: 20/02/2025
Editor: James Dean

Note: All data relate to standard conditions for air density = 1.2 kg/m^3

Unit data	**Supply air**		**Exhaust air**	
	Target value	Actual	Target value	Actual
Air flow	11.4130	11.4130 m^3/s	11.9840	11.9840 m^3/s
External pressure	435	435 Pa	385	385 Pa
Internal pressure	517	517 Pa	298	298 Pa
Air velocity		2.0 m/s		2.1 m/s

Eurovent Efficiency Wint./Sum. A (2016) / A (2020)
Climate zone United Kingdom / BIRMINGHAM
Calculated ERP compliance Compliant 2018



SA - Damper outside	**G 1**	**FU 0**	**Accessory**
Type:	Damper outside		- Damper leak tight class 2
Width:	3,748 mm		- coated Damper divided
Height:	1,530 mm		- Number of motor shaft: 2
Connector:	A30		
Needed torque:	45.00 Nm		
Design pressure:	5 Pa		
Actuator type:	linkage outside one-sided		
Number of axis:	2		
Axis type:	square 15mm		

SA - Empty section	**G 1**	**FU 0**	**Accessory**
Length:	9	AT4 raster	- Maintenance door
			- Hand Lever
			- Hand Lever lockable

SA - Filter	**G 1**	**FU 1**	**Accessory**
Type:	BF - Bag Filter		- Panel with built in pressure gage
Class:	ePM10-55 % / M5		- Indicating pressure gauge 250 Pa
eff. class:	E		- Filter frame coated
Design pressure:	78 Pa		
Initial pressure:	39 Pa		

End pressure:	117	Pa
air velocity cross section:	2.0	m/s
Filter surface:	51.9	m^2
Filter length:	360	mm
Filter element 592x592:	12	
Filter element 287x592:	6	
Maintenance:	DS - dust side	
Air flow:	11.4130	m^3/s

Crossflow heatexchanger	**G 2**	**FU 8**	**Accessory**
Requested material			
HRS type	Crossflow heat exchanger		
Type:	Al - epoxy		- PHX Delivered Sectional
operating state:	Winter		- Maintenance door
Total Thermal Capacity:	346	kW	- Base tub powder coated
Thermal efficiency:	73.0	%	- Stiffening plate, powder coated
Energy recovery class (EN 13053/2020):	H2		- droplet eliminator convertible
Balanced Efficiency (dry / 5-25^{o}C):	73.4	%	
Total torque shutter:	25	Nm	
Supply air:	11.4130	m^3/s	
Δ Pressure (S):	161	Pa	
Pressure loss damper:	5	Pa	
Temperature IN:	-5	^{o}C	
Rel. Humidity IN:	99	%	
Abs. Humidity IN:	2.5	g/kgL	
Temperature OUT (S):	20.0	^{o}C	
Rel. Humidity OUT:	17.0	%	
Abs. Humidity OUT:	2.5	g/kgL	
Exhaust air:	11.9840	m^3/s	
Δ Pressure (E):	161	Pa	
Temperature IN:	25	^{o}C	
Rel. Humidity IN:	12.6	%	
Abs. Humidity IN:	2.5	g/kgL	
Temperature OUT (E):	8.0	^{o}C	
Rel. Humidity OUT:	30.1	%	
Abs. Humidity OUT:	2.0	g/kgL	
Pressure difference loss eliminator:	21	Pa	
operating state:	Summer		
Total Thermal Capacity:	63.2	kW	
Thermal efficiency:	73.4	%	
Supply air:			
Temperature. IN:	32	^{o}C	
Rel Humidity IN:	60	%	
Abs. Humidity IN:	18	g/kgL	
Temperature OUT:	27.6	^{o}C	
Rel. Humidity OUT:	77.3	%	
Abs. Humidity OUT:	18	g/kgL	
Exhaust air:			
Tempearture IN:	26	^{o}C	

Rel. Humidity IN:	55 %
Abs. Humidity IN:	12 g/kgL
Temperature OUT:	30.4 °C
Rel. Humidity OUT:	42 %
Abs. Humidity OUT:	11 g/kgL

Attention:
Delivery of housing partially dismantled (Base/roof mounted)
Block divided in panes with max. 355 kg.

SA - Fan - Wheel - EC	**G 3**	**FU 3**	**Accessory**
# units:	3 Fan wall		- Volume flow measuring for fan
Fan type:	Wheel - EC 630		- Wiring repair switch/fan
Air flow:	13695.6		- Repair switch
Static increase of pressure:	952	Pa	
Casing pressure loss:	37	Pa	
Static efficiency:	72	%	
Manufacturer efficiency:	72	%	
Efficiency class N (EU 327/2011):	77.3		
Speed:	1,786	1/min	
Max. speed:	1,910	1/min	
- *Motor*			
# units:	3		
Control type:	EC - controlled		
Speed:	1,786	1/min	
Control voltage:	9.0	V	
Volume / rotation reserve:	7	%	
Power input:	15.02	kW	
Efficiency class:	IE 5		
SFP value (GEG 2020):	893	W/(m³/s)	
SFPv (EN 16798-3):	1,193	W/(m³/s)	
SFP class:	SFP 3		
Speed Class:	V3		
Max. input power:	19.6	kW	
Nominal rated voltage:	V		
Power Frequency:	50	Hz	
Nominal rated capacity:	4.55 kW		
Nominal rated current:	23.42 A		
Protection class:	IP54		
Overload protection:	Power control		
Insulation class:	F		
P Class:	P1		
System Efficiency:	70	%	
Sound Power Level Inlet:	84.9	dB(A)	
Sound Power Level Outlet:	89.8	dB(A)	

Octave band:	63	125	250	500	1k	2k	4k	8k	Hz
Lw Inlet:	75	80	80	80	79	78	77	70	dB
Lw Outlet:	79	84	80	86	85	82	80	75	dB

Air flow:	11.4130	m³/s
K factor:	463	
volume flow [m³/h]:	K factor x $\sqrt{\text{nozzle-pressure}}$ [Pa]	

Data sheet

Project: **238351 - 001-00-489136** Pos.: **1** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.01 - (Rev 05 // Recirc + Sectional, No Controls - 14.02.2025) Piece: 1 Edition Date: 20/02/2025

Type: AT4-F 49x20/49x20 - Interior Editor: James Dean

SA - Empty section	**G 3**	**FU 0**	**Accessory**
Length:	9	AT4 raster	- Maintenance door - Hand Lever lockable w. Door Catch - Hand Lever lockable

---

SA - Filter	**G 4**	**FU 2**	**Accessory**
Type:	BF - Bag Filter		- Panel with built in pressure gage
Class:	ePM1-60 % / F7		- Indicating pressure gauge 250 Pa
eff. class:	D		- Filter frame coated
Design pressure:	145	Pa	
Initial pressure:	95	Pa	
End pressure:	195	Pa	
air velocity cross section:	2.0	m/s	
Filter surface:	54.7	m^2	
Filter length:	380	mm	
Filter element 592x592:	12		
Filter element 287x592:	6		
Maintenance:	DS - dust side		
Air flow:	11.4130	m^3/s	

SA - Heating coil	**G 4**	**FU 4**	**Accessory**
Type:	PWW - Copper/Al - epoxy - A		
Total Thermal Capacity:	265.20	kW	
pressure loss (dry):	87	Pa	
Air flow speed:	2.27	m/s	
Temperature Inlet:	21.0	^oC	
Rel. Humidity Inlet:	50.0	%	
Abs. Humidity Inlet:	7.8	g/kgL	
Temperature Outlet:	40.0	^oC	
Power reserve:	6	%	
Rel. Humidity Outlet:	16.8	%	
Abs. Humidity Outlet:	7.8	g/kgL	
Medium:	Water		
Medium temperature IN:	45.0	^oC	
Medium temperature OUT:	38.0	^oC	
Medium flow quantity:	32,940	l/h	
Δp medium:	14.0	kPa	
Δ fins:	2.5	mm	
Rows:	5		
Circuits:	95		
Content:	86.3	l	
Pipes:	Copper		
Fins:	Al - epoxy		
Header:	Copper		
Frame:	Stainless steel (1.4301)		
Frame to hold frost protection equipment:	Without		
Connection type:	A - water connection straight sidewards		

Connection width:	DN 80 (R 3)	
Connections per circuit:	2	
Air flow:	11.4130	m^3/s

SA - Connection frame with rubber	**G 4**	**FU 0**	**Accessory**
Type:	Connection frame with rubber		- Connecting Frame powder coated
Width:	3,748	mm	
Height:	1,530	mm	
Depth:	60	mm	
Design:	7001		
Connector:	A30		

EA - Connection frame with rubber	**G 5**	**FU 0**	**Accessory**
Type:	Connection frame with rubber		- Connecting Frame powder coated
Width:	3,748	mm	
Height:	1,530	mm	
Depth:	60	mm	
Design:	7001		
Connector:	A30		

EA - Empty section	**G 5**	**FU 0**	**Accessory**
Length:	4	AT4 raster	

EA - Fan - Wheel - EC	**G 5**	**FU 6**	**Accessory**
# units:	3 Fan wall		- Volume flow measuring for fan
Fan type:	Wheel - EC 630		- Wiring repair switch/fan
Air flow:	14380.8		- Repair switch
Static increase of pressure:	683	Pa	
Casing pressure loss:	26	Pa	
Static efficiency:	69	%	
Manufacturer efficiency:	69	%	
Efficiency class N (EU 327/2011):	76.6		
Speed:	1,645	1/min	
Max. speed:	1,910	1/min	
- *Motor*			
# units:	3		
Control type:	EC - controlled		
Speed:	1,645	1/min	
Control voltage:	8.3	V	
Volume / rotation reserve:	16	%	
Power input:	11.81	kW	
Efficiency class:	IE 5		
SFP value (GEG 2020):	625	$W/(m^3/s)$	
SFPv (EN 16798-3):	925	$W/(m^3/s)$	
SFP class:	SFP 2		
Speed Class:	V4		
Max. input power:	15.1	kW	
Nominal rated voltage:	V		

Power Frequency:								50	Hz
Nominal rated capacity:								3.55	kW
Nominal rated current:								18.70	A
Protection class:								IP54	
Overload protection:								Power control	
Insulation class:								F	
P Class:								P1	
System Efficiency:								67	%
Sound Power Level Inlet:								84.8	dB(A)
Sound Power Level Outlet:								89.2	dB(A)
Octave band:	63	125	250	500	1k	2k	4k	8k	Hz
Lw Inlet:	71	76	79	80	78	78	78	70	dB
Lw Outlet:	76	81	80	86	84	82	81	74	dB
Air flow:								11.9840	m^3/s
K factor:								463	
volume flow [m^3/h]:	K factor x $\sqrt{\text{nozzle-pressure}}$ [Pa]								

EA - Empty section **G 6** **FU 0** **Accessory**

Length: 9 AT4 raster

- Maintenance door
- Hand Lever
- Hand Lever lockable w. Door Catch

EA - Filter **G 6** **FU 5** **Accessory**

Type:	BF - Bag Filter	- Panel with built in pressure gage
Class:	ePM10-55 % / M5	- Indicating pressure gauge 250 Pa
eff. class:	E	- Filter frame coated
Design pressure:	84 Pa	
Initial pressure:	42 Pa	
End pressure:	126 Pa	
air velocity cross section:	2.1 m/s	
Filter surface:	51.9 m^2	
Filter length:	360 mm	
Filter element 592x592:	12	
Filter element 287x592:	6	
Maintenance:	DS - dust side	
Air flow:	11.9840 m^3/s	

Crossflow heatexchanger **G 2** **FU 8** **Accessory**

See above

EA - Empty section **G 7** **FU 11** **Accessory**

Specification: Empty section

Length: 16 AT4 raster

EA - Damper outside **G 7** **FU 0** **Accessory**

Type:	Damper outside	- Damper leak tight class 2
Width:	3,748 mm	- coated Damper divided

Data sheet

Project: **238351 - 001-00-489136** Pos.: **1** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.01 - (Rev 05 // Recirc + Sectional, No Controls - 14.02.2025) Piece: 1 Edition Date: 20/02/2025

Type: AT4-F 49x20/49x20 - Interior Editor: James Dean

Height:	1,530 mm	- Number of motor shaft: 2
Connector:	A30	
Needed torque:	45.00 Nm	
Design pressure:	6 Pa	
Actuator type:	linkage outside one-sided	
Number of axis:	2	
Axis type:	square 15mm	

ERP information

Calculated ERP compliance	Compliant 2018	
Type	NRVU-BVU	
Heat recovery	Cross flow heat exchanger	
Internal SFP	672	W/(m^3/s)
Dp int supply	256	Pa
Dp int exhaust	203	Pa
Fan speed controlled		
max. outer leak rate (+/- 400 Pa)	0.2	%

Unit features:

Frame material AT4-F	Alu
Panel Isolation	Decoupled [T2(M)]
MB-Reference	AT4-F-02
Panel material	7001/7001
Unit corner material (frame)	Zinc
Siphon	Standard siphon
Transport	Standard transport
Base frame	300 mm

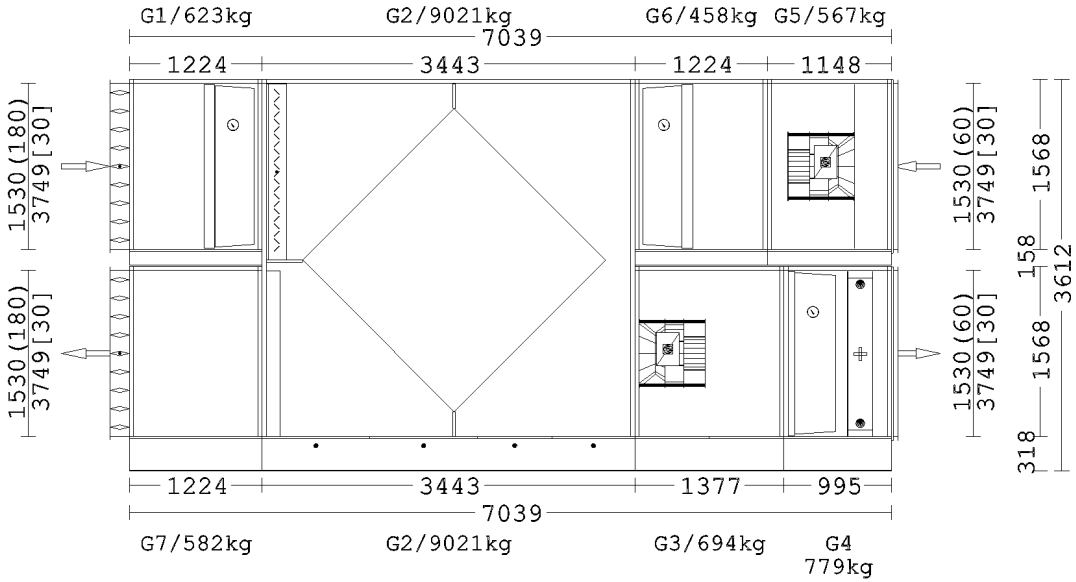
Unit information

AHU SFPv = 2.113 w/l/s

Dimensions **Transport weight**

Length:	7,038 mm	Width:	3,825 mm	Height:	3,612 mm	12,723 kg

***** END OF LIST *****

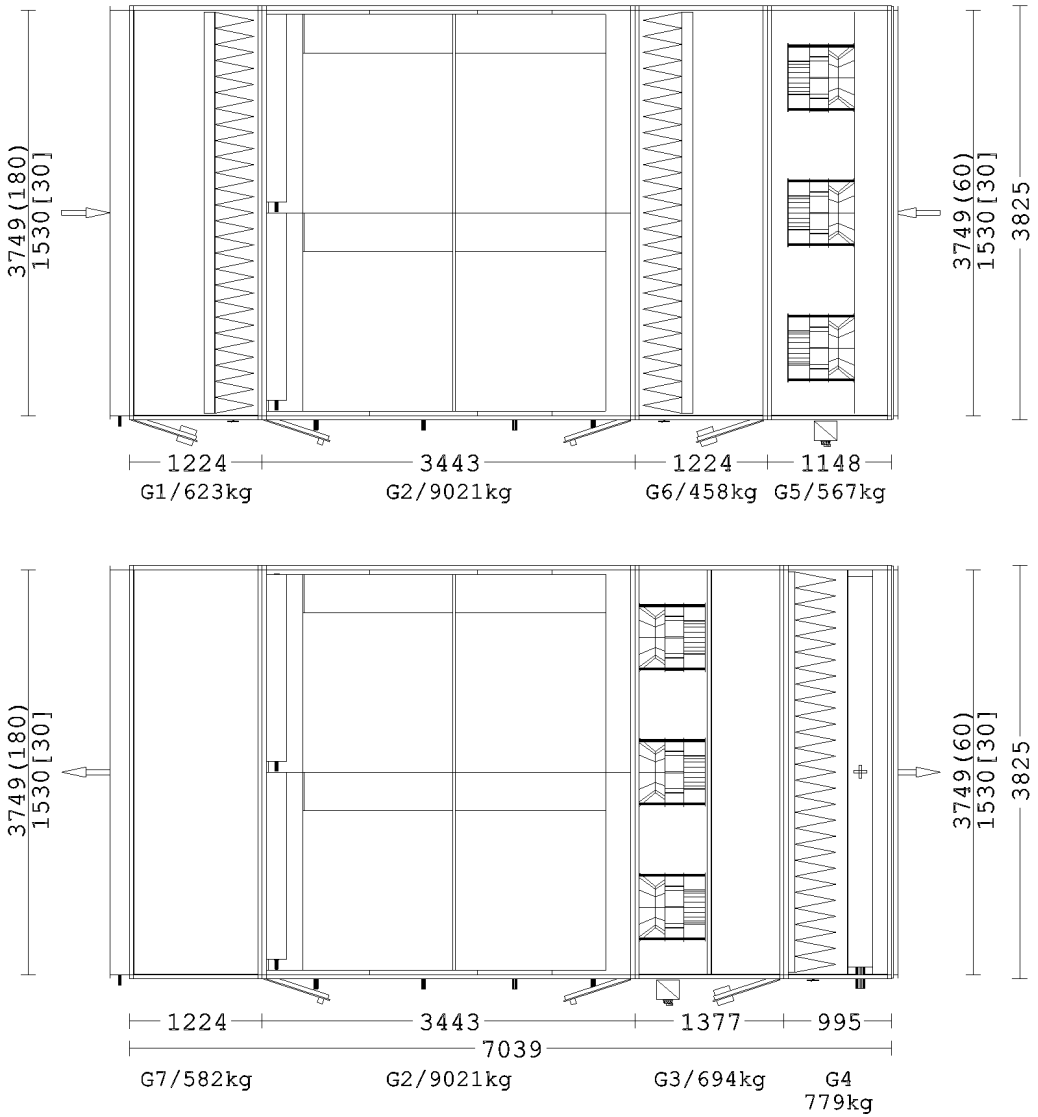


Attention: Transport on base frame! Lid Inside 7001 / Lid Outside 7001 / Decoupled [T2(M)], Frame: Alu, Type: indoor, Weight: 12,723 kg

Front view

If not mentioned otherwise, dimension inside flange to unit38 mm. Round bracket () for single/total flange length, rectangular bracket [] for flange dimensions.Please note an all-round panel overhang (approx. 16mm)!

AL-KO THERM GMBH D-89343 Jettingen-Scheppach James Dean	Project:	238351 - 001-00-489136	Pos. / GS-pos.:	1 /
	Proj. descr.:	ElmwoodLeisure Centre	Order #:	
	Unit:	AHU.R.01 - (Rev 05 // Recirc + Sectional, No Controls - 14.0	Edition Date:	20/02/2025
	Type:	AT4-F 49x20/49x20 - Interior	Scale/Software	1:68 / 3.87.02



Attention: Transport on base frame! Lid Inside 7001 / Lid Outside 7001 / Decoupled [T2(M)], Frame: Alu, Type: indoor, Weight: 12,723 kg

Top view

If not mentioned otherwise, dimension inside flange to unit38 mm. Round bracket () for single/total flange length, rectangular bracket [] for flange dimensions.Please note an all-round panel overhang (approx. 16mm)!

AL-KO THERM GMBH D-89343 Jettingen-Scheppach James Dean	Project:	238351 - 001-00-489136	Pos. / GS-pos.:	1 /
	Proj. descr.:	ElmwoodLeisure Centre	Order #:	
	Unit:	AHU.R.01 - (Rev 05 // Recirc + Sectional, No Controls - 14.0	Edition Date:	20/02/2025
	Type:	AT4-F 49x20/49x20 - Interior	Scale/Software	1:68 / 3.87.02

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trane.co.uk

Manufacturer

AL-KO THERM GMBH
Hauptstrasse 248-250
D-89343 Jettingen-Scheppach
alko-airtechnology.com

James Dean / External

Tel.:

Sound emission

Project: **238351 - 001-00-489136**

Pos.: **1**

Quotation

Order #:

GS-pos.:

Proj. descr.: ElmwoodLeisure Centre

Date Printed: 21.02.2025

Unit: AHU.R.01 - (Rev 05 // Recirc + Sectional, No Controls - 14.02.2025)

Piece: 1

Edition Date: 20/02/2025

Type: AT4-F 49x20/49x20 - Interior

Editor: James Dean

Exhaust air Volume flow: 11.9840 m^3/s tpd: 683 Pa

Octave:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**sum P.**	Unit
Outlet: sound power level in outlet cross section.										
Lw4	**75.6**	**80.0**	**78.2**	**82.7**	**79.9**	**77.2**	**75.6**	**69.5**	87.7	dB
LwA4	49.4	63.9	69.6	79.5	79.9	78.4	76.6	68.4	**85.1**	dB(A)
Intake: sound power level in the inlet cross section.										
Lw3	**71.4**	**76.0**	**79.3**	**80.2**	**77.7**	**78.4**	**77.9**	**70.4**	86.5	dB
LwA3	45.2	59.9	70.7	77.0	77.7	79.6	78.9	69.3	**84.8**	dB(A)
Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
Lw2	**66.2**	**65.7**	**62.2**	**55.8**	**51.8**	**47.9**	**46.5**	**39.0**	70.1	dB
LwA2	40.0	49.6	53.6	52.5	51.8	49.1	47.5	37.9	**59.1**	dB(A)

Supply air Volume flow: 11.4130 m^3/s tpd: 952 Pa

Octave:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**sum P.**	Unit
Outlet: sound power level in outlet cross section.										
Lw4	**78.2**	**82.8**	**76.8**	**81.6**	**79.3**	**75.0**	**72.4**	**62.6**	87.7	dB
LwA4	52.0	66.7	68.2	78.4	79.3	76.2	73.4	61.5	**83.6**	dB(A)
Intake: sound power level in the inlet cross section.										
Lw3	**74.2**	**79.2**	**78.2**	**77.2**	**74.8**	**73.4**	**72.4**	**65.4**	84.8	dB
LwA3	48.0	63.1	69.6	74.0	74.8	74.6	73.4	64.3	**80.8**	dB(A)
Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
Lw2	**69.2**	**69.5**	**62.8**	**56.0**	**53.0**	**48.0**	**46.1**	**39.0**	72.9	dB
LwA2	43.0	53.4	54.1	52.8	53.0	49.2	47.1	37.9	**60.1**	dB(A)

Sum

Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
LwSum	**71.0**	**71.0**	**65.5**	**58.9**	**55.5**	**51.0**	**49.3**	**42.0**	74.8	dB
LwASum	44.8	54.9	56.9	55.7	55.5	52.2	50.3	40.9	**62.6**	dB(A)

Branch office:

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James Dean / External

Manufacturer

AL-KO THERM GMBH
Hauptstrasse 248-250
D-89343 Jettingen-Scheppach
alko-airtechnology.com

Tel.:

Data sheet

Project: **238351 - 001-00-489136**
Order #:
Proj. descr.: ElmwoodLeisure Centre
Unit: AHU.R.02 - (Rev 02 // No Controls - 19.02.2025) Piece: 1
Type: AT4-F 20x12/20x12 - Interior

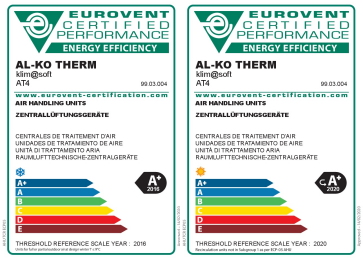
Pos.: **2**
GS-pos.:
Date Printed: 21.02.2025
Edition Date: 20/02/2025
Editor: James Dean

Quotation

Note: All data relate to standard conditions for air density = 1.2 kg/m^3

Unit data	**Supply air**		**Exhaust air**	
	Target value	Actual	Target value	Actual
Air flow	2.6700	2.6700 m^3/s	1.7589	1.7589 m^3/s
External pressure	455	455 Pa	410	410 Pa
Internal pressure	501	501 Pa	159	159 Pa
Air velocity		1.9 m/s		1.3 m/s

Eurovent Efficiency Wint./Sum.	A+ (2016) / A+ (2020)
Climate zone	United Kingdom / BIRMINGHAM
RLT energy efficiency class	A (2018)
Calculated ERP compliance	Compliant 2018



SA - Damper outside	**G 1**	**FU 0**
Type:	Damper outside	
Width:	1,530	mm
Height:	918	mm
Connector:	A30	
Needed torque:	10.00	Nm
Design pressure:	5	Pa
Actuator type:	linkage outside one-sided	
Number of axis:	1	
Axis type:	square 15mm	

Accessory
- Damper leak tight class 2
- coated

SA - Filter	**G 1**	**FU 1**
Type:	BF - Bag Filter	
Class:	ePM10-55 % / M5	
eff. class:	E	
Design pressure:	70	Pa
Initial pressure:	35	Pa
End pressure:	105	Pa
air velocity cross section:	1.9	m/s
Filter surface:	13.0	m^2
Filter length:	360	mm
Filter element 592x592:	2	
Filter element 287x592:	3	

Accessory
- Maintenance door with built in pressure gage
- Hand Lever lockable
- Hand Lever
- Indicating pressure gauge 250 Pa
- Quick change filter frame coated

Filter element 287x287:	1	
Maintenance:	F - quick change filter frame	
Air flow:	2.6700	m^3/s

SA - Filter	**G 1**	**FU 2**	**Accessory**
Type:	BF - Bag Filter		- Maintenance door with built in pressure gage
Class:	ePM1-60 % / F7		- Hand Lever lockable
eff. class:	D		- Hand Lever
Design pressure:	137	Pa	- Indicating pressure gauge 250 Pa
Initial pressure:	87	Pa	- Quick change filter frame coated
End pressure:	187	Pa	
air velocity cross section:	1.9	m/s	
Filter surface:	13.7	m^2	
Filter length:	380	mm	
Filter element 592x592:	2		
Filter element 287x592:	3		
Filter element 287x287:	1		
Maintenance:	F - quick change filter frame		
Air flow:	2.6700	m^3/s	

Crossflow heatexchanger	**G 2**	**FU 8**	**Accessory**
HRS type	Crossflow heat exchanger		
Type:	Al - epoxy		- PHX Delivered Loose
operating state:	Winter		- Maintenance door
Total Thermal Capacity:	62.9	kW	- Base tub powder coated
Thermal efficiency:	67.0	%	- Stiffening plate, powder coated
HRS class (EN13053/2020):	H2		- droplet eliminator convertible
Balanced Efficiency (dry / 5-25^{o}C):	73.1	%	- Plate heat exchanger with epoxy coating
Total torque shutter:	12	Nm	- Bypass flap
Circulation shutter torque:	5	Nm	- recirculating air flap
Delta pressure of circulation shutter:	174	Pa	
Supply air:	2.6700	m^3/s	
Δ Pressure (S):	207	Pa	
Pressure loss damper:	4	Pa	
Temperature IN:	-5.0	^{o}C	
Rel. Humidity IN:	99.0	%	
Abs. Humidity IN:	2.5	g/kgL	
Temperature OUT (S):	14.4	^{o}C	
Rel. Humidity OUT:	24.2	%	
Abs. Humidity OUT:	2.5	g/kgL	
Exhaust air:	1.7589	m^3/s	
Δ Pressure (E):	101	Pa	
Temperature IN:	24.0	^{o}C	
Rel. Humidity IN:	40.0	%	
Abs. Humidity IN:	7.4	g/kgL	
Temperature OUT (E):	2.3	^{o}C	
Rel. Humidity OUT:	100.0	%	
Abs. Humidity OUT:	4.5	g/kgL	
Pressure difference loss eliminator:	8	Pa	

Project: **238351 - 001-00-489136** Pos.: **2** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.02 - (Rev 02 // No Controls - 19.02.2025) Piece: 1 Edition Date: 20/02/2025

Type: AT4-F 20x12/20x12 - Interior Editor: James Dean

SA - Fan - Wheel - EC	**G 3**	**FU 3**	**Accessory**
Fan type:	Wheel - EC 500		- Volume flow measuring for fan
Air flow:	9,612	m^3/h	- Wiring repair switch/fan
Static increase of pressure:	956	Pa	- Repair switch
Casing pressure loss:	24	Pa	- Maintenance door
Static efficiency:	71	%	- Hand Lever lockable w. Door Catch
Efficiency class N (EU 327/2011):	78.0		- Hand Lever
Speed:	1,957	1/min	- Fan pressure wall powder-coated
Max. speed:	2,150	1/min	
- *Motor*			
Control type:	EC - controlled		
Speed:	1,957	1/min	
Control voltage:	9.1	V	
Volume / rotation reserve:	10	%	
Power input:	3.61	kW	
Efficiency class:	IE 5		
SFP value (GEG 2020):	930	$W/(m^3/s)$	
SFPv (EN 16798-3):	1,230	$W/(m^3/s)$	
SFP class:	SFP 3		
Speed Class:	V3		
Max. input power:	5.1	kW	
Nominal rated voltage:	400	V	
Power Frequency:	50	Hz	
Nominal rated capacity:	4.60	kW	
Nominal rated current:	6.00	A	
Protection class:	IP54		
Overload protection:	Power control		
Insulation class:	F		
P Class:	P1		
System Efficiency:	69	%	
Sound Power Level Inlet:	76.8	dB(A)	
Sound Power Level Outlet:	85.8	dB(A)	

Octave band:	63	125	250	500	1k	2k	4k	8k	Hz
Lw Inlet:	74	79	78	75	70	67	64	65	dB
Lw Outlet:	78	88	82	84	80	78	75	71	dB

Air flow:	2.6700	m^3/s
K factor:	280	
volume flow [m^3/h]:	K factor x $\sqrt{\text{nozzle-pressure}}$ [Pa]	

SA - Heating coil	**G 3**	**FU 4**	**Accessory**
Type:	PWW - Copper/Aluminium - A		
Total Thermal Capacity:	61.92	kW	
pressure loss (dry):	54	Pa	
Air flow speed:	2.28	m/s	
Temperature Inlet:	15.0	^oC	
Rel. Humidity Inlet:	50.0	%	
Abs. Humidity Inlet:	5.3	g/kgL	
Temperature Outlet:	34.0	^oC	
Power reserve:	8	%	
Rel. Humidity Outlet:	16.0	%	

Abs. Humidity Outlet:	5.3	g/kgL
Medium:	Water	
Medium temperature IN:	45.0	°C
Medium temperature OUT:	38.0	°C
Medium flow quantity:	7,704	l/h
Δp medium:	14.4	kPa
Δ fins:	2.5	mm
Rows:	3	
Circuits:	17	
Content:	12.6	l
Pipes:	Copper	
Fins:	Aluminium	
Header:	Copper	
Frame:	Galvanised steel	
Frame to hold frost protection equipment:	Without	
Connection type:	A - water connection straight sidewards	
Connection width:	DN 40 (R 1-1/2)	
Connections per circuit:	2	
Air flow:	2.6700	m^3/s

SA - Connection frame with rubber G 3 FU 0

Type:	Connection frame with rubber	
Width:	1,530	mm
Height:	918	mm
Depth:	60	mm
Design:	7001	
Connector:	A30	

Accessory

- Connecting Frame powder coated

EA - Connection frame with rubber G 4 FU 0

Type:	Connection frame with rubber	
Width:	1,530	mm
Height:	918	mm
Depth:	60	mm
Design:	7001	
Connector:	A30	

Accessory

- Connecting Frame powder coated

EA - Filter G 4 FU 5

Type:	BF - Bag Filter	
Class:	ePM10-55 % / M5	
eff. class:	E	
Design pressure:	38	Pa
Initial pressure:	19	Pa
End pressure:	56	Pa
air velocity cross section:	1.3	m/s
Filter surface:	13.0	m^2
Filter length:	360	mm
Filter element 592x592:	2	
Filter element 287x592:	3	
Filter element 287x287:	1	

Accessory

- Maintenance door with built in pressure gage
- Hand Lever lockable
- Hand Lever
- Indicating pressure gauge 250 Pa
- Quick change filter frame coated

Maintenance:	F - quick change filter frame
Air flow:	1.7589 m^3/s

Crossflow heatexchanger **G 2** **FU 8** **Accessory**

See above

EA - Empty section **G 5** **FU 0** **Accessory**

Length:	3 AT4 raster

EA - Fan - Wheel - EC **G 5** **FU 9** **Accessory**

Fan type:	Wheel - EC 500	- Volume flow measuring for fan
Air flow:	6,332 m^3/h	- Wiring repair switch/fan
Static increase of pressure:	569 Pa	- Repair switch
Casing pressure loss:	10 Pa	- Maintenance door
Static efficiency:	70 %	- Hand Lever lockable w. Door Catch
Efficiency class N (EU 327/2011):	80.0	- Hand Lever
Speed:	1,444 1/min	- Fan pressure wall powder-coated
Max. speed:	1,950 1/min	
- *Motor*		
Control type:	EC - controlled	
Speed:	1,444 1/min	
Control voltage:	7.4 V	
Volume / rotation reserve:	35 %	
Power input:	1.44 kW	
Efficiency class:	IE 5	
SFP value (GEG 2020):	491 $W/(m^3/s)$	
SFPv (EN 16798-3):	791 $W/(m^3/s)$	
SFP class:	SFP 1	
Speed Class:	V1	
Max. input power:	2.2 kW	
Nominal rated voltage:	400 V	
Power Frequency:	50 Hz	
Nominal rated capacity:	3.50 kW	
Nominal rated current:	4.40 A	
Protection class:	IP54	
Overload protection:	Power control	
Insulation class:	F	
P Class:	P1	
System Efficiency:	68 %	
Sound Power Level Inlet:	69.3 dB(A)	
Sound Power Level Outlet:	77.7 dB(A)	

Octave band:	63	125	250	500	1k	2k	4k	8k	Hz
Lw Inlet:	65	77	70	67	62	59	55	52	dB
Lw Outlet:	69	81	74	75	73	70	66	60	dB

Air flow:	1.7589 m^3/s
K factor:	280
volume flow [m^3/h]:	K factor x $\sqrt{\text{nozzle-pressure}}$ [Pa]

EA - Damper outside **G 5** **FU 0** **Accessory**

Data sheet

Project: **238351 - 001-00-489136** Pos.: **2** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.02 - (Rev 02 // No Controls - 19.02.2025) Piece: 1 Edition Date: 20/02/2025

Type: AT4-F 20x12/20x12 - Interior Editor: James Dean

Type:	Damper outside	- Damper leak tight class 2
Width:	1,530 mm	- coated
Height:	918 mm	
Connector:	A30	
Needed torque:	10.00 Nm	
Design pressure:	2 Pa	
Actuator type:	linkage outside one-sided	
Number of axis:	1	
Axis type:	square 15mm	

ERP information

Calculated ERP compliance	Compliant 2018
Type	NRVU-BVU
Heat recovery	Cross flow heat exchanger
Internal SFP	602 W/(m^3/s)
Dp int supply	294 Pa
Dp int exhaust	120 Pa
Fan speed controlled	
max. outer leak rate (+/- 400 Pa)	0.4 %

Unit features:

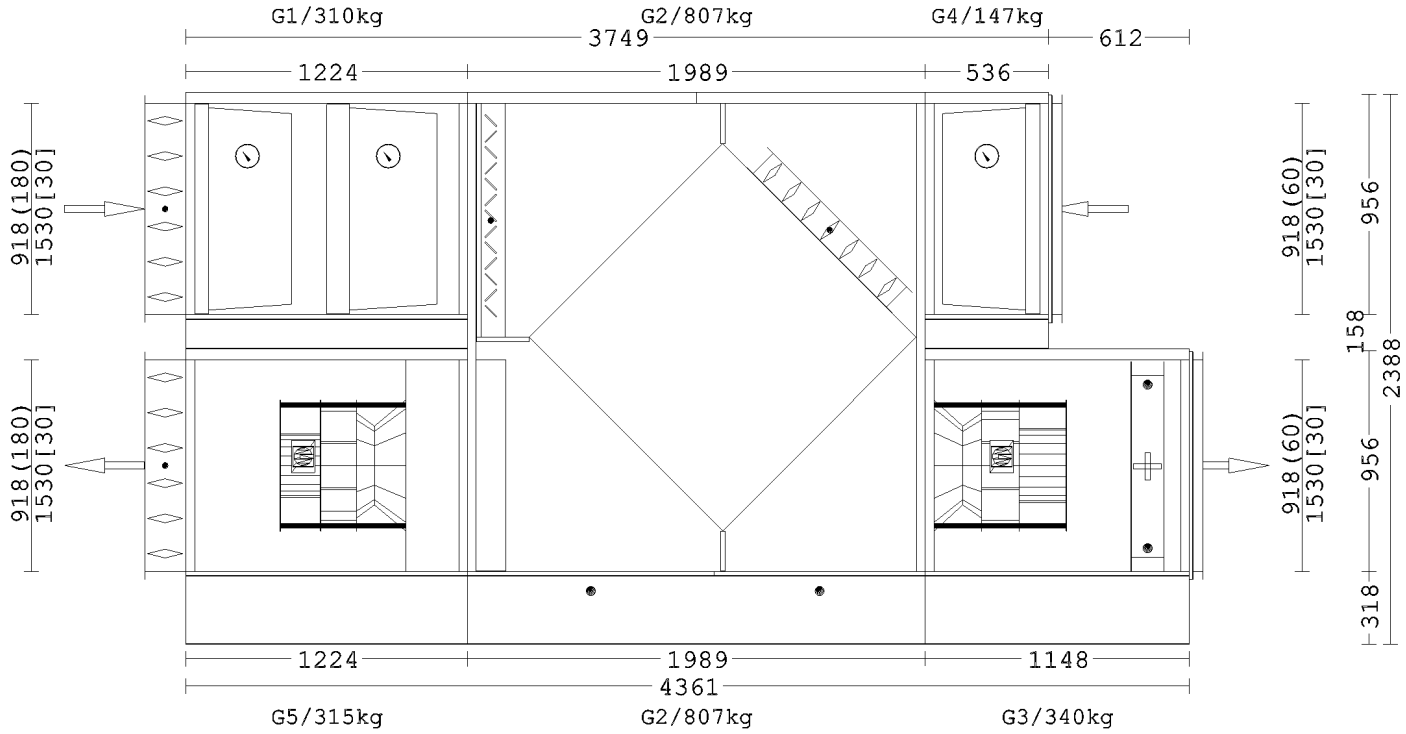
Frame material AT4-F	Alu
Panel Isolation	Decoupled [T2(M)]
MB-Reference	AT4-F-04
Panel material	7001/7001
Unit corner material (frame)	Alu / TB2
Siphon	Standard siphon
Transport	Standard transport
Base frame	300 mm

Unit information

AHU SFPv = 1.518 w/l/s

Dimensions						**Transport weight**
Length:	4,360 mm	Width:	1,606 mm	Height:	2,388 mm	1,919 kg

***** END OF LIST *****

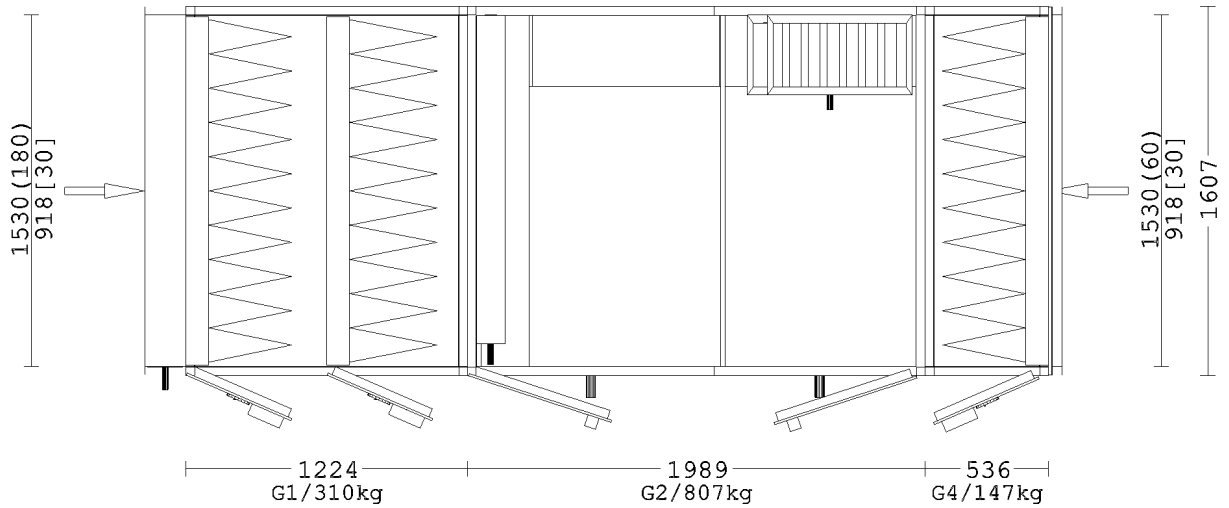


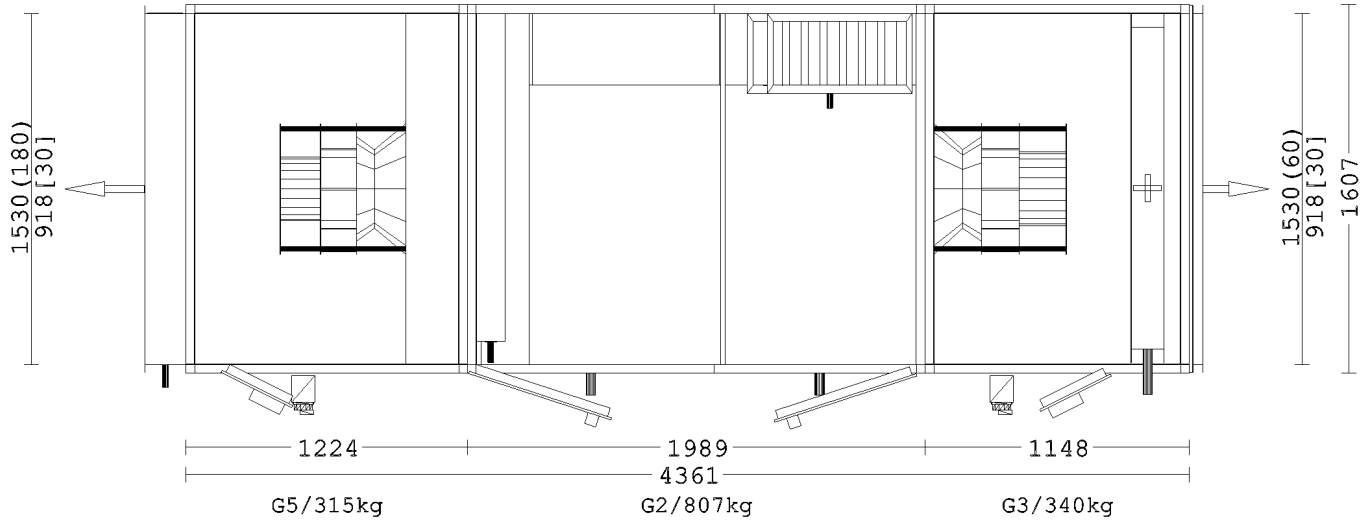
Attention: Transport on base frame! Lid Inside 7001 / Lid Outside 7001 / Decoupled [T2(M)], Frame: Alu, Type: indoor, Weight: 1,919 kg

Front view

If not mentioned otherwise, dimension inside flange to unit38 mm. Round bracket () for single/total flange length, rectangular bracket [] for flange dimensions.Please note an all-round panel overhang (approx. 16mm)!

AL-KO THERM GMBH D-89343 Jettingen-Scheppach James Dean	Project:	238351 - 001-00-489136	Pos. / GS-pos.:	2 /
	Proj. descr.:	ElmwoodLeisure Centre	Order #:	
	Unit:	AHU.R.02 - (Rev 02 // No Controls - 19.02.2025)	Edition Date:	20/02/2025
	Type:	AT4-F 20x12/20x12 - Interior	Scale/Software	1:32 / 3.87.02





Attention: Transport on base frame! Lid Inside 7001 / Lid Outside 7001 / Decoupled [T2(M)], Frame: Alu, Type: indoor, Weight: 1,919 kg

Top view

If not mentioned otherwise, dimension inside flange to unit38 mm. Round bracket () for single/total flange length, rectangular bracket [] for flange dimensions.Please note an all-round panel overhang (approx. 16mm)!

AL-KO THERM GMBH D-89343 Jettingen-Scheppach James Dean	Project:	238351 - 001-00-489136	Pos. / GS-pos.:	2 /
	Proj. descr.:	ElmwoodLeisure Centre	Order #:	
	Unit:	AHU.R.02 - (Rev 02 // No Controls - 19.02.2025)	Edition Date:	20/02/2025
	Type:	AT4-F 20x12/20x12 - Interior	Scale/Software	1:32 / 3.87.02

Branch office:

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trane.co.uk

Manufacturer

AL-KO THERM GMBH
Hauptstrasse 248-250
D-89343 Jettingen-Scheppach
alko-airtechnology.com

James Dean / External

Tel.:

Sound emission

Project: **238351 - 001-00-489136**

Pos.: **2**

Quotation

Order #:

GS-pos.:

Proj. descr.: ElmwoodLeisure Centre

Date Printed: 21.02.2025

Unit: AHU.R.02 - (Rev 02 // No Controls - 19.02.2025) Piece: 1

Edition Date: 20/02/2025

Type: AT4-F 20x12/20x12 - Interior

Editor: James Dean

Exhaust air Volume flow: 1.7589 m^3/s tpd: 569 Pa

Octave:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**sum P.**	Unit
Outlet: sound power level in outlet cross section.										
Lw4	**68.7**	**81.4**	**73.9**	**75.1**	**72.6**	**69.5**	**66.1**	**60.4**	83.7	dB
LwA4	42.5	65.3	65.3	71.9	72.6	70.8	67.1	59.3	**77.7**	dB(A)
Intake: sound power level in the inlet cross section.										
Lw3	**62.3**	**71.5**	**62.7**	**57.4**	**49.7**	**44.6**	**39.7**	**35.6**	72.7	dB
LwA3	36.1	55.4	54.1	54.2	49.7	45.9	40.7	34.5	**60.1**	dB(A)
Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
Lw2	**59.2**	**66.2**	**54.6**	**44.1**	**38.3**	**31.9**	**27.9**	**22.7**	67.3	dB
LwA2	33.0	50.1	46.0	40.9	38.3	33.1	28.9	21.6	**52.2**	dB(A)

Supply air Volume flow: 2.6700 m^3/s tpd: 956 Pa

Octave:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**sum P.**	Unit
Outlet: sound power level in outlet cross section.										
Lw4	**77.8**	**87.3**	**80.9**	**82.2**	**78.2**	**75.4**	**71.5**	**64.1**	90.0	dB
LwA4	51.6	71.2	72.3	79.0	78.2	76.6	72.5	63.0	**83.8**	dB(A)
Intake: sound power level in the inlet cross section.										
Lw3	**70.9**	**72.7**	**68.8**	**61.6**	**53.6**	**47.8**	**43.1**	**43.9**	76.0	dB
LwA3	44.7	56.6	60.2	58.4	53.6	49.0	44.1	42.8	**64.1**	dB(A)
Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
Lw2	**68.3**	**70.4**	**62.9**	**52.0**	**46.1**	**40.2**	**36.3**	**34.7**	73.0	dB
LwA2	42.1	54.3	54.3	48.8	46.1	41.4	37.3	33.6	**58.4**	dB(A)

Sum

Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
LwSum	**68.8**	**71.8**	**63.5**	**52.6**	**46.8**	**40.8**	**36.9**	**34.9**	74.0	dB
LwASum	42.6	55.7	54.9	49.4	46.8	42.0	37.9	33.8	**59.3**	dB(A)

Branch office:

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Adam Finn / External

Manufacturer

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D-89343 Jettingen-Scheppach
alko-airtechnology.com
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Data sheet

Project: **238351 - 001-00-489136**
Order #:
Proj. descr.: ElmwoodLeisure Centre
Unit: AHU.R.03 - (Rev 03 // No Controls - 21.02.2025)
Single Piece
Type: AT4-F 24x12/24x12 - Weatherproof

Piece: 1

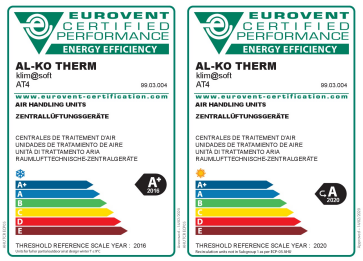
Pos.: **3**
GS-pos.:
Date Printed: 21.02.2025
Edition Date: 21/02/2025
Editor: Adam Finn

Quotation

Note: All data relate to standard conditions for air density = 1.2 kg/m^3

Unit data	**Supply air**		**Exhaust air**	
	Target value	Actual	Target value	Actual
Air flow	3.1089	3.1089 m^3/s	3.3300	3.3300 m^3/s
External pressure	420	420 Pa	385	385 Pa
Internal pressure	373	373 Pa	244	244 Pa
Air velocity		1.8 m/s		2.0 m/s

Eurovent Efficiency Wint./Sum. A+ (2016) / A (2020)
Climate zone United Kingdom / BIRMINGHAM
Calculated ERP compliance Compliant 2018



SA - louvre covering	**G 1**	**FU 0**	**Accessory**
Type:	louvre covering		
Width:	24 AT4 raster		
Height:	12 AT4 raster		
Design pressure:	11 Pa		

SA - Damper inside	**G 1**	**FU 0**	**Accessory**
Type:	Damper inside		- Damper leak tight class 2
Width:	1,647 mm		
Height:	841 mm		
Connector:	A20		
Needed torque:	12.00 Nm		
Design pressure:	6 Pa		
Actuator type:	linkage outside one-sided		
Number of axis:	1		
Axis type:	square 15mm		

SA - Empty section	**G 1**	**FU 13**	**Accessory**
Specification:	Empty section		- Maintenance panel
Length:	4 AT4 raster		

Data sheet

Project: **238351 - 001-00-489136** Pos.: **3** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.03 - (Rev 03 // No Controls - 21.02.2025) Single Piece Piece: 1 Edition Date: 21/02/2025

Type: AT4-F 24x12/24x12 - Weatherproof Editor: Adam Finn

SA - Filter	**G 1**	**FU 2**	**Accessory**
Type:	BF - Bag Filter		- Maintenance door with built in pressure gage
Class:	ePM10-55 % / M5		- Hand Lever lockable
eff. class:	E		- Hand Lever
Design pressure:	67	Pa	- Indicating pressure gauge 250 Pa
Initial pressure:	34	Pa	- Quick change filter frame
End pressure:	101	Pa	
air velocity cross section:	1.8	m/s	
Filter surface:	15.6	m^2	
Filter length:	360	mm	
Filter element 592x592:	3		
Filter element 287x592:	3		
Maintenance:	F - quick change filter frame		
Air flow:	3.1089	m^3/s	

SA - Filter	**G 1**	**FU 5**	**Accessory**
Type:	BF - Bag Filter		- Maintenance door with built in pressure gage
Class:	ePM1-60 % / F7		- Hand Lever lockable
eff. class:	D		- Hand Lever
Design pressure:	134	Pa	- Indicating pressure gauge 250 Pa
Initial pressure:	84	Pa	- Quick change filter frame
End pressure:	184	Pa	
air velocity cross section:	1.8	m/s	
Filter surface:	16.4	m^2	
Filter length:	380	mm	
Filter element 592x592:	3		
Filter element 287x592:	3		
Maintenance:	F - quick change filter frame		
Air flow:	3.1089	m^3/s	

Rotary heatex	**G 2**	**FU 8**	**Accessory**
HRS type	Rotary heat exchanger		
Type:	Standard rotor		- Maintenance door
operating state:	1		- Controller mounted and leaded motor
Total Thermal Capacity:	99.0	kW	
Thermal efficiency:	77.3	%	
Humidity exchange rate:	41.2	%	
HRS class (EN13053/2020):	H1		
Balanced Efficiency (dry / 5-25^{o}C):	75.3	%	
Supply air:	3.1089	m^3/s	
Δ Pressure (S) :	116.8	Pa	
Temperature IN:	-5.0	^{o}C	
Rel. Humidity IN:	99.0	%	
Abs. Humidity IN:	2.5	g/kgL	
Temperature Out:	16.6	^{o}C	
Rel. Humidity OUT:	36.9	%	
Abs. Humidity OUT:	4.3	g/kgL	
Exhaust air:	3.3300	m^3/s	
Δ Pressure (E):	125.6	Pa	

Project: **238351 - 001-00-489136** Pos.: **3** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.03 - (Rev 03 // No Controls - 21.02.2025) Single Piece Piece: 1 Edition Date: 21/02/2025

Type: AT4-F 24x12/24x12 - Weatherproof Editor: Adam Finn

Temperature IN:	23.0	°C
Rel. Humidity IN:	40.0	%
Abs. Humidity IN:	7.0	g/kgL
Temperature Out:	4.0	°C
Rel. Humidity OUT:	95.0	%
Abs. Humidity OUT:	4.8	g/kgL
Drive output:	110	W
Current:	1.2	A
Voltage:	230	V
Phase count:	3-phase	
Supply air:		
Exhaust air:		
EATR:	1.5	%
OACF:	1.05	

SA - Empty section **G 3** **FU 0** **Accessory**

Length: 5 AT4 raster

SA - Fan - Wheel - EC **G 3** **FU 3** **Accessory**

Fan type:	Wheel - EC 560		- Volume flow measuring for fan
Air flow:	11,192	m^3/h	- Wiring repair switch/fan
Static increase of pressure:	793	Pa	- Repair switch
Casing pressure loss:	21	Pa	
Static efficiency:	71	%	
Efficiency class N (EU 327/2011):	78.0		
Speed:	1,600	1/min	
Max. speed:	1,860	1/min	
- *Motor*			
Control type:	EC - controlled		
Speed:	1,600	1/min	
Control voltage:	8.6	V	
Volume / rotation reserve:	16	%	
Power input:	3.49	kW	
Efficiency class:	IE 5		
SFP value (GEG 2020):	704	$W/(m^3/s)$	
SFPv (EN 16798-3):	1,004	$W/(m^3/s)$	
SFP class:	SFP 2		
Speed Class:	V3		
Max. input power:	5.0	kW	
Nominal rated voltage:	400	V	
Power Frequency:	50	Hz	
Nominal rated capacity:	5.20	kW	
Nominal rated current:	6.60	A	
Protection class:	IP54		
Overload protection:	Power control		
Insulation class:	F		
P Class:	P1		
System Efficiency:	69	%	
Sound Power Level Inlet:	74.2	dB(A)	
Sound Power Level Outlet:	82.3	dB(A)	

Project: **238351 - 001-00-489136** Pos.: **3** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.03 - (Rev 03 // No Controls - 21.02.2025) Single Piece Piece: 1 Edition Date: 21/02/2025

Type: AT4-F 24x12/24x12 - Weatherproof Editor: Adam Finn

Octave band:	63	125	250	500	1k	2k	4k	8k	Hz
Lw Inlet:	73	77	73	71	69	65	62	63	dB
Lw Outlet:	76	83	78	80	77	74	71	67	dB

Air flow: 3.1089 m^3/s

K factor: 355

volume flow [m^3/h]: K factor x $\sqrt{\text{nozzle-pressure}}$ [Pa]

SA - Empty section	**G 3**	**FU 9**	**Accessory**
Specification:	Empty section		- Maintenance door
Length:	7	AT4 raster	- Hand Lever lockable w. Door Catch
			- Hand Lever

SA - Heating coil	**G 3**	**FU 4**	**Accessory**
Type:	PWW - Copper/Aluminium - A		
Total Thermal Capacity:	18.97	kW	
pressure loss (dry):	17	Pa	
Air flow speed:	2.15	m/s	
Temperature Inlet:	15.0	^oC	
Rel. Humidity Inlet:	50.0	%	
Abs. Humidity Inlet:	5.3	g/kgL	
Temperature Outlet:	20.0	^oC	
Power reserve:	56	%	
Rel. Humidity Outlet:	36.4	%	
Abs. Humidity Outlet:	5.3	g/kgL	
Medium:	Water		
Medium temperature IN:	45.0	^oC	
Medium temperature OUT:	38.0	^oC	
Medium flow quantity:	2,340	l/h	
Δp medium:	15.5	kPa	
Δ fins:	3.0	mm	
Rows:	1		
Circuits:	5		
Content:	5.2	l	
Pipes:	Copper		
Fins:	Aluminium		
Header:	Copper		
Frame:	Galvanised steel		
Frame to hold frost protection equipment:	Without		
Connection type:	A - water connection straight sidewards		
Connection width:	DN 25 (R 1)		
Connections per circuit:	2		
Air flow:	3.1089	m^3/s	

SA - Connection frame with rubber	**G 3**	**FU 0**	**Accessory**
Type:	Connection frame with rubber		- Connecting Frame powder coated
Width:	1,836	mm	
Height:	918	mm	
Depth:	60	mm	

Design:	7001
Connector:	A30

EA - Connection frame with rubber **G 4** **FU 0** **Accessory**

Type:	Connection frame with rubber
Width:	1,836 mm
Height:	918 mm
Depth:	60 mm
Design:	7001
Connector:	A30

- Connecting Frame powder coated

EA - Filter **G 4** **FU 6** **Accessory**

Type:	BF - Bag Filter
Class:	ePM10-55 % / M5
eff. class:	E
Design pressure:	75 Pa
Initial pressure:	37 Pa
End pressure:	112 Pa
air velocity cross section:	2.0 m/s
Filter surface:	15.6 m^2
Filter length:	360 mm
Filter element 592x592:	3
Filter element 287x592:	3
Maintenance:	F - quick change filter frame
Air flow:	3.3300 m^3/s

- Maintenance door with built in pressure gage
- Hand Lever lockable
- Hand Lever
- Indicating pressure gauge 250 Pa
- Quick change filter frame

Rotary heatex **G 2** **FU 8** **Accessory**

See above

EA - Empty section **G 5** **FU 0** **Accessory**

Length:	5 AT4 raster

EA - Fan - Wheel - EC **G 5** **FU 7** **Accessory**

Fan type:	Wheel - EC 560
Air flow:	11,988 m^3/h
Static increase of pressure:	629 Pa
Casing pressure loss:	24 Pa
Static efficiency:	67 %
Efficiency class N (EU 327/2011):	79.0
Speed:	1,557 1/min
Max. speed:	1,780 1/min
- *Motor*	
Control type:	EC - controlled
Speed:	1,557 1/min
Control voltage:	8.7 V
Volume / rotation reserve:	14 %
Power input:	3.12 kW

- Volume flow measuring for fan
- Wiring repair switch/fan
- Repair switch

Project: **238351 - 001-00-489136** Pos.: **3** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.03 - (Rev 03 // No Controls - 21.02.2025) Single Piece Piece: 1 Edition Date: 21/02/2025

Type: AT4-F 24x12/24x12 - Weatherproof Editor: Adam Finn

Efficiency class:							IE 5		
SFP value (GEG 2020):							581	$W/(m^3/s)$	
SFPv (EN 16798-3):							881	$W/(m^3/s)$	
SFP class:							SFP 2		
Speed Class:							V3		
Max. input power:							4.2	kW	
Nominal rated voltage:							400	V	
Power Frequency:							50	Hz	
Nominal rated capacity:							4.60	kW	
Nominal rated current:							5.80	A	
Protection class:							IP54		
Overload protection:							Power control		
Insulation class:							F		
P Class:							P1		
System Efficiency:							65	%	
Sound Power Level Inlet:							74.1	dB(A)	
Sound Power Level Outlet:							82.3	dB(A)	
Octave band:	63	125	250	500	1k	2k	4k	8k	Hz
Lw Inlet:	78	79	75	71	68	65	61	65	dB
Lw Outlet:	80	83	80	81	77	73	70	69	dB
Air flow:							3.3300	m^3/s	
K factor:							355		
volume flow [m^3/h]:	K factor x $\sqrt{\text{nozzle-pressure}}$ [Pa]								

EA - Empty section **G 5** **FU 10** **Accessory**

Specification:	Empty section	- Maintenance door
Length:	8 AT4 raster	- Hand Lever lockable w. Door Catch
		- Hand Lever

EA - Empty section **G 5** **FU 12** **Accessory**

Specification:	Empty section	- Maintenance panel
Length:	4 AT4 raster	

EA - Damper inside **G 5** **FU 0** **Accessory**

Type:	Damper inside	- Damper leak tight class 2
Width:	1,647 mm	
Height:	841 mm	
Connector:	A20	
Needed torque:	12.00 Nm	
Design pressure:	7 Pa	
Actuator type:	linkage outside one-sided	
Number of axis:	1	
Axis type:	square 15mm	

EA - louvre covering **G 5** **FU 0** **Accessory**

Type:	louvre covering	
Width:	24 AT4 raster	
Height:	12 AT4 raster	

Data sheet

Project: **238351 - 001-00-489136** Pos.: **3** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.03 - (Rev 03 // No Controls - 21.02.2025) Single Piece Piece: 1 Edition Date: 21/02/2025

Type: AT4-F 24x12/24x12 - Weatherproof Editor: Adam Finn

Design pressure:	12 Pa

ERP information

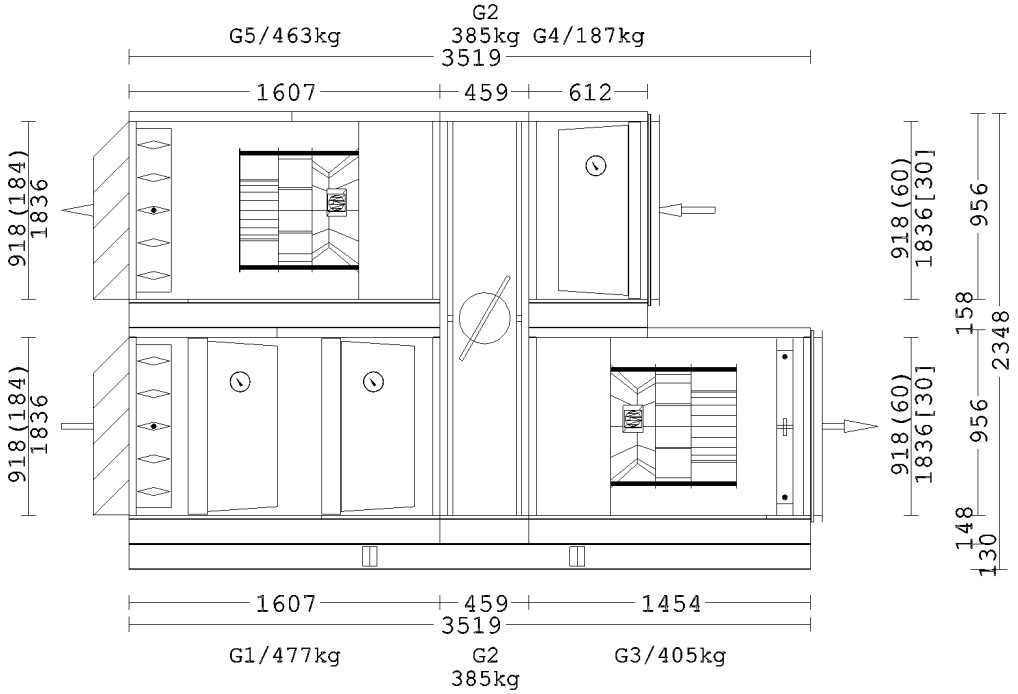
Calculated ERP compliance	Compliant 2018
Type	NRVU-BVU
Heat recovery	Rotary heat exchanger
Internal SFP	544 W/(m^3/s)
Dp int supply	201 Pa
Dp int exhaust	163 Pa
Fan speed controlled	
max. outer leak rate (+/- 400 Pa)	0.2 %

Unit features:

Frame material AT4-F	Alu
Panel Isolation	Decoupled [T2(M)]
MB-Reference	AT4-F-04
Panel material	7001/7001
Unit corner material (frame)	Alu / TB2
Transport	Standard transport
Base frame	130 mm
complete base frame	130 mm
Weatherproof	Yes

Dimensions						**Transport weight**
Length:	3,519 mm	Width:	1,989 mm	Height:	2,348 mm	2,051 kg

***** END OF LIST *****

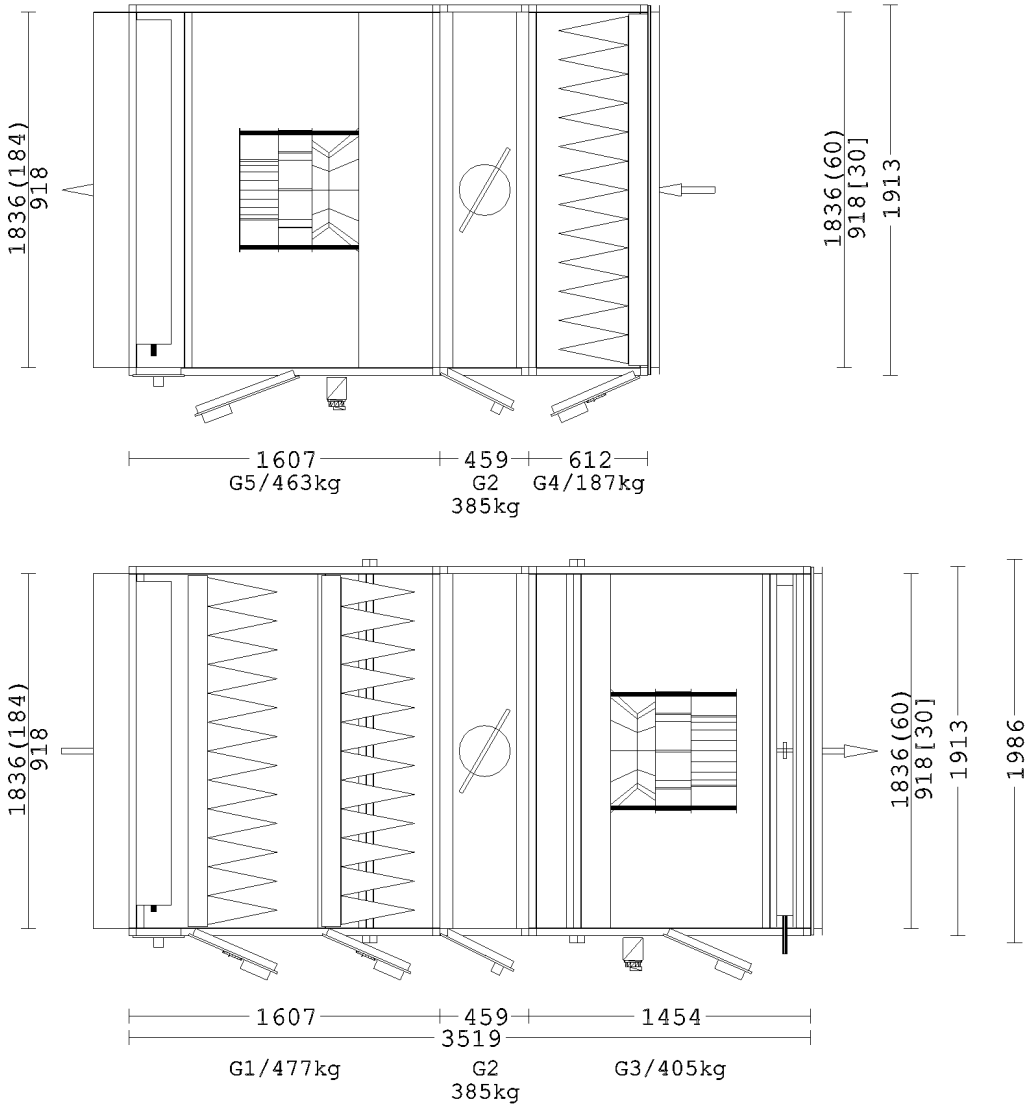


Attention: Transport on base frame! Lid Inside 7001 / Lid Outside 7001 / Decoupled [T2(M)], Frame: Alu, Type: weatherproof, Weight: 2,051 kg

Front view

If not mentioned otherwise, dimension inside flange to unit38 mm. Delivery on common base frame. Round bracket () for single/total flange length, rectangular bracket [] for flange dimensions.Please note an all-round panel overhang (approx. 16mm)!

AL-KO THERM GMBH	Project:	238351 - 001-00-489136	Pos. / GS-pos.:	3 /
D-89343 Jettingen-Scheppach	Proj. descr.:	ElmwoodLeisure Centre	Order #:	
Adam Finn	Unit:	AHU.R.03 - (Rev 03 // No Controls - 21.02.2025) Single Piece	Edition Date:	21/02/2025
+44 8457 165 162	Type:	AT4-F 24x12/24x12 - Weatherproof	Scale/Software	1:38 / 3.88.02



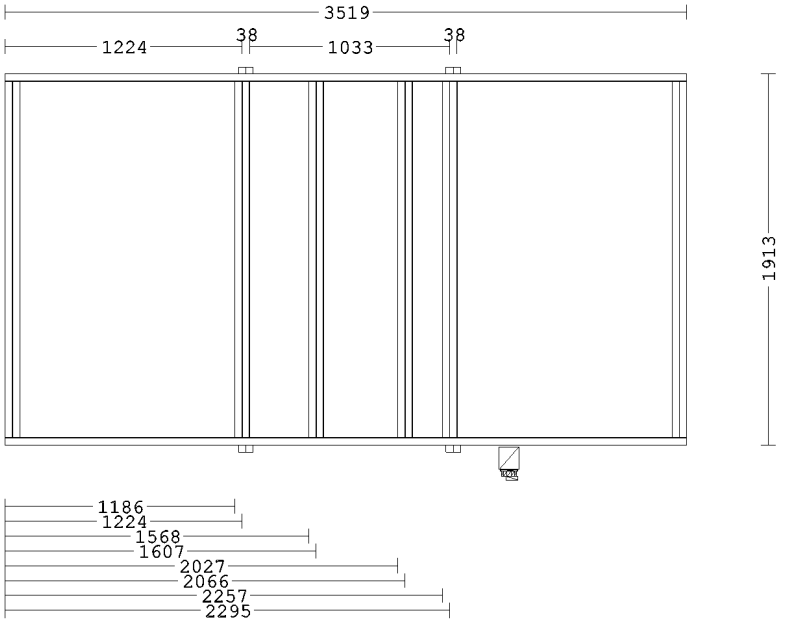
Attention: Transport on base frame! Lid Inside 7001 / Lid Outside 7001 / Decoupled [T2(M)], Frame: Alu, Type: weatherproof, Weight: 2,051 kg

Top view

If not mentioned otherwise, dimension inside flange to unit38 mm. Delivery on common base frame. Round bracket () for single/total flange length, rectangular bracket [] for flange dimensions.Please note an all-round panel overhang (approx. 16mm)!

AL-KO THERM GMBH
D-89343 Jettingen-Scheppach
Adam Finn
+44 8457 165 162

Project:	238351 - 001-00-489136	Pos. / GS-pos.:	3 /
Proj. descr.:	ElmwoodLeisure Centre	Order #:	
Unit:	AHU.R.03 - (Rev 03 // No Controls - 21.02.2025) Single Piece	Edition Date:	21/02/2025
Type:	AT4-F 24x12/24x12 - Weatherproof	Scale/Software	1:38 / 3.88.02



Attention: Transport on base frame! Lid Inside 7001 / Lid Outside 7001 / Decoupled [T2(M)], Frame: Alu, Type: weatherproof, Weight: 2,051 kg

Top view

If not mentioned otherwise, dimension inside flange to unit38 mm. Delivery on common base frame. Round bracket () for single/total flange length, rectangular bracket [] for flange dimensions.Please note an all-round panel overhang (approx. 16mm)!

AL-KO THERM GMBH	Project:	238351 - 001-00-489136	Pos. / GS-pos.:	3 /
D-89343 Jettingen-Scheppach	Proj. descr.:	ElmwoodLeisure Centre	Order #:	
Adam Finn	Unit:	AHU.R.03 - (Rev 03 // No Controls - 21.02.2025) Single Piece	Edition Date:	21/02/2025
+44 8457 165 162	Type:	AT4-F 24x12/24x12 - Weatherproof	Scale/Software	1:38 / 3.88.02

Branch office:

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Basingstoke, RG22 4LT
Tel.: +44 8457 165162
trane.co.uk

Adam Finn / External

Manufacturer

AL-KO THERM GMBH
Hauptstrasse 248-250
D-89343 Jettingen-Scheppach
alko-airtechnology.com

Tel.:+44 8457 165 162

Sound emission

Project: **238351 - 001-00-489136**
Pos.: **3**
Quotation

Order #:
GS-pos.:

Proj. descr.: ElmwoodLeisure Centre
Date Printed: 21.02.2025

Unit: AHU.R.03 - (Rev 03 // No Controls - 21.02.2025)
Single Piece
Piece: 1
Edition Date: 21/02/2025

Type: AT4-F 24x12/24x12 - Weatherproof
Editor: Adam Finn

Exhaust air Volume flow: 3.3300 m^3/s tpd: 629 Pa

Octave:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**sum P.**	Unit
Outlet: sound power level in outlet cross section.										
Lw4	**80.5**	**83.2**	**79.8**	**81.0**	**76.7**	**73.2**	**69.7**	**68.7**	88.0	dB
LwA4	54.3	67.1	71.2	77.8	76.7	74.4	70.7	67.6	**82.3**	dB(A)
Intake: sound power level in the inlet cross section.										
Lw3	**77.9**	**78.0**	**71.6**	**66.2**	**61.5**	**57.1**	**53.1**	**52.8**	81.6	dB
LwA3	51.7	61.9	63.0	63.0	61.5	58.3	54.1	51.7	**69.1**	dB(A)
Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
Lw2	**71.9**	**68.5**	**59.9**	**48.6**	**43.1**	**36.5**	**32.6**	**33.3**	73.8	dB
LwA2	45.7	52.4	51.3	45.4	43.1	37.7	33.6	32.2	**56.2**	dB(A)

Supply air Volume flow: 3.1089 m^3/s tpd: 793 Pa

Octave:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**sum P.**	Unit
Outlet: sound power level in outlet cross section.										
Lw4	**76.1**	**82.5**	**76.7**	**78.5**	**75.2**	**71.8**	**67.8**	**59.9**	85.9	dB
LwA4	49.9	66.4	68.1	75.3	75.2	73.0	68.8	58.8	**80.3**	dB(A)
Intake: sound power level in the inlet cross section.										
Lw3	**71.7**	**74.8**	**68.0**	**63.8**	**58.6**	**52.7**	**49.4**	**46.1**	77.4	dB
LwA3	45.5	58.7	59.4	60.6	58.6	53.9	50.4	45.0	**65.9**	dB(A)
Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
Lw2	**66.9**	**67.4**	**58.4**	**48.4**	**43.9**	**37.4**	**33.8**	**31.5**	70.5	dB
LwA2	40.7	51.3	49.8	45.2	43.9	38.6	34.8	30.4	**54.9**	dB(A)

Sum

Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
LwSum	**73.1**	**71.0**	**62.2**	**51.5**	**46.5**	**40.0**	**36.2**	**35.5**	75.4	dB
LwASum	46.9	54.9	53.6	48.3	46.5	41.2	37.2	34.4	**58.6**	dB(A)

Branch office:

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Adam Finn / External

Manufacturer

AL-KO THERM GMBH
Hauptstrasse 248-250
D-89343 Jettingen-Scheppach
alko-airtechnology.com
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Data sheet

Project: **238351 - 001-00-489136**
Order #:
Proj. descr.: ElmwoodLeisure Centre
Unit: AHU.R.04 - (Rev 03 // No Controls - 21.02.2025)
Single Piece
Type: AT4-F 16x8/16x8 - Weatherproof

Piece: 1

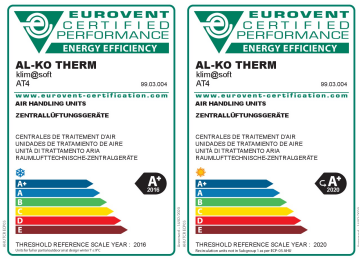
Pos.: **4**
GS-pos.:
Date Printed: 21.02.2025
Edition Date: 21/02/2025
Editor: Adam Finn

Quotation

Note: All data relate to standard conditions for air density = 1.2 kg/m^3

Unit data	**Supply air**		**Exhaust air**	
	Target value	Actual	Target value	Actual
Air flow	0.9900	0.9900 m^3/s	0.9900	0.9900 m^3/s
External pressure	250	250 Pa	250	250 Pa
Internal pressure	259	259 Pa	143	143 Pa
Air velocity		1.3 m/s		1.3 m/s

Eurovent Efficiency Wint./Sum.	A+ (2016) / A+ (2020)	
Climate zone	United Kingdom / BIRMINGHAM	
RLT energy efficiency class	A+ (2018)	
Calculated ERP compliance	Compliant 2018	



SA - louvre covering	**G 1**	**FU 0**	**Accessory**
Type:	louvre covering		- Weather protection louvre covering
Width:	16	AT4 raster	
Height:	8	AT4 raster	
Design pressure:	5	Pa	

SA - Damper inside	**G 1**	**FU 0**	**Accessory**
Type:	Damper inside		- Damper leak tight class 2
Width:	1,073	mm	- coated
Height:	561	mm	
Connector:	A20		
Needed torque:	5.00	Nm	
Design pressure:	3	Pa	
Actuator type:	gearwheels inside one-sided		
Number of axis:	1		
Axis type:	square 10mm		

SA - Empty section	**G 1**	**FU 12**	**Accessory**
Specification:	Empty section		- Maintenance panel
Length:	3	AT4 raster	

Project: **238351 - 001-00-489136** Pos.: **4** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.04 - (Rev 03 // No Controls - 21.02.2025) Single Piece Piece: 1 Edition Date: 21/02/2025

Type: AT4-F 16x8/16x8 - Weatherproof Editor: Adam Finn

SA - Filter	**G 1**	**FU 2**	**Accessory**
Type:	BF - Bag Filter		- Maintenance door with built in pressure gage
Class:	ePM10-55 % / M5		- Hand Lever lockable
eff. class:	E		- Indicating pressure gauge 250 Pa
Design pressure:	41	Pa	- Quick change filter frame
Initial pressure:	20	Pa	
End pressure:	61	Pa	
air velocity cross section:	1.3	m/s	
Filter surface:	6.9	m^2	
Filter length:	360	mm	
Filter element 592x592:	2		
Maintenance:	F - quick change filter frame		
Air flow:	0.9900	m^3/s	

SA - Filter	**G 1**	**FU 5**	**Accessory**
Type:	BF - Bag Filter		- Maintenance door with built in pressure gage
Class:	ePM1-60 % / F7		- Hand Lever lockable
eff. class:	D		- Indicating pressure gauge 250 Pa
Design pressure:	106	Pa	- Quick change filter frame
Initial pressure:	56	Pa	
End pressure:	156	Pa	
air velocity cross section:	1.3	m/s	
Filter surface:	7.3	m^2	
Filter length:	380	mm	
Filter element 592x592:	2		
Maintenance:	F - quick change filter frame		
Air flow:	0.9900	m^3/s	

Rotary heatex	**G 2**	**FU 8**	**Accessory**
HRS type	Rotary heat exchanger		
Type:	Standard rotor		- Maintenance door
operating state:	1		- Controller mounted and leaded motor
Total Thermal Capacity:	32.5	kW	
Thermal efficiency:	78.9	%	
Humidity exchange rate:	44.5	%	
HRS class (EN13053/2020):	H1		
Balanced Efficiency (dry / 5-25^{o}C):	78.9	%	
Supply air:	0.9900	m^3/s	
Δ Pressure (S) :	84.8	Pa	
Temperature IN:	-5.0	^{o}C	
Rel. Humidity IN:	99.0	%	
Abs. Humidity IN:	2.5	g/kgL	
Temperature Out:	17.1	^{o}C	
Rel. Humidity OUT:	37.0	%	
Abs. Humidity OUT:	4.5	g/kgL	
Exhaust air:	0.9900	m^3/s	
Δ Pressure (E):	84.8	Pa	
Temperature IN:	23.0	^{o}C	

Rel. Humidity IN:	40.0	%
Abs. Humidity IN:	7.0	g/kgL
Temperature Out:	2.5	°C
Rel. Humidity OUT:	95.0	%
Abs. Humidity OUT:	4.3	g/kgL
Drive output:	110	W
Current:	1.2	A
Voltage:	230	V
Phase count:	3-phase	
Supply air:		
Exhaust air:		
EATR:	2.0	%
OACF:	1.08	

SA - Empty section	**G 3**	**FU 0**	**Accessory**
Length:	5	AT4 raster	

SA - Fan - Wheel - EC	**G 3**	**FU 3**	**Accessory**
Fan type:	Wheel - EC 355		- Volume flow measuring for fan
Air flow:	3,564	m^3/h	- Wiring repair switch/fan
Static increase of pressure:	509	Pa	- Repair switch
Casing pressure loss:	13	Pa	- Maintenance door
Static efficiency:	67	%	- Hand Lever lockable w. Door Catch
Efficiency class N (EU 327/2011):	80.0		
Speed:	2,033	1/min	
Max. speed:	3,100	1/min	
- *Motor*			
Control type:	EC - controlled		
Speed:	2,033	1/min	
Control voltage:	6.6	V	
Volume / rotation reserve:	52	%	
Power input:	0.76	kW	
Efficiency class:	IE 5		
SFP value (GEG 2020):	359	$W/(m^3/s)$	
SFPv (EN 16798-3):	659	$W/(m^3/s)$	
SFP class:	SFP 1		
Speed Class:	V1		
Max. input power:	1.2	kW	
Nominal rated voltage:	400	V	
Power Frequency:	50	Hz	
Nominal rated capacity:	2.50	kW	
Nominal rated current:	3.20	A	
Protection class:	IP54		
Overload protection:	Power control		
Insulation class:	F		
P Class:	P1		
System Efficiency:	65	%	
Sound Power Level Inlet:	66.8	dB(A)	
Sound Power Level Outlet:	74.6	dB(A)	

Octave band:	63	125	250	500	1k	2k	4k	8k	Hz

Data sheet

Project: **238351 - 001-00-489136** Pos.: **4** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.04 - (Rev 03 // No Controls - 21.02.2025) Single Piece Piece: 1 Edition Date: 21/02/2025

Type: AT4-F 16x8/16x8 - Weatherproof Editor: Adam Finn

Lw Inlet:	66	65	65	65	61	58	56	54	dB
Lw Outlet:	67	73	70	69	71	68	64	61	dB

Air flow: 0.9900 m^3/s

K factor: 140

volume flow [m^3/h]: K factor x $\sqrt{\text{nozzle-pressure [Pa]}}$

SA - Heating coil **G 3** **FU 4** **Accessory**

Type:	PWW - Copper/Aluminium - A
Total Thermal Capacity:	5.97 kW
pressure loss (dry):	6 Pa
Air flow speed:	1.64 m/s
Temperature Inlet:	15.0 °C
Rel. Humidity Inlet:	50.0 %
Abs. Humidity Inlet:	5.3 g/kgL
Temperature Outlet:	20.0 °C
Power reserve:	43 %
Rel. Humidity Outlet:	36.5 %
Abs. Humidity Outlet:	5.3 g/kgL
Medium:	Water
Medium temperature IN:	45.0 °C
Medium temperature OUT:	38.0 °C
Max. medium pressure:	16 bar
Medium flow quantity:	739 l/h
Δp medium:	5.1 kPa
Δ fins:	2.1 mm
Rows:	1
Circuits:	5
Content:	2.1 l
Pipes:	Copper
Fins:	Aluminium
Header:	Copper
Frame:	Aluminium
Frame to hold frost protection equipment:	Without
Connection type:	A - water connection straight sidewards
Connection width:	DN 20 (R 3/4)
Connections per circuit:	2
Air flow:	0.9900 m^3/s

SA - Connection frame with rubber **G 3** **FU 0** **Accessory**

Type:	Connection frame with rubber
Width:	1,224 mm
Height:	612 mm
Depth:	60 mm
Design:	7001
Connector:	A30

- Connecting Frame powder coated

EA - Connection frame with rubber **G 4** **FU 0** **Accessory**

Type: Connection frame with rubber

- Connecting Frame powder coated

Width:	1,224 mm
Height:	612 mm
Depth:	60 mm
Design:	7001
Connector:	A30

EA - Filter **G 4** **FU 6**

Type:	BF - Bag Filter
Class:	ePM10-55 % / M5
eff. class:	E
Design pressure:	41 Pa
Initial pressure:	20 Pa
End pressure:	61 Pa
air velocity cross section:	1.3 m/s
Filter surface:	6.9 m^2
Filter length:	360 mm
Filter element 592x592:	2
Maintenance:	F - quick change filter frame
Air flow:	0.9900 m^3/s

Accessory

- Maintenance door with built in pressure gage
- Hand Lever lockable
- Indicating pressure gauge 250 Pa
- Quick change filter frame

Rotary heatex **G 2** **FU 8**

See above

Accessory

EA - Empty section **G 5** **FU 0**

Length:	5 AT4 raster

Accessory

EA - Fan - Wheel - EC **G 5** **FU 7**

Fan type:	Wheel - EC 400
Air flow:	3,564 m^3/h
Static increase of pressure:	393 Pa
Casing pressure loss:	8 Pa
Static efficiency:	68 %
Efficiency class N (EU 327/2011):	81.0
Speed:	1,520 1/min
Max. speed:	2,360 1/min
- Motor	
Control type:	EC - controlled
Speed:	1,520 1/min
Control voltage:	6.4 V
Volume / rotation reserve:	55 %
Power input:	0.58 kW
Efficiency class:	IE 5
SFP value (GEG 2020):	252 $W/(m^3/s)$
SFPv (EN 16798-3):	552 $W/(m^3/s)$
SFP class:	SFP 0
Speed Class:	V1
Max. input power:	0.9 kW
Nominal rated voltage:	400 V

Accessory

- Volume flow measuring for fan
- Wiring repair switch/fan
- Repair switch
- Maintenance door
- Hand Lever lockable w. Door Catch
- Maintenance panel

Data sheet

Project: **238351 - 001-00-489136** Pos.: **4** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.04 - (Rev 03 // No Controls - 21.02.2025) Single Piece Piece: 1 Edition Date: 21/02/2025

Type: AT4-F 16x8/16x8 - Weatherproof Editor: Adam Finn

Power Frequency:								50	Hz
Nominal rated capacity:								2.10	kW
Nominal rated current:								2.70	A
Protection class:								IP54	
Overload protection:								Power control	
Insulation class:								F	
P Class:								P1	
System Efficiency:								66	%
Sound Power Level Inlet:								63.1	dB(A)
Sound Power Level Outlet:								72.3	dB(A)
Octave band:	63	125	250	500	1k	2k	4k	8k	Hz
Lw Inlet:	57	69	63	61	56	54	51	46	dB
Lw Outlet:	61	76	67	70	68	63	59	53	dB
Air flow:								0.9900	m^3/s
K factor:								180	
volume flow [m^3/h]:	K factor x $\sqrt{\text{nozzle-pressure}}$ [Pa]								

EA - Empty section **G 5** **FU 10** **Accessory**

Specification:	Empty section	
Length:	3 AT4 raster	

EA - Damper inside **G 5** **FU 0** **Accessory**

Type:	Damper inside	- Damper leak tight class 2
Width:	1,073 mm	- coated
Height:	561 mm	
Connector:	A20	
Needed torque:	5.00 Nm	
Design pressure:	3 Pa	
Actuator type:	gearwheels inside one-sided	
Number of axis:	1	
Axis type:	square 10mm	

EA - louvre covering **G 5** **FU 0** **Accessory**

Type:	louvre covering	- Weather protection louvre covering
Width:	16 AT4 raster	
Height:	8 AT4 raster	
Design pressure:	5 Pa	

ERP information

Calculated ERP compliance	Compliant 2018	
Type	NRVU-BVU	
Heat recovery	Rotary heat exchanger	
Internal SFP	376	$W/(m^3/s)$
Dp int supply	141	Pa
Dp int exhaust	105	Pa
Fan speed controlled		
max. outer leak rate (+/- 400 Pa)	0.4	%

Data sheet

Project: **238351 - 001-00-489136** Pos.: **4** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.04 - (Rev 03 // No Controls - 21.02.2025) Single Piece Piece: 1 Edition Date: 21/02/2025

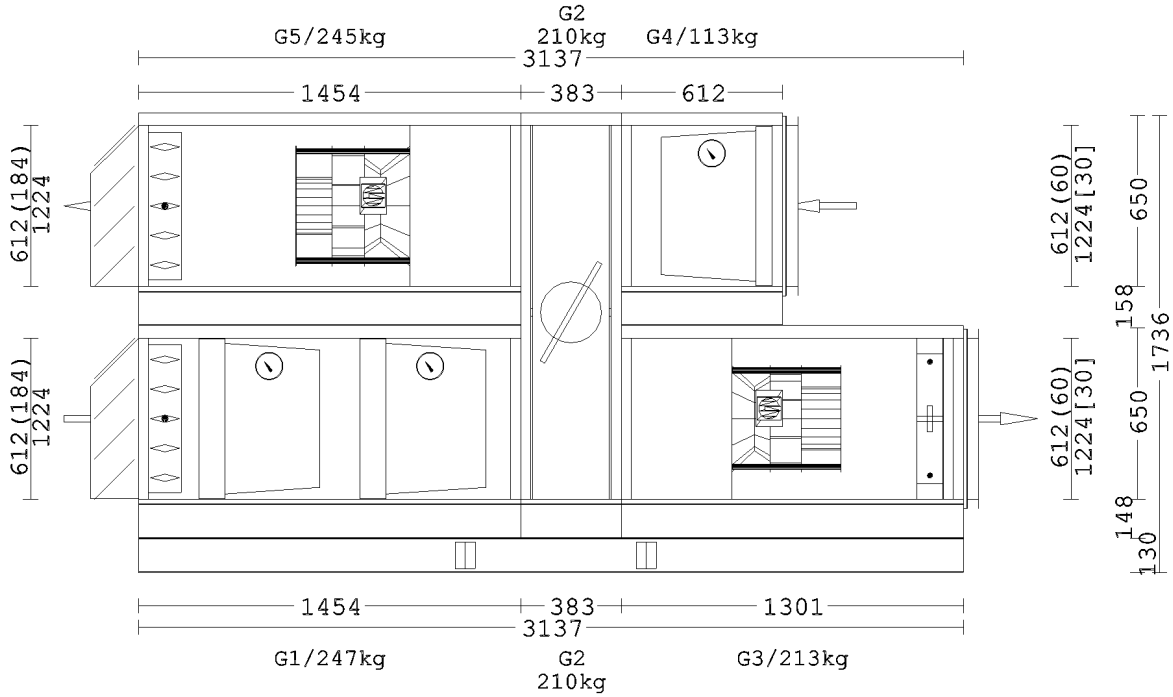
Type: AT4-F 16x8/16x8 - Weatherproof Editor: Adam Finn

Unit features:

Frame material AT4-F	Alu
Panel Isolation	Decoupled [T2(M)]
MB-Reference	AT4-F-04
Panel material	7001/7001
Unit corner material (frame)	Alu / TB2
Transport	Standard transport
Base frame	130 mm
complete base frame	130 mm
Weatherproof	Yes

Dimensions						**Transport weight**
Length:	3,136 mm	Width:	1,377 mm	Height:	1,736 mm	1,126 kg

***** END OF LIST *****

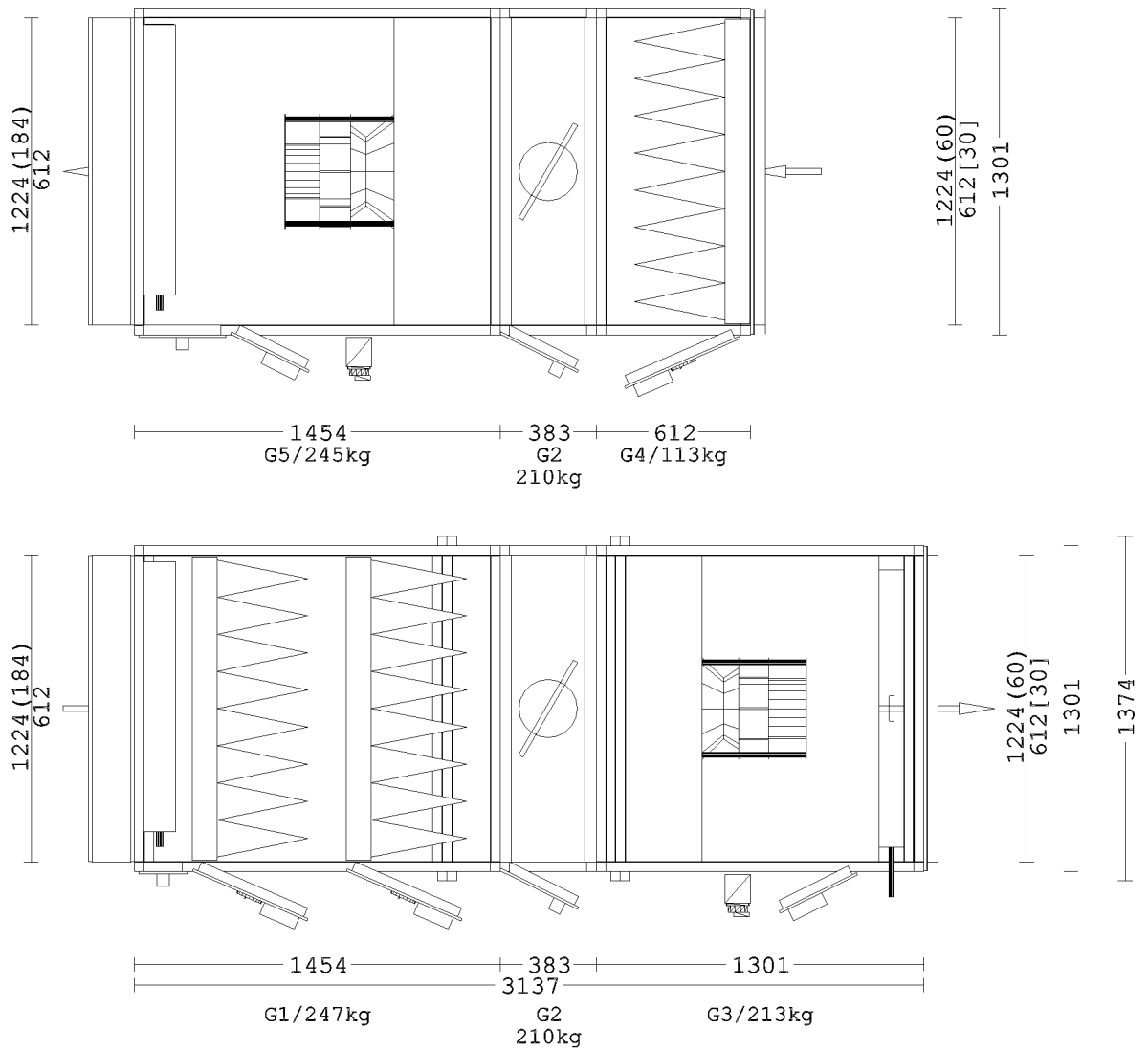


Attention: Transport on base frame! Lid Inside 7001 / Lid Outside 7001 / Decoupled [T2(M)], Frame: Alu, Type: weatherproof, Weight: 1,126 kg

Front view

If not mentioned otherwise, dimension inside flange to unit38 mm. Delivery on common base frame. Round bracket () for single/total flange length, rectangular bracket [] for flange dimensions.Please note an all-round panel overhang (approx. 16mm)!

AL-KO THERM GMBH	Project:	238351 - 001-00-489136	Pos. / GS-pos.:	4 /
D-89343 Jettingen-Scheppach	Proj. descr.:	ElmwoodLeisure Centre	Order #:	
Adam Finn	Unit:	AHU.R.04 - (Rev 03 // No Controls - 21.02.2025) Single Piece	Edition Date:	21/02/2025
+44 8457 165 162	Type:	AT4-F 16x8/16x8 - Weatherproof	Scale/Software	1:28 / 3.88.02

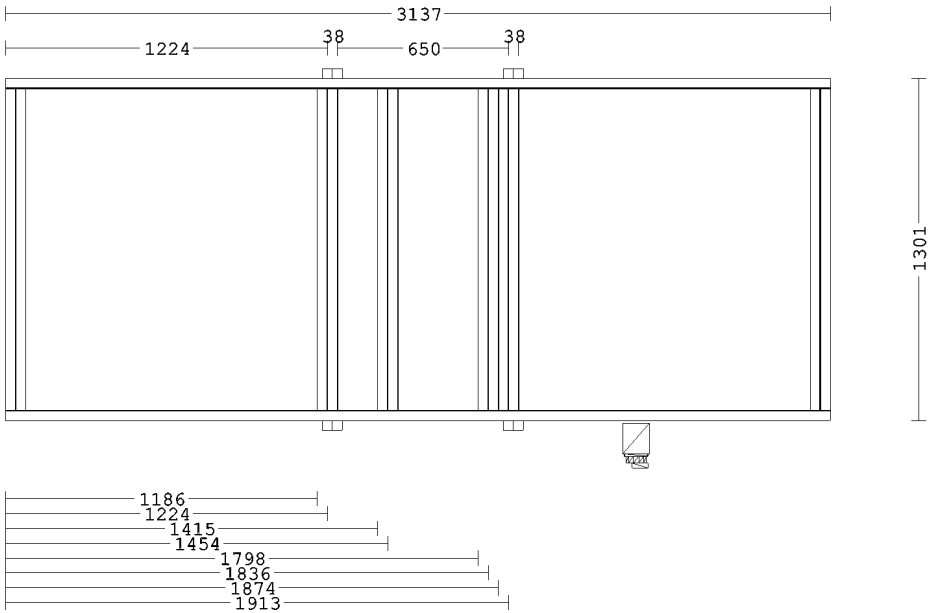


Attention: Transport on base frame! Lid Inside 7001 / Lid Outside 7001 / Decoupled [T2(M)], Frame: Alu, Type: weatherproof, Weight: 1,126 kg

Top view

If not mentioned otherwise, dimension inside flange to unit38 mm. Delivery on common base frame. Round bracket () for single/total flange length, rectangular bracket [] for flange dimensions.Please note an all-round panel overhang (approx. 16mm)!

AL-KO THERM GMBH	Project:	238351 - 001-00-489136	Pos. / GS-pos.:	4 /
D-89343 Jettingen-Scheppach	Proj. descr.:	ElmwoodLeisure Centre	Order #:	
Adam Finn	Unit:	AHU.R.04 - (Rev 03 // No Controls - 21.02.2025) Single Piece	Edition Date:	21/02/2025
+44 8457 165 162	Type:	AT4-F 16x8/16x8 - Weatherproof	Scale/Software	1:28 / 3.88.02



Attention: Transport on base frame! Lid Inside 7001 / Lid Outside 7001 / Decoupled [T2(M)], Frame: Alu, Type: weatherproof, Weight: 1,126 kg

Top view

If not mentioned otherwise, dimension inside flange to unit38 mm. Delivery on common base frame. Round bracket () for single/total flange length, rectangular bracket [] for flange dimensions.Please note an all-round panel overhang (approx. 16mm)!

AL-KO THERM GMBH
D-89343 Jettingen-Scheppach
Adam Finn
+44 8457 165 162

Project:	238351 - 001-00-489136	Pos. / GS-pos.:	4 /
Proj. descr.:	ElmwoodLeisure Centre	Order #:	
Unit:	AHU.R.04 - (Rev 03 // No Controls - 21.02.2025) Single Piece	Edition Date:	21/02/2025
Type:	AT4-F 16x8/16x8 - Weatherproof	Scale/Software	1:28 / 3.88.02

Branch office:

Trane UK
Lawrence House, 1A Jays Close
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Tel.: +44 8457 165162
trane.co.uk

Adam Finn / External

Manufacturer

AL-KO THERM GMBH
Hauptstrasse 248-250
D-89343 Jettingen-Scheppach
alko-airtechnology.com

Tel.:+44 8457 165 162

Sound emission

Project: **238351 - 001-00-489136**
Order #:
Proj. descr.: ElmwoodLeisure Centre
Unit: AHU.R.04 - (Rev 03 // No Controls - 21.02.2025)
Single Piece
Piece: 1
Type: AT4-F 16x8/16x8 - Weatherproof

Pos.: **4**
GS-pos.:
Date Printed: 21.02.2025
Edition Date: 21/02/2025
Editor: Adam Finn

Quotation

Supply air	Volume flow:	0.9900 m^3/s	tpd:	509 Pa					
Octave:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**sum P.**	Unit
Outlet: sound power level in outlet cross section.										
Lw4	**66.8**	**72.9**	**70.3**	**69.2**	**70.1**	**65.7**	**61.9**	**58.8**	77.7	dB
LwA4	40.6	56.8	61.7	66.0	70.1	66.9	62.9	57.7	**73.7**	dB(A)
Intake: sound power level in the inlet cross section.										
Lw3	**65.4**	**63.0**	**59.2**	**57.3**	**51.5**	**45.3**	**42.7**	**36.7**	68.4	dB
LwA3	39.2	46.9	50.6	54.1	51.5	46.5	43.7	35.6	**58.1**	dB(A)
Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
Lw2	**59.1**	**56.4**	**50.0**	**39.8**	**37.0**	**30.3**	**27.0**	**23.8**	61.3	dB
LwA2	32.9	40.3	41.4	36.6	37.0	31.5	28.0	22.7	**45.8**	dB(A)

Exhaust air	Volume flow:	0.9900 m^3/s	tpd:	393 Pa					
Octave:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**sum P.**	Unit
Outlet: sound power level in outlet cross section.										
Lw4	**61.3**	**76.0**	**67.3**	**70.3**	**67.8**	**63.4**	**58.6**	**53.2**	78.2	dB
LwA4	35.1	59.9	58.7	67.1	67.8	64.6	59.6	52.1	**72.3**	dB(A)
Intake: sound power level in the inlet cross section.										
Lw3	**56.5**	**67.2**	**59.1**	**56.9**	**50.3**	**46.2**	**43.2**	**33.7**	68.6	dB
LwA3	30.3	51.1	50.5	53.7	50.3	47.4	44.2	32.6	**58.3**	dB(A)
Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
Lw2	**51.7**	**59.6**	**47.4**	**38.6**	**33.1**	**26.1**	**22.1**	**16.0**	60.5	dB
LwA2	25.5	43.5	38.8	35.4	33.1	27.3	23.1	14.9	**45.6**	dB(A)

Sum										
Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
LwSum	**59.8**	**61.3**	**51.9**	**42.3**	**38.5**	**31.7**	**28.2**	**24.4**	64.0	dB
LwASum	33.6	45.2	43.3	39.1	38.5	32.9	29.2	23.3	**48.7**	dB(A)

Branch office:

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Adam Finn / External

Manufacturer

AL-KO THERM GMBH
Hauptstrasse 248-250
D-89343 Jettingen-Scheppach
alko-airtechnology.com
Tel.:+44 8457 165 162

Data sheet

Project: **238351 - 001-00-489136**
Order #:
Proj. descr.: ElmwoodLeisure Centre
Unit: AHU.R.05 - (Rev 03 // No Controls - 21.02.2025)
Single Piece
Type: AT4-F 16x12/16x12 - Weatherproof

Piece: 1

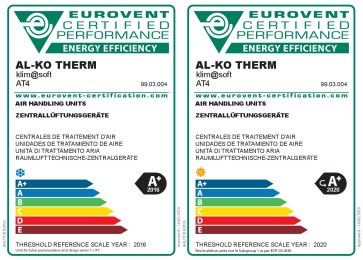
Pos.: **5**
GS-pos.:
Date Printed: 21.02.2025
Edition Date: 21/02/2025
Editor: Adam Finn

Quotation

Note: All data relate to standard conditions for air density = 1.2 kg/m^3

Unit data	**Supply air**		**Exhaust air**	
	Target value	Actual	Target value	Actual
Air flow	1.8000	1.8000 m^3/s	1.6500	1.6500 m^3/s
External pressure	425	425 Pa	425	425 Pa
Internal pressure	399	399 Pa	243	243 Pa
Air velocity		1.6 m/s		1.5 m/s

Eurovent Efficiency Wint./Sum.	A+ (2016) / A+ (2020)
Climate zone	United Kingdom / BIRMINGHAM
RLT energy efficiency class	A+ (2018)
Calculated ERP compliance	Compliant 2018



SA - louvre covering	**G 1**	**FU 0**	**Accessory**
Type:	louvre covering		- Weather protection louvre covering
Width:	16	AT4 raster	
Height:	12	AT4 raster	
Design pressure:	8	Pa	

SA - Damper inside	**G 1**	**FU 0**	**Accessory**
Type:	Damper inside		- Damper leak tight class 2
Width:	1,073	mm	- coated
Height:	867	mm	
Connector:	A20		
Needed torque:	6.00	Nm	
Design pressure:	5	Pa	
Actuator type:	gearwheels inside one-sided		
Number of axis:	1		
Axis type:	square 10mm		

SA - Empty section	**G 1**	**FU 12**	**Accessory**
Specification:	Empty section		- Maintenance panel
Length:	3	AT4 raster	

Project: **238351 - 001-00-489136** Pos.: **5** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.05 - (Rev 03 // No Controls - 21.02.2025) Single Piece Piece: 1 Edition Date: 21/02/2025

Type: AT4-F 16x12/16x12 - Weatherproof Editor: Adam Finn

SA - Filter	**G 1**	**FU 2**	**Accessory**
Type:	BF - Bag Filter		- Maintenance door with built in pressure gage
Class:	ePM10-55 % / M5		- Hand Lever lockable
eff. class:	E		- Hand Lever
Design pressure:	54	Pa	- Indicating pressure gauge 250 Pa
Initial pressure:	27	Pa	- Quick change filter frame
End pressure:	81	Pa	
air velocity cross section:	1.6	m/s	
Filter surface:	10.4	m^2	
Filter length:	360	mm	
Filter element 592x592:	2		
Filter element 287x592:	2		
Maintenance:	F - quick change filter frame		
Air flow:	1.8000	m^3/s	

SA - Filter	**G 1**	**FU 5**	**Accessory**
Type:	BF - Bag Filter		- Maintenance door with built in pressure gage
Class:	ePM1-60 % / F7		- Hand Lever lockable
eff. class:	D		- Hand Lever
Design pressure:	121	Pa	- Indicating pressure gauge 250 Pa
Initial pressure:	71	Pa	- Quick change filter frame
End pressure:	171	Pa	
air velocity cross section:	1.6	m/s	
Filter surface:	10.9	m^2	
Filter length:	380	mm	
Filter element 592x592:	2		
Filter element 287x592:	2		
Maintenance:	F - quick change filter frame		
Air flow:	1.8000	m^3/s	

Rotary heatex	**G 2**	**FU 8**	**Accessory**
HRS type	Rotary heat exchanger		
Type:	Standard rotor		- Maintenance door
operating state:	1		- Maintenance panel
Total Thermal Capacity:	52.5	kW	- Controller mounted and leaded motor
Thermal efficiency:	70.7	%	
Humidity exchange rate:	38.2	%	
HRS class (EN13053/2020):	H2		
Balanced Efficiency (dry / 5-25^{o}C):	73.2	%	
Supply air:	1.8000	m^3/s	
Δ Pressure (S) :	187.4	Pa	
Temperature IN:	-5.0	^{o}C	
Rel. Humidity IN:	99.0	%	
Abs. Humidity IN:	2.5	g/kgL	
Temperature Out:	14.8	^{o}C	
Rel. Humidity OUT:	40.2	%	
Abs. Humidity OUT:	4.2	g/kgL	
Exhaust air:	1.6500	m^3/s	

Data sheet

Project: **238351 - 001-00-489136** Pos.: **5** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.05 - (Rev 03 // No Controls - 21.02.2025) Single Piece Piece: 1 Edition Date: 21/02/2025

Type: AT4-F 16x12/16x12 - Weatherproof Editor: Adam Finn

Δ Pressure (E):	170.8 Pa
Temperature IN:	23.0 °C
Rel. Humidity IN:	40.0 %
Abs. Humidity IN:	7.0 g/kgL
Temperature Out:	3.0 °C
Rel. Humidity OUT:	95.0 %
Abs. Humidity OUT:	4.5 g/kgL
Drive output:	110 W
Current:	1.2 A
Voltage:	230 V
Phase count:	3-phase
Supply air:	
Exhaust air:	
EATR:	1.1 %
OACF:	1.06

SA - Fan - Wheel - EC	**G 3**	**FU 3**
Fan type:	Wheel - EC 450	
Air flow:	6,480	m^3/h
Static increase of pressure:	824	Pa
Casing pressure loss:	17	Pa
Static efficiency:	69	%
Efficiency class N (EU 327/2011):	80.0	
Speed:	1,958	1/min
Max. speed:	2,300	1/min
- *Motor*		
Control type:	EC - controlled	
Speed:	1,958	1/min
Control voltage:	8.5	V
Volume / rotation reserve:	17	%
Power input:	2.15	kW
Efficiency class:	IE 5	
SFP value (GEG 2020):	781	$W/(m^3/s)$
SFPv (EN 16798-3):	1,081	$W/(m^3/s)$
SFP class:	SFP 3	
Speed Class:	V1	
Max. input power:	3.1	kW
Nominal rated voltage:	400	V
Power Frequency:	50	Hz
Nominal rated capacity:	3.40	kW
Nominal rated current:	4.20	A
Protection class:	IP54	
Overload protection:	Power control	
Insulation class:	F	
P Class:	P1	
System Efficiency:	68	%
Sound Power Level Inlet:	73.7	dB(A)
Sound Power Level Outlet:	83.8	dB(A)

Accessory

- Volume flow measuring for fan
- Wiring repair switch/fan
- Repair switch

Octave band:	63	125	250	500	1k	2k	4k	8k	Hz
Lw Inlet:	66	76	76	70	66	65	61	59	dB
Lw Outlet:	71	83	79	79	78	78	75	69	dB

Project: **238351 - 001-00-489136** Pos.: **5** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.05 - (Rev 03 // No Controls - 21.02.2025) Single Piece Piece: 1 Edition Date: 21/02/2025

Type: AT4-F 16x12/16x12 - Weatherproof Editor: Adam Finn

Air flow:	1.8000	m^3/s
K factor:	220	
volume flow [m^3/h]:	K factor x $\sqrt{\text{nozzle-pressure}}$ [Pa]	

SA - Empty section	**G 3**	**FU 13**	**Accessory**
Specification:	Empty section		- Maintenance door
Length:	8	AT4 raster	- Hand Lever lockable w. Door Catch
			- Hand Lever

SA - Heating coil	**G 3**	**FU 4**	**Accessory**
Type:	PWW - Copper/Aluminium - A		
Total Thermal Capacity:	14.02	kW	
pressure loss (dry):	7	Pa	
Air flow speed:	1.93	m/s	
Temperature Inlet:	13.5	^{o}C	
Rel. Humidity Inlet:	25.7	%	
Abs. Humidity Inlet:	2.5	g/kgL	
Temperature Outlet:	20.0	^{o}C	
Power reserve:	11	%	
Rel. Humidity Outlet:	17.0	%	
Abs. Humidity Outlet:	2.5	g/kgL	
Medium:	Water		
Medium temperature IN:	45.0	^{o}C	
Medium temperature OUT:	38.0	^{o}C	
Max. medium pressure:	16	bar	
Medium flow quantity:	1,737	l/h	
Δp medium:	18.2	kPa	
Δ fins:	2.1	mm	
Rows:	1		
Circuits:	6		
Content:	3.6	l	
Pipes:	Copper		
Fins:	Aluminium		
Header:	Copper		
Frame:	Aluminium		
Frame to hold frost protection equipment:	Without		
Connection type:	A - water connection straight sidewards		
Connection width:	DN 25 (R 1)		
Connections per circuit:	2		
Air flow:	1.8000	m^3/s	

SA - Connection frame with rubber	**G 3**	**FU 0**	**Accessory**
Type:	Connection frame with rubber		- Connecting Frame powder coated
Width:	1,224	mm	
Height:	918	mm	
Depth:	60	mm	
Design:	7001		
Connector:	A30		

Project: **238351 - 001-00-489136** Pos.: **5** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.05 - (Rev 03 // No Controls - 21.02.2025) Single Piece Piece: 1 Edition Date: 21/02/2025

Type: AT4-F 16x12/16x12 - Weatherproof Editor: Adam Finn

EA - Connection frame with rubber	**G 4**	**FU 0**	**Accessory**
Type:	Connection frame with rubber		- Connecting Frame powder coated
Width:	1,224	mm	
Height:	918	mm	
Depth:	60	mm	
Design:	7001		
Connector:	A30		

EA - Filter	**G 4**	**FU 6**	**Accessory**
Type:	BF - Bag Filter		- Maintenance door with built in pressure gage
Class:	ePM10-55 % / M5		- Hand Lever lockable
eff. class:	E		- Hand Lever
Design pressure:	48	Pa	- Indicating pressure gauge 250 Pa
Initial pressure:	24	Pa	- Quick change filter frame
End pressure:	71	Pa	
air velocity cross section:	1.5	m/s	
Filter surface:	10.4	m^2	
Filter length:	360	mm	
Filter element 592x592:	2		
Filter element 287x592:	2		
Maintenance:	F - quick change filter frame		
Air flow:	1.6500	m^3/s	

Rotary heatex	**G 2**	**FU 8**	**Accessory**
See above			

EA - Fan - Wheel - EC	**G 5**	**FU 7**	**Accessory**
Fan type:	Wheel - EC 450		- Volume flow measuring for fan
Air flow:	5,940	m^3/h	- Wiring repair switch/fan
Static increase of pressure:	668	Pa	- Repair switch
Casing pressure loss:	14	Pa	
Static efficiency:	69	%	
Efficiency class N (EU 327/2011):	81.0		
Speed:	1,771	1/min	
Max. speed:	2,050	1/min	
- *Motor*			
Control type:	EC - controlled		
Speed:	1,771	1/min	
Control voltage:	8.6	V	
Volume / rotation reserve:	16	%	
Power input:	1.60	kW	
Efficiency class:	IE 5		
SFP value (GEG 2020):	633	$W/(m^3/s)$	
SFPv (EN 16798-3):	933	$W/(m^3/s)$	
SFP class:	SFP 2		
Speed Class:	V1		
Max. input power:	2.4	kW	

Data sheet

Project: **238351 - 001-00-489136** Pos.: **5** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.05 - (Rev 03 // No Controls - 21.02.2025) Single Piece Piece: 1 Edition Date: 21/02/2025

Type: AT4-F 16x12/16x12 - Weatherproof Editor: Adam Finn

Nominal rated voltage:							400 V		
Power Frequency:							50 Hz		
Nominal rated capacity:							2.40 kW		
Nominal rated current:							3.10 A		
Protection class:							IP54		
Overload protection:							Power control		
Insulation class:							F		
P Class:							P1		
System Efficiency:							68 %		
Sound Power Level Inlet:							70.5 dB(A)		
Sound Power Level Outlet:							77.7 dB(A)		
Octave band:	63	125	250	500	1k	2k	4k	8k	Hz
Lw Inlet:	66	74	71	68	64	61	58	55	dB
Lw Outlet:	70	81	74	76	73	69	64	61	dB
Air flow:							1.6500 m^3/s		
K factor:							220		
volume flow [m^3/h]:					K factor x $\sqrt{\text{nozzle-pressure}}$ [Pa]				

EA - Empty section	**G 5**	**FU 14**	**Accessory**
Specification:	Empty section		- Maintenance door
Length:	8	AT4 raster	- Hand Lever lockable w. Door Catch
			- Hand Lever

EA - Empty section	**G 5**	**FU 10**	**Accessory**
Specification:	Empty section		- Maintenance panel
Length:	3	AT4 raster	

EA - Damper inside	**G 5**	**FU 0**	**Accessory**
Type:	Damper inside		- Damper leak tight class 2
Width:	1,073	mm	- coated
Height:	867	mm	
Connector:	A20		
Needed torque:	6.00	Nm	
Design pressure:	4	Pa	
Actuator type:	gearwheels inside one-sided		
Number of axis:	1		
Axis type:	square 10mm		

EA - louvre covering	**G 5**	**FU 0**	**Accessory**
Type:	louvre covering		- Weather protection louvre covering
Width:	16	AT4 raster	
Height:	12	AT4 raster	
Design pressure:	7	Pa	

ERP information

Calculated ERP compliance Compliant 2018

Data sheet

Project: **238351 - 001-00-489136** Pos.: **5** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.05 - (Rev 03 // No Controls - 21.02.2025) Single Piece Piece: 1 Edition Date: 21/02/2025

Type: AT4-F 16x12/16x12 - Weatherproof Editor: Adam Finn

Type	NRVU-BVU
Heat recovery	Rotary heat exchanger
Internal SFP	669 W/(m^3/s)
Dp int supply	258 Pa
Dp int exhaust	195 Pa
Fan speed controlled	
max. outer leak rate (+/- 400 Pa)	0.3 %

Unit features:

Frame material AT4-F	Alu
Panel Isolation	Decoupled [T2(M)]
MB-Reference	AT4-F-04
Panel material	7001/7001
Unit corner material (frame)	Alu / TB2
Transport	Standard transport
Base frame	130 mm
complete base frame	130 mm
Weatherproof	Yes

Dimensions						**Transport weight**
Length:	3,442 mm	Width:	1,377 mm	Height:	2,348 mm	1,367 kg

***** END OF LIST *****

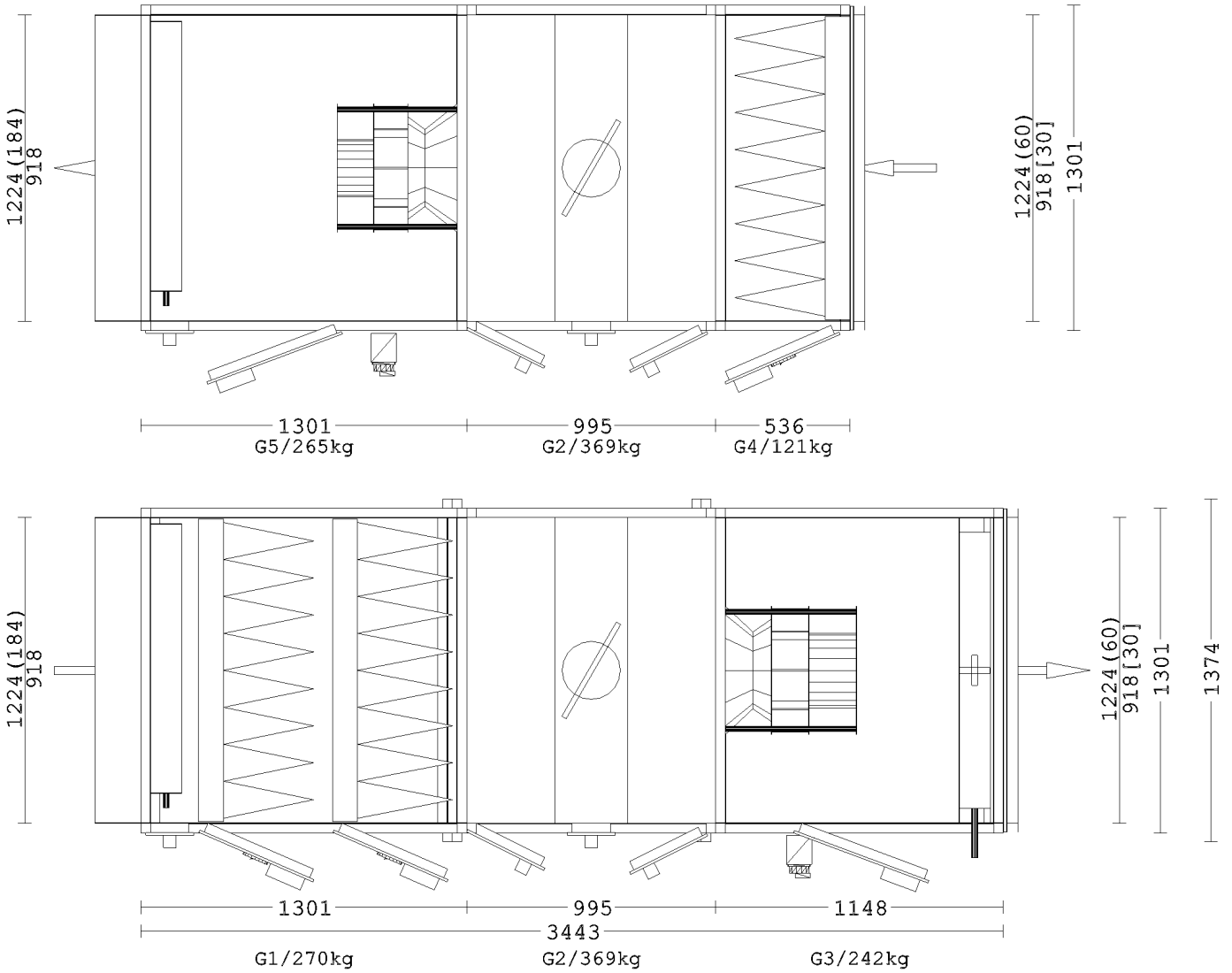


Attention: Transport on base frame! Lid Inside 7001 / Lid Outside 7001 / Decoupled [T2(M)], Frame: Alu, Type: weatherproof, Weight: 1,367 kg

Front view

If not mentioned otherwise, dimension inside flange to unit38 mm. Delivery on common base frame. Round bracket () for single/total flange length, rectangular bracket [] for flange dimensions.Please note an all-round panel overhang (approx. 16mm)!

AL-KO THERM GMBH D-89343 Jettingen-Scheppach Adam Finn +44 8457 165 162	Project:	238351 - 001-00-489136	Pos. / GS-pos.:	5 /
	Proj. descr.:	ElmwoodLeisure Centre	Order #:	
	Unit:	AHU.R.05 - (Rev 03 // No Controls - 21.02.2025) Single Piece	Edition Date:	21/02/2025
	Type:	AT4-F 16x12/16x12 - Weatherproof	Scale/Software	1:26 / 3.88.02



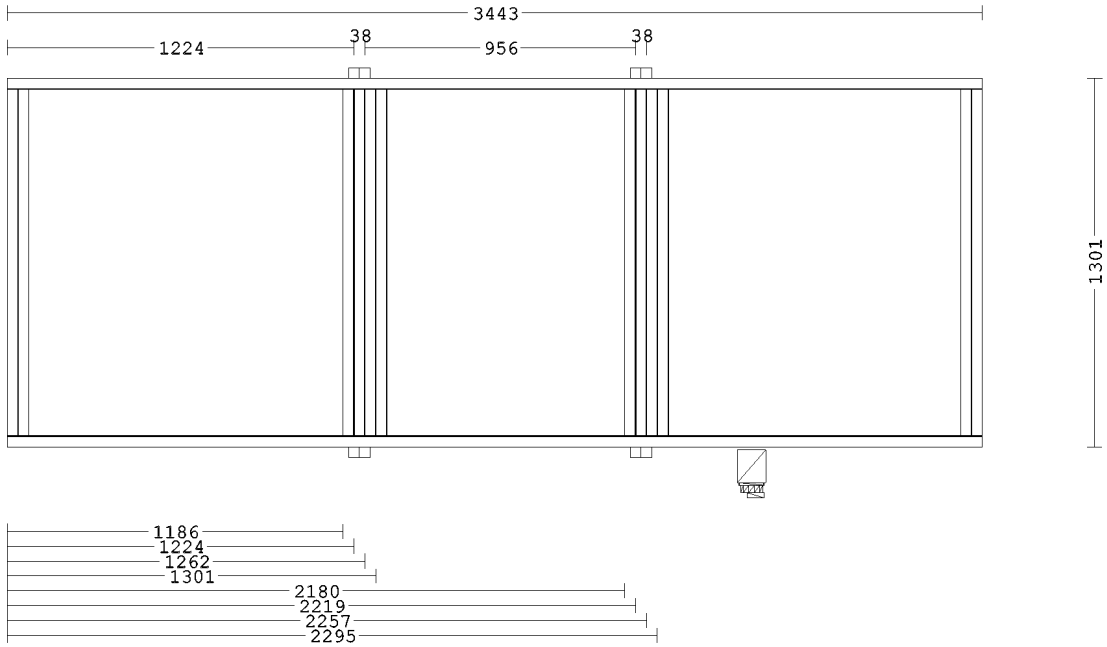
Attention: Transport on base frame! Lid Inside 7001 / Lid Outside 7001 / Decoupled [T2(M)], Frame: Alu, Type: weatherproof, Weight: 1,367 kg

Top view

If not mentioned otherwise, dimension inside flange to unit38 mm. Delivery on common base frame. Round bracket () for single/total flange length, rectangular bracket [] for flange dimensions.Please note an all-round panel overhang (approx. 16mm)!

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Project:	238351 - 001-00-489136	Pos. / GS-pos.:	5 /
Proj. descr.:	ElmwoodLeisure Centre	Order #:	
Unit:	AHU.R.05 - (Rev 03 // No Controls - 21.02.2025) Single Piece	Edition Date:	21/02/2025
Type:	AT4-F 16x12/16x12 - Weatherproof	Scale/Software	1:26 / 3.88.02



Attention: Transport on base frame! Lid Inside 7001 / Lid Outside 7001 / Decoupled [T2(M)], Frame: Alu, Type: weatherproof, Weight: 1,367 kg

Top view

If not mentioned otherwise, dimension inside flange to unit38 mm. Delivery on common base frame. Round bracket () for single/total flange length, rectangular bracket [] for flange dimensions.Please note an all-round panel overhang (approx. 16mm)!

AL-KO THERM GMBH D-89343 Jettingen-Scheppach Adam Finn +44 8457 165 162	Project:	238351 - 001-00-489136	Pos. / GS-pos.:	5 /
	Proj. descr.:	ElmwoodLeisure Centre	Order #:	
	Unit:	AHU.R.05 - (Rev 03 // No Controls - 21.02.2025) Single Piece	Edition Date:	21/02/2025
	Type:	AT4-F 16x12/16x12 - Weatherproof	Scale/Software	1:26 / 3.88.02

Branch office:

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Tel.: +44 8457 165162
trane.co.uk

Adam Finn / External

Manufacturer

AL-KO THERM GMBH
Hauptstrasse 248-250
D-89343 Jettingen-Scheppach
alko-airtechnology.com

Tel.:+44 8457 165 162

Sound emission

Project: **238351 - 001-00-489136**
Pos.: **5**
Quotation

Order #:
GS-pos.:

Proj. descr.: ElmwoodLeisure Centre
Date Printed: 21.02.2025

Unit: AHU.R.05 - (Rev 03 // No Controls - 21.02.2025)
Single Piece
Piece: 1
Edition Date: 21/02/2025

Type: AT4-F 16x12/16x12 - Weatherproof
Editor: Adam Finn

Exhaust air Volume flow: 1.6500 m^3/s tpd: 668 Pa

Octave:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**sum P.**	Unit
Outlet: sound power level in outlet cross section.										
Lw4	**70.2**	**81.0**	**74.4**	**75.8**	**73.1**	**68.7**	**64.1**	**61.0**	83.7	dB
LwA4	44.0	64.9	65.8	72.6	73.1	69.9	65.1	59.9	**77.7**	dB(A)
Intake: sound power level in the inlet cross section.										
Lw3	**65.2**	**72.6**	**67.8**	**63.9**	**57.8**	**53.9**	**50.3**	**43.5**	74.9	dB
LwA3	39.0	56.5	59.2	60.7	57.8	55.1	51.3	42.4	**65.5**	dB(A)
Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
Lw2	**60.5**	**64.7**	**55.4**	**44.9**	**39.5**	**32.6**	**28.4**	**24.8**	66.5	dB
LwA2	34.3	48.6	46.8	41.7	39.5	33.8	29.4	23.6	**51.8**	dB(A)

Supply air Volume flow: 1.8000 m^3/s tpd: 824 Pa

Octave:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**sum P.**	Unit
Outlet: sound power level in outlet cross section.										
Lw4	**71.0**	**83.3**	**78.9**	**78.5**	**77.6**	**75.9**	**72.6**	**66.8**	86.9	dB
LwA4	44.8	67.2	70.3	75.3	77.6	77.1	73.6	65.7	**82.7**	dB(A)
Intake: sound power level in the inlet cross section.										
Lw3	**64.6**	**73.0**	**70.7**	**62.9**	**56.4**	**52.9**	**48.2**	**42.2**	75.7	dB
LwA3	38.4	56.9	62.1	59.7	56.4	54.1	49.2	41.1	**65.9**	dB(A)
Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
Lw2	**60.8**	**66.6**	**60.1**	**47.3**	**43.2**	**39.3**	**35.1**	**30.5**	68.4	dB
LwA2	34.6	50.5	51.5	44.1	43.2	40.5	36.1	29.4	**55.0**	dB(A)

Sum

Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
LwSum	**63.7**	**68.8**	**61.3**	**49.3**	**44.7**	**40.1**	**36.0**	**31.5**	70.5	dB
LwASum	37.5	52.7	52.7	46.1	44.7	41.3	37.0	30.4	**56.7**	dB(A)

Branch office:

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Manufacturer

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Data sheet

Project: **238351 - 001-00-489136**
Order #:
Proj. descr.: ElmwoodLeisure Centre
Unit: AHU.R.06 - (Rev 03 // No Controls - 21.02.2025)
Single Piece
Type: AT4-F 12x8/12x8 - Weatherproof

Piece: 1

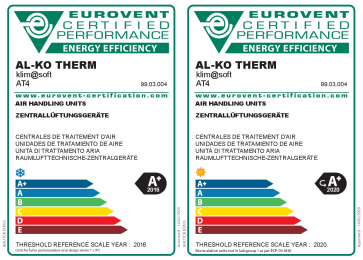
Pos.: **6**
GS-pos.:
Date Printed: 21.02.2025
Edition Date: 21/02/2025
Editor: Adam Finn

Quotation

Note: All data relate to standard conditions for air density = 1.2 kg/m^3

Unit data	**Supply air**		**Exhaust air**	
	Target value	Actual	Target value	Actual
Air flow	0.8800	0.8800 m^3/s	0.8800	0.8800 m^3/s
External pressure	285	285 Pa	185	185 Pa
Internal pressure	359	359 Pa	232	232 Pa
Air velocity		1.6 m/s		1.6 m/s

Eurovent Efficiency Wint./Sum.	A+ (2016) / A+ (2020)
Climate zone	United Kingdom / BIRMINGHAM
RLT energy efficiency class	A+ (2018)
Calculated ERP compliance	Compliant 2018



SA - louvre covering	**G 1**	**FU 0**	**Accessory**
Type:	louvre covering		- Weather protection louvre covering
Width:	12	AT4 raster	
Height:	8	AT4 raster	
Design pressure:	8	Pa	

SA - Damper inside	**G 1**	**FU 0**	**Accessory**
Type:	Damper inside		- Damper leak tight class 2
Width:	767	mm	- coated
Height:	561	mm	
Connector:	A20		
Needed torque:	5.00	Nm	
Design pressure:	5	Pa	
Actuator type:	gearwheels inside one-sided		
Number of axis:	1		
Axis type:	square 10mm		

SA - Empty section	**G 1**	**FU 12**	**Accessory**
Specification:	Empty section		- Maintenance panel
Length:	3	AT4 raster	

Data sheet

Project: **238351 - 001-00-489136** Pos.: **6** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.06 - (Rev 03 // No Controls - 21.02.2025) Piece: 1 Edition Date: 21/02/2025
Single Piece

Type: AT4-F 12x8/12x8 - Weatherproof Editor: Adam Finn

SA - Filter	**G 1**	**FU 2**	**Accessory**
Type:	BF - Bag Filter		- Maintenance door with built in pressure gage
Class:	ePM10-55 % / M5		- Hand Lever lockable
eff. class:		E	- Indicating pressure gauge 250 Pa
Design pressure:		52 Pa	- Quick change filter frame
Initial pressure:		26 Pa	
End pressure:		78 Pa	
air velocity cross section:		1.6 m/s	
Filter surface:		5.2 m^2	
Filter length:		360 mm	
Filter element 592x592:		1	
Filter element 287x592:		1	
Maintenance:	F - quick change filter frame		
Air flow:		0.8800 m^3/s	

SA - Filter	**G 1**	**FU 5**	**Accessory**
Type:	BF - Bag Filter		- Maintenance door with built in pressure gage
Class:	ePM1-60 % / F7		- Hand Lever lockable
eff. class:		D	- Indicating pressure gauge 250 Pa
Design pressure:		119 Pa	- Quick change filter frame
Initial pressure:		69 Pa	
End pressure:		169 Pa	
air velocity cross section:		1.6 m/s	
Filter surface:		5.5 m^2	
Filter length:		380 mm	
Filter element 592x592:		1	
Filter element 287x592:		1	
Maintenance:	F - quick change filter frame		
Air flow:		0.8800 m^3/s	

Rotary heatex	**G 2**	**FU 8**	**Accessory**
HRS type	Rotary heat exchanger		
Type:	Standard rotor		- Maintenance door
operating state:		1	- Maintenance panel
Total Thermal Capacity:		27.3 kW	- Controller mounted and leaded motor
Thermal efficiency:		75.1 %	
Humidity exchange rate:		40.4 %	
HRS class (EN13053/2020):		H2	
Balanced Efficiency (dry / 5-25^{o}C):		75.1 %	
Supply air:		0.8800 m^3/s	
Δ Pressure (S) :		166.9 Pa	
Temperature IN:		-5.0 ^{o}C	
Rel. Humidity IN:		99.0 %	
Abs. Humidity IN:		2.5 g/kgL	
Temperature Out:		16.0 ^{o}C	
Rel. Humidity OUT:		38.1 %	
Abs. Humidity OUT:		4.3 g/kgL	
Exhaust air:		0.8800 m^3/s	

Data sheet

Project: **238351 - 001-00-489136** Pos.: **6** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.06 - (Rev 03 // No Controls - 21.02.2025) Single Piece Piece: 1 Edition Date: 21/02/2025

Type: AT4-F 12x8/12x8 - Weatherproof Editor: Adam Finn

Δ Pressure (E):	166.9 Pa
Temperature IN:	23.0 °C
Rel. Humidity IN:	40.0 %
Abs. Humidity IN:	7.0 g/kgL
Temperature Out:	3.4 °C
Rel. Humidity OUT:	95.0 %
Abs. Humidity OUT:	4.6 g/kgL
Drive output:	110 W
Current:	1.2 A
Voltage:	230 V
Phase count:	3-phase
Supply air:	
Exhaust air:	
EATR:	4.4 %
OACF:	1.01

SA - Fan - Wheel - EC	**G 3**	**FU 3**
Fan type:	Wheel - EC 355	
Air flow:	3,168	m^3/h
Static increase of pressure:	644	Pa
Casing pressure loss:	0	Pa
Static efficiency:	66	%
Manufacturer efficiency:	70	%
Efficiency class N (EU 327/2011):	72.9	
Speed:	2,513	1/min
Max. speed:	3,100	1/min
- *Motor*		
Control type:	EC - controlled	
Speed:	2,513	1/min
Control voltage:	7.8	V
Volume / rotation reserve:	23	%
Power input:	0.86	kW
Efficiency class:	IE 5	
SFP value (GEG 2020):	560	$W/(m^3/s)$
SFPv (EN 16798-3):	860	$W/(m^3/s)$
SFP class:	SFP 2	
Speed Class:	V1	
Max. input power:	1.3	kW
Nominal rated voltage:	380 .. 480	V
Power Frequency:	50	Hz
Nominal rated capacity:	1.50	kW
Nominal rated current:	2.30	A
Protection class:	IP54	
Overload protection:	Power control	
Insulation class:	F	
P Class:	P1	
System Efficiency:	66	%
Sound Power Level Inlet:	74.2	dB(A)
Sound Power Level Outlet:	78.0	dB(A)

Octave band:	63	125	250	500	1k	2k	4k	8k	Hz
Lw Inlet:	69	66	71	66	68	69	66	57	dB

Accessory

- Volume flow measuring for fan
- Wiring repair switch/fan
- Repair switch

Data sheet

Project: **238351 - 001-00-489136** Pos.: **6** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.06 - (Rev 03 // No Controls - 21.02.2025) Piece: 1 Edition Date: 21/02/2025
Single Piece

Type: AT4-F 12x8/12x8 - Weatherproof Editor: Adam Finn

Lw Outlet:	69	67	72	69	74	72	70	60	dB
Air flow:							0.8800		m^3/s
K factor:							145		

volume flow [m^3/h]: K factor x $\sqrt{\text{nozzle-pressure}}$ [Pa]

SA - Empty section	**G 3**	**FU 14**	**Accessory**
Specification:	Empty section		- Maintenance door
Length:	7	AT4 raster	- Hand Lever lockable w. Door Catch

SA - Heating coil	**G 3**	**FU 4**	**Accessory**
Type:	PWW - Copper/Aluminium - A		
Total Thermal Capacity:	5.30	kW	
pressure loss (dry):	8	Pa	
Air flow speed:	2.00	m/s	
Temperature Inlet:	15.0	^{o}C	
Rel. Humidity Inlet:	50.0	%	
Abs. Humidity Inlet:	5.3	g/kgL	
Temperature Outlet:	20.0	^{o}C	
Power reserve:	30	%	
Rel. Humidity Outlet:	36.5	%	
Abs. Humidity Outlet:	5.3	g/kgL	
Medium:	Water		
Medium temperature IN:	45.0	^{o}C	
Medium temperature OUT:	38.0	^{o}C	
Max. medium pressure:	16	bar	
Medium flow quantity:	657	l/h	
Δp medium:	5.3	kPa	
Δ fins:	2.1	mm	
Rows:	1		
Circuits:	4		
Content:	1.7	l	
Pipes:	Copper		
Fins:	Aluminium		
Header:	Copper		
Frame:	Aluminium		
Frame to hold frost protection equipment:	Without		
Connection type:	A - water connection straight sidewards		
Connection width:	DN 20 (R 3/4)		
Connections per circuit:	2		
Air flow:	0.8800	m^3/s	

SA - Connection frame with rubber	**G 3**	**FU 0**	**Accessory**
Type:	Connection frame with rubber		- Connecting Frame powder coated
Width:	918	mm	
Height:	612	mm	
Depth:	60	mm	
Design:	7001		
Connector:	A30		

Project: **238351 - 001-00-489136** Pos.: **6** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.06 - (Rev 03 // No Controls - 21.02.2025) Piece: 1 Edition Date: 21/02/2025
Single Piece

Type: AT4-F 12x8/12x8 - Weatherproof Editor: Adam Finn

EA - Connection frame with rubber	**G 4**	**FU 0**	**Accessory**
Type:	Connection frame with rubber		- Connecting Frame powder coated
Width:	918	mm	
Height:	612	mm	
Depth:	60	mm	
Design:	7001		
Connector:	A30		

EA - Filter	**G 4**	**FU 6**	**Accessory**
Type:	BF - Bag Filter		- Maintenance door with built in pressure gage
Class:	ePM10-55 % / M5		- Hand Lever lockable
eff. class:	E		- Indicating pressure gauge 250 Pa
Design pressure:	52	Pa	- Quick change filter frame
Initial pressure:	26	Pa	
End pressure:	78	Pa	
air velocity cross section:	1.6	m/s	
Filter surface:	5.2	m^2	
Filter length:	360	mm	
Filter element 592x592:	1		
Filter element 287x592:	1		
Maintenance:	F - quick change filter frame		
Air flow:	0.8800	m^3/s	

Rotary heatex	**G 2**	**FU 8**	**Accessory**
See above			

EA - Fan - Wheel - EC	**G 5**	**FU 7**	**Accessory**
Fan type:	Wheel - EC 355		- Volume flow measuring for fan
Air flow:	3,168	m^3/h	- Wiring repair switch/fan
Static increase of pressure:	417	Pa	- Repair switch
Casing pressure loss:	0	Pa	
Static efficiency:	63	%	
Manufacturer efficiency:	68	%	
Efficiency class N (EU 327/2011):	72.9		
Speed:	2,179	1/min	
Max. speed:	3,100	1/min	
- *Motor*			
Control type:	EC - controlled		
Speed:	2,179	1/min	
Control voltage:	6.7	V	
Volume / rotation reserve:	42	%	
Power input:	0.58	kW	
Efficiency class:	IE 5		
SFP value (GEG 2020):	320	$W/(m^3/s)$	
SFPv (EN 16798-3):	620	$W/(m^3/s)$	
SFP class:	SFP 1		
Speed Class:	V1		

Project: **238351 - 001-00-489136** Pos.: **6** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.06 - (Rev 03 // No Controls - 21.02.2025) Single Piece Piece: 1 Edition Date: 21/02/2025

Type: AT4-F 12x8/12x8 - Weatherproof Editor: Adam Finn

Max. input power:	0.9 kW
Nominal rated voltage:	380 .. 480 V
Power Frequency:	50 Hz
Nominal rated capacity:	1.50 kW
Nominal rated current:	2.30 A
Protection class:	IP54
Overload protection:	Power control
Insulation class:	F
P Class:	P1
System Efficiency:	63 %
Sound Power Level Inlet:	71.2 dB(A)
Sound Power Level Outlet:	75.2 dB(A)

Octave band:	63	125	250	500	1k	2k	4k	8k	Hz
Lw Inlet:	62	64	63	64	65	66	64	55	dB
Lw Outlet:	64	65	64	67	71	69	67	58	dB

Air flow:	0.8800 m^3/s
K factor:	145
volume flow [m^3/h]:	K factor x $\sqrt{\text{nozzle-pressure}}$ [Pa]

EA - Empty section	**G 5**	**FU 13**	**Accessory**
Specification:	Empty section		- Maintenance door
Length:	8	AT4 raster	- Hand Lever lockable w. Door Catch

EA - Empty section	**G 5**	**FU 10**	**Accessory**
Specification:	Empty section		- Maintenance panel
Length:	3	AT4 raster	

EA - Damper inside	**G 5**	**FU 0**	**Accessory**
Type:	Damper inside		- Damper leak tight class 2
Width:	767	mm	- coated
Height:	561	mm	
Connector:	A20		
Needed torque:	5.00	Nm	
Design pressure:	5	Pa	
Actuator type:	gearwheels inside one-sided		
Number of axis:	1		
Axis type:	square 10mm		

EA - louvre covering	**G 5**	**FU 0**	**Accessory**
Type:	louvre covering		- Weather protection louvre covering
Width:	12	AT4 raster	
Height:	8	AT4 raster	
Design pressure:	8	Pa	

ERP information

Calculated ERP compliance: Compliant 2018

Data sheet

Project: **238351 - 001-00-489136** Pos.: **6** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.06 - (Rev 03 // No Controls - 21.02.2025) Piece: 1 Edition Date: 21/02/2025
Single Piece

Type: AT4-F 12x8/12x8 - Weatherproof Editor: Adam Finn

Type	NRVU-BVU
Heat recovery	Rotary heat exchanger
Internal SFP	663 W/(m^3/s)
Dp int supply	236 Pa
Dp int exhaust	193 Pa
Fan speed controlled	
max. outer leak rate (+/- 400 Pa)	0.4 %

Unit features:

Frame material AT4-F	Alu
Panel Isolation	Decoupled [T2(M)]
MB-Reference	AT4-F-04
Panel material	7001/7001
Unit corner material (frame)	Alu / TB2
Transport	Standard transport
Base frame	130 mm
complete base frame	130 mm
Weatherproof	Yes

Dimensions						**Transport weight**
Length:	3,289 mm	Width:	1,071 mm	Height:	1,736 mm	933 kg

***** END OF LIST *****

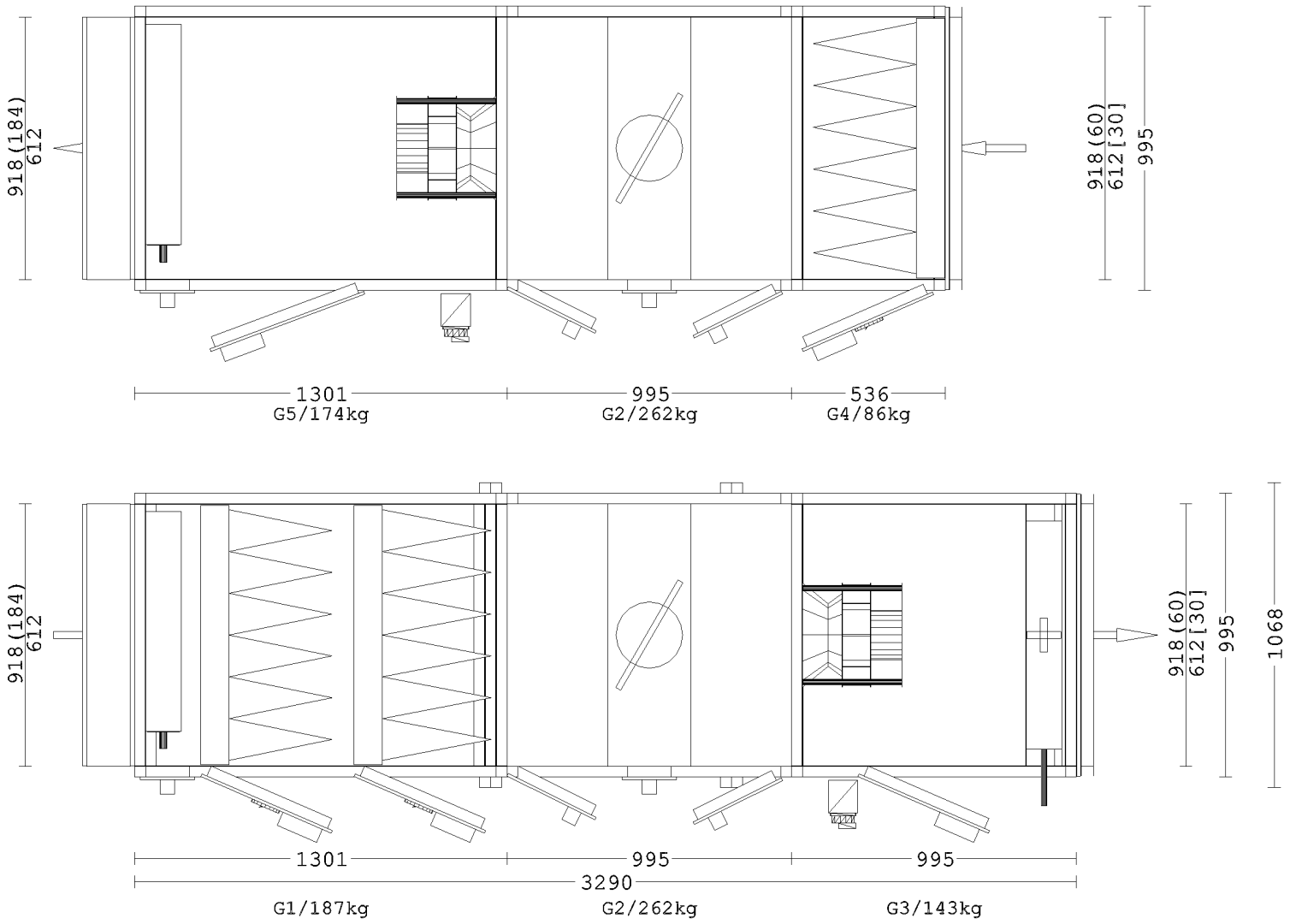


Attention: Transport on base frame! Lid Inside 7001 / Lid Outside 7001 / Decoupled [T2(M)], Frame: Alu, Type: weatherproof, Weight: 933 kg

Front view

If not mentioned otherwise, dimension inside flange to unit38 mm. Delivery on common base frame. Round bracket () for single/total flange length, rectangular bracket [] for flange dimensions.Please note an all-round panel overhang (approx. 16mm)!

AL-KO THERM GMBH	Project:	238351 - 001-00-489136	Pos. / GS-pos.:	6 /
D-89343 Jettingen-Scheppach	Proj. descr.:	ElmwoodLeisure Centre	Order #:	
Adam Finn	Unit:	AHU.R.06 - (Rev 03 // No Controls - 21.02.2025) Single Piece	Edition Date:	21/02/2025
+44 8457 165 162	Type:	AT4-F 12x8/12x8 - Weatherproof	Scale/Software	1:22 / 3.88.02

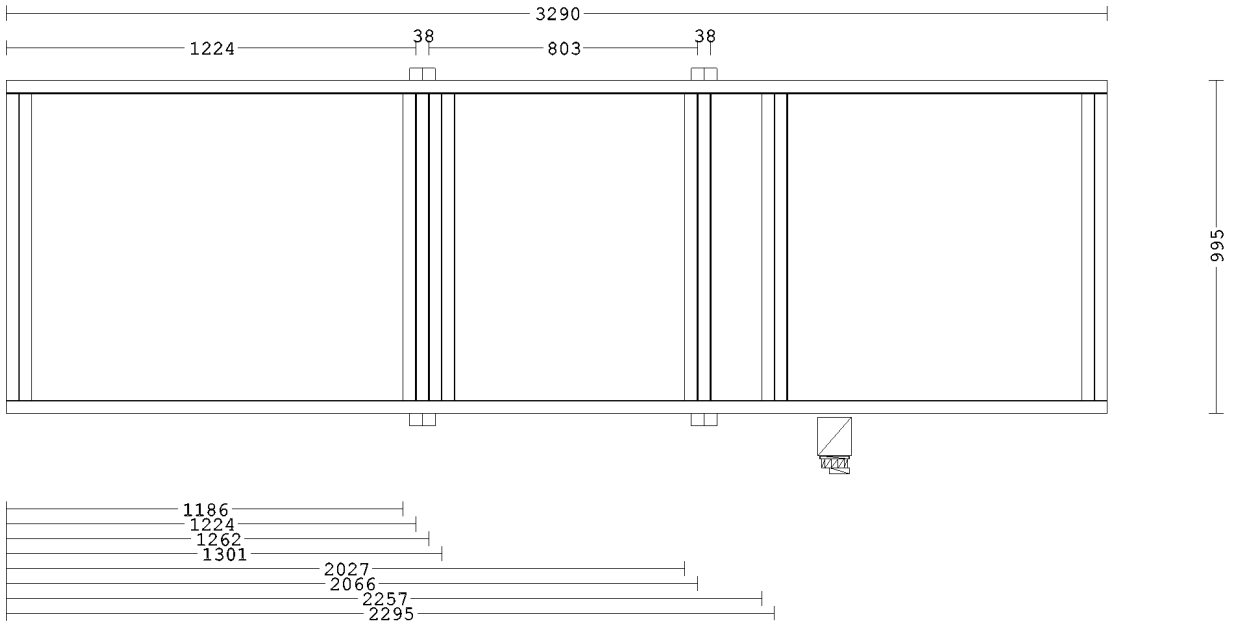


Attention: Transport on base frame! Lid Inside 7001 / Lid Outside 7001 / Decoupled [T2(M)], Frame: Alu, Type: weatherproof, Weight: 933 kg

Top view

If not mentioned otherwise, dimension inside flange to unit38 mm. Delivery on common base frame. Round bracket () for single/total flange length, rectangular bracket [] for flange dimensions.Please note an all-round panel overhang (approx. 16mm)!

AL-KO THERM GMBH	Project:	238351 - 001-00-489136	Pos. / GS-pos.:	6 /
D-89343 Jettingen-Scheppach	Proj. descr.:	ElmwoodLeisure Centre	Order #:	
Adam Finn	Unit:	AHU.R.06 - (Rev 03 // No Controls - 21.02.2025) Single Piece	Edition Date:	21/02/2025
+44 8457 165 162	Type:	AT4-F 12x8/12x8 - Weatherproof	Scale/Software	1:22 / 3.88.02



Attention: Transport on base frame! Lid Inside 7001 / Lid Outside 7001 / Decoupled [T2(M)], Frame: Alu, Type: weatherproof, Weight: 933 kg

Top view

If not mentioned otherwise, dimension inside flange to unit38 mm. Delivery on common base frame. Round bracket () for single/total flange length, rectangular bracket [] for flange dimensions.Please note an all-round panel overhang (approx. 16mm)!

AL-KO THERM GMBH	Project:	238351 - 001-00-489136	Pos. / GS-pos.:	6 /
D-89343 Jettingen-Scheppach	Proj. descr.:	ElmwoodLeisure Centre	Order #:	
Adam Finn	Unit:	AHU.R.06 - (Rev 03 // No Controls - 21.02.2025) Single Piece	Edition Date:	21/02/2025
+44 8457 165 162	Type:	AT4-F 12x8/12x8 - Weatherproof	Scale/Software	1:22 / 3.88.02

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Manufacturer

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Sound emission

Project: **238351 - 001-00-489136**
Order #:
Proj. descr.: ElmwoodLeisure Centre
Unit: AHU.R.06 - (Rev 03 // No Controls - 21.02.2025)
Single Piece
Piece: 1
Type: AT4-F 12x8/12x8 - Weatherproof

Pos.: **6**
GS-pos.:
Date Printed: 21.02.2025
Edition Date: 21/02/2025
Editor: Adam Finn

Quotation

Exhaust air Volume flow: 0.8800 m^3/s tpd: 417 Pa

Octave:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**sum P.**	Unit
Outlet: sound power level in outlet cross section.										
Lw4	**63.8**	**64.6**	**64.0**	**67.0**	**71.1**	**69.0**	**67.2**	**57.9**	76.0	dB
LwA4	37.6	48.5	55.4	63.8	71.1	70.2	68.2	56.8	**75.2**	dB(A)
Intake: sound power level in the inlet cross section.										
Lw3	**62.0**	**62.3**	**59.2**	**59.4**	**59.1**	**58.4**	**55.8**	**42.8**	68.4	dB
LwA3	35.8	46.2	50.6	56.2	59.1	59.6	56.8	41.7	**64.5**	dB(A)
Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
Lw2	**55.6**	**51.4**	**45.9**	**38.2**	**39.1**	**35.0**	**32.7**	**22.9**	57.5	dB
LwA2	29.4	35.3	37.2	35.0	39.1	36.2	33.7	21.8	**44.4**	dB(A)

Supply air Volume flow: 0.8800 m^3/s tpd: 644 Pa

Octave:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**sum P.**	Unit
Outlet: sound power level in outlet cross section.										
Lw4	**68.9**	**67.2**	**72.3**	**68.9**	**73.3**	**69.7**	**68.1**	**57.9**	78.8	dB
LwA4	42.7	51.1	63.7	65.7	73.3	70.9	69.1	56.8	**76.9**	dB(A)
Intake: sound power level in the inlet cross section.										
Lw3	**67.8**	**63.8**	**65.7**	**58.4**	**57.8**	**56.5**	**53.5**	**40.0**	71.5	dB
LwA3	41.6	47.7	57.1	55.2	57.8	57.7	54.5	38.9	**63.8**	dB(A)
Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
Lw2	**61.4**	**54.0**	**54.2**	**40.2**	**41.8**	**38.0**	**35.5**	**24.9**	62.8	dB
LwA2	35.2	37.9	45.6	37.0	41.8	39.2	36.5	23.8	**49.0**	dB(A)

Sum

Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
LwSum	**62.4**	**55.9**	**54.8**	**42.3**	**43.7**	**39.7**	**37.3**	**27.0**	63.9	dB
LwASum	36.2	39.8	46.2	39.1	43.7	40.9	38.3	25.9	**50.3**	dB(A)

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James Dean / External

Manufacturer

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Hauptstrasse 248-250
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Tel.:

Data sheet

Project: **238351 - 001-00-489136**
Order #:
Proj. descr.: ElmwoodLeisure Centre
Unit: AHU.R.07 - (Rev 04 // Sectional, No Controls - 14.02.2025)
Type: AT4-F 32x16/32x16 - Interior

Piece: 1

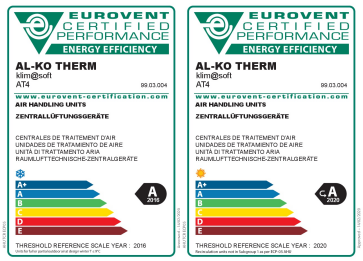
Pos.: **7**
GS-pos.:
Date Printed: 21.02.2025
Edition Date: 20/02/2025
Editor: James Dean

Quotation

Note: All data relate to standard conditions for air density = 1.2 kg/m^3

Unit data	**Supply air**		**Exhaust air**	
	Target value	Actual	Target value	Actual
Air flow	7.2400	7.2400 m^3/s	7.2300	7.2300 m^3/s
External pressure	385	385 Pa	285	285 Pa
Internal pressure	506	506 Pa	288	288 Pa
Air velocity		2.4 m/s		2.4 m/s

Eurovent Efficiency Wint./Sum. A (2016) / A (2020)
Climate zone United Kingdom / BIRMINGHAM
Calculated ERP compliance Compliant 2018



SA - Damper outside	**G 1**	**FU 0**	**Accessory**
Type:	Damper outside		- Damper leak tight class 2
Width:	2,448 mm		- Damper divided
Height:	1,224 mm		
Connector:	A30		
Needed torque:	25.00 Nm		
Design pressure:	7 Pa		
Actuator type:	linkage outside one-sided		
Number of axis:	1		
Axis type:	square 15mm		

SA - Empty section	**G 1**	**FU 0**	**Accessory**
Length:	2	AT4 raster	

SA - Filter	**G 1**	**FU 2**	**Accessory**
Type:	BF - Bag Filter		- Maintenance door with built in pressure gage
Class:	ePM10-55 % / M5		- Hand Lever
eff. class:	E		- Hand Lever lockable
Design pressure:	101 Pa		- Indicating pressure gauge 250 Pa
Initial pressure:	51 Pa		- Quick change filter frame
End pressure:	151 Pa		
air velocity cross section:	2.4 m/s		

Filter surface:	27.7	m^2
Filter length:	360	mm
Filter element 592x592:	8	
Maintenance:	F - quick change filter frame	
Air flow:	7.2400	m^3/s

SA - Filter	**G 1**	**FU 3**	**Accessory**
Type:	BF - Bag Filter		- Maintenance door with built in pressure gage
Class:	ePM1-60 % / F7		- Hand Lever
eff. class:	D		- Hand Lever lockable
Design pressure:	168	Pa	- Indicating pressure gauge 250 Pa
Initial pressure:	118	Pa	- Quick change filter frame
End pressure:	218	Pa	
air velocity cross section:	2.4	m/s	
Filter surface:	29.2	m^2	
Filter length:	380	mm	
Filter element 592x592:	8		
Maintenance:	F - quick change filter frame		
Air flow:	7.2400	m^3/s	

Rotary heatex	**G 2**	**FU 8**	**Accessory**
HRS type	Rotary heat exchanger		
Type:	Standard rotor		- Sectorised Rotor for Delivery
operating state:	1		- Maintenance door
Total Thermal Capacity:	165.0	kW	- Controller mounted and leaded motor
Thermal efficiency:	73.9	%	
Humidity exchange rate:	41.8	%	
HRS class (EN13053/2020):	H2		
Balanced Efficiency (dry / 5-25^{o}C):	73.9	%	
Supply air:	7.2400	m^3/s	
Δ Pressure (S) :	179.5	Pa	
Temperature IN:	-5.0	^{o}C	
Rel. Humidity IN:	99.0	%	
Abs. Humidity IN:	2.5	g/kgL	
Temperature Out:	10.5	^{o}C	
Rel. Humidity OUT:	48.2	%	
Abs. Humidity OUT:	3.8	g/kgL	
Exhaust air:	7.2300	m^3/s	
Δ Pressure (E):	179.2	Pa	
Temperature IN:	16.0	^{o}C	
Rel. Humidity IN:	50.0	%	
Abs. Humidity IN:	5.6	g/kgL	
Temperature Out:	1.3	^{o}C	
Rel. Humidity OUT:	95.0	%	
Abs. Humidity OUT:	3.9	g/kgL	
Drive output:	220	W	
Current:	2.4	A	
Voltage:	230	V	
Phase count:	3-phase		

Data sheet

Project: **238351 - 001-00-489136** Pos.: **7** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.07 - (Rev 04 // Sectional, No Controls - 14.02.2025) Piece: 1 Edition Date: 20/02/2025

Type: AT4-F 32x16/32x16 - Interior Editor: James Dean

Supply air:
Exhaust air:

SA - Empty section	**G 3**	**FU 10**	**Accessory**
Specification:		Empty section	- Maintenance door
Length:		8 AT4 raster	- Hand Lever
			- Hand Lever lockable

SA - Fan - Wheel - EC	**G 3**	**FU 4**	**Accessory**
# units:		2	- Volume flow measuring for fan
Fan type:		Wheel - EC 560	
Air flow:		13,032 m^3/h	
Static increase of pressure:		891 Pa	
Casing pressure loss:		0 Pa	
Static efficiency:		71 %	
Manufacturer efficiency:		79 %	
Efficiency class N (EU 327/2011):		74.6	
Speed:		2,076 1/min	
Max. speed:		2,080 1/min	
- *Motor*			
# units:		2	
Control type:		EC - controlled	
Speed:		2,076 1/min	
Control voltage:		10.0 V	
Volume / rotation reserve:		0 %	
Power input:		4.52 kW	
Efficiency class:		IE 5	
SFP value (GEG 2020):		809 $W/(m^3/s)$	
SFPv (EN 16798-3):		1,109 $W/(m^3/s)$	
SFP class:		SFP 3	
Speed Class:		V5	
Max. input power:		6.2 kW	
Nominal rated voltage:		380 .. 480 V	
Power Frequency:		50 Hz	
Nominal rated capacity:		4.40 kW	
Nominal rated current:		6.70 A	
Protection class:		IP54	
Overload protection:		Power control	
Insulation class:		F	
P Class:		P1	
System Efficiency:		71 %	
Sound Power Level Inlet:		84.8 dB(A)	
Sound Power Level Outlet:		89.5 dB(A)	

Octave band:	63	125	250	500	1k	2k	4k	8k	Hz
Lw Inlet:	75	78	78	78	77	76	80	76	dB
Lw Outlet:	78	81	80	84	85	82	81	78	dB

Air flow: 7.2400 m^3/s

K factor: 381

volume flow [m^3/h]: K factor x $\sqrt{\text{nozzle-pressure}}$ [Pa]

Project: **238351 - 001-00-489136** Pos.: **7** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.07 - (Rev 04 // Sectional, No Controls - 14.02.2025) Piece: 1 Edition Date: 20/02/2025

Type: AT4-F 32x16/32x16 - Interior Editor: James Dean

SA - Empty section	**G 4**	**FU 13**	**Accessory**
Specification:	Empty section		- Maintenance door
Length:	8	AT4 raster	- Hand Lever
			- Hand Lever lockable w. Door Catch

SA - Heating coil	**G 4**	**FU 5**	**Accessory**
Type:	PWW - Copper/Aluminium - A		
Total Thermal Capacity:	158.60	kW	
pressure loss (dry):	49	Pa	
Air flow speed:	2.81	m/s	
Temperature Inlet:	10.0	^{o}C	
Rel. Humidity Inlet:	50.3	%	
Abs. Humidity Inlet:	3.8	g/kgL	
Temperature Outlet:	28.0	^{o}C	
Power reserve:	11	%	
Rel. Humidity Outlet:	16.3	%	
Abs. Humidity Outlet:	3.8	g/kgL	
Medium:	Water		
Medium temperature IN:	45.0	^{o}C	
Medium temperature OUT:	38.0	^{o}C	
Max. medium pressure:	16	bar	
Medium flow quantity:	19,705	l/h	
Δp medium:	32.9	kPa	
Δ fins:	3.5	mm	
Rows:	4		
Circuits:	52		
Content:	27.9	l	
Pipes:	Copper		
Fins:	Aluminium		
Header:	Copper		
Frame:	Galvanised steel		
Frame to hold frost protection equipment:	Without		
Connection type:	A - water connection straight sidewards		
Connection width:	DN 65 (R 2-1/2)		
Connections per circuit:	2		
Air flow:	7.2400	m^3/s	

SA - Connection frame with rubber	**G 4**	**FU 0**	**Accessory**
Type:	Connection frame with rubber		- Connecting Frame powder coated
Width:	2,448	mm	
Height:	1,224	mm	
Depth:	60	mm	
Design:	7001		
Connector:	A30		

EA - Connection frame with rubber	**G 5**	**FU 0**	**Accessory**

Project: **238351 - 001-00-489136** Pos.: **7** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.07 - (Rev 04 // Sectional, No Controls - 14.02.2025) Piece: 1 Edition Date: 20/02/2025

Type: AT4-F 32x16/32x16 - Interior Editor: James Dean

Type:	Connection frame with rubber	- Connecting Frame powder coated
Width:	2,448 mm	
Height:	1,224 mm	
Depth:	60 mm	
Design:	7001	
Connector:	A30	

EA - Empty section **G 5** **FU 15** **Accessory**

Specification:	Empty section	
Length:	8 AT4 raster	

EA - Filter **G 5** **FU 6** **Accessory**

Type:	BF - Bag Filter	- Maintenance door with built in pressure gage
Class:	ePM10-55 % / M5	- Hand Lever
eff. class:	E	- Hand Lever lockable
Design pressure:	101 Pa	- Indicating pressure gauge 250 Pa
Initial pressure:	51 Pa	- Quick change filter frame
End pressure:	151 Pa	
air velocity cross section:	2.4 m/s	
Filter surface:	27.7 m^2	
Filter length:	360 mm	
Filter element 592x592:	8	
Maintenance:	F - quick change filter frame	
Air flow:	7.2300 m^3/s	

Rotary heatex **G 2** **FU 8** **Accessory**

See above

EA - Empty section **G 6** **FU 11** **Accessory**

Specification:	Empty section	- Maintenance door
Length:	8 AT4 raster	- Hand Lever
		- Hand Lever lockable

EA - Fan - Wheel - EC **G 6** **FU 7** **Accessory**

# units:	2	- Volume flow measuring for fan
Fan type:	Wheel - EC 630	
Air flow:	13,014 m^3/h	
Static increase of pressure:	573 Pa	
Casing pressure loss:	0 Pa	
Static efficiency:	71 %	
Manufacturer efficiency:	79 %	
Efficiency class N (EU 327/2011):	75.0	
Speed:	1,488 1/min	
Max. speed:	1,630 1/min	
- *Motor*		
# units:	2	
Control type:	EC - controlled	

Data sheet

Project: **238351 - 001-00-489136** Pos.: **7** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.07 - (Rev 04 // Sectional, No Controls - 14.02.2025) Piece: 1 Edition Date: 20/02/2025

Type: AT4-F 32x16/32x16 - Interior Editor: James Dean

Speed:	1,488 1/min
Control voltage:	9.0 V
Volume / rotation reserve:	10 %
Power input:	2.90 kW
Efficiency class:	IE 5
SFP value (GEG 2020):	433 W/(m^3/s)
SFPv (EN 16798-3):	733 W/(m^3/s)
SFP class:	SFP 1
Speed Class:	V5
Max. input power:	4.1 kW
Nominal rated voltage:	380 .. 480 V
Power Frequency:	50 Hz
Nominal rated capacity:	3.72 kW
Nominal rated current:	5.70 A
Protection class:	IP54
Overload protection:	Power control
Insulation class:	F
P Class:	P1
System Efficiency:	71 %
Sound Power Level Inlet:	81.2 dB(A)
Sound Power Level Outlet:	86.6 dB(A)

Octave band:	63	125	250	500	1k	2k	4k	8k	Hz
Lw Inlet:	74	81	74	76	74	74	75	66	dB
Lw Outlet:	77	84	76	82	83	78	76	68	dB

Air flow:	7.2300 m^3/s
K factor:	463
volume flow [m^3/h]:	K factor x $\sqrt{\text{nozzle-pressure}}$ [Pa]

EA - Empty section **G 6** **FU 14**

Specification:	Empty section
Length:	8 AT4 raster

Accessory

- Maintenance door
- Hand Lever
- Hand Lever lockable w. Door Catch

EA - Damper outside **G 6** **FU 0**

Type:	Damper outside
Width:	2,448 mm
Height:	1,224 mm
Connector:	A30
Needed torque:	25.00 Nm
Design pressure:	7 Pa
Actuator type:	linkage outside one-sided
Number of axis:	1
Axis type:	square 15mm

Accessory

- Damper leak tight class 2
- Damper divided

ERP information

Calculated ERP compliance	Compliant 2018
Type	NRVU-BVU
Heat recovery	Rotary heat exchanger

Data sheet

Project: **238351 - 001-00-489136** Pos.: **7** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.07 - (Rev 04 // Sectional, No Controls - 14.02.2025) Piece: 1 Edition Date: 20/02/2025

Type: AT4-F 32x16/32x16 - Interior Editor: James Dean

Internal SFP	741 W/(m^3/s)
Dp int supply	298 Pa
Dp int exhaust	230 Pa
Fan speed controlled	
max. outer leak rate (+/- 400 Pa)	0.2 %

Unit features:

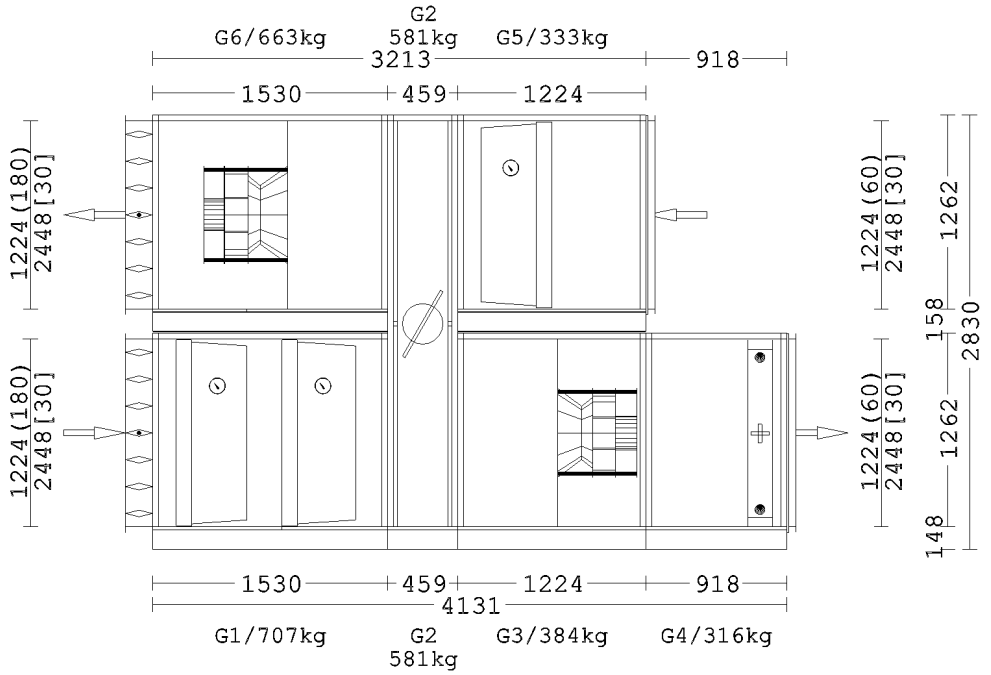
Frame material AT4-F	Alu
Panel Isolation	Decoupled [T2(M)]
MB-Reference	AT4-F-02
Panel material	7001/7001
Unit corner material (frame)	Alu / TB2
Transport	Standard transport
Base frame	130 mm

Unit information

AHU SFPv = 1.840 w/l/s

Dimensions						**Transport weight**
Length:	4,131 mm	Width:	2,524 mm	Height:	2,830 mm	2,985 kg

***** END OF LIST *****

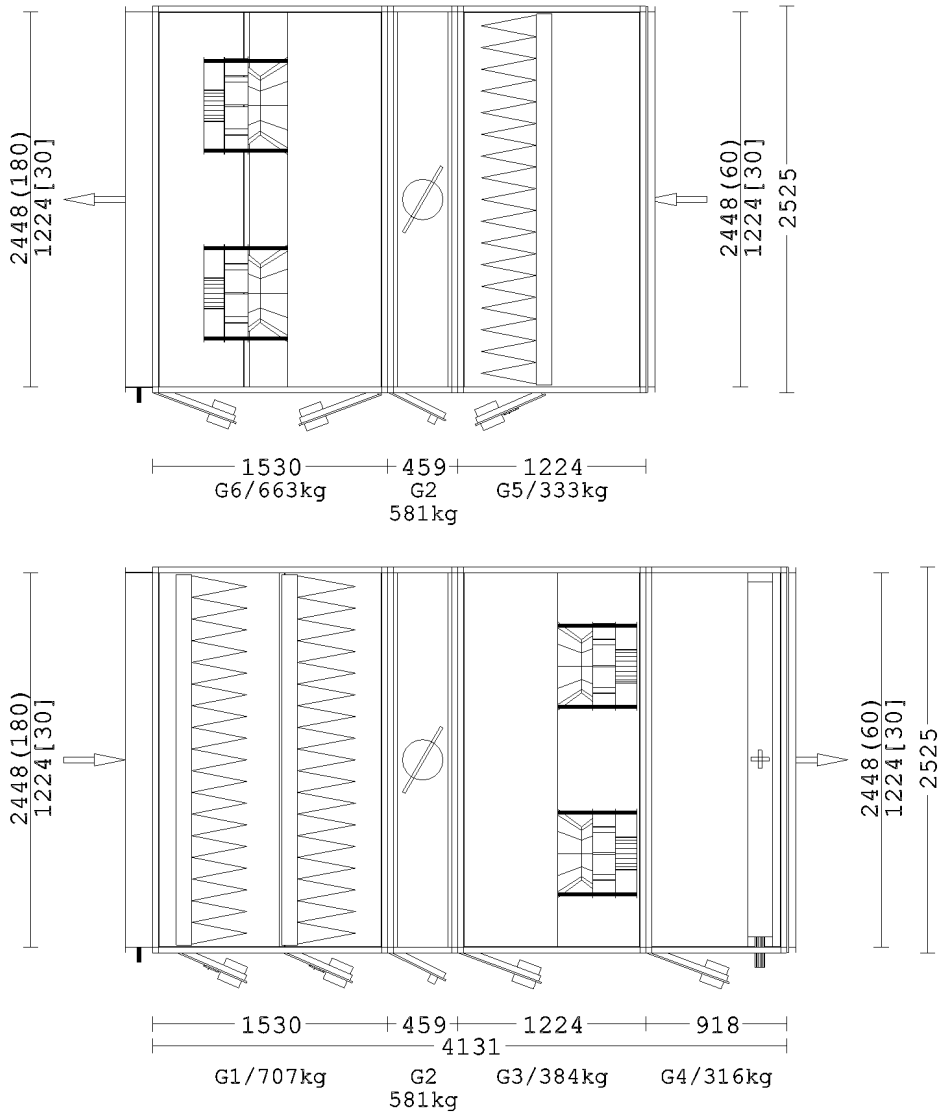


Attention: Transport on base frame! Lid Inside 7001 / Lid Outside 7001 / Decoupled [T2(M)], Frame: Alu, Type: indoor, Weight: 2,985 kg

Front view

If not mentioned otherwise, dimension inside flange to unit38 mm. Round bracket () for single/total flange length, rectangular bracket [] for flange dimensions.Please note an all-round panel overhang (approx. 16mm)!

AL-KO THERM GMBH D-89343 Jettingen-Scheppach James Dean	Project:	238351 - 001-00-489136	Pos. / GS-pos.:	7 /
	Proj. descr.:	ElmwoodLeisure Centre	Order #:	
	Unit:	AHU.R.07 - (Rev 04 // Sectional, No Controls - 14.02.2025)	Edition Date:	20/02/2025
	Type:	AT4-F 32x16/32x16 - Interior	Scale/Software	1:48 / 3.87.02



Attention: Transport on base frame! Lid Inside 7001 / Lid Outside 7001 / Decoupled [T2(M)], Frame: Alu, Type: indoor, Weight: 2,985 kg

Top view

If not mentioned otherwise, dimension inside flange to unit38 mm. Round bracket () for single/total flange length, rectangular bracket [] for flange dimensions.Please note an all-round panel overhang (approx. 16mm)!

AL-KO THERM GMBH D-89343 Jettingen-Scheppach James Dean	Project:	238351 - 001-00-489136	Pos. / GS-pos.:	7 /
	Proj. descr.:	ElmwoodLeisure Centre	Order #:	
	Unit:	AHU.R.07 - (Rev 04 // Sectional, No Controls - 14.02.2025)	Edition Date:	20/02/2025
	Type:	AT4-F 32x16/32x16 - Interior	Scale/Software	1:48 / 3.87.02

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Manufacturer

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D-89343 Jettingen-Scheppach
alko-airtechnology.com

James Dean / External

Tel.:

Sound emission

Project: **238351 - 001-00-489136**

Pos.: **7**

Quotation

Order #:

GS-pos.:

Proj. descr.: ElmwoodLeisure Centre

Date Printed: 21.02.2025

Unit: AHU.R.07 - (Rev 04 // Sectional, No Controls - 14.02.2025)

Piece: 1

Edition Date: 20/02/2025

Type: AT4-F 32x16/32x16 - Interior

Editor: James Dean

Exhaust air Volume flow: 7.2300 m^3/s tpd: 573 Pa

Octave:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**sum P.**	Unit
Outlet: sound power level in outlet cross section.										
Lw4	**76.6**	**84.1**	**76.4**	**82.1**	**83.3**	**78.4**	**76.3**	**68.0**	89.2	dB
LwA4	50.4	68.0	67.8	78.9	83.3	79.6	77.3	66.9	**86.6**	dB(A)
Intake: sound power level in the inlet cross section.										
Lw3	**73.0**	**79.1**	**70.6**	**71.7**	**68.3**	**66.9**	**66.9**	**53.8**	81.6	dB
LwA3	46.8	63.0	62.0	68.5	68.3	68.1	67.9	52.7	**74.8**	dB(A)
Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
Lw2	**67.5**	**69.5**	**57.8**	**52.0**	**49.8**	**44.0**	**42.8**	**33.4**	71.9	dB
LwA2	41.3	53.4	49.1	48.8	49.8	45.2	43.8	32.3	**57.4**	dB(A)

Supply air Volume flow: 7.2400 m^3/s tpd: 891 Pa

Octave:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**sum P.**	Unit
Outlet: sound power level in outlet cross section.										
Lw4	**78.3**	**80.9**	**78.4**	**82.4**	**82.9**	**79.8**	**78.3**	**71.0**	89.1	dB
LwA4	52.1	64.8	69.8	79.2	82.9	81.0	79.3	69.9	**87.1**	dB(A)
Intake: sound power level in the inlet cross section.										
Lw3	**74.0**	**75.6**	**72.6**	**70.8**	**67.2**	**64.0**	**66.7**	**58.8**	80.2	dB
LwA3	47.8	59.5	64.0	67.6	67.2	65.2	67.7	57.7	**73.8**	dB(A)
Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
Lw2	**69.2**	**67.0**	**61.5**	**53.9**	**52.0**	**47.0**	**47.7**	**43.4**	71.8	dB
LwA2	43.0	50.9	52.9	50.7	52.0	48.2	48.7	42.3	**58.9**	dB(A)

Sum

Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
LwSum	**71.4**	**71.5**	**63.0**	**56.0**	**54.1**	**48.8**	**48.9**	**43.8**	74.9	dB
LwASum	45.2	55.4	54.4	52.8	54.1	50.0	49.9	42.7	**61.2**	dB(A)

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James Dean / External

Manufacturer

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alko-airtechnology.com

Tel.:

Data sheet

Project: **238351 - 001-00-489136**
Order #:
Proj. descr.: ElmwoodLeisure Centre
Unit: AHU.R.08 - (Rev 02 // No Controls - 19.02.2025) Piece: 1
Type: AT4-F 24x12/24x12 - Interior

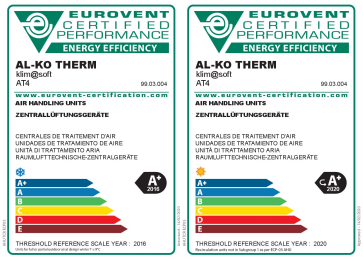
Pos.: **8**
GS-pos.:
Date Printed: 21.02.2025
Edition Date: 20/02/2025
Editor: James Dean

Quotation

Note: All data relate to standard conditions for air density = 1.2 kg/m^3

Unit data	**Supply air**		**Exhaust air**	
	Target value	Actual	Target value	Actual
Air flow	3.2250	3.2250 m^3/s	3.2250	3.2250 m^3/s
External pressure	360	360 Pa	310	310 Pa
Internal pressure	375	375 Pa	220	220 Pa
Air velocity		1.9 m/s		1.9 m/s

Eurovent Efficiency Wint./Sum.	A+ (2016) / A+ (2020)
Climate zone	United Kingdom / BIRMINGHAM
RLT energy efficiency class	A (2018)
Calculated ERP compliance	Compliant 2018



SA - Damper outside	**G 1**	**FU 0**
Type:	Damper outside	
Width:	1,836	mm
Height:	918	mm
Connector:	A30	
Needed torque:	12.00	Nm
Design pressure:	5	Pa
Actuator type:	linkage outside one-sided	
Number of axis:	1	
Axis type:	square 15mm	

Accessory
- Damper leak tight class 2

SA - Filter	**G 1**	**FU 2**
Type:	BF - Bag Filter	
Class:	ePM10-55 % / M5	
eff. class:	E	
Design pressure:	71	Pa
Initial pressure:	36	Pa
End pressure:	107	Pa
air velocity cross section:	1.9	m/s
Filter surface:	15.6	m^2
Filter length:	360	mm
Filter element 592x592:	3	
Filter element 287x592:	3	

Accessory
- Maintenance door with built in pressure gage
- Hand Lever lockable
- Hand Lever
- Indicating pressure gauge 250 Pa
- Quick change filter frame

Project: **238351 - 001-00-489136** Pos.: **8** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.08 - (Rev 02 // No Controls - 19.02.2025) Piece: 1 Edition Date: 20/02/2025

Type: AT4-F 24x12/24x12 - Interior Editor: James Dean

Maintenance:	F - quick change filter frame	
Air flow:	3.2250	m^3/s

SA - Filter	**G 1**	**FU 5**	**Accessory**
Type:	BF - Bag Filter		- Maintenance door with built in pressure gage
Class:	ePM1-60 % / F7		- Hand Lever lockable
eff. class:	D		- Hand Lever
Design pressure:	138	Pa	- Indicating pressure gauge 250 Pa
Initial pressure:	88	Pa	- Quick change filter frame
End pressure:	188	Pa	
air velocity cross section:	1.9	m/s	
Filter surface:	16.4	m^2	
Filter length:	380	mm	
Filter element 592x592:	3		
Filter element 287x592:	3		
Maintenance:	F - quick change filter frame		
Air flow:	3.2250	m^3/s	

Rotary heatex	**G 2**	**FU 8**	**Accessory**
HRS type	Rotary heat exchanger		
Type:	Standard rotor		- Sectorised Rotor for Delivery
operating state:	1		- Maintenance door
Total Thermal Capacity:	99.6	kW	- Controller mounted and leaded motor
Thermal efficiency:	74.8	%	
Humidity exchange rate:	40.3	%	
HRS class (EN13053/2020):	H2		
Balanced Efficiency (dry / 5-25^{o}C):	74.8	%	
Supply air:	3.2250	m^3/s	
Δ Pressure (S) :	121.4	Pa	
Temperature IN:	-5.0	^{o}C	
Rel. Humidity IN:	99.0	%	
Abs. Humidity IN:	2.5	g/kgL	
Temperature Out:	15.9	^{o}C	
Rel. Humidity OUT:	38.2	%	
Abs. Humidity OUT:	4.3	g/kgL	
Exhaust air:	3.2250	m^3/s	
Δ Pressure (E):	121.4	Pa	
Temperature IN:	23.0	^{o}C	
Rel. Humidity IN:	40.0	%	
Abs. Humidity IN:	7.0	g/kgL	
Temperature Out:	3.4	^{o}C	
Rel. Humidity OUT:	95.0	%	
Abs. Humidity OUT:	4.6	g/kgL	
Drive output:	110	W	
Current:	1.2	A	
Voltage:	230	V	
Phase count:	3-phase		
Supply air:			
Exhaust air:			

Project: **238351 - 001-00-489136** Pos.: **8** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.08 - (Rev 02 // No Controls - 19.02.2025) Piece: 1 Edition Date: 20/02/2025

Type: AT4-F 24x12/24x12 - Interior Editor: James Dean

SA - Empty section **G 3** **FU 0** **Accessory**

Length: 5 AT4 raster

SA - Fan - Wheel - EC **G 3** **FU 3** **Accessory**

Fan type:	Wheel - EC 560	- Volume flow measuring for fan
Air flow:	11,610 m^3/h	- Wiring repair switch/fan
Static increase of pressure:	735 Pa	- Repair switch
Casing pressure loss:	22 Pa	
Static efficiency:	70 %	
Efficiency class N (EU 327/2011):	78.0	
Speed:	1,589 1/min	
Max. speed:	1,860 1/min	
- *Motor*		
Control type:	EC - controlled	
Speed:	1,589 1/min	
Control voltage:	8.5 V	
Volume / rotation reserve:	17 %	
Power input:	3.38 kW	
Efficiency class:	IE 5	
SFP value (GEG 2020):	627 $W/(m^3/s)$	
SFPv (EN 16798-3):	927 $W/(m^3/s)$	
SFP class:	SFP 2	
Speed Class:	V3	
Max. input power:	4.8 kW	
Nominal rated voltage:	400 V	
Power Frequency:	50 Hz	
Nominal rated capacity:	5.20 kW	
Nominal rated current:	6.60 A	
Protection class:	IP54	
Overload protection:	Power control	
Insulation class:	F	
P Class:	P1	
System Efficiency:	68 %	
Sound Power Level Inlet:	74.6 dB(A)	
Sound Power Level Outlet:	82.6 dB(A)	

Octave band:	63	125	250	500	1k	2k	4k	8k	Hz
Lw Inlet:	75	77	74	72	69	65	62	64	dB
Lw Outlet:	78	83	79	81	77	74	71	67	dB

Air flow:	3.2250 m^3/s
K factor:	355
volume flow [m^3/h]:	K factor x $\sqrt{\text{nozzle-pressure}}$ [Pa]

SA - Empty section **G 3** **FU 9** **Accessory**

Specification:	Empty section	- Maintenance door
Length:	8 AT4 raster	- Hand Lever lockable w. Door Catch
		- Hand Lever

SA - Heating coil **G 3** **FU 4** **Accessory**

Project: **238351 - 001-00-489136** Pos.: **8** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.08 - (Rev 02 // No Controls - 19.02.2025) Piece: 1 Edition Date: 20/02/2025

Type: AT4-F 24x12/24x12 - Interior Editor: James Dean

Type:	PWW - Copper/Aluminium - A	
Total Thermal Capacity:	19.68	kW
pressure loss (dry):	18	Pa
Air flow speed:	2.23	m/s
Temperature Inlet:	15.0	^{o}C
Rel. Humidity Inlet:	50.0	%
Abs. Humidity Inlet:	5.3	g/kgL
Temperature Outlet:	20.0	^{o}C
Power reserve:	53	%
Rel. Humidity Outlet:	36.4	%
Abs. Humidity Outlet:	5.3	g/kgL
Medium:	Water	
Medium temperature IN:	45.0	^{o}C
Medium temperature OUT:	38.0	^{o}C
Medium flow quantity:	2,448	l/h
Δp medium:	16.6	kPa
Δ fins:	3.0	mm
Rows:	1	
Circuits:	5	
Content:	5.2	l
Pipes:	Copper	
Fins:	Aluminium	
Header:	Copper	
Frame:	Galvanised steel	
Frame to hold frost protection equipment:	Without	
Connection type:	A - water connection straight sidewards	
Connection width:	DN 25 (R 1)	
Connections per circuit:	2	
Air flow:	3.2250	m^3/s

SA - Connection frame with rubber G 3 FU 0

Accessory

Type:	Connection frame with rubber	- Connecting Frame powder coated
Width:	1,836 mm	
Height:	918 mm	
Depth:	60 mm	
Design:	7001	
Connector:	A30	

EA - Connection frame with rubber G 4 FU 0

Accessory

Type:	Connection frame with rubber	- Connecting Frame powder coated
Width:	1,836 mm	
Height:	918 mm	
Depth:	60 mm	
Design:	7001	
Connector:	A30	

EA - Filter G 4 FU 6

Accessory

Type:	BF - Bag Filter	- Maintenance door with built in pressure gage
Class:	ePM10-55 % / M5	- Hand Lever lockable

Project: **238351 - 001-00-489136** Pos.: **8** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.08 - (Rev 02 // No Controls - 19.02.2025) Piece: 1 Edition Date: 20/02/2025

Type: AT4-F 24x12/24x12 - Interior Editor: James Dean

eff. class:	E		- Hand Lever
Design pressure:	71	Pa	- Indicating pressure gauge 250 Pa
Initial pressure:	36	Pa	- Quick change filter frame
End pressure:	107	Pa	
air velocity cross section:	1.9	m/s	
Filter surface:	15.6	m^2	
Filter length:	360	mm	
Filter element 592x592:	3		
Filter element 287x592:	3		
Maintenance:	F - quick change filter frame		
Air flow:	3.2250	m^3/s	

Rotary heatex **G 2** **FU 8** **Accessory**

See above

EA - Empty section **G 5** **FU 0** **Accessory**

Length:	5	AT4 raster

EA - Fan - Wheel - EC **G 5** **FU 7** **Accessory**

Fan type:	Wheel - EC 560		- Volume flow measuring for fan
Air flow:	11,610	m^3/h	- Wiring repair switch/fan
Static increase of pressure:	530	Pa	- Repair switch
Casing pressure loss:	22	Pa	
Static efficiency:	66	%	
Efficiency class N (EU 327/2011):	79.0		
Speed:	1,470	1/min	
Max. speed:	1,780	1/min	
- *Motor*			
Control type:	EC - controlled		
Speed:	1,470	1/min	
Control voltage:	8.3	V	
Volume / rotation reserve:	21	%	
Power input:	2.60	kW	
Efficiency class:	IE 5		
SFP value (GEG 2020):	453	$W/(m^3/s)$	
SFPv (EN 16798-3):	753	$W/(m^3/s)$	
SFP class:	SFP 1		
Speed Class:	V3		
Max. input power:	3.5	kW	
Nominal rated voltage:	400	V	
Power Frequency:	50	Hz	
Nominal rated capacity:	4.60	kW	
Nominal rated current:	5.80	A	
Protection class:	IP54		
Overload protection:	Power control		
Insulation class:	F		
P Class:	P1		
System Efficiency:	63	%	
Sound Power Level Inlet:	73.3	dB(A)	
Sound Power Level Outlet:	81.2	dB(A)	

Data sheet

Project: **238351 - 001-00-489136** Pos.: **8** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.08 - (Rev 02 // No Controls - 19.02.2025) Piece: 1 Edition Date: 20/02/2025

Type: AT4-F 24x12/24x12 - Interior Editor: James Dean

Octave band:	63	125	250	500	1k	2k	4k	8k	Hz
Lw Inlet:	78	80	75	70	66	63	60	64	dB
Lw Outlet:	80	83	79	80	75	72	68	68	dB

Air flow: 3.2250 m^3/s

K factor: 355

volume flow [m^3/h]: K factor x $\sqrt{\text{nozzle-pressure}}$ [Pa]

EA - Empty section **G 5** **FU 10** **Accessory**

Specification: Empty section - Maintenance door

Length: 8 AT4 raster - Hand Lever lockable w. Door Catch

- Hand Lever

EA - Damper outside **G 5** **FU 0** **Accessory**

Type: Damper outside - Damper leak tight class 2

Width: 1,836 mm

Height: 918 mm

Connector: A30

Needed torque: 12.00 Nm

Design pressure: 5 Pa

Actuator type: linkage outside one-sided

Number of axis: 1

Axis type: square 15mm

ERP information

Calculated ERP compliance: Compliant 2018

Type: NRVU-BVU

Heat recovery: Rotary heat exchanger

Internal SFP: 558 W/(m^3/s)

Dp int supply: 209 Pa

Dp int exhaust: 157 Pa

Fan speed controlled

max. outer leak rate (+/- 400 Pa): 0.2 %

Unit features:

Frame material AT4-F: Alu

Panel Isolation: Decoupled [T2(M)]

MB-Reference: AT4-F-04

Panel material: 7001/7001

Unit corner material (frame): Alu / TB2

Transport: Standard transport

Base frame: 130 mm

Dimensions **Transport weight**

Length: 3,290 mm Width: 1,912 mm Height: 2,218 mm 1,682 kg

Project: **238351 - 001-00-489136** Pos.: **8** **Quotation**

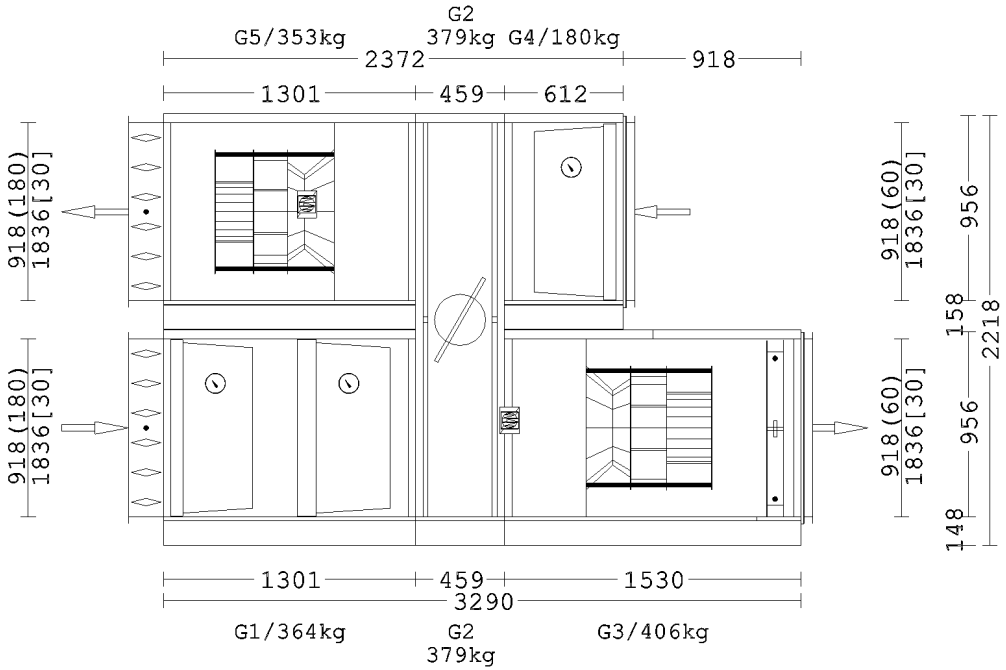
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Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.08 - (Rev 02 // No Controls - 19.02.2025) Piece: 1 Edition Date: 20/02/2025

Type: AT4-F 24x12/24x12 - Interior Editor: James Dean

***** END OF LIST *****

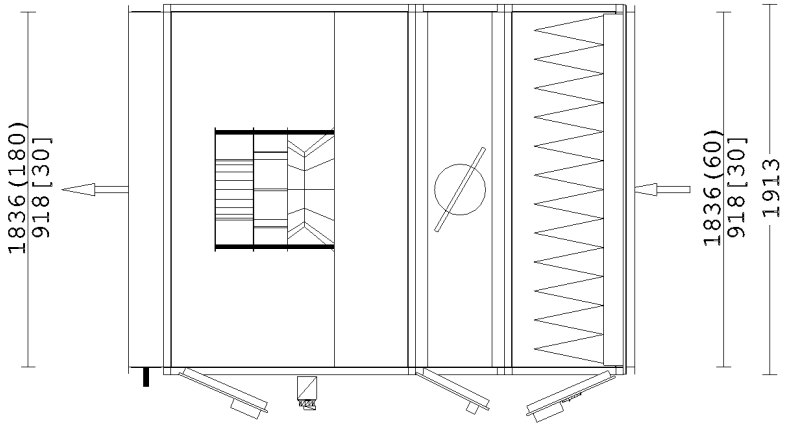


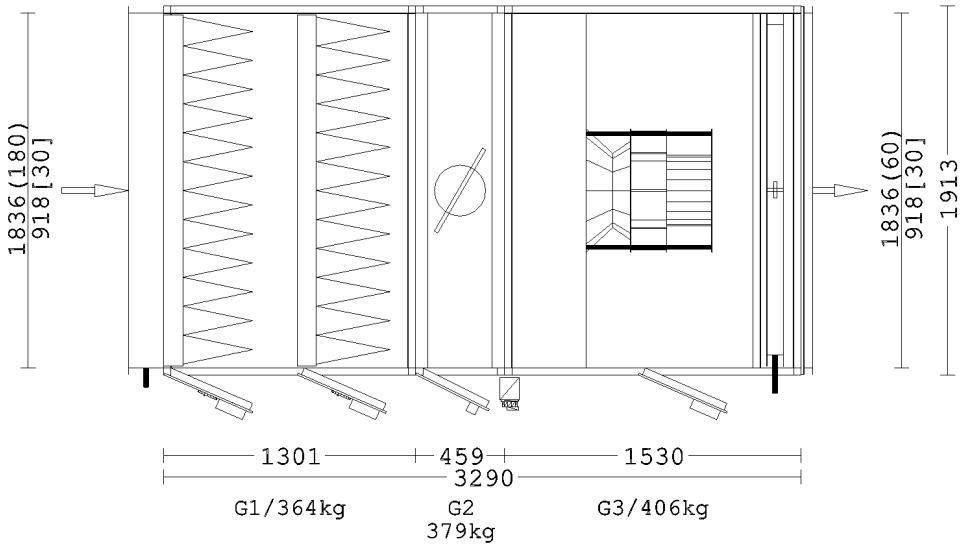
Attention: Transport on base frame! Lid Inside 7001 / Lid Outside 7001 / Decoupled [T2(M)], Frame: Alu, Type: indoor, Weight: 1,682 kg

Front view

If not mentioned otherwise, dimension inside flange to unit38 mm. Round bracket () for single/total flange length, rectangular bracket [] for flange dimensions.Please note an all-round panel overhang (approx. 16mm)!

AL-KO THERM GMBH D-89343 Jettingen-Scheppach James Dean	Project:	238351 - 001-00-489136	Pos. / GS-pos.:	8 /
	Proj. descr.:	ElmwoodLeisure Centre	Order #:	
	Unit:	AHU.R.08 - (Rev 02 // No Controls - 19.02.2025)	Edition Date:	20/02/2025
	Type:	AT4-F 24x12/24x12 - Interior	Scale/Software	1:38 / 3.87.02





Attention: Transport on base frame! Lid Inside 7001 / Lid Outside 7001 / Decoupled [T2(M)], Frame: Alu, Type: indoor, Weight: 1,682 kg

Top view

If not mentioned otherwise, dimension inside flange to unit38 mm. Round bracket () for single/total flange length, rectangular bracket [] for flange dimensions.Please note an all-round panel overhang (approx. 16mm)!

AL-KO THERM GMBH D-89343 Jettingen-Scheppach James Dean	Project:	238351 - 001-00-489136	Pos. / GS-pos.:	8 /
	Proj. descr.:	ElmwoodLeisure Centre	Order #:	
	Unit:	AHU.R.08 - (Rev 02 // No Controls - 19.02.2025)	Edition Date:	20/02/2025
	Type:	AT4-F 24x12/24x12 - Interior	Scale/Software	1:38 / 3.87.02

Branch office:

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Basingstoke, RG22 4LT
Tel.: +44 8457 165162
trane.co.uk

Manufacturer

AL-KO THERM GMBH
Hauptstrasse 248-250
D-89343 Jettingen-Scheppach
alko-airtechnology.com

James Dean / External

Tel.:

Sound emission

Project: **238351 - 001-00-489136**

Pos.: **8**

Quotation

Order #:

GS-pos.:

Proj. descr.: ElmwoodLeisure Centre

Date Printed: 21.02.2025

Unit: AHU.R.08 - (Rev 02 // No Controls - 19.02.2025) Piece: 1

Edition Date: 20/02/2025

Type: AT4-F 24x12/24x12 - Interior

Editor: James Dean

Exhaust air Volume flow: 3.2250 m^3/s tpd: 530 Pa

Octave:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**sum P.**	Unit
Outlet: sound power level in outlet cross section.										
Lw4	**79.7**	**82.7**	**78.7**	**80.2**	**75.2**	**71.7**	**68.3**	**67.9**	87.2	dB
LwA4	53.5	66.6	70.1	77.0	75.2	72.9	69.3	66.8	**81.2**	dB(A)
Intake: sound power level in the inlet cross section.										
Lw3	**77.3**	**78.2**	**71.0**	**65.3**	**60.1**	**55.8**	**51.9**	**52.5**	81.4	dB
LwA3	51.1	62.1	62.4	62.1	60.1	57.0	52.9	51.4	**68.4**	dB(A)
Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
Lw2	**71.3**	**68.4**	**59.1**	**47.8**	**41.7**	**35.1**	**31.3**	**32.7**	73.3	dB
LwA2	45.1	52.3	50.5	44.6	41.7	36.3	32.3	31.6	**55.6**	dB(A)

Supply air Volume flow: 3.2250 m^3/s tpd: 735 Pa

Octave:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**sum P.**	Unit
Outlet: sound power level in outlet cross section.										
Lw4	**78.3**	**82.9**	**77.5**	**79.0**	**75.5**	**71.8**	**67.7**	**60.5**	86.6	dB
LwA4	52.1	66.8	68.9	75.8	75.5	73.0	68.7	59.4	**80.6**	dB(A)
Intake: sound power level in the inlet cross section.										
Lw3	**74.5**	**75.0**	**68.8**	**64.2**	**58.8**	**52.9**	**49.5**	**46.8**	78.5	dB
LwA3	48.3	58.9	60.2	61.0	58.8	54.1	50.5	45.7	**66.4**	dB(A)
Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
Lw2	**69.4**	**67.7**	**59.2**	**48.9**	**44.2**	**37.5**	**33.8**	**32.1**	71.9	dB
LwA2	43.2	51.6	50.6	45.7	44.2	38.7	34.8	31.0	**55.5**	dB(A)

Sum

Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.

LwSum	**73.4**	**71.1**	**62.2**	**51.4**	**46.1**	**39.4**	**35.8**	**35.4**	75.6	dB
LwASum	47.2	55.0	53.6	48.2	46.1	40.6	36.8	34.3	**58.6**	dB(A)

Branch office:

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Adam Finn / External

Manufacturer

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D-89343 Jettingen-Scheppach
alko-airtechnology.com
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Data sheet

Project: **238351 - 001-00-489136**
Order #:
Proj. descr.: ElmwoodLeisure Centre
Unit: AHU.R.09 - (Rev 03 // No Controls - 21.02.2025)
Single Piece
Type: AT4-F 16x12/16x12 - Weatherproof

Piece: 1

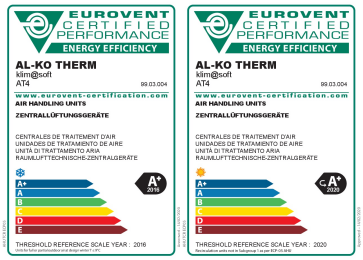
Pos.: **9**
GS-pos.:
Date Printed: 21.02.2025
Edition Date: 21/02/2025
Editor: Adam Finn

Quotation

Note: All data relate to standard conditions for air density = 1.2 kg/m^3

Unit data	**Supply air**		**Exhaust air**	
	Target value	Actual	Target value	Actual
Air flow	1.8619	1.8619 m^3/s	1.8619	1.8619 m^3/s
External pressure	280	280 Pa	280	280 Pa
Internal pressure	464	464 Pa	320	320 Pa
Air velocity		1.7 m/s		1.7 m/s

Eurovent Efficiency Wint./Sum.	A+ (2016) / A+ (2020)
Climate zone	United Kingdom / BIRMINGHAM
RLT energy efficiency class	A+ (2018)
Calculated ERP compliance	Compliant 2018



SA - louvre covering	**G 1**	**FU 0**	**Accessory**
Type:	louvre covering		- Weather protection louvre covering
Width:	16	AT4 raster	
Height:	12	AT4 raster	
Design pressure:	9	Pa	

SA - Damper inside	**G 1**	**FU 0**	**Accessory**
Type:	Damper inside		- Damper leak tight class 2
Width:	1,073	mm	- coated
Height:	867	mm	
Connector:	A20		
Needed torque:	6.00	Nm	
Design pressure:	5	Pa	
Actuator type:	gearwheels inside one-sided		
Number of axis:	1		
Axis type:	square 10mm		

SA - Empty section	**G 1**	**FU 12**	**Accessory**
Specification:	Empty section		- Maintenance panel
Length:	3	AT4 raster	

Data sheet

Project: **238351 - 001-00-489136** Pos.: **9** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.09 - (Rev 03 // No Controls - 21.02.2025) Single Piece Piece: 1 Edition Date: 21/02/2025

Type: AT4-F 16x12/16x12 - Weatherproof Editor: Adam Finn

SA - Filter	**G 1**	**FU 2**	**Accessory**
Type:	BF - Bag Filter		- Maintenance door with built in pressure gage
Class:	ePM10-55 % / M5		- Hand Lever lockable
eff. class:	E		- Hand Lever
Design pressure:	57	Pa	- Indicating pressure gauge 250 Pa
Initial pressure:	28	Pa	- Quick change filter frame
End pressure:	85	Pa	
air velocity cross section:	1.7	m/s	
Filter surface:	10.4	m^2	
Filter length:	360	mm	
Filter element 592x592:	2		
Filter element 287x592:	2		
Maintenance:	F - quick change filter frame		
Air flow:	1.8619	m^3/s	

SA - Filter	**G 1**	**FU 5**	**Accessory**
Type:	BF - Bag Filter		- Maintenance door with built in pressure gage
Class:	ePM1-60 % / F7		- Hand Lever lockable
eff. class:	D		- Hand Lever
Design pressure:	124	Pa	- Indicating pressure gauge 250 Pa
Initial pressure:	74	Pa	- Quick change filter frame
End pressure:	174	Pa	
air velocity cross section:	1.7	m/s	
Filter surface:	10.9	m^2	
Filter length:	380	mm	
Filter element 592x592:	2		
Filter element 287x592:	2		
Maintenance:	F - quick change filter frame		
Air flow:	1.8619	m^3/s	

Rotary heatex	**G 2**	**FU 8**	**Accessory**
HRS type	Rotary heat exchanger		
Type:	Standard rotor		- Maintenance door
operating state:	1		- Maintenance panel
Total Thermal Capacity:	58.1	kW	- Controller mounted and leaded motor
Thermal efficiency:	75.6	%	
Humidity exchange rate:	40.4	%	
HRS class (EN13053/2020):	H2		
Balanced Efficiency (dry / 5-25^{o}C):	75.5	%	
Supply air:	1.8619	m^3/s	
Δ Pressure (S) :	237.3	Pa	
Temperature IN:	-5.0	^{o}C	
Rel. Humidity IN:	99.0	%	
Abs. Humidity IN:	2.5	g/kgL	
Temperature Out:	16.2	^{o}C	
Rel. Humidity OUT:	37.7	%	
Abs. Humidity OUT:	4.3	g/kgL	
Exhaust air:	1.8619	m^3/s	

Data sheet

Project: **238351 - 001-00-489136** Pos.: **9** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.09 - (Rev 03 // No Controls - 21.02.2025) Single Piece Piece: 1 Edition Date: 21/02/2025

Type: AT4-F 16x12/16x12 - Weatherproof Editor: Adam Finn

Δ Pressure (E):	237.3 Pa
Temperature IN:	23.0 °C
Rel. Humidity IN:	40.0 %
Abs. Humidity IN:	7.0 g/kgL
Temperature Out:	3.3 °C
Rel. Humidity OUT:	95.0 %
Abs. Humidity OUT:	4.5 g/kgL
Drive output:	110 W
Current:	1.2 A
Voltage:	230 V
Phase count:	3-phase
Supply air:	
Exhaust air:	
EATR:	2.9 %
OACF:	1.02

SA - Fan - Wheel - EC	**G 3**	**FU 3**
Fan type:	Wheel - EC 450	
Air flow:	6,703	m^3/h
Static increase of pressure:	744	Pa
Casing pressure loss:	18	Pa
Static efficiency:	69	%
Efficiency class N (EU 327/2011):	80.0	
Speed:	1,913	1/min
Max. speed:	2,300	1/min
- *Motor*		
Control type:	EC - controlled	
Speed:	1,913	1/min
Control voltage:	8.3	V
Volume / rotation reserve:	20	%
Power input:	2.02	kW
Efficiency class:	IE 5	
SFP value (GEG 2020):	670	$W/(m^3/s)$
SFPv (EN 16798-3):	970	$W/(m^3/s)$
SFP class:	SFP 2	
Speed Class:	V2	
Max. input power:	2.9	kW
Nominal rated voltage:	400	V
Power Frequency:	50	Hz
Nominal rated capacity:	3.40	kW
Nominal rated current:	4.20	A
Protection class:	IP54	
Overload protection:	Power control	
Insulation class:	F	
P Class:	P1	
System Efficiency:	67	%
Sound Power Level Inlet:	73.6	dB(A)
Sound Power Level Outlet:	83.1	dB(A)

Accessory

- Volume flow measuring for fan
- Wiring repair switch/fan
- Repair switch

Octave band:	63	125	250	500	1k	2k	4k	8k	Hz
Lw Inlet:	66	74	78	70	66	65	61	60	dB
Lw Outlet:	71	83	79	78	78	77	74	68	dB

Project: **238351 - 001-00-489136** Pos.: **9** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.09 - (Rev 03 // No Controls - 21.02.2025) Single Piece Piece: 1 Edition Date: 21/02/2025

Type: AT4-F 16x12/16x12 - Weatherproof Editor: Adam Finn

Air flow:	1.8619	m^3/s
K factor:	220	
volume flow [m^3/h]:	K factor x $\sqrt{\text{nozzle-pressure}}$ [Pa]	

SA - Empty section	**G 3**	**FU 13**	**Accessory**
Specification:	Empty section		- Maintenance door
Length:	8	AT4 raster	- Hand Lever lockable w. Door Catch
			- Hand Lever

SA - Heating coil	**G 3**	**FU 4**	**Accessory**
Type:	PWW - Copper/Aluminium - A		
Total Thermal Capacity:	15.91	kW	
pressure loss (dry):	15	Pa	
Air flow speed:	2.03	m/s	
Temperature Inlet:	15.0	^{o}C	
Rel. Humidity Inlet:	50.0	%	
Abs. Humidity Inlet:	5.3	g/kgL	
Temperature Outlet:	22.0	^{o}C	
Power reserve:	10	%	
Rel. Humidity Outlet:	32.2	%	
Abs. Humidity Outlet:	5.3	g/kgL	
Medium:	Water		
Medium temperature IN:	45.0	^{o}C	
Medium temperature OUT:	38.0	^{o}C	
Medium flow quantity:	1,980	l/h	
Δp medium:	28.1	kPa	
Δ fins:	3.0	mm	
Rows:	1		
Circuits:	3		
Content:	3.5	l	
Pipes:	Copper		
Fins:	Aluminium		
Header:	Copper		
Frame:	Galvanised steel		
Frame to hold frost protection equipment:	Without		
Connection type:	A - water connection straight sidewards		
Connection width:	DN 25 (R 1)		
Connections per circuit:	2		
Air flow:	1.8619	m^3/s	

SA - Connection frame with rubber	**G 3**	**FU 0**	**Accessory**
Type:	Connection frame with rubber		- Connecting Frame powder coated
Width:	1,224	mm	
Height:	918	mm	
Depth:	60	mm	
Design:	7001		
Connector:	A30		

Project: **238351 - 001-00-489136** Pos.: **9** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.09 - (Rev 03 // No Controls - 21.02.2025) Single Piece Piece: 1 Edition Date: 21/02/2025

Type: AT4-F 16x12/16x12 - Weatherproof Editor: Adam Finn

EA - Connection frame with rubber	**G 4**	**FU 0**	**Accessory**
Type:	Connection frame with rubber		- Connecting Frame powder coated
Width:	1,224	mm	
Height:	918	mm	
Depth:	60	mm	
Design:	7001		
Connector:	A30		

EA - Filter	**G 4**	**FU 6**	**Accessory**
Type:	BF - Bag Filter		- Maintenance door with built in pressure gage
Class:	ePM10-55 % / M5		- Hand Lever lockable
eff. class:	E		- Hand Lever
Design pressure:	57	Pa	- Indicating pressure gauge 250 Pa
Initial pressure:	28	Pa	- Quick change filter frame
End pressure:	85	Pa	
air velocity cross section:	1.7	m/s	
Filter surface:	10.4	m^2	
Filter length:	360	mm	
Filter element 592x592:	2		
Filter element 287x592:	2		
Maintenance:	F - quick change filter frame		
Air flow:	1.8619	m^3/s	

Rotary heatex	**G 2**	**FU 8**	**Accessory**
See above			

EA - Fan - Wheel - EC	**G 5**	**FU 7**	**Accessory**
Fan type:	Wheel - EC 500		- Volume flow measuring for fan
Air flow:	6,703	m^3/h	- Wiring repair switch/fan
Static increase of pressure:	600	Pa	- Repair switch
Casing pressure loss:	12	Pa	
Static efficiency:	70	%	
Efficiency class N (EU 327/2011):	80.0		
Speed:	1,495	1/min	
Max. speed:	1,950	1/min	
- *Motor*			
Control type:	EC - controlled		
Speed:	1,495	1/min	
Control voltage:	7.7	V	
Volume / rotation reserve:	30	%	
Power input:	1.60	kW	
Efficiency class:	IE 5		
SFP value (GEG 2020):	519	$W/(m^3/s)$	
SFPv (EN 16798-3):	819	$W/(m^3/s)$	
SFP class:	SFP 2		
Speed Class:	V2		
Max. input power:	2.4	kW	

Data sheet

Project: **238351 - 001-00-489136** Pos.: **9** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.09 - (Rev 03 // No Controls - 21.02.2025) Single Piece Piece: 1 Edition Date: 21/02/2025

Type: AT4-F 16x12/16x12 - Weatherproof Editor: Adam Finn

Nominal rated voltage:							400 V		
Power Frequency:							50 Hz		
Nominal rated capacity:							3.50 kW		
Nominal rated current:							4.40 A		
Protection class:							IP54		
Overload protection:							Power control		
Insulation class:							F		
P Class:							P1		
System Efficiency:							68 %		
Sound Power Level Inlet:							70.3 dB(A)		
Sound Power Level Outlet:							78.5 dB(A)		
Octave band:	63	125	250	500	1k	2k	4k	8k	Hz
Lw Inlet:	64	77	72	69	63	60	56	53	dB
Lw Outlet:	68	82	75	76	73	70	67	62	dB
Air flow:							1.8619 m^3/s		
K factor:							280		
volume flow [m^3/h]:							K factor x $\sqrt{\text{nozzle-pressure}}$ [Pa]		

EA - Empty section	**G 5**	**FU 14**	**Accessory**
Specification:	Empty section		- Maintenance door
Length:	8	AT4 raster	- Hand Lever lockable w. Door Catch
			- Hand Lever

EA - Empty section	**G 5**	**FU 10**	**Accessory**
Specification:	Empty section		- Maintenance panel
Length:	3	AT4 raster	

EA - Damper inside	**G 5**	**FU 0**	**Accessory**
Type:	Damper inside		- Damper leak tight class 2
Width:	1,073	mm	- coated
Height:	867	mm	
Connector:	A20		
Needed torque:	6.00	Nm	
Design pressure:	5	Pa	
Actuator type:	gearwheels inside one-sided		
Number of axis:	1		
Axis type:	square 10mm		

EA - louvre covering	**G 5**	**FU 0**	**Accessory**
Type:	louvre covering		- Weather protection louvre covering
Width:	16	AT4 raster	
Height:	12	AT4 raster	
Design pressure:	9	Pa	

ERP information

Calculated ERP compliance Compliant 2018

Data sheet

Project: **238351 - 001-00-489136** Pos.: **9** **Quotation**

Order #: GS-pos.:

Proj. descr.: ElmwoodLeisure Centre Date Printed: 21.02.2025

Unit: AHU.R.09 - (Rev 03 // No Controls - 21.02.2025) Single Piece Piece: 1 Edition Date: 21/02/2025

Type: AT4-F 16x12/16x12 - Weatherproof Editor: Adam Finn

Type	NRVU-BVU	
Heat recovery	Rotary heat exchanger	
Internal SFP	853	W/(m^3/s)
Dp int supply	311	Pa
Dp int exhaust	266	Pa
Fan speed controlled		
max. outer leak rate (+/- 400 Pa)	0.3	%

Unit features:

Frame material AT4-F	Alu
Panel Isolation	Decoupled [T2(M)]
MB-Reference	AT4-F-04
Panel material	7001/7001
Unit corner material (frame)	Alu / TB2
Transport	Standard transport
Base frame	130 mm
complete base frame	130 mm
Weatherproof	Yes

Dimensions						**Transport weight**
Length:	3,442 mm	Width:	1,377 mm	Height:	2,348 mm	1,380 kg

***** END OF LIST *****



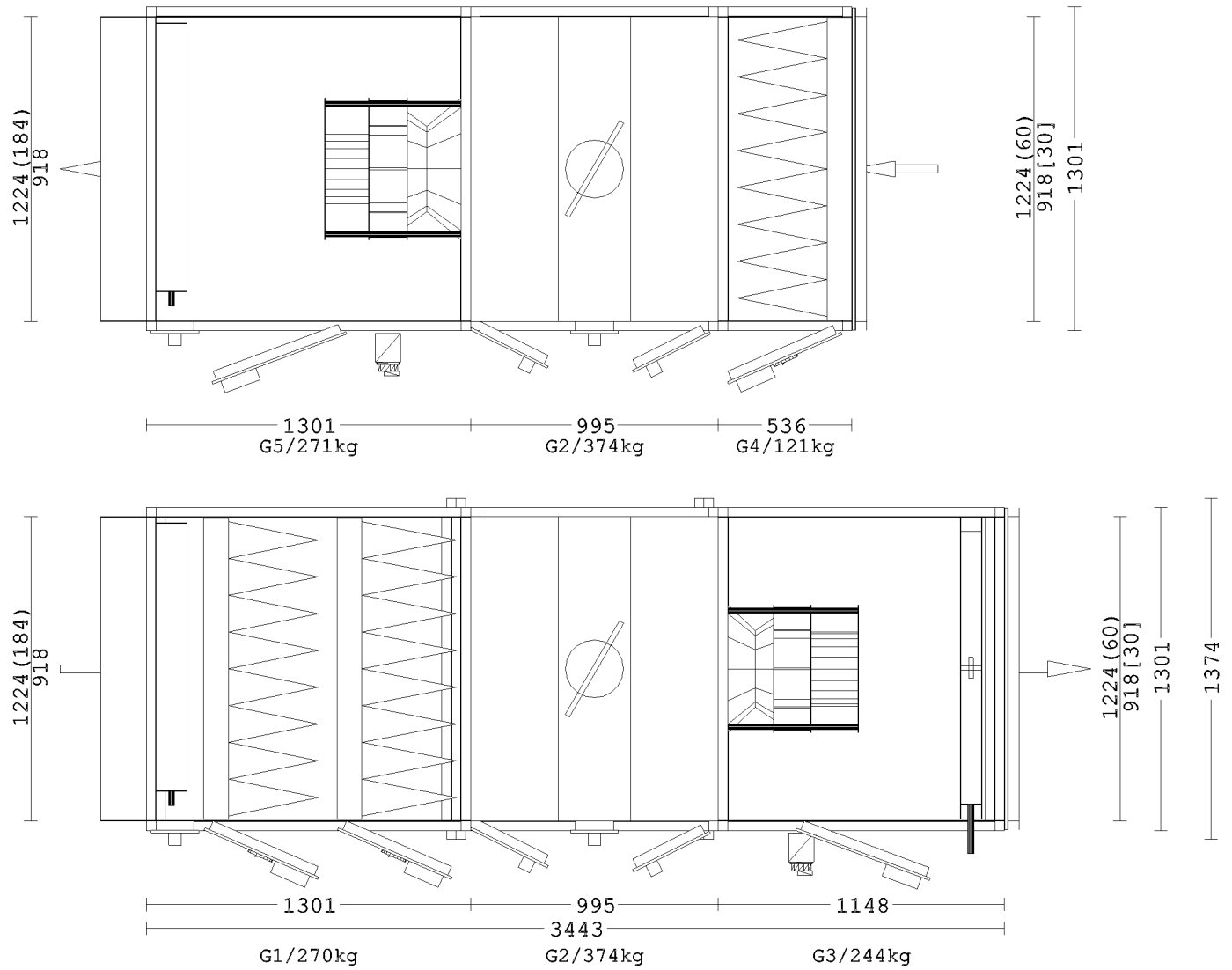
Attention: Transport on base frame! Lid Inside 7001 / Lid Outside 7001 / Decoupled [T2(M)], Frame: Alu, Type: weatherproof, Weight: 1,380 kg

Front view

If not mentioned otherwise, dimension inside flange to unit38 mm. Delivery on common base frame. Round bracket () for single/total flange length, rectangular bracket [] for flange dimensions.Please note an all-round panel overhang (approx. 16mm)!

AL-KO THERM GMBH
D-89343 Jettingen-Scheppach
Adam Finn
+44 8457 165 162

Project:	238351 - 001-00-489136	Pos. / GS-pos.:	9 /
Proj. descr.:	ElmwoodLeisure Centre	Order #:	
Unit:	AHU.R.09 - (Rev 03 // No Controls - 21.02.2025) Single Piece	Edition Date:	21/02/2025
Type:	AT4-F 16x12/16x12 - Weatherproof	Scale/Software	1:26 / 3.88.02



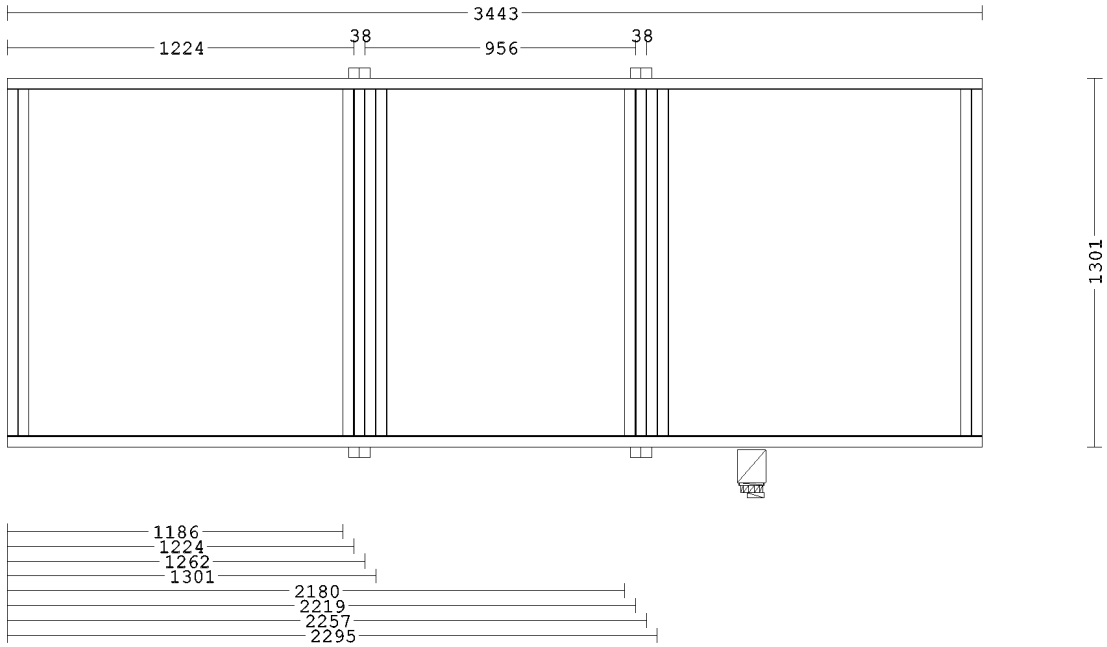
Attention: Transport on base frame! Lid Inside 7001 / Lid Outside 7001 / Decoupled [T2(M)], Frame: Alu, Type: weatherproof, Weight: 1,380 kg

Top view

If not mentioned otherwise, dimension inside flange to unit38 mm. Delivery on common base frame. Round bracket () for single/total flange length, rectangular bracket [] for flange dimensions.Please note an all-round panel overhang (approx. 16mm)!

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Project:	238351 - 001-00-489136	Pos. / GS-pos.:	9 /
Proj. descr.:	ElmwoodLeisure Centre	Order #:	
Unit:	AHU.R.09 - (Rev 03 // No Controls - 21.02.2025) Single Piece	Edition Date:	21/02/2025
Type:	AT4-F 16x12/16x12 - Weatherproof	Scale/Software	1:26 / 3.88.02



Attention: Transport on base frame! Lid Inside 7001 / Lid Outside 7001 / Decoupled [T2(M)], Frame: Alu, Type: weatherproof, Weight: 1,380 kg

Top view

If not mentioned otherwise, dimension inside flange to unit38 mm. Delivery on common base frame. Round bracket () for single/total flange length, rectangular bracket [] for flange dimensions.Please note an all-round panel overhang (approx. 16mm)!

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Project:	238351 - 001-00-489136	Pos. / GS-pos.:	9 /
Proj. descr.:	ElmwoodLeisure Centre	Order #:	
Unit:	AHU.R.09 - (Rev 03 // No Controls - 21.02.2025) Single Piece	Edition Date:	21/02/2025
Type:	AT4-F 16x12/16x12 - Weatherproof	Scale/Software	1:26 / 3.88.02

Branch office:

Trane UK
Lawrence House, 1A Jays Close
Basingstoke, RG22 4LT
Tel.: +44 8457 165162
trane.co.uk

Adam Finn / External

Manufacturer

AL-KO THERM GMBH
Hauptstrasse 248-250
D-89343 Jettingen-Scheppach
alko-airtechnology.com

Tel.:+44 8457 165 162

Sound emission

Project: **238351 - 001-00-489136**
Pos.: **9**
Quotation

Order #:
GS-pos.:

Proj. descr.: ElmwoodLeisure Centre
Date Printed: 21.02.2025

Unit: AHU.R.09 - (Rev 03 // No Controls - 21.02.2025)
Single Piece
Piece: 1
Edition Date: 21/02/2025

Type: AT4-F 16x12/16x12 - Weatherproof
Editor: Adam Finn

Exhaust air Volume flow: 1.8619 m^3/s tpd: 600 Pa

Octave:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**sum P.**	Unit
Outlet: sound power level in outlet cross section.										
Lw4	**68.5**	**82.0**	**74.6**	**75.9**	**73.4**	**70.4**	**67.2**	**61.6**	84.4	dB
LwA4	42.3	65.9	66.0	72.7	73.4	71.6	68.2	60.5	**78.5**	dB(A)
Intake: sound power level in the inlet cross section.										
Lw3	**63.2**	**75.7**	**68.3**	**64.1**	**56.5**	**52.4**	**48.1**	**41.3**	76.9	dB
LwA3	37.0	59.6	59.7	60.9	56.5	53.6	49.1	40.2	**65.9**	dB(A)
Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
Lw2	**58.6**	**66.8**	**55.7**	**45.1**	**39.0**	**32.8**	**28.8**	**23.9**	67.7	dB
LwA2	32.4	50.7	47.1	41.9	39.0	34.0	29.8	22.8	**53.0**	dB(A)

Supply air Volume flow: 1.8619 m^3/s tpd: 744 Pa

Octave:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**sum P.**	Unit
Outlet: sound power level in outlet cross section.										
Lw4	**70.7**	**82.6**	**77.2**	**76.4**	**75.5**	**74.6**	**71.0**	**61.5**	85.6	dB
LwA4	44.5	66.5	68.6	73.2	75.5	75.8	72.0	60.4	**80.9**	dB(A)
Intake: sound power level in the inlet cross section.										
Lw3	**64.6**	**71.4**	**72.1**	**62.0**	**55.6**	**52.3**	**48.0**	**42.7**	75.4	dB
LwA3	38.4	55.3	63.5	58.8	55.6	53.5	49.0	41.6	**66.0**	dB(A)
Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
Lw2	**60.7**	**65.7**	**60.6**	**46.5**	**42.6**	**38.6**	**34.7**	**30.6**	67.8	dB
LwA2	34.5	49.6	52.0	43.3	42.6	39.8	35.7	29.5	**54.9**	dB(A)

Sum

Unit: sound power level emitted by the unit walls without opening, measured and calculated in accordance with EN 1886/EN ISO 3744 including the sound-absorbing rate De.										
LwSum	**62.8**	**69.3**	**61.8**	**48.8**	**44.1**	**39.6**	**35.7**	**31.5**	70.8	dB
LwASum	36.6	53.2	53.2	45.6	44.1	40.8	36.7	30.4	**57.0**	dB(A)

8.68

Kooltherm Pipe Sections Technical Data Sheet

The following 8 pages are the document exactly as received and checked. It is bookmarked in the PDF.

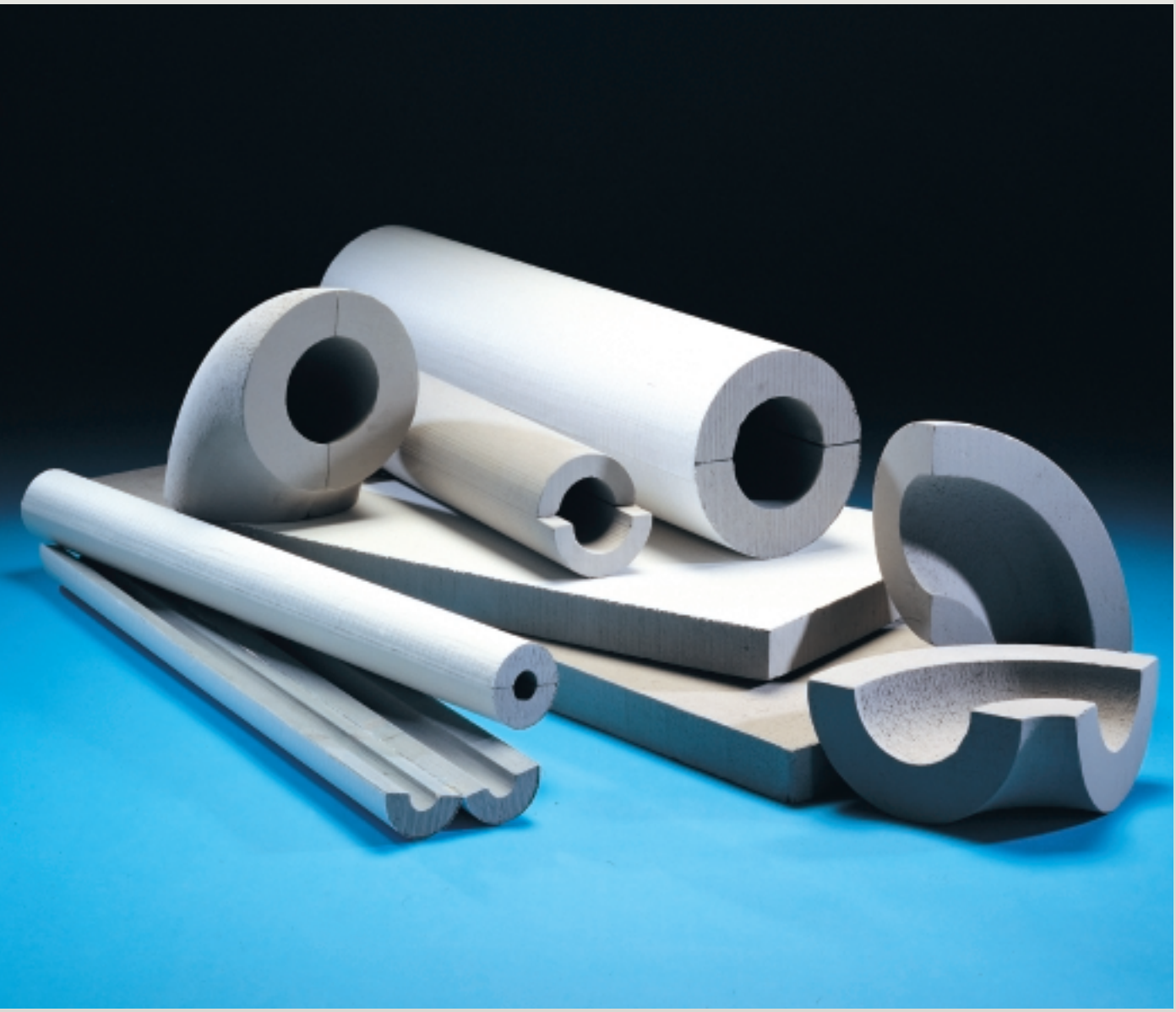
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Pages	8

First Issue February 2008

Kingspan® Tarec®
Industrial Insulation

Kooltherm® Rigid Phenolic Insulation & Kooltherm® High-Density Rigid Phenolic Insulation

TECHNICAL DATA

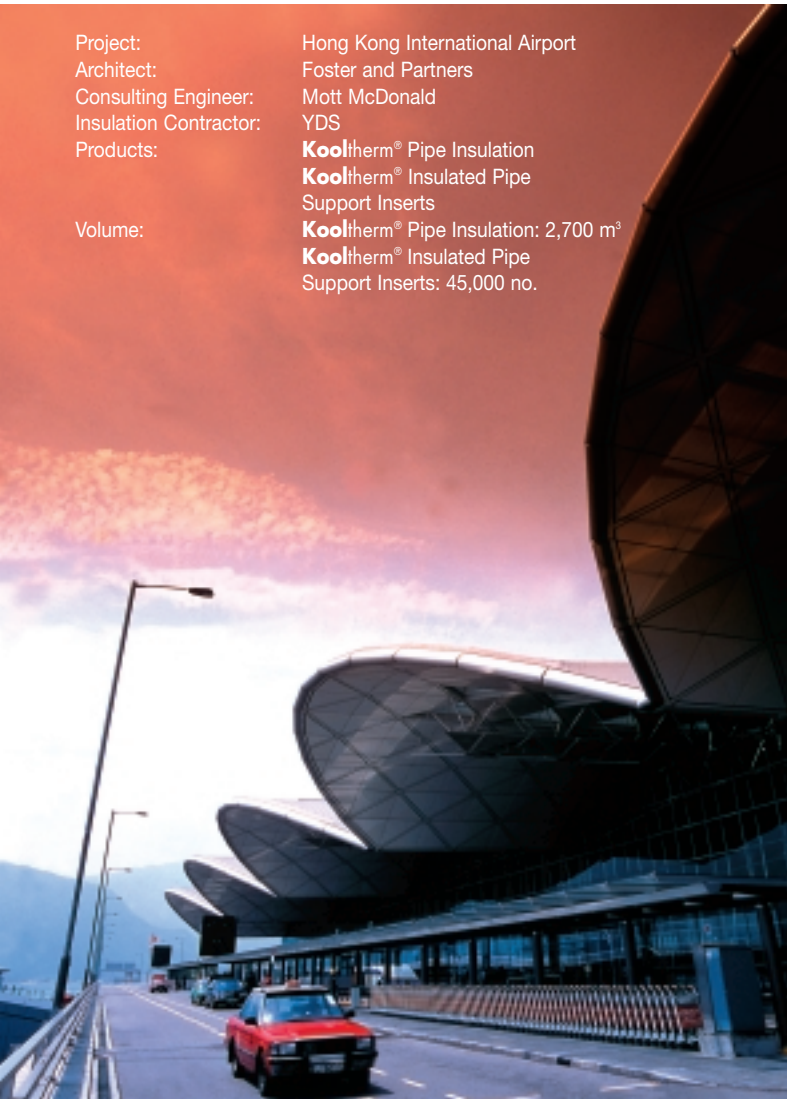


Prestige Projects



Project:	Lincoln University, UK
Consulting Engineer:	Mott McDonald
Mechanical Contractor:	Bellmarsh Building Services
Insulation Contractor:	Kendrick Insulation
Products:	**Kool**therm® Pipe Insulation

Project:	Hong Kong International Airport
Architect:	Foster and Partners
Consulting Engineer:	Mott McDonald
Insulation Contractor:	YDS
Products:	**Kool**therm® Pipe Insulation **Kool**therm® Insulated Pipe Support Inserts
Volume:	**Kool**therm® Pipe Insulation: 2,700 m^3 **Kool**therm® Insulated Pipe Support Inserts: 45,000 no.



Project:	Burj Al Arab Hotel, Jumeirah Beach, Dubai
Engineer:	W S Atkins
Insulation Contractor:	B K Gulf
Products:	**Kool**therm® Pipe Insulation **Kool**therm® Insulated Pipe Support Inserts
Volume:	**Kool**therm® Pipe Insulation: > 100,000 linear metres **Kool**therm® Insulated Pipe Support Inserts: > 30,000 no.



Insulation Benefits

Description

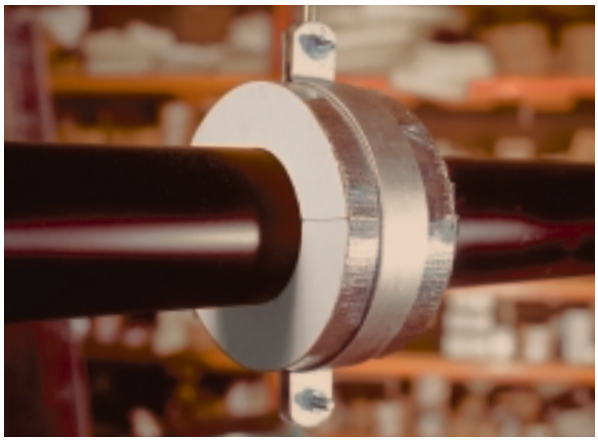
Kooltherm® rigid phenolic insulation is based on patented technology. Whilst retaining all the benefits of rigid polyurethane and rigid polyisocyanurate insulation **Kool**therm® rigid phenolic insulation has a far superior resistance to burning and spread of flame, and the lowest thermal conductivity of any commonly available insulant at 0.021 W/m·K (0.145 Btu·in/h·ft²·°F).

Kooltherm® High–Density rigid phenolic insulation is used in the manufacture of insulated pipe support inserts. Its greater density gives it much higher compressive strength and rigidity whilst retaining its far superior resistance to burning and spread of flame, making it an ideal insulation material for load bearing applications.

Kooltherm® rigid phenolic insulation and **Kool**therm® High–Density rigid phenolic insulation are entirely CFC/HCFC–free with zero Ozone Depletion Potential (ODP).

They have been developed to provide optimum performance with regards to insulation efficiency, fire resistance, low smoke emission, compressive strength, environment, health, safety and cost.

Kooltherm® rigid phenolic insulation and **Kool**therm® High–Density rigid phenolic insulation have gained a reputation for quality and consistency, a reputation that has spread worldwide.



Structure

Kooltherm® rigid phenolic insulation has a high closed cell content and fine cell structure.

Kooltherm® High–Density rigid phenolic insulation has an open cell structure.

Kooltherm® rigid phenolic insulation and **Kool**therm® High–Density rigid phenolic insulation consist of a densely cross linked matrix which does not readily break down in service.



Temperature Range

Kooltherm® rigid phenolic insulation and **Kool**therm® High–Density rigid phenolic insulation may be used for pipework and equipment operating within the temperature range –180°C to +120°C (–292°F to +248ºF).

Thermal Performance

Kooltherm® rigid phenolic insulation has a thermal conductivity of 0.021 W/m·K (0.145 Btu·in/h·ft²·°F). This is the lowest thermal conductivity of any commonly available insulation material.

A low thermal conductivity allows specified thermal performance standards to be achieved with a minimal thickness of insulation. This is particularly significant where space saving is important.

A thinner insulant can facilitate installation in confined spaces. Furthermore, it can often result in a lower surface area and therefore savings in finishing materials.

Insulation Benefits

Moisture Resistance



Kooltherm® rigid phenolic insulation has a 95% (or greater) closed cell content, which makes it non–wicking and highly resistant to moisture penetration. This is particularly valuable in humid conditions where the build up of moisture can compromise the performance of lesser insulation materials. It is an ideal insulation material for cold, chilled and low temperature hot water pipework.

Because of its high density, **Kool**therm® High–Density rigid phenolic insulation is also non–wicking and resistant to moisture penetration.

Chemical Resistance and Compatibility

Kooltherm® rigid phenolic insulation and **Kool**therm® High–Density rigid phenolic insulation are resistant to a wide range of oils, solvents and chemicals. Their compatibility with most solvent based coatings and adhesives, and polyester and epoxy resin based coatings, allows them to maintain their physical integrity when in contact with such substances.



Hygiene

Kooltherm® rigid phenolic insulation and **Kool**therm® High–Density rigid phenolic insulation are resistant to fungus and mould growth, will not sustain vermin and are non–fibrous, odourless and non–tainting.



Fire Performance



The resistance to burning and spread of flame of **Kool**therm® rigid phenolic insulation and **Kool**therm® High–Density rigid phenolic insulation is far superior to that of any other cellular plastic insulation material, regardless of facing type. In addition, there is an almost complete absence of smoke when these materials are subjected to a flame source, buying valuable time for evacuation.

Quality Assurance

Kooltherm® rigid phenolic insulation and **Kool**therm® High–Density rigid phenolic insulation are manufactured to the highest quality standards under a quality control system approved to BS EN ISO 9001: 2000 / EN ISO 9001: 2000.

Assessed to BS EN ISO 9001: 2000
Certificate No. 279

Assessed to EN ISO 9001: 2000
Certificate No. 935626.1

Applications

Kooltherm® rigid phenolic insulation and **Kool**therm® High–Density rigid phenolic insulation are lightweight, easy to transport, handle and install. They are specified for use on building services / HVAC projects including:

- public sector non residential (health, education, leisure); and
- private sector non residential (hotels, casinos, offices, commercial and public buildings).

In particular, **Kool**therm® rigid phenolic insulation and **Kool**therm® High–Density rigid phenolic insulation are used to insulate clean or sterile areas of hospitals and controlled environments, where hygiene is high priority and non–mineral fibre products are preferred.

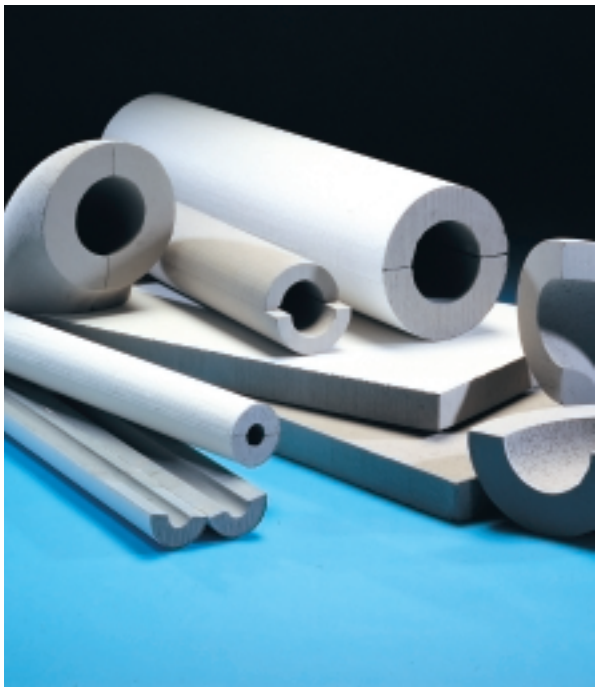


Availability

Kooltherm® rigid phenolic insulation is available in the following forms as standard:

- pipe sections and bends;
- insulated pipe support inserts;
- radiused and bevelled segments;
- standard slab: 1220 mm x 1000 mm (48.0 in x 39.3 in) and 2440 mm x 1000 mm (96.1 in x 39.3 in);
- standard and non standard pipe sizes; and
- single layer, multi layer or rebated joints.

Kooltherm® High–Density rigid phenolic insulation is used for insulated pipe support inserts only.



Technical Data

Kooltherm® Rigid Phenolic Insulation 37 - 60 kg/m³ (2.3 - 3.75 lb/ft³)

General Physical Properties (Metric)

Property	Test Method	Unit	Typical Value	
Nominal Density	(EN ISO 845) / (ASTM D 1622)	kg/m³	37	60
Thermal Conductivity at +10°C	(EN 12667) / (ASTM C 518)	W/m·K	0.021	0.029
Colour			Grey / Pink	Grey
Closed Cell Content	(EN ISO 4590 Method 1) / (ASTM D 2856 Method B)	%	≥ 95	≥ 95
Operating Temperature Limits	Upper Limit Lower Limit	°C °C	+120 –180	+120 –180
Minimum Compressive Strength at +23°C	(EN 826) / (ASTM D 1621) Parallel Perpendicular	 kPa kPa	 150 100	 360 170
Minimum Tensile Strength at +23°C	(ASTM D 1623) Parallel Perpendicular	 kPa kPa	 150 110	 300 210
Linear Dimensional Stability	(EN 1604) / (ASTM D 2126) +93°C for 24 hours –30°C for 24 hours	 % %	 ≤ 1 ≤ 1	 ≤ 1 ≤ 1
Linear Expansion Coefficient	(ASTM D 696)	m/m·K	40–70 x 10^{-6}	40–70 x 10^{-6}

General Physical Properties (Imperial)

Property	Test Method	Unit	Typical Value	
Nominal Density	(EN ISO 845) / (ASTM D 1622)	lb/ft³	2.3	3.75
Thermal Conductivity at +50°F	(EN 12667) / (ASTM C 518)	Btu·in/h·ft²·°F	0.145	0.20
Colour			Grey / Pink	Grey
Closed Cell Content	(EN ISO 4590 Method 1) / (ASTM D 2856 Method B)	%	≥ 95	≥ 95
Operating Temperature Limits	Upper Limit Lower Limit	°F °F	+248 –292	+248 –292
Minimum Compressive Strength at +73°F	(EN 826) / (ASTM D 1621) Parallel Perpendicular	 psi psi	 21.8 14.5	 52.2 24.7
Minimum Tensile Strength at +73°F	(ASTM D 1623) Parallel Perpendicular	 psi psi	 21.8 16.0	 43.6 30.5
Linear Dimensional Stability	(EN 1604) / (ASTM D 2126) +199.4°F for 24 hours –22°F for 24 hours	 % %	 ≤ 1 ≤ 1	 ≤ 1 ≤ 1
Linear Expansion Coefficient	(ASTM D 696)	ft/ft·K	40–70 x 10^{-6}	40–70 x 10^{-6}

Fire Test Classifications

Fire Test	Test Method	Result	
Fire Propagation	BS 476–6: 1989	Index of performance (I) not exceeding 12 and sub index (i_1) not exceeding 6*	
Surface Spread of Flame	BS 476–7: 1997	Class 1*	Class 1*
Horizontal Burning	EN ISO 3582: 2000	≤ 10 mm / 0.4 in	≤ 10 mm / 0.4 in
Oxygen Index	EN ISO 4589–2: 1996	≥ 50%	≥ 50%
Temperature Index	EN ISO 4589–3: 1996	> 390°C / 734°F	> 390°C / 734°F
Flame Spread Index	ASTM E 84	< 25	–
Epiradiateur	NF P 92–501	M1	M1
Fire Behaviour	DIN 4102–1: 1998	B2	B2

**Kooltherm® rigid phenolic insulation will achieve these results which enables it to be classified as Class 0 by the Building Regulations in England & Wales, Northern Ireland and the Republic of Ireland, and Low Risk by the Building Standards in Scotland.*

Kooltherm® High-Density Rigid Phenolic Insulation 80 - 120 kg/m^3 (5.0 - 7.5 lb/ft^3)

General Physical Properties (Metric)

Property	Test Method	Unit	Typical Value	
Nominal Density	(EN ISO 845) / (ASTM D 1622)	kg/m^3	80	120
Thermal Conductivity at +10°C	(EN 12667) / (ASTM C 518)	W/m·K	0.030	0.032
Colour			Grey	Grey
Operating Temperature Limits	Upper Limit	°C	+120	+120
	Lower Limit	°C	–180	–180
Minimum Compressive Strength at +23°C	(EN 826) / (ASTM D 1621)			
	Parallel	kPa	590	1100
	Perpendicular	kPa	440	900
Minimum Tensile Strength at +23°C	(ASTM D 1623)			
	Parallel	kPa	520	800
	Perpendicular	kPa	350	600
Linear Dimensional Stability	(EN 1604) / (ASTM D 2126)			
	+93°C for 24 hours	%	≤ 1	≤ 1
	–30°C for 24 hours	%	≤ 1	≤ 1
Linear Expansion Coefficient	(ASTM D 696)	m/m·K	40–70 x 10^{-6}	40–70 x 10^{-6}

General Physical Properties (Imperial)

Property	Test Method	Unit	Typical Value	
Nominal Density	(EN ISO 845) / (ASTM D 1622)	lb/ft	5.0	7.5
Thermal Conductivity at +50°F	(EN 12667) / (ASTM C 518)	Btu·in/h·ft^2·°F	0.208	0.222
Colour			Grey	Grey
Operating Temperature Limits	Upper Limit	°F	+248	+248
	Lower Limit	°F	–292	–292
Minimum Compressive Strength at +73°F	(EN 826) / (ASTM D 1621)			
	Parallel	psi	85.6	159.5
	Perpendicular	psi	63.8	130.5
Minimum Tensile Strength at +73°F	(ASTM D 1623)			
	Parallel	psi	75.4	116.0
	Perpendicular	psi	50.8	87.0
Linear Dimensional Stability	(EN 1604) / (ASTM D 2126)			
	+199.4°F for 24 hours	%	≤ 1	≤ 1
	–22°F for 24 hours	%	≤ 1	≤ 1
Linear Expansion Coefficient	(ASTM D 696)	ft/ft·K	40–70 x 10^{-6}	40–70 x 10^{-6}

Fire Test Classifications

Fire Test	Test Method	Result	
Fire Propagation	BS 476–6: 1989	Index of performance (I) not exceeding 12 and sub index (i_1) not exceeding 6*	
Surface Spread of Flame	BS 476–7: 1997	Class 1*	Class 1*
Horizontal Burning	EN ISO 3582: 2000	≤ 10 mm / 0.4 in	≤ 10 mm / 0.4 in
Oxygen Index	EN ISO 4589–2: 1996	≥ 50%	≥ 50%
Temperature Index	EN ISO 4589–3: 1996	> 390°C / 734°F	> 390°C / 734°F
Epiradiateur	NF P 92–501	M1	M1
Fire Behaviour	DIN 4102–1: 1998	B2	B2
Smoke Index	NES 711	–	≤ 1.6
Toxicity Index	NES 713	–	≤ 2.7

Kooltherm® *High–Density rigid phenolic insulation will achieve these results which enables it to be classified as Class 0 by the Building Regulations in England & Wales, Northern Ireland and the Republic of Ireland, and Low Risk by the Building Standards in Scotland.*

Contact Details

Customer Service

For quotations, order placement and details of despatches please contact the Kingspan Tarec Industrial Insulation Customer Service Department on the numbers below:

UK and Ireland – Tel: +44 (0) 870 733 0021
– Fax: +44 (0) 870 733 0022
– email: sales.uk@KingspanTarec.co.uk

Rest of World – Tel: +32 (0) 14 44 25 21
– Fax: +32 (0) 14 44 25 37
– email: sales.be@KingspanTarec.com

Technical Advice

Kingspan Tarec Industrial Insulation supports all of its products with a comprehensive Technical Advisory Service for specifiers, stockists and contractors.

Calculations can be run to provide heat losses / gains, condensation / dew point risk, required insulation thicknesses etc… upon receipt of project specifications. Thereafter, any number of permutations can be run to help you achieve your desired targets.

General application advice and advice on design detailing and fixing etc… can also be given. Site surveys are also undertaken as appropriate. Please contact the Kingspan Tarec Industrial Insulation Technical Service Department on the numbers below:

UK and Ireland – Tel: +44 (0) 870 733 0021
– Fax: +44 (0) 870 733 0022
– email: technical.uk@KingspanTarec.co.uk

Rest of World – Tel: +32 (0) 14 44 25 36
– Fax: +32 (0) 14 42 72 21
– email: technical.be@KingspanTarec.com

Literature & Samples

Kingspan Tarec Industrial Insulation produces a comprehensive range of technical literature for specifiers, contractors, stockists and end users.

For copies please contact the Kingspan Tarec Industrial Insulation Marketing Department on the numbers below:

UK and Ireland – Tel: +44 (0) 870 733 0021
– Fax: +44 (0) 870 733 0022
– email: info.uk@KingspanTarec.co.uk

Rest of World – Tel: +32 (0) 14 44 25 21
– Fax: +32 (0) 14 44 25 37
– email: info.be@KingspanTarec.com

General Enquiries

For all other enquiries contact Kingspan Tarec Industrial Insulation on the numbers below:

UK and Ireland – Tel: +44 (0) 870 733 0021
– Fax: +44 (0) 870 733 0022
– email: info.uk@KingspanTarec.co.uk

Rest of World – Tel: +32 (0) 14 44 25 25
– Fax: +32 (0) 14 42 72 21
– email: info.be@KingspanTarec.com

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Kingspan® Tarec®
Industrial Insulation

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8.69

LBV1 DZR Brass Lever Ball Valve FxF 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	LBV1 DZR Brass Lever Ball Valve FxF TDS.pdf
Pages	1

DZR Brass Lever Ball Valve - FxF BSPT

LBV1

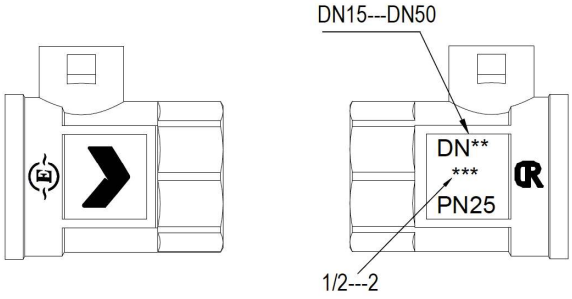


Features and Benefits

- Screwed BSP Taper threads
- PTFE seats & seals
- Anti blow out stem
- Full bore, bi-directional flow
- Red & Blue handle included
- Locking lever & extension

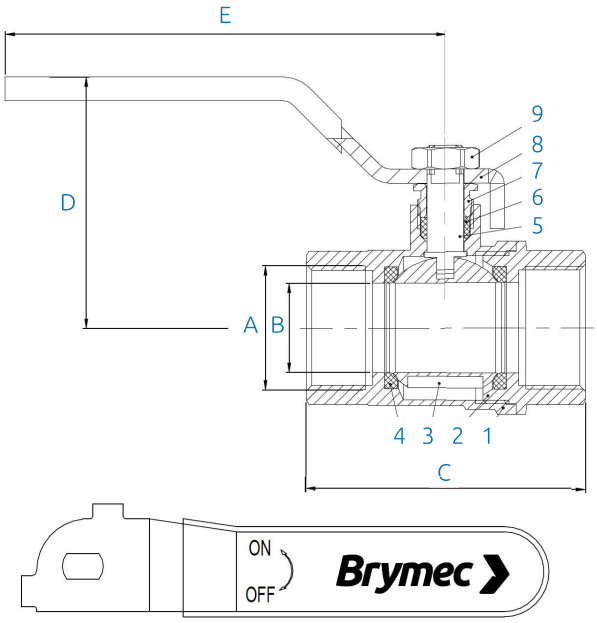
Technical Data

- Fields of applications: water
- Maximum working pressure: PN25
- Working temperature: -20°C to +120°C
- Full bore



Applicable Standards

- Valves are manufactured in accordance with: EN13828
- Female thread connections are to: ISO 7/1
- WRAS approved



Product Codes & Dimensions

STOCK NO.	A (DN)	B (mm)	C (mm)	D (mm)	E (mm)
38835	1/2"	14.5	55	50	93
38836	3/4"	19	67	53	93
38837	1"	24	75	62	115
38838	1 ¼	30	75	72	127
38839	1 ½	40	95	76	162
38840	2"	45	117	91	180

Material Specifications

NO	COMPONENT	MATERIAL	QUANTITY	OTHER
1	Body	CW602N	1	Natural
2	Seat	CW602N	2	Natural
3	Ball	CW602N	1	Chrome Plated
4	Ball Seat	PTFE	1	-
5	Stem	Brass	1	Natural
6	Packing	PTFE	1	-
7	Lock Nut	Brass	1	Natural
8	Handle	Q235+PVC	1	Red & Blue
9	Nut	Q235	1	Zinc Plated

8.70

EPH 0.01 installation and user instructions

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

Reference	HEN0203-EPH001-OM
Asset	EPH 0.01
Provided by	Rexel UK Ltd
Source file	Dimplex LST panel heater data sheet.pdf
Pages	1

LSTE Low Surface Temperature Heater



Technical Details

Controls	Digitally controlled, Electronic Thermostat accurate to (±0.2°C) **Timer modes:** 7 Day Programmable User Timer, Out All Day, Home All Day. **Continuous heat modes:** Eco, Manual, Frost Protect. **Additional modes:** Away, Boost, Setback.
Controller UI	• Graphical display with RGB backlight. • Capacitive buttons with audio feedback. • User replaceable battery (Coin-Type).
Controller Functions	• Open window detection, Adaptive-start, Advance time period. • Wide SP range (7-30°C). • Child Lock & Heater Lock (PIN-based).
Construction	• Durable epoxy-polyester powder coated steel casing with forward facing grille. • Advanced controls with cap-sense technology for total flexibility of heating.
Element	Compact, finned, mineral filled sheathed element.
Installation	1 wall bracket for easy fixing.
Safety	• Thermal cut-out. Auto reset type. • Overheat detection.
IP Rating	IP24.
Battery Backup	1 x CR2032 Lithium Manganese Dioxide 3V coin cell battery to backup real time clock (weight 3g). Battery life > 5 years.
Supply	1.3 metres fitted, 3 core for fused spur installation, 1/N/PE ~230-240 V, 50Hz. Class I, with earth wire.
Colour / Finish	Metal Chassis, Air Outlet Grille & Control Moulding - Traffic White (RAL 9016).

Warranty & Approvals

Approvals	UKCA, CE, BEAB
Warranty	2 Years
Country of Origin	United Kingdom
Manufacturer	Glen Dimplex Heating & Ventilation (GDC Group Ltd)

Product Description

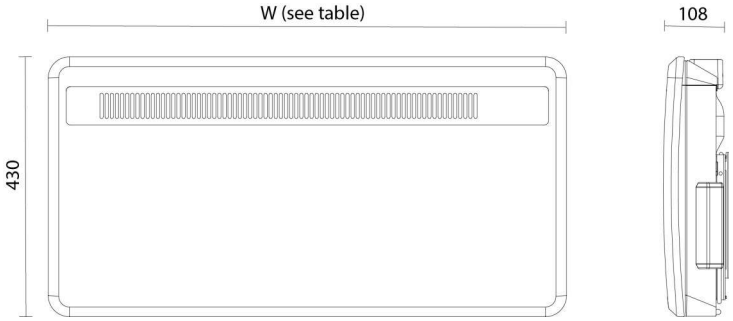
LSTE features intuitive user controls, allowing the programming of multiple 7-day timer profiles via a backlit LCD display and capacitive buttons. This low surface temperature panel heater meets the requirements of a maximum contact temperature of 43 degrees.

Key Features

- Intuitive user controls with RGB backlit LCD display.
- User programmable room temperatures with multiple seven-day timer profiles.
- Electronic thermostat accurate to within 0.2°C.
- Energy-saving technologies such as Adaptive Start and Open Window Detection.
- Fanned heat for rapid warm up.
- Quiet operation.
- Forward facing grille for optimum heat circulation.
- Splash proof for use in bathrooms.
- Complies with Lot 20 of ERP Directive.
- Smartphone APP controllable via the Dimplex Control system*

*Requires additional hardware, sold separately. A Dimplex Hub and RFM 'Radio Frequency Module' device are required for this product to connect to the Dimplex Control system and be controlled via the Dimplex Control smartphone APP.

Dimensions



Model/Item No.(EAN-Code 5011139+Item No.)	091208	LST050E	091178	LST075E	091185	LST100E	091192	LST150E
Output (kW)	0.50		0.75		1.00		1.50	
Height (mm)	430		430		430		430	
Width A (mm)	690		690		690		860	
Depth B (mm)	108		108		108		108	
Weight (Kg)	8.76		8.76		8.76		11.21	
Packaging Details								
Height (mm)	470		470		470		470	
Width (mm)	720		720		720		890	
Depth (mm)	135		135		135		135	
Packed Weight (Kg)	9.86		9.86		9.86		12.47	
Ti	10		10		10		9	
Hi	4		4		4		4	
Pallet Quantity (2.4m high)	40		40		40		36	

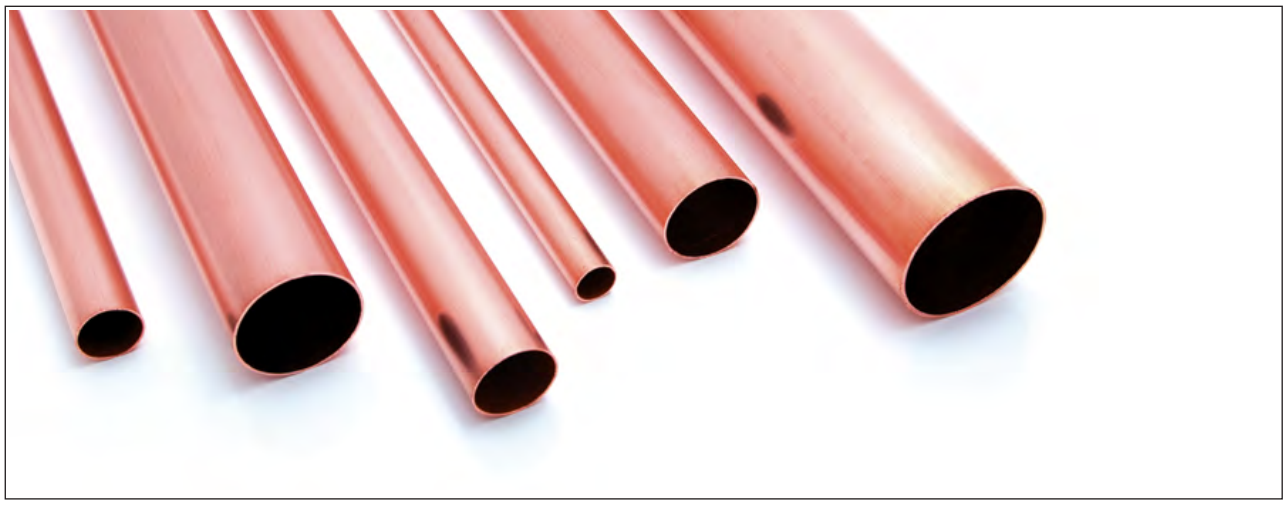
8.71

Lawtons 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	`Lawtons Data Sheet.pdf`
Pages	1

Refrigeration and Air Conditioning Tubes Data Sheet



Pipeline solutions for refrigeration and air conditioning, all to EN 12735-1

Our copper tubing is designed specifically for refrigeration and air conditioning use and accordingly cleaned, nitrogen-purged and capped.

Material Analysis

Material Grade Phosphorus de-oxidised copper; Cu-DHP or CW024A as defined in BS EN 1976.
Minimum Copper Content 99.90 % (including silver)
Phosphorus 0.015-0.040 %
Total Impurity Maxima 0.060 % (excluding phosphorus and silver)
The melting point of copper is 1083°C and it has a density of 8.9 gm/cc

Mechanical Properties

BS EN 12735-1 Refrigeration and Air Conditioning Tubes

Material Temper EN 1173	Tensile Strength min. (N/mm2)	Elongation min. (%)	Hardness (Indicative) HV5 VPN
R220 (soft)	220	40	40-70
	250	30	75-100
	290	3	Over 100

The Lawton Tube Co. Ltd
Torrington Avenue, Coventry CV4 9AB

Telephone: (024) 7646 6203
Fax: (024) 7669 4183
E-mail: sales@lawtontubes.co.uk

www.lawtontubes.co.uk

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NPU.fm

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	`NPU.fm.pdf`
Pages	1

Coupling

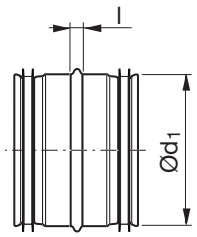
NPU



Description

Coupling connector for joining circular ducts.

Dimensions



Ød$_1$ nom	l [mm]	m [kg]
63	8	0,07
80	8	0,09
100	8	0,12
112	8	0,14
125	8	0,15
140	8	0,16
150	8	0,18
160	8	0,19
180	8	0,25
200	8	0,30
224	8	0,30
250	8	0,52
280	8	0,56
300	8	0,64
315	8	0,66
355	8	0,76
400	10	1,10
450	10	1,34
500	10	1,52
560	10	1,90
600	12	2,10
630	12	2,24
710	12	2,65
800	12	3,10
900	12	4,52
1000	14	5,30
1120	14	7,03
1250	14	7,70

Ordering example

NPU	200
Product	
Dimension Ød$_1$	

EUROVENT CERTIFIED PERFORMANCE
DUCT-MC
Identification number 17.11.002
www.eurovent-certification.com

Lindab reserves the right to make changes without prior notice
2023-10-03

8.73

DTG-TYPE A product datasheet

The following 8 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	HEN0203-DTGTYPEA-DS
Asset	DTG-TYPE A
Provided by	Ventilation Direct Ltd
Source file	Ventilation Direct door transfer grille data.pdf
Pages	8

Grilles & Diffusers

Series NV
Non-vision grilles

- **Sight blocking design ensures privacy is maintained**
- **Perfect for areas like changing rooms**
- **Four models available including units to suit door mounting and dark room installations**



Series NV



Series NV non-vision grilles are intended to provide good levels of ventilation for areas where privacy must be ensured; bathrooms or hospital examination rooms for example.

Available in the following models:

NV1: Standard flanged grille.

NV2: As NV1 but with a spare backing frame for fitting into doors.

NV3: Double layered grille intended for dark-rooms.

NV4: Slimline surface mounted with a non chevron blade. Designed to suit fire doors.

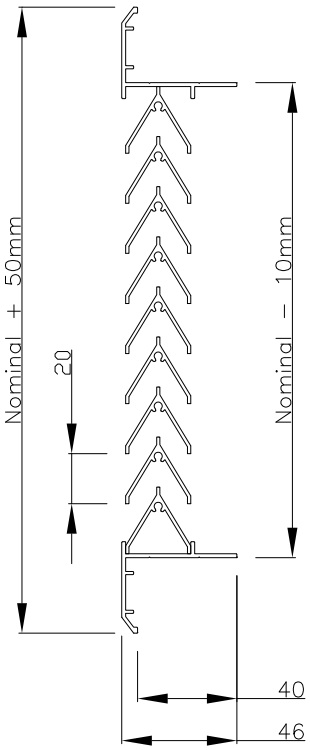
Please note: A very narrow sight line can be gained through NV4 grilles if looked at from directly below.

Design features

Material	Extruded aluminium frame and core
Frame	NV1 - NV3: 37BN - 37mm bevelled
	NV4: SMS - Surface mounted small
Sizes	Minimum: 100mm x 100mm
	Maximum: 2900mm x 2900mm
Fixings	Standard: None
	Optional: See page 4
Finish	Standard: Satin anodised (AA5)
	Optional: See page 6
Mass/m² face area	NV1: 12.5kg
	NV2: 15 kg
	NV3: 23 kg
	NV4: 11 kg
Free area	NV1 - NV3: Approx 38%
	NV4: Approx 30%

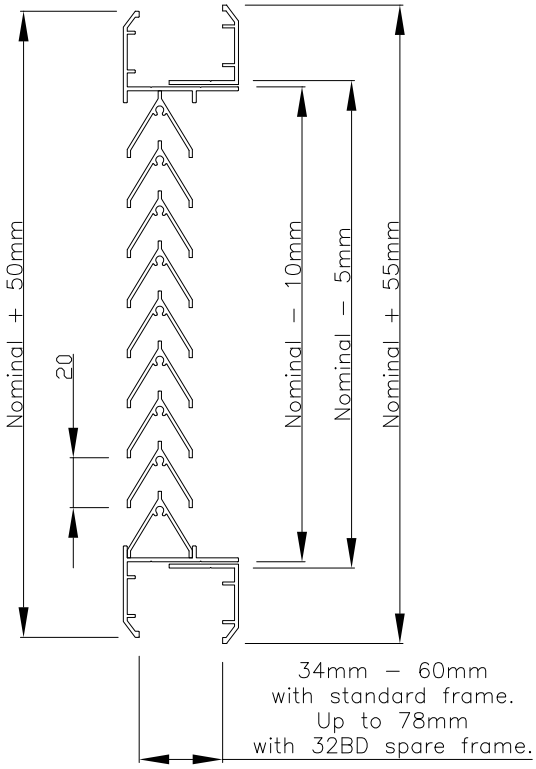
Models

NV1: Standard flanged grille



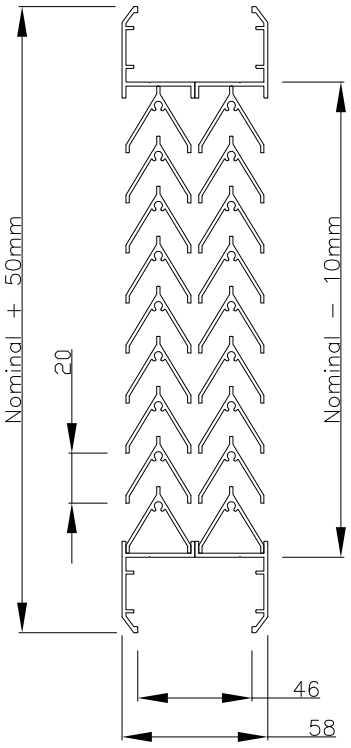
NV2: Door grille

As NV1 but with a spare frame for mounting on the other side of a door.



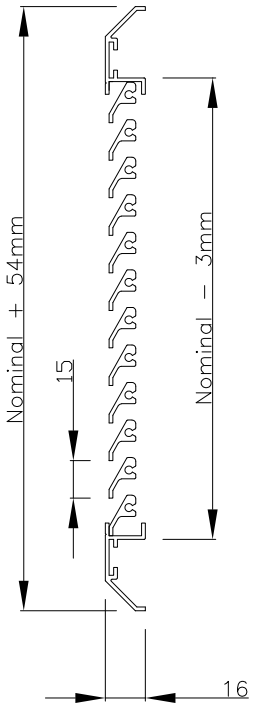
NV3: Double layered grille for darkrooms

Two grilles supplied separately with trimmed frames for mounting either side of an aperture.



NV4: Surface mounted

Designed for use in fire doors to conceal an intumescent fire damper, Series IFB60 / IFB120 (supplied separately).



Stocked sizes

The following sizes of Series NV4 surface mounted non-vision grilles are held in stock in satin anodised finish and with prepunched fixing holes, available for immediate despatch.

150mm^2
200mm^2
250mm^2
300mm^2
350mm^2
400mm^2
450mm^2
500mm^2
550mm^2
600mm^2

All sizes are nominal.

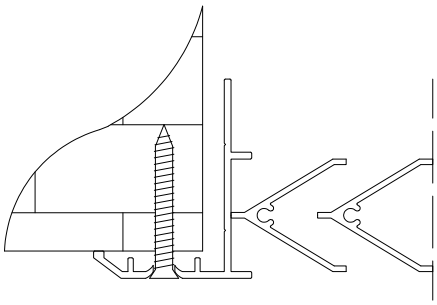
Product code: NV4 - FH - SAA

Fixings

Countersunk fixing holes: Code suffix FH

For extremely simple fitting, countersunk fixing holes can be punched into the outer frame.

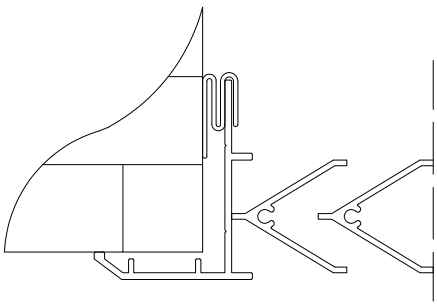
Self tapping screws in the same finish as the grille are provided as standard.



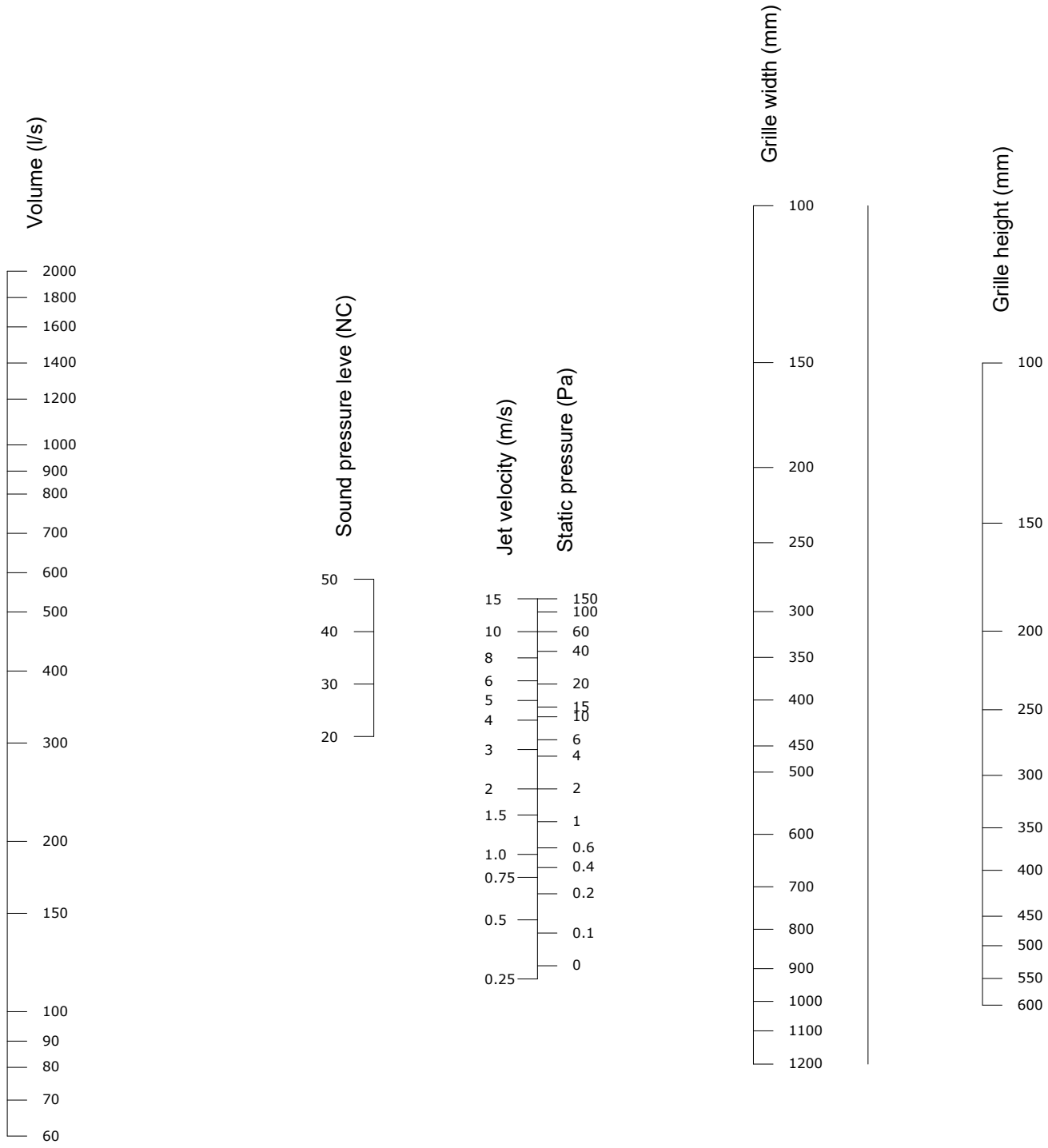
Push-in clip method: Code suffix PC

These sprung clips are compressed when the grille is pushed into place. The outward force provided then holds the grille securely in place.

This fixing method is not suitable for use in ceilings, nor is it suitable for use with NV4 grilles.



Selection data (NV1 and NV2 only)



Finishes

Satin anodised aluminium

Polyester powder coating to any RAL or BS colour



Ordering codes

Example

1	**-**	**400 x 400**	**-**	**NV1**	**-**	**FH**	**-**	**RAL9010**		

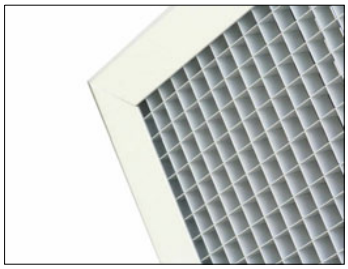
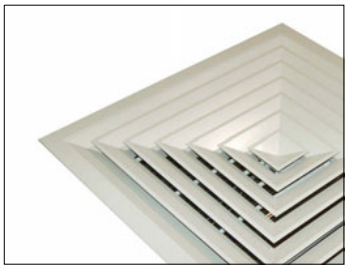
Codes

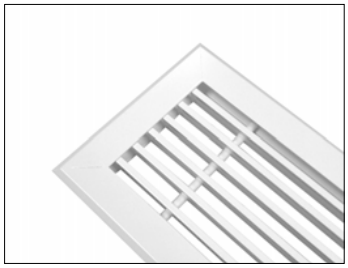
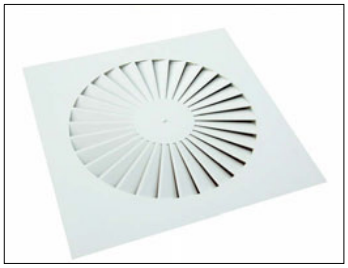
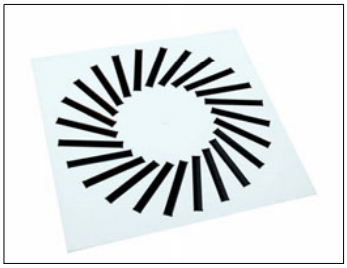
1)	**Quantity**		
2)	**Size (mm)**	(Width x height)	
3)	**Series**	NV1	Standard flanged non-vision grille
		NV2	As NV1 but with spare backing frame for use with doors Please state if deeper frame is required for doors up to 78mm thick
		NV3	Double layered grille for dark-rooms
		NV4	Slimline surface mounted non-vision grille
4)	**Fixings**	FH	Countersunk fixing holes (optional with NV1, 2 and 3, standard with NV4)
		PC	Push-in clips (not for use in ceilings, not suitable for NV4 grilles)
5)	**Finish**	SAA	Satin anodised frame (standard)
		RAL...	Polyester powder coated to RAL...
		BS...	Polyester powder coated to BS...

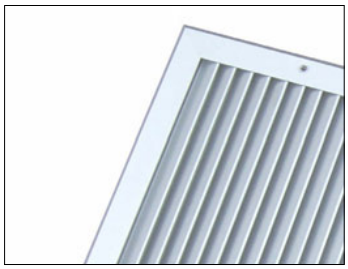
Important: Size will be taken to be nominal (hole internal) unless stated otherwise.

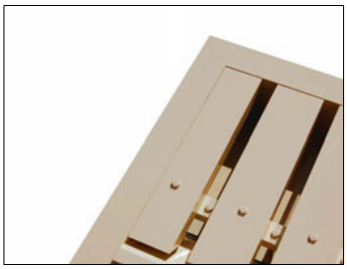
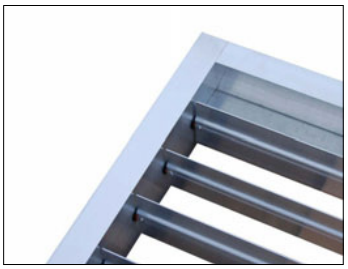
Leave code section blank if no option is required.

Series NV
Non-vision grilles



NCA: Fire and Volume Control Dampers





8.74

Frico over door heater data sheet

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	`Frico over door heater data sheet.pdf`
Pages	2

AR215E11 Air curtain

Article Number: 3264

Variant : 400V 3N~



Description

Recessed air curtain for smaller entrances

• Recommended installation height 2,5 m*

• Recessed mounting

• Lengths: 1, 1,5 and 2 m

AR200 is a compact air curtain, suitable for most small entrances. A low height makes it possible to install AR200 where ceiling space is limited. The recessed installation and low sound level makes AR200 very discreet.

*) Recommended installation height varies depending on the relevant premises.

Technical parameters

Installation		
Type of installation	Recessed mounting	
Maximum installation height	2,500	mm
Nominal data		
Color casing	Traffic white	
Color casing, NCS	NCS S 0500-N	
Color casing, RAL	RAL 9016	
Color, outlet grilles	Telegrey 2	
Color outlet grilles, RAL	RAL 7046	
Enclosure class	IP20	
Ambient working temperature (dry conditions)	-20 to 30	°C
Dimensions and weights		
Length	1,552	mm
Height	198	mm
Depth	432	mm
Weight	28	kg
Air flow		
Air flow	950; 1750; 1450	m^3/h
Sound data		
Sound level	50; 45; 34	dB(A)
Sound power level LWA	66	dB(A)
Motor/control supply		
Control/motor supply	230	V
Control/motor current	0.6	A
Input power (P1), motor	120	W
Maximum fan impeller speed	1,130	r.p.m.

Electric heat		
Input power, heater	11.3; 6.8	kW
Current heating	16.3; 9.8	A
Voltage heating	400	V
Phase(s)	3~	
Temperature rise, maximum heat output, highest airflow	20	°C
Temperature rise, maximum heat output, lowest airflow	35	°C

Parameter	
Power	11.30 kW
Air flow	1750 m³/h
Inlet air temperature	20 °C
Outlet air temperature	39 °C
Inlet air humidity	70.0 % r.H
Outlet air humidity	23.0 % r.H

Accessories

SIREAXE Advanced kit AR200E (18089)
SIREBN Basic control system (33481)
SIRECC603 3m Modular cable (17542)
SIRECC610 10m Modular cable (17544)
SIRECC640 40m Modular cable (17773)
SIREB1XAE Ext. PC board (74061)
SIREBXE Basic kit AR200E (18087)
SIRECC605 5m Modular cable (17543)
SIRECC615 15m Modular cable (17545)
SIRECXE Competent control (18088)

Documents

cat_frico_ar200_gb_170613.pdf
Product leaflet Control system SIRe
MA_FRICO_AR200_GB_170619.PDF
MA_FRICO_SIREB1X_GB_SE_160927.PDF
3D MODEL (TURNTOOL) AR200.TNT
CAD DRAWINGS (DWG) AR210E SIMPLE.DWG
CAD DRAWINGS (DWG) AR215E SIMPLE.DWG
CAD DRAWINGS (DWG) AR220E SIMPLE.DWG
Declaration of conformity Air curtains
ENVIRONMENTAL FACTS AR200-300, ADR200-300.PDF
WD_FRICO_AR200_CB30N_32N_170420.PDF

8.75

Phenolic Block Pipe Supports 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	`Phenolic Block Pipe Supports TDS.pdf`
Pages	1

SUPAPHEN Pipe Supports Data Sheet

SUPAPHEN High Density Phenolic Pipe Supports

The use of factory manufactured phenolic foam insulated load bearing pipe support inserts will greatly reduce the risk of condensation on cold/chilled water pipe applications, providing continuous insulation and vapour resistance as well as enhancing the thermal insulation performance of the system.

Supaphen pipe support inserts are manufactured from high density phenolic insulation to suit a full range of diameters and thicknesses covering copper, steel and plastic pipes.

BS5970 2012 Thermal insulation code of practice recommends the use of Insulated pipe support inserts and that the pipe support bracket be fixed over load bearing insulation of the same material (or compatible with) the insulation on the pipe.

Supaphen pipe supports are supplied with a factory applied aluminium foil vapour barrier and are cut to the required length per the table below. A half metal sleeve (or full if required) is applied as standard from 48mm diameter per the table below. Supaphen pipe supports are bore coated in line with major engineering specifications.

Supaphen HD phenolic complies with the requirements of product standard EN14314.

Contact MWI for further technical data on the specification and application of Supaphen pipe supports.





Supaphen pipe supports standard specification.

Pipe Size OD	Support Length	Metal Spreader Plate	Max Support Centres	Density (kg/m³)
15-42mm	100mm	none	3m	60
48-67mm	100mm	1mm	4m	60
76-159mm	100mm	1mm	4m	80
168-273mm	125mm	1.5mm	6m	120
298-457mm	200mm	2mm	6m	120
Please contact MW for non standard applications i.e on roller supports or larger diameters.				

Supaphen Heavy Density Phenolic	Technical Data		
Density	60kg/m3	80kg/m3	120kg/m3
Colour	Grey	Grey	Grey
Thermal Conductivity Aged	0.031W/mK	0 .034W/mK	0.045W/mK
Temperature Range	-50C to 110C		
Compressive Strength (Parallel to Rise)	>150kpa	>470kpa	>1000kpa
Tensile Strength (Parallel to Rise)	>150kpa	>520kpa	>800kpa
Fire Test Classification	BL s1 d0		

Supaphen Approvals & Compliance

BRE Global Verified EPD

EN 15804 Environmental Product Declaration (EPD) www.greenbooklive.com

MW Insulation Ltd Approvals & Compliance

ISO 9001 QUALITY MANAGEMENT

ISO 14001 CERTIFIED

Disclaimer - The values provided are typical and accurate but subject to normal variation. The information contained on this data sheet is believed to be correct at the time of publication. MW Insulation reserves the right to amend the product data/specification without notice. MW Insulation makes no guarantees nor provides warranties about the suitability of the product for a chosen application. If in doubt or for any advice, please contact MW Insulation Ltd.

8.76

Proclad150 Technical 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	`Proclad150 Technical Data Sheet.pdf`
Pages	1

Technical Data Sheet

PROCLAD150™

The Professional Cladding Solution

PROCLAD150™ is the premium multi-layered laminate system, which provides a weatherproof cladding and jacketing system to insulated duct and pipe systems. The 6 ply laminate has a zero perm rating to prevent moisture ingress and with increased strength and UV resistance, PROCLAD150™ provides a market leading solution. The technically advanced adhesive being solvent free for safe environmentally conscious use, is capable of being applied in wet/humid conditions at extremes of temperatures (-30C to +130C).

	Value	Standard
Product Thickness	150 microns	
Tensile Strength	> 200 Newtons	EN 527-3
Elongation	> 60%	EN 527-3
Water Permeability	0.00 g/m2/d	ASTM F1249 ISO 15106-2
Puncture Resistance	>100 Newtons	DIN EN 14477
Service Temperature	-40C to +140C	
Application Temperature	-30C to +130C	
Emissivity Value	0.03 to 0.84	
UV Testing	10 Years Plus	ASTM G 26A ISO 4892-2

Product Performance Benefits

External & Internal Applications
Proven UV Resistance – 10 years+
Increased Puncture Resistance
Salt Water Resistant
Resistant To a Range Of Chemicals
Compliant for Direct Food Contact
BS 476 parts 6&7: Class 'O'

Product Range and Sizes:

Product No	Name	COLOUR	MICRON	WIDTHS	LENGTH
P150S6	PROCLAD 150S	Silver	150	600mm	50m
P150W6	PROCLAD 150W	White	150	600mm	50m
P150B6	PROCLAD 150B	Black	150	600mm	50m
P150EMB6	PROCLAD 150EMB	Embossed	150	600mm	50m

Installation Guidelines: ProTech Global Ltd provides detailed method statements for all its products for use in various applications. These must be referred to prior to starting work.

ProTech Global Ltd:
Unit1 Moor Farm, Green Lane, Failand, Bristol, BS8 3TP, UK

Tel:+44 (0)117 298 0573 Email: sales@protechglobal.co.uk

8.77

FD 0.01 product datasheet and installation instructions

The following 8 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	HEN0203-FD001-DS
Asset	FD 0.01
Provided by	BSB Engineering Services Ltd
Source file	BSB rectangular resettable fire damper instructions.pdf
Pages	8

FD-R Series



Installation, Operation and Maintenance Instructions

THESE INSTALLATION INSTRUCTIONS MUST BE READ IN THEIR ENTIRETY BEFORE COMMENCING WORK TO ENSURE COMPLIANCE.

Dampers will only be CE marked if:

- Installed as tested
- No deviation to design
- These instructions are followed

Third party approval will be required for any non-tested proposal.
Before commencing installation, the “Installation Check List” within DW/145 should be referred to. See “Damper Installation Certificate” within section 11.

FD-R Series

FD-R Damper Installation, Operation & Maintenance Instructions.

1. Storage

Dampers received on site should be stored in a purpose made storage area, where they can be protected from moisture, dust, and impact damage until required. Dampers are designed for installation within internal normal dry filtered H&V systems.

2. Health and Safety

2.1. Only competent personnel may carry out the work outlined in this document.
2.2. Wear appropriate Personal Protective Equipment as required for safe working conditions and as site rules dictate.
2.3. Do not introduce fingers across the open blade or near to the spring-loaded handle when releasing.
2.4. Where dampers are only accessible with the need for additional elevation, any equipment used should be done so with due consideration to the Work at Height regulations 2005 and current site rules.

3. Important

3.1. These instructions should be read in their entirety before commencing work. The installer must be familiar with the fire separating element construction detail that is produced by that manufacturer, and the “as tested” damper installation method, as appropriate for that fire separation barrier.
3.2. Do not over-tighten Fusible Link. Do not force handle when Fusible Link assembly is set. Refer to section 9 for testing.
3.3. Check internally that any debris has been removed and ductwork is connected.
3.4. In accordance with TR/19 and BESA DW144 and DW145 access doors/panels/flexi-duct should be fitted adjacent to the damper to allow commissioning, servicing, and cleaning. Access doors should not be obstructed.
3.5. All installations are subject to local Building Control Approval (BCA). Tested Installations are detailed herein. If the proposed installation deviates to that shown, acceptance from the BCA should be sought before proceeding.
3.6. Refer to main product brochure for full details and specification.
3.7. Where more than one duct penetrates a wall, adjacent fire damper assemblies must have a minimum clear separation of 200 mm between damper casings to comply with BS EN1366-2, Section 13.6.
3.8. A minimum separation of 75mm between the fire damper and adjacent construction element is required e.g. wall/floor to comply with BS EN1366-2, Section 13.6.

4. Equipment required

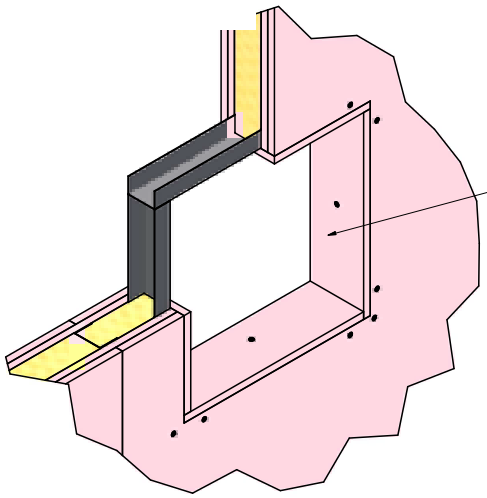
4.1. Equipment and tools will vary dependent upon the fire barrier construction that the damper is being installed within. Standard equipment that is normally used for the building of the construction element should suffice.
4.2. Appropriate access equipment must be used.
4.3. Cordless drill and various dia. drill bits / drivers to suit Angle Frame fixings, and duct connection fixings.

5. Preparation for Installation and General Notes

5.1. Before installation, the damper should be inspected to ensure that it has not been damaged and is in good condition following transportation and/or storage.
5.2. Check damper reference and size to site specification.
5.3. The damper is supplied with blade in the closed position and the Fusible Link held in place by orange transit tape.
5.4. Remove the tape. Unscrew Fusible Link anti-clockwise a couple of turns.
5.5. Perform quick test to check damper opens and self closes keeping fingers away from moving blade/handle.
5.6. Install damper to site specification details and building codes of practice. (Refer to Tested Installation Methods contained herein).
5.7. Ensure that the ductwork is independently and adequately supported in accordance with DW144/145.
5.8. All Fire / Smoke Damper installations must be carried out to the satisfaction of the appropriate Building Control Officer and/or specifying authority.
5.9. The installation methods contained herein assumes that the wall has been built prior to the damper opening preparation. If the opening has already been formed, verify suitability, size, and position accordingly.
5.10. Ensure any services (e.g., electrical/plumbing) within the structure or running close to the structure will not be affected.
5.11. Where the structure is deeper than the casing length, it may be necessary to connect ducting to the non-access side of the damper through the opening before final installation of the damper. If this is done, slide the damper and ductwork assembly back through the opening until the Angle Frame butts up to the structural surface ready to be affixed.

6. Dry wall Installation Procedure

FIGURE 1



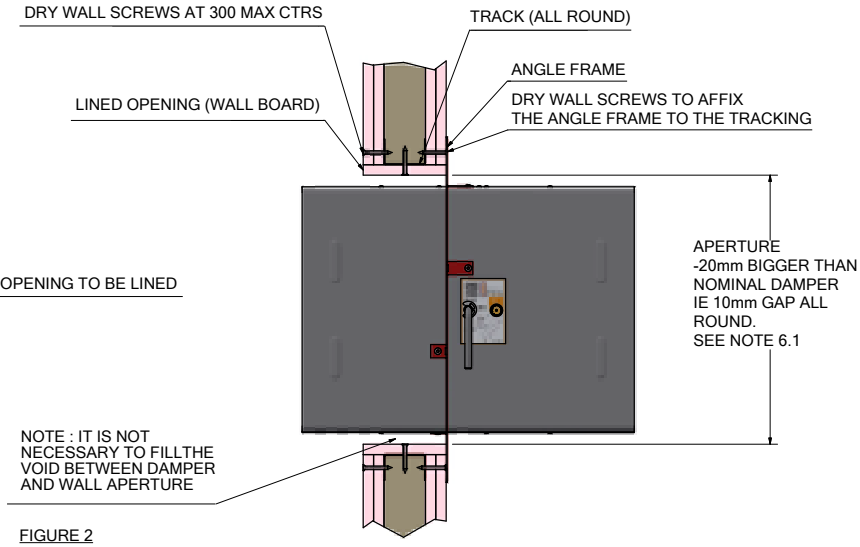


FIGURE 2

SECTION VIEW
(APPLIES TO SIDES/TOP/BOTTOM)

6.1 . For existing dry walls – When cutting the opening for a damper, if (partial) removal of stud is unavoidable, ensure the structure is sufficiently supported to conform to design specification.
6.2. Ensure that appropriate 'fire-rated' plasterboard (Type D or Type F in accordance with EN520) is used throughout the construction of the drywall partition.
6.3. Finished aperture size is to be 20mm larger than the nominal damper width and height. This leaves 10mm nominal gap all round.
6.4. Dry wall openings must be lined with a single layer of type D or F fire rated board.
6.5. Cut size = damper size + (2 x nominal gap size) + (2 x board thickness). See Figure 2. And table below:

Example 300mm x 200mm damper							
Damper Size (mm)		2 x nominal gap size		2 x board thickness		Cut Size (mm)	Finished Size (mm)
300 x 200	+	2 x 10mm (20mm)	+	2 x 12.5mm (25mm)	=	345 x 245	320 x 220

6.6. Mark out position and size required, cut the hole in the wall using appropriate means, add track and fix into position.
6.7. Dry wall openings must be lined with a single layer of type D or F fire rated board. See Figure 1.
6.8. The Finished size should be in accordance with the table above.
6.9. Position damper centrally in opening and fix Angle Frame to wall using drywall screws of sufficient length to engage with track.
6.10.All Ø5mm fixing holes must be used.
6.11.Install from one side. There is no need to fill void.
6.12.Test unit in accordance with the Commissioning requirements within section 8.
6.13.Ductwork to be fitted and connected in accordance with DW 144 / DW145. Aluminium rivets should be used (to act as breakaway-joint). If fire resisting ductwork is being fitted to the dampers, use the appropriate tested fire resisting fastenings. The use of Teck Screws is not permitted.
6.14.Complete Installation check list within section 11.

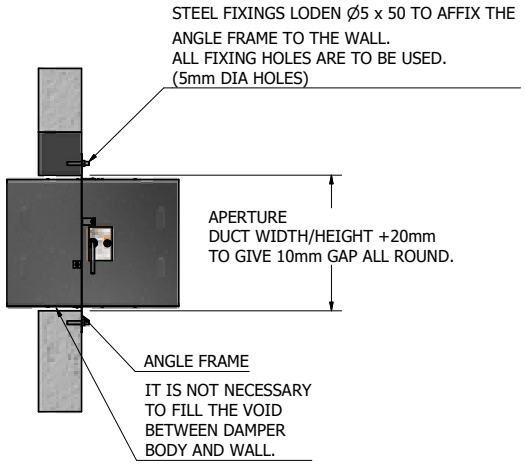
FD-R Series

FD-R Damper Installation, Operation & Maintenance Instructions.

7. Masonry wall and floor Installation Procedure

MASONRY WALL

SECTION VIEW
(APPLIES TO SIDES/TOP/BOTTOM.)



MASONRY FLOOR

SECTION VIEW
(APPLIES TO SIDES/TOP/BOTTOM)

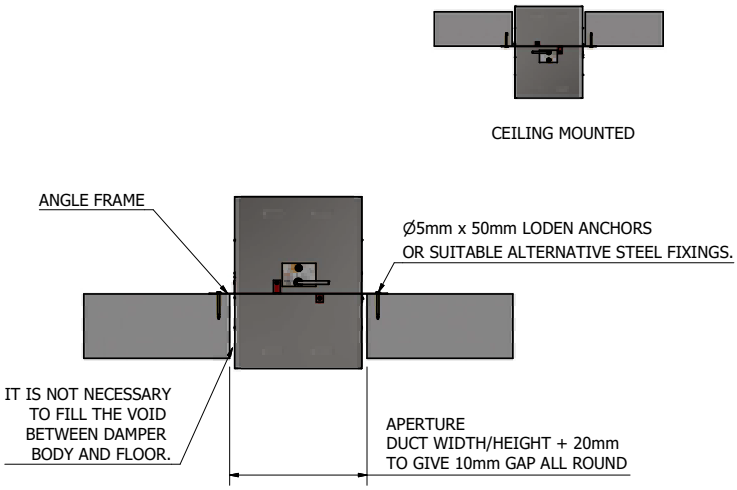


FIGURE 3

7.1. Finished aperture size is to be rectangular and 20mm larger than the nominal damper width and height. This leaves 10mm nominal gap all round.
7.2. Cut size (finished) = damper size + (2 x nominal gap size). See Figure 3. And table below:

Example 300mm x 200mm damper cut size				
Damper Size	+	2 x nominal gap size	=	Cut Size
300 x 200mm		2 x 10mm (20mm)		320 x 220mm

7.3. Mark out the position and size of the required aperture on the wall / floor. Using appropriate means, cut the aperture in the wall / floor.
7.4. Position damper centrally in aperture. Fix Angle Frame to wall / floor.
7.5. It is possible to install the damper to the underside of a masonry floor (ceiling). See Figure 3.
7.6. There are a variety of proprietary fixings available. Fixings must be fire rated (steel, NOT aluminium or plastic). Check minimum dimension specification between fixing and edge of aperture. BSB recommend Loden Anchors or steel anchor type bolts (Ø5mm minimum).
7.7. ALL Ø5mm fixing holes must be used.
7.8. Test unit in accordance with the Commissioning requirements within section 8.
7.9. Ductwork to be fitted and connected in accordance with DW 144 / DW145. Aluminium rivets should be used (to act as breakaway-joint). If fire resisting ductwork is being fitted to the dampers, use the appropriate tested fire resisting fastenings. The use of Teck Screws is not permitted.
7.10. Complete Installation check list within section 11.

8. Commissioning

8.1. It is recommended that the blade is only opened and locked in position once the damper has been installed into the fire barrier and ductwork is connected. If set and locked open before installation, handling of the casing can cause the fusible link mechanism to actuate and close the blade. Dampers should always be checked that they are open and set correctly after installation.

8.2. Do not over-tighten the Fusible Link. Use light finger pressure only. The mechanism relies on engaging toothed spring into retention slots to hold blade in position. Rotate handle whilst tightening Fusible Link 'feeling' for slots. Once engaged, it is only necessary to rotate a further ¼ turn.

8.3. Do not force handle when Fusible Link assembly is set. This will result in damage to mechanism rendering unit inoperable.

8.4. Check the Installation conforms to specification. Refer to DW/145 appendix E, E.2 and E.3 (check lists). Test the damper as follows:

8.4.1. Remove access doors/flexible duct as appropriate.

8.4.2. Check internally that any debris has been removed and the damper internals are clean.

8.4.3. Unscrew the Fusible Link anti-clockwise a couple of turns. Open damper using handle and set to desired blade position. (Only set blade position if being used additionally as an air balance damper, otherwise set to fully open). Retighten the Fusible Link.

8.4.4. Keeping hands and fingers out of way of the spring-loaded blade and handle, Unscrew the Fusible Link quickly. Check visually that the damper blade closes fully.

8.4.5. Reset the damper blade to the required open position.

8.4.6. If damper operates satisfactorily, go to section 11 to complete checklist. If not, see Fault Finding Section10.

8.4.7. It is important to log, and review maintenance frequency based on inspections and test history.

9. Maintenance and Test

9.1. In accordance with BS 9999 Annex W.1, inspection should be undertaken annually. Local regulations/conditions may override this with periodic Inspection being carried out more frequently where corrosive or dirty conditions prevail. The maintenance log should be reviewed at each inspection and the frequency adjusted as required dependent upon findings. (BSB recommend a maximum of 1 year between inspections).

9.2. Before starting, note the damper blade position so that it can be left in same position after test.

9.3. Remove access doors/flexible duct as appropriate. Check damper is clean and free of dust and debris, clean if necessary, using lightly oiled rag to clean inside of the damper case and blade. DEB "duck oil" is recommended.

9.4. If corrosion is observed on the blade axle, apply 2 drops of oil on each axis bearing and operate a few times to free up the operation.

9.5. Now test damper operation. Keeping hands and fingers out of the way of the spring-loaded handle, unscrew the Fusible Link quickly. Check visually that the damper blade closes fully.

9.6. Reset the damper blade to its previously set position at the start of this exercise.

9.7. Do not over-tighten the Fusible Link. Use light finger pressure only. The mechanism relies on engaging toothed spring into retention slots to hold blade in position. Rotate handle whilst tightening Fusible Link 'feeling' for slots. Once engaged, it is only necessary to rotate a further ¼ turn.

9.8. Do not force handle when Fusible Link assembly is set. This may result in damage to mechanism rendering unit inoperable.

9.9. If damper operates satisfactorily, complete maintenance log (this should be retained by facilities management).

9.10. If damper does not operate correctly, go to fault-finding section (section 10). Recording findings and corrective action necessary to facilitate repair in maintenance log.

9.11. IMPORTANT. When using powered duct cleaning equipment, with a powered rotary head, it is important that contact with the installed damper is not made, as this could result in damage to the damper internals.

FD-R Series

FD-R Damper Installation, Operation & Maintenance Instructions.

10. Fault Finding

Symptom	Fault	Corrective Action
Damper blade does not travel fully open / close smoothly or has become stuck.	Internal foreign object fouling blade.	Inspect / remove items.
		Clean and lubricate. (Maintenance and test section 9).
	Casing dented/damaged or not rectangular.	Minor damage may be corrected carefully with a soft mallet. (BSB always recommend replacement of damaged dampers).
	Damper internals have been exposed to moisture.	Gently apply pressure to blade by hand to move open. Use Scotch Bright pad RED 07447 grade, wet with duck oil and clean the damper internally at the point where the blade closes. Wipe dry and leave clean. 'Massage' exposed peripheral blade seal until pliable.
Damper not in expected 'normal' state.	Fusible Link missing.	Fit Fusible Link - Part No: 201448.
	Fusible Link not tightened properly.	Tighten Fusible Link.
	Fusible Link has activated.	Measure Fusible Link overall length, which is normally 29.5mm. If less than 28mm, replace with new link- Part No: 201448.
Fusible Link Mechanism too sensitive / not possible to set damper in open position.	Fusible Link has activated.	Measure Fusible Link overall length, which is normally 29.5mm. If less than 28mm, replace with new link- Part No: 201448.
	Damper case damaged/not rectangular.	Minor damage may be corrected carefully with a soft mallet. BSB always recommend replacement of damaged dampers.
	Circlip on the handle lost/ damaged.	Contact BSB Tech Sales.

For other symptoms not listed, please refer to BSB Technical Sales Office.

11. Installation Checklist

Project Name: .....Date of Installation:.....

Installation Address ..... Postcode: .....

Location Identification (Section/Floor/Room): .....

The installer should complete this installation certificate when installing BSB Engineering dampers. A separate certificate must be completed for each individual damper. This certificate applies only to BSB dampers.

No.	Question	Guidelines	Confirmed
01	Are the dampers the correct type?	Confirm the damper is the correct type and model.	YES / NO
02	Are the dampers correctly identified individually?	Unique system identification and location reference aids commissioning and must be clearly indicated on the damper or agreed location	YES / NO
03	Are the dampers located correctly?	The damper position shall be checked against the installation drawings and/or instructions	YES / NO
04	Is the installation method tested and approved for the type of barrier that is being protected?	Ensure modifications have not been made to the tested method	YES / NO
05	Is the damper installed and fixed in accordance with the manufacturer's tested and approved methods?	Check the damper has been fixed correctly to the fire barrier and is independently supported from the ductwork	YES / NO
06	Have access doors been fitted to the ductwork allowing the damper blades to be inspected?	Access doors are required for commissioning and servicing	YES / NO
07	Is access through the ductwork to the damper unhindered?	Unobstructed space shall be provided for safe access to damper. Also consider access through ceiling's voids and adjacent service	YES / NO
08	Using the access opening provided, has the damper been left in the open position?	Check the blade position	YES / NO
09	Have the damper blades been released to simulate failure of thermal release mechanism (damper 'drop test')?	Confirm fitted correctly to ductwork/damper	YES / NO
10	Have the dampers been checked for internal cleanliness free from damage and debris?	Test button on thermal fuse probe shall be used or fusible link removed to drop test	YES / NO
11	Have the dampers blades been re-set following the drop test and the access panel replaced?	With the damper in the closed position inspect for damage and contamination	YES / NO
12	At the time of the damper handover, is fire damper installation completed in accordance with this checklist?	Damper installer to record, on the register, any incomplete works relevant to the damper installation	YES / NO
13	Is the damper installation completed and available for handover prior to system commissioning?	Damper Installer to record, on the register, any incomplete works relevant to the damper installation	YES / NO
14	Is the completed handover register cross-referenced back to the identification codes listed in the system?	Obtain relevant acceptance of the damper installation from the system designer	YES / NO

Damper reference ID: .....Damper product type: .....

Notes/Considerations (Please use an additional sheet if applicable): .....

.....

Company name: .....

Company address: ..... Postcode: .....

Company telephone: .....Company website: .....

Installer's first name: .....Installer's Last name: .....

Installer's mobile: .....Email address :.....

Please provide the full name, contact number and email address of additional installers on a separate sheet.

I, the undersigned, confirm that the damper referenced in this certificate has been checked and installed to the manufacturer's tested method.

Signature: .....Name: .....Date: .....

FD-R Series

FD-R Damper Installation, Operation & Maintenance Instructions.

Other Air, Fire and Smoke Control Products in the BSB Range:



BSB Engineering Services Limited

Unit 56, Trinity Trade Centre, Mill Way, Sittingbourne, Kent ME10 2PD, UK • Tel: +44 (0)1795 422609

For purchase orders and order related enquiries, please email: orders@bsb-dampers.co.uk

For pricing, technical and general enquiries, please email: enquiries@bsb-dampers.co.uk

Website: www.bsb-dampers.co.uk • A member of the Maico group

A brand of MAICO

BSB Engineering Services Ltd. reserves the right to modify or withdraw any specification without prior notice that may result from continuous product development. The information contained within this brochure is correct at the time of going to press.

Assessed to ISO 9001:2015
Certificate No. 1464

MADE IN BRITAIN · ASFP · SMOKE CONTROL ASSOCIATION · HEVAC · ADCAS
THE VOICE OF THE DUCTWORK INDUSTRY

8.78

Rockwool Ductslab & Ductwrap Data Sheet

The following 8 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`Rockwool Ductslab & Ductwrap Data Sheet.pdf`
Pages	8



ROCKWOOL®

Ductwrap and Ductslab

For the thermal insulation of ductwork and water storage tanks

ROCKWOOL Ductwrap and Ductslab provide thermal insulation for air conditioning, warm air and extract ducts used in the internal and external environment generally within plant rooms and boiler houses.

CE A1

Ductwrap and Ductslab

ROCKWOOL Ductwrap and Ductslab are used for the thermal insulation of cold water storage, feed and expansion tanks.

The products are recommended for ductwork for service temperatures of up to 230°C.

Advantages

- Acoustically absorbent
- Non-combustible
- Water repellent
- Chemically inert
- Easy to handle and install

Standards and approvals

Ductwrap and Ductslab products are CE marked in accordance with BS EN 14303. For more information please visit www.rockwool.co.uk/DOP

Ductslab satisfies the requirements of BS 3958–5, 'Specification for bonded man-made mineral fibre slabs'.

Ductwrap and Ductslab can be used to satisfy the requirements of BS 5422 'Method for specifying thermal insulating materials .....'.

The product has been authorised for use in LUL surface and sub-surface premises when installed in accordance with this data sheet – please refer to the LUL Approved Product Register website www.LU-apr.co.uk for specific details.

Description

Ductwrap is a lightweight, flexible insulation roll, faced with reinforced aluminium foil.

Ductslab is a semi-rigid insulation slab, faced with reinforced aluminium foil.

Dimensions

- Ductwrap rolls - 1000 mm wide

Thickness of roll (mm)	Length of roll (mm)	Rolls per pack	Area per pack (m^2)
25	5000	2	10
40	4000	2	8
50	6000	1	6

- Ductslab - length 1000 mm width 600 mm thickness 40, 50 and 60 mm*

* Other thicknesses may be available upon request

Density

The nominal density of Ductwrap and Ductslab is 45 kg/m^3.

Performance

Fire

The products are classified A1 in accordance with BS EN 13501-1 and fully comply with the definitions of non-combustible in all UK and Ireland Building Regulations.

Water vapour resistance

When suitably taped, the aluminium foil gives Ductwrap and Ductslab a water vapour resistance of approx 1000 MNs/g.

Thermal conductivity

	T (°C)	10	50	100	150	200
Ductslab	λ (W/mK)	0.034	0.042	0.054	0.060	0.086
Ductwrap	λ (W/mK)	0.034	0.040	0.050	0.063	0.079

T = mean temperature

Consider a horizontal duct at 35°C in still air at 15°C insulated with 50mm Ductslab or Ductwrap:

Cladding type	Emissivity (ε)	Other surface temp (°C)	Heat loss (W/m)
Aluminium	0.05	19.0	13
Cloth	0.90	16.9	14

Ductwrap and Ductslab

Service Temperature and Limiting Surface Temperature

ROCKWOOL Ductwrap and Ductslab can be used for service temperatures of up to 230°C. The limiting outer foil face temperature is 80°C to maintain facing bond strength.

Acoustics

It is sometimes desirable to improve the acoustic insulation on ducts, especially those in which gases, fluids or particle solids are transported at high velocities. The use of Ductwrap and Ductslab can considerably improve the level of environmental sound. For higher standards of acoustic attenuation, ROCKWOOL Techwrap can be used to provide both thermal and acoustic insulation.

pH Neutrality

ROCKWOOL insulation is chemically compatible with all types of pipes, ducts, equipment and fittings. (Guidance is given in BS5970 regarding the treatment of austenitic stainless steel pipework and fittings). Stonewool insulation is chemically inert. A typical aqueous extract of ROCKWOOL insulation is neutral or slightly alkaline (pH 7 to 9.5).

Durability

ROCKWOOL stone wool insulation products have been proven in service for over 60 years, in a wide range of climates and degrees of exposure. ROCKWOOL insulation will generally perform effectively for the lifetime of the building, plant or structure.

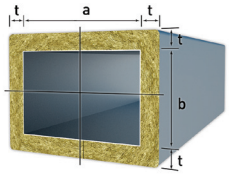
Biological

ROCKWOOL stone wool is a naturally inert and rot-proof material that does not encourage or support the growth of fungi, moulds or bacteria, or offer sustenance to insects or vermin.

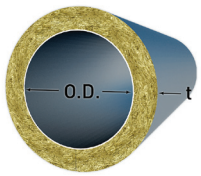
ROCKWOOL Ductwrap

Calculation of length

The calculation to determine the length of Ductwrap required to insulate the pipe or duct is made using the formula shown below:



Regular Ducts: L = 2a + 2b + 8t



Circular Ducts: L = 3.14 x (O.D. +2t)

Ductwrap and Ductslab

Applications

The required thickness of Ductwrap and Ductslab insulation will depend on such factors as duct air temperatures, ambient air temperatures and the designed heat losses.

The following tables are for general guidance only.

Thickness of ROCKWOOL insulation for warm air ducts (taken from BS 5422:2009 Table 12)

Table 12 - Ductwrap

Minimum temperature inside duct (°C)	External surface emissivity Minimum thickness of ROCKWOOL Ductwrap (mm)					
	0.05 (eg. bright aluminium foil)		0.44 (eg. dusty galvanised steel)		0.90 (eg. black paint)	
	CALCULATED THICKNESS (mm)	ADVISED THICKNESS (mm)	CALCULATED THICKNESS (mm)	ADVISED THICKNESS (mm)	CALCULATED THICKNESS (mm)	ADVISED THICKNESS (mm)
15	26	30	13	25	9	25
10	45	50	23	25	15	25
5	64	70	33	40	21	25
0	83	90	42	50	27	30

Table 12 - Ductslab

Minimum temperature inside duct (°C)	External surface emissivity Minimum thickness of ROCKWOOL Ductslab (mm)					
	0.05 (eg. bright aluminium foil)		0.44 (eg. dusty galvanised steel)		0.90 (eg. black paint)	
	CALCULATED THICKNESS (mm)	ADVISED THICKNESS (mm)	CALCULATED THICKNESS (mm)	ADVISED THICKNESS (mm)	CALCULATED THICKNESS (mm)	ADVISED THICKNESS (mm)
15	26	30	14	25	9	25
10	47	50	24	25	15	25
5	67	70	34	40	22	25
0	86	90	44	50	28	30

Indicative thickness of insulation for ductwork carrying warm air to control heat loss (taken from BS5422:2009 Table 13)

Table 13 - Ductwrap

Maximum Heat Loss (W/m^2)	External surface emissivity Minimum thickness of ROCKWOOL Ductwrap (mm)					
	0.05 (eg. bright aluminium foil)		0.44 (eg. dusty galvanised steel)		0.90 (eg. black paint)	
	CALCULATED THICKNESS (mm)	ADVISED THICKNESS (mm)	CALCULATED THICKNESS (mm)	ADVISED THICKNESS (mm)	CALCULATED THICKNESS (mm)	ADVISED THICKNESS (mm)
16.34	31	40	37	40	39	40

Table 13 - Ductslab

Maximum Heat Loss (W/m^2)	External surface emissivity Minimum thickness of ROCKWOOL Ductslab (mm)					
	0.05 (eg. bright aluminium foil)		0.44 (eg. dusty galvanised steel)		0.90 (eg. black paint)	
	CALCULATED THICKNESS (mm)	ADVISED THICKNESS (mm)	CALCULATED THICKNESS (mm)	ADVISED THICKNESS (mm)	CALCULATED THICKNESS (mm)	ADVISED THICKNESS (mm)
16.34	32	40	38	40	41	50

Indicative thickness of insulation for chilled and dual-purpose ducting to control heat transfer (taken from BS5422:2009 Table 14)

Table 14 - Ductwrap

Maximum Heat Loss (W/m^2)	External surface emissivity Minimum thickness of ROCKWOOL Ductwrap (mm)					
	0.05 (eg. bright aluminium foil)		0.44 (eg. dusty galvanised steel)		0.90 (eg. black paint)	
	CALCULATED THICKNESS (mm)	ADVISED THICKNESS (mm)	CALCULATED THICKNESS (mm)	ADVISED THICKNESS (mm)	CALCULATED THICKNESS (mm)	ADVISED THICKNESS (mm)
6.45	50	50	58	60	61	70

Table 14 - Ductslab

Maximum Heat Loss (W/m^2)	External surface emissivity Minimum thickness of ROCKWOOL Ductslab (mm)					
	0.05 (eg. bright aluminium foil)		0.44 (eg. dusty galvanised steel)		0.90 (eg. black paint)	
	CALCULATED THICKNESS (mm)	ADVISED THICKNESS (mm)	CALCULATED THICKNESS (mm)	ADVISED THICKNESS (mm)	CALCULATED THICKNESS (mm)	ADVISED THICKNESS (mm)
6.45	52	60	59	60	63	70

Ductwrap and Ductslab

Typical specification clauses for ductwork

The following specifications are for guidance purposes only and should be read in conjunction with recommendations given in BS 5970.

1) Horizontal ducts – concealed from view

To be insulated with ROCKWOOL Ductwrap/ Ductslab, nominal density 45 kg/m^3, having a factory applied reinforced aluminium foil facing. Joints to be securely taped with 75 mm minimum wide soft aluminium self adhesive tape. The insulation on the underside of the ducting to be additionally secured by suitable insulation hangers at 300 mm centres.

The whole to be further supported by means of:-

- 19 - 22 SWG x 50 mm mesh galvanised wire netting. Where a vapour barrier is required, care to be taken when applying wire mesh support to avoid damaging the aluminium foil.

  or

- Aluminium Bands, circumferential at nominal 300mm centres. Bands located over the outer surface typically 50 mm from the circumferential joint of the Ductwrap and Ductslab. Do not over tighten the aluminium bands, as this will locally reduce the thickness of the insulation and reduce the thermal efficiency.

  N.B. Additional measures may be necessary to prevent sagging.

  or

- Subject to the client's approval, alternative fixings can be used in place, or alongside the above.

For operating temperatures below ambient a vapour barrier is required.

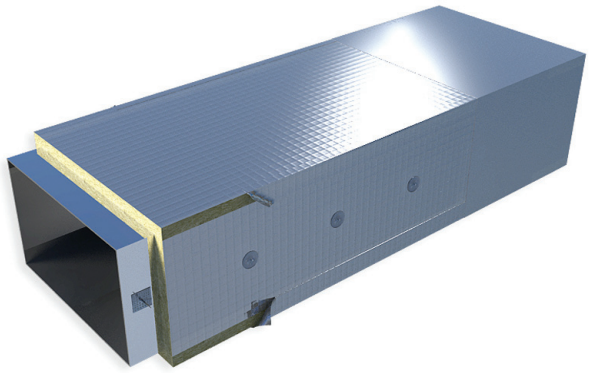
Provision should be made at all exposed edges to ensure continuation of the aluminium foil to the duct surface. Aluminium foil to be secured with 75 mm wide aluminium self-adhesive tape (i.e. Idenden T303 or similar and approved).

Where support pins/hangers puncture the foil, they should be sealed using aluminium foil tape to maintain the vapour barrier.

2) External applications (weather protected)

The duct insulation is to be Ductslab manufactured by ROCKWOOL Limited, Pencoed, Bridgend, CF35 6NY, secured to the ducting by means of a suitable adhesive and/or self-adhesive stick pins*, applied in accordance with the manufacturer's recommendations.

All joints are to be securely taped with 75 mm wide plain soft aluminium foil self-adhesive tape (Idenden type T303, or similar and approved) to maintain a continuous vapour barrier. The final surface treatment is to be:



External application of Ductslab with weather protection

a) Flat aluminium zinc coated steel protection:

Mild steel sheet continuously hot dipped with 185g/m^2 aluminium-zinc coating to BS EN 10326 and BS EN 10327, applied directly to insulating material.

0.4 mm thick flat sheet
Fixed and installed in accordance with BS5970.

b) Ribbed aluminium-zinc coated steel protection:

Mild steel sheet continuously hot dipped with 185g/m^2 aluminium-zinc coating to BS EN 10326 and BS EN 10327, applied directly to insulating material.

0.4 mm thick ribbed sheet
Fixed and installed in accordance with BS5970.

Ductwrap and Ductslab

c) Aluminium sheeting protection:

Apply flat (embossed) or profiled aluminium cladding directly to insulating material.

0.56 mm thick on pipework
0.71 mm thick on ductwork
Fixed and installed in accordance with BS5970.

d) Mild steel sheet:

Mild steel sheet continuously hot dipped with aluminium-zinc coating to BS EN 10326 and BS EN 10327, applied directly to insulating material.

Fixed and installed in accordance with BS5970.

e) Self adhesive weather resistant zero perm multi-layer laminate:

Apply multi-layer laminate directly over ducts and pipework, ensuring 75 mm overlap for a complete vapour barrier.

Fixed and installed in accordance with BS5970.

f) Polyisobutylene:

Polyisobutylene, minimum thickness 0.8 mm.

Fixed and installed in accordance with BS5970.

g) Roofing felt protection:

Secure in position with galvanized wire netting, of 1 mm x 25 mm mesh. Finish with two coats of black bituminous paint.

Fixed and installed in accordance with BS5970.

*__Note__ The pins and washers are necessary to avoid sagging of the insulation, particularly on larger size ducts and on the undersides of ducts. Fixing centres will depend on the size of the duct and the weight of the insulating material. The excess projection of the pins above the washers should be cut off and the washer sealed using the soft aluminium self-adhesive tape to maintain the integrity of the vapour barrier. The maximum surface temperature of the ductwork should not exceed the recommended maximum service temperature of the self-adhesive stick pins. (Guidance should be sought from the manufacturer of the stick pins).

Ductwrap and Ductslab

Sustainability

As an environmentally conscious company, ROCKWOOL promotes the sustainable production and use of insulation and is committed to a continuous process of environmental improvement.



All ROCKWOOL products provide outstanding thermal protection as well as four added benefits:

- **Fire resistance**
- **Acoustic comfort**
- **Sustainable materials**
- **Durability**

Health and safety

The safety of ROCKWOOL stone wool is confirmed by current UK and Republic of Ireland health & safety regulations and EU directive 97/69/EC: ROCKWOOL stone wool fibres are not classified as a possible human carcinogen. A Material Safety Data Sheet is available and can be downloaded from www.rockwool.co.uk to assist in the preparation of risk assessments, as required by the Control of Substances Hazardous to Health Regulations (COSHH).

Environment

Made from a renewable and plentiful naturally occurring resource, ROCKWOOL insulation saves fuel costs and energy in use and relies on trapped air for its thermal properties.

ROCKWOOL does not contain (and has never contained) gases that have ozone depletion potential (ODP) or global warming potential (GWP).

ROCKWOOL stone wool insulation is approximately 97% recyclable. For waste ROCKWOOL material that may be generated during installation or at end of life, we are happy to discuss the individual requirements of contractors and users considering returning these materials to our factory for recycling.

Interested?

For further information and technical advice please visit www.rockwool.co.uk or contact our Technical Solutions team on 01656 862 621 or info@rockwool.co.uk.

For Terms and Conditions go to www.rockwool.co.uk

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MAY 2016

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SAS61.03

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Reference	
Asset	General
Provided by	Not recorded
Source file	`SAS61.03.pdf`
Pages	50

SIEMENS



SAS31.03



SAS61.53



SAS61.33

Acvatix™
Actuators SAS.., SAT.. for valves
Basic Documentation

CE1P4041en
2015-05-19

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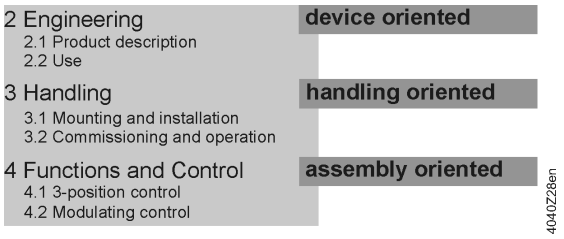
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1 About this documentation

1.1 Navigation

Information about a specific actuator is provided throughout the document. The structure of chapters 2 to 4 is as follows:



Note

Glossary and Index are arranged at the end of the document.

1.2 Revision history

Revision	Date	Changes	Chapter
First edition	2015-05-19	-	-

1.3 Reference documents

Type of document		SAS..	SAT..
Data Sheet		N4581	N4584
Mounting Instructions		lasered on cover	
CE Declaration of Conformity	AC 230 V	T4581X1	T4584X1
	AC/DC 24 V	T4581X2	T4584X2
Environmental Declaration		E4581	E4584

1.4 Before you start

1.4.1 Trademarks

The table below lists the third-party trademarks used in this document and their legal owners. The use of trademarks is subject to international and domestic provisions of the law.

Trademarks	Legal owner
Acvatix™	Siemens Switzerland Ltd

All product names listed in the table are registered (®) or not registered (™) trademarks of the owner listed in the table. We forgo the labeling (e.g. using the symbols ® and ™) of trademarks for the purposes of legibility based on the reference in this section.

1.4.2 Copyright

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1.4.3 Quality assurance

These documents were prepared with great care.

- The contents of all documents are checked at regular intervals
- All necessary corrections are included in subsequent versions
- Anpassungen bzw. Documents are automatically amended as a consequence of modifications and corrections to the products described

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1.5 Scope of this documentation

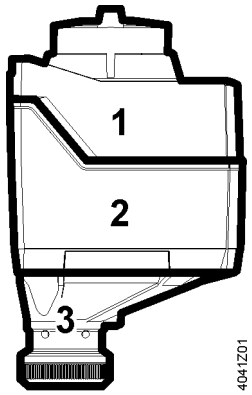
This document shall serve as a source of knowledge. In addition to basic information, it provides general technical information about the actuators used in HVAC plants. It is also targeted at engineering staff, HVAC electrical planners, system integrators and service engineers and provides all information required for planning work, correct installation, commissioning and service.

2 Engineering

2.1 Product description

The line of small actuators is comprised of stroke actuators SAS.. and SAT..

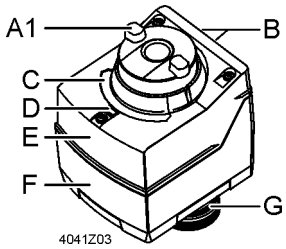
Mechanical design



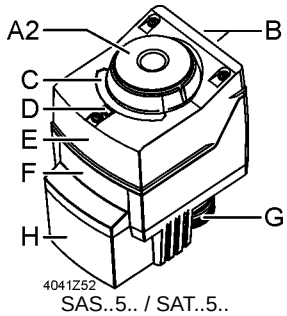
SAS.., SAT..

1	User interface Electrical connections
2	Power transmission and preparation Print Motor
3	Yoke (for assembly of actuator and seat, slipper valve)

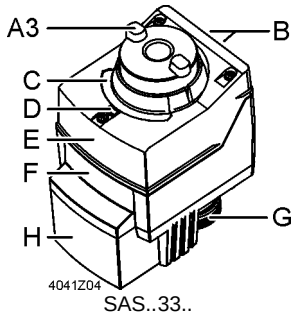
Components



SAS.. / SAT..



SAS..5.. / SAT..5..



SAS..33..

A1 Manual adjuster (with slide switch)
A2 Dummy cover (without manual adjuster)
A3 Manual adjuster (without slide switch)
B Cable glands (M16 / M20)
C Position indication
D Status indication (SA..61.., 0…10 V)
E Housing cover
F Housing
G Valve stem coupling
H Housing of spring return

2.2 Use

SAS.. / SAT..

For use in connection with Siemens 2-port or 3-port valves, as control or shutoff valves for HVAC plants.

2.3 Type summary

2.3.1 Stroke actuators

All types:
- **Stroke** 5.5 mm
- **Positioning force** SAS.. 400 N
  SAT.. 300 N

Product no.	Stock no.	Operating voltage	Positioning signal	Power consumption	Positioning time	Fail safe function / Spring return time	Manual adjuster	Position feedback	Remark	
SAS31.00	S55158-A106	AC 230 V	3-position	2.8 / 2.4 VA [5]	120 s	no / –	yes	-	[1]	[3]
SAS31.03	S55158-A107			3.5 / 2.9 VA [5]	30 s					
SAS31.50	S55158-A108			3.5 / 2.9 VA [5]	120 s	yes / <28 s [6]	no			
SAS31.53	S55158-A109			5.5 / 3.8 VA [5]	30 s	yes / <14 s [6]				
SAS61.03	S55158-A100	AC/DC 24 V	DC 0…10 V DC 4…20 mA 0…1000 Ω	5.3 / 4.5 VA [5]	30 s	no / –	yes	DC 0…10 V	[1]	[4]
SAS61.03U	S55158-A100-A100			5.3 / 4.5 VA [5]					[2]	
SAS61.33	S55158-A101			5.9 / 4.8 VA [5]		yes / <14 s [6]			[1]	
SAS61.33U	S55158-A101-A100			5.9 / 4.8 VA [5]					[2]	
SAS61.53	S55158-A102			5.8 / 5.0 VA [5]			no		[1]	
SAS81.00	S55158-A103	AC/DC 24 V	3-position	2.2 / 2.0 VA [5]	120 s	no / –	yes	-	[1]	[4]
SAS81.00U	S55158-A103-A100			2.2 / 2.0 VA [5]					[2]	
SAS81.03	S55158-A104			2.5 / 2.1 VA [5]	30 s				[1]	
SAS81.03U	S55158-A104-A100			2.5 / 2.1 VA [5]					[2]	
SAS81.33	S55158-A105			3.4 / 2.4 VA [5]		yes / <14 s [6]			[1]	
SAS81.33U	S55158-A105-A100			3.4 / 2.4 VA [5]					[2]	
SAT31.008	S55158-A119	AC 230 V	3-position	5.0 / 2.5 VA [5]	8 s	no / –	yes	-	[1]	[3]
SAT31.51	S55158-A120			5.5 / 3.2 VA [5]	15 s	yes / <8 s [6]	no			
SAT61.008	S55158-A117	AC/DC 24 V	DC 0…10 V DC 4…20 mA 0…1000 Ω	7.1 / 4.6 VA [5]	8 s	no / –	yes	DC 0…10 V		[4]
SAT61.51	S55158-A118			6.4 / 4.8 VA [5]	15 s	yes / <8 s [6]	no			

[1] Cable gland: M16 and M20 (ISO50262)
[2] Cable gland: ½“ (UL514C)
[3] Approbation: CE
[4] Approbation: CE and UL (only 24 V)
[5] Second value: Power consumption in neutral position
[6] Spring return time increased slightly at low temperatures

2.4 Ordering

Example

Product no.	Stock no.	Description	Quantity
SAS31.00	S55158-A106	Actuator	1
+ auxiliary components (connections, auxiliary switches…)			

Delivery

Actuators, valves and accessories are supplied in individual packs.

2.5 Equipment combinations

2.5.1 2-port / 3-port threaded valves with stroke actuator SAS..

Typical applications:
- Heating plants
- District heating plants
- Ventilation and air conditioning plants

Actuators	**SAS..**
Stroke	5.5 mm
Positioning force	400 N
Data sheet	N4581

PN 16	VVG44..	PN 16	VXG44..				SAS..	
Medium	1…120 °C	Medium	1…120 °C	**DN**	**G**	**k_{vs}**	**Δp_s**	**Δp_{max}**
Data sheet	N4364	Data sheet	N4464		[Inch]	[m^3/h]	[kPa]	[kPa]
	VVG44.15-..[1]		VXG44.15-..[1]	15	G 1 B	0.25 / 0.4 / 0.63	1600	400
	VVG44.15-..[1]		VXG44.15-..[1]	15	G 1 B	1 / 1.6	725	400
	VVG44.15-..[1]		VXG44.15-..[1]	15	G 1 B	2.5 / 4	400	400
	VVG44.20-6.3		VXG44.20-6.3	20	G 1 1/4 B	6.3	750	400
	VVG44.25-10		VXG44.25-10	25	G 1 1/2 B	10	400	400
	VVG44.32-16		VXG44.32-16	32	G 2 B	16	250	250
	VVG44.40-25		VXG44.40-25	40	G 2 1/4 B	25	125	125

PN 25	VVG55..				SAS..	
Medium	1…130 °C	**DN**	**G**	**k_{vs}**	**Δp_s**	**Δp_{max}**
Data sheet	N4379		[Inch]	[m^3/h]	[kPa]	[kPa]
	VVG55.15-..[1]	15	G 3/4 B	0.25 / 0.4 / 0.63	2500	1200
	VVG55.15-..[1]	15	G 3/4 B	1 / 1.6 / 2.5	2000	1200
	VVG55.20-4	20	G 1 B	4	1000	1000
	VVG55.25-6.3	25	G 1 1/4 B	6.3	800	800

[1] .. = insert k_{vs} value

2.5.2 2-port / 3-port threaded valves with stroke actuator SAT..

Typical applications:
- Heating plants
- Ventilation plants

Actuators	**SAT..**
Stroke	5.5 mm
Positioning force	300 N
Data sheet	N4584

PN 25	VVG549..				SAT..	
Medium	2...130 °C [1]	**DN**	**G**	**k_{vs}**	**Δp_s**	**Δp_{max}**
Data sheet	Q4380		[Inch]	[m^3/h]	[kPa]	[kPa]
	VVG549.15-0.25	15	G 3/4 B	0.25	1200	2500
	VVG549.15-0.4			0.4		
	VVG549.15-0.63			0.63		
	VVG549.15-1			1		1500
	VVG549.15-1.6			1.6		
	VVG549.15-2.5			2.5		
	VVG549.20-4K [2]	20	G 1 B	4		1600
	VVG549.25-6.3K [2]	25	G 1 1/4 B	6.3		

[1] Briefly 150 °C, with ALG..B fittings up to 100 °C
[2] Pressure compensated

2.6 Accessories

2.6.1 Electrical accessories

Product no.	Accessory	Description
SAS.. / SAT..	ASC10.51	Auxiliary switch

2.6.2 Mechanical accessories

Product no.	Accessory	Description
SAS.. / SAT..	ASK39.2	Weather shield

2.7 Product replacements

Replacement of SQS../SSC.. actuators by SAS.. and SAT.. actuators.

Note

- When replacing actuators consider positioning force and torque.
- Adjust in the controller the parameter "Running time" (corresponds to positioning time + idle stroke) and "Positioning time" if changed, to ensure stable control.
- The replacement of accessory items needs to be taken into consideration also. In that case, compatibility is not necessarily ensured.

2.7.1 Stroke actuators SAS../SAT.. to SQS..

SQS..				**SAS.. / SAT..**					
Product no.	OEM	**Pos. time** [s]	**Pos. force** [N]	Product no.	**Pos. time** [s]	**Pos. force** [N]	**VVG44.. VXG44..** DN15…40	**VVG55..** DN15…25	**VVG549..** DN15…25
SQS35.00	SQS359.00/189	150	400	SAS31.00	120	400	✓	✓	-
	SQS35.000C						✓	✓	-
	SQS35.00SL						✓	✓	-
SQS35.03	SQS359.03	35		SAS31.03	30		✓	✓	-
	SQS359.03/189						✓	✓	-
SQS35.50	-	150		SAS31.50	120		✓	✓	-
SQS35.53	-	35		SAS31.53	30		✓	✓	
-	SQS359.05	15	250	SAT31.008	8	300	-	-	✓
-	SQS359.54	20	400	SAT31.51	15		-	-	✓
SQS65	-	150	400	SAS61.03	30	400	✓	✓	-
SQS65.2	-	35		-			✓	✓	-
SQS65.5	-			SAS61.53			✓	✓	-
SQS65.5U	-			SAS61.33U			✓	✓	-
SQS65U	-			SAS61.03U			✓	✓	-
SQS85.00	-	150	400	SAS81.00	120	400	✓	✓	-
SQS85.03	-	35		SAS81.03	30		✓	✓	-
SQS85.53U	-			SAS81.33U			✓	✓	-

2.7.2 Electrical accessories

Notes

- If auxiliary switches are used, their switching points should be indicated on the plant schematic.
- Do not insulate the yoke and housing of the actuator and the valve stem, as air circulation must be ensured.

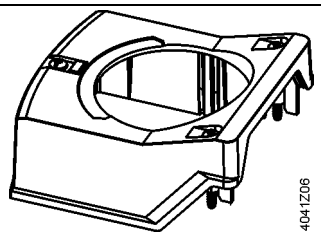
⚠ ⚠
- **Non-observance of the above may result in accidents and fires!**
- **Do not touch the hot parts without prior protective measures to avoid burns!**

Stroke actuators		SQS..	SAS..
ASC9.6	Auxiliary switch	ASC9.6	**ASC10.51**

2.8 Spare parts

The following spare parts are available:

SAS..
SAT..

Stock number	Description	
8000069479	Housing cover with screws and light conductor as an assembly, without laser marking	

2.9 Sizing

2.9.1 Parallel operation of actuators

SAS31.. and SAS81..

3-position actuators must have one specific controller each; refer to chapter 6.3 Connection diagrams (page 41).

SAS61..

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.

2.9.2 Permissible cable length and wire cross-sectional area

Cable lengths and wire cross-sectional areas depend on the following criteria of the actuators:

- Current draw
- Permissible voltage drop across the power supply lines

The control accuracy of the modulating actuators can be improved by using 4-wire connections, thus ensuring that voltage drops on G0 will not distort the positioning signal.

Note

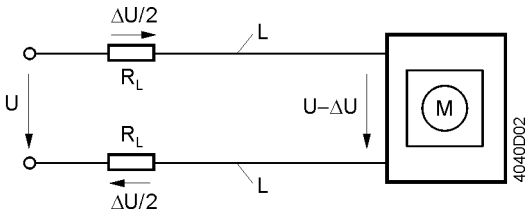
When determining the cable length and the wire cross-sectional area, adherence to the permissible operating voltage tolerance at the actuator is of importance, in addition to the permissible voltage drop across the operating voltage and signal lines (see table below).

Product no.	Operating voltage	Terminal	Max. permissible voltage drop
SA..31..	AC 230 V	N, Y1, Y2	2% each (total of 4%)
SA..61..	AC/DC 24 V	G0, Y, U	1% each (at DC 0…10 V)
SA..81..		G, Y1, Y2	4% each (total of 8%)

The following criteria must be considered:

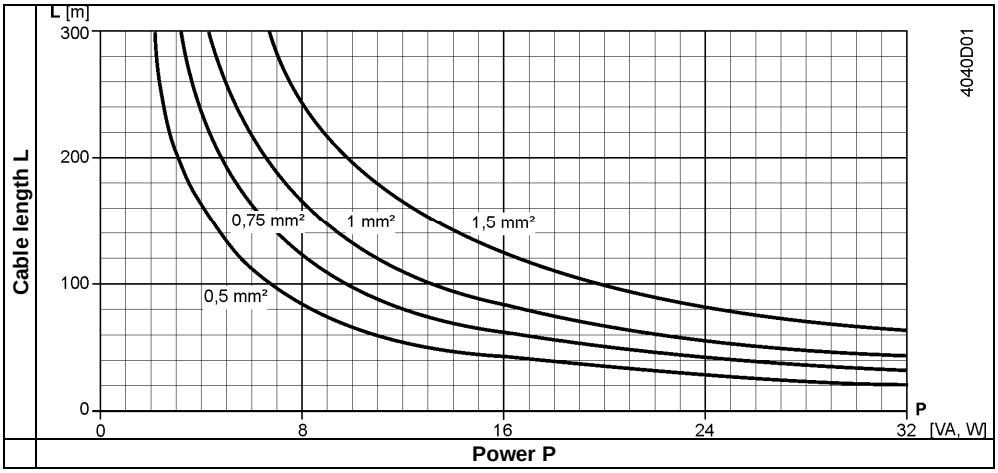
- With modulating control, the permissible positioning signal error must not exceed 1%, the reason being the voltage drop on the G0 wire.
- The voltage drop, caused by charging current peaks in the actuator's DC circuit, must not exceed 2 Vpp.
- If the G0 line is not correctly sized, load changes of the actuator due to changes of the DC voltage drop might lead to self-oscillations.
- The operating voltage drop at AC/DC 24 V may be a maximum of 8% (4% across the G0 wire).

Basic diagram − voltage drop across the power supply cables



The following diagram can be used to determine the cable lengths and wire cross-sectional areas.

L/P-diagram for AC/DC 24 V



Permissible cable length **L** as a function of power **P** and cross-sectional area of wire as a parameter

Note

P is the decisive power consumption of all actuators connected in parallel. When operating on AC 24 V, power consumption is in VA; when operating on DC 24 V, in W.

Formulas for wire lengths

Operating voltage	Permissible voltage drop / wire	Formula for wire length
AC 230 V	2 % of AC 230 V	$L = 46 \bullet \frac{1313 \bullet A}{P}$ [m]
AC 24 V	4 % of AC 24 V	$L = \frac{1313 \bullet A}{P}$ [m]
	1 % of DC 10 V	$L = \frac{5.47 \bullet A}{I(DC)}$ [m]

A Cross-sectional area of wire in mm^2
L Permissible wire length in m
P Power consumption in VA (AC) or W (DC) (see actuator's rating plate)
I(DC) DC current part (in A) on G0 wire

2.10 Warranty

The engineering data specified in chapter 2.5 Equipment combinations (page 9) are only guaranteed in connection with the Siemens valves listed.

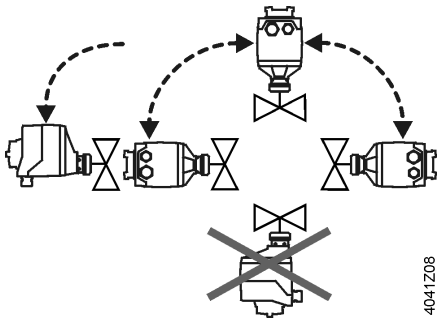
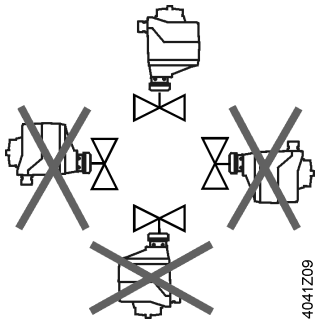
Note

When using the actuators in connection with valves of other manufacture, correct functioning must be ensured by the user, and Siemens will assume no responsibility.

3 Handling

3.1 Mounting and installation

3.1.1 Mounting positions

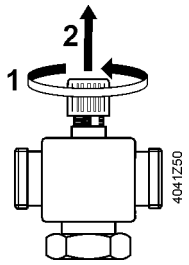
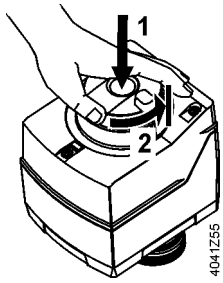
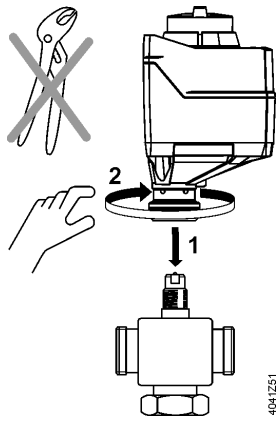
Indoor use	Outdoor use [1]
	

[1] Only in connection with weather shield ASK39.2, housing protection IP54 remains unchanged

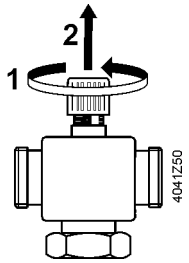
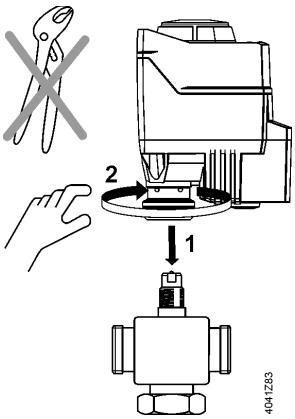
3.1.2 Fitting stroke actuators SAS.. to threaded valves

First, observe chapter 3.1.1 Mounting positions.

SAS..0..
SAT..0..

1	2	3
		
		tighten firmly by hand

SAS..5..

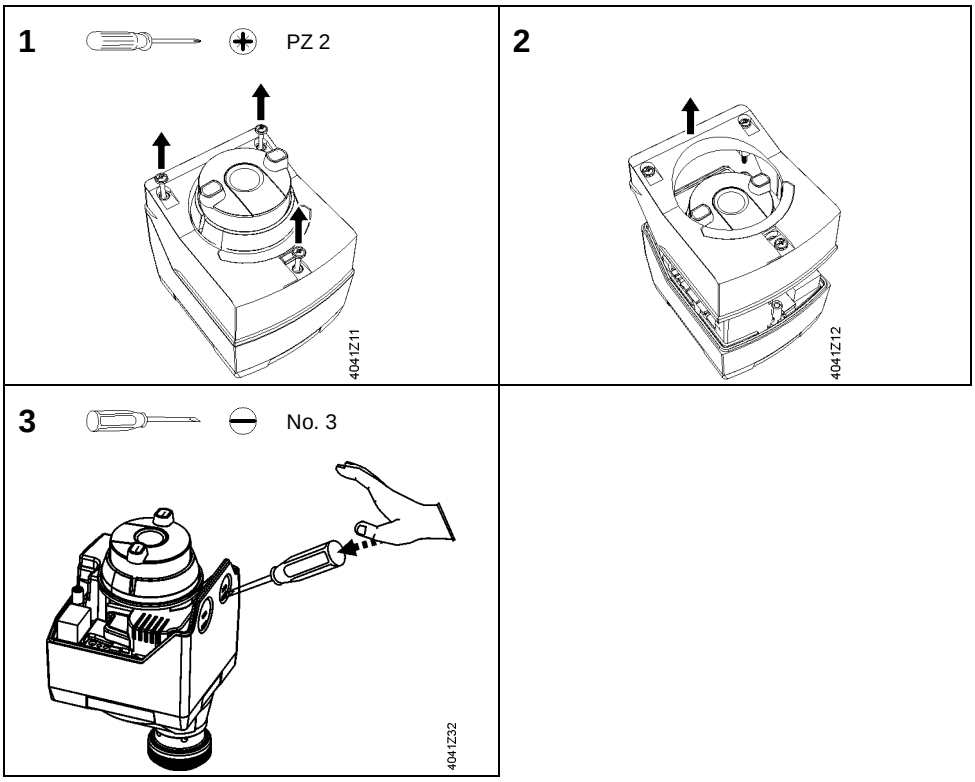
1	2	3
	-	
		tighten firmly by hand

3.1.3 Accessories

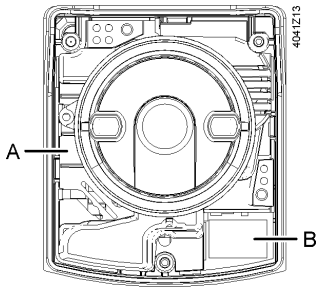
Special notes on mounting

Before fitting the accessory items shown below, the following steps must be performed:

1. Actuator is mechanically connected to a Siemens valve.
2. Observe compatibility and choice of combinations. Refer to 2.6 (page 10).
3. Disconnect actuator, auxiliary switch from power.
   Attention if AC 230 V connected danger of life!
4. ⚠ Only required with actuators without fail safe function: Using the manual adjuster, drive the actuator's stem to the fully retracted position and fix the coupling. See "Manual operation" and "Fixing the position" (page 33).
5. To fit an auxiliary switch the housing cover must be removed and the M16 knock-out broken out.



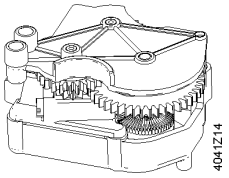
Interior view



A Plug-in space for accessory
B Connection terminal

Auxiliary switch ASC10.51

Scope of delivery
- 1 auxiliary switch
- 1 screw

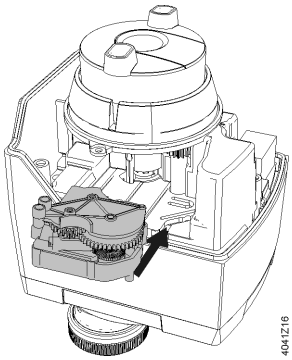




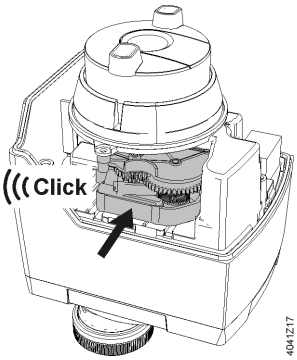
Plug-in space for accessory

First, observe "Special notes on mounting" (page 15).

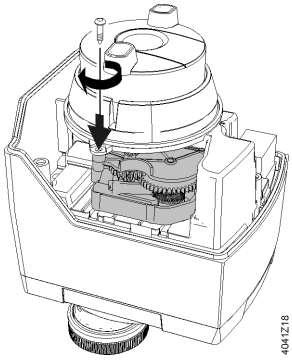
1



2

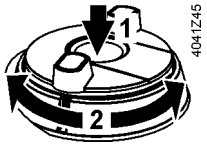


3 No.: 1

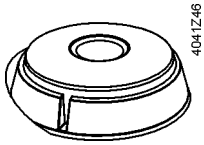


4 **Adjust switch position** (refer also to "Manual adjuster" page 33)

Without fail safe function (SA..1.0..)

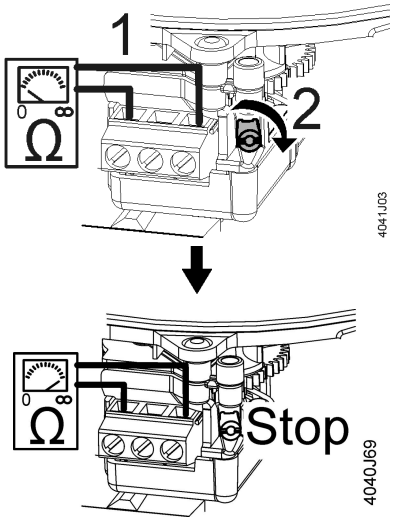


With fail safe function (SA..1.3.. / SA..1.5..)

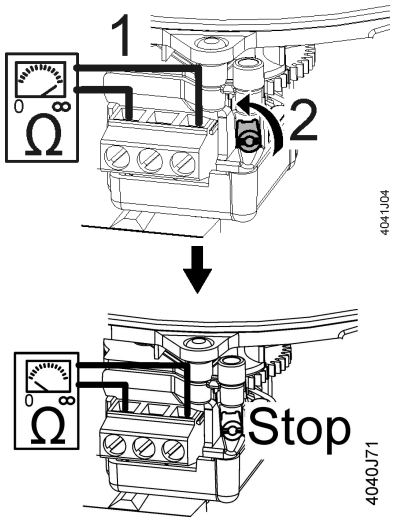


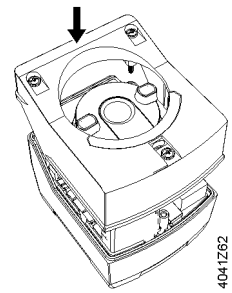
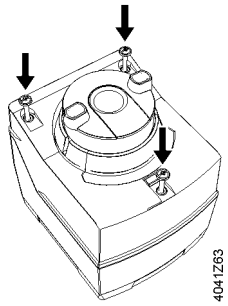
5 No.: 1

When initial situation**: 0 Ω**



When initial situation: **∞ Ω**



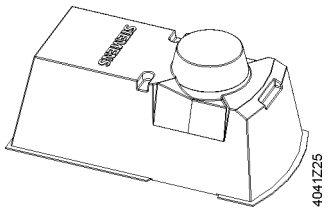
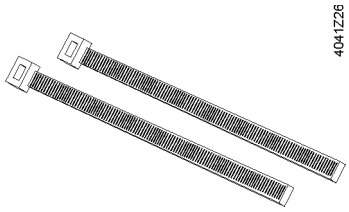
6 Observe "Wiring (installation)" (page 18)	**7** Observe "Connection terminals" (page 39)
8 	**9** max. 1.2 Nm 

Note

Before commissioning with the control, check the exact position again; see "Auxiliary switch", page 21.

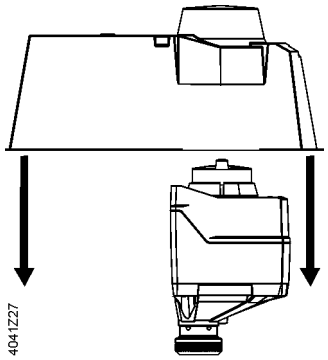
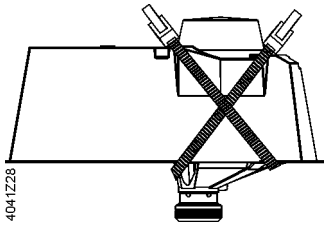
Weather shield ASK39.2

First, observe "Special notes on mounting" (page 15).

Scope of delivery	
Weather shield ASK39.2	2 UV-proof cable ties
	

Notes

- To protect the actuator from weather effects when used outdoors, the weather shield must always be fitted. The housing protection IP54 remains unchanged.
- If fitted several times, 2 UV-proof cable ties (700 x 7 mm) must be used when fitted again.
- The manual adjuster cannot be used when the weather shield is mounted.

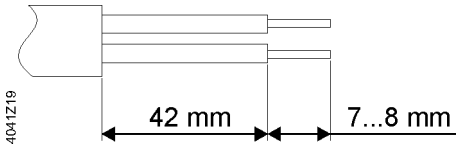
1 	**2** 

3.1.4 Wiring (installation)

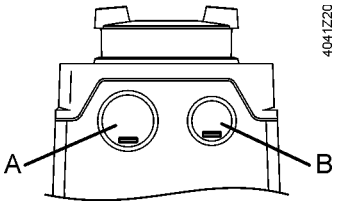
Conduct the electrical connections in accordance with local regulations on electrical installations as well as chapter 6.2 "Connection terminals" on page 39.

Preparation of wire endings

The cable endings must be prepared before as follows:

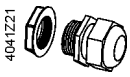
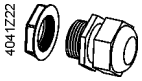
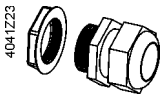


Cable entries



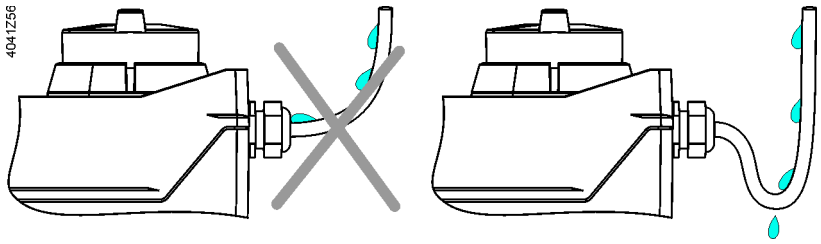
A	EU: M20 US: ½“	Connection actuator
B	EU: M16 US: ½“	Connection accessories

Cable glands

Cable glands (not contained in scope of delivery)		
Metric	Metric	Inch thread
M16	M20	½“
		

Notes

- Without cable gland IP protection is **not** guaranteed!
- Guide the cable in a loop to the cable gland, so water can drop off.

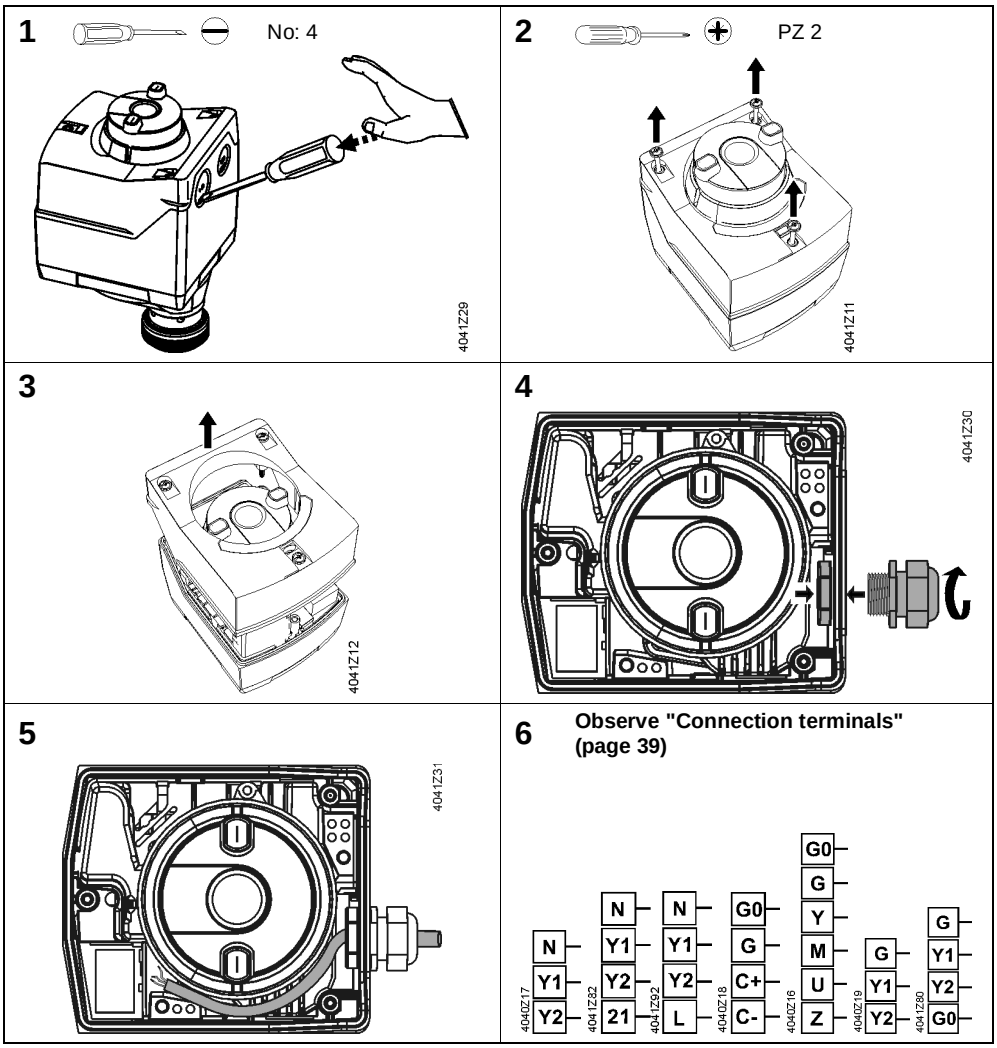


Preconditions

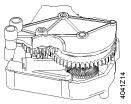
Prior to installation, the following preconditions must be satisfied:

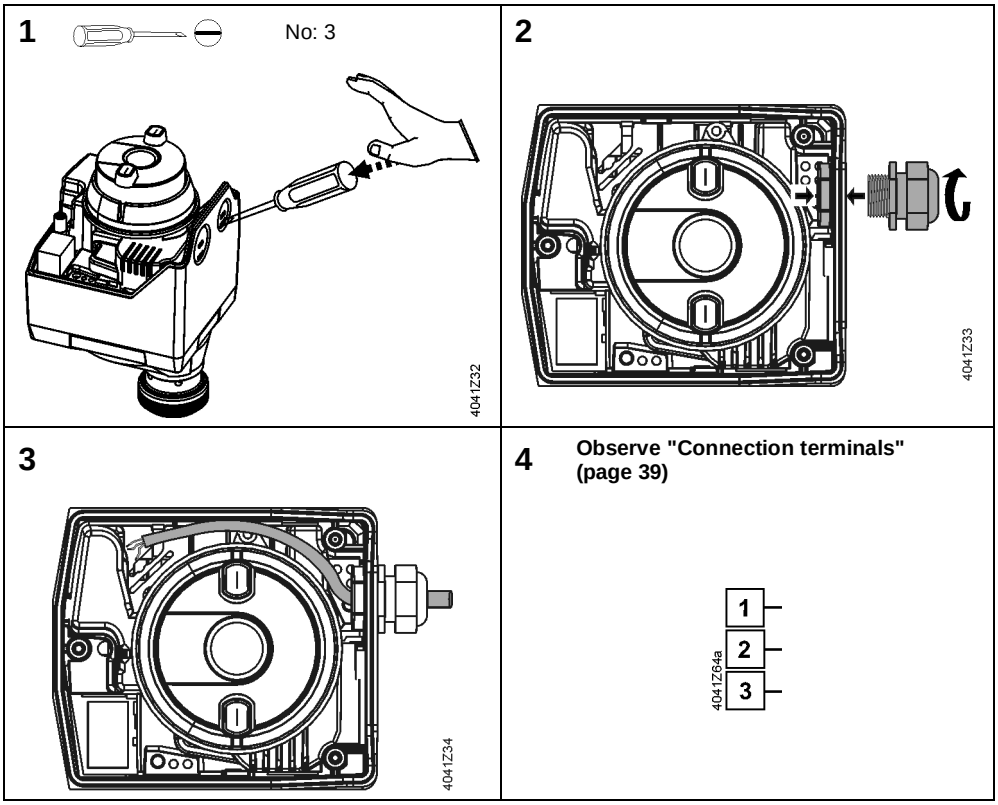
- Actuator is mechanically connected to a Siemens valve.
- Housing cover is removed.

Actuator



Auxiliary switch ASC10.51





3.2 Commissioning and operation

3.2.1 Function check and Calibration

Manually

Before making the function check, the following preconditions must be satisfied:
- "Environmental conditions" specified in chapter "Technical data" (page 36)
- Actuator is mechanically connected to a Siemens valve.
- ⚠ **Actuator is in "Manual operation" mode** (page 33).

If available, the actuator can be operated with the help of the “Manual adjuster” (see page 33).

Manual adjuster	Stroke actuator	Rotary actuator	Control path valve A→AB	Bypass valve B → AB
Turning in clockwise direction	Actuator’s stem extends	Actuator’s spindle turns in clockwise direction	Opening	Closing
Turning in counter-clockwise direction	Actuator’s stem retracts	Actuator’s spindle turns in counterclockwise direction	Closing	Opening

Notes
- If the actuator is forced to travel beyond its end positions, overload protection responds.
- Observe information given in chapter 4.2.1 Positioning signal and flow characteristic selection, page 26.

Electrically

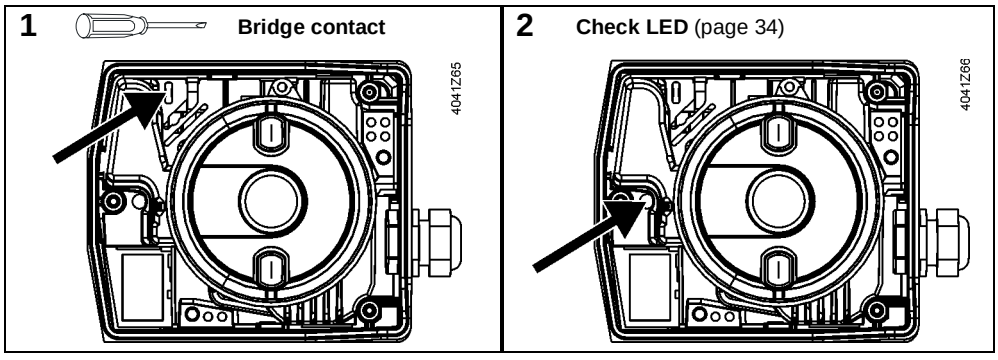
Before making the function check, the following preconditions must be satisfied:
- "Environmental conditions" specified in chapter "Technical data" (page 36).
- Actuator is mechanically connected to a Siemens valve.
- ⚠ **Actuator is in “Automatic” mode** (page 33).
- Actuator and, if required, accessories are correctly fitted and connected. Also refer to chapter 6.2 Connection terminals (page 39).
- Power is applied.

SA..61..

Calibration is required with modulating actuators and SA..61.. before the function check.

General notes on calibration

Before making the calibration, the following preconditions must be satisfied:
- A description of the calibration function is given in chapter 4.2.3 Calibration (page 27).
- Housing cover is removed (see “Special notes on mounting”, page 15).



If required, calibration can be repeated any number of times.

Make the function check for modulating actuators after the calibration with a point test according to the following table:

Connection terminals	Stroke actuator	Rotary actuator	Control path valve A→AB	Bypass valve B → AB	Position feedback U
Y 6 V 13.6 mA	Actuator's stem extends (60%)	Actuator's spindle turns in clockwise direction (60 %)	Opening	Closing	6 V
Y 5 V 12 mA	Actuator's stem retracts (50%)	Actuator's spindle turns in counterclockwise direction (50 %)	Closing	Opening	5 V
Z connected to G	Actuator's stem extends	Actuator's spindle turns in clockwise direction	Opening	Closing	10 V
Z connected to G0	Actuator's stem retracts	Actuator's spindle turns in counterclockwise direction	Closing	Opening	0 V
Only SAS61.33, SAS61.33U, SAS61.53, SAT61.51 No voltage at G and G0 (fail safe function) [1)]	Actuator's stem retracts (until end position is reached)	-	Closing	Opening	-

[1)] Closing action is always completed first, also when power returns.

SA..31.. and SA..81.. Make the function check for 3-position actuators according to the following table:

Connection terminals	Stroke actuator	Rotary actuator	Control path valve A→AB	Bypass valve B → AB
Voltage at Y1	Actuator's stem extends	Actuator's spindle turns in clockwise direction	Opening	Closing
Voltage at Y2	Actuator's stem retracts	Actuator's spindle turns in counterclockwise direction	Closing	Opening
No voltage at Y1 and Y2	Actuator's stem maintains the position	Actuator's spindle maintains the position	Maintains the position	
Only SAS31.50, SAS31.53, SAS81.33, SAS81.33U, SAT31.51 No voltage at G and G0 (fail safe function) [1)]	Actuator's stem retracts (until end position is reached)	-	Closing	Opening

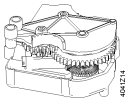
[1)] Closing action is always completed first, also when power returns.

Note

- Observe information given in chapter 4.2.1 Positioning signal and flow characteristic selection, page 26.

Auxiliary switch ASC10.51

Make the function check of the mounted auxiliary switch with a point test according to the following table – example switching point at 25% position:



Connection terminals		Stroke actuator	Rotary actuator	Terminal S1 – S3	Terminal S1 – S2
Voltage at Y2	Y = 0 V	Actuator's stem retracts (until end position is reached)	Actuator's spindle turns in counter-clockwise direction (until end position is reached)	-	-
No voltage at Y1 und Y2	Y = 0 V	Actuator's stem maintains the position	Actuator's spindle maintains the position		
Voltage at Y1 for desired valve position % + 2% x positioning time **Example:** SAS31.00 = 27 % x 120 sec = 32.5 sec	Valve position % + 2% Y = 2.7 V	Actuator's stem extends to desired position (27%)	Actuator's spindle turns in clockwise direction to desired position (27%)		
Check switching point with voltmeter		Actuator's stem maintains the position	Actuator's spindle maintains the position	-	-

3.2.2 Maintenance

The actuators are maintenance-free.

Mounting:

- Do not touch the valve coupling if the components (valve/pipes) are hot
- If necessary, disconnect electrical connections from the terminals

The actuator must be correctly fitted to the valve before recommissioning.

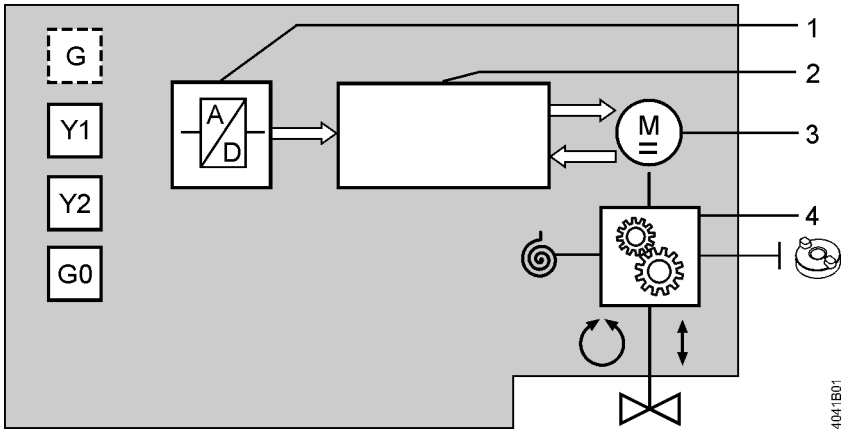
3.2.3 Disposal



The products contain electrical and electronic components and must not be disposed of together with domestic waste. This applies in particular to the printed circuit board.
Legislation may demand special handling of certain components, respectively it may be sensible from an ecological point of view.
Observe all local and currently valid legislation.

4 Functions and control

4.1 3-position control



Example: brushless DC motor with fail safe function

A 3-position signal drives the actuator via connection terminals Y1 or Y2. The required position is transferred to the valve.

1	A/D conversion	
2	Control functions	Identification of seat
		Control of direction
		Motor control
		Manual adjustment
3	Brushless DC motor	
4	Gear train	
	Fail safe function	
	Manual adjuster	

Positioning signal	Stroke actuator	Rotary actuator	Control path valve A→AB	Bypass valve B → AB
Voltage at Y1	Actuator's stem extends	Actuator's spindle turns in clockwise direction	Opening	Closing
Voltage at Y2	Actuator's stem retracts	Actuator's spindle turns in counter-clockwise direction	Closing	Opening
No voltage at Y1 and Y2	Actuator's stem maintains the position	Actuator's spindle maintains the position	Maintains the position	
No voltage at Y1 and Y2; with fail safe function	Actuator's stem retracts	Actuator's spindle turns in counter-clockwise direction	Closing	Opening

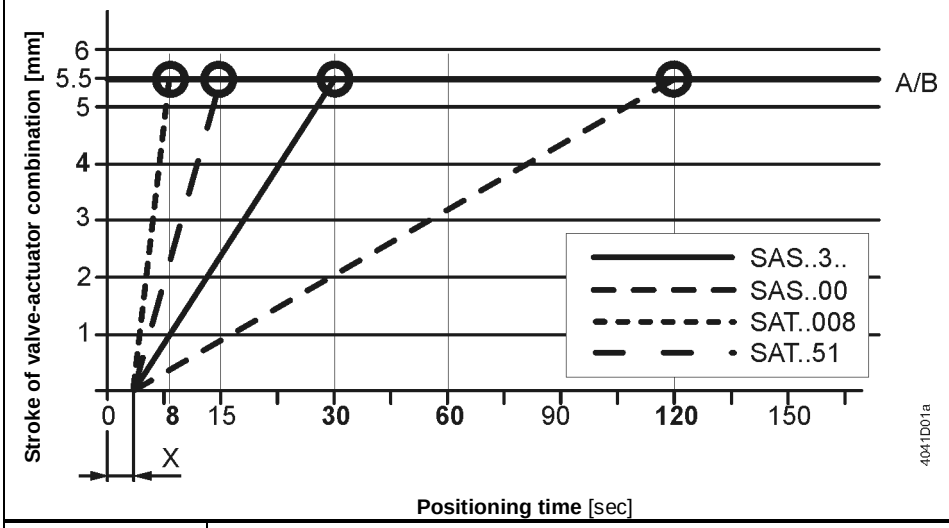
Note

Observe information given in chapter 4.2.1 Positioning signal and flow characteristic selection on page 26.

Internal control ensures very constant positioning times and determination of the actuator's position.

Positioning times stroke model

The specified positioning times refer to the respective nominal stroke / nominal angular rotation. Since the end positions of rotary actuators are inside the actuator, the following remarks refer to stroke actuators.
The resulting effective strokes vary, depending on the type of valve, resulting in shorter or longer actuator positioning times.

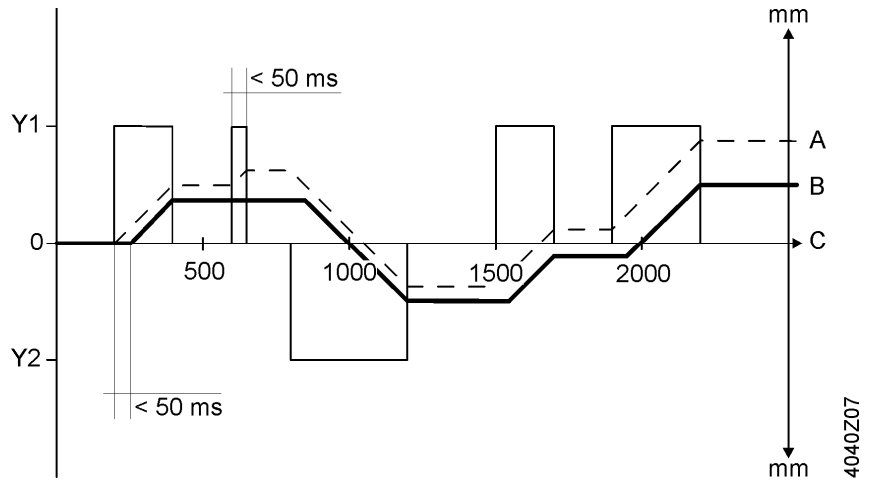


Legend diagram	
A	Mechanical end position in actuator
B	Valves with 5.5 mm nominal stroke
X	Time to override idle stroke (delay time), see glossary

Notes

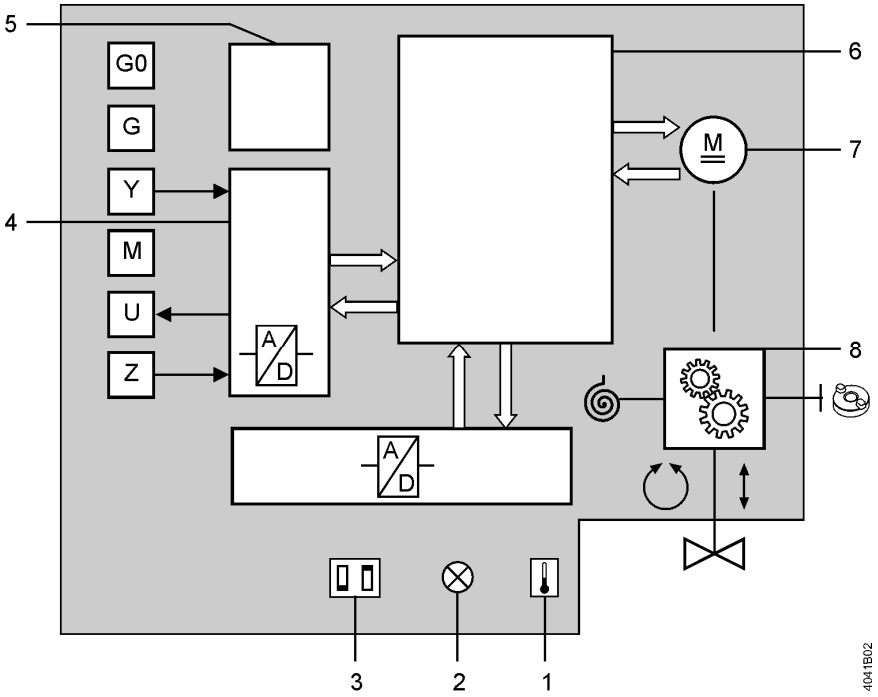
Deviations occur

- after several positioning signals Y1 and Y2 in the same direction since the stroke movement starts with a delay of 50 ms.
- when positioning signals Y1 and Y2 are active for less than 50 ms since the stroke movement cannot be made in that case.



A	B	C	Y1	Y2	0
Calculated position	Actual position	Positioning time [ms]	Positioning signals (power applied)		No power applied

4.2 Modulating control



The modulating positioning signal drives the actuator steplessly. The positioning signal range (DC 0...10 V / DC 4...20 mA / 0...1000 Ω) corresponds in a linear manner to the positioning range (fully closed...fully open, or 0…100 % stroke).

The actuator is controlled via terminal Y or forced control Z (page 30). The desired stroke / the desired rotation is transferred to the valve stem / the valve spindle.

1	Calibration slot	
2	LED (2 colors)	
3	DIL switches	Changeover of characteristic
		Positioning signal
4	A/D conversion	
5	Power supply	
6	Control functions	Identification of seat
		Position control
		Motor control
		Detection of foreign bodies
		Calibration
		Forced control
		Characteristics function
		Manual adjustment
7	Brushless DC motor	
8	Gear train	
	Fail safe function	
	Manual adjuster	

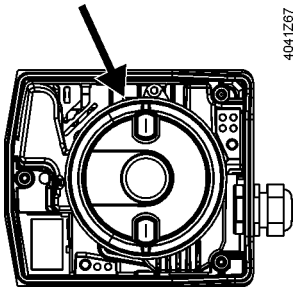
Positioning signal	Stroke actuator	Rotary actuator	Control path valve A→AB	Bypass valve B → AB
Signal Y, Z increasing	Actuator's stem extends	Actuator's spindle turns in clockwise direction	Opening	Closing
Signal Y, Z decreasing	Actuator's stem retracts	Actuator's spindle turns in counterclockwise direction	Closing	Opening
Signal Y, Z constant	Actuator's stem maintains the position	Actuator's spindle maintains the position	Maintains the position	
No voltage at Y1 and Y2; with fail safe function	Actuator's stem retracts	Actuator's spindle turns in counterclockwise direction	Closing	Opening

Note

Observe the information given in chapter 4.2.1 Positioning signal and flow characteristic selection on page 26.

4.2.1 Positioning signal and flow characteristic selection

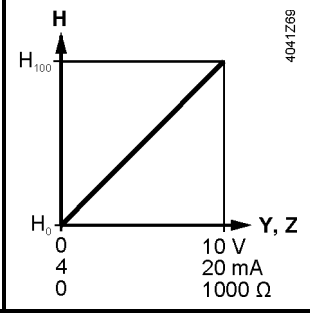
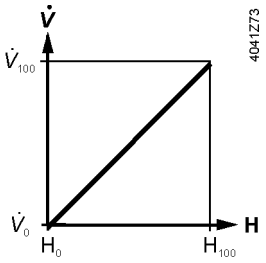
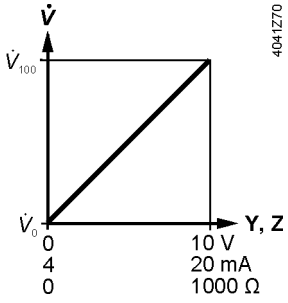
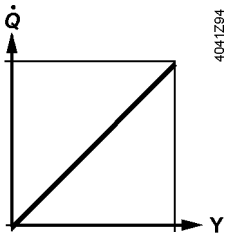
DIL switches

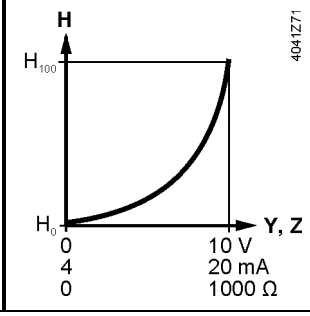
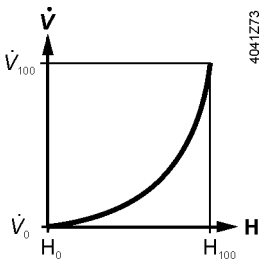
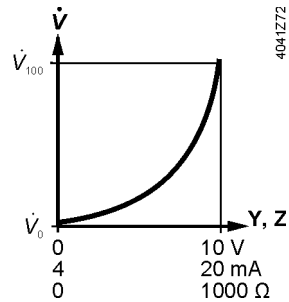
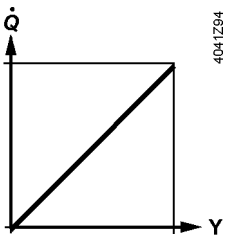


	Positioning signal "Y"	Position feedback "U"	Flow characteristic	
OFF [1]	ON 1 2 4040Z10 DC 0…10 V	DC 0…10 V	ON 1 2 4040Z12 log = equal-percentage	4041Z68
ON	ON 1 2 4040Z09 DC 4…20 mA	DC 0…10 V	ON 1 2 4040Z11 lin = linear	

[1] Factory setting: All DIL switches set to OFF

Flow characteristic

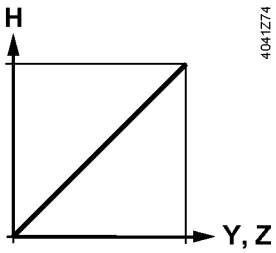
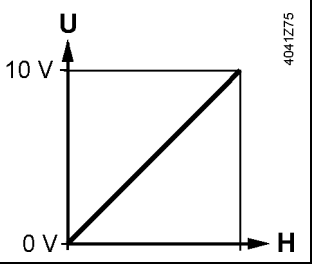
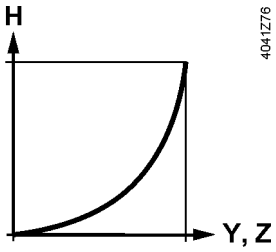
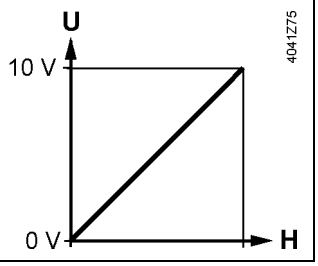
	Actuator	Valve VVG44.. / VXG44..	Valve & actuator combined	Valve & actuator & heat exchanger combined
lin				

	Actuator	Valve VVG55.. / VVG549..	Valve & actuator combined	Valve & actuator & heat exchanger combined
log				

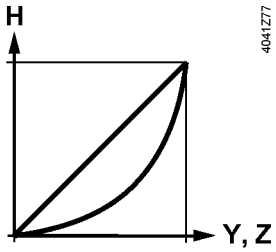
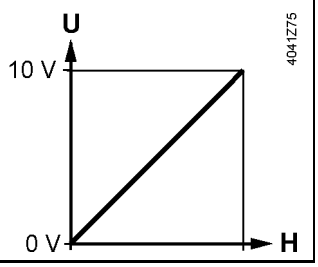
Y, Z Positioning signal
H Stroke
V̇ Volumetric flow
Q̇ Heat transfer capacity

4.2.2 Position feedback U

The position feedback U (DC 0...10 V) is always proportional to stroke H of the actuator's stem.

	Actuator Positioning signal Y, Z	Actuator Position feedback U
 lin = linear		
 log = equal-percentage		

Y, Z	Positioning signal
H	Stroke
U	Position feedback

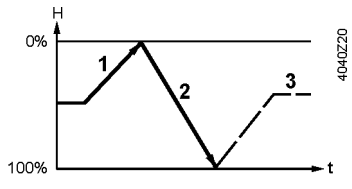
Actuator Positioning signal Y, Z	Actuator Position feedback U
	

4.2.3 Calibration

To match the actuator to production-related mechanical tolerances of the individual valves and to guarantee accurate positioning and position feedback, a calibration should be performed when the plant is commissioned (page 20). During commissioning, the actuator detects the valve's end positions and files the exact stroke in its internal memory.

Calibration takes place in the following phases:

- Actuator drives to the upper end position (1), valve closes. Detection of upper end position.
- Actuator drives to the lower end position (2), valve opens. Detection of lower end position.
- The detected values are stored (3). Then the actuator follows the positioning signal.



Note

Observe status indication (LED) during and after calibration (page 34).

4.2.4 Signal priorities

The actuators are controlled via different interlinked positioning signal paths (positioning signal “Y“, forced control input “Z“, manual adjuster). The signal paths are assigned the following priorities (1 = highest priority, 4 = lowest priority):

Actuator without fail safe function

Priority	Description	
1	The manual adjuster always has priority 1, thus overriding all signals active at “Z“ or “Y“, independent of whether or not power is applied.	
2	Only SA..61..: As soon as a valid positioning signal is active at input “Z“, the position is determined via positioning signal “Z“ (forced control). Prerequisite: The manual adjuster is not used.	**Z**
3	The position is determined via positioning signal “Y“ at Y, Y1 or Y2. The manual adjuster is not used and on “Z“ there is no active signal.	**Y**

Examples

Manual adjuster	Forced control (Z)	Positioning signal (Y)	Stroke actuator	Rotary actuator
Automatic mode	Not connected	**5 V**	Actuator’s stem travels to position (50%)	Actuator’s spindle travels to position (50%)
Automatic mode	**G**	3 V	Actuator’s stem extends	Actuator’s spindle turns in clockwise direction
Automatic mode	**G0**	3 V	Actuator’s stem retracts	Actuator’s spindle turns in counterclockwise direction
Operated (30%) and engaged	G	8 V	Actuator’s stem extends manual (to 30%)	Actuator’s spindle turns manually in counterclockwise direction (to 30%)

Bold printing = positioning signal currently active

Actuator with fail safe function

Priority	Description	
1	The fail safe function responds in the event of a power failure.	
2	The position is solely determined via positioning signal ”Z” (forced control), provided power is applied.	**Z**
3	The position is determined by positioning signal Y, provided power is applied and positioning signal ”Z” is not used.	**Y**
4	Upon actuation and slightly turning in counterclockwise direction, the manual adjuster remains engaged. **Power applied:** After 5 seconds, the manual adjuster disengages itself and positioning signal ”Y” or ”Z” determines the position. **No power applied:** The actuator maintains the position defined by the manual adjuster until power returns. Upon restoration of power, an automatic ClosedPosition-Synchronisation will be performed.	

Examples

Operating voltage (G/G0)	Manual adjuster	Forced control (Z)	Positioning signal (Y)	Stroke actuator
Applied	Automatic mode	Not connected	**5 V**	Actuator’s stem travels to position (50%)
Applied	Automatic mode	**G**	3 V	Actuator’s stem extends
Applied	Automatic mode	**G0**	3 V	Actuator’s stem retracts
Interrupted (fail safe function)	Automatic mode	G	6 V	Actuator’s stem retracts (until end position is reached)
Interrupted (fail safe function)	**Operated (30%)**and engaged	G	8 V	Actuator’s stem retracts (until end position is reached), then: Actuator’s stem extends manually (to 30%)

Bold printing = positioning signal currently active

4.2.5 Detection of valve seat

SAS..

The actuators feature force-dependent valve seat detection. After calibration, the exact valve stroke is filed in the actuator's memory.
If no force is built up in the calculated end position (e.g. in the event of temperature effects for instance), the actuator continues to operate at a reduced positioning speed until the nominal positioning force is restored. This ensures that the valve always fully closes.
After a power failure, valve seat identification is not active – the actuators without fail safe function define their stroke position on power resoration to be at 50%.
From now on, the actuator follows the positioning signal.
When the valve plug reaches its seat for the first time, the actuator readjusts its stroke model.

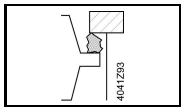
Example

The supposed position is 50%, Y = 2 V, the actuator travels 30% of the stored valve stroke in the direction of "Actuator's stem retracted".
If the actuator reaches the seat within this 30% travel, it interprets the position as "Valve fully closed" and shifts the position of the valve's stroke accordingly without changing the extent of travel.
From now on, the actuator follows the changed valve stroke position.
This means: New position 0%, Y = 2 V, actuator travels 20% of the stored valve stroke in the direction "Actuator's stem extended".

4.2.6 Detection of foreign bodies

The actuator detects when the valve is clogged and adjusts its operational behavior accordingly to prevent damage to itself or the valve.
If the actuator hits an obstacle within the calibrated stroke and is not able to overcome it with its nominal positioning force, it stores the position at which the obstacle was hit. Depending on the direction of travel, as …

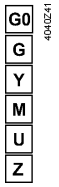
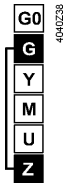
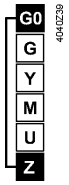
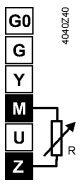
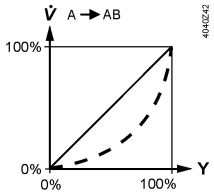
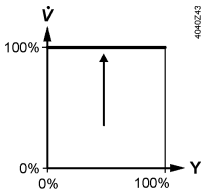
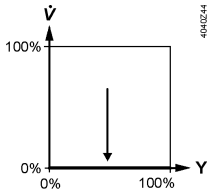
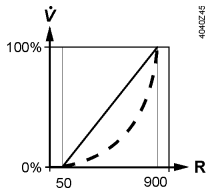
"Upper limit of valve clogging", if the clogging was detected when traveling in the direction of "Actuator's stem extending".



Now, the status LED blinks red and the actuator only follows the positioning signal between the positions "Actuator's stem retracted" and "Lower limit of valve clogging".
After detection of clogging, 3 attempts are made to overcome clogging by traveling about 15% in the opposite direction and then trying again to overcome the position of clogging. If the attempts made are unsuccessful, the actuator continues to follow the positioning signal within the restricted range only and the LED continues to blink red (see "Status indication " page 34).

4.2.7 Forced control Z

Forced control uses the following operating modes:

	Z mode			
	No function	Fully open	Fully closed	Overriding positioning signal "Y" by 0…1000 Ω
Connections				
Transmission				
	Equal-percentage or linear characteristic			Equal-percentage or linear characteristic
	Contact "Z" not connected, valve follows positioning signal "Y"	Contact "Z" is connected directly to "G", positiong signal "Y" has no impact	Contact "Z" is connected directly to "G0", positiong signal "Y" has no impact	Contact "Z" is connected to "M" via resistor "R", starting point at 50 Ω, end point at 900 Ω, positioning signal "Y" has no impact

4.3 Technical and mechanical design

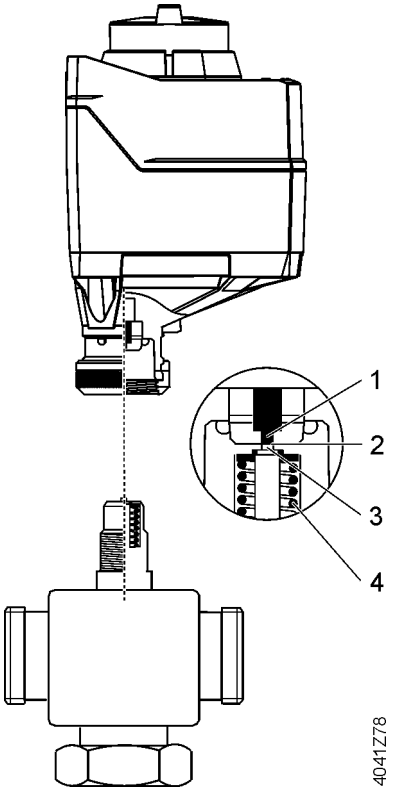
4.3.1 Transmission of power

Function principle

Incoming positioning signals are translated to positioning commands for the motor.

A gear train transmits the motor's positioning steps to the output stage. Here, the translation from rotary to stroke movement takes place. Attached to the gear train are the electrical and mechanical accessory items and the manual adjuster. With the stroke actuators with fail safe function, the gear train also accommodates the return spring.

In the case of the rotary actuators, the adjustment to the required torque is made in the output stage.

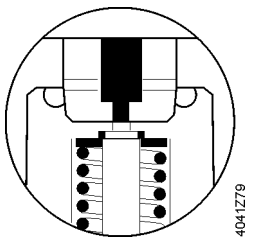


Power transmission of stroke actuator:

1 Actuator stem
2 Contact point actuator stem – valve stem
3 Valve stem
4 Valve spring

The transmission of power has no fix connection.
If the actuator stem extends, it presses on the valve stem and against the force of the spring in the valve.
If the actuator stem retracts, the valve stem follows the actuator stem due to the force of the valve spring.

4.3.2 Coupling

SAS.., SAT..

Actuator stem and valve stem run into each other. They are not permanently connected.

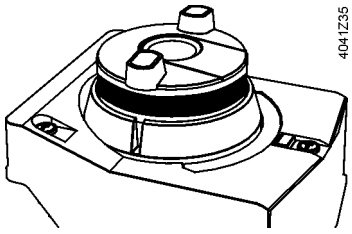
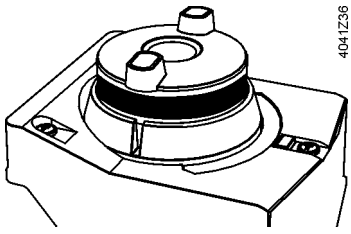
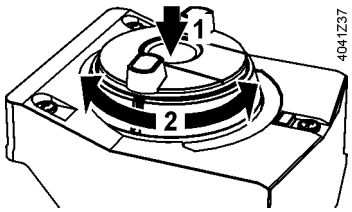
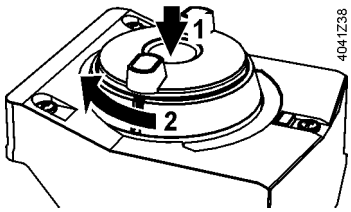
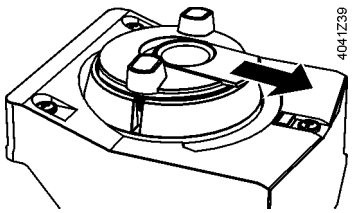
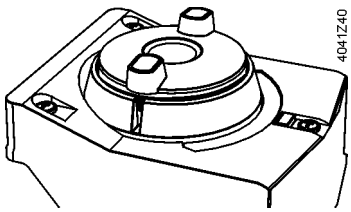
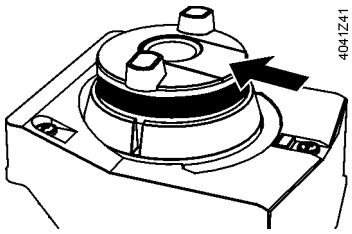
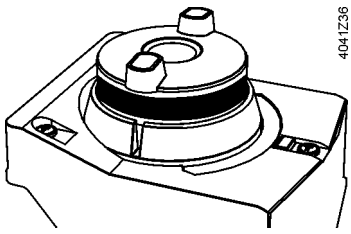
4.3.3 Fail safe function

The fail safe function works mechanically with a return spring and ensures the protection of the plant. It guarantees the safe operation in uncontrolled operating states.
In the event of a power failure, the actuator will return to its 0 % stroke position with the help of the return spring, closing the valve. The Y positioning signal is not valued.

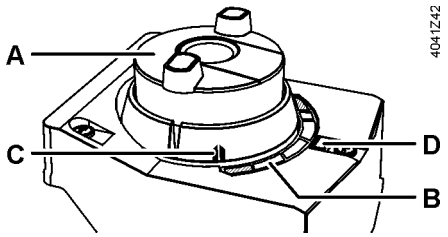
Fail safe function	Actuator	Valve		Spring return time	At positioning time
Active	Actuator's stem retracts	Spring in valve closes	Valve closes	<8 s [1)] <14 s [1)] <28 s [1)]	15 s 30 s 120 s

[1)] Spring return time increased slightly at low temperatures

4.3.4 Manual adjuster

	Without fail safe function	With fail safe function (SA..33..)
Automatic		
	When the motor drives the manual adjuster turns. Thus in automatic mode, the manual adjuster is used for indication of travel. If the manual adjuster is held firm in this mode, there is no transmission of power to the gear train.	
Manual operation		
	When pushing the manual adjuster down (1), it engages and the actuator can be manually operated.	
	Stroke actuator: When turning the manual adjuster in clockwise / counterclockwise direction (2), the actuator's stem extends / retracts. **Rotary actuator:** The actuator spindle turns in the same direction	When turning the manual adjuster in clockwise direction (2), the actuator's stem extends. **CAUTION:** Turning the manual adjuster in counterclockwise direction is not possible.
	An overload protection prevents damage to the manual adjuster.	
Fixing the position		
	Upon actuation and locking the slide switch, the manual adjuster remains engaged. When in this mode, do not turn the manual adjuster (manual adjuster locked).	After pushing and slightly turning the manual adjuster in counterclockwise direction, it remains engaged, provided no power is applied. If power is applied, refer to "Disengaging the fixing".
Disengaging the fixing		
	When resetting the slide switch, the manual adjuster returns to automatic mode.	Coupling disengages **automatically**… • after 5 seconds if power is applied, • when power returns; a restart is made (actuator's stem retracts), then, the actuator follows the active positioning signal. Coupling is disengaged **manually** by slightly turning the manual adjuster in clockwise direction.

4.3.5 Indicators



A	Indication of travel	
B	Scale	Position indication
C	Indicator	
D	LED Status indication	

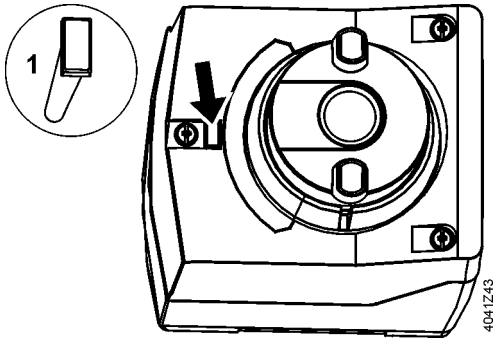
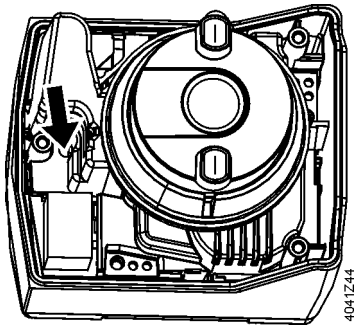
Operational status indication

In Automatic mode, the manual adjuster serves for the indication of travel.
See "Automatic" (page 33).

Position indication

When turning the manual adjuster, the indicator also moves.
The scale indicates the stroke. When reaching the stops, the valve is either fully open or fully closed.

Status indication (LED), only with modulating control (only SA..61..)

Housing cover fitted	Housing cover removed
	
When the housing cover is fitted, the LED can be viewed through a light conductor.	When the housing cover is removed, the LED can be viewed through a hole.

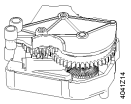
The status indication informs about the operational state of the actuator.

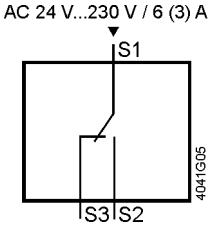
LED	Indication	Operating state	Remarks, troubleshooting
Green	On	Automatic mode	Normal operation
	Blinking	Calibration	Wait until calibration is finished (then green or red light)
		In manual mode	Manual adjuster in MAN position
Red	On	Calibration error	Start calibration again
		Undervoltage (AC 13 V)	Check operating voltage
	Blinking	Clogged valve, detection of foreign bodies	Check valve / actuator
Dark	Dark	No power or electronics faulty	Check operating voltage

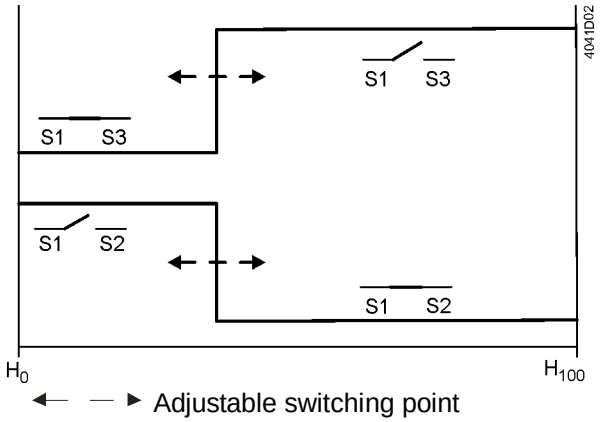
4.3.6 Electrical accessories

Auxiliary switch ASC10.51

The auxiliary switch ASC10.51 switches on or off when a certain position is reached. The switching point can be set between 0…100%.







Switching point for S1–S2 and S1–S3 cannot be set separately. If S1–S2 is open then S1–S3 is closed.

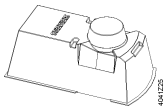
Application example:

When using an auxiliary switch, position feedback can trigger an automatic stop of the circulating pump in the end position "Fully closed".

4.3.7 Mechanical accessories

Weather shield ASK39.2

To protect the actuator from weather effects when used outdoors, the weather shield ASK39.2 must always be fitted. The housing protectionIP54 remains unchanged.



5 Technical data

				SAS..	SAT..
Power supply	**Operating voltage**		SA..31..	AC 230 V ± 15 %	
			SA..61..	AC 24 V ± 20 % / DC 24 V + 20 % / -15% or AC 24 V class 2 (US)	
			SA..81..	AC/DC 24 V ± 20 % or AC 24 V class 2 (US)	
	Frequency			45…65 Hz	
	External supply line protection (EU)			6 A...10 A slow or Circuit breaker max. 13 A Characteristic B, C, D according to EN 60898 Power source with current limitation of max. 10 A	
	Power consumption at 50 Hz			Stem retracts / extends	Stem retracts / extends
	SAS31.00	SAT31.008		2.8 / 2.4 VA [1]	5.0 / 2.5 VA [1]
	SAS31.03	SAT31.51		3.5 / 2.9 VA [1]	5.5 / 3.2 VA [1]
	SAS31.50	SAT61.008		3.5 / 2.9 VA [1]	7.1 / 4.6 VA [1]
	SAS31.53	SAT61.51		5.5 / 3.8 VA [1]	6.4 / 4.8 VA [1]
	SAS61.03			5.3 / 4.5 VA [1]	
	SAS61.03U			5.3 / 4.5 VA [1]	
	SAS61.33			5.9 / 4.8 VA [1]	
	SAS61.33U			5.9 / 4.8 VA [1]	
	SAS61.53			5.8 / 5.0 VA [1]	
	SAS81.00			2.2 / 2.0 VA [1]	
	SAS81.00U			2.2 / 2.0 VA [1]	
	SAS81.03			2.5 / 2.1 VA [1]	
	SAS81.03U			2.5 / 2.1 VA [1]	
	SAS81.33			3.4 / 2.4 VA [1]	
	SAS81.33U			3.4 / 2.4 VA [1]	
Function data	**Positioning times** with the specified nominal stroke / nominal angular rotation				
	SAS..0	SAT..008		120 s	8 s
	SAS..3/..3U	SAT..51		30 s	15 s
	Positioning force			400 N	300 N
	Nominal stroke			5.5 mm	5.5 mm
	Torque				
	Nominal angular rotation				
	Permissible medium temperature (valve fitted)			1...130 °C	1…130 °C
			briefly		150 °C
Signal inputs	**Y positioning signal**				
	SAS31..	SAT31.008		3-position	
	SAS81..	SAT31.51			
	SAS61..	SAT61.008		DC 0...10 V / DC 4...20 mA / 0...1000 Ω	
		SAT61.51			
			SA..61.. (DC 0...10 V) Current draw	≤ 0.1 mA	
			Input impedance	≥ 100 kΩ	
			SA..61.. (DC 4...20 mA) Current draw	DC 4...20 mA ± 1 %	
			Input impedance	≤ 500 Ω	
Parallel operation			SA..61..	≤ 10 (depending on controler output)	
Forced control	**Positioning signal Z**		SA..61..	R= 0…1000 Ω, G, G0	
			R = 0…1000 Ω	Stroke / rotation proportional to R	
			Z connected to G	Max. stroke 100 %	Max. stroke 100 %
			Z connected to G0	Min. stroke 0 %	Min. stroke 0 %
			Voltage	Max. AC 24 V ± 20 % / Max. DC 24 V + 20 % / -15%	
			Current draw	≤ 0.1 mA	
Position feedback	**U**		SA..61..	DC 0...10 V ± 1 %	
			Load impedance	> 10 kΩ res.	
			Load	Max. 1 mA	
Connecting cable	**Wire cross-sectional areas**			0.75…1.5 mm^2, AWG 20…16 [2]	

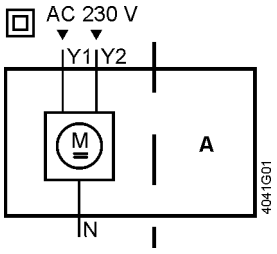
			SAS..	SAT..
	Cable entries	SA..	EU: 1 entry ∅ 16.4 mm (for M16) 1 entry ∅ 20.5 mm (for M20)	
		SA..U	US: 2 entries ∅ 21.5 mm for ½“ tube connection	
Degree of protection	**Housing protection**		IP 54 as per EN 60529 [3]	
	Mounting position		vertical	
	Insulation class		As per EN 60730	
	Actuators SA..31.. AC 230 V		II	
	Actuators SA..61.. AC / DC 24 V		III	
	Actuators SA..81.. AC / DC 24 V		III	
Environmental conditions	**Operation**		IEC 60721-3-3	
	Climatic conditions		Class 3K5	
	Mounting location		Indoors, outdoors [4]	
	Temperature general		-5…55 °C	
	Humidity (noncondensing)		5…95 % r. h.	
	Transport		IEC 60721-3-2	
	Climatic conditions		Class 2K3	
	Temperature		-25…70 °C	
	Humidity		<95 % r. h.	
	Storage		IEC 60721-3-1	
	Temperature		-15…55 °C	
	Humidity		5…95 % r. h.	
Directives and Standards	**Product standard**		EN60730-x	
	Electromagnetic compatibility (Application)		For residential, commercial and industrial environments	
	EU Conformity (CE)		CE1T4581xx [5]	
	RCM Conformity		CE1T4581en_C1 [5]	
	UL, cUL	AC / DC 24 V	UL 873 http://ul.com/database	
Environmental compatibility			The product environmental declaration CE1E4581 [5] contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).	
Dimensions			See Dimensions (page 42)	
Weight	Excl. packaging		See Dimensions (page 42)	
Accessories [6]	**Auxiliary switch ASC10.51**	Switching capacity	AC 24…230 V, 6 (2) A, floating	
	External supply line protection		See section power supply	
	US installation, UL & cUL		AC 24 V class 2, 5 A general purpose	
Data sheet			N4581	N4584

[1] Second value: Power consumption in neutral position
[2] AWG = American wire gauge
Wire cross-sectional areas and fuses have to be well-matching, which is the responsibility of the planner / installer. Observe norm of protection measures - protection against overcurrent: IEC 60364-4-43:2008 resp. german adoption HD 60364-4-43:2010.
[3] Also with weather shield ASK39.2
[4] Outdoors always with weather shield ASK39.2, housing protection IP54 remains unchanged
[5] The documents can be downloaded from http://siemens.com/bt/download
[6] UL recognized component

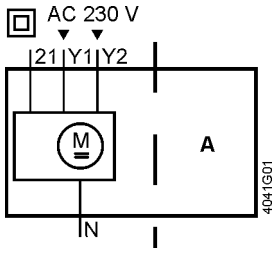
6 Connection diagrams and dimensions

6.1 Internal diagrams

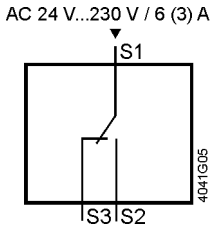
SA..31..



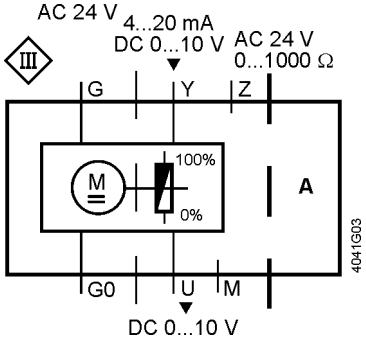
SA..31.5..



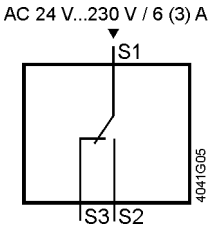
Accessory plug-in space A
1x ASC10.51
ASC10.51
AC 24 V...230 V / 6 (3) A



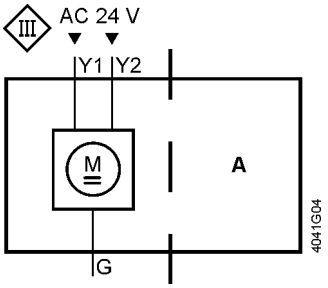
SA..61..



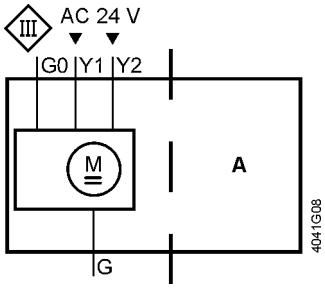
Accessory plug-in space A
1x ASC10.51
ASC10.51
AC 24 V...230 V / 6 (3) A



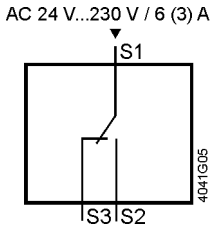
SAS81..



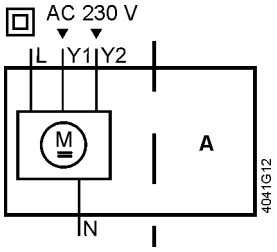
SAS81.33, SAS81.33U



Accessory plug-in space A
1x ASC10.51
ASC10.51
AC 24 V...230 V / 6 (3) A



SAT31.008



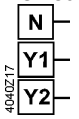
Accessory plug-in space A
-

6.2 Connection terminals

6.2.1 Actuators

SA..31..
(without SAT31.008)

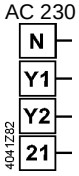
AC 230 V, 3-position



- N — System neutral (SN)
- Y1 — Positioning signal (actuator's stem extends / actuator's spindle turns clockwise)
- Y2 — Positioning signal (actuator's stem retracts / actuator's spindle turns counter-clockwise)

SA..31.5..

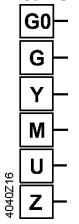
AC 230 V, 3-position



- N — System neutral (SN)
- Y1 — Positioning signal (actuator's stem extends / actuator's spindle turns clockwise)
- Y2 — Positioning signal (actuator's stem retracts / actuator's spindle turns counter-clockwise)
- 21 — Fail safe function

SA..61..

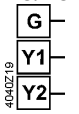
AC/DC 24 V, DC 0…10 V / 4…20 mA / 0…1000 Ω



- G0 — Sytem 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
- Z — Positioning signal forced control AC/DC ≤ 24 V, 0...1000 Ω

SA..81..

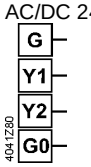
AC/DC 24 V, 3-position



- G — System potential (SP)
- Y1 — Positioning signal (actuator's stem extends / actuator's spindle turns clockwise)
- Y2 — Positioning signal (actuator's stem retracts / actuator's spindle turns counter-clockwise)

SAS81.33U

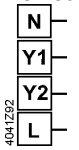
AC/DC 24 V, 3-position



- G — System potential (SP)
- Y1 — Positioning signal (actuator's stem extends / actuator's spindle turns clockwise)
- Y2 — Positioning signal (actuator's stem retracts / actuator's spindle turns counter-clockwise)
- G0 — System neutral (SN)

SAT31.008

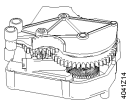
AC 230 V, 3-position



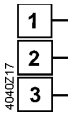
- N — System neutral (SN)
- Y1 — Positioning signal (actuator's stem extends / actuator's spindle turns clockwise)
- Y2 — Positioning signal (actuator's stem retracts / actuator's spindle turns counter-clockwise)
- L — System potential (SP)

6.2.2 Electrical accessories

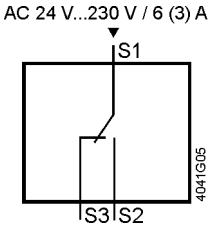
Auxiliary switch ASC10.51



Adjustable switching points, AC 24…230 V



1 System potential (SP)
2 Closing (actuator's stem extends / actuator's spindle turns clockwise)
3 Opening (actuator's stem extends / actuator's spindle turns clockwise)



6.2.3 Cable labeling

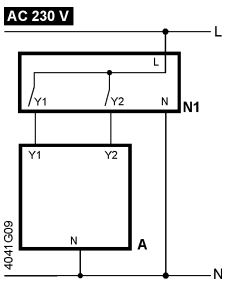
The wires are color coded and labeled.

Connection	Cable				Description
	Code	No.	Color	Abbreviation	
Actuators AC 230V	N	4	blue	BU	System neutral
	Y1	6	black	BK	Positioning signal
	Y2	7	white	WH	Positioning signal
	L		-		System potential
	21		-		Fail safe function
Actuators AC 24 V resp. AC/DC 24 V	G	1	red	RD	System potential
	G0	2	black	BK	System neutral
	Y1	6	violet	VT	Positioning signal
	Y2	7	orange	OG	Positioning signal
	Y	8	grey	GY	Positioning signal
	M		-	-	Measuring neutral
	U	9	pink	PK	Position feedback
	Z		-	-	Positioning signal forced control

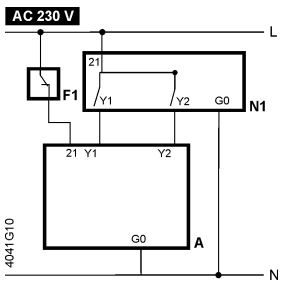
6.3 Connection diagrams

SA..31..

SA..31..



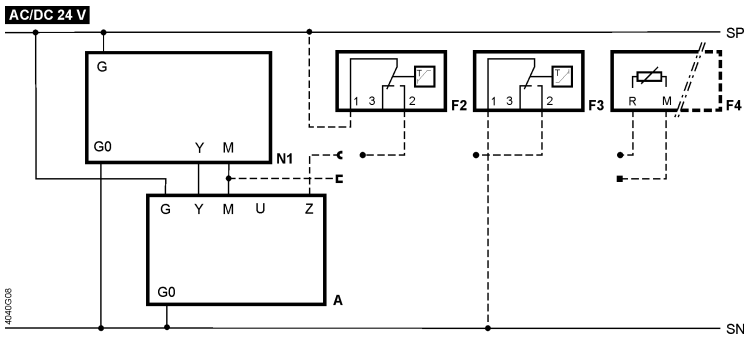
SA..31.5..



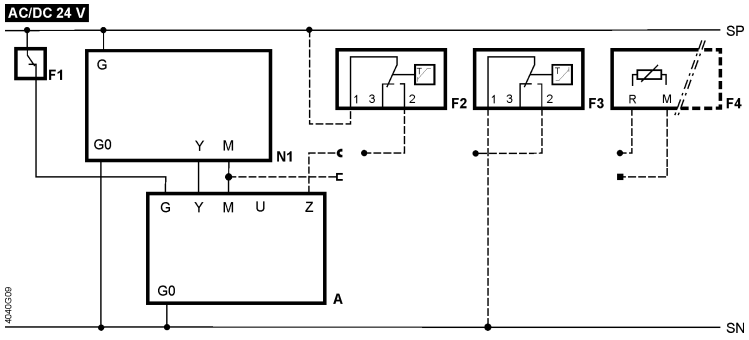
A	Actuator
L	Phase
N	Neutral
N1	Controller
Y1, Y2	Positioning signals
21	System potential

SA..61..

SA..61..



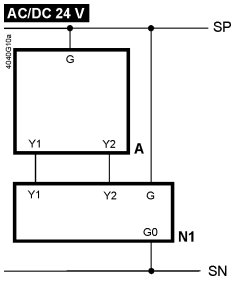
SAS61.33
SAS61.33U
SAS61.53



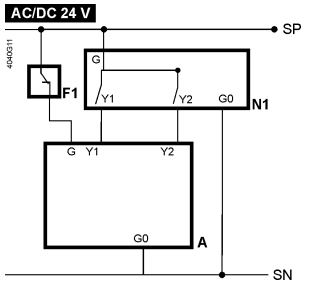
A	Actuator
F1	Temperature limiter
F2	Frost protection thermostat; terminals: 1 – 2 frost hazard / sensor is interrupted (thermostat closes with frost) 1 – 3 normal operation
F3	Temperature detector
F4	Frost protection monitor with 0…1000 Ω signal output, does NOT support QAF21.. or QAF61..
M	Measuring neutral
N1	Controller
SN	System neutral
SP	System potential AC/DC 24 V
U	Position feedback
Y	Positioning signal
Z	Positioning signal forced control

SA..81..

SA..81..



SAS81.33, SAS81.33U



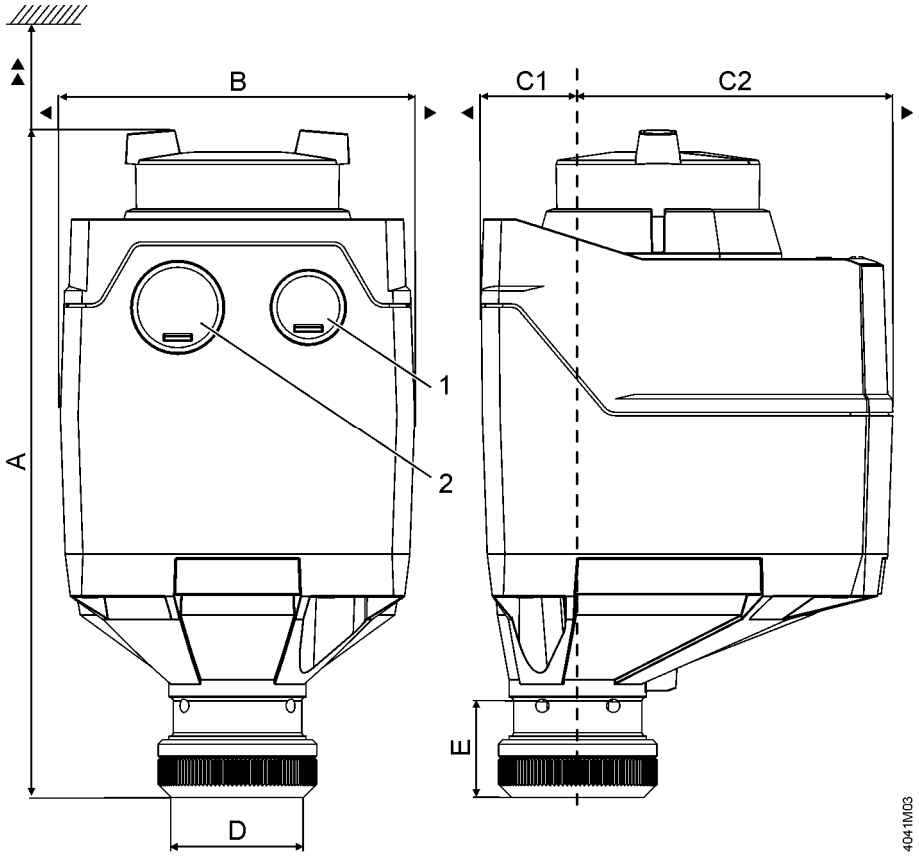
A	Actuator
F1	Temperature limiter
N1	Controller
SN	System neutral
SP	System potential AC/DC 24 V
Y1, Y2	Positioning signals

6.4 Dimensions

6.4.1 Stroke actuators

Dimensions in mm, weights in kg

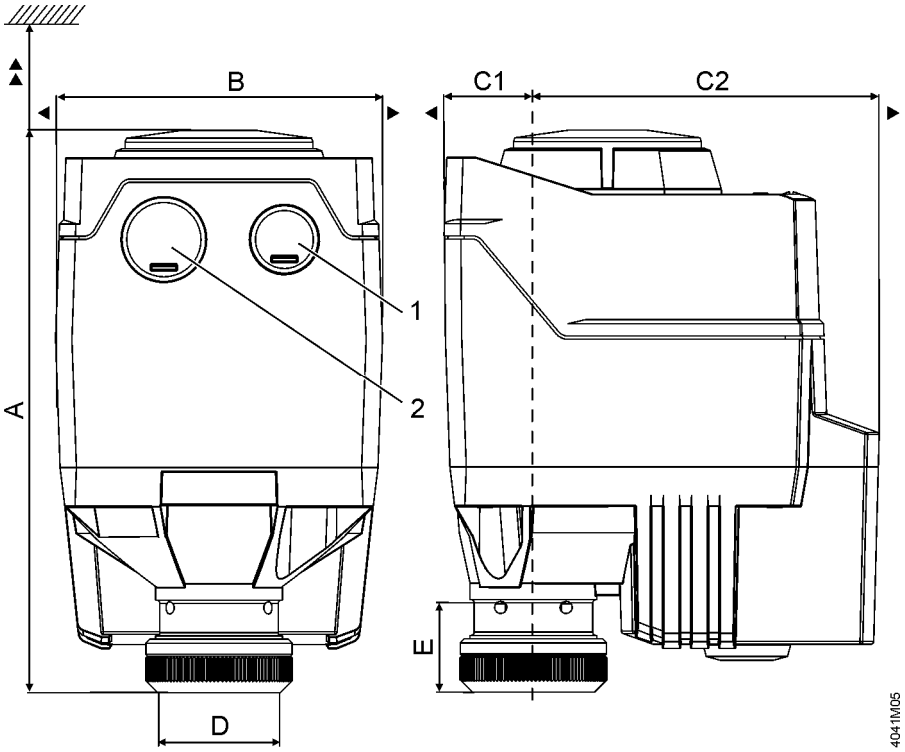
With manual adjuster



1 SA..: M16
SA..U: ½" (Ø 21.5 mm)
2 SA..: M20
SA..U: ½" (Ø 21.5 mm)

Product no.	A	B	C	C1	C2	D	E	►	►►	kg
SAS.. / SAT..	151	80	93	21.9	71.1	29.9	21.8	100	200	0.40
With ASK39.2	155	126	248	99	149	29.9	21.8	100	200	0.55

Without manual adjuster



1 SA..: M16

2 SA..: M20

Product no.	A	B	C	C1	C2	D	E	►	►►	kg
SAT.. / SAT..	137.6 [1)] 151 [2)]	80	106.5	21.9	84.6	29.9	21.8	100	200	0.68
With ASK39.2	155	126	248	99	149	29.9	21.8	100	200	0.83

[1)] Black cover

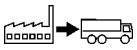
[2)] Blue manual adjuster

Revision numbers

Product no.	Valid from rev. no.	Product no.	Valid from rev. no.	Product no.	Valid from rev. no.
SAS31.00	..A	**SAT31.008**	..A		
SAS31.03	..A	**SAT31.51**	..A		
SAS31.50	..A	**SAT61.008**	..A		
SAS31.53	..A	**SAT61.51**	..A		
SAS61.03	..A				
SAS61.03U	..A				
SAS61.33	..A				
SAS61.33U	..A				
SAS61.53	..A				
SAS81.00	..A				
SAS81.00U	..A				
SAS81.03	..A				
SAS81.03U	..A				
SAS81.33	..A				
SAS81.33U	..A				

7 Glossary

7.1 Symbols

	Caution, general danger – read the notes!
	Caution, hot surface – read the notes!
	Condition as supplied to costumer
	Crosstip screwdriver (Pozidriv)
	Slotted screwdriver
	Screw wrench
	Allen key

7.2 Terms

ClosedPosition-Synchronisation	The Synchronisation of the mechanical position and the internal position control will be performed (after manual operation).
DIL switches	A DIL switch shows the switching choices in the form of a place value system (dual in line) in relation to basis 2 (on and off).
DN	Nominal size [mm]: Characteristic for matching parts of the piping system.
Fail safe function	The fail safe function ensures that the actuator is driven to a defined end position also in the event of a power failure. In normal situations, dampers are shut or valves closed, thus cutting off the medium flow.
kPa	Unit of pressure: 100 kPa = 1 bar = 10 mWS.
k_{vs}	Nominal flow rate: Nominal flow rate of cold water (5…30 °C) through the fully open valve (H_{100}) at a differential pressure of 100 kPa (1 bar).
LED	Light emitting diode.
Idle stroke	The actuator stem lifts off the valve stem slightly (0.2 mm), so that the valve closed securely. If the valve opens again, this idle stroke has to be overcome, before the valve really opens (valve characteristic has an effect).
PN	PN class [bar]: Characteristic relating to the combination of mechanical und dimensional properties of a component in the piping system.
Position feedback	Signal used to acquire the position, fed back via an input.
Forced control	Forced control serves for overriding automatic mode and is implemented in the structure.

Δp_{max} / Δp_{maxV}	Maximum permissible differential pressure across the valve's control path, valid for the entire actuating range of the motorized valve (V = diverting mode).
Δp_s	Maximum permissible differential pressure at which the motorized valve will close securely against the pressure (close off pressure).

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SR.fm

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Reference	
Asset	General
Provided by	Not recorded
Source file	`SR.fm.pdf`
Pages	1

Spiral duct

SR



Description

Circular spiral duct.

Galvanised as standard, stainless steel or perforated tube is available on request.

Non-standard lengths are available on request and will be charged at a per m rate.

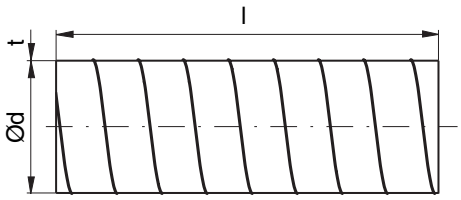
Diameters 180, 224, 280 and 600 mm are only available to special order.

Ducts are produced locally and can therefore have different thicknesses and other specifications per country.

Ordering example

	SR	200	3000
Product			
Dimension Ød			
Length l			

Dimensions



Ød std nom	O πd m	A πd²/4 m²	t std [mm]	l std [mm]	ml std kg/m
80	0.251	0.005	0.5	3000	1.14
100	0.314	0.008	0.5	3000	1.43
125	0.393	0.012	0.5	3000	1.79
150	0.471	0.018	0.5	3000	2.08
160	0.503	0.020	0.5	3000	2.29
180	0.565	0.025	0.6	3000	3.09
200	0.628	0.031	0.6	3000	3.39
224	0.704	0.039	0.6	3000	3.81
250	0.785	0.049	0.6	3000	4.30
280	0.880	0.062	0.6	3000	4.81
300	0.942	0.071	0.6	3000	5.16
315	0.990	0.078	0.6	3000	5.41
355	1.115	0.099	0.8	3000	8.13
400	1.257	0.126	0.8	3000	9.17
450	1.414	0.159	0.8	3000	10.31
500	1.571	0.196	0.8	3000	11.46
560	1.759	0.246	0.8	3000	12.83
600	1.885	0.283	0.8	3000	13.68
630	1.979	0.312	0.8	3000	14.32
710	2.231	0.396	0.8	3000	16.26
800	2.513	0.503	0.8	3000	18.33
900	2.827	0.636	1.0	3000	25.59
1000	3.142	0.785	1.0	3000	28.43
1120	3.519	0.985	1.0	3000	33.14
1250	3.927	1.227	1.0	3000	36.96
1422	4.398	1.539	1.0	2400	42.09
1500	4.712	1.767	1.0	2400	44.01
1600	5.027	2.011	1.2	2400	60.39

EUROVENT CERTIFIED PERFORMANCE
DUCT-MC
Identification number 17.11.002
www.eurovent-certification.com

Lindab reserves the right to make changes without prior notice

8.81

STR1 Brass Y Pattern Strainer FxF 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	STR1 Brass Y Pattern Strainer FxF TDS.pdf
Pages	1

Brass Y Pattern Strainer - FxF BSPP

STR1



Features and Benefits

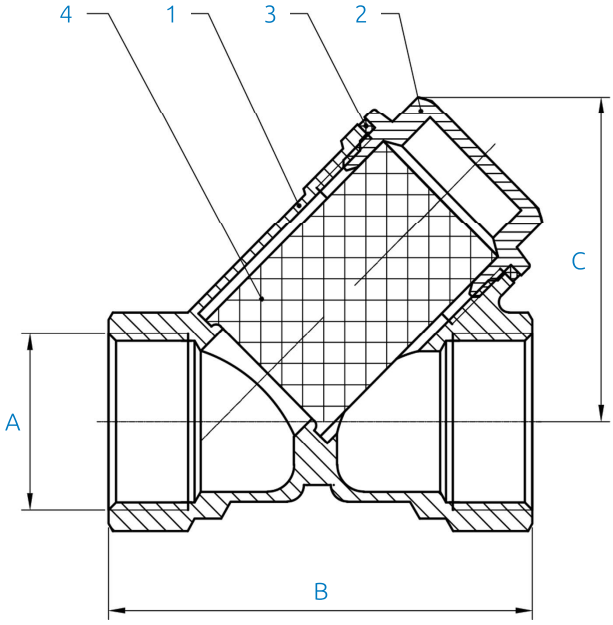
- Brass Body
- Stainless Steel Mesh
- BSP FxF Thread

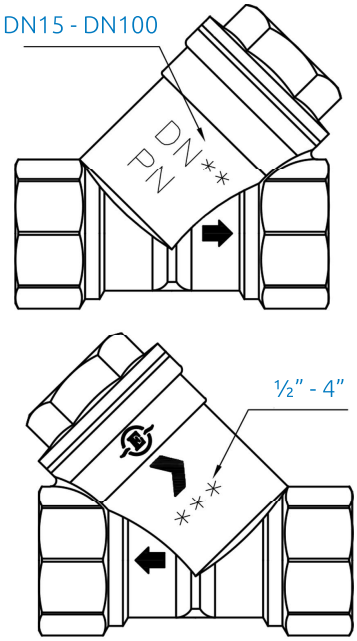
Applicable Standards

- BSP parallel ISO 228/1 connections

Technical Data

- Fields of applications: water
- ½" - 2" Maximum working pressure: PN20
- 2½" - 4" Maximum working pressure: PN16
- Maximum working temperature: 90°C





Material Specifications

NO	NAME	MATERIAL	QUANTITY
1	Body	HPb59-T	1
2	Bonnet	HPb59-T	1
3	Washer	PTFE	1
4	Filter net	Stainless Steel	1

Product Codes & Dimensions

STOCK NO	DN	A	B (mm)	C	WRAS
36233	½"	½"	54	40.5	Yes
36234	¾"	¾"	64	48.7	Yes
36235	1"	1"	71	52.5	Yes
36236	1 ¼"	1 ¼"	91	71	Yes
36237	1 ½"	1 ½"	100	77	Yes
36238	2"	2"	122	94	Yes
36239	2 ½"	2 ½"	176	122	No
36240	3"	3"	201	135.5	No
36241	4"	4"	250	168	No