KG/KGW 40 – 250 RAL

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Verleihungsurkunde

Die Gütegemeinschaft Raumlufttechnische Geräte e.V.
verleiht hiermit
aufgrund des von ihrem Güteausschuß vorliegenden Prüfberichts

Wolf GmbH Mainburg

(der Firma)

das vom RAL Deutsches Institut für Gütesicherung und Kennzeichnung e.V.
anerkannte und durch Eintragung beim Deutschen Patentamt
warenzeichenrechtlich geschützte

„Gütezeichen Raumlufttechnische Geräte“

RAL RLT
Gütezeichen
Raumlufttechnische Geräte

Germering, den 21.08.2000
(Ort) (Datum)

Gütegemeinschaft
Raumlufttechnische Geräte e.V.

Der Vorstandsvorsitzende

Der Geschäftsführer

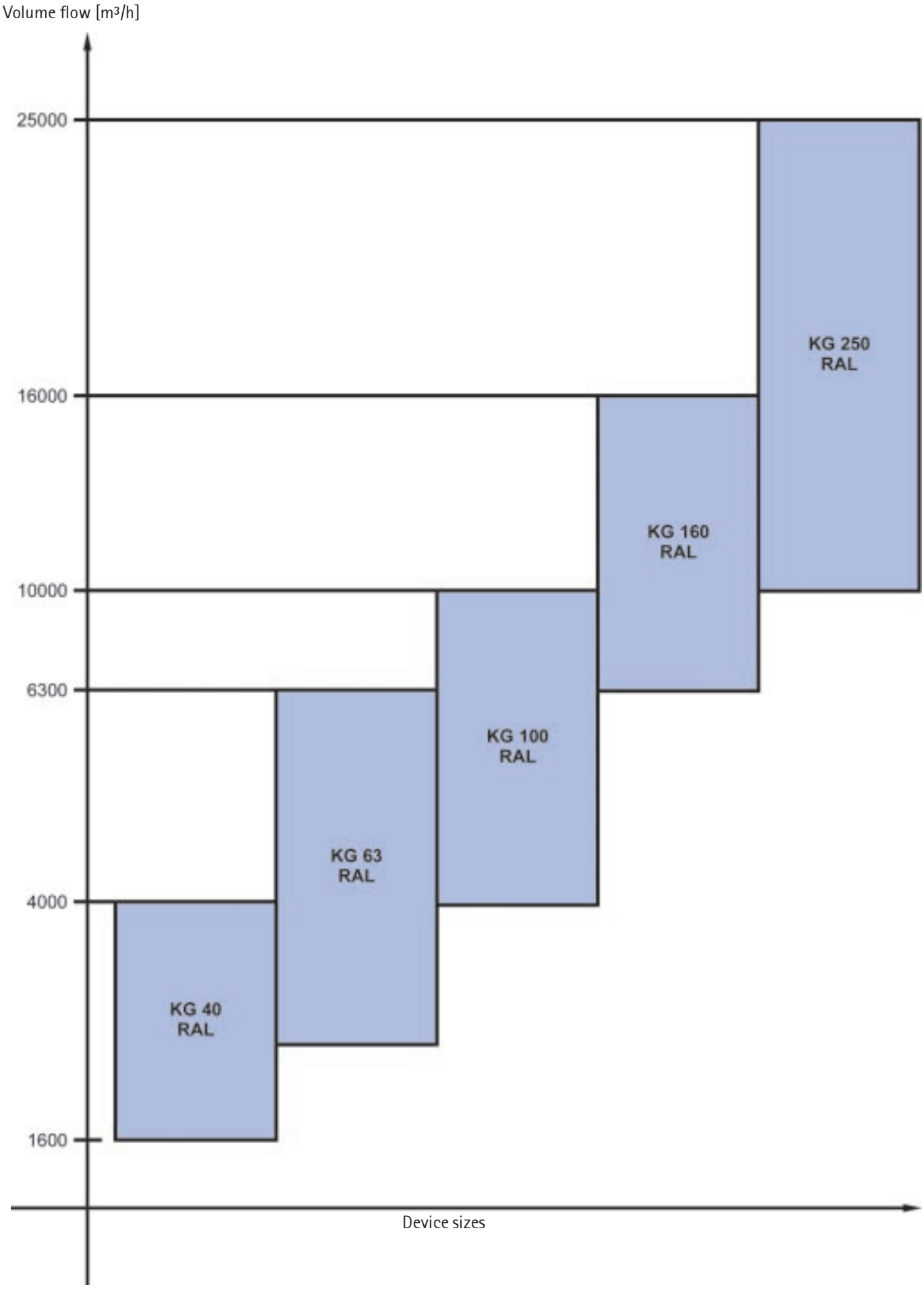

Volume flow [m³/h]
25000
16000
10000
6300
4000
1600
KG 250 RAL
KG 160 RAL
KG 100 RAL
KG 63 RAL
KG 40 RAL
Device sizes

Image: Partial air conditioner KG RAL

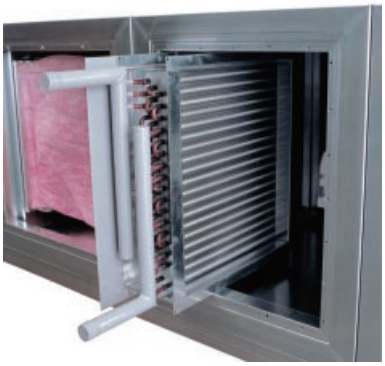


Image: Heat exchanger, extractable

Image: Louver damper according to DIN 1946

Image: Frost-protection frame extractable

Image: Motor tension carriage with manual adjustment

Image: Mist eliminator extractable

Image: Silencer removable to the side

Air conditioner series KG/KGW 40-250 RAL

The air conditioners in the series KG/KGW RAL are made up of individual cubes in modular design.

Outer frame
- Frame construction with inherent sturdiness made up of welded angle profiles, 80 x 80 x 2 mm
- Completely galvanised for optimum corrosion protection

Inner frame
- Prolate, screwed to inner corners of frame

Frame profile
- Inner and outer frame together create a frame profile
- With the two-part, dampened design, the inside is decoupled from the outside both thermally and acoustically

Frame cover
- Flush transition to the device bottom and to panels
- Completely galvanised for optimum corrosion protection

Inspection door
- Double-shell design with sheet steel galvanised on both sides
- Insulation 50 mm mineral wool, material class A1
- Hinges on outside
- Opens to right or left and can be removed completely without alteration
- Surrounding permanently elastic door seal with sealing lip

Cladding
- Double-shell design with sheet steel galvanised on both sides
- Insulation 50 mm mineral wool, material class A1
- Easily removable by removing screw connection with frame profile
- Is flush with the inside frame corners
- Completely smooth inside surfaces, clean easily
- Permanent elastic seal between cladding and frame

Sleeve filter
- Can be released and removed to the side without using tool by the means of the quick release device
- Filter frame pressed tightly against all sides

Cooler basin
- Cooler basin integrated in device bottom
- Continuous basin for cooler and mist eliminator
- Cooler basin with inclination for complete emptying through condensate connector
- Permanent corrosion protection through use of aluminium

Mist eliminator
- Easily accessible due to large inspection opening
- Mist eliminator extractable to the side
- Mist eliminator profiles removable
- Flanging of cooler not necessary
- Low pressure drops
- Complete silicone-free

in addition for weather-proof model KGW RAL:

Device top
- Device painted completely on the outside
- Large top hangover for protection against wind-driven rain
- Drip edge around top
- Transport eyelet

Drop ledge
- As a protection against water infiltration on the bottom of the device

Base frame
- Sturdy, galvanised profile frame, 200 mm high
  On request: 200 - 500 mm high

Surface finish
- Outside paint of at least 60 µm, including under the suction hood
- Outside air flap painted

Door
- Door locking device and inspection hole Ø 150 mm for KG/KGW 250
- Glass inspection hole in double-wall design

Device classification according to DIN EN(V) 1886

The air conditioners of the series KG/KGW-RAL as integral devices are classified in the device class „not inflammable", class A1 according to DIN 4102.

Heat transmission class	(U = 0.96)	= T2
Heat bridge class	(Kb = 0.57)	= TB3
Filter bypass leakage		= 0.36%
Tightness of the casing		Tightness class B
Mechanical strength		Casing class 1A

Volumetric weight of insulation at least 27 kg/m³

Insertion loss De of the casing

Hz	125	250	500	1000	2000	4000	8000	∑
dB	18	26	24	34	37	32	43	34

Technical data

Insulation:	thickness	50 mm
	Material class (according to DIN 4102)	A1 (not inflammable)
	Thermal conductivity λ [W/mK]	0,04
Cladding:	sound reduction coefficient Rw [dB] (according to DIN 20140-3)	41

Construction

Construction of the air conditioners in modular design made up of independently sturdy, self-supporting, completely galvanised individual cubes Complete galvanization according to EN 10142 and EN 10143 . Individual cubes screwed to each other; easily separable if needed. Permanently elastic seal between the individual cubes, suitable for overpressure and subpressure, assure maximum device tightness.

Frame construction, 80 x 80 x 2 mm

self-supporting surrounding design; device sturdy even without base frame
Frame insulated with 50 mm mineral wool, material class A1, consisting of thermally and acoustically decoupled outer and inner frame

Outer frame: angle frame with inherent stability, connected according to the MIG process without burning loss, fully galvanised according to EN 10142 and EN 10143.

Inside frame: easily removable angle profile, fully galvanised according to EN 10142 and EN 10143, smooth on the inside, easy maintenance and easy cleaning.
On request: Outer frame in parts for easy insertion, quick assembly due to partial dismantling, can be separated horizontally or vertically

Cladding for indoor installation

Thickness of panels: 50 mm, consisting of thermally decoupled inside and outside panelling, fully galvanised steel sheets according to EN 10142 and EN 10143.
Sound proofing and thermal insulation with high-quality, non inflammable mineral wool insulation, material class A1 according to DIN 4102, attached slip-proof and vibration-proof between inside and outside panelling.
Panels are smooth and clean easily, screwed to the frame, easily removable, inside and outside panelling can be separated.

Permanently elastic, non-ageing seal between panels and frame profile for high device tightness.
Special frame construction with fully galvanised metal panel sheets according to EN 10142 and EN 10143.
All inside panelling easily accessible for cleaning and inspection.

Cladding
KGW-RAL weather-proof

Thickness of panels: 50 mm, consisting of thermally decoupled inside and outside panelling, fully galvanised steel sheets according to EN 10142 and EN); outside panelling also painted (min. 60 µm). Sound proofing and thermal insulation with high-quality, non inflammable mineral wool insulation, material class A1 according to DIN 4102, attached slip-proof and vibration-proof between inside and outside panelling.
Panels are smooth and clean easily, screwed to the frame, easily removable, inside and outside panelling can be separated.

Permanently elastic, non-ageing seal between panels and frame profile for high device tightness. Special frame construction with fully galvanised metal panel sheets according to EN 10142 and EN 10143.
All inside panelling easily accessible for cleaning and inspection.

Angle arc top made of galvanised, painted (min. 60 µm) steel sheet with surrounding drip edge, top hangover 60 mm to the side, 50-120 mm to the front.

Base frame height = 200 mm required. Wolf base frame attached in factory.
Suction/exhaust hood for optimum rain protection with free suction/exhaust, painted on inside and outside (min. 60 µm)
Outside air suction element also painted on inside (min. 60 µm) with corrosion resistant, insulated aluminium condensation basin with incline to outlet chute on side, ball siphon supplied but not installed.
Weatherproof front part as rain protection for outer fittings and piping.

Inspection door

Thickness of inspection door: 50 mm. Inspection door can be opened with regular tools, may be opened to the right or left or removed completely.
Surrounding, non-ageing special sealing profile with sealing lip. Surface pressure controllable with adjustable hinges.
Inspection door consisting of thermally decoupled inside and outside elements made of fully galvanised steel sheets.
High quality mineral wool insulation inserted between inside and outside element, material class A1 (non inflammable) according to DIN 4102, enclosed by metal on all sides, attached slip-proof and vibration-proof.
Thermal and acoustic properties correspond to the panels with inserted and slip-proof attached insulation.

For KG 250, doors standard with pressure-resistant inspection hole, Ø min. 150 mm with double glass and lighting.
Door locking device for KGW 40-250 RAL

Fan element

With double-sided high-powered radial suction fan, forward or backward rotor blades (only backward rotor blades are permissible for motor output of more than 2.2 kW) with exit flange according to DIN 24159.
Balanced shaft, set off to standard diameter on both ends for the addition of V-belt pulleys.
With sturdy suspension and noise-verified precision deep groove ball bearing, greased with non-ageing lithium soap grease, rotor wheel balanced statically and dynamically according to VDI 2060.
Fan and motor are attached to a common base frame, which is attached inside the casing on optimised, pressure-loaded vibration isolators (standard with potential equalisation), oscillation velocity 2.8 mm/s. Continuously adjustable V-belt tensioning device acting parallel to the axis.
Easily removable from casing for repair and maintenance work.
Driven by three phase motor 400 V/50 Hz, construction type B3, heat class F, degree of protection IP 55; for motor output of 1.1†kW and up, winding shield is standard. Tested by TÜV-GS; wired motors are generally high-voltage and PE conductor tested.
Power transmission with high-power V-belt and V-belt pulleys.
V-belt pulleys fastened with taper-lock clamping bushes according to DIN 6885.
V-belt protection for KG/KGW 250.

Elastic connection between fan and casing.
Suction and exhaust openings can be arranged in any position.
Inspection door on operating side can be opened with regular tools, may be opened to the right or left or removed completely.
Repair switch for control or series current is standard.

On request:
Fan spiral casing with inspection opening.
Fan spiral casing with condensate connector
Belt protection for KG/KGW 40 to 160
Three phase motor with speed control
Motor protection with PTC thermistor or thermal contacts for motor output up to 1.1 kW

Free-running fan wheel

Fan/engine with free-running, backward-curved high-power rotor wheel, mounted directly on motor shaft. Screwed support construction made of galvanised steel sheets. Complete unit attached to C profiles and decoupled by rubber vibration damping elements. Rotor wheel in welded steel sheet design, or in polyamide for models up to KG100. In case of steel sheet design, surface protection with powder coating.
Rotor wheel balanced with hub, balancing grade G 2.5 according to ISO 1940 P1. Retracted entry nozzle made of galvanised steel sheets for optimum flow-in of the rotary wheel. Entry nozzle rigidly connected with support frame and adjusted, ensuring optimum slot centring. Taper lock hub made of grey cast iron, screwed in. IEC three phase standard motor, 400 V, 50 Hz, motor protection with PTC thermistor, ISO class F motor suitable for operation with frequency converters. Maximum permissible air temperature: 60 °C. Measuring possibilities at inlet nozzle for volume flow determination.
Custom model:
Rotor wheel in welded aluminium design, surface untreated.
Motor with built-in frequency converter

Accessories for continuous speed control on request

Transducer:
Transducer for maintaining constant pressure or volume flow
Control module:
Power supply for pressure sensor with control amplifier for frequency converter.
Wolf frequency converter:
Electronic frequency converter (5 to 70 Hz) for setting the required fan speed. Electronic limits (U_{peak} < 1000V; du/dt < 500 V/µsec).
On request:
For longer supply wires to the frequency converter, the use of a motor filter or a sinus filter is recommended.
Interference suppression filter according to EN 55011, class B.
Connection line between motor and frequency converter with shielded cables.

Heater element
permissible operating pressure: 16 bar
Test pressure 30 bar

With extractable heat exchanger Cu/Al, pipes made of Cu with pressed-on, optimised, and profiled high-performance lamella, collector made of steel, for warm-water, hot-water, or steam operation.
Protected against bending of copper pipes
Connections with inch system thread or flange and connecting flange, led out of the device on the side and sealed airtight with seals GU 50

Lamella distance min. 2.0 mm
Water resistance max. 20 kPA
Entering velocity max. 4.0 m/sec (up to 10,000 m^3/h)
max. 3.5 m/sec (over 10,000 m^3/h)

On request:
Heat exchanger: galvanised steel
Heat exchanger coated
Connectors with bleed and drain nozzle
Extractable frost-protection frame (if heater not accessible)

Cooling element
permissible operating pressure: 16 bar
Test pressure 30 bar

With extractable heat exchanger Cu/Al, pipes made of Cu with pressed-on, optimised, and profiled high-performance lamellas, collector made of Cu, for cold-water pump operation. Connections with inch system thread or flange and connecting flange, loose, led out of the device on the side and sealed airtight with seals GU.
Corrosion-resistant, insulated aluminium condensate basin with inclination towards outlet chute on side for continuous and complete removal of condensate.

Lamella distance	min. 2,4 mm
Water resistance	max. 50 kPa
Entering velocity	max. 4.0 m/sec (up to 10,000 m³/h)
	max. 3.5 m/sec (over 10,000 m³/h)

Protected against bending of copper pipes
insulated pipes (min. 19 mm) through device wall

On request:
Heat exchanger: galvanised steel
Heat exchanger coated
Connectors with bleed and drain nozzle

alternative:
Cooling element (direct evaporator)

With extractable heat exchanger Cu/Al as direct evaporator.
Corrosion-resistant, insulated aluminium condensate basin with inclination towards outlet chute on side for continuous and complete removal of condensate.

Mist eliminator

Plastic mist eliminator, extractable for cleaning, silicone-free, temperature resistant up to 85 °C, dismountable, with access via door with handle or inspection cover metal sheet.

Sleeve filter element

Sleeve filter, grade F5, F7, F9, clamped in with quick connect device, removable without tools, extractable towards the side for inspection.
Filter frame pressed tightly against all sides, permanently sealed with closed-cell sealant. High connecting pressure via lever transmission in quick connect device.
Inspection door on operating side can be opened with regular tools, may be opened to the right or left or removed completely.
Inspection hole incl. lighting standard for KG 250, filter differential pressure monitoring, labelling of filter with the following specifications: Filter class, type of filter material, nominal volume, starting resistance and final resistance.
Filter element made of several perpendicular pockets, which have been stabilised by seams, sealed conically with odour-free plastic adhesive, and are temperature-resistant up to 80 °C and humidity resistance up to 100% relative humidity.
Installation and filter frame airtight according to DIN/EN 1886.

Mixing and filter element

Extractable filter frame with V-shaped, inserted, regenerative filter mat of **grade G4, permissible only as pre-filter**.
Filter change on operation side via double-walled inspection door.

On request:
With opposite coupled profile lamellas with plastic connection, linkage and control lever for manual or motor-supported operation.

Mixed/exhaust air element

Mixed air, exhaust air, or suction element with flaps, airtight according to DIN 1946, with opposite coupled profile lamellas with plastic connection, with linkage and control lever for manual or motor-supported operation.

Indoor installation:	Outside air flap attached inside or attached outside and insulated.
Outdoor installation:	All flaps inside and coated with at least 60ì m

KG/KGW 40-250 RAL with removable panel or with inspection door

On request:
Mixing pockets
Integrated in mixed/exhaust air element for KG/KGW 40-250 RAL
Mixing pockets made of galvanised steel sheets for mixing of circulating air and outside air. Uniform temperature distribution.
With opposite coupled profile lamellas with plastic connection, linkage and control lever for manual or motor-supported operation.

Exhaust air element

As mixing element with flaps, airtight according to DIN 1946, with opposite coupled profile lamellas with plastic connection. Linkage with control lever for manual or motor-supported operation

Silencer element

With mineral fibre screen, material class A1 (non inflammable) according to DIN 4102, in galvanised steel sheet frame. Water-repellent, abrasion-resistant, cleanable surfaces.
On request: with double-foil cover
with perforated plate cover
screens removable towards the side

Washer element made of plastic

Casing made of glass fibre reinforced plastic (polyester resin) in shell design with 6-8 mm wall thickness, with laminated reinforcement for stabilisation against high pressure loads, colour RAL 7030.
Equipped with supply system with float valve 3/4", stainless steel sealing fit, and plastic float, for operation with fully desalinated water
Outlet and overflow chute made of PVC, nozzle holder with self-cleaning nozzles spraying against air-flow, consisting of distributor tube with perpendicular nozzle tubes and nozzles made of PP with quick clip lock, stainless steel cap, self-cleaning and largely clog-free. Rectifier and mist eliminator made of PP-tv with the necessary holders and spacer profiles, completely removable, heat-resistant up to 110°C. Basin bottom accessible, inclination all around towards the removal chute, may be emptied completely, easy-clean surface.
Inspection door double-walled with insulation with double-walled inspection hole and darkening option.
Lighting splash-proof (glass fibre reinforced plastic, transparent), accessible from the outside, lighting 230 V/60 W, drain and overflow device made of PVC with inside siphon, thermometer, pressure gauge, pump housing made of stainless steel (KG 160 and up), pump motor, heat class CL F, degree of protection IP 55, with PTC thermistor, suitable for speed controlled operation. All connectors are on the operating side, incl. dry-run protection, de-sludging system.

KG/KGW 40-100:	Pump housing, rotor wheel and shaft made of stainless steel
KG/KGW 160-250:	Pump housing made of grey cast iron, rotor wheel and shaft made of stainless steel

Entering velocity max. 3.2 m/sec (speed with respect to connection cross-section)

On request:
Access path
Automatic desalination
UV water treatment

Rotation heat exchanger Type RWT

Condensation rotor for optimum utilisation of the **sensible thermal energy** in the exhaust air. Horizontal or vertical installation. Sturdy frame construction.
Low weight and easy accessibility of all device components.

Rotor material made of corrosion-resistant aluminium alloy, wound in wavy and straight position, for laminar airflow. For casing dimension larger than 2200 mm, frame and rotor mass separated, assembly on site.

Flush chamber to avoid overflow of the withdrawn air and supply air (if necessary).

Seal of rotor mass with surrounding, readjustable, and replaceable felt seals.

Rotor drive with continuously adjustable motor with reduction gear and V-belt around the rotor circumference. Controller for controlling the motor.

Enthalpy rotor for optimum utilisation of the **sensible and latent thermal energy** in the exhaust air. Horizontal or vertical installation. Sturdy frame construction. Low weight and easy accessibility of all device components.

Rotor material made of corrosion-resistant aluminium alloy with hygroscopic surface for humidity transmission, wound in wavy and straight position, for laminar airflow. For casing dimension larger than 2200 mm, frame and rotor mass separated, assembly on site.

Flush chamber to avoid overflow of the withdrawn air and supply air (if necessary).

Seal of rotor mass with surrounding, readjustable, and replaceable felt seals.

Rotor drive with continuously adjustable motor with reduction gear and V-belt around the rotor circumference. Controller for controlling the motor.

Cross flow heat exchanger Type KGX

Cross flow heat exchanger KGX with integrated bypass design horizontal (for air guide horizontal-horizontal) or vertical (for air guide horizontal-vertical)

Recuperative heat and cold recovery according to VDI 2071 with corrosion-resistant special aluminium plates.
Profiled exchanger plates made of special aluminium, sealed from each other with permanent elastic and temperature-resistant sealing compound.
Connected with integrated spacers.
By-pass flap on outside air side, with profiled, opposite lamellas for performance and rime protection control.
Condensate basin with inclination towards outflow made of corrosion-resistant aluminium (optional: stainless steel min. material no.: 1.4301)
incl. outflow 1 1/4"
Outside air and exhaust air are separated, mixing is impossible.
For flow velocities of more than 2.0 m/s and a relative withdrawn air humidity of more than 50 %, a mist eliminator that can be taken apart is generally required.
Siphon with back-up protection and automatic filling supplied but not installed.

Cross flow heat exchanger Type KGXD with integrated bypass

Recuperative heat and cold recovery according to VDI 2071 with corrosion-resistant special aluminium plates.
Profiled exchanger plates made of special aluminium, sealed from each other with permanent elastic and temperature-resistant sealing compound.
Connected with integrated spacers.
By-pass flap on outside air side, with profiled, opposite lamellas for performance and rime protection control.
Condensate basin with inclination towards outflow made of corrosion-resistant aluminium (optional: stainless steel min. material no.: 1.4301)
incl. outflow 1 1/4"
Outside air and exhaust air are separated.

For flow velocities of more than 2.0 m/s and a relative withdrawn air humidity of more than 50 %, a mist eliminator that can be taken apart is generally required.
Siphon with back-up protection and automatic filling supplied but not installed.

Tube heat exchanger Type WRT

The frame of the heat exchanger is made of galvanised/coated steel sheets; the tubes are made of Cu with pressed-on, optimised and profiled high-performance lamellas made of aluminium.
Lamella spacing is at least 2.0 mm on the supply air side and at least 2.4 mm on the withdrawn air side.
The heat recovery chamber is made with a condensate basin made of corrosion-resistant aluminium (at least AlMg).
The heat exchanger pipe can be cleaned from all sides.
In order to prevent damage to subsequent elements (due to condensate), a mist eliminator is installed in the exhaust air side.

Alternatively with internal bypass:
In order to prevent rime on the heat exchanger surfaces, the outside air can partially or entirely pass by the heat exchanger in the internal bypass.

Cycle-connected system
Type KVS
permissible operating pressure: 16 bar
Test pressure 30 bar

For heat recovery from withdrawn air.
Casing design same as air conditioner

Cooling element: with insertable heat exchanger for heat recovery for transmitting medium with antifreeze, connections with inch system thread, mist eliminator and condensate basin.

Heater element: with insertable heat exchanger Cu/Al for heat recovery for transmitting medium water with antifreeze. Connections with inch system thread.

At the withdrawn air side, a mist eliminator is built in in order to prevent damage to following aggregates by accumulating condensate.

Requirement for heat recovery systems

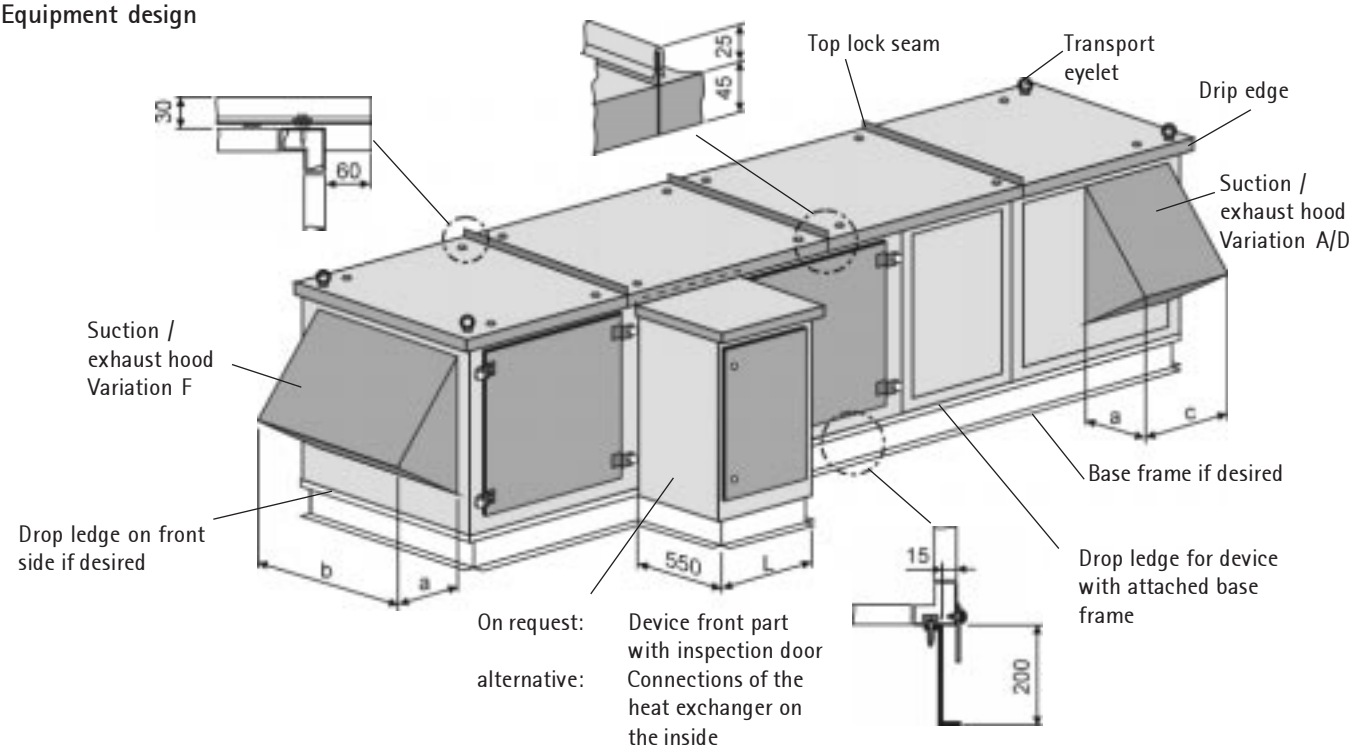
Heat recovery system		min. Heat recovery rate (-)	max. pressure drop (Pa)	max. Leakage air rate (%)
Rotation heat exchanger		0.70	150	5.0
Plate-type heat exchanger				
≤ 15 000 m³/h	without bypass	0.50	200	0.25
	with internal bypass	0.45	300	0.25
> 15 000 m³/h	without bypass	0.55	200	0.25
	with internal bypass	0.50	300	0.25
Tube heat exchanger				
	without bypass	0.45	250	0.25
	with internal bypass	0.40	300	0.25
Cycle connected system (KVS)		0.45	200	-

Accessories

Device base frame made of galvanised, sturdy steel sheet, attached to air conditioner or supplied separately. Height 200 mm (standard equipment with KGW RAL).
Flexible canvas connector for suction or pressure side, 4-hole profile frame and potential equalisation.
Temperature resistant flexible canvas connector for suction or pressure side, 4-hole profile frame.

- **Spare filter for all filter grades**
- **Transport eyelets (standard equipment for KGW RAL)**
- **Double-walled inspection hole Ø 150 mm (standard equipment for KGW RAL 250)**
- **Lighting (standard equipment for KGW RAL 250)**
- **Differential pressure gauge**
- **Inclined tube manometer with switch contact**
- **Air flow controller**
- **Air volume measuring instrument**

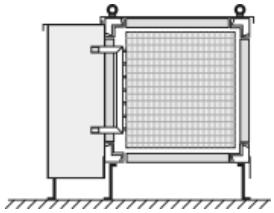
Equipment design



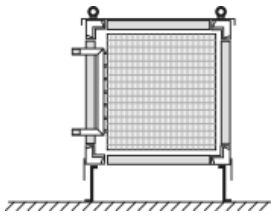
Dimensions
Suction / exhaust hood

Dimensions [mm]

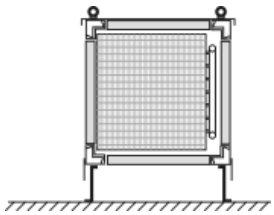
KGW	40	63	100	160	250
a	420	545	680	850	680
b	610	780	961	1211	1561
c	440	610	791	871	1051



Connections of the heat exchanger external in the weatherproof device front part with inspection door.
Weatherproof device front part available in the lengths L = 380mm, L = 580mm, L = 960mm and L = 1160mm without isolation.
Insulated if desired.



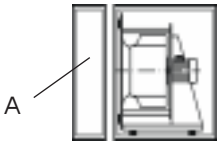
Connections of the heat exchanger outside of the panelling.



Connections of the heat exchanger on the inside, in or rather against the air direction.

Installation of the connection pipes and fittings in a subsequent empty element.

Insulation of the connection pipes and fittings to be provided on-site.

Size KG/KGW RAL		40	63	100	160	250
Fan element 	L W H	1080 710 710	1080 880 880	1430 1040 1040	1290 1290 1290	1640 1640 1640
Heater element (also KVS) 	L W H	380 710 710	380 880 880	380 1040 1040	380 1290 1290	380 1640 1640
Heater element with frost-protection frame 	L W H	580 710 710	580 880 880	580 1040 1040	580 1290 1290	580 1640 1640
Cooling element (also KVS) 	L W H	580 710 710	580 880 880	580 1040 1040	580 1290 1290	580 1640 1640
Washer element 	L W H	1000 710 960	1000 880 1130	1000 1040 1290	1000 1290 1540	1000 1640 1890
Mixed/exhaust air element 	L W H	540 710 710	710 880 880	870 1040 1040	950 1290 1290	1130 1640 1640
Mixing and filter element 	L W H	710 710 710	880 880 880	1040 1040 1040	1290 1290 1290	1640 1640 1640
Sleeve filter element 	L W H	710 710 710	880 880 880	1040 1040 1040	950 1290 1290	1130 1640 1640
Silencer element 						
Type 2	L	880	880	950	950	950
Type 3	L	1080	1080	1130	1130	1130
Type 4	L	1330	1330	1430	1430	1430
Type 5	L	1680	1680	1640	1640	1640
	W	710	880	1040	1290	1640
	H	710	880	1040	1290	1640
Empty element with/ without inspection door 	L L L L W H	380 540 710 1330 710 710	380 580 880 1330 880 880	380 580 1040 1430 1040 1040	380 580 1290 1430 1290 1290	380 580 - 1640 1640 1640
KGX 	L W H	710 710 710	880 880 880	1040 1040 1040	1290 1290 1290	1640 1640 1640
KGXD 	L W H	1170 710 1420	1470 880 1760	1640 1040 2080	2040 1290 2580	2540 1640 3280
Tube heat exchanger WRT 	L W H	710 710 1420	710 880 1760	870 1040 2080	870 1290 2580	870 1640 3280
Rotation heat exchanger RWT 	L *WxH **WxH	400 1420/1040 1040/1420	400 1760/1290 1290/1760	400 2080/1640 1640/2080	400 2580/1940 1940/2580	440 3280/2280 2280/3280
Free-running fan wheel 	L W H	710 710 710	880 880 880	1040 1040 1040	1290 1290 1290	1640 1640 1640
	A: Empty element required if suction is not over entire cross-section					

Dimensions in [mm] * Design: Airflows side by side ** Design: Airflows on top of each other

For KGW: top hangover 60 mm to the side, 50-120 mm at the front side, height of the top 30 mm, base frame height 200 mm.

Weights
[kg]

KG/KGW-RAL		40	63	100	160	250
Fan element without motor drive	Fan element with forward rotor blades.	105	145	200	-	-
	Fan element with backward rotor blades	100	130	200	265	445
Heater element Cu/Al	Heater element	35	45	55	65	85
	Heater element type 1, complete	50	65	95	120	170
	Heater element type 2, complete	50	65	95	120	170
	Heater element type 3, complete	55	75	100	125	190
	Heater element type 4, complete	60	80	110	140	220
Heater KVS	Heater element type II, complete	75	105	140	185	285
Heater element type III, cpl.		80	110	150	200	315
Heater element Cu/Al with frost protection frame	Heater element with frost prot. frame	45	55	65	85	110
	Heater element type 1, complete	60	75	105	140	195
	Heater element type 2, complete	60	75	105	140	195
	Heater element type 3, complete	65	85	100	145	215
	Heater element type 4, complete	70	90	120	160	245
Heater element steel, galv.	Heater element	35	45	55	65	85
	Heater element type 1, complete	80	115	160	230	365
	Heater element type 2, complete	100	150	215	310	550
	Heater element type 3, complete	100	160	230	375	615
	Heater element type 4, complete	145	230	340	550	815
Heater element steel, galv. with frost protection frame	Heater element with frost-prot. frame	45	55	65	85	110
	Heater element type 1, complete	90	125	170	250	290
	Heater element type 2, complete	110	160	225	330	575
	Heater element type 3, complete	115	170	240	395	640
	Heater element type 4, complete	155	240	350	570	840
Washer element	Washer element complete	145	170	210	270	320
Cooling element	Cooling element	45	55	65	85	155
	Cooling element with mist eliminator	50	65	75	100	130
	Cooling element complete with direct evaporator Type A	75	100	130	175	250
	Cooler type 7 / direct evaporator Type B	85	115	150	205	310
	Cooler type 8	90	120	160	220	340
Cooler KVS	Cooling element type II, complete	85	115	150	205	310
	Cooling element type III, complete	90	120	160	220	340
Mixing and filter element	Mixing and filter element	50	75	110	155	245
	Mixing and filter element, complete with filter G4	55	80	125	175	265
Sleeve filter element	Sleeve filter with sleeve filter F5, F7, F9	60	80	125	135	205
Mixing and exhaust air el.	Mixing and exhaust air element with 1 flap	45	60	95	125	180
Silencer element	Silencer element complete type 2	80	105	155	200	260
	Silencer element complete type 3	95	125	185	220	310
	Silencer element complete type 4	110	140	215	270	375
	Silencer element complete type 5	130	175	260	350	465
Empty element	Length 380 mm	35	45	55	65	85
	Length 580 mm	45	55	65	85	110
Cross flow heat exchanger	KGX	120	180	310	570	970
	KGXD	215	315	520	935	1380
Tube heat exchanger	WRT with internal bypass	on request				
Rotation heat exchanger	RWT	135	185	255	340	470
Top (KGW only)	Top per current m	2.9	3.5	4.2	5.1	6.5
Base frame (200 mm high)	Base frame per current m	5.1	5.1	5.1	5.1	5.1

Selection of unit size

The selection of the required unit size is done according to the desired air volume flow.

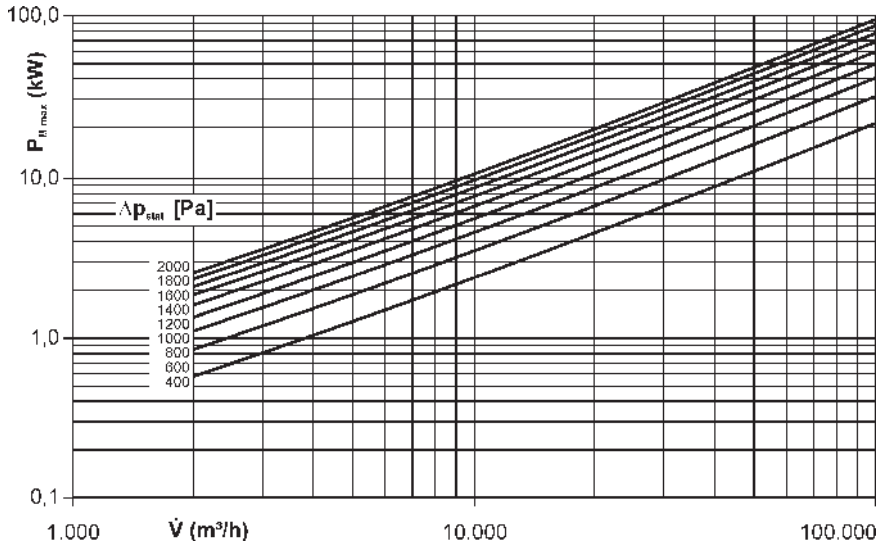
The power demand as well as the limit air volumes of the individual components (heater, filter, cooler, washer...) must be observed.

Limit air volumes

Limit air volumes [m³/h]	KG 40	KG 63	KG 100	KG 160	KG 250
Filter	3,340	5,260	8,870	14,750	24,820
Heater	2,910	5,620	9,180	14,200	24,250
Cooler	3,080	5,430	9,180	13,280	23,750
Humidifier/washer	3,480	5,980	8,870	14,750	25,000
„suction-side“ suction F	3,120	6,010	9,620	13,850	22,470
„suction-side“ suction A/D	2,280	4,380	7,160	9,980	18,950
„pressure side“ suction F	4,150	8,000	12,800	18,400	29,950
„pressure-side“ suction A/D	3,050	5,850	9,530	13,280	25,250
Exhaust hood	1,950	2,950	4,570	7,520	11,360

Electrical active power $P_{M\,max}$

For fans with or without spiral casing the following P_M limits apply to the electrical active power.



Design:

for ambient temperature of the motor up to 40°C and
for installation heights up to 1000 m above see level

for ambient temperatures over 40°C or
for installation heights more than 1000 m above see level
the nominal power is decreased:

Ambient temperature	40°C	45°C	50°C	55°C
Reduction of the nominal power to	100%	95%	90%	85%

Installation height over sea level	2000 m	3000 m	4000 m
Reduction of the nominal power to	92 %	84 %	78 %

Increased insulation class:

required for ambient temperatures over 55°C.

Note:

Variable speed motors are designed standard for direct start and direct switchover to stage 2 or 3.

Variable speed motors over 10 kW, relays for heavy starting recommended!

Motor protection:

On request: Motors up to 1.1kW with PTC thermistor or thermal contacts. For 1.1kW and over, motor protection is standard.

Maximum motor weights:

kW	1	2	3	4	5	7,5	9	12	15	20	30	40	50	70	90
kg	15	25	32	45	55	80	100	130	150	200	300	350	460	680	840

Maximum possible rated motor capacity (kW):

for installation in the fan element.

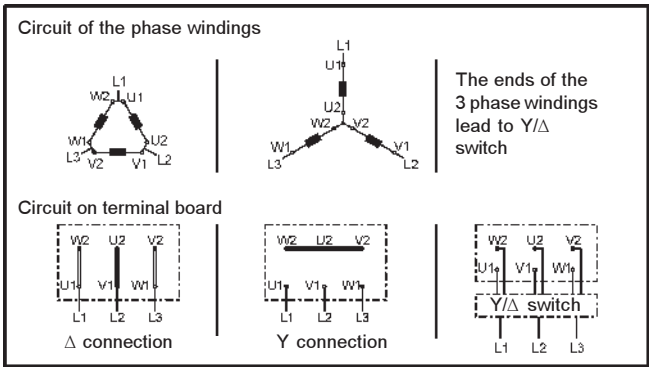
KG RAL	max. exhaust variation	Size of motor	Speed [min^{-1}] / motors 400 V 1500	3000	1500 / 3000	1000 / 1500	750 / 1500	750 / 1000 / 1500	500 / 1000 / 1500	1500 EExeIIT3	3000 EExeIIT3
40	A / B / C	100	3.0	3.0	8.0 / 3.0	0.7 / 2.0	0.5 / 2.4	0.45 / 0.70 / 1.8	0.15 / 0.70 / 1.9	1.35	1.8
63	A / B / C	112	4.0	4.0	1.1 / 4.1	0.9 / 3.0	0.8 / 3.2	0.60 / 0.80 / 2.4	0.18 / 0.85 / 2.4	2.5	2.5
100	A / B / C	112	4.0	4.0	1.1 / 4.1	0.9 / 3.0	0.8 / 3.2	0.60 / 0.80 / 2.4	0.18 / 0.85 / 2.4	2.5	2.5
160	A / B [1)] C	160 90	15.0 1.5	11.0 2.2	3.0 / 12.0 0.5 / 2.0	3.5 / 12.0 0.3 / 1.0	3.0 / 12.0 0.3 / 1.4	1.50 / 2.00 / 6.5 0.20 / 0.30 / 0.9	0.60 / 2.60 / 6.6 - / - / -	10 2.5	10 2.5
250	A B C	180 132 112	22.0 7.5 4.0	22.0 7.5 4.0	6.0 / 24.0 2.0 / 8.0 1.1 / 4.1	6.0 / 19.0 17.7 / 5.0 0.9 / 3.0	5.0 / 18.0 1.4 / 6.0 0.8 / 3.2	3.50 / 5.50 / 15.5 1.00 / 1.50 / 4.4 0.60 / 0.80 / 2.4	1.50 / 5.50 / 16.0 0.40 / 1.80 / 4.4 0.18 / 0.85 / 2.4	17 6.5 3.6	15 5.5 3.3

[1)] KG 160 RAL with exhaust B, for HLZ fans or with spring vibration absorber only up to size 132.

For larger motor outputs: Design and delivery on request.
Delivery times ex factory in according to delivery list.

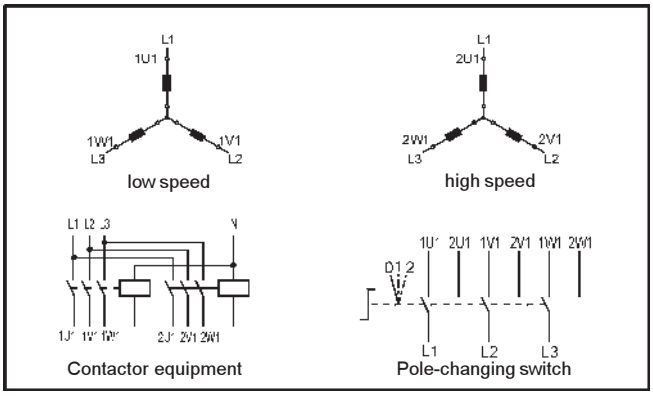
Circuit for 1 speed

Motors up to 2.2 kW are normally started directly, starting from 3 kW in star-delta connection.



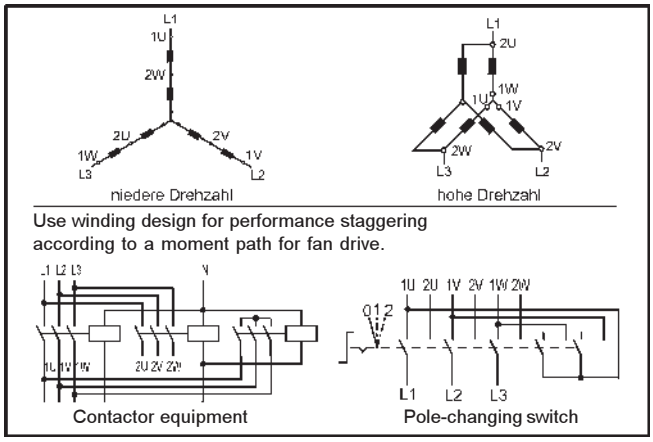
Circuit for 2 speeds
(2 separate windings)

Design e.g. for 1000/1500 min^{-1} or 750/1000 min^{-1}



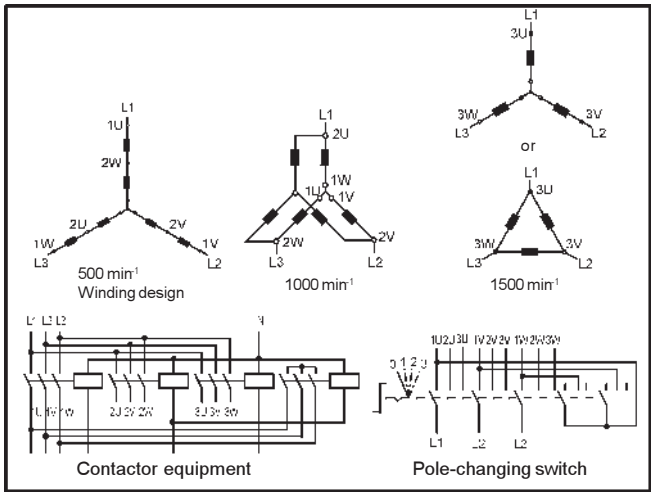
Circuit for 2 speeds in the ratio 1:2
(winding in Dahlander circuit)

Design e.g. for 1500/3000 min^{-1} or 750/1500 min^{-1}



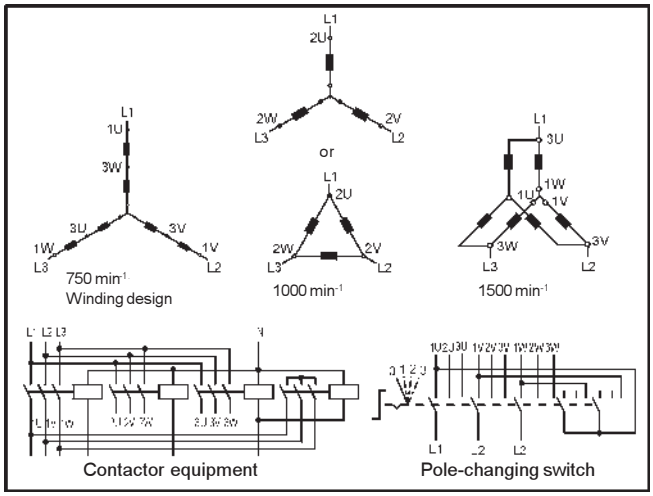
Circuit for 3 speeds
(2 separate windings, 1 in Dahlander circuit)

Design for fan drives 500/1000/1500 min^{-1} or 8/6/4-pole; 500/1000 min^{-1} in Dahlander circuit.



Circuit for 3 speeds
(2 separate windings, 1 in Dahlander circuit)

Design for fan drives 750/1000/1500 min^{-1} or 8/6/4-pole; 750/1500 min^{-1} in Dahlander circuit.



Sleeve filter

Sleeve filter, grade G4*, F5, F7, F9, clamped in with quick connect device, removable without tools, extractable towards the side.
Filter frame pressed tightly against all sides. High connecting pressure via lever transmission in quick connect device.

Dimensions

KG RAL	40	63	100	160	250
Length [mm]	710	880	1040	950	1130
Width [mm]	710	880	1040	1290	1640
Height [mm]	710	880	1040	1290	1640

The case dimensions are the same for all grades

Inspection door: As desired, right/left in air direction

Filter surfaces [m²]

Grade	40	63	100	160	250
G4*	2.1	3.4	5.5	9.2	15
F5	3.5	5.6	9.1	15.6	25.6
F7	5.0	8.2	13.2	22	36.8
F9	5.0	8.2	13.2	22.6	38

* Sleeve filter G4 permissible only as additional pre-filter.

Note:
Change of extractable filter sleeves from the operating side

Filter class classifications

DIN EN 779	G4	F5	F7	F9
DIN 24185	EU4	EU5	EU7	EU9

Final pressure differences

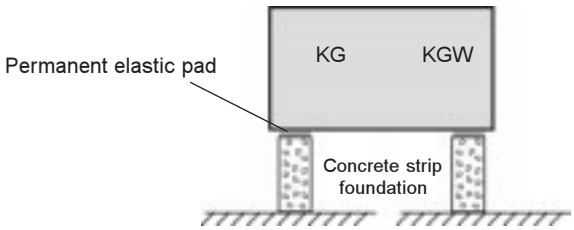
Sleeve filter F5 = 200 Pa
Sleeve filter F7 = 200 Pa
Sleeve filter F9 = 300 Pa

Device installation KG-RAL

The air conditioners KG RAL do not require a special foundation for installation.
It is however necessary to prepare a horizontal, even and sturdy installation area.

For the installation of air conditioners with cooler or crossflow heat exchanger, it is advisable to provide a foundation basement or a base frame in order to be able to attach the drain siphon without problem. The base frame can be purchased from WOLF or installed on site.
The foundation height required depends on the necessary siphon height.
The heights of the base frame and/or the foundation are according to the local conditions, with a minimum of 200 mm.

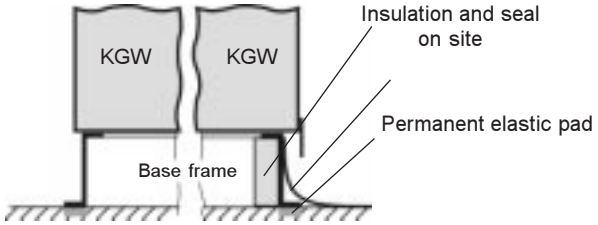
Especially suitable as foundation are either strip foundations parallel to the longitudinal axis of the device under the frame profiles or a complete foundation block over the total installation area.



To prevent body-borne sound transmission from the air conditioner to the building, there must be a permanent elastic pad (damping plate or strip) provided between the installation area and/or the foundation and the air conditioner.

KGW-RAL

Base frame is standard
The insulation of the base frame and the seal of the building roof must be done on site.

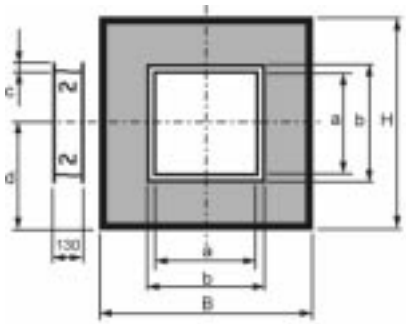


Connection measures

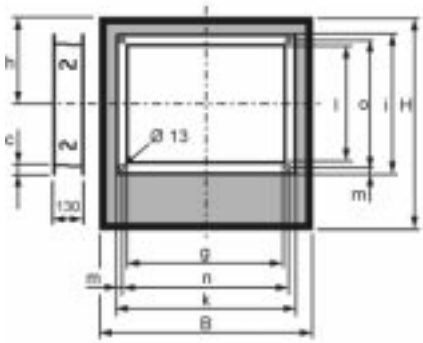
Canvas connector for AC / ACW

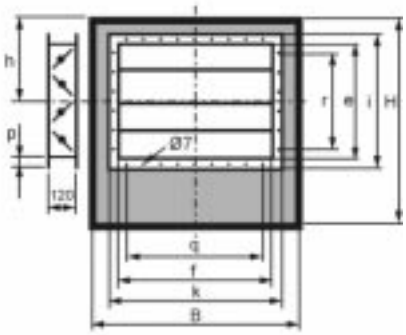
Louver damper for KG

pressure-side

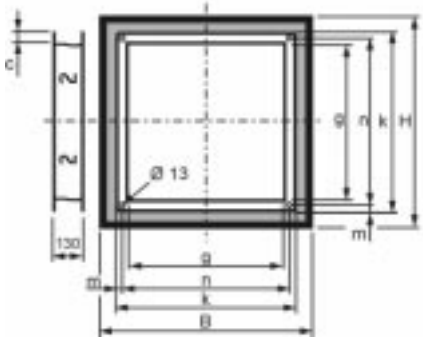


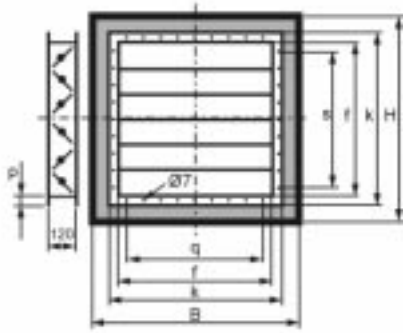
suction-side





suction-side over the whole cross section





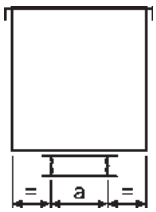
Dimensions

KG/KGW	40	63	100	160	250
B	710	880	1040	1290	1640
H	710	880	1040	1290	1640
a	338	411	503	619	765
b	398	471	563	679	825
c	30	30	30	30	30
d	355	440	520	645	820
e	360	530	690	770	950
f	530	700	860	1110	1460
g	530	700	860	1110	1460
h	270	355	435	475	565
i	420	590	750	830	1010
k	590	760	920	1170	1520
l	360	530	690	770	950
m	13	13	13	13	13
n	564	734	894	1144	1494
o	394	564	724	804	984
p	30	30	30	30	30
q	1 x 170	2 x 170	3 x 170	6 x 170	8 x 170
r	2 x 170	3 x 170	4 x 170	4 x 170	5 x 170
s	3 x 170	4 x 170	5 x 170	6 x 170	8 x 170

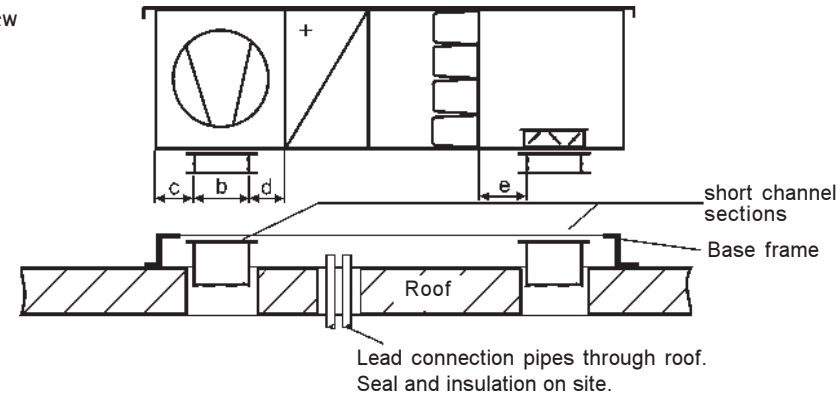
Connection measures

Duct connection downwards (KGW)

Front view



Side view



Warning:

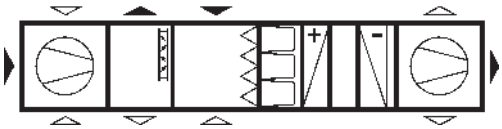
For heaters with connections on the inside, an empty element for the pipework system must be provided before or after the heater element.
For coolers with connections on the inside, an empty element for the pipework system must be provided before the cooler element.
Minimum length of drain element l_{min} = 580 mm.

KGW			40	63	100	160	250
Fan element	suction-side	a x b	400 x 400	530 x 360	700 x 530	860 x 690	1110 x 770
		c	155	260	255	300	435
		d	735	840	835	300	435
	pressure-side	a x b	338 x 338	411 x 411	503 x 503	619 x 619	765 x 765
		c	186	234.5	268.5	335.5	437.5
		d	766	814.5	848.5	33.5	437.5
Mixing and filter element	suction/ pressure-side	a x b	338 x 338	530 x 360	700 x 530	860 x 690	1110 x 770
		e	240	260	255	300	435
Exhaust air el.	suction/ pressure-side	a x b	338 x 338	530 x 360	700 x 530	860 x 690	1110 x 770
		e	90	90	90	90	90

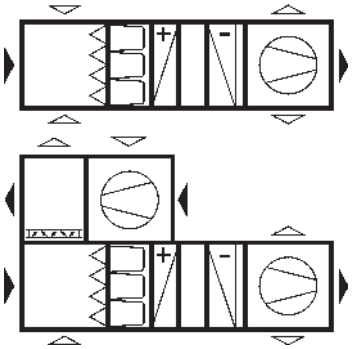
Dimensions in [mm]

Arrangement of equipment:

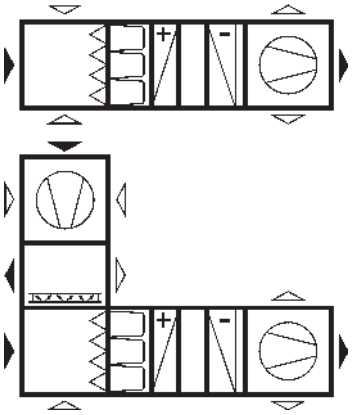
horizontal



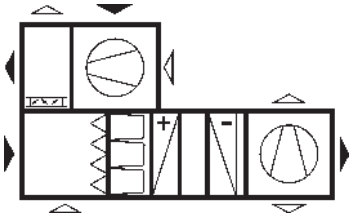
horizontal side by side



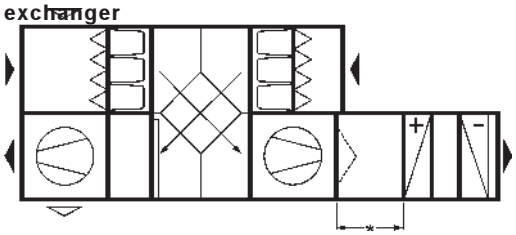
horizontal, angled



horizontal one above the other

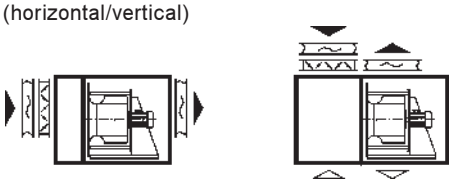


horizontal, one above the other, with crossflow heat exchanger



Arrangement of equipment with free-running fan wheel:

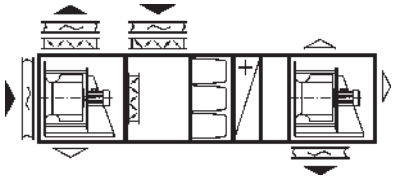
Withdrawn air device
(horizontal/vertical)



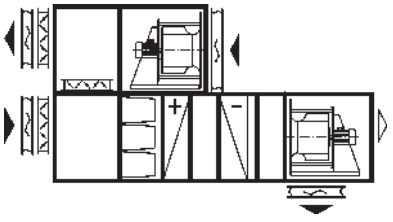
Supply air device

Partial air conditioner

Combined supply and withdrawn air device



Combined partial air conditioner
Arrangement of equipment on top of each other or side by side



* If components are located after the fan element, which require a uniform incident flow (heat exchanger, filter, etc.), then an empty element with flow distributor must be attached on the fan exit.

For inspection purposes, it is recommended to provide empty elements that permit access to the installed elements from both sides.

Required empty element length [mm]

KG RAL	40	63	100	160	250
Empty el.length	380	380	380	580	580

Fan element

L 1080
W 710
H 710

L 710
W 710
H 710

Heater element

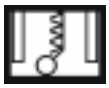
* with extractable frost protection frame L = 580

L 380
W 710
H 710

Cooling element

L 580
W 710
H 710

Washer element



L 1000
W 710
H 960

Mixing and filter element

L 710
W 710
H 710

Mixing and exhaust air element

L 540
W 710
H 710

Sleeve filter element

L 710
W 710
H 710

Silencer element

L ....
W 710
H 710

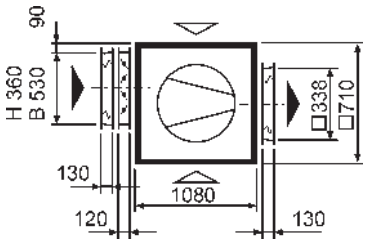
Empty element / vapour humidifier empty element

L ....
W 710
H 710

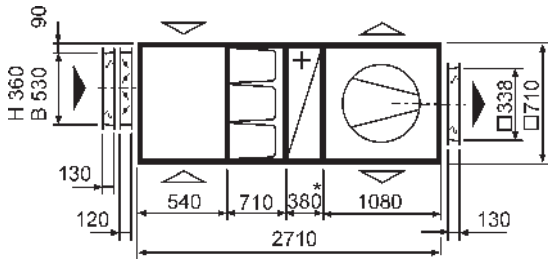
KGX

L 710
B 710
H 710

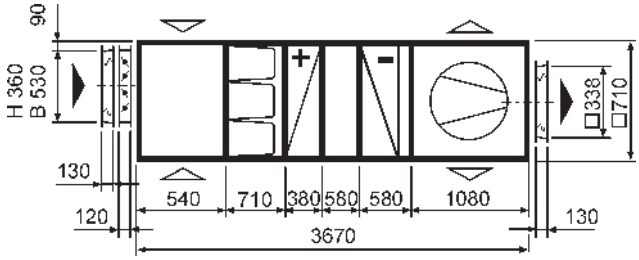
Withdrawn air device



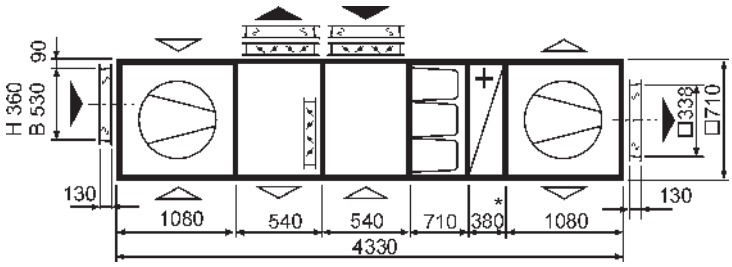
Supply air device



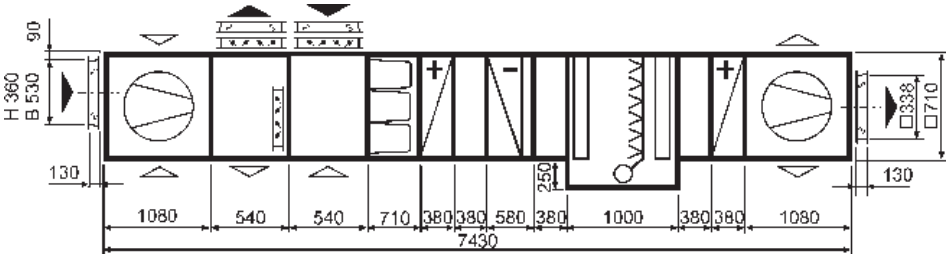
Partial air conditioner

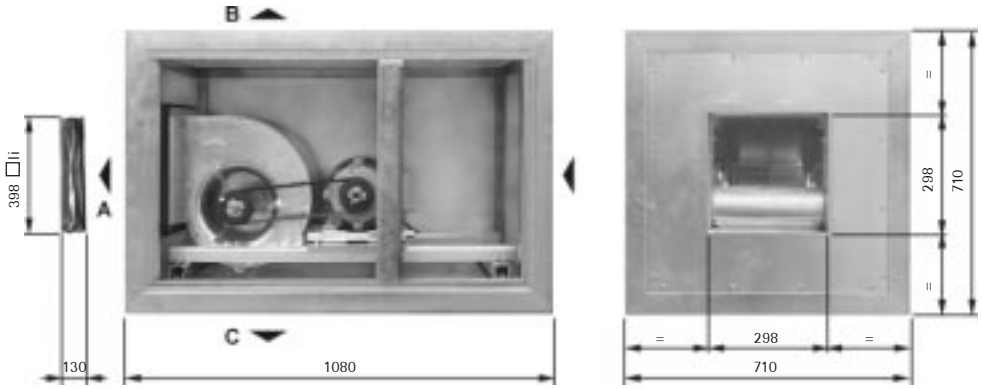


Combined supply and withdrawn air device



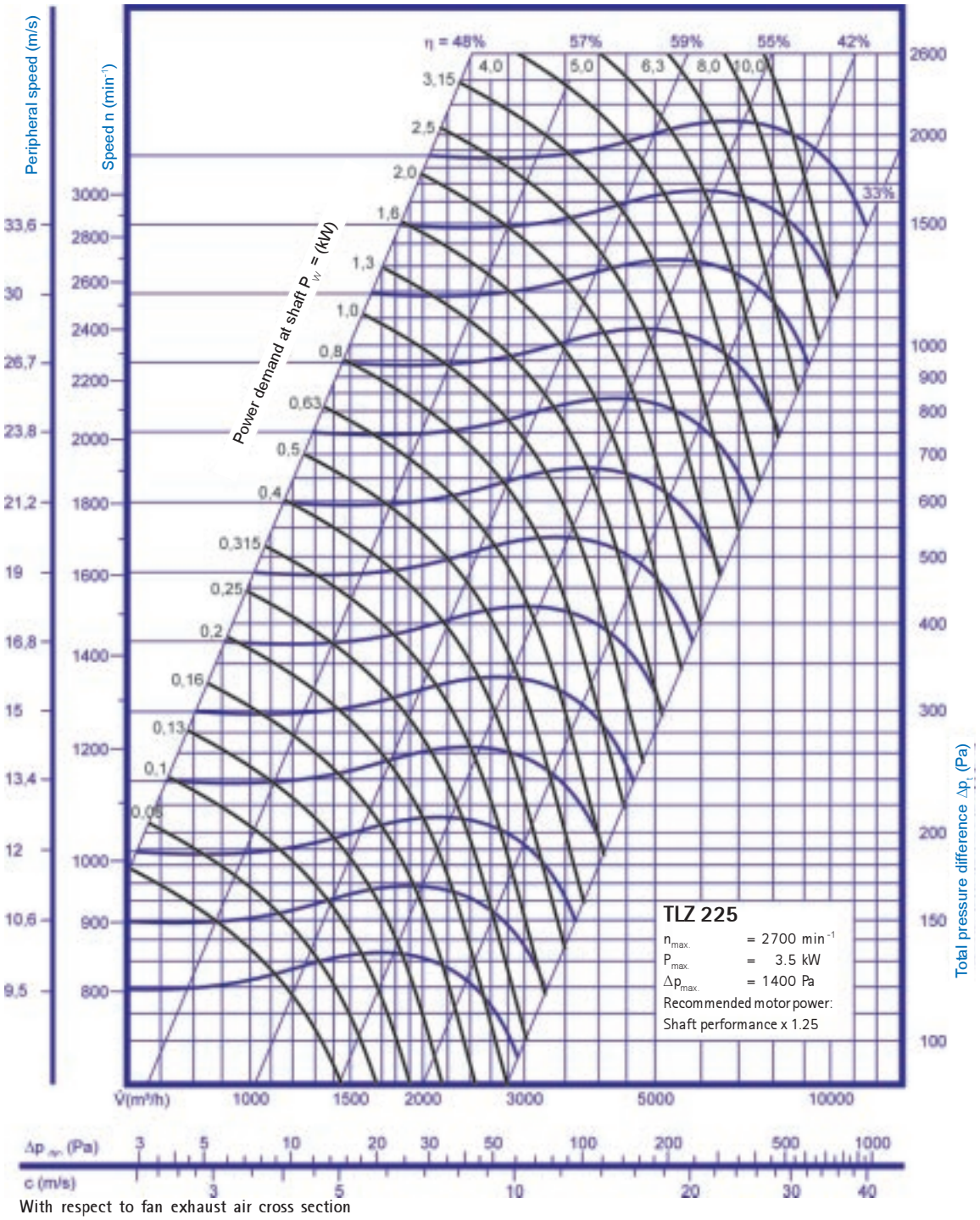
Combined climate control, supply and withdrawn air device





Fan diagram

Forward rotor blades permissible for motor output up to 2.2 kW



With respect to fan exhaust air cross section

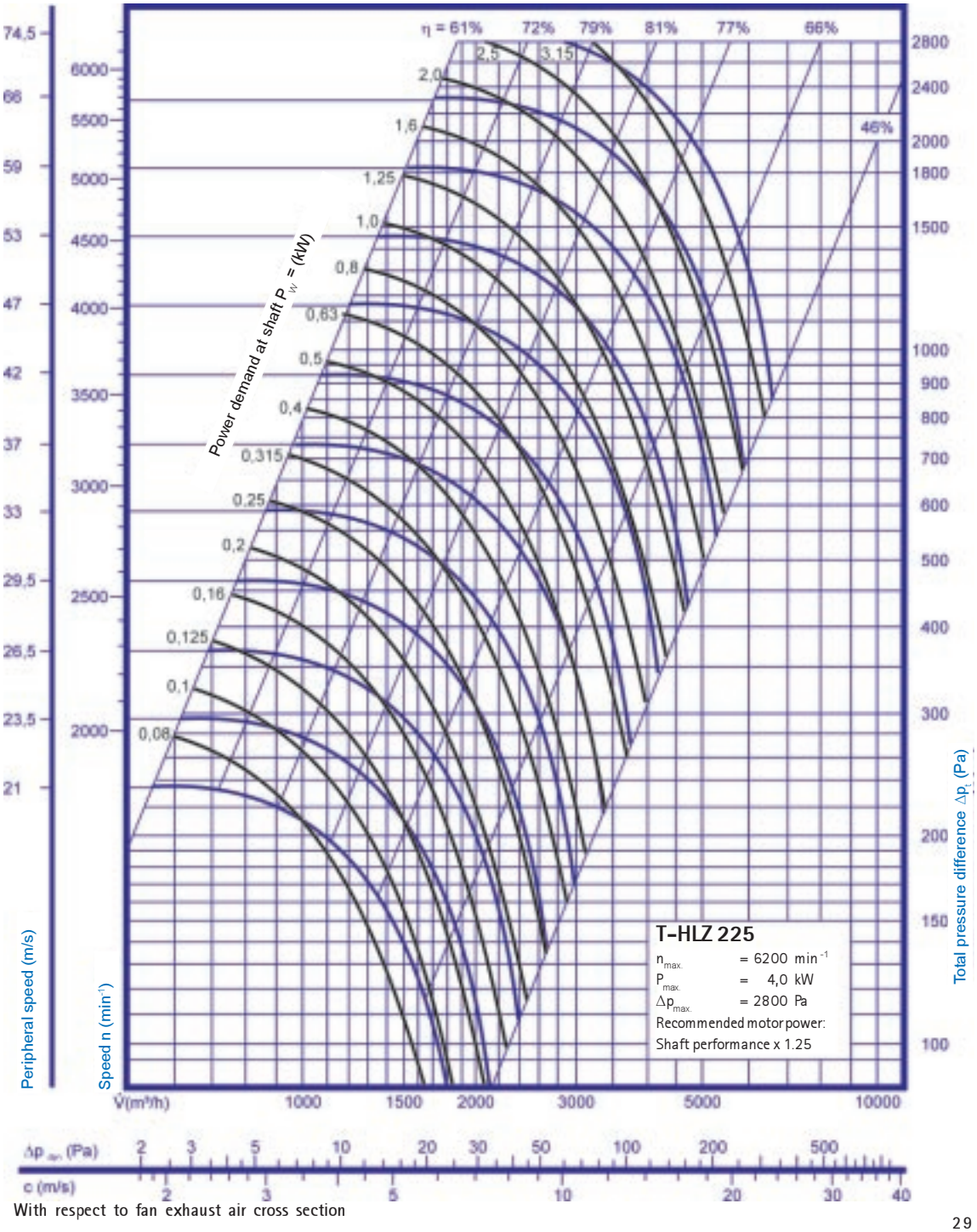
Exhaust variation: A, B, C

Fan/motor: Base frame design with motor tension carriage, vibration absorber and belt protection. Elastic connection between fan exhaust and casing
Flaps on the inside not possible

Inspection door: in air direction right, left, top, if desired bottom, with turn locks

Fan diagram

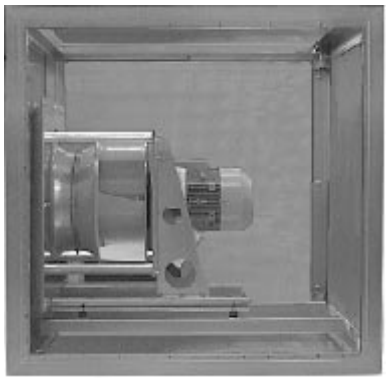
Backward rotor blades



With respect to fan exhaust air cross section

Free-running fan wheel KG 40 RAL

Description



Free-running fan wheel, unidirectional suction, with backward rotor blades, attached directly to the motor shaft.

Complete unit mounted on sturdy base frame with flexible vibration absorbers.

Rotor wheel statically and dynamically balanced. Complete motor protection with built-in PTC thermistors.

High fan efficiency even at low speed, almost without dynamic pressure ratios.

In connection with frequency converter, accurate adaptation to unit characteristics is possible.

Economical and energy-saving operation even under partial load conditions.

Low maintenance costs, no drive belt losses, no retightening required.

External pressure drops

Customer specification of the installation side pressure drops (e.g. duct system).

Internal pressure drops

The pressure drops of all components with respect to the volume flow (also fan element) are listed in the pressure drop tables of the individual chapters.
For components on the pressure-side, neither flow distributors nor incident flow elements are required, since the exhaust flows through the entire cross section.

Dynamic pressure drops

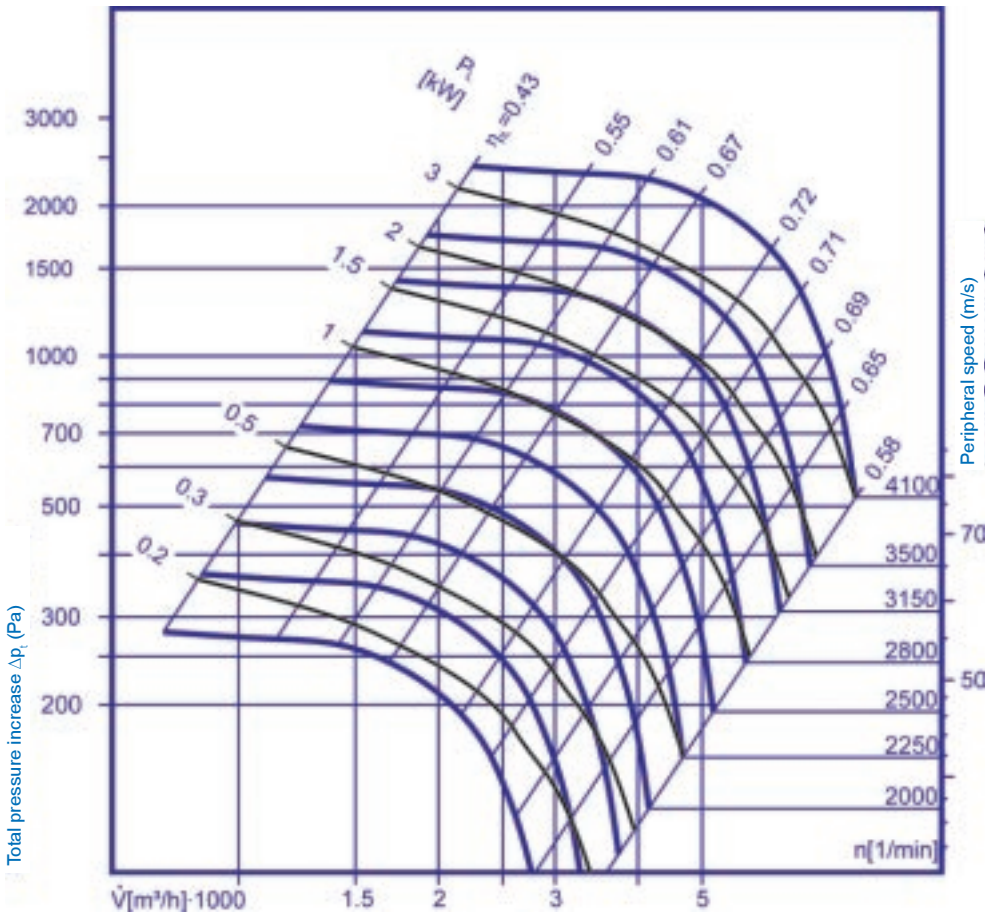
The dynamic pressure portions do not have to be considered in planning.

Performance data

KG size	Max. air volume m^3/h	Total pressure increase to Pa	Operational data* Fan power kW	Operational data* Fan speed min^{-1}	Standard data* Motor power kW	Standard data* Motor speed min^{-1}	Standard data* Motor current A
KG 40	4000	500	0.86	2427	1.50	3000	3.40
		1000	1.73	2987	2.20	3000	4.65
		1500	2.70	3472	3.00	3000	6.10

* Fan speed is controlled by frequency converter (f ≥ 50Hz)

Fan diagram
Rotor wheel Ø 355mm



Total sound power level L_W in [dB]

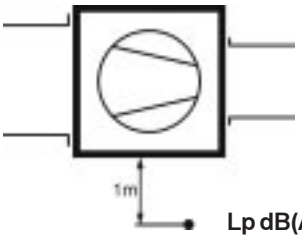
The accurate, device-specific sound data can be determined only for the specific order.

L_w [dB] = the computational total sound power of the fan on the suction/pressure-side.

		Total pressure increase △p [Pa]					
	L_w	500	750	1000	1250	1500	2000
V̇ [m³/h]	2,000	87	91	93	95	97	99
	3,000	89	92	95	97	98	101
	4,000	90	94	96	98	100	102

Sound pressure level Lp dB(A)

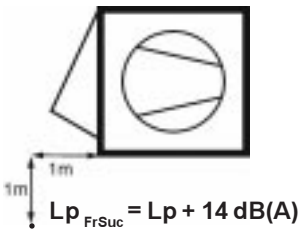
Lp dB(A) = sound pressure level at 1 m distance beside the fan element, measured in the free field with suction and pressure-side duct connection



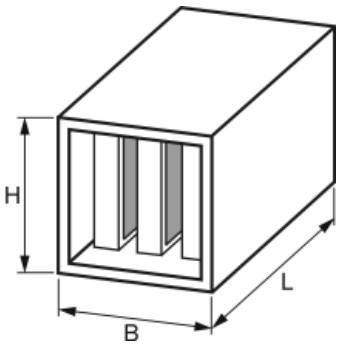
Forward rotor blades								
V̇ m³/h	n min⁻¹	Lp dB(A)	V̇ m³/h	n min⁻¹	Lp dB(A)	V̇ m³/h	n min⁻¹	Lp dB(A)
2,000	1120	41	3,000	1250	47	4,000	1400	53
	1400	45		1600	49		1800	54
	1800	51		2000	53		2240	56
	2240	56		2500	58		2800	61
Backward rotor blades								
V̇ m³/h	n min⁻¹	Lp dB(A)	V̇ m³/h	n min⁻¹	Lp dB(A)	V̇ m³/h	n min⁻¹	Lp dB(A)
2,000	2000	46	3,000	2800	46	4,000	3550	48
	2500	47		3550	54		4000	55
	3150	53		4000	58		4500	60
	4000	60		5000	62		5000	62
Free-running fan wheel Ø 355mm								
V̇ m³/h	n min⁻¹	Lp dB(A)	V̇ m³/h	n min⁻¹	Lp dB(A)	V̇ m³/h	n min⁻¹	Lp dB(A)
2,000	1900	47	3,000	2100	49	4,000	2375	50
	2350	51		2500	52		2750	54
	2650	53		2750	55		2900	56
	3300	57		3300	58		3400	60

Sound pressure level Lp dB(A) beside the fan element

With free suction or exhaust opening



Silencer element



Dimensions (mm)

Height H	Width W	Length L			
		Type 2	Type 3	Type 4	Type 5
710	710	880	1080	1330	1680

Insertion loss De dB(A)

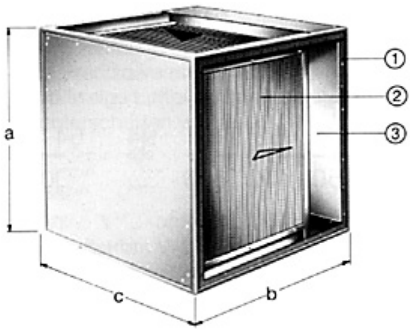
Type	Octave band (Hz)							
	63	125	250	500	1000	2000	4000	8000
2	6	12	20	20	22	16	12	11
3	7	14	24	25	26	20	14	13
4	8	17	30	32	34	25	18	17
5	9	21	37	37	41	29	21	19

For series connection of 2 silencers: $De = De_1 + De_2 - 3$ dB(A)

The accurate, device-specific heat recovery data can be determined only for the specific order.

Description KGX/KGXD

KGX air circulation horizontally/ vertically
KGXD air circulation diagonally



Hot air and cold air are led past each other in the cross current.

The heat recovery takes place via heat transmission from the hot to the cold air flow. The air flows are completely separated by aluminium plates.

- Heat recovery of up to over 80 %
- no moisture transmission
- no mobile parts, corrosion-resistant

① **Casing**
Design same as air conditioner

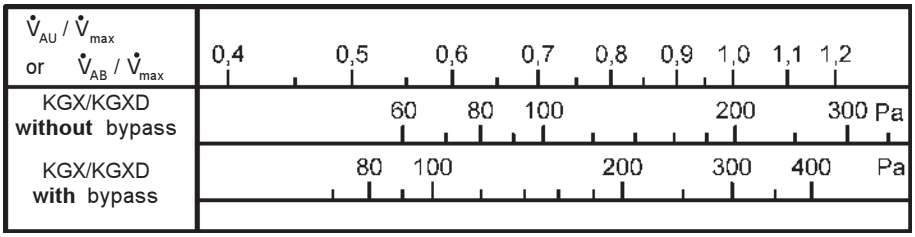
② **Heat exchanger**
Heat exchanger surfaces made of special corrosion-resistant aluminium plates.

③ **Internal bypass** (on request)
In order to prevent rime on the heat exchanger surfaces, the outside air can partially or entirely pass by the heat exchanger in the internal bypass.

Type	max. volume flow $\dot{V}$ [m³/h]		Dimensions [mm]			Weight [kg]	Condensate connector
	without int. bypass	with int. bypass	a	b	c		R"
KGX 40	2,800	3,100	710	710	710	120	-
KGXD 40	2,800	3,100	710	710	1040	215	1 ¼"

Pressure drop Δp [Pa]

for KGX/KGXD
with or without internal bypass



Description RWT

RWT air circulation horizontally/vertically

A rotating storage capacity takes up heat from the withdrawn air stream and emits it to the outside air stream.

- Heat recovery of up to 80 %.
- Simple power control by adjusting the speed.
- With suitable rotor material, humidification of the supply air.
- Rime protection, defrosting device, pre-heating of air not required.
- Easy maintenance through inspection doors in the air incident flow elements.

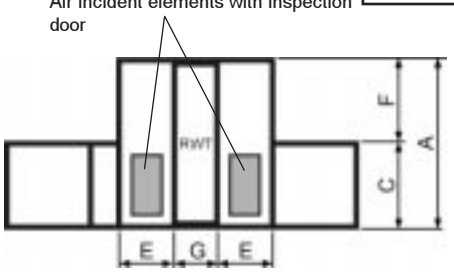
Pressure drop Δp [Pa]

Volume flow V [m³/h]	1,500	2,000	2,500	3,000	3,500	4,000
Pressure drop Δp [Pa]	49	66	83	100	115	130

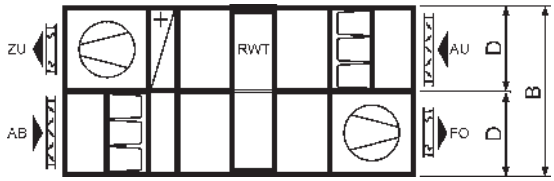
Dimensions

KG	A	B	C	D	E	F	G
40	1040	1420	710	710	330	580	400

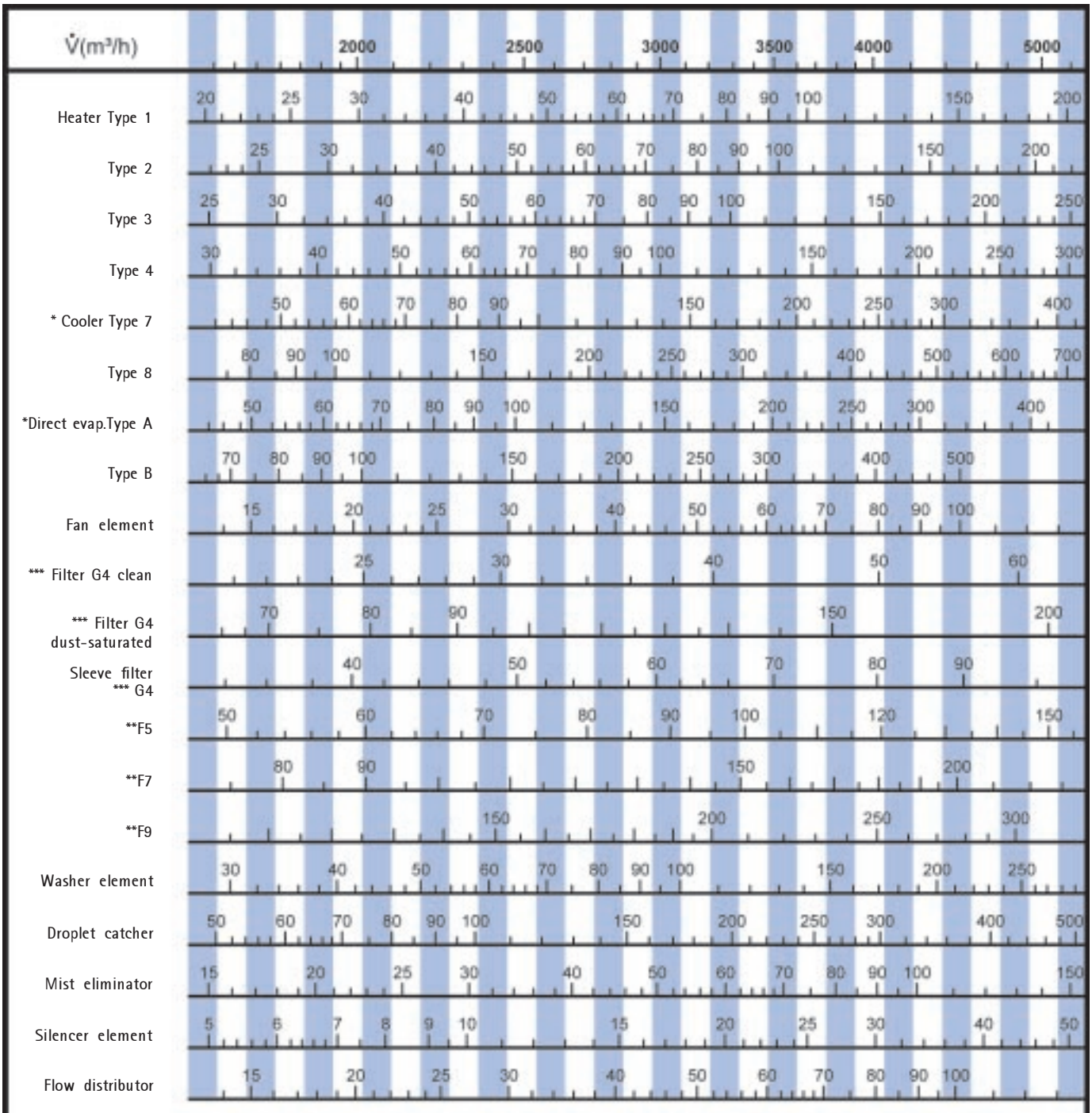
Front view



Top view



Pressure drops (Pa)



**** Design sleeve filter F5 to F9:**

$$\left(\frac{\text{Start pressure difference + Final pressure difference}}{2}\right)$$

***** Design filter G4, G4 clean, sleeve filter G4**

Start pressure difference + 50 Pa
These filters may be used only as additional pre-filters.

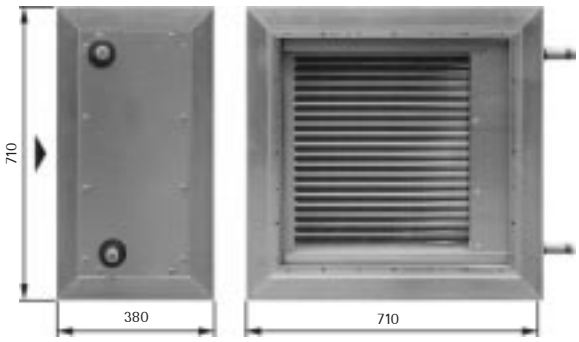
Final pressure differences:

Sleeve filter F5 = 200 Pa
Sleeve filter F7 = 200 Pa
Sleeve filter F9 = 300 Pa

* Add pressure drop from mist eliminator

Heater element KG 40 RAL

Heat exchanger for warm pump water PWW



Connections: in air direction right or left

Equipment:

Heat exchanger with Cu pipes and aluminium lamellas, collecting tank made of steel

Type	Connections	Water content
1	¾"	1.0 l
2	1"	1.5 l
3	1"	2.0 l
4	1"	2.5 l

permissible operating pressure: 16 bar
Test pressure 30 bar

on request:

Heat exchanger with Cu pipes and corrosion-resistant aluminium lamellas
Heat exchanger with Cu pipes and Cu lamellas
Heat exchanger made of steel - galvanised
Heat exchanger for steam
Heat exchanger for hot oil
Heat exchanger with bleed and drain connectors

Note:

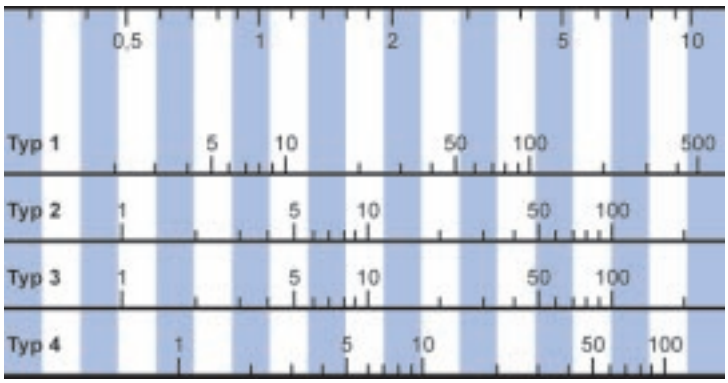
Allow for sufficient room for extraction of the heat exchanger.

Water resistance max. 20kPa

Quantity of water $w = \frac{0{,}86 \cdot \dot{Q}}{\Delta t_W}$ (m³/h)

$\dot{Q}$ = Power in kW
$\Delta t_w = t_{WI} - t_{WO}$

Quantity of water w (m³/h)



Type		1							
V̇ (m³/h)		1 600		2 400		3 200		4 000	
t_{WI} / t_{WO} °C / °C	t_{AI} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C
45/35	- 15	12.7	6	16.2	3	19.1	1	21.6	-1
	- 10	11.4	9	14.4	6	17.0	4	19.3	3
	- 5	10.1	12	12.8	10	15.0	8	17.0	7
	± 0	8.8	15	11.1	13	13.0	11	14.8	10
	+ 5	7.5	18	9.4	16	11.1	15	12.6	14
	+ 10	6.2	21	7.8	19	9.2	18	10.4	18
	+ 15	5.0	24	6.2	23	7.3	22	8.2	21
	+ 20	3.7	27	4.7	26	5.4	25	6.1	25
50/40	- 15	14.1	8	17.9	5	21.1	2	24.0	1
	- 10	12.7	11	16.1	8	19.1	6	21.7	5
	- 5	11.4	15	14.4	12	17.0	10	19.3	8
	± 0	10.1	18	12.8	15	15.1	13	17.1	12
	+ 5	8.8	21	11.1	18	13.1	17	14.8	16
	+ 10	7.5	24	9.5	21	11.1	20	12.6	19
	+ 15	6.2	27	7.9	25	9.2	24	10.5	23
	+ 20	5.0	29	6.3	28	7.4	27	8.3	26
60/40	- 15	14.3	9	18.0	5	21.2	3	24.0	1
	- 10	12.9	12	16.3	8	19.2	6	21.7	5
	- 5	11.6	15	14.6	12	17.2	10	19.4	8
	± 0	10.3	18	12.9	15	15.2	13	17.1	12
	+ 5	9.0	21	11.3	18	13.2	17	14.9	16
	+ 10	7.7	24	9.7	22	11.3	20	12.7	19
	+ 15	6.5	27	8.1	25	9.4	24	10.6	23
	+ 20	5.2	30	6.5	28	7.5	27	8.5	26
70/50	- 15	17.0	13	21.5	9	25.4	6	28.8	4
	- 10	15.6	16	19.8	12	23.3	10	26.4	8
	- 5	14.3	20	18.1	16	21.3	13	24.1	12
	± 0	13.0	23	16.4	19	19.3	17	21.8	15
	+ 5	11.7	26	14.7	23	17.3	20	19.6	19
	+ 10	10.4	29	13.1	26	15.3	24	17.3	23
	+ 15	9.1	32	11.4	29	13.4	27	15.2	26
	+ 20	7.8	35	9.8	32	11.5	31	13.0	30
70/55	- 15	18.2	15	23.1	11	27.3	8	31.0	6
	- 10	16.8	18	21.3	14	25.2	11	28.6	9
	- 5	15.4	22	19.6	18	23.2	15	26.3	13
	± 0	14.1	25	17.9	21	21.1	19	24.0	17
	+ 5	12.8	28	16.2	24	19.1	22	21.7	21
	+ 10	11.5	31	14.6	28	17.2	26	19.5	24
	+ 15	10.2	34	12.9	31	15.2	29	17.2	28
	+ 20	8.9	37	11.3	34	13.3	33	15.1	31
80/50	- 15	17.3	14	21.9	9	25.7	6	29.1	4
	- 10	16.0	17	20.2	13	23.7	10	26.8	8
	- 5	14.6	20	18.4	16	21.6	14	24.5	12
	± 0	13.3	23	16.8	20	19.6	17	22.2	16
	+ 5	12.0	26	15.1	23	17.7	21	19.9	19
	+ 10	10.7	29	13.4	26	15.7	24	17.7	23
	+ 15	9.4	32	11.8	30	13.8	28	15.5	26
	+ 20	8.2	35	10.2	33	11.9	31	13.3	30
80/60	- 15	19.7	18	25.0	13	29.5	9	33.5	7
	- 10	18.3	21	23.2	16	27.4	13	31.1	11
	- 5	16.9	24	21.5	20	25.4	17	28.8	15
	± 0	15.6	27	19.8	23	23.3	20	26.5	19
	+ 5	14.3	30	18.1	27	21.3	24	24.2	22
	+ 10	13.0	34	16.4	30	19.3	28	21.9	26
	+ 15	11.7	37	14.8	33	17.4	31	19.7	30
	+ 20	10.4	40	13.1	36	15.4	35	17.5	33
90/70	- 15	22.3	22	28.4	16	33.6	13	38.2	10
	- 10	20.9	25	26.6	20	31.5	17	35.8	14
	- 5	19.5	29	24.9	24	29.4	20	33.4	18
	± 0	18.2	32	23.1	27	27.3	24	31.0	22
	+ 5	16.8	35	21.4	30	25.3	28	28.7	26
	+ 10	15.5	38	19.7	34	23.3	31	26.4	29
	+ 15	14.2	41	18.1	37	21.3	35	24.2	33
	+ 20	12.9	44	16.4	41	19.3	38	21.9	37

Other operating conditions on request!

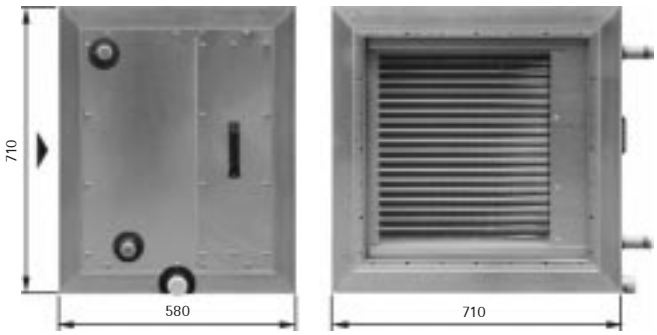
	2								3								4							
	1 600		2 400		3 200		4 000		1 600		2 400		3 200		4 000		1 600		2 400		3 200		4 000	
	$\dot{Q}$ kW	t_{AI} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C
	15.2	10	19.5	7	23.1	4	26.4	3	20.3	19	26.9	15	32.5	12	37.6	10	24.0	25	32.5	21	40.0	18	46.7	16
	13.6	13	17.4	10	20.7	7	23.6	6	18.3	21	24.1	17	29.2	15	33.7	13	21.6	26	29.2	23	35.9	20	41.9	18
	12.0	16	15.4	13	18.3	11	20.8	9	16.2	23	21.4	20	25.8	17	29.8	16	19.2	28	25.9	25	31.8	22	37.1	21
	10.5	18	13.4	16	15.9	14	18.1	13	14.2	25	18.7	22	22.6	20	26.0	18	16.8	30	22.7	27	27.8	24	32.4	23
	8.9	21	11.4	19	13.5	17	15.4	16	12.2	27	16.0	24	19.3	22	22.3	21	14.5	31	19.5	28	23.8	26	27.8	25
	7.4	23	9.5	21	11.2	20	12.7	19	10.2	29	13.4	26	16.1	25	18.6	23	12.2	32	16.3	30	20.0	28	23.2	27
	5.9	26	7.5	24	8.9	23	10.1	22	8.3	30	10.8	28	13.0	27	14.9	26	9.9	33	13.2	31	16.1	30	18.7	29
	4.5	28	5.7	27	6.6	26	7.5	26	6.4	32	8.2	30	9.9	29	11.3	28	7.7	34	10.1	33	12.3	32	14.2	31
	16.7	13	21.5	9	25.6	6	29.2	4	22.3	22	29.6	18	35.8	15	41.4	12	26.2	28	35.6	24	43.9	21	51.4	19
	15.1	16	19.4	12	23.1	10	26.4	8	20.2	24	26.8	20	32.4	17	37.5	15	23.8	30	32.3	26	39.8	24	46.5	21
	13.5	18	17.4	15	20.7	13	23.6	11	18.2	26	24.0	23	29.1	20	33.6	18	21.4	32	29.0	28	35.7	26	41.7	24
	12.0	21	15.4	18	18.3	16	20.8	15	16.1	28	21.3	25	25.8	23	29.8	21	19.1	33	25.8	30	31.7	28	37.0	26
	10.5	24	13.4	21	15.9	19	18.1	18	14.1	30	18.7	27	22.5	25	26.0	24	16.7	35	22.6	32	27.7	30	32.3	28
	8.9	26	11.4	24	13.6	22	15.4	21	12.2	32	16.0	29	19.3	28	22.3	26	14.4	36	19.4	34	23.8	32	27.7	30
	7.5	29	9.5	27	11.2	25	12.8	24	10.2	34	13.4	32	16.2	30	18.6	29	12.2	37	16.3	35	19.9	33	23.2	32
	6.0	31	7.6	30	9.0	28	10.2	28	8.3	36	10.8	34	13.0	32	15.0	31	9.9	39	13.2	37	16.1	35	18.7	34
	17.0	13	21.8	9	25.8	6	29.3	4	23.3	24	30.6	19	36.9	16	42.5	13	27.6	31	37.2	26	45.5	23	53.0	20
	15.4	16	19.7	12	23.3	10	26.5	8	21.2	26	27.8	21	33.5	18	38.5	16	25.2	33	33.8	28	41.4	25	48.2	23
	13.9	19	17.7	15	20.9	13	23.8	11	19.1	28	25.0	24	30.1	21	34.7	19	22.8	34	30.5	30	37.3	27	43.4	25
	12.3	22	15.7	18	18.5	16	21.0	15	17.1	30	22.3	26	26.8	24	30.8	22	20.4	36	27.3	32	33.3	29	38.6	27
	10.8	24	13.7	21	16.2	19	18.3	18	15.1	32	19.7	28	23.6	26	27.1	24	18.0	37	24.1	34	29.3	31	33.9	29
	9.3	27	11.7	24	13.8	23	15.7	21	13.1	34	17.0	31	20.4	29	23.3	27	15.7	39	20.9	35	25.3	33	29.3	31
	7.8	29	9.8	27	11.5	26	13.0	25	11.1	36	14.4	33	17.2	31	19.6	30	13.4	40	17.7	37	21.4	35	24.7	33
	6.3	32	7.9	30	9.2	29	10.4	28	9.1	37	11.8	35	14.0	33	16.0	32	11.0	41	14.5	38	17.5	36	20.2	35
	20.2	19	25.9	14	30.8	11	35.1	8	27.3	30	36.0	25	43.5	21	50.3	18	32.1	38	43.5	33	53.5	29	62.5	26
	18.6	21	23.9	17	28.3	14	32.3	12	25.2	32	33.2	27	40.1	24	46.3	21	29.7	40	40.2	35	49.3	32	57.6	29
	17.0	24	21.8	20	25.9	17	29.5	15	23.1	35	30.4	30	36.7	27	42.4	24	27.3	42	36.9	37	45.2	34	52.7	31
	15.5	27	19.8	23	23.4	21	26.7	19	21.0	37	27.7	32	33.4	29	38.5	27	24.9	44	33.6	39	41.2	36	48.0	34
	13.9	30	17.8	26	21.0	24	23.9	22	19.0	39	25.0	35	30.1	32	34.7	30	22.6	45	30.4	41	37.2	38	43.3	36
	12.4	33	15.8	29	18.7	27	21.2	25	17.0	41	22.3	37	26.9	34	30.9	32	20.3	47	27.2	43	33.2	40	38.6	38
	10.9	35	13.8	32	16.3	30	18.6	29	15.1	43	19.7	39	23.7	37	27.2	35	18.0	48	24.0	45	29.3	42	34.0	40
	9.4	38	11.9	35	14.0	33	15.9	32	13.1	45	17.1	41	20.5	39	23.5	38	15.7	49	20.9	46	25.4	44	29.5	42
	21.6	21	27.8	16	33.1	12	37.8	10	28.6	33	38.0	27	46.1	23	53.4	20	33.6	41	45.7	36	56.4	32	66.1	29
	19.9	24	25.7	19	30.6	16	34.9	14	26.5	35	35.2	30	42.7	26	49.4	23	31.1	43	42.3	38	52.2	34	61.1	31
	18.3	27	23.6	22	28.1	19	32.1	17	24.5	37	32.4	32	39.3	29	45.4	26	28.7	45	39.0	40	48.1	36	56.3	34
	16.8	29	21.6	25	25.6	23	29.3	21	22.4	39	29.7	35	35.9	32	41.6	29	26.4	46	35.8	42	44.0	39	51.5	36
	15.2	32	19.5	28	23.2	26	26.5	24	20.4	41	27.0	37	32.7	34	37.7	32	24.0	48	32.6	44	40.0	41	46.8	38
	13.7	35	17.5	31	20.8	29	23.7	27	18.4	44	24.3	40	29.4	37	33.9	35	21.7	50	29.4	46	36.1	43	42.2	41
	12.2	38	15.6	34	18.5	32	21.0	31	16.4	45	21.7	42	26.2	39	30.2	37	19.4	51	26.2	47	32.2	45	37.6	43
	10.7	40	13.6	37	16.2	35	18.4	34	14.5	47	19.1	44	23.0	42	26.5	40	17.2	52	23.1	49	28.3	47	33.0	45
	20.7	19	26.5	14	31.3	11	35.6	9	28.3	32	37.2	26	44.9	22	51.7	19	33.6	41	45.3	35	55.4	31	64.5	28
	19.1	22	24.4	17	28.8	14	32.8	12	26.2	34	34.4	29	41.4	25	47.7	22	31.2	43	41.9	37	51.2	33	59.6	30
	17.5	25	22.3	21	26.4	18	30.0	16	24.2	37	31.6	31	38.1	28	43.8	25	28.8	45	38.6	39	47.1	36	54.7	33
	16.0	28	20.3	24	24.0	21	27.2	19	22.1	39	28.9	34	34.7	30	39.9	28	26.4	46	35.3	41	43.0	38	50.0	35
	14.4	31	18.3	27	21.6	24	24.5	22	20.1	41	26.2	36	31.4	33	36.1	31	24.0	48	32.0	43	39.0	40	45.2	37
	12.9	33	16.3	30	19.2	27	21.7	26	18.0	43	23.5	38	28.2	36	32.3	33	21.6	49	28.8	45	35.0	42	40.5	39
	11.3	36	14.3	33	16.9	31	19.1	29	16.0	45	20.8	41	24.9	38	28.5	36	19.3	51	25.6	47	31.0	44	35.9	42
	9.8	38	12.4	36	14.5	34	16.4	32	14.0	46	18.2	43	21.7	40	24.8	39	16.9	52	22.4	48	27.1	45	31.3	44
	23.3	24	30.1	18	35.8	15	40.8	12	31.1	37	41.3	31	50.0	26	57.9	23	36.5	46	49.7	40	61.2	36	71.7	33
	21.7	27	27.9	21	33.2	18	38.0	16	29.0	39	38.4	33	46.6	29	53.9	26	34.1	48	46.3	42	57.0	38	66.7	35
	20.1	30	25.9	25	30.8	21	35.1	19	26.9	41	35.7	36	43.2	32	49.9	29	31.7	50	43.0	44	52.9	41	61.9	38
	18.5	33	23.8	28	28.3	25	32.3	23	24.9	44	32.9	38	39.8	35	46.0	32	29.3	51	39.7	46	48.8	43	57.1	40
	17.0	35	21.8	31	25.9	28	29.5	26	22.9	46	30.2	41	36.5	38	42.2	35	26.9	53	36.5	48	44.8	45	52.4	42
	15.4	38	19.8	34	23.5	31	26.7	29	20.9	48	27.5	43	33.3	40	38.4	38	24.6	55	33.3	50	40.9	47	47.7	45
	13.9	41	17.8	37	21.1	35	24.0	33	18.9	50	24.9	46	30.0	43	34.6	41	22.3	56	30.1	52	36.9	49	43.1	47
	12.4	43	15.9	40	18.8	38	21.4	36	16.9	52	22.3	48	26.8	45	30.9	43	20.1	58	27.0	54	33.1	51	38.5	49
	26.4	29	34.1	23	40.6	19	46.5	16	34.9	43	46.4	36	56.4	32	65.4	28	40.7	53	55.6	46	68.8	42	80.7	38
	24.8	32	32.0	26	38.1	22	43.5	19	32.8	45	43.6	39	52.9	35	61.3	31	38.3	55	52.3	49	64.6	45	75.7	41
	23.2	35	29.9	29	35.6	26	40.6	23	30.7	48	40.8	42	49.5	38	57.3	34	35.9	57	48.9	51	60.4	47	70.8	44
	21.6	38	27.8	32	33.1	29	37.8	27	28.6	50	38.0	44	46.1	40	53.4	37	33.5	59	45.6	53	56.3	49	66.0	46
	20.0	41	25.7	36	30.6	32	35.0	30	26.6	53	35.3	47	42.8	43	49.5	40	31.2	61	42.4	55	52.3	52	61.2	49
	18.4	43	23.7	39	28.2	36	32.2	33	24.6	55	32.6	49	39.5	46	45.7	43	28.9	62	39.2	58	48.3	54	56.5	51
	16.9	46	21.7	42	25.8	39	29.5	37	22.6	57	29.9	52	36.3	49	41.9	46	26.6	64	36.1	59	44.4	56	51.9	53
	15.4	49	19.7	45	23.5	42	26.7	40	20.7	59	27.3	54	33.0	51	38.2	49	24.3	66	32.9	61	40.5	58	47.3	56

Cooling element

Performance tables KG 40 RAL

Exchanger for cold pump water PKW / direct evaporator

Performance data for direct evaporator for cooling agent R134a, for other cooling agents on request.



Air direction: horizontal:

Connections: in air direction right or left

Equipment:

Exchanger for cold water with Cu pipes and aluminium lamellas, collecting tank made of Cu.

Direct evaporator with Cu pipes and aluminium lamellas, cooling agent distributor.

Mist eliminator,
Condensate basin with condensate connector on side, male thread 1¼",
Droplet catcher for air direction vertical.

Type	Connections	Contents
7	1¼"	4.0 l
8	1¼"	7.5 l
A	DN 22 cooling agent inlet DN 28 cooling agent outlet	3.5 l
B	DN 22 cooling agent inlet DN 30 cooling agent outlet	5.0 l

permissible operating pressure: 16 bar
Test pressure 30 bar

on request:

Exchanger for cold water with Cu pipes
and corrosion-resistant aluminium lamellas
Exchanger for cold water with Cu pipes and Cu lamellas
Exchanger for cold water with bleed and drain connector

Note:

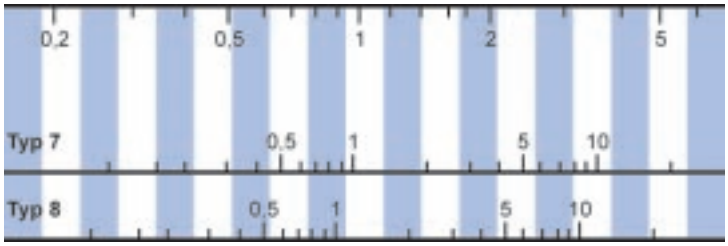
Allow for sufficient room for extraction of the exchanger.
Build in siphon on site with the condensate connector.

Water resistance max. 50kPa

Quantity of water $w = \frac{0.86 \cdot \dot{Q}}{\Delta t_W}$ (m³/h)

$\dot{Q}$ = Power in kW
$\Delta t_w = t_{WI} - t_{WO}$

Quantity of water w (m³/h)



$\dot{V}$ (m³/h)		1 600		2 400		3 200		4 000	
PKW	t_{AI} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C
		Exchanger for cold water Type 7							
4/8	32	15.7	11.9	21.2	13.7	26.1	15.0	30.5	16.0
	28	13.2	11.4	17.8	12.9	21.8	14.0	25.3	14.9
	26	11.6	10.8	15.7	12.2	19.2	13.2	22.3	14.0
	25	10.9	10.5	14.6	11.9	17.9	12.8	10.8	13.6
5/10	32	14.0	13.1	18.9	14.7	23.1	16.0	26.9	16.9
	28	11.5	12.6	15.4	14.0	18.8	15.0	21.8	15.8
	26	9.9	12.0	13.3	13.3	16.2	14.2	18.8	14.9
	25	9.2	11.7	12.3	12.9	15.0	13.8	17.4	14.4
6/12	32	12.2	14.1	16.4	15.7	20.1	16.8	23.3	17.7
	28	9.8	13.6	13.0	14.9	15.8	15.8	18.3	16.5
	26	8.2	13.0	10.9	14.1	13.3	14.9	15.3	15.6
	25	7.5	12.7	9.9	13.7	12.0	14.5	13.9	15.0
8/12	32	12.3	14.2	16.7	15.6	20.5	16.7	24.0	17.5
	28	9.8	13.7	13.2	14.8	16.2	15.7	18.9	16.4
	26	8.2	13.0	11.1	14.1	13.6	14.8	15.9	15.4
	25	7.4	12.7	10.0	13.7	12.3	14.4	14.3	14.9
		Type 8							
4/8	32	21.0	5.8	30.3	6.8	38.9	7.7	46.9	8.4
	28	18.1	5.9	25.9	6.8	33.4	7.6	40.0	8.3
	26	16.1	5.8	23.1	6.6	29.5	7.3	35.5	8.0
	25	15.1	5.8	21.7	6.6	27.7	7.2	33.3	7.8
5/10	32	19.4	7.1	27.8	8.1	35.5	8.9	42.7	9.7
	28	16.4	7.2	23.4	8.1	29.8	8.9	35.8	9.6
	26	14.4	7.1	20.5	7.9	26.1	8.6	31.3	9.2
	25	13.4	7.1	19.1	7.9	24.2	8.5	29.1	9.1
6/12	32	17.6	8.4	25.1	9.4	31.9	10.2	38.4	10.9
	28	14.6	8.5	20.7	9.4	26.3	10.1	31.4	10.8
	26	12.6	8.4	17.8	9.2	22.5	9.9	26.9	10.4
	25	11.6	8.4	16.3	9.1	20.6	9.7	24.6	10.3
8/12	32	16.6	9.4	23.9	10.2	30.6	10.9	37.0	11.4
	28	13.6	9.5	19.6	10.2	25.0	10.8	30.1	11.3
	26	11.6	9.4	16.6	10.0	21.2	10.5	25.6	10.9
	25	10.6	9.3	15.1	9.9	19.3	10.4	23.3	10.8
Ev. temp. °C		**Direct evaporator type A**							
2.0	32	15.2	12.0	19.0	14.5	21.8	16.3	23.9	17.7
	28	13.4	10.9	16.8	13.1	19.2	14.7	21.1	15.9
	26	12.2	10.2	15.2	12.3	17.4	13.8	19.1	14.9
	25	11.6	9.9	14.4	11.9	16.5	13.3	18.1	14.3
5.0	32	13.7	13.3	17.2	15.5	19.8	17.1	21.7	18.3
	28	11.8	12.2	14.9	14.2	17.1	15.6	18.8	16.6
	26	10.6	11.6	13.3	13.4	15.3	14.6	16.8	15.6
	25	10.0	11.3	12.5	12.9	14.3	14.2	15.8	15.1
8.0	32	11.8	14.7	14.9	16.6	17.2	18.0	18.9	19.1
	28	10.0	13.8	12.6	15.4	14.5	16.6	15.9	17.5
	26	8.7	13.1	11.0	14.6	12.6	15.7	13.9	16.5
	25	8.1	12.8	10.2	14.2	11.7	15.2	12.9	16.0
		Type B							
2.0	32	17.5	9.4	22.8	11.7	26.8	13.4	30.0	14.8
	28	15.5	8.7	20.1	10.7	23.7	12.2	26.4	13.4
	26	14.1	8.1	18.3	10.0	21.5	11.4	24.0	12.6
	25	13.4	7.9	17.4	9.7	20.4	11.0	22.8	12.1
5.0	32	15.7	11.0	20.5	13.0	24.2	14.5	27.2	15.7
	28	13.7	10.3	17.8	12.0	21.0	13.3	23.5	14.4
	26	12.2	9.8	15.9	11.4	18.7	12.6	21.0	13.5
	25	11.5	9.6	15.0	11.0	17.6	12.2	19.7	13.1
8.0	32	13.6	12.8	17.8	14.4	21.1	15.7	23.6	16.7
	28	11.5	12.1	15.0	13.5	17.7	14.6	19.9	15.5
	26	10.0	11.6	13.1	12.9	15.5	13.9	17.3	14.7
	25	9.3	11.4	12.2	12.6	14.3	13.5	16.1	14.3

Air inlet state: 32°C / 40 % r.h., 28°C / 47 % r.h.
26°C / 49 % r.h., 25°C / 50 % r.h.

Note: min. evaporation temperature 2°C.

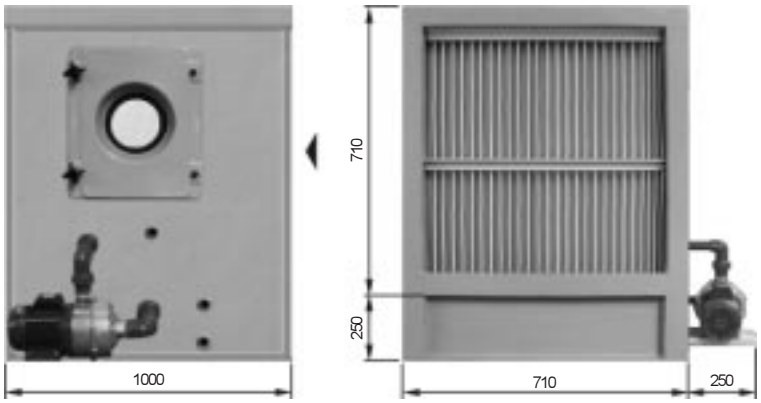
Other operating conditions on request.

Washer element

Casing
Plastic (glass fibre reinforced plastic)

Inspection door and connections
in air direction right or left

Equipment
Block pump 1.1 kW, 230/400 V, D/Y; 4.8/2.8 A, 50 Hz;
Stainless steel pump
Nozzle holder with self-cleaning nozzles spraying against air flow
Washer basin with all-round inclination towards the drain connector
Pump with complete piping on suction and pressure side



Inspection door with inspection window
Flow rectifier
Mist eliminator
} temperature-resistant to 70°C, dismantable

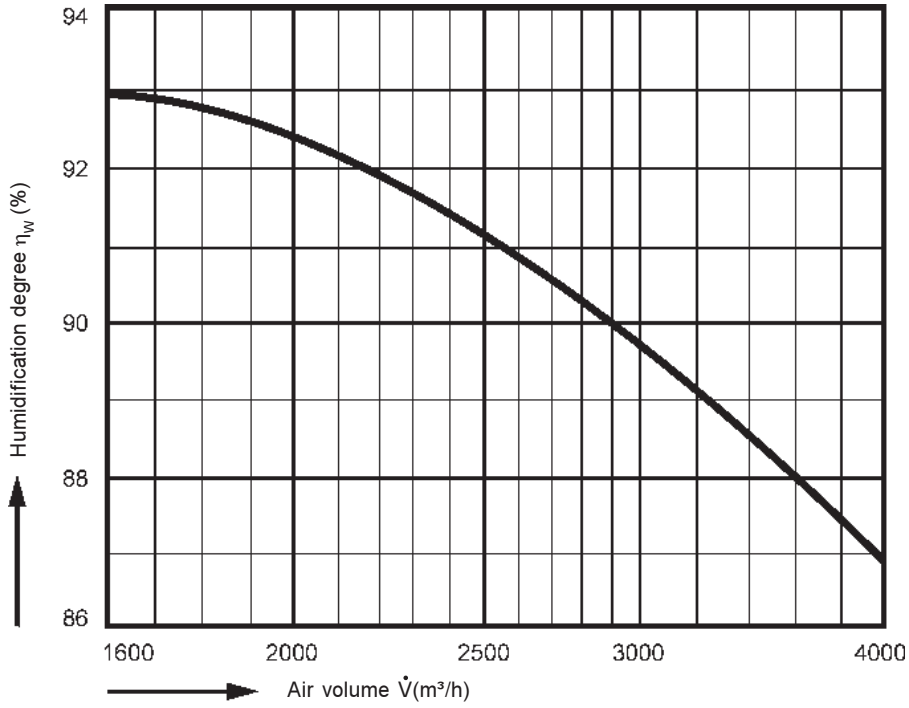
Inlet device, male thread 3/4", with float valve and float, overflow spout DN 40, outlet chute DN 40, dry-run protection for pump, de-sludging system, lighting 230 V / 60 W, darkening for inspection window.
On request:
Drain and overflow device with siphon on the inside, thermometer, pressure gauge

Humidification degree η_W

$$\eta_W = \frac{x_2 - x_1}{x_s - x_1}$$

x = water content of air
Index 1 = air inlet
2 = air outlet
S = saturation state

with air temperature 20°C, density 1.2 kg/m³, water pressure 2.6 bar, quantity of water 4000 l/h



Vapour humidifier element

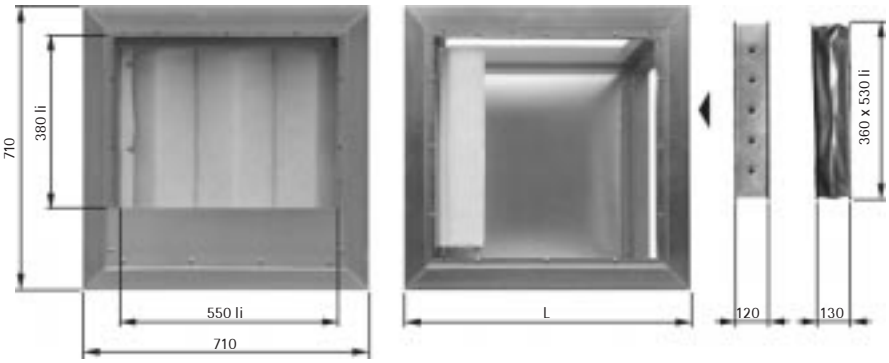
suitable for vapour lances of different manufacturers

Design:
- Humidifier chamber with basin made of corrosion-resistant material
- Inspection door
- Basin with drain 1¼" male thread made of corrosion-resistant material
- Lengths on request
- Inspection hole double-walled Ø 150mm
- Lighting

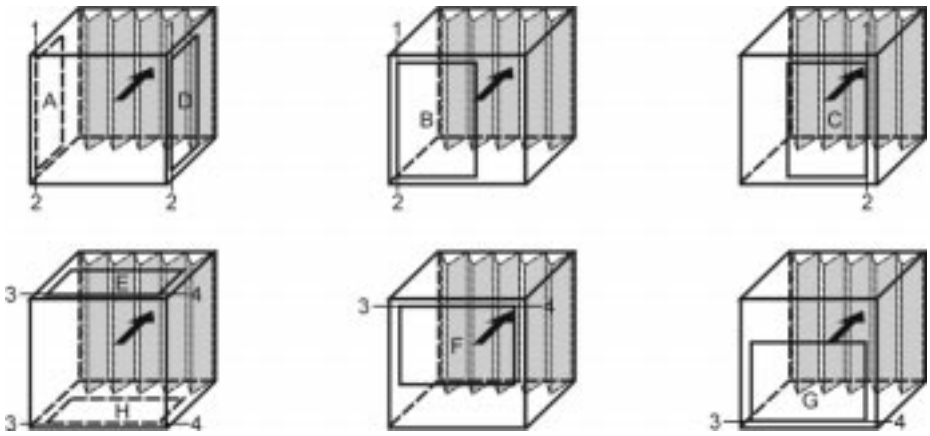
Connection and suction variations KG 40 RAL

Filter/air mixture element L = 710 mm
combined
Suction on operating side L = 1040mm

Air mixture element/exhaust air element
L = 580 mm



Suction variations:



One external flap		Two external flaps joined with linkage.	
Flap arrangement	Flap drive	Flap arrangement	Flap drive
A	1, 2	A + B	1, 2
B	1, 2	A + C	1, 2
C	1, 2	A + D	1, 2
D	1, 2	B + D	1, 2
E	3, 4	C + D	1, 2
F	3, 4	E + F	3, 4
G	3, 4	E + G	3, 4
H	3, 4	E + H	3, 4
		F + H	3, 4
		G + H	3, 4

One internal flap		Two internal flaps joined with linkage.	
Flap arrangement	Flap drive	Flap arrangement	Flap drive
A	1, 2	A + C	1, 2
B	1, 2	A + D	1, 2
C	1, 2	B + D	1, 2
D	1, 2	E + G	3, 4
E	3, 4	E + G	3, 4
F	3, 4	F + H	3, 4
G	3, 4		
H	3, 4		

Drive torque for 1 flap 3 Nm (airtight flap according to DIN 1946: 10 Nm)

Inspection door:

in air direction right, left, top, bottom
required space for filter extraction: min. 0.65 m
for air mixture element/exhaust air element inspection door only on request in air direction right/left

Fan element

L 1080
W 880
H 880

L 880
W 880
H 880

Heater element

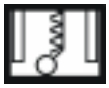
* with extractable frost protection frame L = 580

L 380
W 880
H 880

Cooling element

L 580
W 880
H 880

Washer element



L 1000
W 880
H 1130

Mixing and filter element

L 880
W 880
H 880

Mixing and exhaust air element

L 710
W 880
H 880

Sleeve filter element

L 880
W 880
H 880

Silencer element

L ....
W 880
H 880

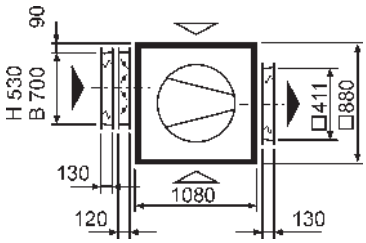
Empty element / vapour humidifier empty element

L ....
W 880
H 880

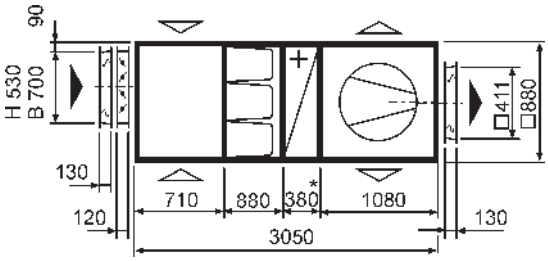
KGX

L 880
W 880
H 880

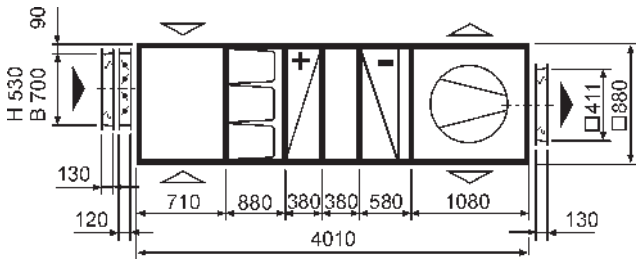
Withdrawn air device



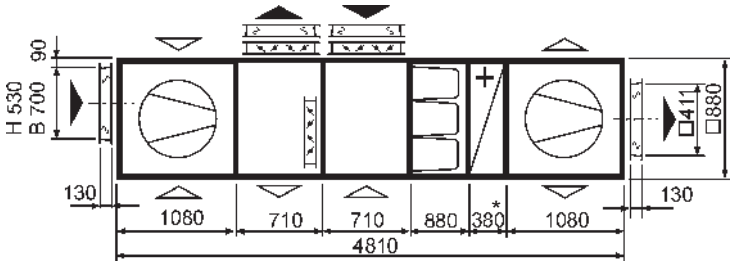
Supply air device



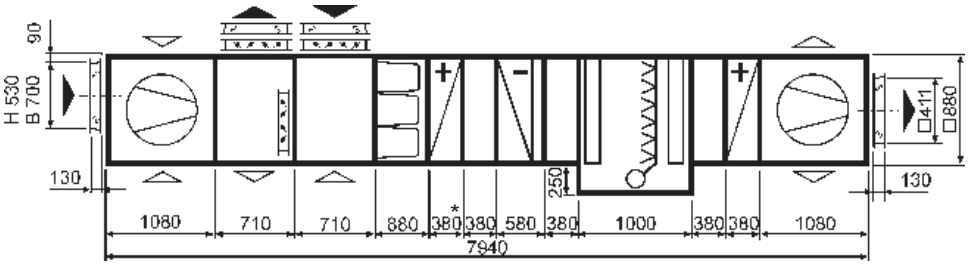
Partial air conditioner

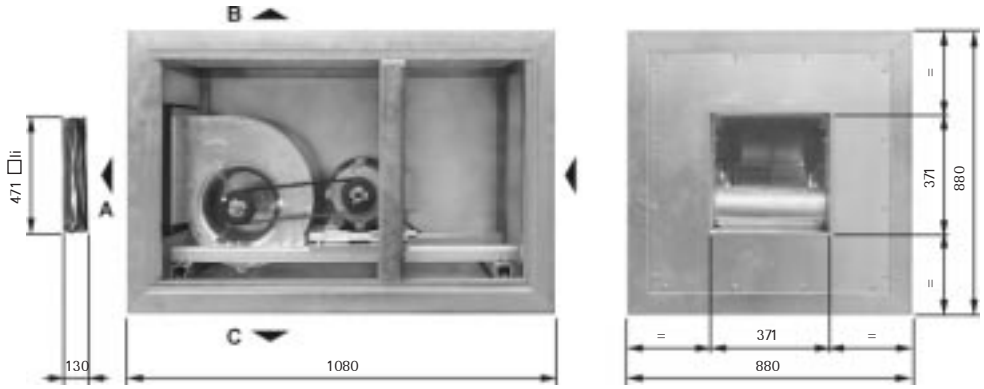


Combined supply and withdrawn air device



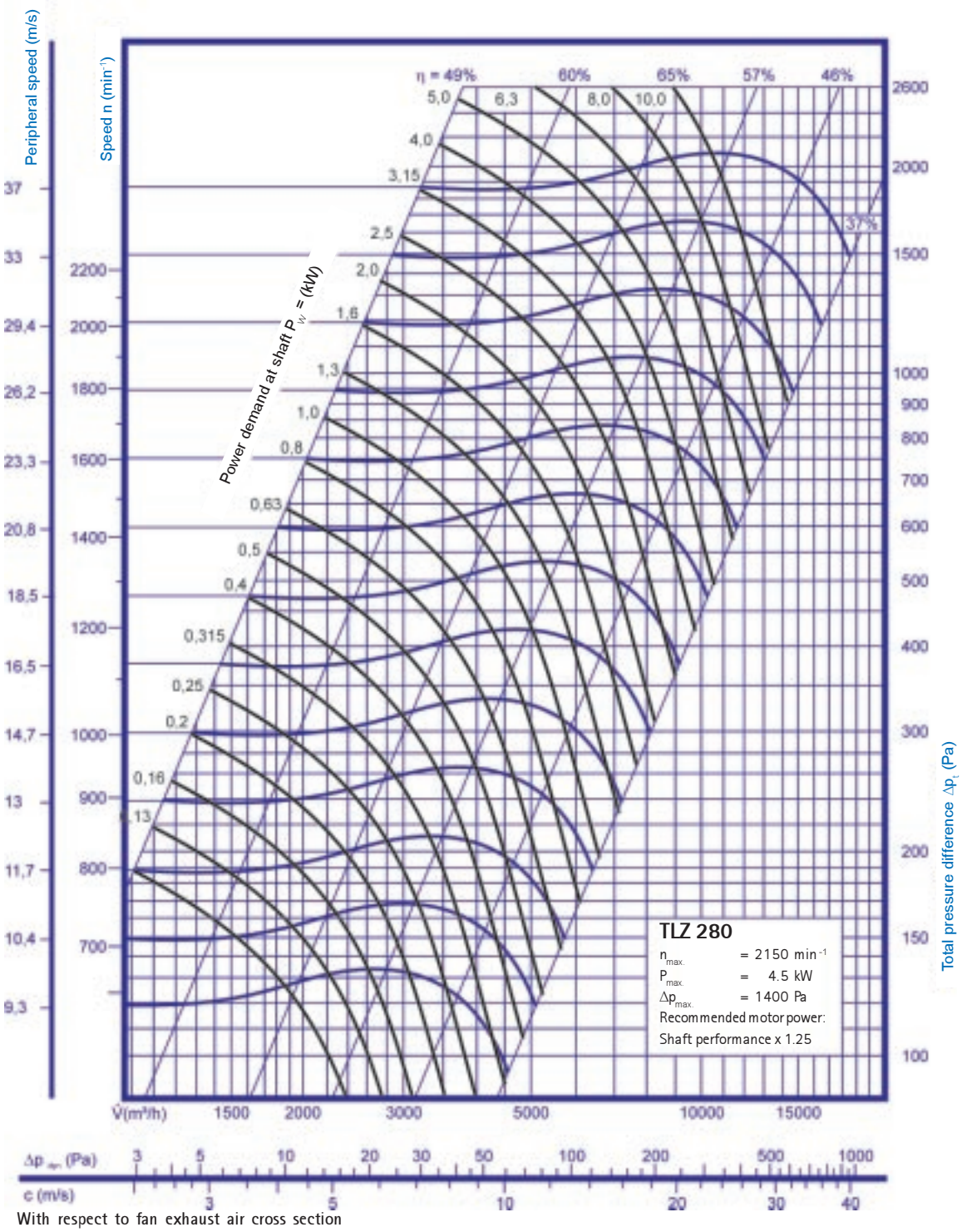
Combined climate control, supply and withdrawn air device





Fan diagram

Forward rotor blades permissible for motor output up to 2.2 kW



With respect to fan exhaust air cross section

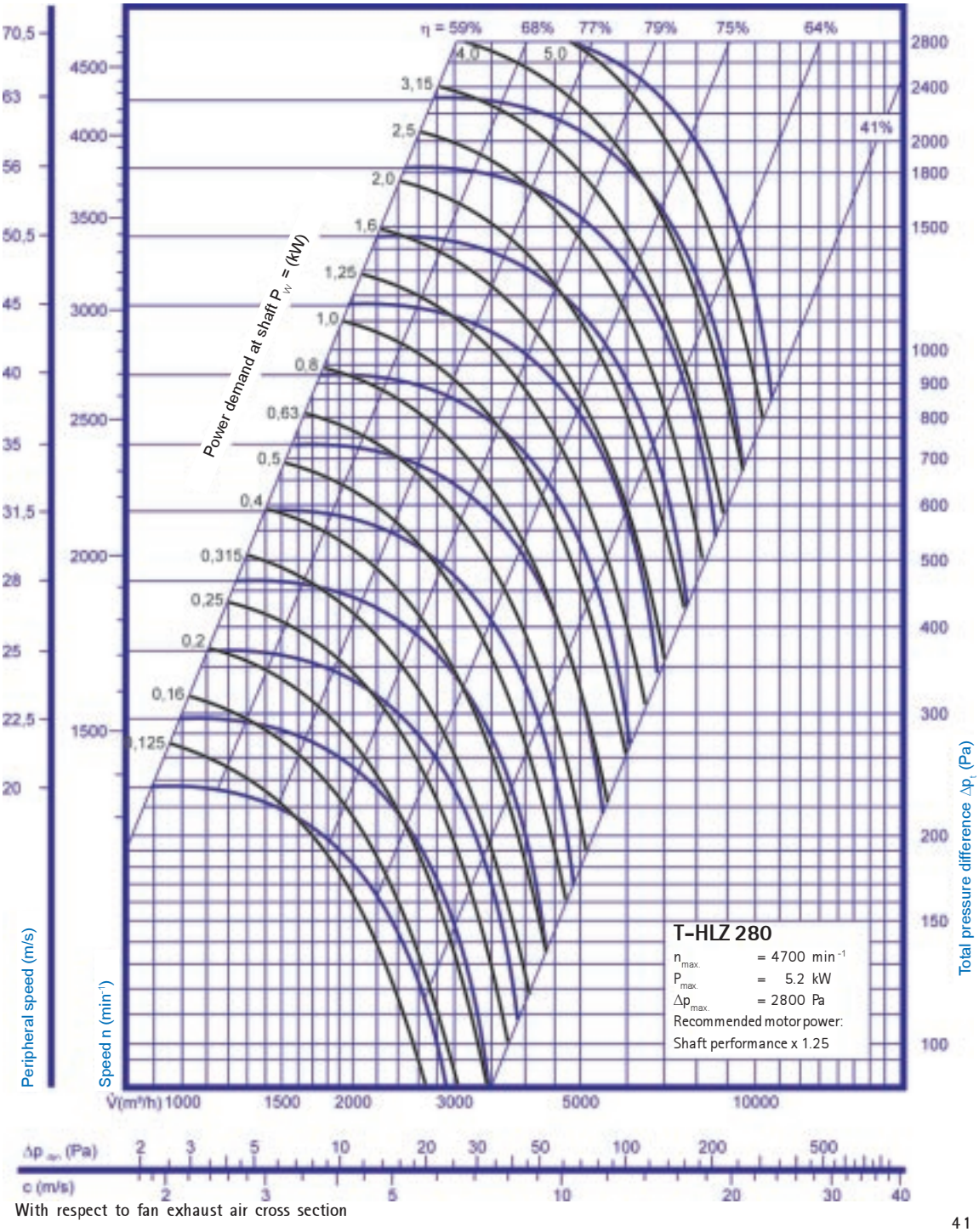
Exhaust variation: A, B, C

Fan/motor: Base frame design with motor tension carriage, vibration absorber and belt protection. Elastic connection between fan exhaust and casing
Flaps on the inside F possible only with exhaust A up to motor power of 4 kW

Inspection door: in air direction right, left, top, if desired bottom, with turn locks

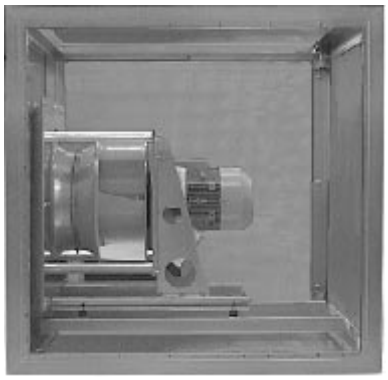
Fan diagram

Backward rotor blades



With respect to fan exhaust air cross section

Description



Free-running fan wheel, unidirectional suction, with backward rotor blades, attached directly to the motor shaft.

Complete unit mounted on sturdy base frame with flexible vibration absorbers.

Rotor wheel statically and dynamically balanced. Complete motor protection with built-in PTC thermistors.

High fan efficiency even at low speed, almost without dynamic pressure ratios.

In connection with frequency converter, accurate adaptation to unit characteristics is possible.

Economical and energy-saving operation even under partial load conditions.

Low maintenance costs, no drive belt losses, no retightening required.

External pressure drops

Customer specification of the installation side pressure drops (e.g. duct system).

Internal pressure drops

The pressure drops of all components with respect to the volume flow (also fan element) are listed in the pressure drop tables of the individual chapters.
For components on the pressure-side, neither flow distributors nor incident flow elements are required, since the exhaust flows through the entire cross section.

Dynamic pressure drops

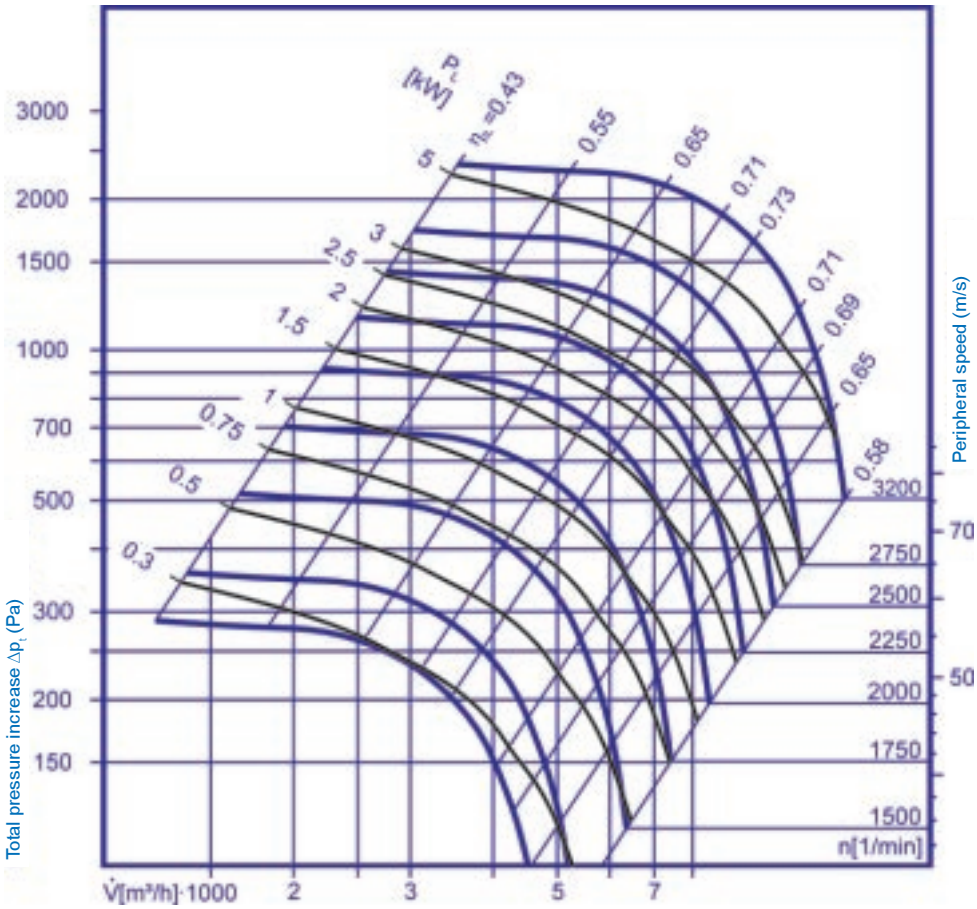
The dynamic pressure portions do not have to be considered in planning.

Performance data

KG size	Max. air volume m³/h	Total pressure increase to Pa	Operational data* Fan power kW	Operational data* Fan speed min⁻¹	Standard data* Motor power kW	Standard data* Motor speed min⁻¹	Standard data* Motor current A
KG 63	6300	500	1.34	1895	2.20	1500	5.20
		1000	2.71	2342	3.00	1500	6.80
		1500	4.25	2728	5.50	3000	11.30

* Fan speed is controlled by frequency converter (f ≥ 50Hz)

Fan diagram
Rotor wheel Ø 450 mm



Free-running fan wheel KG 63 RAL

Total sound power level L_W in [dB]

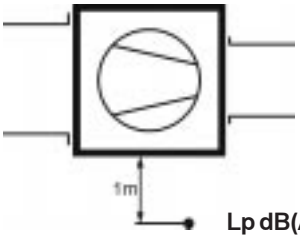
The accurate, device-specific sound data can be determined only for the specific order.

L_w [dB] = the computational total sound power of the fan on the suction/pressure-side.

		Total pressure increase Δp [Pa]					
	L_w	500	750	1000	1250	1500	2000
$\dot{V}$ [m³/h]	3,000	89	92	95	97	98	101
	4,500	90	94	96	98	100	102
	6,300	92	95	98	100	101	104

Sound pressure level Lp dB(A)

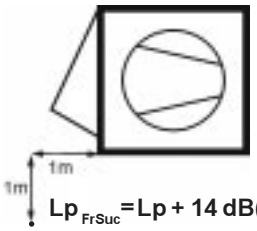
Lp dB(A) = sound pressure level at 1 m distance beside the fan element, measured in the free field with suction and pressure-side duct connection



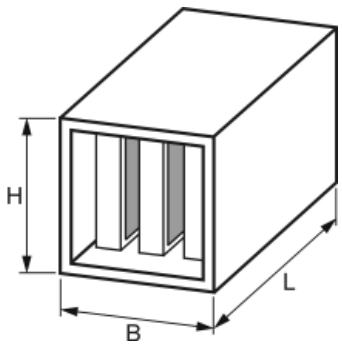
Forward rotor blades								
$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)
3,000	800	37	4,500	900	44	6,300	1000	51
	1000	41		1120	45		1250	52
	1250	46		1400	48		1600	53
	1600	51		1600	53		2000	56
Backward rotor blades								
$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)
3,000	2000	47	4,500	2000	44	6,300	2800	52
	2500	53		2500	52		3150	56
	3150	59		3150	57		3500	59
	4000	65		4000	63		4000	62
Free-running fan wheel Ø 450mm								
$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)
3,000	1550	49	4,500	1600	50	6,300	1800	52
	1850	52		1900	54		2150	55
	2150	55		2150	56		2350	58
	2600	58		2600	60		2650	61

Sound pressure level Lp dB(A) beside the fan element

With free suction or exhaust opening



Silencer element



Dimensions (mm)

Height H	Width B	Length L			
		Type 2	Type 3	Type 4	Type 5
880	880	880	1080	1330	1680

Insertion loss De dB(A)

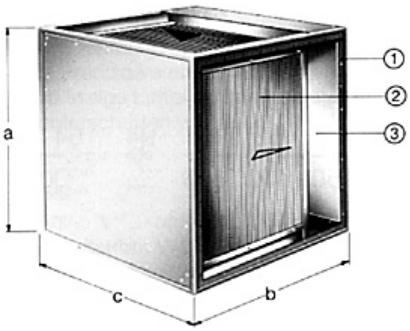
Type	Octave band (Hz)							
	63	125	250	500	1000	2000	4000	8000
2	6	12	20	20	22	16	12	11
3	7	14	24	25	26	20	14	13
4	8	17	30	32	34	25	18	17
5	9	21	37	37	41	29	21	19

For series connection of 2 silencers: $De = De_1 + De_2 - 3$ dB(A)

The accurate, device-specific heat recovery data can be determined only for the specific order.

Description KGX/KGXD

KGX air circulation horizontally/ vertically
KGXD air circulation diagonally



Hot air and cold air are led past each other in the cross current.

The heat recovery takes place via heat transmission from the hot to the cold air flow. The air flows are completely separated by aluminium plates.

- Heat recovery of up to over 80 %
- no moisture transmission
- no mobile parts, corrosion-resistant

① **Casing**
Design same as air conditioner

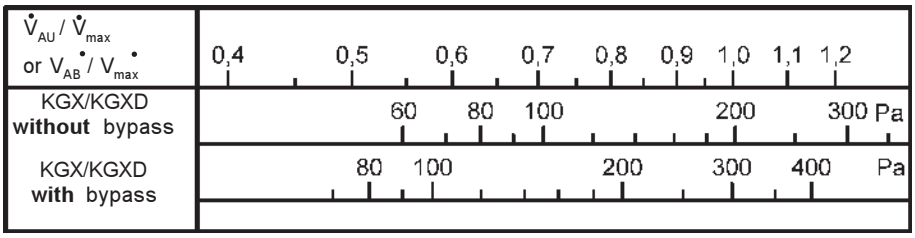
② **Heat exchanger**
Heat exchanger surfaces made of special corrosion-resistant aluminium plates.

③ **Internal bypass (on request)**
In order to prevent rime on the heat exchanger surfaces, the outside air can partially or entirely pass by the heat exchanger in the internal bypass.

Type	max. volume flow $\dot{V}$ [m³/h]		Dimensions [mm]			Weight [kg]	Condensate connector
	without int.bypass	with int. bypass	a	b	c		R“
KGX 63	4,500	4,750	880	880	880	180	-
KGXD 63	4,500	4,750	880	880	1290	315	1 ¼"

Pressure drop Δp [Pa]

for KGX/KGXD
with or without internal bypass



Description RWT

RWT air circulation horizontally/vertically

A rotating storage capacity takes up heat from the withdrawn air stream and emits it to the outside air stream.

- Heat recovery of up to 80 %.
- Simple power control by adjusting the speed.
- With suitable rotor material, humidification of the supply air.
- Rime protection, defrosting device, pre-heating of air not required.
- Easy maintenance through inspection doors in the air incident flow elements.

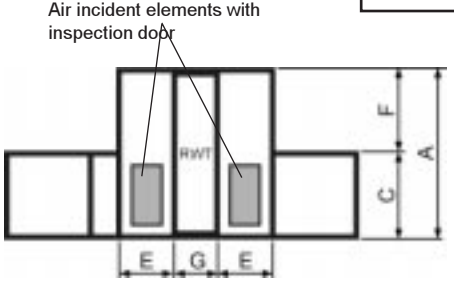
Pressure drop Δp [Pa]

Volume flow $\dot{V}$ [m³/h]	2,500	3,000	3,500	4,000	5,000	6,300
Pressure drop Δp [Pa]	50	60	70	80	102	130

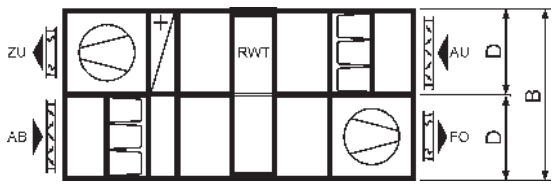
Dimensions

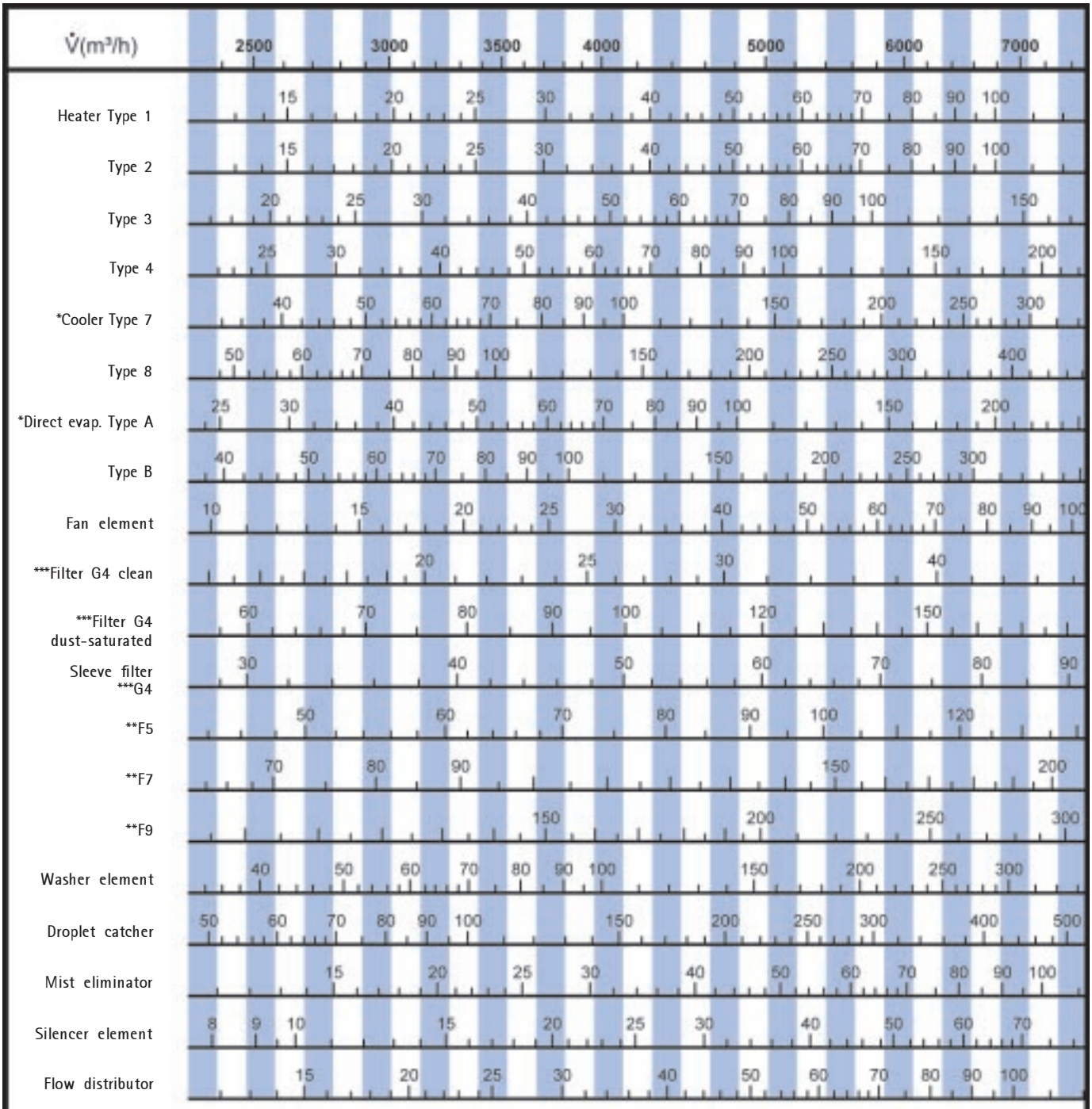
KG	A	B	C	D	E	F	G
63	1290	1760	880	880	410	580	400

Front view



Top view





**** Design sleeve filter F5 to F9:**

$$\left(\frac{\text{Start pressure difference + Final pressure difference}}{2}\right)$$

Final pressure differences:

Sleeve filter F5 = 200 Pa
Sleeve filter F7 = 200 Pa
Sleeve filter F9 = 300 Pa

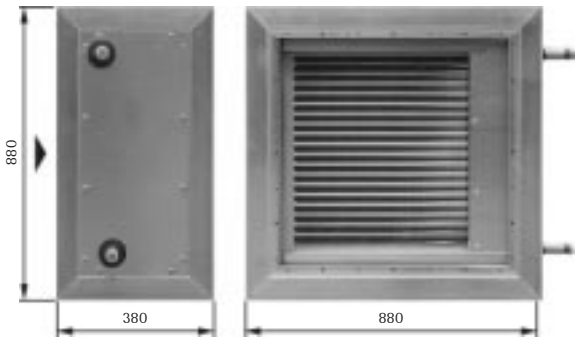
***** Design filter G4, G4 clean, sleeve filter G4**

Start pressure difference + 50 Pa
These filters may be used only as additional pre-filters.

* Add pressure drop from mist eliminator

Heater element KG 63 RAL

Heat exchanger for warm pump water PWW



Connections: in air direction right or left

Equipment:

Heat exchanger with Cu pipes and aluminium lamellas, collecting tank made of steel

Type	Connections	Water content
1	DN 25	2.5 l
2	1 ¼"	3.5 l
3	1 ¼"	3.5 l
4	1 ¼"	5.5 l

permissible operating pressure: 16 bar
Test pressure 30 bar

on request:

Heat exchanger with Cu pipes and corrosion-resistant aluminium lamellas

Heat exchanger with Cu pipes and Cu lamellas

Heat exchanger made of steel - galvanised

Heat exchanger for steam

Heat exchanger for hot oil

Heat exchanger with bleed and drain connectors

Note:

Allow for sufficient room for extraction of the heat exchanger.

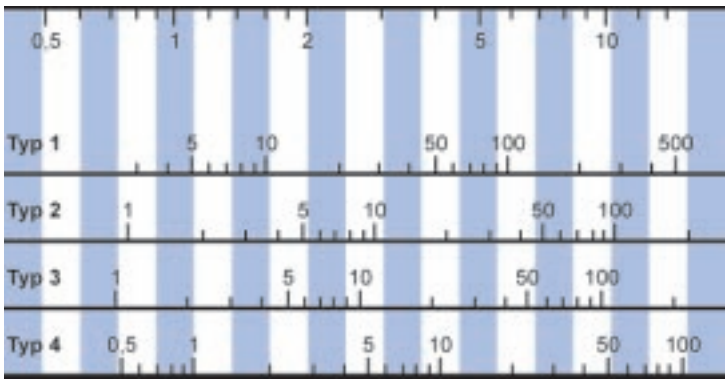
Water resistance max. 20kPa

Quantity of water $w = \frac{0.86 \cdot \dot{Q}}{\Delta t_W}$ (m³/h)

$\dot{Q}$ = Power in kW

$\Delta t_w = t_{WI} - t_{WO}$

Quantity of water w (m³/h)



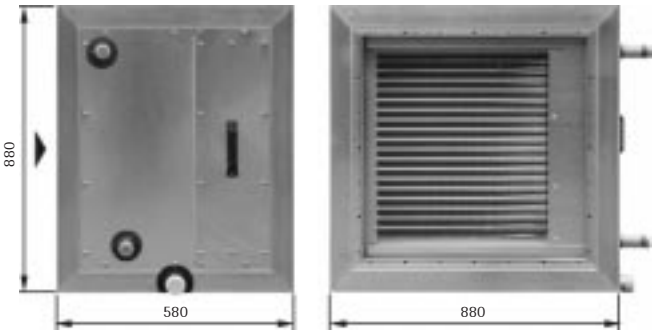
Type		1							
$\dot{V}$ (m³/h)		2 500		3 700		5 000		6 300	
t_{WI} / t_{WO} °C / °C	t_{AI} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C
45/35	- 15	21.6	8	27.3	5	32.5	2	37.2	1
	- 10	19.4	11	24.5	8	29.2	6	33.3	4
	- 5	17.2	14	21.7	11	25.8	9	29.5	8
	± 0	15.0	17	19.0	14	22.6	13	25.7	11
	+ 5	12.9	20	16.3	18	19.3	16	22.0	15
	+10	10.8	23	13.6	21	16.1	19	18.4	18
	+15	8.7	25	11.0	24	13.0	23	14.8	22
	+20	6.7	28	8.4	27	9.9	26	11.2	25
50/40	- 15	23.7	10	30.0	7	35.8	4	41.0	2
	- 10	21.5	13	27.2	10	32.5	8	37.1	6
	- 5	19.3	16	24.4	13	29.1	11	33.3	10
	± 0	17.1	19	21.7	16	25.8	14	29.5	13
	+ 5	15.0	22	19.0	20	22.6	18	25.7	17
	+10	12.9	25	16.3	23	19.4	21	22.1	20
	+15	10.8	28	13.6	26	16.2	25	18.4	24
	+20	8.8	31	11.0	29	13.0	28	14.8	27
60/40	- 15	24.6	11	31.0	7	36.8	5	42.0	3
	- 10	22.3	14	28.1	11	33.4	8	38.1	6
	- 5	20.2	17	25.4	14	30.1	12	34.3	10
	± 0	18.0	20	22.6	17	26.8	15	30.5	14
	+ 5	15.9	23	19.9	20	23.6	18	26.8	17
	+10	13.7	26	17.2	24	20.3	22	23.1	21
	+15	11.6	29	14.5	27	17.2	25	19.5	24
	+20	9.5	31	11.9	30	14.0	28	15.8	28
70/50	- 15	28.9	16	36.6	11	43.6	8	49.7	6
	- 10	26.7	19	33.7	15	40.1	12	45.8	10
	- 5	24.5	22	30.9	18	36.8	15	42.0	13
	± 0	22.3	25	28.1	21	33.4	19	38.1	17
	+ 5	20.1	28	25.4	25	30.2	22	34.4	21
	+10	18.0	31	22.7	28	26.9	26	30.6	24
	+15	15.9	34	20.0	31	23.7	29	27.0	28
	+20	13.8	37	17.3	34	20.5	32	23.3	31
70/55	- 15	30.6	17	38.8	13	46.3	10	52.9	7
	- 10	28.3	21	35.9	16	42.8	13	49.0	11
	- 5	26.1	24	33.1	20	39.4	17	45.1	15
	± 0	23.9	27	30.3	23	36.1	20	41.2	18
	+ 5	21.7	30	27.5	26	32.8	24	37.4	22
	+10	19.6	33	24.8	30	29.5	27	33.7	26
	+15	17.5	36	22.1	33	26.3	31	30.0	29
	+20	15.4	39	19.4	36	23.1	34	26.3	33
80/50	- 15	29.9	17	37.7	12	44.8	9	51.1	7
	- 10	27.7	20	34.9	15	41.4	12	47.2	10
	- 5	25.5	23	32.0	19	38.0	16	43.3	14
	± 0	23.3	26	29.3	22	34.7	19	39.5	18
	+ 5	21.1	29	26.5	25	31.4	23	35.7	21
	+10	19.0	32	23.8	29	28.1	26	32.0	25
	+15	16.8	35	21.1	32	24.9	30	28.3	28
	+20	14.7	38	18.4	35	21.7	33	24.6	32
80/60	- 15	33.2	20	42.1	15	50.2	12	57.4	9
	- 10	31.0	23	39.2	19	46.8	15	53.4	13
	- 5	28.7	27	36.4	22	43.4	19	49.5	17
	± 0	26.5	30	33.6	25	40.0	22	45.7	20
	+ 5	24.3	33	30.8	29	36.7	26	41.9	24
	+10	22.2	36	28.0	32	33.4	29	38.1	28
	+15	20.1	39	25.3	35	30.1	33	34.4	31
	+20	18.0	42	22.7	38	26.9	36	30.7	35
90/70	- 15	37.4	25	47.5	19	56.8	15	65.0	12
	- 10	35.2	28	44.6	23	53.3	19	61.0	16
	- 5	32.9	31	41.7	26	49.9	22	57.0	20
	± 0	30.7	34	38.9	30	46.5	26	53.1	24
	+ 5	28.5	38	36.1	33	43.1	30	49.3	27
	+10	26.3	41	33.4	36	39.8	33	45.5	31
	+15	24.2	44	30.6	39	36.5	37	41.7	35
	+20	22.1	47	27.9	43	33.3	40	38.0	38

Other operating conditions on request!

2								3								4							
2 500		3 700		5 000		6 300		2 500		3 700		5 000		6 300		2 500		3 700		5 000		6 300	
$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C
27.5	14	35.3	10	42.6	8	49.1	6	33.2	20	43.7	16	53.6	13	62.3	11	39.7	27	53.8	24	67.3	21	79.5	18
24.6	17	31.6	13	38.2	11	43.9	9	29.9	22	39.3	19	48.1	16	55.9	14	35.8	29	48.4	25	60.5	23	71.4	21
21.8	19	28.0	16	33.8	14	38.9	12	26.6	24	34.9	21	42.6	18	49.5	17	31.9	30	43.1	27	53.7	25	63.4	23
19.1	21	24.5	19	29.5	17	33.9	15	23.3	26	30.5	23	37.3	21	43.3	19	28.0	31	37.8	29	47.1	26	55.5	25
16.4	24	21.0	21	25.2	19	29.0	18	20.1	28	26.3	25	32.0	23	37.1	22	24.2	33	32.6	30	40.5	28	47.7	27
13.7	26	17.5	24	21.0	22	24.1	21	16.9	30	22.0	27	26.8	26	31.0	24	20.5	34	27.4	32	34.1	30	40.0	28
11.1	28	14.1	26	16.9	25	19.3	24	13.7	31	17.8	29	21.6	28	25.0	27	16.7	35	22.4	33	27.6	31	32.4	30
8.5	30	10.7	29	12.8	28	14.6	27	10.6	33	13.7	31	16.5	30	19.1	29	13.0	36	17.3	34	21.3	33	24.8	32
30.1	17	38.8	13	46.9	10	54.1	8	36.4	24	48.0	19	58.9	16	68.6	14	43.3	31	58.9	27	73.7	24	87.2	22
27.3	19	35.2	16	42.5	13	48.9	11	33.0	26	43.5	22	53.3	19	62.1	17	39.4	33	53.4	29	66.9	26	79.0	24
24.5	22	31.6	18	38.1	16	43.9	14	29.7	28	39.1	24	47.9	21	55.7	19	35.5	34	48.1	31	60.1	28	71.0	26
21.7	24	28.0	21	33.8	19	38.8	17	26.4	30	34.7	26	42.5	24	49.4	22	31.6	36	42.8	32	53.5	30	63.1	28
19.0	27	24.5	24	29.5	22	33.9	20	23.2	32	30.4	29	37.2	26	43.2	25	27.8	37	37.6	34	46.9	32	55.3	30
16.4	29	21.0	26	25.3	25	29.0	23	20.0	33	26.2	31	32.0	29	37.1	27	24.1	38	32.4	36	40.4	33	47.6	32
13.7	31	17.6	29	21.1	27	24.2	26	16.8	35	22.0	33	26.8	31	31.1	30	20.4	39	27.4	37	34.0	35	39.9	34
11.1	33	14.2	32	17.0	30	19.4	29	13.7	37	17.8	35	21.7	33	25.1	32	16.7	40	22.3	38	27.6	37	32.4	35
31.2	18	40.0	14	48.1	11	55.3	8	38.2	26	50.0	21	61.0	17	70.8	15	46.1	34	62.1	29	77.2	26	90.9	23
28.4	21	36.3	17	43.7	14	50.1	12	34.8	28	45.5	23	55.5	20	64.3	18	42.1	36	56.6	31	70.4	28	82.8	26
25.6	23	32.7	19	39.3	17	45.1	15	31.5	30	41.1	26	50.0	23	57.9	20	38.2	37	51.2	33	63.6	30	74.7	28
22.8	26	29.2	22	35.0	20	40.1	18	28.2	32	36.7	28	44.6	25	51.7	23	34.3	38	45.9	35	56.9	32	66.7	30
20.1	28	25.6	25	30.7	23	35.1	21	24.9	33	32.4	30	39.3	27	45.4	26	30.4	40	40.6	36	50.3	34	58.9	32
17.4	30	22.1	27	26.5	25	30.3	24	21.7	35	28.1	32	34.0	30	39.3	28	26.6	41	35.4	38	43.7	35	51.1	34
14.7	32	18.7	30	22.3	28	25.4	27	18.5	37	23.9	34	28.8	32	33.2	31	22.8	42	30.2	39	37.1	37	43.3	35
12.1	35	15.2	32	18.1	31	20.6	30	15.3	38	19.6	36	23.6	34	27.1	33	19.0	43	25.0	40	30.6	38	35.6	37
36.7	24	47.2	19	57.0	15	65.6	13	44.6	32	58.7	27	71.8	23	83.4	20	53.3	42	72.2	37	90.2	33	106.5	30
33.8	27	43.5	22	52.5	18	60.4	16	41.2	35	54.1	30	66.2	26	76.9	23	49.4	43	66.7	39	83.3	35	98.3	32
31.0	29	39.9	25	48.0	21	55.2	19	37.9	37	49.7	32	60.7	28	70.5	26	45.4	45	61.4	41	76.5	37	90.2	34
28.3	32	36.3	28	43.7	25	50.2	22	34.6	39	45.3	34	55.3	31	64.1	29	41.6	47	56.0	42	69.8	39	82.2	37
25.5	34	32.7	30	39.3	27	45.2	25	31.3	41	40.9	37	49.9	34	57.9	31	37.7	48	50.8	44	63.2	41	74.3	39
22.8	37	29.2	33	35.1	30	40.2	29	28.1	43	36.6	39	44.6	36	51.7	34	33.9	49	45.6	46	56.6	43	66.5	41
20.1	39	25.7	36	30.9	33	35.4	32	24.9	44	32.4	41	39.4	38	45.6	36	30.2	51	40.4	47	50.1	45	58.8	43
17.5	41	22.3	38	26.7	36	30.5	35	21.7	46	28.2	43	34.2	41	39.5	39	26.5	52	35.3	49	43.7	46	51.1	44
38.7	26	50.0	21	60.5	17	69.8	14	46.7	35	61.7	29	75.7	25	88.3	22	55.4	44	75.4	39	94.6	35	111.9	32
35.9	29	46.3	24	56.0	20	64.6	18	43.3	37	57.2	32	70.1	28	81.7	25	51.4	46	69.9	41	87.6	37	103.7	35
33.1	31	42.7	27	51.6	23	59.4	21	40.0	39	52.7	34	64.6	31	75.3	28	47.5	47	64.5	43	80.8	40	95.6	37
30.3	34	39.0	30	47.2	27	54.3	24	36.6	41	48.3	37	59.2	33	68.9	31	43.6	49	59.2	45	74.1	42	87.6	39
27.5	37	35.5	32	42.8	30	49.3	27	33.4	43	43.9	39	53.8	36	62.6	33	39.8	51	54.0	47	67.5	44	79.7	41
24.8	39	32.0	35	38.5	32	44.3	31	30.2	45	39.7	41	48.5	38	56.4	36	36.1	52	48.8	48	60.9	45	71.9	43
22.1	41	28.5	38	34.3	35	39.4	34	27.0	47	35.4	43	43.3	41	50.3	39	32.3	53	43.7	50	54.5	47	64.2	45
19.5	44	25.0	40	30.1	38	34.6	37	23.8	49	31.2	45	38.1	43	44.2	41	28.7	55	38.6	51	48.1	49	56.6	47
38.0	25	48.7	20	58.6	16	67.2	13	46.6	34	61.0	29	74.3	24	86.2	21	56.2	45	75.6	39	94.1	35	110.7	32
35.2	28	45.0	23	54.1	19	62.1	17	43.2	37	56.4	31	68.7	27	79.7	24	52.2	46	70.1	41	87.2	37	102.5	34
32.3	31	41.3	26	49.6	22	56.9	20	39.8	39	51.9	34	63.2	30	73.2	27	48.2	48	64.7	43	80.3	39	94.4	36
29.6	33	37.7	29	45.2	25	51.9	23	36.5	41	47.5	36	57.8	32	66.8	30	44.3	50	59.3	45	73.5	41	86.3	38
26.8	36	34.2	31	40.9	28	46.8	26	33.2	43	43.1	38	52.4	35	60.5	32	40.4	51	54.0	47	66.8	43	78.3	41
24.1	38	30.6	34	36.6	31	41.9	29	29.9	45	38.8	40	47.0	37	54.3	35	36.6	53	48.7	48	60.2	45	70.5	43
21.4	40	27.1	37	32.4	34	37.0	32	26.6	47	34.5	43	41.7	40	48.1	38	32.7	54	43.5	50	53.6	47	62.6	44
18.7	42	23.6	39	28.1	37	32.1	35	23.4	48	30.2	45	36.5	42	42.0	40	28.9	55	38.3	51	47.0	48	54.8	46
42.1	30	54.3	24	65.6	20	75.7	17	50.8	39	67.1	33	82.3	29	95.8	25	60.3	49	82.0	44	102.8	40	121.7	36
39.2	32	50.6	27	61.1	23	70.4	20	47.4	41	62.5	36	76.7	31	89.3	28	56.3	51	76.5	46	95.9	42	113.4	39
36.4	35	46.9	30	56.6	26	65.2	24	44.0	44	58.0	38	71.1	34	82.8	31	52.4	53	71.2	48	89.1	44	105.3	41
33.6	38	43.3	33	52.2	29	60.1	27	40.7	46	53.6	41	65.7	37	76.4	34	48.6	54	65.8	50	82.3	46	97.2	43
30.8	40	39.7	36	47.9	32	55.1	30	37.4	48	49.2	43	60.3	39	70.1	37	44.7	56	60.6	52	75.7	48	89.3	45
28.1	43	36.1	38	43.6	35	50.1	33	34.2	50	44.9	45	54.9	42	63.8	39	41.0	58	55.4	54	69.1	50	81.5	48
25.4	45	32.6	41	39.3	38	45.2	36	31.0	52	40.7	48	49.7	44	57.7	42	37.2	59	50.2	55	62.6	52	73.8	50
22.8	47	29.2	44	35.1	41	40.3	39	27.8	54	36.4	50	44.5	47	51.6	45	33.5	60	45.1	57	56.2	54	66.1	52
47.3	35	61.3	29	74.2	24	85.6	21	56.9	45	75.3	39	92.6	34	108.0	30	67.1	56	91.5	51	115.1	46	136.4	42
44.4	38	57.5	32	69.6	28	80.3	24	53.4	48	70.7	42	86.9	37	101.4	33	63.1	58	86.1	53	108.1	48	128.1	45
41.6	41	53.8	35	65.1	31	75.1	28	50.1	50	66.2	44	81.3	40	94.8	36	59.2	60	80.6	55	101.3	51	119.9	47
38.8	44	50.1	38	60.6	34	69.9	31	46.7	52	61.8	47	75.8	43	88.4	39	55.3	62	75.3	57	94.5	53	111.9	50
36.0	46	46.5	41	56.2	37	64.8	34	43.4	55	57.4	49	70.4	45	82.0	42	51.5	64	70.0	59	87.8	55	103.9	52
33.3	49	42.9	44	51.9	40	59.8	38	40.2	57	53.0	52	65.0	48	75.7	45	47.7	66	64.9	61	81.3	57	96.1	54
30.6	51	39.4	47	47.6	43	54.8	41	37.0	59	48.7	54	59.7	50	69.5	48	44.0	67	59.7	63	74.7	59	88.3	56
27.9	54	35.9	49	43.4	46	49.9	44	33.8	61	44.5	56	54.5	53	63.4	50	40.3	69	54.6	64	68.3	61	80.7	59

Exchanger for cold pump water PKW / direct evaporator

Performance data for direct evaporator for cooling agent R134a, for other cooling agents on request.



Air direction: horizontal:

Connections: in air direction right or left

Equipment:

Exchanger for cold water with Cu pipes and aluminium lamellas, Collecting tank made of Cu.

Direct evaporator with Cu pipes and aluminium lamellas, cooling agent distributor.

Mist eliminator,
Condensate basin with condensate connector on side, male thread 1¼",
Droplet catcher for air direction vertical.

Type	Connections	Contents
7	1½"	8.5 l
8	1½"	14.0 l
A	DN 28 cooling agent inlet DN 35 cooling agent outlet	5.0 l
B	DN 28 cooling agent inlet DN 35 cooling agent outlet	7.0 l

permissible operating pressure: 16 bar
Test pressure 30 bar

on request:

Exchanger for cold water with Cu pipes and corrosion-resistant aluminium lamellas

Exchanger for cold water with Cu pipes and Cu lamellas

Exchanger for cold water with bleed and drain connector

Note:

Allow for sufficient room for extraction of the exchanger.
Build in siphon on site with the condensate connector.

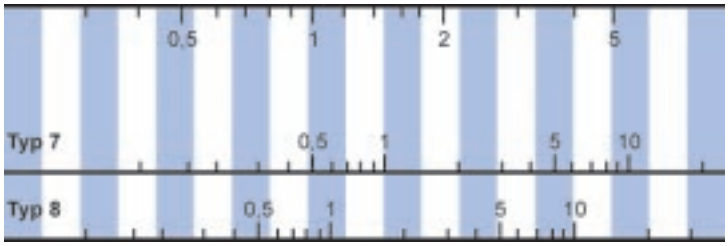
Water resistance max. 50kPa

Quantity of water $w = \frac{0.86 \cdot \dot{Q}}{\Delta t_W}$ (m³/h)

$\dot{Q}$ = Power in kW

$\Delta t_w = t_{WI} - t_{WO}$

Quantity of water w (m³/h)



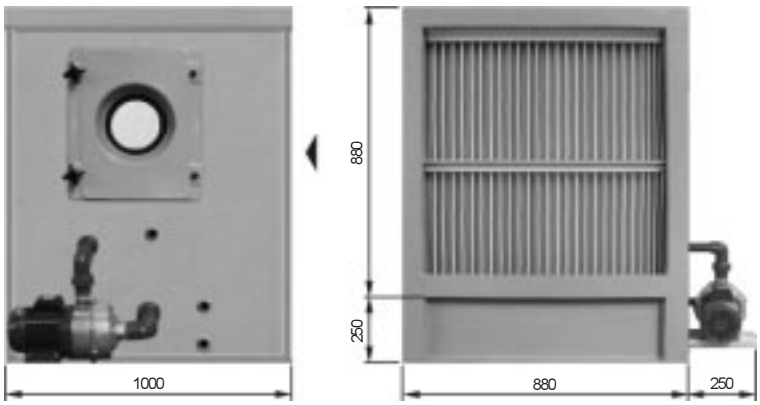
V̇ (m³/h)		2 500		3 700		5 000		6 300	
PKW	t_{AI} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C
		Exchanger for cold water Type 7							
4/8	32	27.9	9.5	38.2	11.0	48.1	12.4	57.1	13.4
	28	23.7	9.2	32.3	10.6	40.5	11.7	47.9	12.7
	26	21.0	8.9	28.6	10.1	35.9	11.1	42.5	12.0
	25	19.6	8.7	26.7	9.9	33.6	10.8	39.7	11.6
5/10	32	25.2	10.7	34.4	12.2	43.2	13.5	51.1	14.5
	28	21.0	10.5	28.5	11.8	35.6	12.9	42.1	13.7
	26	18.3	10.1	24.8	11.3	31.0	12.3	36.6	13.0
	25	17.0	9.9	23.0	11.0	28.7	11.9	33.8	12.7
6/12	32	22.5	11.9	30.5	13.3	38.2	14.5	45.1	15.4
	28	18.3	11.7	24.6	12.9	30.7	13.9	36.1	14.7
	26	15.6	11.3	20.9	12.4	26.0	13.2	36.6	13.9
	25	14.2	11.1	19.1	12.1	23.7	12.9	27.9	13.5
8/12	32	22.0	12.3	30.1	13.6	38.0	14.6	45.2	15.5
	28	17.8	12.0	24.2	13.1	30.4	14.0	36.1	14.7
	26	15.0	11.6	20.5	12.5	25.7	13.3	30.5	13.9
	25	13.7	11.4	18.6	12.3	23.4	13.0	27.7	13.5
		Type 8							
4/8	32	33.1	5.9	47.1	6.8	61.2	7.7	74.3	8.6
	28	28.6	5.9	40.5	6.8	52.5	7.6	63.6	8.3
	26	25.6	5.8	36.2	6.6	46.8	7.3	56.7	8.0
	25	24.0	5.7	33.9	5.5	43.9	7.2	53.3	7.8
5/10	32	30.8	7.1	43.6	8.1	56.4	9.0	68.4	9.8
	28	26.2	7.1	36.9	8.0	47.6	8.8	57.6	9.6
	26	23.1	7.0	32.5	7.8	41.9	8.6	60.6	9.2
	25	21.5	7.0	30.3	7.7	39.1	8.4	47.2	9.0
6/12	32	28.2	8.3	39.8	9.3	51.4	10.1	62.1	10.9
	28	23.6	8.4	33.1	9.2	42.6	10.0	51.3	10.7
	26	20.5	8.2	28.7	9.0	36.8	9.8	44.3	10.4
	25	18.9	8.2	26.4	8.9	33.9	9.6	40.9	10.2
8/12	32	26.3	9.5	37.5	10.2	48.7	10.9	59.2	11.6
	28	21.8	9.5	30.9	10.1	39.9	10.8	48.5	11.3
	26	18.7	9.3	26.4	9.9	34.2	10.5	41.5	11.0
	25	17.1	9.3	24.2	9.8	31.3	10.3	37.9	10.8
Ev. temp. °C		**Direct evaporator type A**							
2.0	32	22.4	13.4	27.5	15.9	31.5	17.8	34.4	19.1
	28	19.8	12.2	24.2	14.4	27.7	16.0	30.3	17.2
	26	17.9	11.4	21.9	13.4	25.1	14.9	27.4	16.0
	25	17.0	11.0	20.8	12.9	23.8	14.4	26.0	15.4
5.0	32	20.2	14.6	24.9	16.8	28.5	18.5	31.3	19.7
	28	17.5	13.4	21.5	15.3	24.6	16.7	27.0	17.8
	26	15.6	12.6	19.2	14.4	22.0	15.7	24.1	16.7
	25	14.7	12.3	18.0	13.9	20.6	15.2	22.6	16.1
8.0	32	17.5	15.9	21.6	17.9	24.8	19.3	27.3	20.4
	28	14.8	14.8	18.2	16.4	20.9	17.6	22.9	18.5
	26	12.8	14.0	15.8	15.5	18.2	16.6	19.9	17.4
	25	11.9	13.7	14.7	15.1	16.8	16.1	18.5	16.9
		Type B							
2.0	32	27.4	9.9	35.2	12.2	41.5	14.0	46.4	15.5
	28	24.2	9.1	31.0	11.1	36.5	12.7	40.8	14.0
	26	22.0	8.5	28.1	10.4	33.1	11.9	37.0	13.1
	25	20.9	8.3	26.7	10.0	31.4	11.5	35.1	12.6
5.0	32	24.6	11.5	31.7	13.4	37.5	15.0	42.0	16.3
	28	21.4	10.7	27.4	12.4	32.4	13.8	36.3	14.9
	26	19.1	10.1	24.5	11.7	28.9	13.0	32.4	14.0
	25	17.9	9.9	23.0	11.4	27.2	12.6	30.5	13.6
8.0	32	21.3	13.2	27.5	14.8	32.6	16.2	36.6	17.3
	28	18.0	12.4	23.2	13.8	27.4	15.0	30.8	15.9
	26	15.7	11.9	20.2	13.2	23.9	14.2	26.8	15.1
	25	14.5	11.7	18.7	12.9	22.1	13.9	24.8	14.7

Air inlet state: 32°C / 40 % r.h., 28°C / 47 % r.h.
26°C / 49 % r.h., 25°C / 50 % r.h.

Note: min. evaporation temperature 2°C.

Other operating conditions on request.

Washer element



Casing
Plastic (glass fibre reinforced plastic)

Inspection door and connections
in air direction right or left

Equipment
Block pump 1.1 kW, 230/400 V, D/Y; 4.8/2.8 A, 50 Hz;
Stainless steel pump
Nozzle holder with self-cleaning nozzles spraying against air flow
Washer basin with all-round inclination towards the drain connector
Pump with complete piping on suction and pressure side

Inspection door with inspection window
Flow rectifier
Mist eliminator
} temperature-resistant to 70°C, dismantable

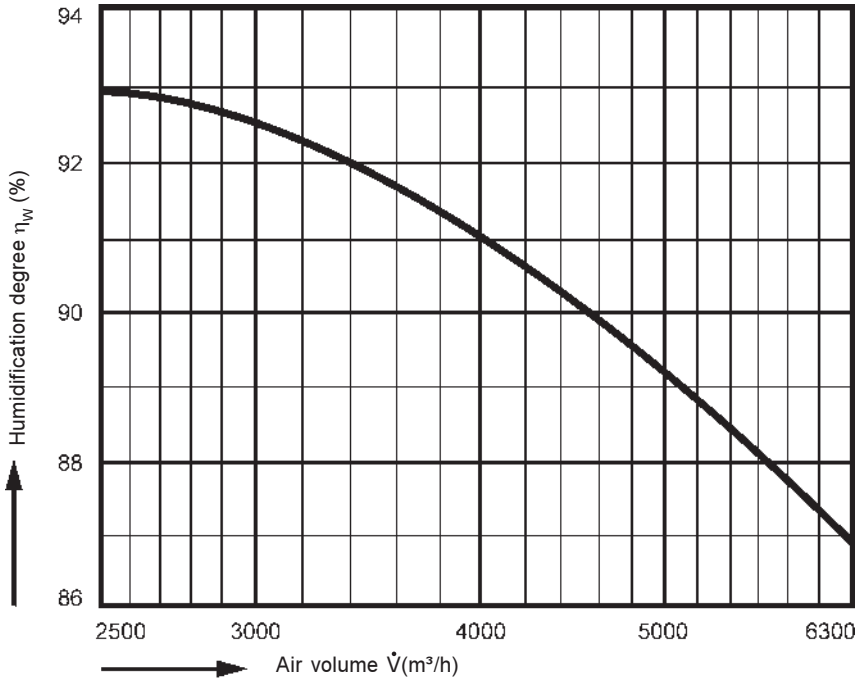
Inlet device, male thread 3/4", with float valve and float, overflow spout DN 40, outlet chute DN 40, dry-run protection for pump, de-sludging system, lighting 230 V / 60 W, darkening for inspection window.
On request:
Drain and overflow device with siphon on the inside, thermometer, pressure gauge

Humidification degree η_W

$$\eta_W = \frac{x_2 - x_1}{x_s - x_1}$$

Index
x = water content of air
1 = air inlet
2 = air outlet
S = saturation state

with air temperature 20°C, density 1.2 kg/m³, water pressure 2.1 bar, quantity of water 6000 l/h



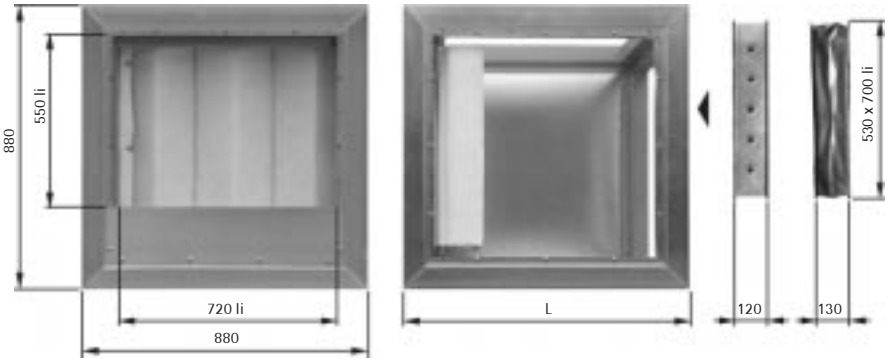
Vapour humidifier element

suitable for vapour lances of different manufacturers

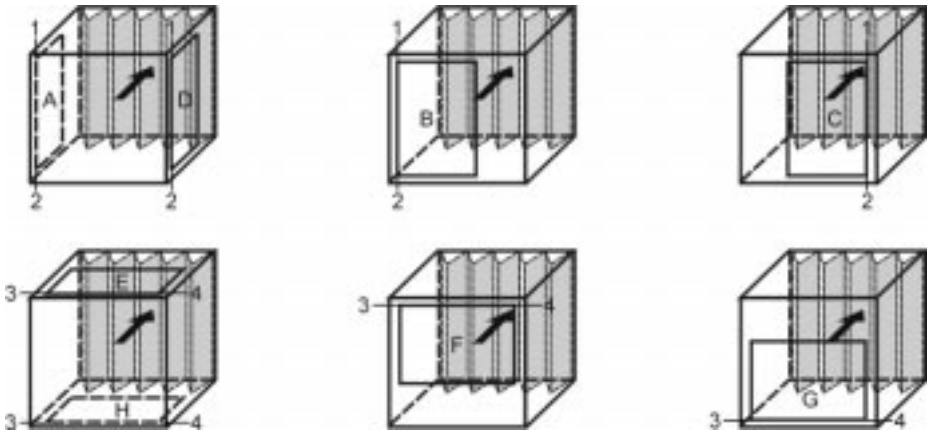
Design:
- Humidifier chamber with basin made of corrosion-resistant material
- Inspection door
- Basin with drain 1¼" male thread made of corrosion-resistant material
- Lengths on request
- Inspection hole double-walled Ø 150mm
- Lighting

Filter/air mixture element L = 880 mm
combined

Air mixture element/exhaust air element
L = 710 mm



Suction variations:



One external flap		Two external flaps joined with linkage.	
Flap arrangement	Flap drive	Flap arrangement	Flap drive
A	1, 2	A + B	1, 2
B	1, 2	A + C	1, 2
C	1, 2	A + D	1, 2
D	1, 2	B + D	1, 2
E	3, 4	C + D	1, 2
F	3, 4	E + F	3, 4
G	3, 4	E + G	3, 4
H	3, 4	E + H	3, 4
		F + H	3, 4
		G + H	3, 4

One internal flap		Two internal flaps joined with linkage.	
Flap arrangement	Flap drive	Flap arrangement	Flap drive
A	1, 2	A + C	1, 2
B	1, 2	A + D	1, 2
C	1, 2	B + D	1, 2
D	1, 2	E + G	3, 4
E	3, 4	E + G	3, 4
F	3, 4	F + H	3, 4
G	3, 4		
H	3, 4		

Drive torque for 1 flap 4 Nm (airtight flap according to DIN 1946: 15 Nm)

Inspection door:

in air direction right, left, top, bottom
required space for filter extraction: min. 0.8 m
for air mixture element/exhaust air element inspection door only on request in air direction right/left

Fan element

L 1430
W 1040
H 1040

L 1040
W 1040
H 1040

Heater element

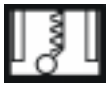
* with extractable frost protection frame L = 580

L 380
W 1040
H 1040

Cooling element

L 580
W 1040
H 1040

Washer element



L 1000
W 1040
H 1290

Mixing and filter element

L 1040
W 1040
H 1040

Mixing and exhaust air element

L 870
W 1040
H 1040

Sleeve filter element

L 1040
W 1040
H 1040

Silencer element

L ....
W 1040
H 1040

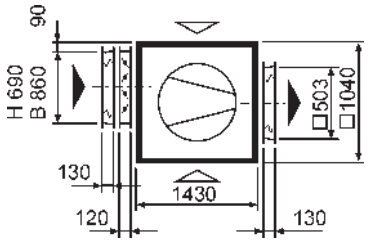
Empty element / vapour humidifier empty element

L ....
W 1040
H 1040

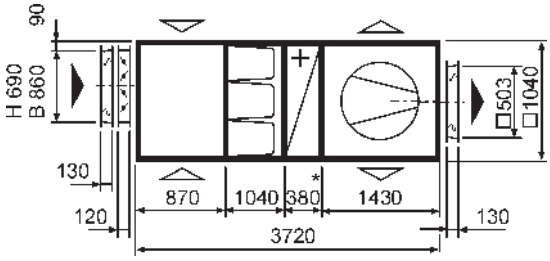
KGX

L 1040
W 1040
H 1040

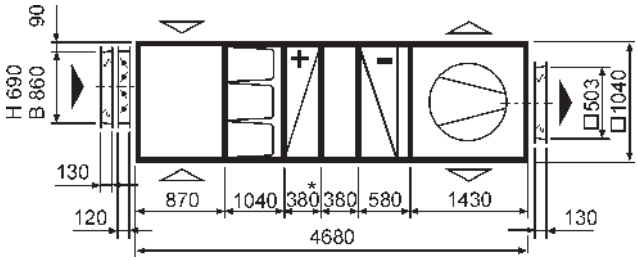
Withdrawn air device



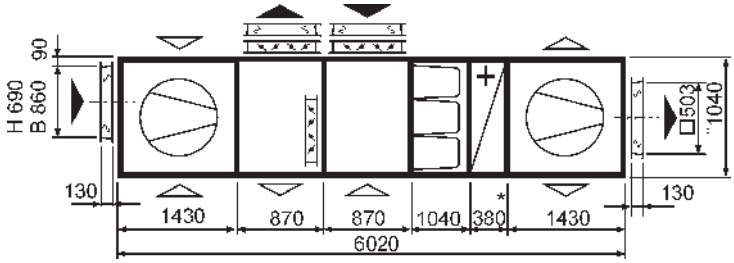
Supply air device



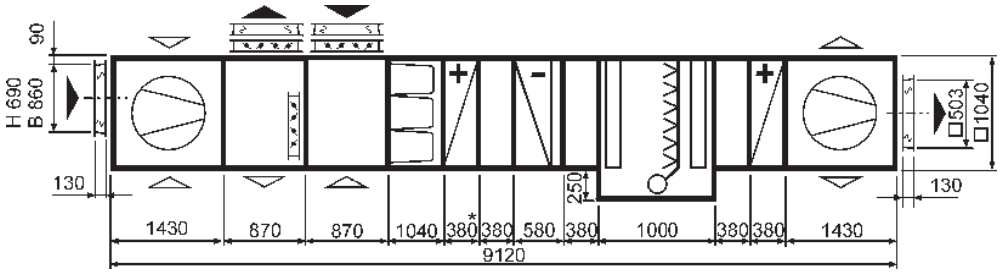
Partial air conditioner

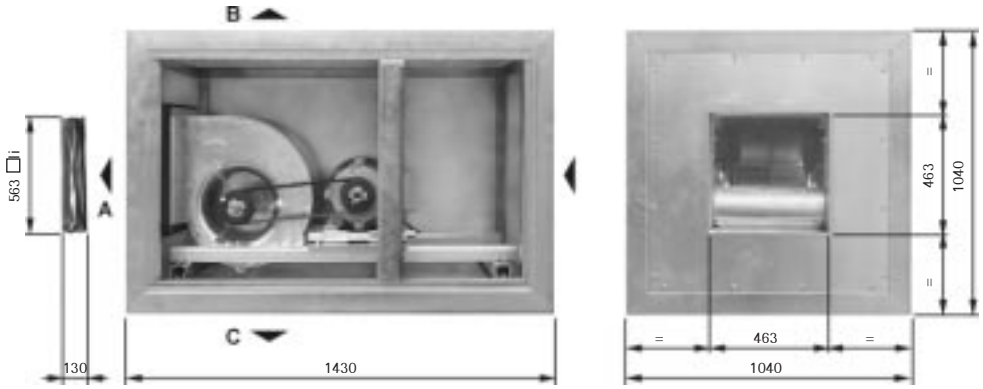


Combined supply and withdrawn air device



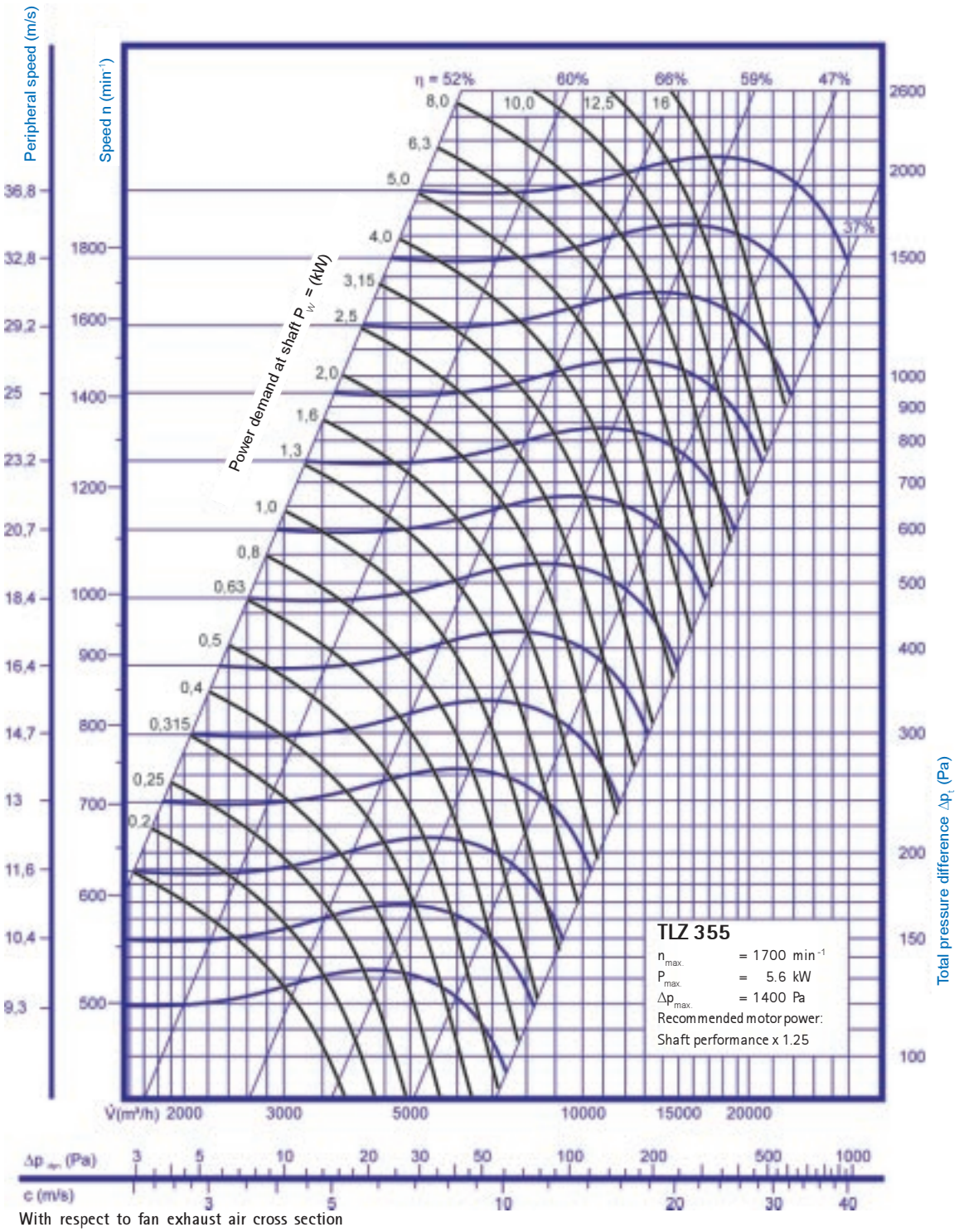
Combined climate control, supply and withdrawn air device





Fan diagram

Forward rotor blades permissible for motor output up to 2.2 kW



With respect to fan exhaust air cross section

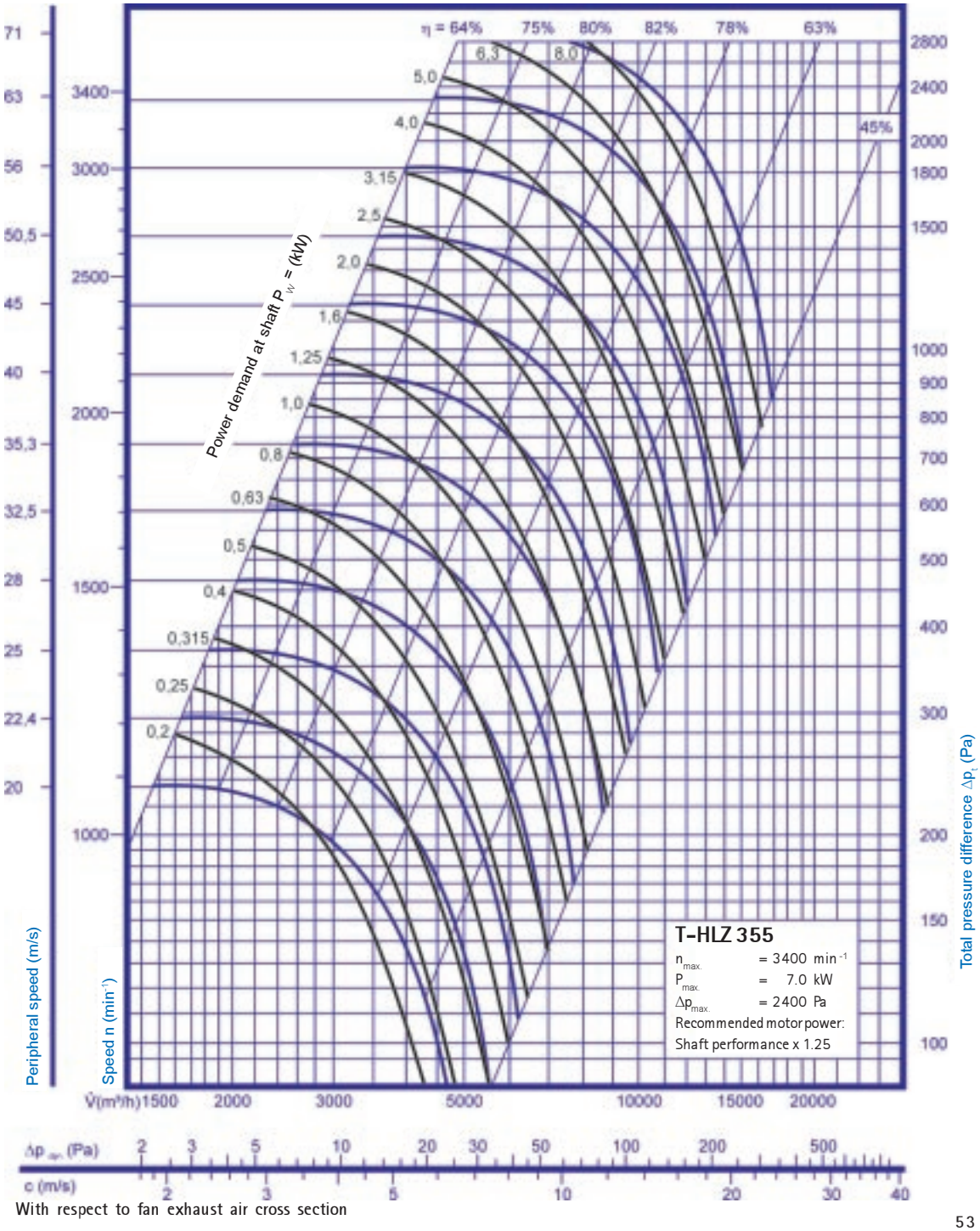
Exhaust variation: A, B, C

Fan/motor: Base frame design with motor tension carriage, vibration absorber and belt protection. Elastic connection between fan exhaust and casing
Flaps on the inside F possible only with exhaust A

Inspection door: in air direction right, left, top, if desired bottom, with turn locks

Fan diagram

Backward rotor blades

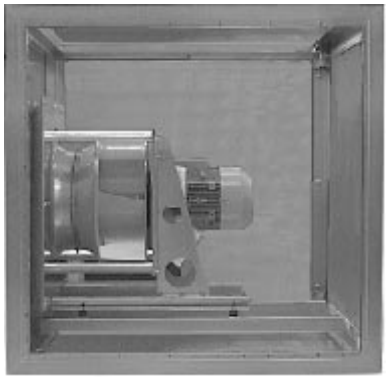


With respect to fan exhaust air cross section

Free-running fan wheel

KG 100 RAL

Description



Free-running fan wheel, unidirectional suction, with backward rotor blades, attached directly to the motor shaft.

Complete unit mounted on sturdy base frame with flexible vibration absorbers.

Rotor wheel statically and dynamically balanced. Complete motor protection with built-in PTC thermistors.

High fan efficiency even at low speed, almost without dynamic pressure ratios.

In connection with frequency converter, accurate adaptation to unit characteristics is possible.

Economical and energy-saving operation even under partial load conditions.

Low maintenance costs, no drive belt losses, no retightening required.

External pressure drops

Customer specification of the installation side pressure drops (e.g. duct system).

Internal pressure drops

The pressure drops of all components with respect to the volume flow (also fan element) are listed in the pressure drop tables of the individual chapters.
For components on the pressure-side, neither flow distributors nor incident flow elements are required, since the exhaust flows through the entire cross section.

Dynamic pressure drops

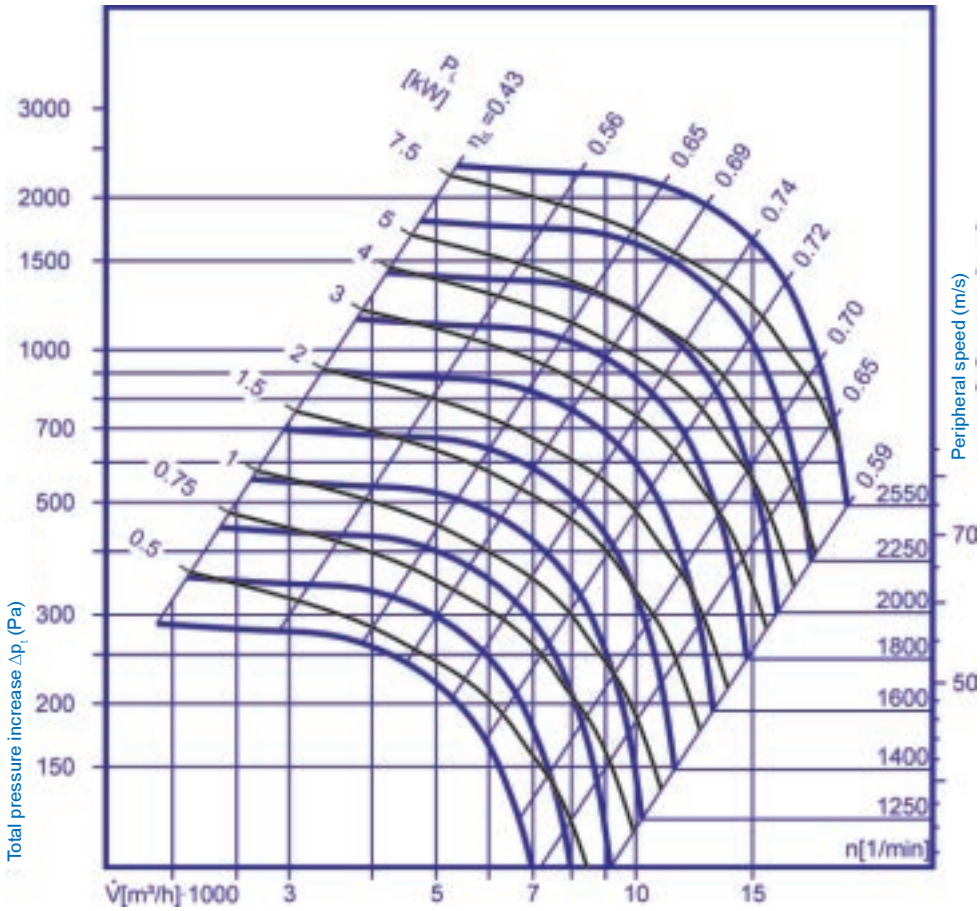
The dynamic pressure portions do not have to be considered in planning.

Performance data

KG size	Max. air volume m^3/h	Total pressure increase to Pa	Operational data* Fan power kW	Operational data* Fan speed min^{-1}	Standard data* Motor power kW	Standard data* Motor speed min^{-1}	Standard data* Motor current A
KG 100	10000	500	2.13	1542	3.00	1500	6.80
		1000	4.26	1896	5.50	1500	11.40
		1500	6.64	2203	7.50	1500	15.40

* Fan speed is controlled by frequency converter (f ≥ 50Hz)

Fan diagram
Rotor wheel Ø 560 mm



Total sound power level L_W in [dB]

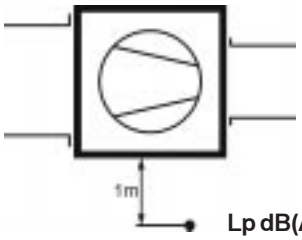
The accurate, device-specific sound data can be determined only for the specific order.

L_w [dB] = the computational total sound power of the fan on the suction/pressure-side.

		Total pressure increase Δp [Pa]					
	L_w	500	750	1000	1250	1500	2000
$\dot{V}$ [m³/h]	5,000	91	94	97	99	101	103
	7,500	92	96	98	100	102	104
	10,000	94	98	100	102	104	106

Sound pressure level Lp dB(A)

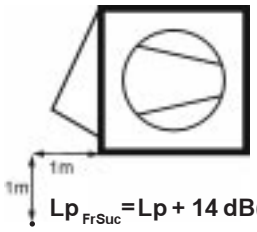
Lp dB(A) = sound pressure level at 1 m distance beside the fan element, measured in the free field with suction and pressure-side duct connection



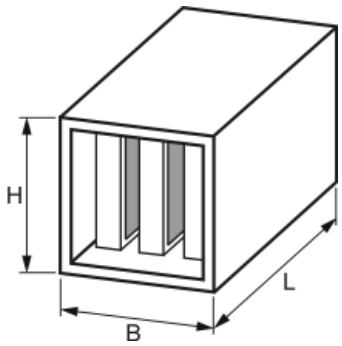
Forward rotor blades								
$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)
5,000	630	38	7,500	710	45	10,000	800	52
	860	42		900	46		1000	52
	1000	46		1120	49		1250	53
	1250	51		1400	54		1600	57
Backward rotor blades								
$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)
5,000	1400	45	7,500	1800	50	10,000	2250	53
	1800	51		2240	55		2500	58
	2240	57		2800	61		2800	60
	2800	63		3150	64		3150	62
Free-running fan wheel Ø 560mm								
$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)
5,000	1000	51	7,500	1350	52	10,000	2000	54
	1500	54		1550	56		2100	58
	1700	57		1700	58		2250	60
	2100	61		2100	62		2400	64

Sound pressure level Lp dB(A) beside the fan element

With free suction or exhaust opening



Silencer element



Dimensions (mm)

Height H	Width B	Length L			
		Type 2	Type 3	Type 4	Type 5
1040	1040	950	1130	1430	1640

Insertion loss De dB(A)

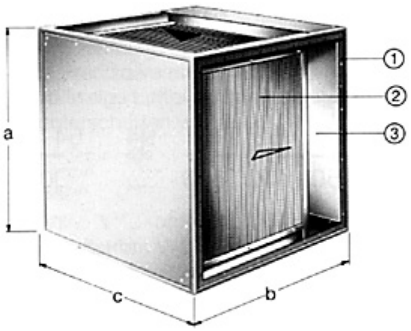
Type	Octave band (Hz)							
	63	125	250	500	1000	2000	4000	8000
2	6	12	20	20	22	16	12	11
3	7	14	24	25	26	20	14	13
4	8	17	30	32	34	25	18	17
5	9	21	37	37	41	29	21	19

For series connection of 2 silencers: $De = De_1 + De_2 - 3$ dB(A)

The accurate, device-specific heat recovery data can be determined only for the specific order.

Description KGX/KGXD

KGX air circulation horizontally/ vertically
KGXD air circulation diagonally



Hot air and cold air are led past each other in the cross current.

The heat recovery takes place via heat transmission from the hot to the cold air flow. The air flows are completely separated by aluminium plates.

- Heat recovery of up to over 80 %
- no moisture transmission
- no mobile parts, corrosion-resistant

① **Casing**
Design same as air conditioner

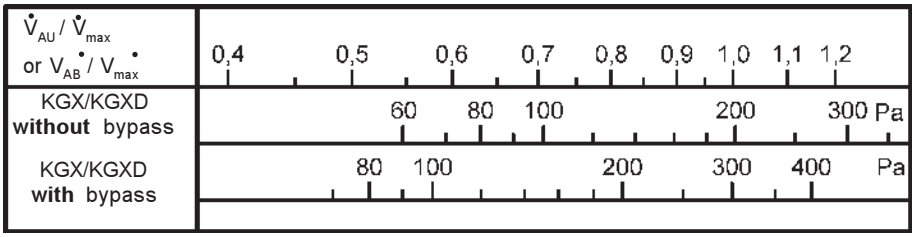
② **Heat exchanger**
Heat exchanger surfaces made of special corrosion-resistant aluminium plates.

③ **Internal bypass** (on request)
In order to prevent rime on the heat exchanger surfaces, the outside air can partially or entirely pass by the heat exchanger in the internal bypass.

Type	max. volume flow $\dot{V}$ [m³/h]		Dimensions [mm]			Weight [kg]	Condensate connector
	without int.bypass	wit int. bypass	a	b	c		R"
KGX 100	7,000	8,000	1040	1040	1040	310	-
KGXD 100	7,000	8,000	1040	1040	1640	520	1 ¼"

Pressure drop Δp [Pa]

for KGX/KGXD with or without internal bypass



Description RWT

RWT air circulation horizontally/vertically

A rotating storage capacity takes up heat from the withdrawn air stream and emits it to the outside air stream.

- Heat recovery of up to 80 %.
- Simple power control by adjusting the speed.
- With suitable rotor material, humidification of the supply air.
- Rime protection, defrosting device, pre-heating of air not required.
- Easy maintenance through inspection doors in the air incident flow elements.

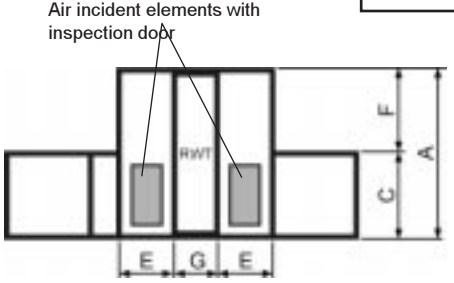
Pressure drop Δp [Pa]

Volume flow V [m³/h]	4,000	5,000	6,000	7,000	8,000	10,000
Pressure drop Δp [Pa]	44	55	66	77	90	110

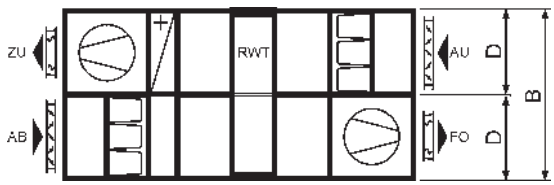
Dimensions

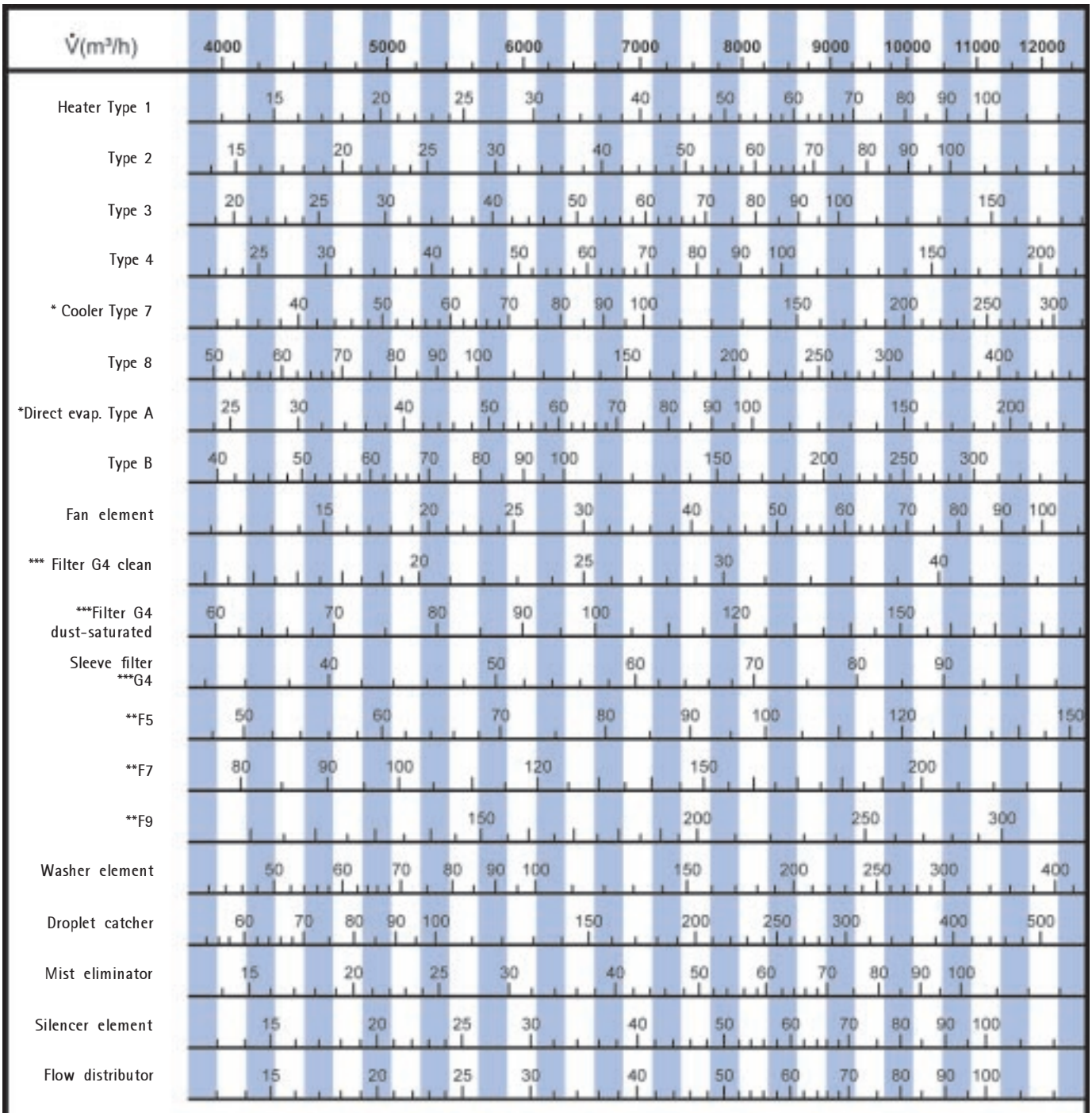
KG	A	B	C	D	E	F	G
100	1640	2080	1040	1040	600	580	400

Front view



Top view





**** Design sleeve filter F5 to F9:**

$$\left(\frac{\text{Start pressure difference + Final pressure difference}}{2}\right)$$

Final pressure differences:

Sleeve filter F5 = 200 Pa
Sleeve filter F7 = 200 Pa
Sleeve filter F9 = 300 Pa

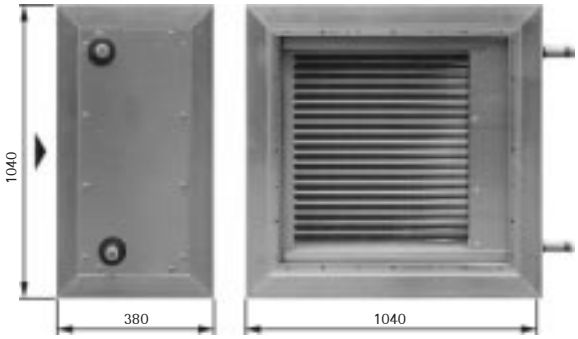
***** Design filter G4, G4 clean, sleeve filter G4**

Start pressure difference + 50 Pa
These filters may be used only as additional pre-filters.

* Add pressure drop from mist eliminator

Heater element KG 100 RAL

Heat exchanger for warm pump water PWW



Connections: in air direction right or left

Equipment:

Heat exchanger with Cu pipes and aluminium lamellas, collecting tank made of steel

Type	Connections	Water content
1	DN 25	3.5 l
2	1 ½"	5.5 l
3	1 ½"	7.5 l
4	1 ½"	9.5 l

permissible operating pressure: 16 bar
Test pressure 30 bar

on request:

Heat exchanger with Cu pipes and corrosion-resistant aluminium lamellas

Heat exchanger with Cu pipes and Cu lamellas

Heat exchanger made of steel - galvanised

Heat exchanger for steam

Heat exchanger for hot oil

Heat exchanger with bleed and drain connectors

Note:

Allow for sufficient room for extraction of the heat exchanger.

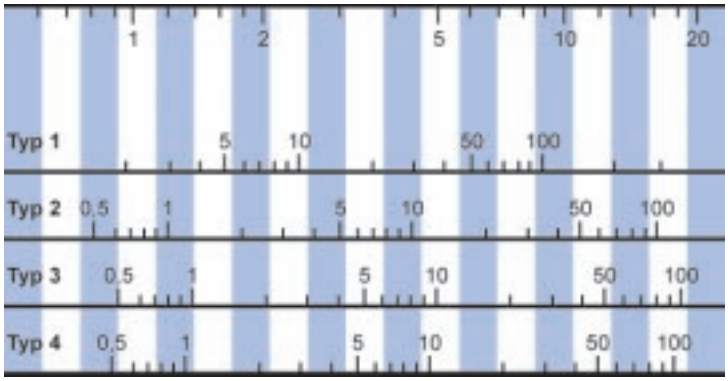
Water resistance max. 20kPa

Quantity of water $w = \frac{0.86 \cdot \dot{Q}}{\Delta t_W}$ (m³/h)

$\dot{Q}$ = Power in kW

$\Delta t_w = t_{WI} - t_{WO}$

Quantity of water w (m³/h)



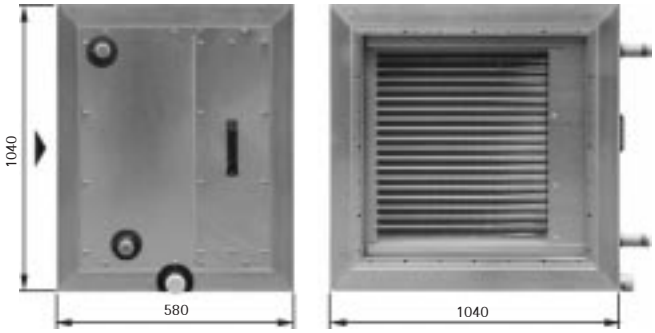
Type		1							
V̇ (m³/h)		4 000		6 300		8 000		10 000	
t_{WI} / t_{WO} °C / °C	t_{AI} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C
45/35	- 15	35.3	8	45.0	5	53.3	3	60.7	1
	- 10	31.7	11	40.4	8	47.8	6	54.4	5
	- 5	28.1	14	35.8	11	42.4	10	48.2	8
	± 0	24.6	17	31.3	15	37.0	13	42.0	12
	+ 5	21.1	20	26.9	18	31.7	16	36.0	15
	+ 10	17.7	23	22.5	21	26.5	20	30.0	19
	+ 15	14.3	26	18.1	24	21.3	23	24.1	22
	+ 20	10.9	28	13.8	27	16.2	26	18.3	26
50/40	- 15	38.8	11	49.6	7	58.8	4	66.9	3
	- 10	35.2	14	44.9	10	53.2	8	60.6	6
	- 5	31.6	17	40.3	14	47.7	11	54.3	10
	± 0	28.0	20	35.8	17	42.3	15	48.1	14
	+ 5	24.6	23	31.3	20	37.0	18	42.1	17
	+ 10	21.1	25	26.9	23	31.7	22	36.0	20
	+ 15	17.7	28	22.5	26	26.5	25	30.1	24
	+ 20	14.3	31	18.2	29	21.4	28	24.2	27
60/40	- 15	40.2	12	51.1	8	60.4	5	68.6	3
	- 10	36.6	15	46.5	11	54.8	9	62.3	7
	- 5	33.0	18	41.9	14	49.4	12	56.0	10
	± 0	29.5	21	37.4	17	44.0	15	49.9	14
	+ 5	26.0	24	32.9	21	38.7	19	43.8	18
	+ 10	22.5	26	28.4	24	33.4	22	37.8	21
	+ 15	19.1	29	24.0	27	28.2	25	31.8	24
	+ 20	15.7	32	19.6	30	23.0	29	25.9	28
70/50	- 15	47.3	16	60.4	12	71.4	9	81.2	7
	- 10	43.7	20	55.7	15	65.8	12	74.8	10
	- 5	40.1	23	51.0	18	60.3	16	68.5	14
	± 0	36.5	26	46.4	22	54.9	19	62.3	17
	+ 5	33.0	29	41.9	25	49.5	23	56.2	21
	+ 10	29.5	31	37.4	28	44.1	26	50.1	25
	+ 15	26.0	34	33.0	31	38.9	29	44.1	28
	+ 20	22.6	37	28.6	34	33.7	33	38.1	31
70/55	- 15	50.0	18	64.0	13	75.9	10	86.4	8
	- 10	46.3	21	59.3	17	70.2	14	80.0	12
	- 5	42.7	24	54.6	20	64.7	17	73.6	15
	± 0	39.1	27	50.0	23	59.2	21	67.3	19
	+ 5	35.6	30	45.4	27	53.8	24	61.2	23
	+ 10	32.1	33	40.9	30	48.4	28	55.0	26
	+ 15	28.6	36	36.5	33	43.1	31	49.0	30
	+ 20	25.2	39	32.1	36	37.9	34	43.0	33
80/50	- 15	49.0	17	62.3	13	73.5	9	83.5	7
	- 10	45.4	21	57.6	16	67.9	13	77.1	11
	- 5	41.7	24	52.9	19	62.4	16	70.8	14
	± 0	38.1	27	48.3	23	56.9	20	64.5	18
	+ 5	34.6	30	43.8	26	51.5	23	58.4	22
	+ 10	31.1	33	39.3	29	46.2	27	52.3	25
	+ 15	27.6	35	34.8	32	40.9	30	46.2	29
	+ 20	24.1	38	30.4	35	35.6	33	40.2	32
80/60	- 15	54.3	21	69.5	16	82.3	12	93.7	10
	- 10	50.6	24	64.7	19	76.7	16	87.3	14
	- 5	47.0	27	60.0	23	71.1	19	80.9	17
	± 0	43.4	30	55.4	26	65.6	23	74.6	21
	+ 5	39.8	33	50.8	29	60.1	26	68.4	25
	+ 10	36.3	36	46.3	32	54.8	30	62.2	28
	+ 15	32.8	39	41.8	36	49.4	33	56.1	32
	+ 20	29.4	42	37.4	39	44.2	37	50.1	35
90/70	- 15	61.2	26	78.5	20	93.1	16	106.1	13
	- 10	57.5	29	73.7	23	87.4	20	99.5	17
	- 5	53.8	32	68.9	27	81.7	23	93.1	21
	± 0	50.2	35	64.2	30	76.2	27	86.7	24
	+ 5	46.6	38	59.6	33	70.7	30	80.4	28
	+ 10	43.1	41	55.1	37	65.2	34	74.2	32
	+ 15	39.6	44	50.6	40	59.9	37	68.1	35
	+ 20	36.1	47	46.1	43	54.5	41	62.0	39

Other operating conditions on request!

2								3								4							
4 000		6 300		8 000		10 000		4 000		6 300		8 000		10 000		4 000		6 300		8 000		10 000	
$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C
44.1	14	57.4	10	68.7	8	78.7	6	56.1	22	75.1	18	91.6	15	106.4	13	64.9	28	89.1	24	110.6	22	130.1	19
39.6	17	51.4	13	61.5	11	70.5	9	50.5	24	67.5	20	82.2	18	95.5	16	58.5	30	80.3	26	99.5	24	117.0	22
35.1	19	45.5	16	54.4	14	62.3	12	44.9	36	60.0	23	73.0	20	84.7	18	52.2	31	71.5	28	88.6	26	104.1	24
30.7	22	39.7	19	47.5	17	54.3	15	39.4	28	52.5	25	63.9	22	74.1	21	46.0	32	62.9	29	77.8	27	91.3	26
26.3	24	34.0	21	40.6	19	46.4	18	34.0	29	45.2	27	54.9	25	63.6	23	39.9	33	54.4	31	67.2	29	78.8	28
22.0	26	28.4	24	33.8	22	38.6	21	28.7	31	38.0	28	46.1	27	53.3	25	33.8	35	46.0	32	56.7	31	66.3	29
17.7	28	22.8	26	27.1	25	30.8	24	23.4	32	30.9	30	37.3	29	43.0	28	27.8	36	37.7	34	46.3	32	54.0	31
13.5	30	17.3	29	20.4	28	23.2	27	18.1	34	23.8	32	28.6	31	32.9	30	21.8	36	29.4	35	35.9	34	41.8	33
48.5	17	63.2	13	75.8	10	86.9	8	61.4	26	82.3	21	100.5	18	116.9	16	70.6	32	97.3	28	120.9	25	142.4	23
44.0	20	57.2	16	68.5	13	78.6	11	55.7	28	74.7	24	91.1	21	105.9	19	64.3	33	88.4	30	109.8	27	129.2	25
39.5	22	51.3	19	61.4	16	70.4	14	50.1	30	67.1	26	81.9	23	95.1	21	58.0	35	79.6	32	98.8	29	116.2	27
35.0	25	45.5	21	54.4	19	62.3	17	44.6	31	59.7	28	72.7	26	84.4	24	51.8	36	71.0	33	88.0	31	103.5	29
30.6	27	39.7	24	47.5	22	54.3	21	39.2	33	52.3	30	63.7	28	73.9	26	45.6	38	62.5	35	77.4	33	90.9	31
26.3	29	34.0	26	40.6	25	46.5	24	33.9	35	45.1	32	54.8	30	63.5	28	39.6	39	54.1	36	66.9	34	78.4	33
22.0	31	28.4	29	33.9	28	38.7	26	28.6	36	37.9	34	46.0	32	53.5	31	33.6	40	45.8	38	56.5	36	66.1	35
17.8	33	22.9	31	27.2	30	31.0	29	23.3	38	30.9	35	37.3	34	43.1	33	27.7	41	37.5	39	46.2	37	54.0	36
50.2	18	64.9	14	77.4	11	88.4	8	64.8	28	86.2	23	104.7	20	121.3	17	75.8	35	103.5	31	127.9	27	150.0	25
45.6	21	58.9	17	70.2	14	80.2	12	59.1	30	78.5	25	95.3	22	110.3	20	69.4	37	94.6	33	116.7	29	136.8	27
41.1	23	53.0	19	63.1	17	72.0	15	53.5	32	70.9	28	86.0	25	99.5	22	63.0	38	85.8	34	105.7	31	123.8	29
36.7	26	47.2	22	56.1	20	64.0	18	47.9	34	63.5	30	76.8	27	88.8	25	56.7	40	77.0	36	94.9	33	110.9	31
32.2	28	41.4	25	49.2	23	56.0	21	42.5	35	56.1	32	67.8	29	78.2	27	50.5	41	68.4	38	84.1	35	98.2	33
27.9	30	35.7	27	42.3	25	48.2	24	37.0	37	48.7	34	58.8	31	67.8	30	44.4	42	59.9	39	73.4	37	85.6	35
23.6	32	30.1	30	35.6	28	40.4	27	31.6	38	41.5	35	49.9	33	57.4	32	38.2	43	51.4	40	62.8	38	73.1	37
19.3	34	24.5	32	28.8	31	32.7	30	26.2	40	34.2	37	41.0	35	47.1	34	32.1	44	42.9	41	52.2	40	60.6	38
59.1	24	76.7	19	91.8	15	105.1	13	75.3	35	100.8	30	122.8	26	142.6	23	87.3	43	119.8	38	148.6	34	174.7	31
54.5	27	70.7	22	84.5	19	96.7	16	69.6	37	93.0	32	113.3	28	131.5	26	80.9	45	110.9	40	137.4	36	161.5	34
50.0	29	64.7	25	77.3	22	88.5	19	64.0	39	85.4	34	104.0	31	120.6	28	74.5	46	102.1	42	126.4	39	148.4	36
45.5	32	58.9	28	70.2	25	80.3	23	58.5	41	77.9	36	94.8	33	109.8	31	68.3	48	93.4	44	115.5	41	135.5	38
41.0	34	53.1	30	63.2	28	72.3	26	53.0	43	70.5	39	85.6	36	99.2	33	62.1	49	84.8	45	104.7	42	122.8	40
36.7	37	47.3	33	56.3	30	64.3	29	47.6	45	63.2	41	76.6	38	88.7	36	56.0	51	76.3	47	94.1	44	110.2	42
32.3	39	41.6	36	49.5	33	56.5	32	42.2	46	55.9	43	67.7	40	78.3	38	50.0	52	67.8	48	83.5	46	97.7	44
28.0	41	36.0	38	42.7	36	48.7	35	36.9	48	48.7	44	58.9	42	68.0	40	43.9	53	59.5	50	73.1	47	85.4	46
62.5	26	81.5	21	97.7	17	112.2	15	78.6	37	105.7	32	129.2	28	150.4	25	90.2	45	124.4	40	154.89	36	182.6	33
57.8	29	75.4	24	90.4	21	103.7	18	72.9	39	98.0	34	119.7	30	139.3	28	83.8	47	115.5	42	143.7	39	169.3	36
53.3	32	69.4	27	83.2	24	95.4	21	67.3	41	90.4	37	110.4	33	128.3	30	77.5	48	106.7	44	132.6	41	156.2	38
48.8	34	63.5	30	76.0	27	87.2	25	61.8	43	82.8	39	101.1	36	117.5	33	71.2	50	98.0	46	121.8	43	143.4	40
44.3	37	57.7	33	69.0	30	79.1	28	56.3	45	75.4	41	92.0	38	106.9	36	65.1	52	89.5	48	111.0	45	130.6	42
40.0	39	51.9	35	62.1	33	71.1	31	50.9	47	68.1	43	83.0	40	96.3	38	59.0	53	81.0	49	100.4	47	118.1	44
35.6	41	46.2	38	55.2	35	63.2	34	45.6	49	60.9	45	74.1	42	86.0	40	53.0	54	72.7	51	90.0	48	105.7	46
31.4	44	40.6	40	48.4	38	55.4	37	40.3	50	53.7	47	65.3	45	75.7	43	47.1	55	64.4	52	79.6	50	93.4	48
61.1	26	79.0	20	94.1	16	107.6	14	78.9	37	105.0	31	127.6	27	147.7	24	92.5	46	126.2	41	156.0	37	182.9	33
56.5	28	72.9	23	86.9	19	99.2	17	73.2	39	97.3	34	118.1	30	136.6	27	86.0	48	117.2	43	144.7	39	169.6	36
51.9	31	67.0	26	79.7	22	90.9	20	67.6	42	89.6	36	108.7	32	125.7	30	79.6	50	108.4	45	133.6	41	156.4	38
47.4	33	61.1	29	72.6	25	82.8	23	62.0	43	82.1	38	99.4	35	114.9	32	73.3	51	99.6	47	122.6	43	143.5	40
43.0	36	55.2	31	65.6	28	74.7	26	56.4	45	74.6	41	90.2	37	104.2	35	67.0	53	90.9	48	111.7	45	130.6	42
38.6	38	49.4	34	58.6	31	66.7	29	50.9	47	67.2	43	81.1	39	93.6	37	60.8	54	82.2	50	101.0	47	117.8	44
34.2	40	43.7	37	51.7	34	58.8	32	45.5	49	59.8	44	72.1	42	83.0	40	54.6	55	73.7	51	90.3	48	105.2	46
29.8	42	38.0	39	44.9	37	51.0	35	40.1	50	52.5	46	63.1	44	72.6	42	48.5	56	65.1	53	79.6	50	92.6	48
67.8	30	88.4	24	105.9	20	121.5	17	85.6	42	115.0	36	140.5	32	163.4	28	98.4	50	135.6	45	168.8	41	198.8	38
63.2	33	82.3	27	98.6	23	113.0	21	79.9	44	107.2	38	130.9	34	152.2	31	92.0	52	126.7	47	157.5	43	185.5	40
58.6	35	76.3	30	91.3	26	104.7	24	74.3	46	99.6	41	121.5	37	141.2	34	85.6	54	117.9	49	146.4	45	172.3	42
54.1	38	70.3	33	84.2	30	96.4	27	68.7	48	92.0	43	112.2	39	130.4	37	79.4	56	109.2	51	135.5	48	159.4	45
49.6	40	64.5	36	77.1	33	88.3	30	63.2	50	84.6	45	103.1	42	119.7	39	73.3	57	100.6	53	124.7	50	146.6	47
45.2	43	58.7	38	70.1	35	80.3	33	57.8	52	77.2	47	94.0	44	109.1	42	67.2	59	92.1	55	114.1	51	134.0	49
40.9	45	53.0	41	63.2	38	72.3	36	52.2	54	70.0	49	85.1	46	98.7	44	61.2	60	83.7	56	103.6	53	121.6	51
36.6	48	47.3	44	56.4	41	64.5	39	47.2	55	62.8	51	76.3	49	88.3	47	55.2	62	75.4	58	93.1	55	109.2	53
76.3	36	99.8	29	119.8	25	137.6	21	95.6	48	128.8	42	157.7	37	183.8	34	109.1	57	151.6	52	188.4	47	222.2	44
71.7	38	93.6	32	112.4	28	129.1	25	89.9	51	121.0	45	148.1	40	172.5	37	102.7	59	142.0	54	177.0	50	208.8	46
67.1	41	87.6	35	105.1	31	120.6	28	84.2	53	113.3	47	138.7	43	161.5	39	96.4	61	133.2	56	165.9	52	195.7	49
62.5	44	81.6	38	97.8	34	112.3	32	78.6	55	105.8	49	129.3	45	150.5	42	90.1	63	124.5	58	154.9	54	182.7	51
58.0	46	75.7	41	90.7	37	104.1	35	73.2	57	98.3	52	120.1	48	139.8	45	84.0	65	115.9	60	144.1	56	169.9	54
53.6	49	69.8	44	83.7	40	95.9	38	67.7	59	90.9	54	111.0	50	129.1	48	77.9	67	107.4	62	133.5	59	157.2	56
49.2	51	64.1	47	76.7	43	87.9	41	62.4	61	83.6	56	102.1	53	118.6	50	71.9	68	99.0	64	123.0	60	144.7	58
44.9	54	58.4	49	69.8	46	80.0	44	57.1	63	76.4	58	93.2	55	108.2	53	66.0	70	90.7	65	112.6	62	132.4	60

Exchanger for cold pump water PKW / direct evaporator

Performance data for direct evaporator for cooling agent R134a, for other cooling agents on request.



Air direction: horizontal:
Connections: in air direction right or left

Equipment:

Exchanger for cold water with Cu pipes and aluminium lamellas,
Collecting tank made of Cu.

Direct evaporator with Cu pipes and aluminium lamellas, cooling agent distributor.

Mist eliminator,
Condensate basin with condensate connector on side, male thread 1¼",
Droplet catcher for air direction vertical.

Type	Connections	Contents
7	2"	15 l
8	2"	24 l
A	DN 28 cooling agent inlet DN 35 cooling agent outlet	8 l
B	DN 28 cooling agent inlet DN 42 cooling agent outlet	12 l

permissible operating pressure: 16 bar
Test pressure 30 bar

on request:

Exchanger for cold water with Cu pipes
and corrosion-resistant aluminium lamellas
Exchanger for cold water with Cu pipes and Cu lamellas
Exchanger for cold water with bleed and drain connector

Note:

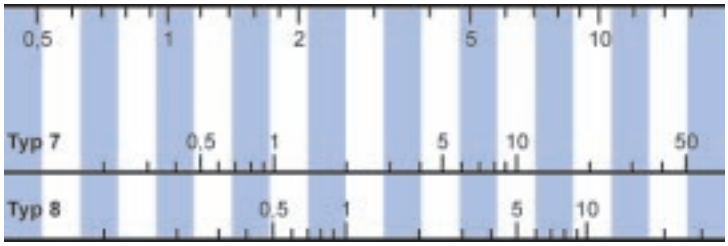
Allow for sufficient room for extraction of the exchanger.
Build in siphon on site with the condensate connector.

Water resistance max. 50kPa

Quantity of water $w = \frac{0.86 \cdot \dot{Q}}{\Delta t_W}$ (m³/h)

$\dot{Q}$ = Power in kW
$\Delta t_w = t_{WI} - t_{WO}$

Quantity of water w (m³/h)



V̇ (m³/h)		4 000		6 300		8 000		10 000	
PKW	t_{AI} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C
Exchanger for cold water type 7									
4/8	32	43.7	10.2	60.1	11.9	74.6	13.2	87.8	14.3
	28	37.2	9.8	51.0	11.3	63.1	12.4	74.0	13.3
	26	33.1	9.3	45.4	10.7	56.2	11.7	65.9	12.5
	25	31.1	9.1	42.6	10.4	52.7	11.4	61.8	12.2
5/10	32	40.0	11.4	54.8	13.0	67.8	14.2	79.7	15.2
	28	33.4	11.0	45.6	12.4	56.3	13.5	66.0	14.3
	26	29.3	10.5	40.0	11.8	49.4	12.8	57.8	13.5
	25	27.3	10.3	37.2	11.5	45.9	12.4	53.8	13.1
6/12	32	36.1	12.5	49.3	14.0	60.9	15.2	71.4	16.1
	28	29.5	12.1	40.1	13.4	49.4	14.4	57.8	15.2
	26	25.4	11.6	34.5	12.8	42.5	13.7	49.7	14.4
	25	23.4	11.4	31.7	12.5	39.0	13.3	45.6	13.9
8/12	32	34.9	12.9	48.1	14.3	59.8	15.4	70.4	16.2
	28	28.4	12.5	38.9	13.7	48.2	14.5	56.7	15.3
	26	24.2	12.0	33.2	13.0	41.2	13.8	48.4	14.4
	25	22.1	11.7	30.4	12.7	33.6	12.4	44.3	14.0
Type 8									
4/8	32	52.1	6.1	74.7	7.2	95.7	8.1	115.3	8.9
	28	44.9	6.2	64.1	7.1	81.8	7.9	98.3	8.7
	26	39.9	6.1	56.9	6.9	72.7	7.7	87.3	8.3
	25	37.5	6.0	53.5	6.8	68.2	7.5	81.9	8.2
5/10	32	48.0	7.4	68.6	8.5	87.5	9.3	105.1	10.1
	28	40.7	7.5	57.8	8.4	73.5	9.2	88.0	9.9
	26	35.7	7.3	50.7	8.2	64.4	8.9	77.1	9.6
	25	33.3	7.3	47.1	8.1	59.8	8.8	71.6	9.4
6/12	32	43.7	8.7	62.0	9.7	78.9	10.5	94.6	11.3
	28	36.3	8.7	51.2	9.7	64.8	10.5	77.4	11.1
	26	31.2	8.6	44.0	9.5	55.6	10.2	66.4	10.7
	25	28.7	8.6	40.4	9.4	51.1	10.0	60.9	10.6
8/12	32	41.2	9.7	59.1	10.5	75.6	11.2	91.2	11.8
	28	33.9	9.7	48.4	10.4	61.7	11.0	74.2	11.6
	26	28.9	9.5	41.2	10.2	52.5	10.7	63.1	11.2
	25	26.4	9.5	37.6	10.1	47.9	10.6	57.5	11.0
Evap-temp. °C		**Direct evaporator type A**							
2,0	32	36.1	13.0	44.9	15.5	51.2	17.3	56.1	18.7
	28	31.8	11.8	39.5	14.0	45.1	15.6	49.4	16.8
	26	28.9	11.0	35.9	13.1	40.9	14.6	44.8	15.6
	25	27.4	10.7	34.0	12.6	38.8	14.0	42.5	15.1
5.0	32	32.5	14.2	40.5	16.5	46.4	18.1	50.9	19.3
	28	28.1	13.0	35.0	15.0	40.1	16.4	44.0	17.4
	26	25.1	12.3	31.3	14.1	35.8	15.4	39.3	16.3
	25	23.6	12.0	29.4	13.7	33.7	14.9	36.9	15.8
8.0	32	28.1	15.6	35.2	17.6	40.4	19.0	44.4	20.1
	28	23.7	14.5	29.6	16.1	34.0	17.3	37.3	18.2
	26	20.7	13.8	25.8	15.3	29.6	14.6	32.5	17.2
	25	19.2	13.4	23.9	14.9	27.4	15.9	30.1	16.6
Type B									
2.0	32	43.5	9.6	56.4	12.0	66.3	13.7	74.1	15.1
	28	38.4	8.9	49.8	10.9	58.5	12.5	65.3	13.7
	26	34.9	8.3	45.2	10.2	53.1	11.7	59.2	12.8
	25	33.2	8.0	42.9	9.9	50.4	11.3	56.2	12.4
5.0	32	39.0	11.2	50.8	13.2	59.9	14.8	67.1	16.0
	28	33.9	10.5	44.0	12.2	51.8	13.6	58.0	14.6
	26	30.3	10.0	39.4	11.6	46.3	12.8	51.8	13.8
	25	28.5	9.7	37.0	11.2	43.6	12.4	48.7	13.3
8.0	32	33.8	13.0	44.1	14.7	52.0	16.0	58.4	17.0
	28	28.5	12.3	37.2	13.7	43.8	14.8	49.2	15.7
	26	24.9	11.8	32.4	13.1	38.2	14.1	42.8	14.9
	25	23.1	11.5	30.1	12.8	35.4	13.7	39.7	14.5

Air inlet state: 32°C / 40 % r.h., 28°C / 47 % r.h.
26°C / 49 % r.h., 25°C / 50 % r.h.

Note: min. evaporation temperature 2°C.

Other operating conditions on request.

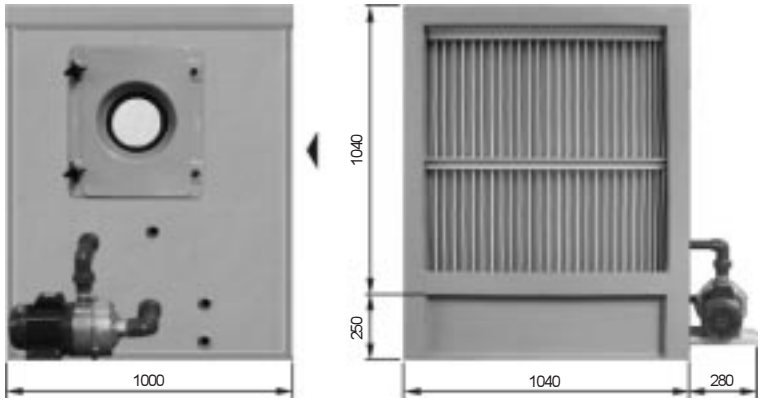
Washer / Vapour humidifier element KG 100 RAL

Washer element

Casing
Plastic (glass fibre reinforced plastic)

Inspection door and connections
in air direction right or left

Equipment
Block pomp 1.85 kW, 230/400 V, Δ/Y; 8.1/4.7 A, 50 Hz;
Stainless steel pump
Nozzle holder with self-cleaning nozzles spraying against air flow
Washer basin with all-round inclination towards the drain connector
Pump with complete piping on suction and pressure side



Inspection door with inspection window
Flow rectifier
Mist eliminator
} temperature-resistant to 70°C, dismantable

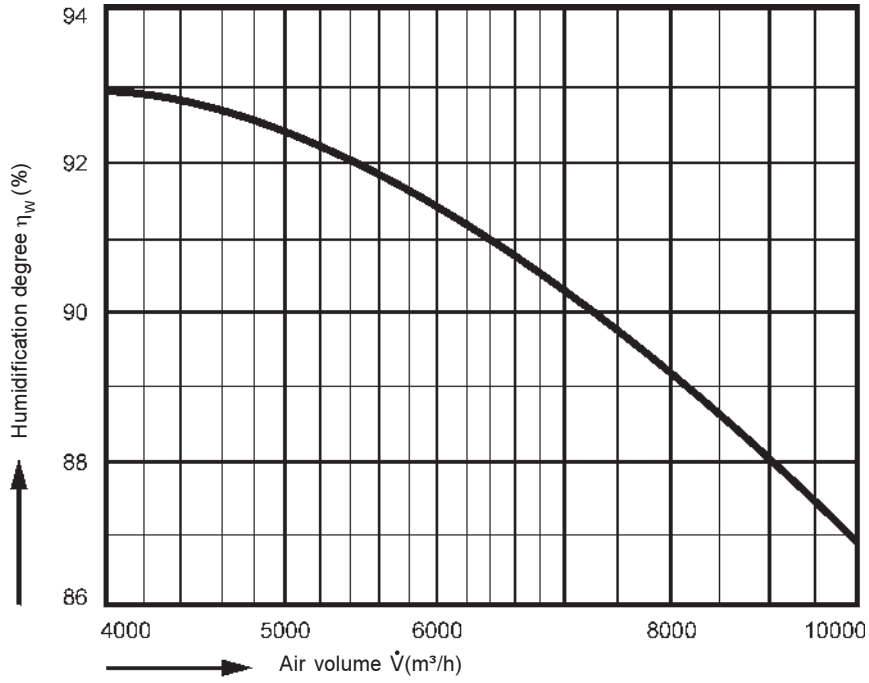
Inlet device, male thread 3/4", with float valve and float, overflow spout DN 40, outlet chute DN 40, dry-run protection for pump, de-sludging system, lighting 230 V / 60 W, darkening for inspection window.
On request:
Drain and overflow device with siphon on the inside, thermometer, pressure gauge

Humidification degree η_W

$$\eta_W = \frac{x_2 - x_1}{x_s - x_1}$$

Index
x = water content of air
1 = air inlet
2 = air outlet
S = saturation state

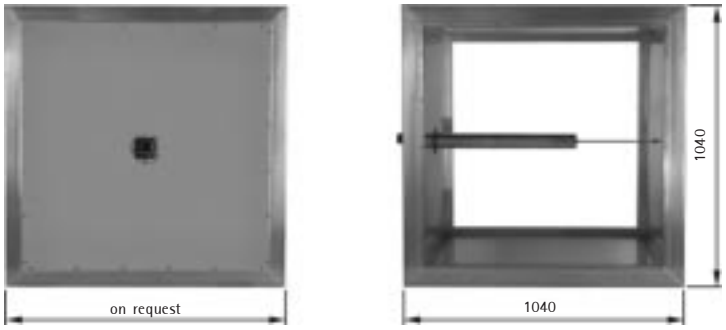
with air temperature 20°C, density 1.2 kg/m³, water pressure 2.0 bar, quantity of water 9500 l/h



Vapour humidifier element

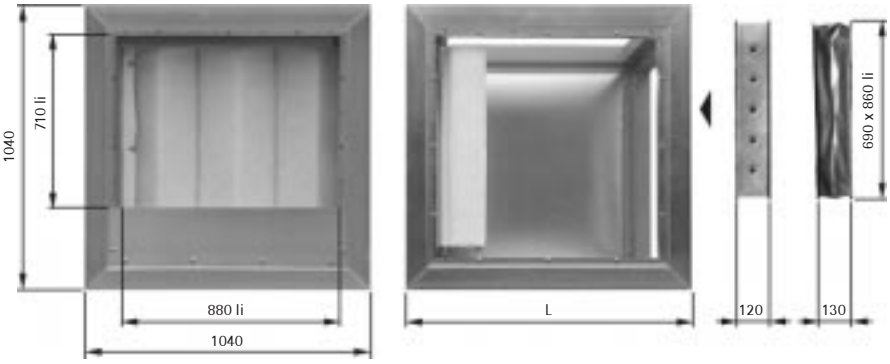
suitable for vapour lances of different manufacturers

Design:
- Humidifier chamber with basin made of corrosion-resistant material
- Inspection door
- Basin with drain 1¼" male thread made of corrosion-resistant material
- Lengths on request
- Inspection hole double-walled Ø 150mm
- Lighting

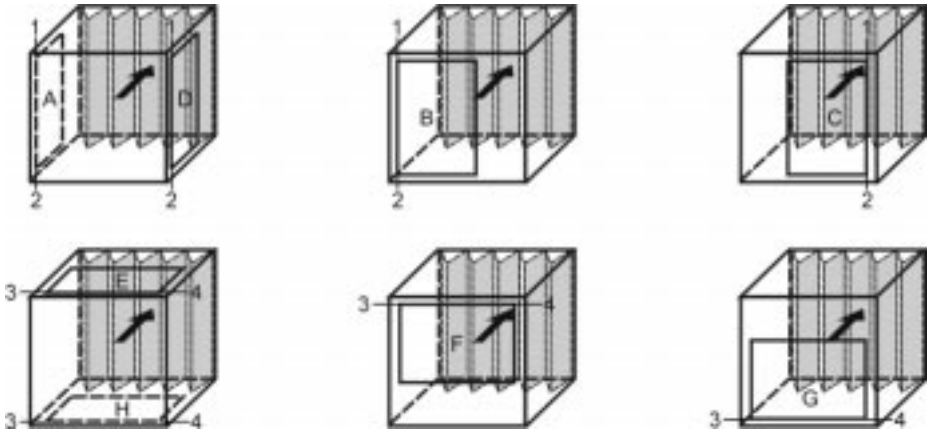


Filter/air mixture element L = 1040 mm
combined

Air mixture element/exhaust air element
L = 870 mm



Suction variations:



One external flap		Two external flaps joined with linkage.	
Flap arrangement	Flap drive	Flap arrangement	Flap drive
A	1, 2	A + B	1, 2
B	1, 2	A + C	1, 2
C	1, 2	A + D	1, 2
D	1, 2	B + D	1, 2
E	3, 4	C + D	1, 2
F	3, 4	E + F	3, 4
G	3, 4	E + G	3, 4
H	3, 4	E + H	3, 4
		F + H	3, 4
		G + H	3, 4

One internal flap		Two internal flaps joined with linkage.	
Flap arrangement	Flap drive	Flap arrangement	Flap drive
A	1, 2	A + C	1, 2
B	1, 2	A + D	1, 2
C	1, 2	B + D	1, 2
D	1, 2	E + G	3, 4
E	3, 4	E + G	3, 4
F	3, 4	F + H	3, 4
G	3, 4		
H	3, 4		

Drive torque for 1 flap 4 Nm (airtight flap according to DIN 1946: 18 Nm)

Inspection door:

in air direction right, left, top, bottom
required space for filter extraction: min. 0.5 m
for air mixture element/exhaust air element inspection door only on request in air direction right/left

Fan element

L 1290
W 1290
H 1290

L 1290
W 1290
H 1290

Heater element

* with extractable frost protection frame L = 580

L 380
W 1290
H 1290

Cooling element

L 580
W 1290
H 1290

Washer element

L 1000
W 1290
H 1540

Mixing and filter element

L 1290
W 1290
H 1290

Mixing and exhaust air element

L 950
W 1290
H 1290

Sleeve filter element

L 950
W 1290
H 1290

Silencer element

L ....
W 1290
H 1290

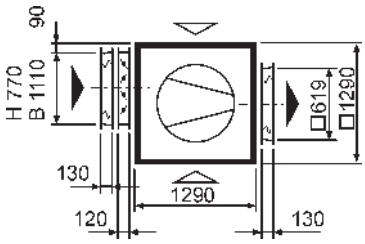
Empty element / vapour humidifier empty element

L ....
W 1290
H 1290

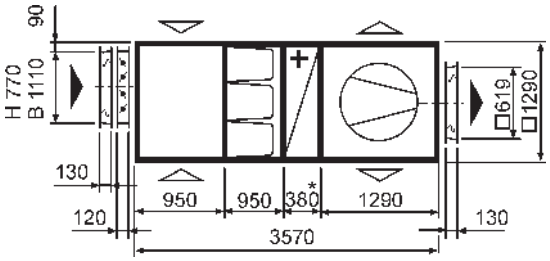
KGX

L 1290
W 1290
H 1290

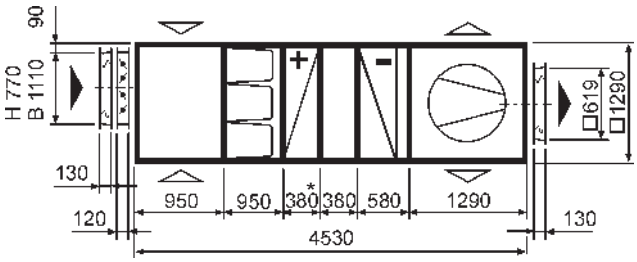
Withdrawn air device



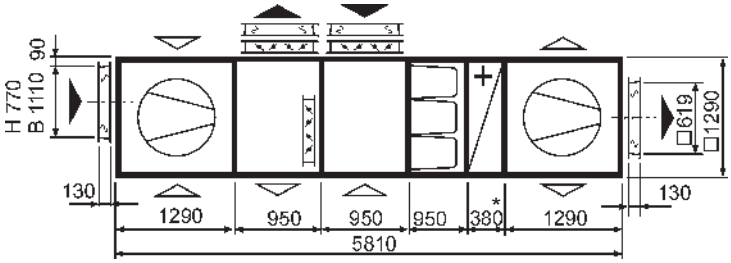
Supply air device



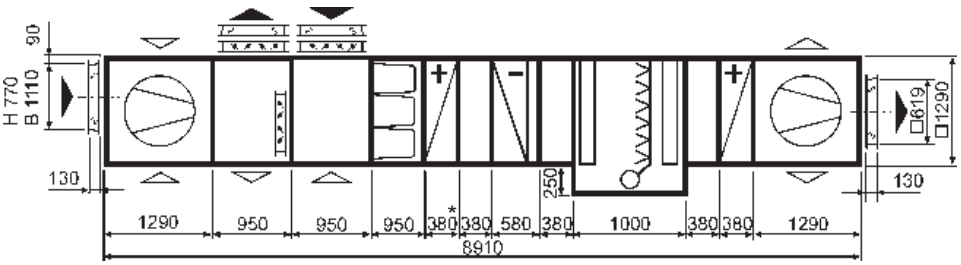
Partial air conditioner

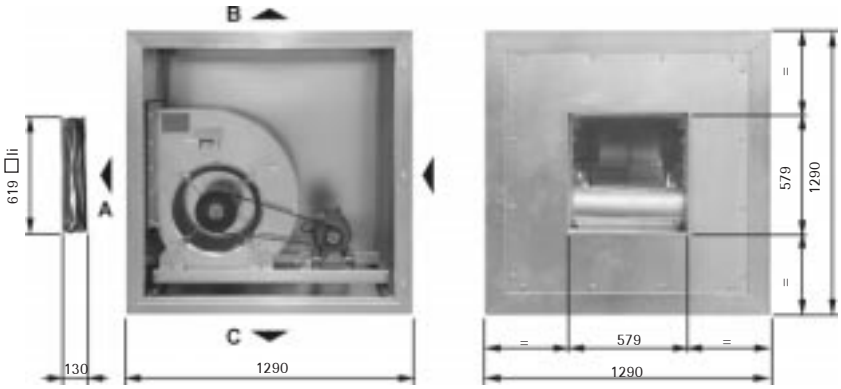


Combined supply and withdrawn air device



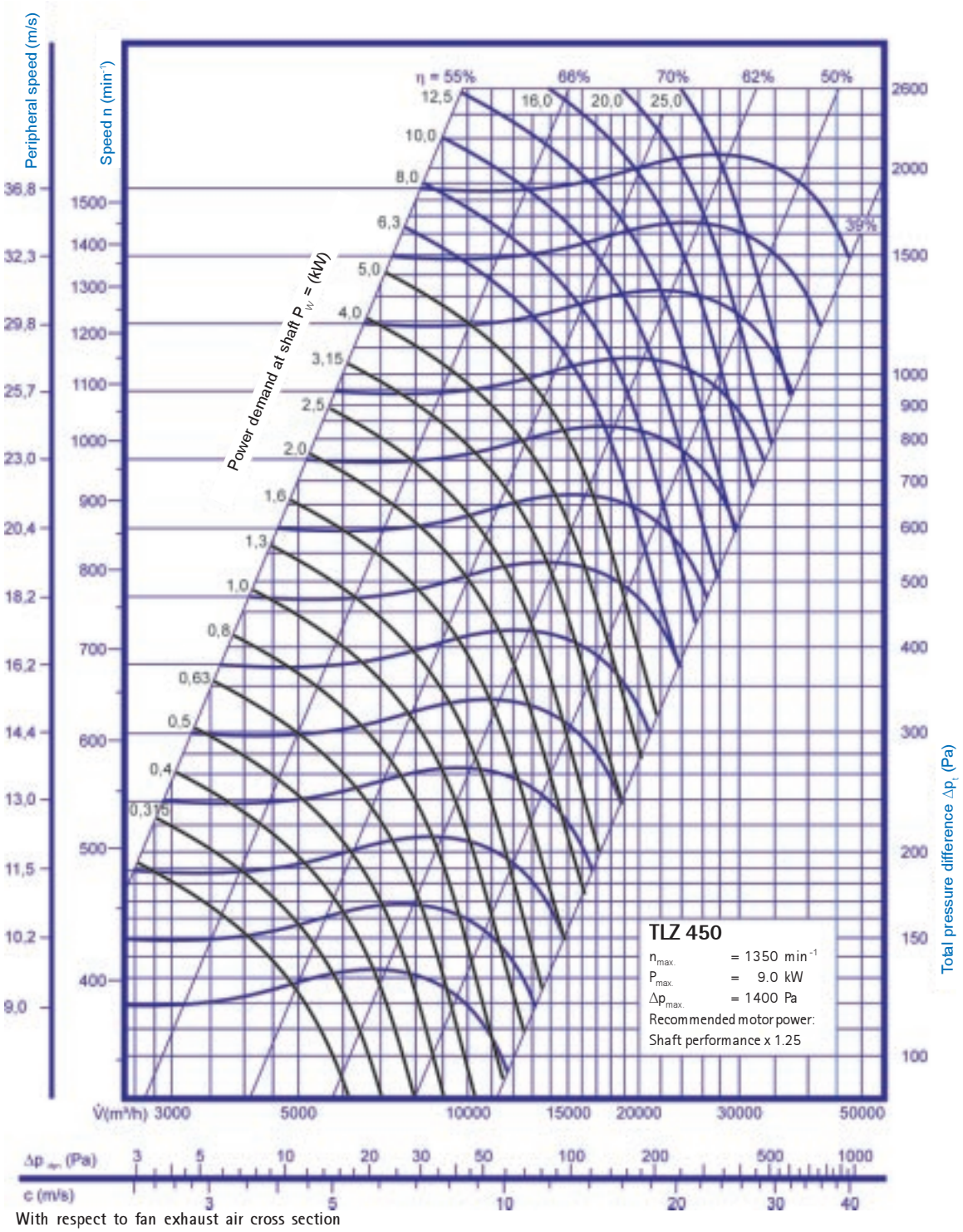
Combined climate control, supply and withdrawn air device





Fan diagram

Forward rotor blades permissible for motor output up to 2.2 kW



With respect to fan exhaust air cross section

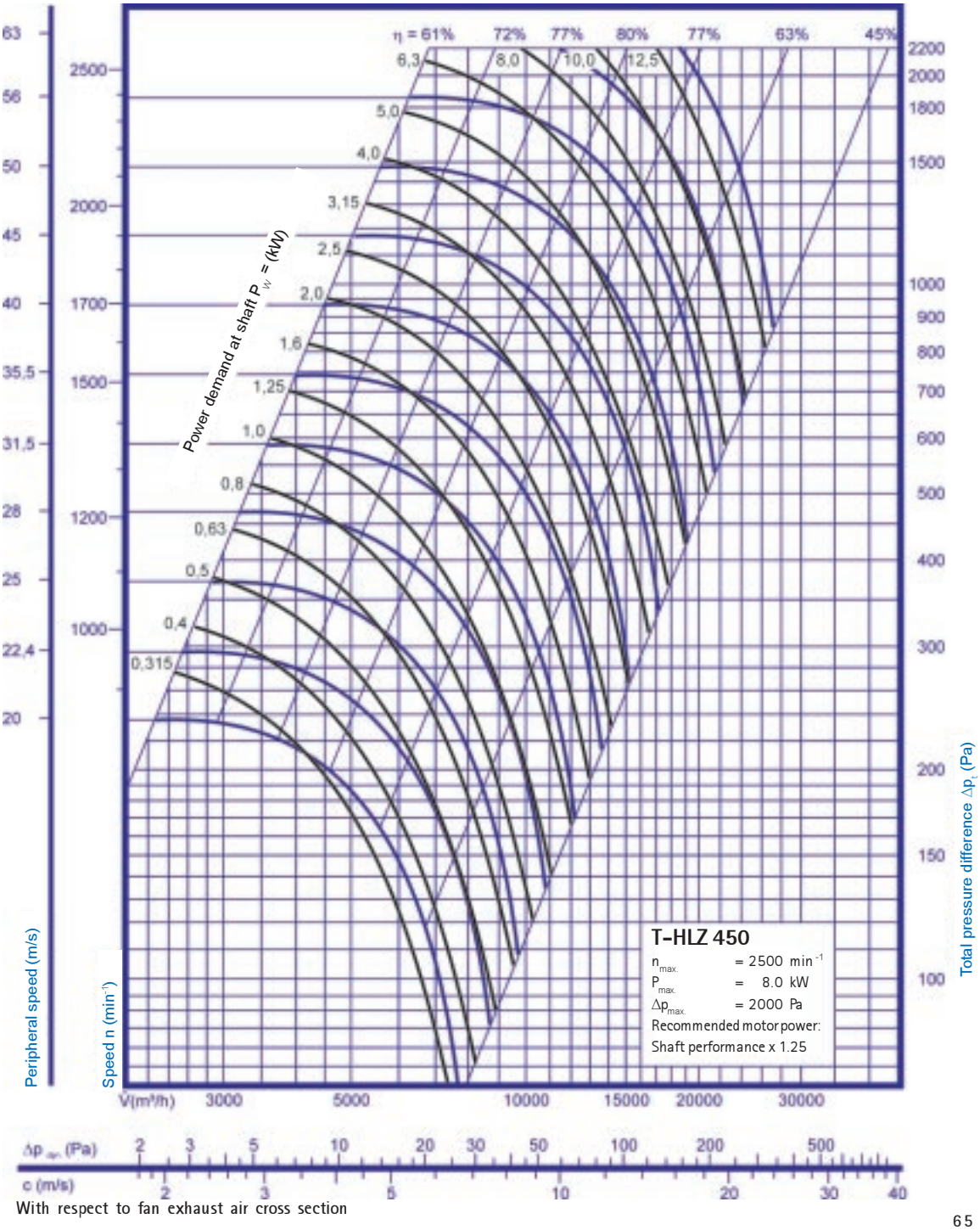
Exhaust variation: A, B, C

Fan/motor: Base frame design with motor tension carriage, vibration absorber and belt protection. Elastic connection between fan exhaust and casing
Flaps on the inside E and F possible

Inspection door: in air direction right, left, with turn locks

Fan diagram

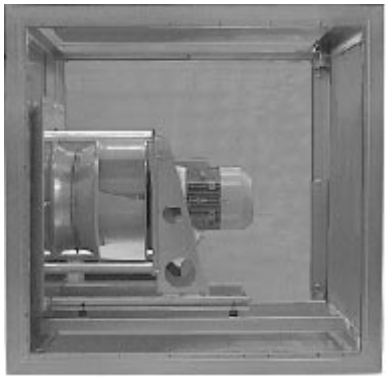
Backward rotor blades



With respect to fan exhaust air cross section

Free-running fan wheel KG 160 RAL

Description



Free-running fan wheel, unidirectional suction, with backward rotor blades, attached directly to the motor shaft.

Complete unit mounted on sturdy base frame with flexible vibration absorbers.

Rotor wheel statically and dynamically balanced. Complete motor protection with built-in PTC thermistors.

High fan efficiency even at low speed, almost without dynamic pressure ratios.

In connection with frequency converter, accurate adaptation to unit characteristics is possible.

Economical and energy-saving operation even under partial load conditions.

Low maintenance costs, no drive belt losses, no retightening required.

External pressure drops

Customer specification of the installation side pressure drops (e.g. duct system).

Internal pressure drops

The pressure drops of all components with respect to the volume flow (also fan element) are listed in the pressure drop tables of the individual chapters.
For components on the pressure-side, neither flow distributors nor incident flow elements are required, since the exhaust flows through the entire cross section.

Dynamic pressure drops

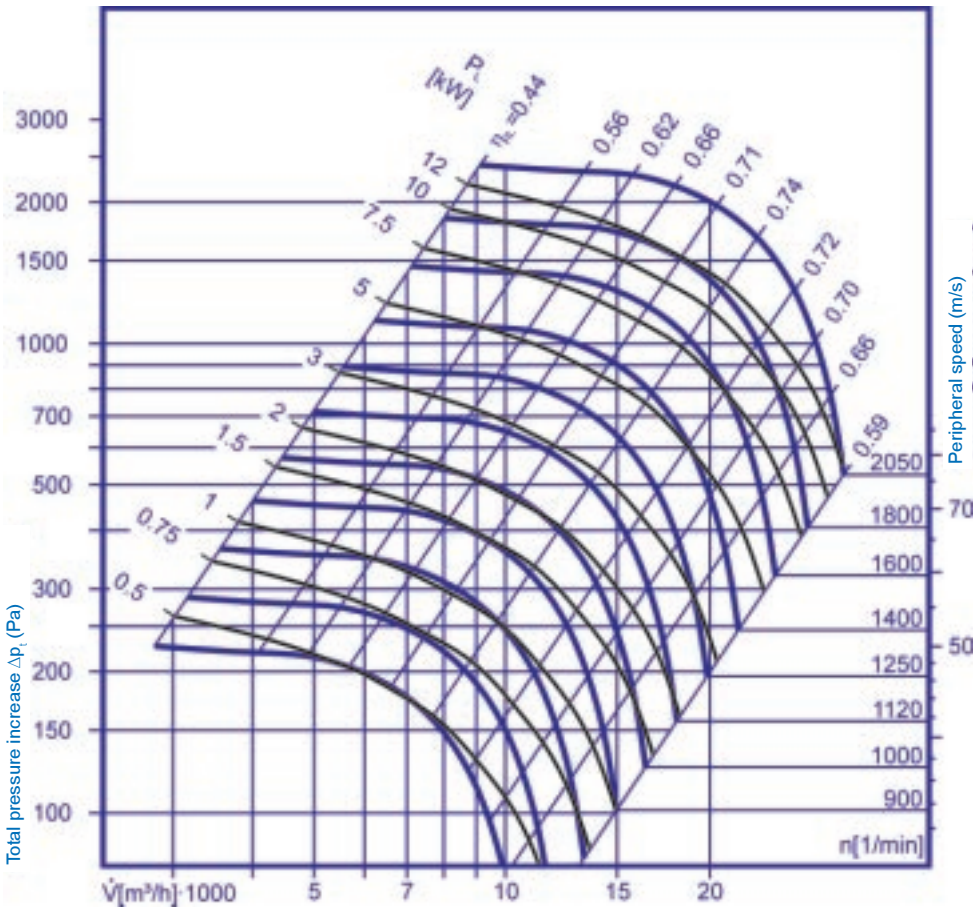
The dynamic pressure portions do not have to be considered in planning.

Performance data

KG size	Max. air volume m³/h	Total pressure increase to Pa	Operational data* Fan power kW	Operational data* Fan speed min⁻¹	Standard data* Motor power kW	Standard data* Motor speed min⁻¹	Standard data* Motor current A
KG 160	16000	500	3.32	1207	4.00	1000	9.70
		1000	6.76	1493	7.50	1500	15.40
		1500	10.58	1736	15.00	1500	28.50

* Fan speed is controlled by frequency converter (f ≥ 50Hz)

Fan diagram
Rotor wheel Ø 710 mm



Total sound power level L_W in [dB]

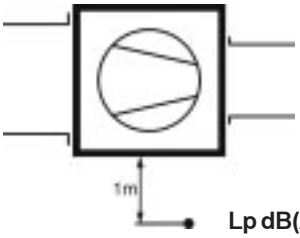
The accurate, device-specific sound data can be determined only for the specific order.

L_w [dB] = the computational total sound power of the fan on the suction/pressure-side.

		Total pressure increase Δp [Pa]					
	L_w	500	750	1000	1250	1500	2000
$\dot{V}$ [m³/h]	8,000	93	97	99	101	103	105
	12,000	95	98	101	103	104	106
	16,000	96	100	102	104	106	108

Sound pressure level Lp dB(A)

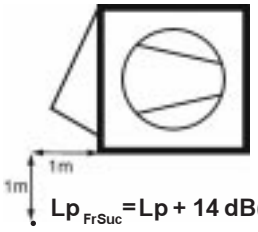
Lp dB(A) = sound pressure level at 1 m distance beside the fan element, measured in the free field with suction and pressure-side duct connection



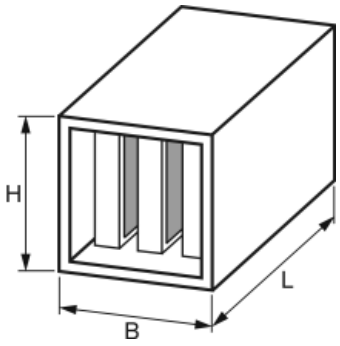
Forward rotor blades								
$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)
8,000	500	37	12,000	560	45	16,000	630	51
	630	41		710	46		800	51
	800	46		900	49		1000	52
	1000	51		1120	53		1250	56
Backward rotor blades								
$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)
8,000	1000	45	12,000	1400	49	16,000	1600	45
	1250	47		1600	52		1800	53
	1600	53		1800	55		2000	57
	2000	59		2240	60		2240	60
Free-running fan wheel Ø 710mm								
$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)
8,000	1000	53	12,000	1000	55	16,000	1200	56
	1200	57		1200	58		1350	60
	1300	59		1300	61		1500	62
	1650	63		1650	64		1700	66

Sound pressure level Lp dB(A) beside the fan element

With free suction or exhaust opening



Silencer element



Dimensions (mm)

Height H	Width B	Length L			
		Type 2	Type 3	Type 4	Type 5
1290	1290	950	1130	1430	1640

Insertion loss De dB(A)

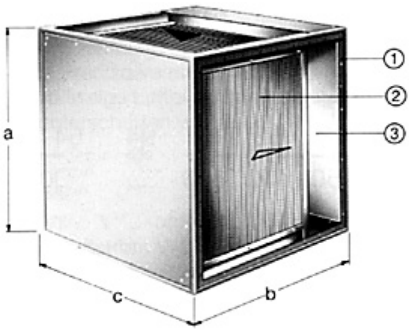
	Octave band (Hz)							
Type	63	125	250	500	1000	2000	4000	8000
2	6	12	20	20	22	16	12	11
3	7	14	24	25	26	20	14	13
4	8	17	30	32	34	25	18	17
5	9	21	37	37	41	29	21	19

For series connection of 2 silencers: $De = De_1 + De_2 - 3$ dB(A)

The accurate, device-specific heat recovery data can be determined only for the specific order.

Description KGX/KGXD

KGX air circulation horizontally/ vertically
KGXD air circulation diagonally



Hot air and cold air are led past each other in the cross current.

The heat recovery takes place via heat transmission from the hot to the cold air flow. The air flows are completely separated by aluminium plates.

- Heat recovery of up to over 80 %
- no moisture transmission
- no mobile parts, corrosion-resistant

① **Casing**
Design same as air conditioner

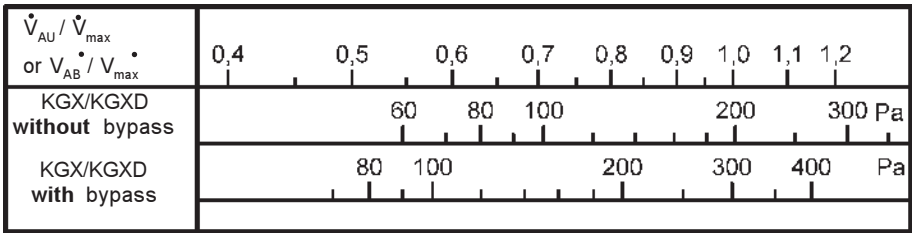
② **Heat exchanger**
Heat exchanger surfaces made of special corrosion-resistant aluminium plates.

③ **Internal bypass** (on request)
In order to prevent rime on the heat exchanger surfaces, the outside air can partially or entirely pass by the heat exchanger in the internal bypass.

Type	max. volume flow $\dot{V}$ [m³/h]		Dimensions [mm]			Weight [kg]	Condensate connector
	without int.bypass	with int. bypass	a	b	c		R"
KGX 160	11,500	12,200	1290	1290	1290	570	-
KGXD 160	11,500	12,200	1290	1290	2040	935	1 ¼"

Pressure drop Δp [Pa]

for KGX/KGXD with or without internal bypass



Description RWT

RWT air circulation horizontally/vertically

A rotating storage capacity takes up heat from the withdrawn air stream and emits it to the outside air stream.

- Heat recovery of up to 80 %.
- Simple power control by adjusting the speed.
- With suitable rotor material, humidification of the supply air.
- Rime protection, defrosting device, pre-heating of air not required.
- Easy maintenance through inspection doors in the air incident flow elements.

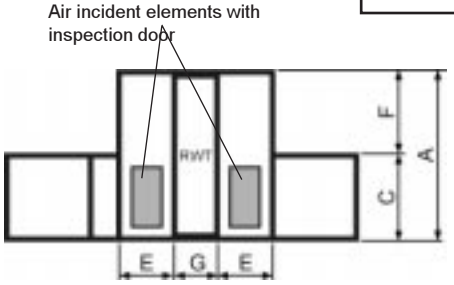
Pressure drop Δp [Pa]

Volume flow $\dot{V}$ [m³/h]	6,400	8,000	10,000	12,000	14,000	16,000
Pressure drop Δp [Pa]	56	72	90	105	125	145

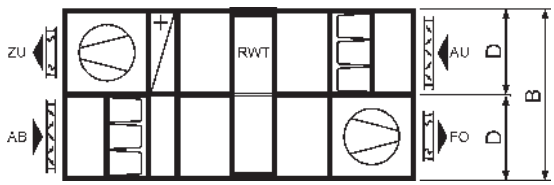
Dimensions

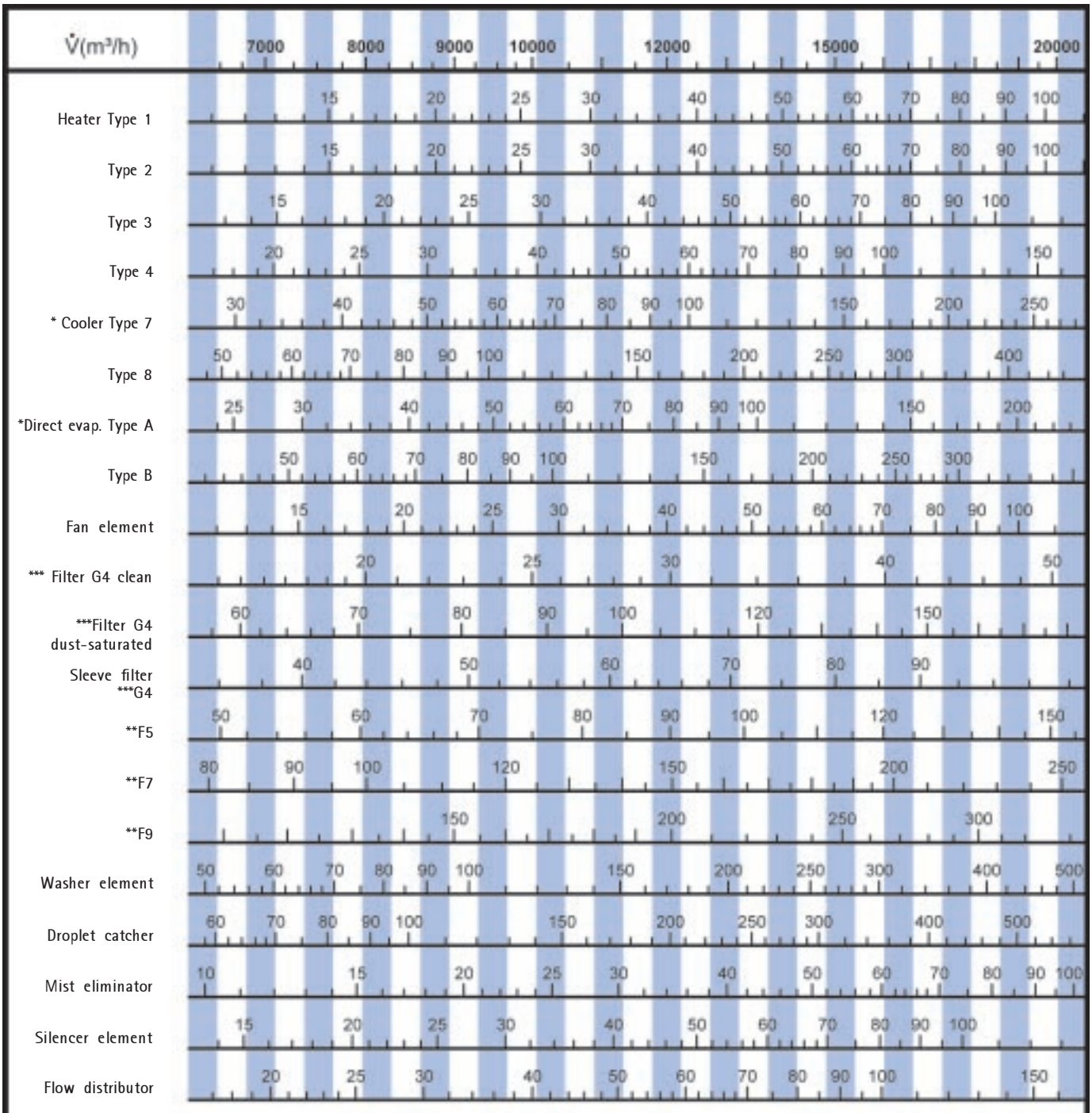
KG	A	B	C	D	E	F	G
160	1940	2580	1290	1290	650	580	400

Front view



Top view





**** Design sleeve filter F5 to F9:**

$$\left(\frac{\text{Start pressure difference + Final pressure difference}}{2}\right)$$

Final pressure differences:

Sleeve filter F5 = 200 Pa
Sleeve filter F7 = 200 Pa
Sleeve filter F9 = 300 Pa

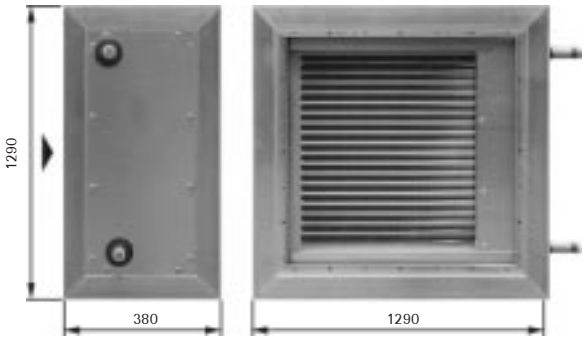
***** Design filter G4, G4 clean, sleeve filter G4**

Start pressure difference + 50 Pa
These filters may be used only as additional pre-filters.

* Add pressure drop from mist eliminator

Heater element KG 160 RAL

Heat exchanger for warm pump water PWW



Connections: in air direction right or left

Equipment:

Heat exchanger with Cu pipes and aluminium lamellas, collecting tank made of steel

Type	Connections	Water content
1	1 ½"	8.0 l
2	1 ½"	10.0 l
3	2"	15.0 l
4	2"	16.0 l

permissible operating pressure: 16 bar
Test pressure 30 bar

on request:

Heat exchanger with Cu pipes and corrosion-resistant aluminium lamellas

Heat exchanger with Cu pipes and Cu lamellas

Heat exchanger made of steel - galvanised

Heat exchanger for steam

Heat exchanger for hot oil

Heat exchanger with bleed and drain connectors

Note:

Allow for sufficient room for extraction of the heat exchanger.

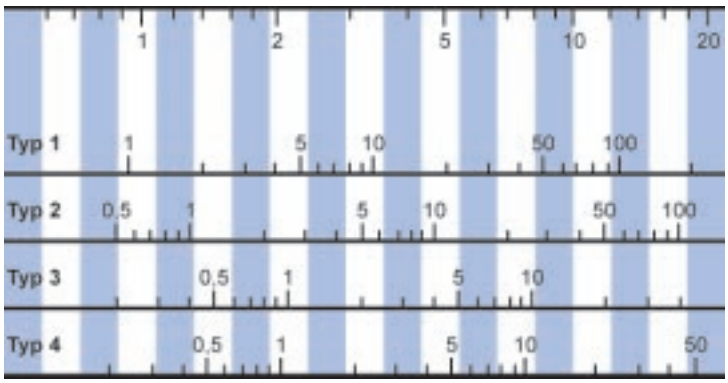
Water resistance max. 20kPa

Quantity of water $w = \frac{0.86 \cdot \dot{Q}}{\Delta t_W}$ (m³/h)

$\dot{Q}$ = Power in kW

$\Delta t_w = t_{WI} - t_{WO}$

Quantity of water w (m³/h)



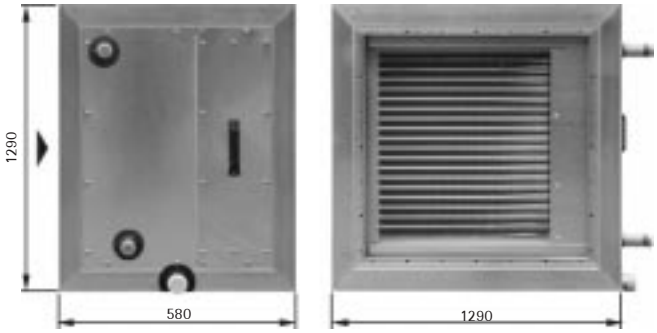
Type		1							
V̇ (m³/h)		6 300		9 500		12 800		16 000	
t_{WI} / t_{WO} °C / °C	t_{AI} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C
45/35	- 15	58.3	10	74.8	6	89.3	3	101.6	2
	- 10	52.4	12	67.2	9	80.1	7	91.2	5
	- 5	46.5	15	59.7	12	71.1	10	80.9	9
	± 0	40.8	18	52.3	15	62.2	14	70.8	12
	+ 5	35.1	21	44.9	19	53.4	17	60.7	16
	+ 10	29.5	24	37.7	22	44.8	20	50.8	19
	+ 15	23.9	26	30.5	24	36.2	23	41.0	23
	+ 20	18.4	29	23.4	27	27.7	27	31.3	26
50/40	- 15	64.0	12	82.2	8	98.2	5	111.9	4
	- 10	58.0	15	74.6	11	89.0	9	101.4	7
	- 5	52.2	18	67.0	14	79.9	12	91.0	11
	± 0	46.4	21	59.5	18	71.0	16	80.8	14
	+ 5	40.7	23	52.2	21	62.2	19	70.7	18
	+ 10	35.0	26	44.9	24	53.4	22	60.7	21
	+ 15	29.5	29	37.7	27	44.8	25	50.9	24
	+ 20	24.0	31	30.6	30	36.3	29	41.1	28
60/40	- 15	66.8	13	85.5	9	101.7	6	115.6	4
	- 10	60.9	16	77.8	12	92.5	10	105.1	8
	- 5	55.0	19	70.2	15	83.5	13	94.8	11
	± 0	49.2	22	62.8	19	74.5	16	84.5	15
	+ 5	43.5	25	55.4	22	65.7	20	74.4	18
	+ 10	37.8	27	48.0	25	56.9	23	64.4	22
	+ 15	32.1	30	40.8	28	48.2	26	54.5	25
	+ 20	26.5	33	33.5	31	39.6	29	44.7	28
70/50	- 15	78.3	18	100.5	13	119.8	10	136.4	8
	- 10	72.3	21	92.8	16	110.5	13	125.8	11
	- 5	66.4	24	85.1	20	101.4	17	115.3	15
	± 0	60.6	27	77.6	23	92.3	20	105.0	18
	+ 5	54.8	30	70.1	26	83.4	24	94.8	22
	+ 10	49.1	33	62.7	29	74.6	27	84.7	25
	+ 15	43.4	35	55.4	32	65.8	30	74.7	29
	+ 20	37.8	38	48.2	35	57.2	33	64.8	32
70/55	- 15	82.4	20	106.0	15	127.7	11	144.4	9
	- 10	76.4	23	98.3	18	117.4	15	133.7	13
	- 5	70.4	26	90.6	21	108.2	18	123.2	16
	± 0	64.6	29	83.0	25	99.1	22	112.8	20
	+ 5	58.8	32	75.5	28	90.1	25	102.6	23
	+ 10	53.1	35	68.1	31	81.2	29	92.5	27
	+ 15	47.4	37	60.8	34	72.5	32	82.4	30
	+ 20	41.8	40	53.6	37	63.8	35	72.5	34
80/50	- 15	81.5	19	104.2	14	124.0	11	140.9	8
	- 10	75.5	22	96.5	17	114.7	14	130.3	12
	- 5	69.5	25	88.8	21	105.5	18	119.8	16
	± 0	63.7	28	81.2	24	96.4	21	109.4	19
	+ 5	57.9	31	73.7	27	87.4	25	99.2	23
	+ 10	52.1	34	66.3	30	78.5	28	89.0	26
	+ 15	46.4	37	58.9	33	69.7	31	78.9	30
	+ 20	40.7	39	51.6	36	61.0	34	68.9	33
80/60	- 15	89.6	23	115.3	17	137.7	14	156.9	11
	- 10	83.6	26	107.5	21	128.3	17	146.2	15
	- 5	77.6	29	99.8	24	119.1	21	135.6	18
	± 0	71.8	32	92.2	27	109.9	24	125.2	22
	+ 5	65.9	35	84.7	30	100.9	28	114.9	26
	+ 10	60.2	38	77.2	34	92.0	31	104.7	29
	+ 15	54.5	41	69.9	37	83.2	34	94.6	32
	+ 20	48.9	43	62.6	40	74.5	38	84.6	36
90/70	- 15	100.8	27	129.9	21	155.3	17	177.1	14
	- 10	94.7	31	122.0	25	145.9	21	166.3	18
	- 5	88.7	34	114.3	28	136.5	24	155.6	22
	± 0	82.8	37	106.6	31	127.3	28	145.1	25
	+ 5	76.9	40	99.0	35	118.2	31	134.7	29
	+ 10	71.1	43	91.5	38	109.2	35	124.4	33
	+ 15	65.4	46	84.1	41	100.3	38	114.2	36
	+ 20	59.7	49	76.7	44	91.5	42	104.2	40

Other operating conditions on request!

	2								3								4							
	6 300		9 500		12 800		16 000		6 300		9 500		12 800		16 000		6 300		9 500		12 800		16 000	
	$\dot{Q}$ kW	t_{AP} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C
	73.0	16	95.6	12	115.4	9	132.5	7	91.3	23	123.1	19	151.7	16	176.4	14	102.3	28	141.0	24	176.3	22	207.2	19
	65.6	18	85.9	14	103.7	12	119.0	10	82.1	25	110.7	22	136.3	19	158.5	17	92.2	30	126.9	26	158.5	23	186.2	21
	58.4	21	76.4	17	92.1	15	105.7	13	73.2	27	98.5	24	121.1	21	140.7	19	82.2	31	113.1	28	141.0	25	165.5	23
	51.3	23	66.9	20	80.7	18	92.5	16	64.3	29	86.4	26	106.1	23	123.2	22	72.4	32	99.4	29	123.8	27	145.1	25
	44.2	25	57.6	22	69.4	20	79.5	19	55.6	30	74.5	27	91.4	25	106.0	24	62.7	33	85.8	31	106.7	29	125.0	27
	37.2	27	48.5	25	58.3	23	66.7	22	46.9	32	62.8	29	76.8	27	89.0	26	53.1	35	72.5	32	89.9	30	105.1	29
	30.4	29	39.4	27	47.2	26	54.0	25	38.4	33	51.1	31	62.4	29	72.1	28	43.6	35	59.2	33	73.2	32	85.4	31
	23.5	31	30.4	30	36.3	29	41.4	28	29.8	34	39.5	33	48.1	31	55.4	30	34.1	36	46.0	35	56.7	33	65.9	32
	79.9	19	104.8	14	126.8	11	145.7	9	99.7	27	134.8	23	166.3	19	193.6	17	111.7	32	154.0	28	192.8	25	226.9	23
	72.6	21	95.1	17	115.0	14	132.0	12	90.5	29	122.4	25	150.8	22	175.6	20	101.3	33	139.9	30	175.0	27	205.9	25
	65.3	24	85.5	20	103.3	17	118.6	15	81.6	31	110.1	27	135.6	24	157.7	22	91.3	35	126.0	32	157.5	29	185.1	27
	58.1	26	76.1	22	91.8	20	105.4	18	72.7	32	98.0	29	120.6	26	140.2	25	81.5	36	112.3	33	140.2	31	164.7	29
	51.1	28	66.7	25	80.5	23	92.3	21	63.9	34	86.0	31	105.8	29	122.9	27	71.8	38	98.7	35	123.1	32	144.5	31
	44.1	30	57.5	28	69.3	26	79.4	24	55.3	36	74.2	33	91.1	31	105.8	29	62.3	39	85.4	36	106.3	34	124.6	33
	37.2	32	48.4	30	58.2	28	66.7	27	46.7	37	62.6	34	76.7	33	88.9	31	52.8	40	72.2	37	89.6	36	104.9	34
	30.3	34	39.4	32	47.3	31	54.1	30	38.3	38	51.0	36	62.4	35	72.2	34	43.4	41	59.1	39	73.1	37	85.4	36
	84.1	20	109.7	16	132.1	12	151.4	10	105.7	29	141.9	25	174.1	21	202.0	18	119.2	35	163.3	31	203.2	27	238.2	24
	76.8	23	100.0	18	120.3	15	137.8	13	96.6	31	129.4	27	158.6	23	183.9	21	109.0	37	149.2	32	185.4	29	217.1	27
	69.5	25	90.4	21	108.7	18	124.4	16	87.5	33	117.1	29	143.3	26	166.1	24	99.0	38	135.2	34	167.8	31	196.2	29
	62.3	28	80.9	24	97.2	21	111.1	19	78.6	35	104.9	31	128.3	28	148.5	26	89.1	40	121.3	36	150.3	33	175.6	31
	55.1	30	71.5	27	85.8	24	98.0	23	69.7	37	92.9	33	113.3	30	131.0	28	79.2	41	107.6	37	133.1	35	155.3	33
	48.1	32	62.2	29	74.5	27	85.0	25	60.9	38	80.9	35	98.6	32	113.8	31	69.5	42	94.0	39	116.0	36	135.1	35
	41.1	34	53.0	31	63.3	30	72.2	28	52.2	40	69.0	37	83.9	34	96.7	33	59.7	43	80.5	40	99.0	38	115.1	36
	34.1	36	43.8	34	52.2	32	59.4	31	43.5	41	57.2	38	69.3	36	79.6	35	50.0	44	67.0	41	82.1	39	95.1	38
	98.1	26	128.5	21	155.1	17	178.0	14	122.6	37	165.4	31	203.6	27	236.7	24	137.5	43	189.4	38	236.6	34	278.0	31
	90.7	29	118.7	24	143.2	20	164.2	18	113.5	39	152.9	33	188.0	30	218.5	27	127.3	45	175.2	40	218.7	36	256.8	33
	83.4	31	109.0	27	131.4	23	150.7	21	104.4	41	140.5	36	172.6	32	200.6	30	117.3	46	161.2	42	201.0	38	235.9	36
	76.1	34	99.4	29	119.8	26	137.3	24	95.5	43	128.3	38	157.5	35	182.8	32	107.4	48	147.4	44	183.6	40	215.2	38
	69.0	36	90.0	32	108.3	29	124.1	27	86.6	44	116.2	40	142.5	37	165.3	35	97.7	49	133.7	45	166.3	42	194.8	40
	61.9	39	80.6	35	97.0	32	111.0	30	77.9	46	104.3	42	127.7	39	148.0	37	88.0	51	120.2	47	149.3	44	174.7	42
	54.9	41	71.4	37	85.8	35	98.1	33	62.2	48	92.5	44	113.1	41	130.9	39	78.4	52	106.8	48	132.4	46	154.7	44
	48.0	43	62.2	40	74.6	38	85.3	36	60.6	49	80.7	46	98.5	43	113.9	41	68.9	53	93.5	50	115.7	47	134.9	45
	102.7	28	134.9	23	163.3	19	187.7	16	127.6	39	172.9	33	213.6	29	249.0	26	142.2	45	197.1	40	247.1	36	291.1	33
	95.2	31	125.1	26	151.3	22	173.9	19	118.4	41	160.4	36	198.0	32	230.7	29	132.1	47	182.9	42	229.2	38	269.9	36
	87.9	33	115.4	29	139.5	25	160.3	23	109.4	43	148.0	38	182.6	34	212.7	32	122.1	48	168.9	44	211.5	41	249.0	38
	80.7	36	105.8	31	127.9	28	146.9	26	100.4	45	135.8	40	167.4	37	194.9	34	112.3	50	155.1	46	194.1	43	228.3	40
	73.5	38	96.3	34	116.4	31	133.6	29	91.6	47	123.7	42	152.4	39	177.4	37	102.5	52	141.5	48	176.9	45	207.9	42
	66.4	41	87.0	37	105.0	34	120.5	32	82.9	48	111.8	44	137.7	41	160.1	39	93.0	53	128.1	49	159.9	46	187.8	44
	59.5	43	77.8	39	93.8	37	107.6	35	74.3	50	100.1	46	123.0	43	143.0	41	83.5	54	114.8	51	143.1	48	168.0	46
	52.6	45	68.6	42	82.7	39	94.8	38	65.8	51	88.5	48	108.6	46	126.1	44	74.1	55	101.6	52	126.5	50	148.3	48
	102.7	28	133.9	22	161.2	18	184.6	16	129.0	39	173.0	33	212.2	29	246.2	26	145.4	46	199.1	41	247.8	36	290.3	33
	95.2	31	124.0	25	149.2	22	170.9	19	119.7	41	160.4	36	196.6	32	227.9	29	135.1	48	184.9	43	229.7	39	269.0	35
	87.8	33	114.3	28	137.4	25	157.3	22	110.6	43	148.0	38	181.2	34	209.9	31	125.0	50	170.7	45	211.9	41	247.9	38
	80.6	36	104.7	31	125.7	28	143.8	25	101.6	45	135.7	40	165.9	36	192.0	34	115.0	51	156.8	46	194.4	43	227.1	40
	73.3	38	95.2	34	114.2	30	130.5	28	92.6	47	123.5	42	150.8	39	174.4	36	105.1	53	143.0	48	176.9	44	206.5	42
	66.2	41	85.7	36	102.8	33	117.3	31	83.8	49	111.4	44	135.8	41	156.9	39	95.3	54	129.2	50	159.7	46	186.1	44
	59.1	43	76.4	39	91.4	36	104.3	34	75.0	50	99.4	46	121.0	43	139.6	41	85.5	55	115.6	51	142.5	48	165.9	46
	52.0	45	67.1	41	80.1	39	91.3	37	66.2	52	87.5	48	106.2	45	122.3	43	75.8	56	102.0	52	125.4	49	145.7	47
	111.8	32	146.9	26	177.6	22	204.1	19	139.0	44	188.3	38	232.4	33	270.7	30	155.1	50	214.7	45	269.0	41	316.8	37
	104.4	35	137.0	29	165.6	25	190.2	22	129.8	46	175.7	40	216.7	36	252.4	33	144.9	52	200.5	47	251.0	43	295.4	40
	97.0	37	127.2	32	153.7	28	176.6	25	120.6	48	163.2	42	201.2	38	234.3	35	134.9	54	186.4	49	233.3	45	274.4	42
	89.7	40	117.6	35	142.0	31	163.1	29	111.8	50	151.0	45	186.0	41	216.4	38	125.1	56	172.6	51	215.8	47	253.7	44
	82.5	42	108.1	38	130.5	34	149.7	32	103.0	52	138.9	47	171.0	43	198.8	40	115.4	57	158.9	53	198.5	49	233.3	47
	75.4	45	98.7	40	119.1	37	136.6	35	94.2	53	126.9	49	156.1	45	181.4	43	105.7	59	145.5	55	181.5	51	213.1	49
	68.4	47	89.4	43	107.8	40	123.5	38	85.6	55	115.1	51	141.4	48	164.2	45	96.2	60	132.1	56	164.6	53	193.1	51
	61.5	49	80.2	45	96.6	43	110.7	41	77.1	57	103.4	53	126.9	50	147.2	48	86.8	61	118.9	58	148.0	55	173.4	53
	125.3	38	164.9	31	199.8	26	229.9	23	154.9	50	210.6	44	260.5	39	304.0	35	172.1	57	239.2	52	300.5	47	354.5	44
	117.7	41	154.9	34	187.7	30	215.9	26	145.7	53	197.9	46	244.7	42	285.5	38	161.9	59	224.9	54	282.4	50	333.1	46
	110.3	43	145.1	37	175.7	33	202.1	30	136.6	55	185.4	49	229.2	44	267.3	41	152.0	61	210.9	56	264.7	52	312.0	49
	103.0	46	135.4	40	163.9	36	188.5	33	127.7	57	173.1	51	213.9	47	249.3	44	142.1	63	197.0	58	247.1	54	291.2	51
	95.8	48	125.9	43	152.3	39	175.0	36	118.8	59	161.0	53	198.8	49	231.6	46	132.4	65	183.4	60	229.8	56	270.7	53
	88.7	51	116.4	46	140.8	42	161.7	39	110.1	61	149.0	56	183.8	52	214.1	49	122.8	67	169.9	62	212.8	58	250.4	56
	81.6	53	107.1	48	129.4	45	148.6	42	101.5	63	137.2	58	169.1	54	196.9	51	113.3	68	156.6	64	195.9	60	230.4	58
	74.6	56	97.8	51	118.2	48	135.7	46	92.9	64	125.5	60	154.5	56	179.8	54	104.0	70	143.4	65	179.2	62	210.7	60

Exchanger for cold pump water PKW / direct evaporator

Performance data for direct evaporator for cooling agent R134a, for other cooling agents on request.



Air direction: horizontal:

Connections: in air direction right or left

Equipment:

Exchanger for cold water with Cu pipes and aluminium lamellas,
Collecting tank made of Cu.

Direct evaporator with Cu pipes and aluminium lamellas, cooling agent distributor.

Mist eliminator,
Condensate basin with condensate connector on side, male thread 1¼",
Droplet catcher for air direction vertical.

Type	Connections	Contents
7	2.5"	25 l
8	2.0"	42 l
A	DN 28 cooling agent inlet DN 48 cooling agent outlet	14 l
B	DN 28 cooling agent inlet DN 48 cooling agent outlet	20 l

permissible operating pressure: 16 bar
Test pressure 30 bar

on request:

Exchanger with Cu pipes and corrosion-resistant aluminium lamellas

Exchanger with Cu pipes and Cu lamellas

Exchanger with bleed and drain connector

Note:

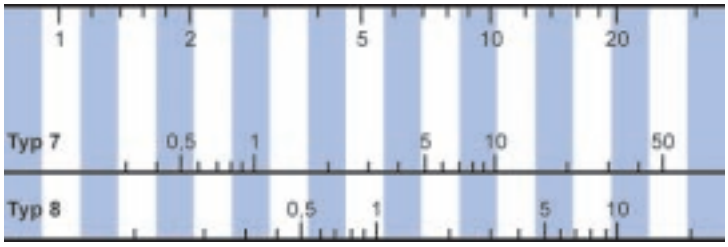
Allow for sufficient room for extraction of the exchanger.
Build in siphon on site with the condensate connector.

Water resistance max. 50kPa

Quantity of water $w = \frac{0.86 \cdot \dot{Q}}{\Delta t_W}$ (m³/h)

$\dot{Q}$ = Power in kW
$\Delta t_w = t_{WI} - t_{WO}$

Quantity of water w (m³/h)



V̇ (m³/h)		6 300		9 500		12 800		16 000	
PKW	t_{AI} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C
Exchanger for cold water type 7									
4/8	32	69.4	10.0	96.0	11.7	120.2	13.0	141.5	14.1
	28	59.0	9.6	81.3	11.1	101.6	12.3	119.3	13.2
	26	52.5	9.2	72.4	10.6	90.4	11.6	106.1	12.4
	25	49.3	9.0	67.9	10.3	84.8	11.3	99.5	12.0
5/10	32	63.3	11.2	87.3	12.8	109.1	14.1	128.2	15.1
	28	53.0	10.8	72.6	12.3	90.5	13.3	106.1	14.2
	26	46.4	10.4	63.7	11.7	79.3	12.7	92.9	13.4
	25	43.2	10.2	59.2	11.4	73.6	12.3	86.3	13.0
6/12	32	57.1	12.3	78.4	13.9	97.8	15.0	114.7	16.0
	28	46.7	12.0	63.8	13.3	79.2	14.3	92.6	15.1
	26	40.1	11.5	54.7	12.7	67.9	13.6	79.4	14.3
	25	36.9	11.3	50.2	12.4	62.3	13.2	72.8	13.9
8/12	32	55.3	12.7	76.6	14.1	96.1	15.2	113.3	16.1
	28	44.9	12.4	61.9	13.5	77.5	14.4	91.1	15.1
	26	38.3	11.9	52.8	12.9	66.1	13.7	77.7	14.3
	25	35.0	11.6	48.2	12.6	60.3	13.3	71.0	13.9
Type 8									
4/8	32	83.8	5.5	121.8	6.4	158.5	7.1	192.1	7.8
	28	72.3	5.6	104.6	6.4	135.6	7.1	163.9	7.8
	26	64.3	5.6	92.9	6.3	120.4	6.9	145.4	7.5
	25	60.3	5.5	87.1	6.2	112.8	6.9	136.2	7.4
5/10	32	77.1	6.8	111.5	7.7	144.6	8.5	174.6	9.1
	28	65.5	6.9	94.1	7.8	121.5	8.5	146.3	9.1
	26	57.4	6.9	82.3	7.6	106.1	8.3	127.7	8.8
	25	53.3	6.8	76.4	7.6	98.4	8.2	118.4	8.7
6/12	32	69.9	8.1	100.6	9.0	129.8	9.7	156.3	10.4
	28	58.1	8.2	82.9	9.1	106.5	9.8	127.8	10.4
	26	49.8	8.2	71.0	8.9	91.1	9.6	109.1	10.1
	25	45.6	8.2	65.1	8.9	83.3	9.5	99.7	9.9
8/12	32	65.9	9.2	95.7	9.9	124.5	10.5	150.8	11.0
	28	54.2	9.3	78.3	9.9	101.6	10.4	122.7	10.9
	26	46.0	9.2	66.5	9.7	86.0	10.2	103.9	10.6
	25	41.9	9.1	60.5	9.6	78.3	10.1	94.4	10.5
Ev. temp. °C		**Direct evaporator type A**							
2.0	32	57.3	12.9	71.5	15.5	82.1	17.3	90.0	18.7
	28	50.5	11.7	63.0	14.0	72.3	15.6	79.2	16.8
	26	45.8	11.0	57.1	13.1	65.6	14.6	71.8	15.6
	25	43.5	10.6	54.2	12.6	62.2	14.0	68.1	15.1
5.0	32	51.5	14.1	64.6	16.4	74.3	18.1	81.6	19.3
	28	44.6	13.0	55.8	15.0	64.3	16.4	70.5	17.4
	26	39.9	12.3	49.9	14.1	57.4	15.4	62.9	16.4
	25	37.5	11.9	46.9	13.6	53.9	14.9	59.2	15.8
8.0	32	44.6	15.5	56.1	17.5	64.7	19.0	71.1	20.1
	28	37.6	14.4	47.2	16.1	54.4	17.3	59.8	18.3
	26	32.8	13.7	41.1	15.3	47.4	16.4	52.1	17.2
	25	30.4	13.4	38.1	14.8	43.9	15.9	48.3	16.6
Type B									
2.0	32	69.8	9.3	91.4	11.6	108.5	13.4	121.5	14.8
	28	61.7	8.6	80.7	10.6	95.6	12.2	107.1	13.4
	26	56.1	8.0	73.3	9.9	86.8	11.4	97.1	12.6
	25	53.3	7.8	69.6	9.6	82.4	11.0	92.2	12.1
5.0	32	62.6	10.9	82.3	12.9	97.9	14.5	109.9	15.7
	28	54.3	10.2	71.3	12.0	84.8	13.3	95.1	14.4
	26	48.6	9.7	63.7	11.3	75.7	12.6	84.9	13.6
	25	45.8	9.5	60.0	11.0	71.2	12.2	79.9	13.1
8.0	32	54.2	12.7	71.3	14.4	85.0	15.7	95.6	16.8
	28	45.8	12.0	60.2	13.5	71.7	14.6	80.5	15.5
	26	40.0	11.6	52.5	12.9	62.5	13.9	70.2	14.7
	25	37.1	11.4	48.7	12.6	57.9	13.5	65.0	14.3

Air inlet state: 32°C / 40 % r.h., 28°C / 47 % r.h.
26°C / 49 % r.h., 25°C / 50 % r.h.

Note: min. evaporation temperature 2°C.

Other operating conditions on request.

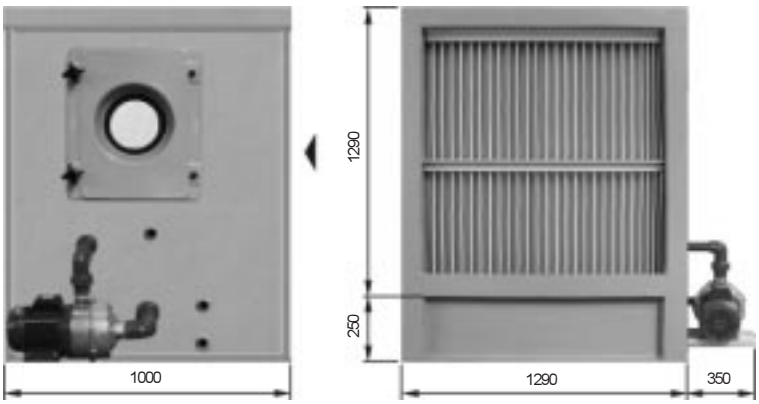
Washer / Vapour humidifier element KG 160 RAL

Washer element

Casing
Plastic (glass fibre reinforced plastic)

Inspection door and connections
in air direction right or left

Equipment
Block pomp 2.2 kW, 230/400 V, Δ/Y; 8.5/4.9 A, 50 Hz;
Pump housing made of grey cast iron;
Rotor wheel and shaft made of stainless steel
Nozzle holder with self-cleaning nozzles spraying against air flow
Washer basin with all-round inclination towards the drain connector
Pump with complete piping on suction and pressure side



Inspection door with inspection window
Flow rectifier
Mist eliminator
} temperature-resistant to 70°C, dismantable

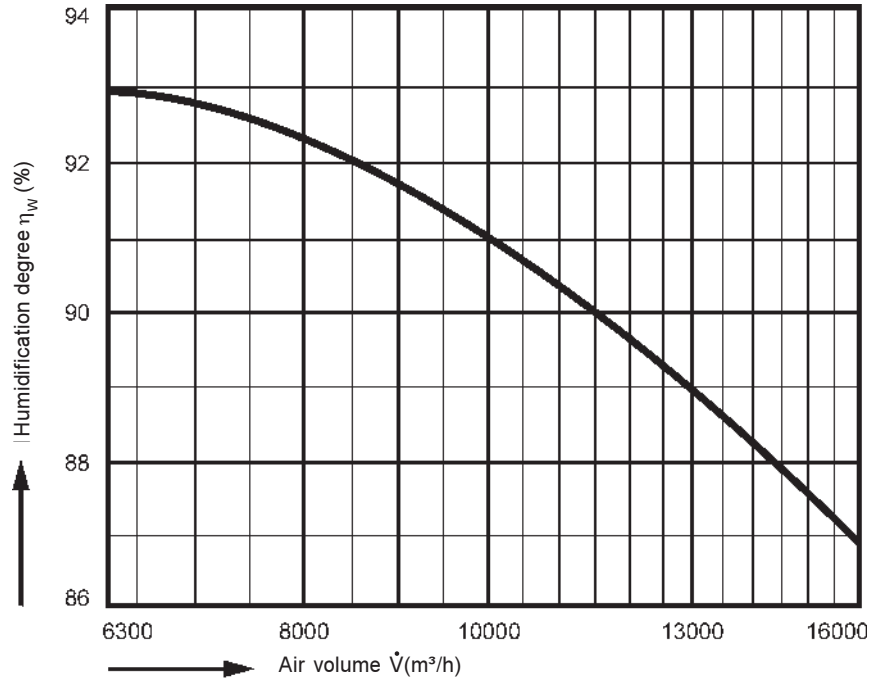
Inlet device, male thread 3/4", with float valve and float, overflow spout DN 40, outlet chute DN 40, dry-run protection for pump, de-sludging system, lighting 230 V / 60 W, darkening for inspection window.
On request:
Drain and overflow device with siphon on the inside, thermometer, pressure gauge

Befeuchtungsgrad η_W

$$\eta_W = \frac{x_2 - x_1}{x_s - x_1}$$

x = water content of air
Index 1 = air inlet
2 = air outlet
S = saturation state

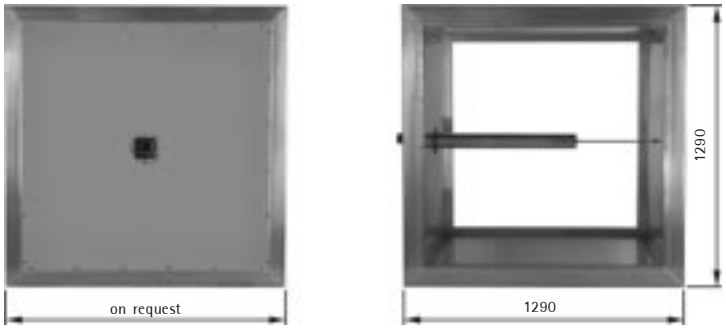
with air temperature 20°C, density 1.2 kg/m³, water pressure 2.3 bar, quantity of water 15,100 l/h



Vapour humidifier element

suitable for vapour lances of different manufacturers

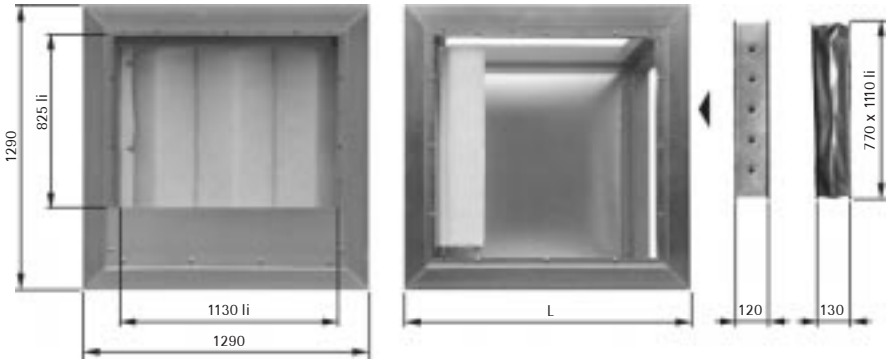
Design:
- Humidifier chamber with basin made of corrosion-resistant material
- Inspection door
- Basin with drain 1¼" male thread made of corrosion-resistant material
- Lengths on request
- Inspection hole double-walled Ø 150mm
- Lighting



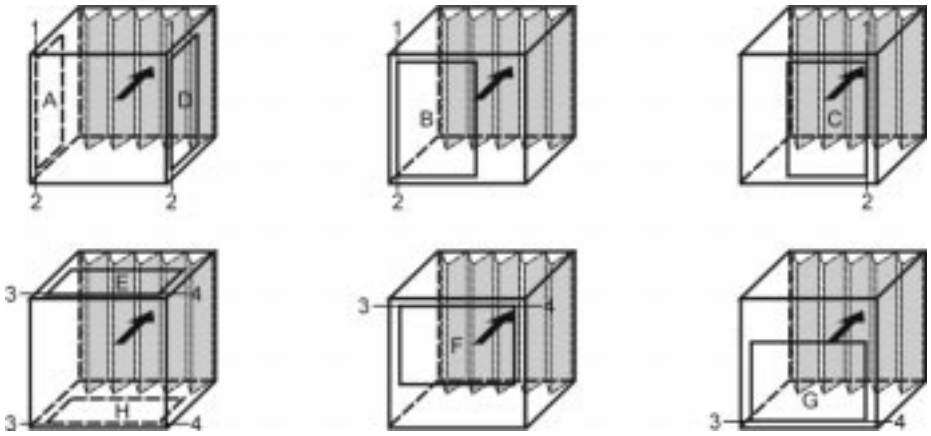
Connection and suction variations KG 160 RAL

Filter/air mixture element L = 1290 mm
combined

Air mixture element/exhaust air element
L = 950 mm



Suction variations:



One external flap		Two external flaps joined with linkage.	
Flap arrangement	Flap drive	Flap arrangement	Flap drive
A	1, 2	A + B	1, 2
B	1, 2	A + C	1, 2
C	1, 2	A + D	1, 2
D	1, 2	B + D	1, 2
E	3, 4	C + D	1, 2
F	3, 4	E + F	3, 4
G	3, 4	E + G	3, 4
H	3, 4	E + H	3, 4
		F + H	3, 4
		G + H	3, 4

One internal flap		Two internal flaps joined with linkage.	
Flap arrangement	Flap drive	Flap arrangement	Flap drive
A	1, 2	A + C	1, 2
B	1, 2	A + D	1, 2
C	1, 2	B + D	1, 2
D	1, 2	E + G	3, 4
E	3, 4	E + G	3, 4
F	3, 4	F + H	3, 4
G	3, 4		
H	3, 4		

Drive torque for 1 flap 6 Nm (airtight flap according to DIN 1946: 34 Nm)

Inspection door:

in air direction right or left
required space for filter extraction: min. 0.7 m
for air mixture element/exhaust air element inspection door only on request in air direction right/left

Fan element

L 1640
W 1640
H 1640

L 1640
W 1640
H 1640

Heater element

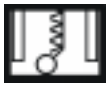
* with extractable frost protection frame L = 580

L 380
W 1640
H 1640

Cooling element

L 580/1040*
W 1640
H 1640

Washer element



L 1000
W 1640
H 1890

Mixing and filter element

L 1640
W 1640
H 1640

Mixing and exhaust air element

L 1130
W 1640
H 1640

Sleeve filter element

L 950
W 1640
H 1640

Silencer element

L ....
W 1640
H 1640

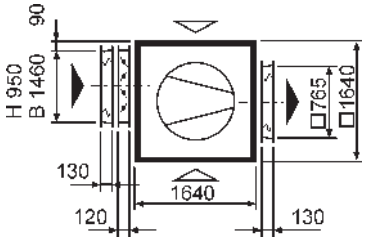
Empty element / vapour humidifier empty element

L ....
W 1640
H 1640

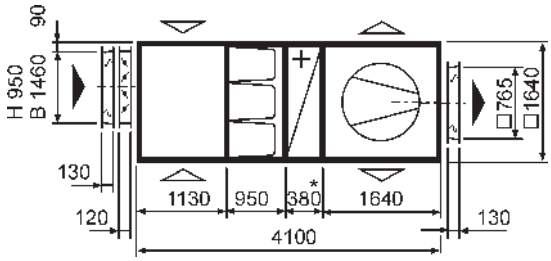
KGX

L 1640
W 1640
H 1640

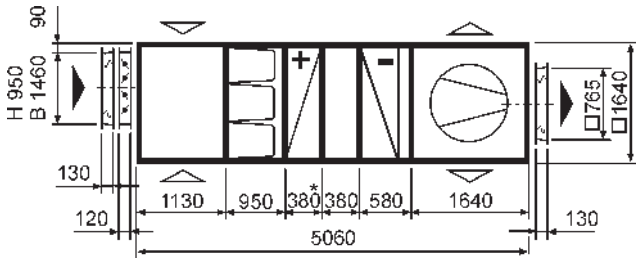
Withdrawn air device



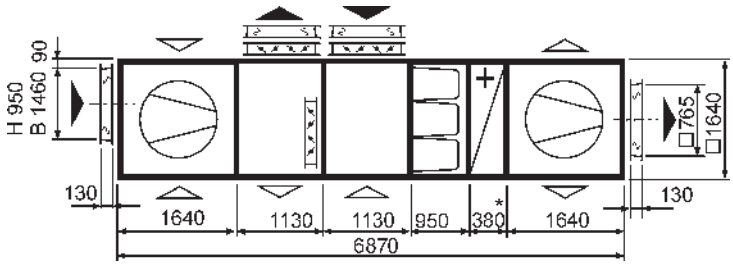
Supply air device



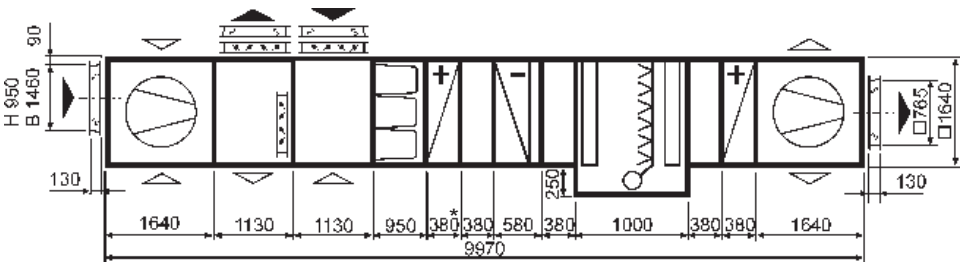
Partial air conditioner

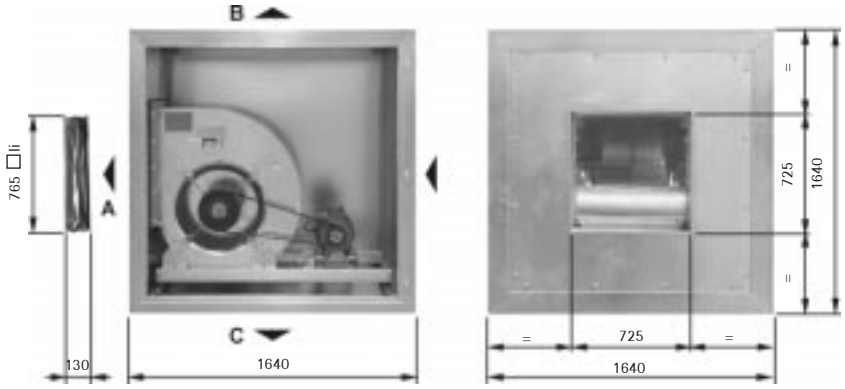


Combined supply and withdrawn air device



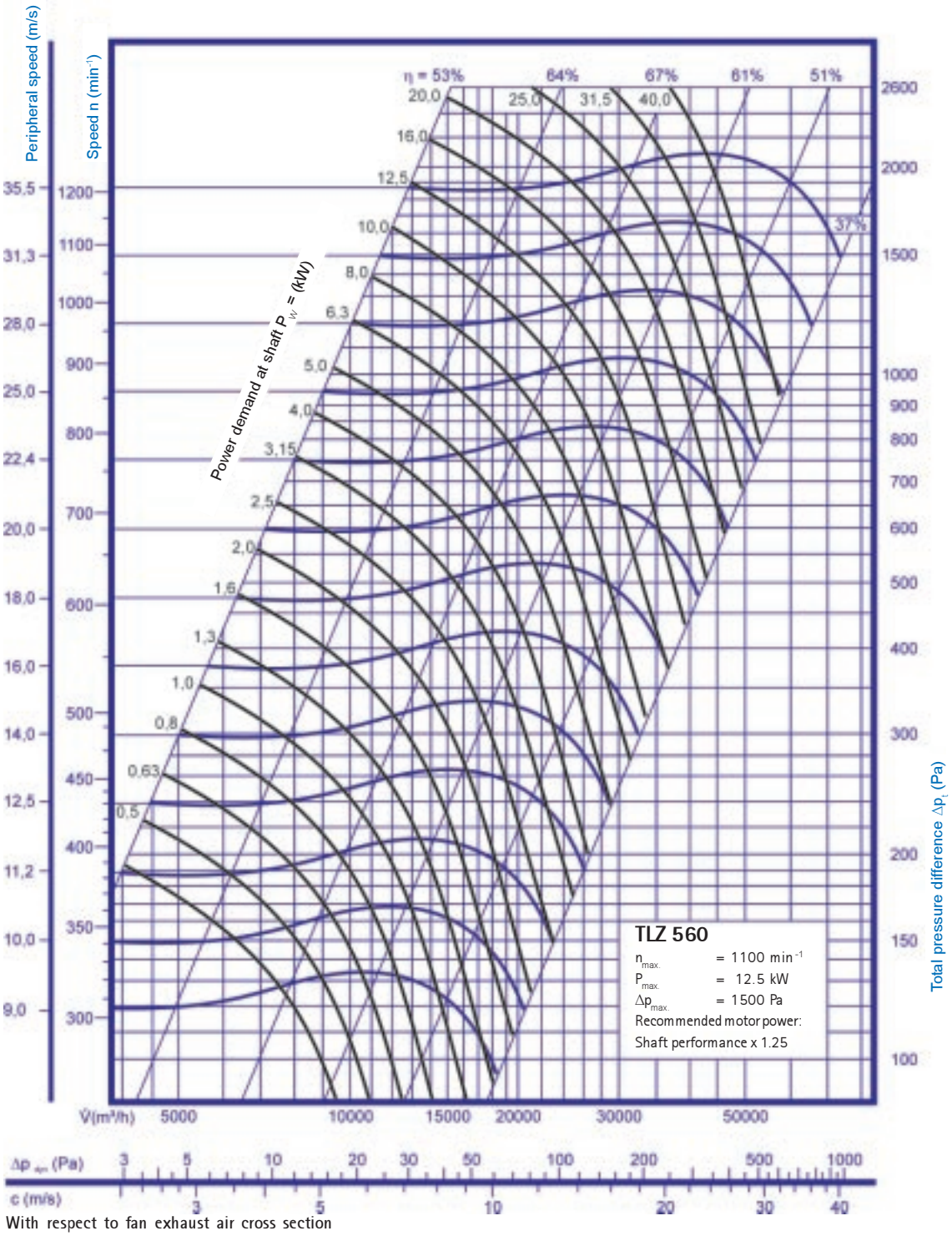
Combined climate control, supply and withdrawn air device





Fan diagram

Forward rotor blades permissible for motor output up to 2.2 kW



With respect to fan exhaust air cross section

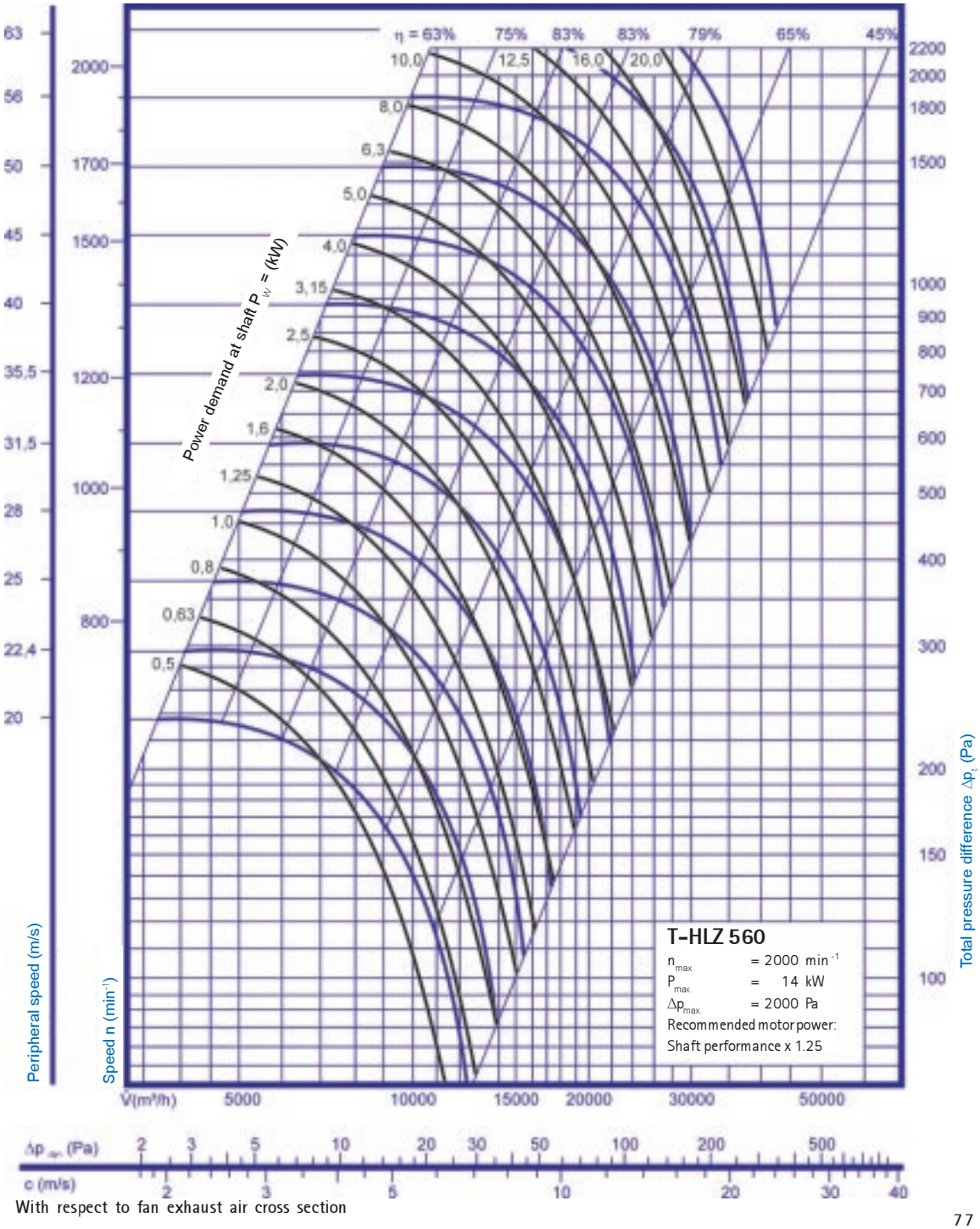
Exhaust variation: A, B, C

Fan/motor: Base frame design with motor tension carriage, vibration absorber and belt protection. Elastic connection between fan exhaust and casing
Flaps on the inside E and F possible

Inspection door: in air direction right, left, with turn locks

Fan diagram

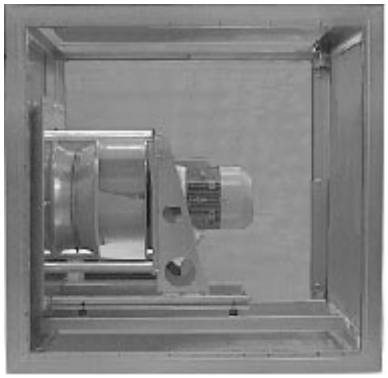
Backward rotor blades



With respect to fan exhaust air cross section

Free-running fan wheel KG 250 RAL

Description



Free-running fan wheel, unidirectional suction, with backward rotor blades, attached directly to the motor shaft.

Complete unit mounted on sturdy base frame with flexible vibration absorbers.

Rotor wheel statically and dynamically balanced. Complete motor protection with built-in PTC thermistors.

High fan efficiency even at low speed, almost without dynamic pressure ratios.

In connection with frequency converter, accurate adaptation to unit characteristics is possible.

Economical and energy-saving operation even under partial load conditions.

Low maintenance costs, no drive belt losses, no retightening required.

External pressure drops

Customer specification of the installation side pressure drops (e.g. duct system).

Internal pressure drops

The pressure drops of all components with respect to the volume flow (also fan element) are listed in the pressure drop tables of the individual chapters.
For components on the pressure-side, neither flow distributors nor incident flow elements are required, since the exhaust flows through the entire cross section.

Dynamic pressure drops

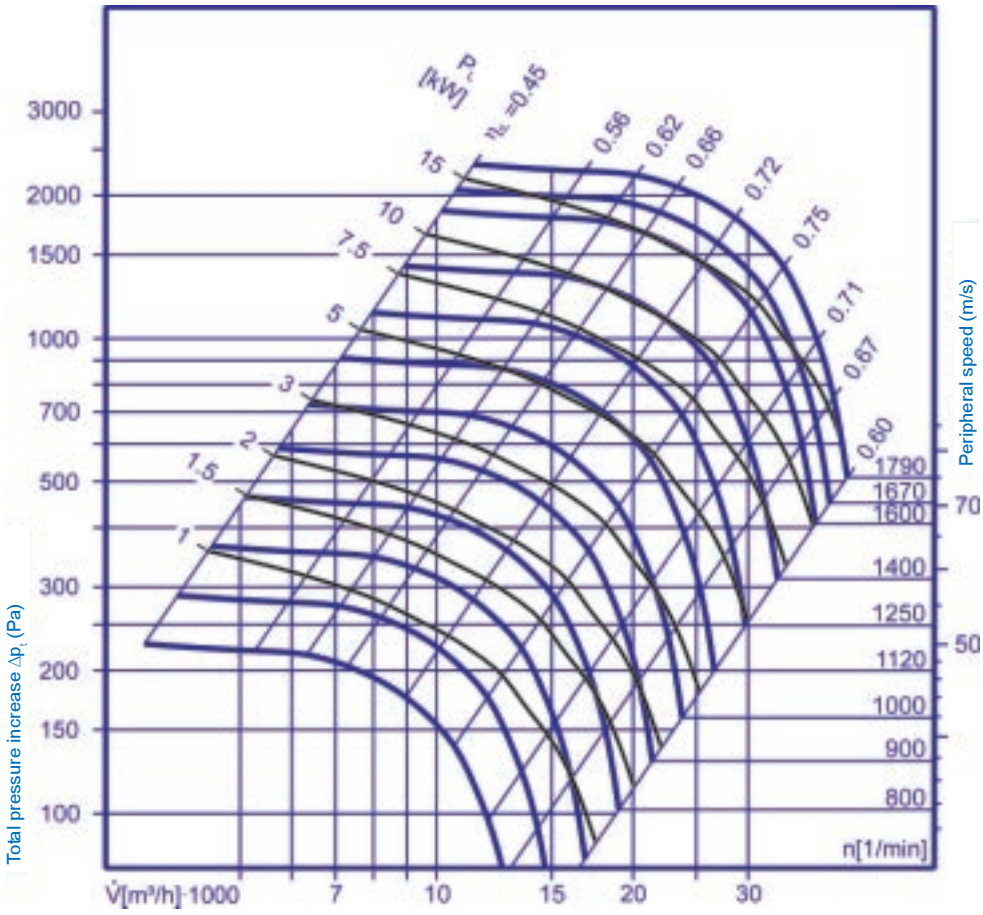
The dynamic pressure portions do not have to be considered in planning.

Performance data

KG size	Max. air volume m³/h	Total pressure increase to Pa	Operational data* Fan power kW	Operational data* Fan speed min⁻¹	Standard data* Motor power kW	Standard data* Motor speed min⁻¹	Standard data* Motor current A
KG 250	25000	500	5.61	1205	7.50	1000	17.50
		1000	10.24	1429	15.00	1500	28.50
		1500	15.74	1626	18.50	1500	35.00

* Fan speed is controlled by frequency converter (f ≥ 50Hz)

Fan diagram
Rotor wheel Ø 900 mm



Total sound power level L_W in [dB]

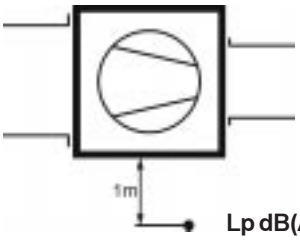
The accurate, device-specific sound data can be determined only for the specific order.

L_w [dB] = the computational total sound power of the fan on the suction/pressure-side.

		Total pressure increase Δp [Pa]					
	L_w	500	750	1000	1250	1500	2000
$\dot{V}$ [m³/h]	15000	95	99	101	103	105	107
	20000	97	101	103	105	106	109
	25000	98	101	104	106	107	110

Sound pressure level Lp dB(A)

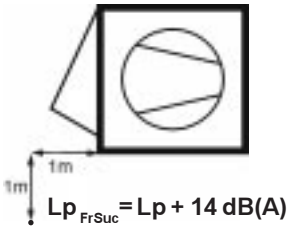
Lp dB(A) = sound pressure level at 1 m distance beside the fan element, measured in the free field with suction and pressure-side duct connection



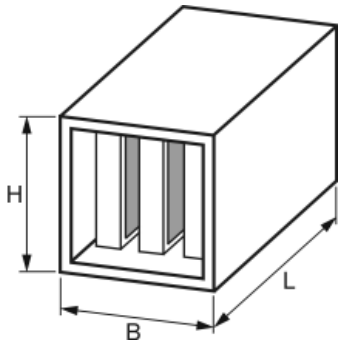
Forward rotor blades								
$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)
15,000	400	45	20,000	450	51	25,000	500	55
	500	46		560	51		630	56
	630	50		710	53		800	57
	800	55		900	58		1000	60
Backward rotor blades								
$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)
15,000	1120	53	20,000	1120	53	25,000	1400	57
	1400	58		1400	58		1600	61
	1800	65		1800	64		1800	64
	2000	68		2000	66		2000	66
Free-running fan wheel Ø 900mm								
$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)	$\dot{V}$ m³/h	n min⁻¹	Lp dB(A)
15,000	950	55	20,000	1050	57	25,000	1200	58
	1100	59		1200	61		1300	61
	1200	61		1300	63		1400	64
	1450	65		1500	66		1600	67

Sound pressure level Lp dB(A) beside the fan element

With free suction or exhaust opening



Silencer element



Dimensions (mm)

Height H	Width B	Length L			
		Type 2	Type 3	Type 4	Type 5
1640	1640	950	1130	1430	1640

Insertion loss De dB(A)

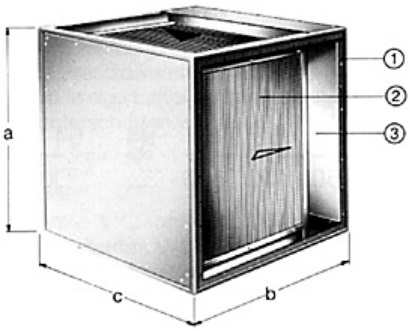
Type	Octave band (Hz)							
	63	125	250	500	1000	2000	4000	8000
2	6	12	20	20	22	16	12	11
3	7	14	24	25	26	20	14	13
4	8	17	30	32	34	25	18	17
5	9	21	37	37	41	29	21	19

For series connection of 2 silencers: $De = De_1 + De_2 - 3$ dB(A)

The accurate, device-specific heat recovery data can be determined only for the specific order.

Description KGX/KGXD

KGX air circulation horizontally/ vertically
KGXD air circulation diagonally



Hot air and cold air are led past each other in the cross current.

The heat recovery takes place via heat transmission from the hot to the cold air flow. The air flows are completely separated by aluminium plates.

- Heat recovery of up to over 80 %
- no moisture transmission
- no mobile parts, corrosion-resistant

① **Casing**
Design same as air conditioner

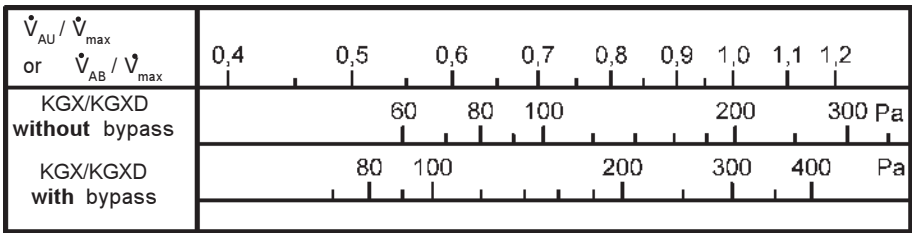
② **Heat exchanger**
Heat exchanger surfaces made of special corrosion-resistant aluminium plates.

③ **Internal bypass** (on request)
In order to prevent rime on the heat exchanger surfaces, the outside air can partially or entirely pass by the heat exchanger in the internal bypass.

Type	max. volume flow $\dot{V}$ [m³/h]		Dimensions [mm]			Weight [kg]	Condensate connector
	without int.bypass	with int. bypass	a	b	c		R"
KGX 250	17,700	19,100	1640	1640	1640	970	-
KGXD 250	17,700	19,100	1640	1640	2440	1380	1 ¼"

Pressure drop Δp [Pa]

for KGX/KGXD with or without internal bypass



Description RWT

RWT air circulation horizontally/vertically

A rotating storage capacity takes up heat from the withdrawn air stream and emits it to the outside air stream.

- Heat recovery of up to 80 %.
- Simple power control by adjusting the speed.
- With suitable rotor material, humidification of the supply air.
- Rime protection, defrosting device, pre-heating of air not required.
- Easy maintenance through inspection doors in the air incident flow elements.

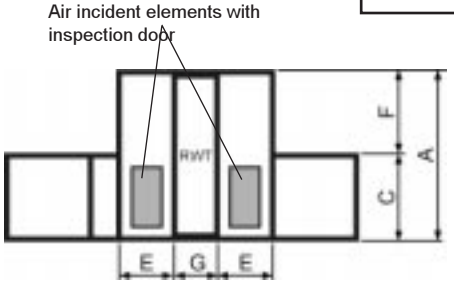
Pressure drop Δp [Pa]

Volume flow $\dot{V}$ [m³/h]	10,000	13,000	16,000	19,000	22,000	25,000
Pressure drop Δp [Pa]	55	71	90	105	120	140

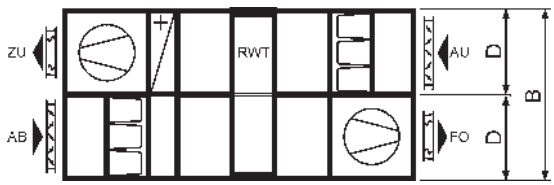
Dimensions

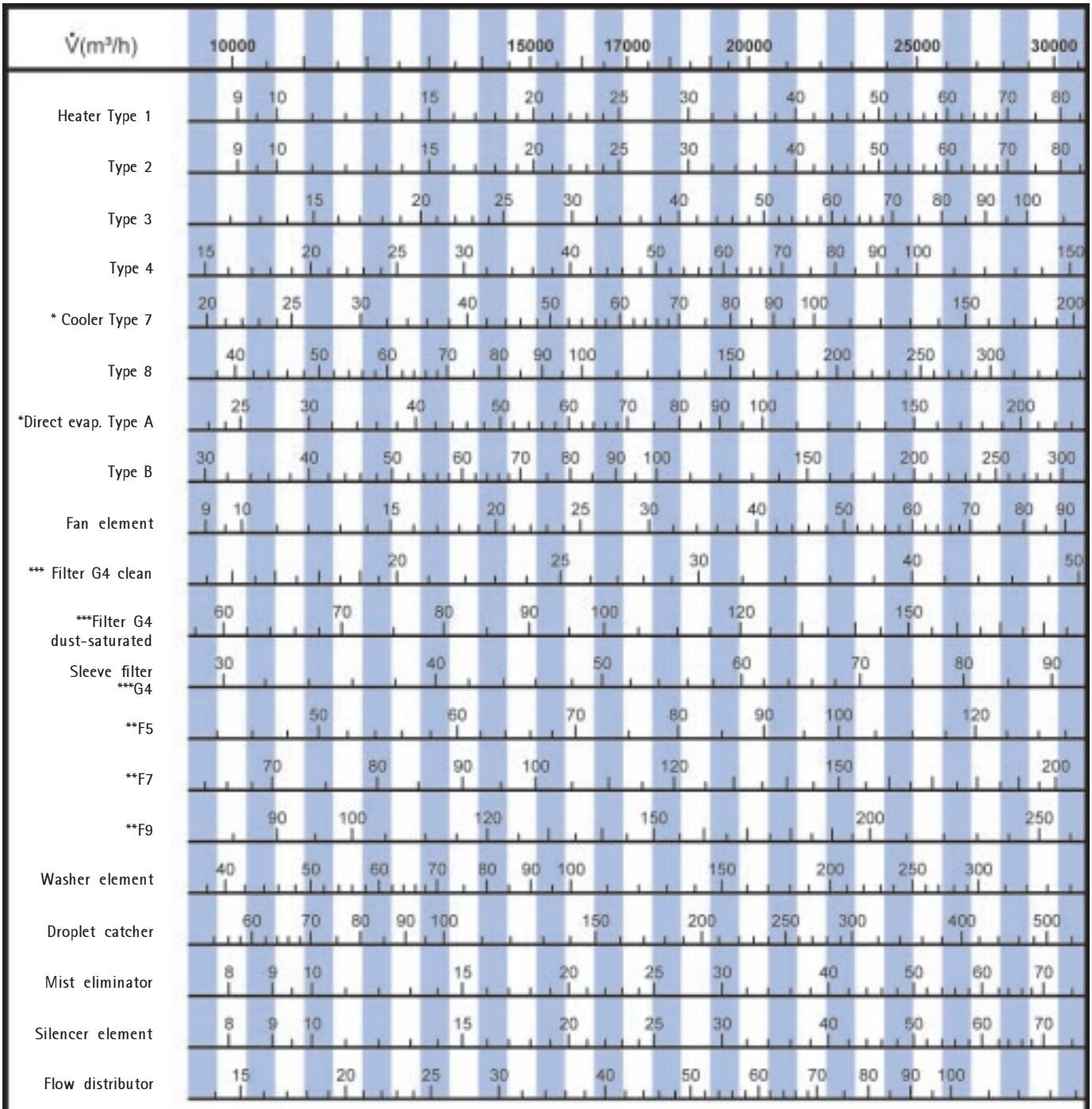
KG	A	B	C	D	E	F	G
250	2280	3280	1640	1640	640	580	440

Front view



Top view





**** Design sleeve filter F5 to F9:**

$$\left(\frac{\text{Start pressure difference + Final pressure difference}}{2}\right)$$

Final pressure differences:

Sleeve filter F5 = 200 Pa
Sleeve filter F7 = 200 Pa
Sleeve filter F9 = 300 Pa

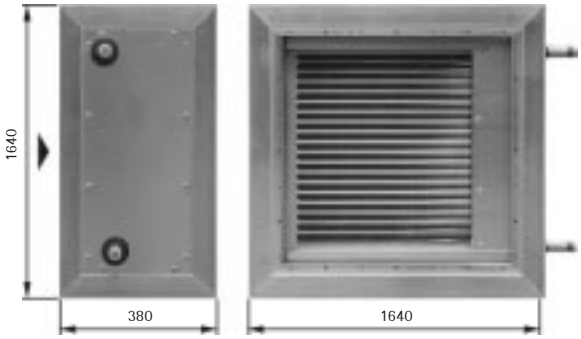
***** Design filter G4, G4 clean, sleeve filter G4**

Start pressure difference +50 Pa
These filters may be used only as additional pre-filters.

* Add pressure drop from mist eliminator

Heater element KG 250 RAL

Heat exchanger for warm pump water PWW



Connections: in air direction right or left

Equipment:

Heat exchanger with Cu pipes and aluminium lamellas, collecting tank made of steel

Type	Connections	Water content
1	1 ½"	12 l
2	1 ½"	16 l
3	2"	25 l
4	2"	25 l

permissible operating pressure: 16 bar
Test pressure 30 bar

on request:

Heat exchanger with Cu pipes and corrosion-resistant aluminium lamellas

Heat exchanger with Cu pipes and Cu lamellas

Heat exchanger made of steel - galvanised

Heat exchanger for steam

Heat exchanger for hot oil

Heat exchanger with bleed and drain connectors

Note:

Allow for sufficient room for extraction of the heat exchanger.

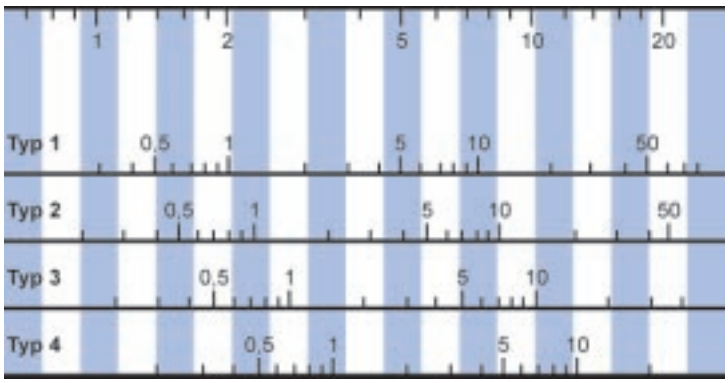
Wasserwiderstand max. 20kPa

Quantity of water $w = \frac{0.86 \cdot \dot{Q}}{\Delta t_W}$ (m³/h)

$\dot{Q}$ = Power in kW

$\Delta t_w = t_{WI} - t_{WO}$

Quantity of water w (m³/h)



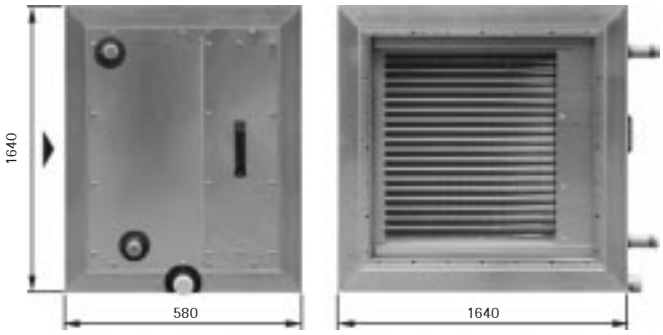
Type		1							
$\dot{V}$ (m³/h)		10 000		15 000		20 000		25 000	
t_{WI} / t_{WO} °C / °C	t_{AI} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C
45/35	- 15	97.8	11	125.6	7	149.2	5	170.1	3
	- 10	87.7	14	112.6	10	133.7	8	152.3	6
	- 5	77.7	16	99.7	13	118.3	11	134.7	10
	± 0	67.9	19	87.0	16	103.1	14	117.4	13
	+ 5	58.2	22	74.4	19	88.1	18	100.2	16
	+ 10	48.7	24	62.1	22	73.4	21	83.3	20
	+ 15	39.2	27	49.8	25	58.8	24	66.7	23
	+ 20	29.8	29	37.8	28	44.4	27	50.2	26
50/40	- 15	107.6	14	138.5	9	164.7	7	187.9	5
	- 10	97.5	16	125.4	13	149.0	10	169.9	8
	- 5	87.5	19	112.4	16	133.5	13	152.2	12
	± 0	77.6	22	99.6	19	118.3	17	134.7	15
	+ 5	67.8	24	87.0	22	103.2	20	117.5	18
	+ 10	58.2	27	74.5	24	88.3	23	100.5	22
	+ 15	48.7	29	62.2	27	73.6	26	83.7	25
	+ 20	39.3	32	50.1	30	59.1	29	67.1	28
60/40	- 15	110.9	14	141.9	10	168.0	7	191.0	5
	- 10	100.8	17	128.8	13	152.4	11	173.2	9
	- 5	90.8	20	115.9	16	137.0	14	155.6	12
	± 0	80.9	23	103.1	19	121.8	17	138.2	16
	+ 5	71.2	25	90.5	22	106.7	20	121.0	19
	+ 10	61.5	28	78.0	25	91.9	23	104.0	22
	+ 15	51.9	30	65.7	28	77.2	26	87.2	25
	+ 20	42.4	33	53.4	31	62.6	29	70.6	28
70/50	- 15	130.9	20	168.0	15	199.5	11	227.2	9
	- 10	120.7	23	154.8	18	183.7	15	209.2	13
	- 5	110.6	25	141.8	21	168.1	18	191.3	16
	± 0	100.7	28	128.9	24	152.7	21	173.7	19
	+ 5	90.8	31	116.1	27	137.5	25	156.3	23
	+ 10	81.1	34	103.5	30	122.4	28	139.1	26
	+ 15	71.5	36	91.1	33	107.6	31	122.1	29
	+ 20	61.9	39	78.7	36	92.9	34	105.3	33
70/55	- 15	138.6	22	178.7	17	212.6	13	242.7	11
	- 10	128.4	25	165.4	20	196.7	17	224.4	14
	- 5	118.2	28	152.2	23	181.0	20	206.5	18
	± 0	108.2	30	139.2	26	165.5	23	188.7	21
	+ 5	98.4	33	126.4	29	150.2	27	171.2	25
	+ 10	88.6	36	113.8	32	135.1	30	153.9	28
	+ 15	79.0	38	101.3	35	120.1	33	136.8	31
	+ 20	69.4	41	88.9	38	105.4	36	119.9	34
80/50	- 15	135.1	21	172.7	16	204.4	12	232.4	10
	- 10	124.9	24	159.5	19	188.6	15	214.3	13
	- 5	114.8	27	146.4	22	173.0	19	196.5	17
	± 0	104.8	29	133.5	25	157.6	22	178.8	20
	+ 5	94.9	32	120.7	28	142.3	25	161.4	23
	+ 10	85.1	35	108.0	31	127.3	28	144.2	27
	+ 15	75.4	37	95.5	34	112.3	32	127.1	30
	+ 20	65.7	40	83.0	37	97.5	35	110.1	33
80/60	- 15	150.5	25	193.8	19	230.4	16	262.9	13
	- 10	140.2	28	180.4	23	214.5	19	244.6	16
	- 5	130.0	31	167.2	26	198.7	22	226.5	20
	± 0	120.0	34	154.2	29	183.1	26	208.7	23
	+ 5	110.1	36	141.3	32	167.7	29	191.1	27
	+ 10	100.3	39	128.6	35	152.6	32	173.7	30
	+ 15	90.6	42	116.0	38	137.5	35	156.5	34
	+ 20	81.0	44	103.6	41	122.7	38	139.5	37
90/70	- 15	169.7	30	219.1	24	260.9	20	298.0	17
	- 10	159.3	33	205.6	27	244.8	23	279.5	20
	- 5	149.1	36	192.3	30	228.9	27	261.3	24
	± 0	138.9	39	179.1	34	213.1	30	243.2	27
	+ 5	128.9	42	166.1	37	197.6	33	225.5	31
	+ 10	119.1	45	153.3	40	182.3	36	207.9	34
	+ 15	109.3	47	140.6	43	167.1	40	190.5	38
	+ 20	99.7	50	128.1	46	152.1	43	173.3	41

Other operating conditions on request!

	2								3								4							
	10 000		15 000		20 000		25 000		10 000		15 000		20 000		25 000		10 000		15 000		20 000		25 000	
	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C
	126.3	18	166.5	14	201.0	12	231.7	10	151.5	25	205.1	21	252.0	18	294.2	16	164.2	29	226.3	25	281.2	22	331.1	20
	113.4	21	149.4	17	180.2	14	207.6	12	136.5	27	184.7	23	226.7	21	264.5	19	148.0	30	203.6	27	252.7	24	297.4	22
	100.7	23	132.5	19	159.7	17	183.9	15	121.8	29	164.5	25	201.8	23	235.3	21	131.9	31	181.2	28	224.7	26	264.2	24
	88.2	25	115.9	22	139.5	20	160.5	18	107.2	30	144.6	27	177.2	25	206.4	23	116.1	33	159.1	30	197.0	28	231.4	26
	75.9	27	99.4	24	119.6	22	137.4	21	92.8	32	124.9	29	152.9	27	177.9	25	100.4	34	137.3	31	169.7	29	199.0	28
	63.7	29	83.2	26	99.9	25	114.6	23	78.6	33	105.5	30	128.9	29	149.8	27	85.0	35	115.7	32	142.7	31	167.1	29
	51.6	30	67.2	28	80.4	27	92.1	26	64.5	34	86.3	32	105.1	31	121.9	29	69.6	36	94.3	34	116.0	32	135.5	31
	39.6	32	51.3	30	61.2	29	69.9	28	50.5	35	67.1	33	81.5	32	94.3	31	54.3	36	73.1	35	89.4	33	104.1	33
	138.5	22	183.0	17	221.2	14	255.2	12	165.5	29	224.2	25	275.8	22	322.3	19	179.0	32	247.3	29	307.8	26	363.0	23
	125.6	24	165.8	20	200.3	17	231.0	15	150.2	31	203.6	27	250.4	24	292.5	22	162.7	34	224.5	30	279.3	28	329.1	26
	112.9	26	148.8	22	179.7	20	207.1	18	135.4	32	183.4	29	225.3	26	263.1	24	146.7	35	202.1	32	251.2	30	295.8	28
	100.3	28	132.1	25	159.4	22	183.6	21	120.8	34	163.4	31	200.6	28	234.1	26	130.8	37	180.0	34	223.4	31	262.9	30
	87.9	30	115.6	27	139.3	25	160.4	23	106.5	35	143.8	32	176.3	30	205.6	28	115.2	38	158.2	35	196.1	33	230.5	31
	75.7	32	99.3	29	119.5	27	137.5	26	92.2	37	124.3	34	152.2	32	177.3	31	99.8	39	136.6	36	169.1	35	198.5	33
	63.6	34	83.3	31	100.0	30	114.9	29	78.2	38	105.1	36	128.5	34	149.4	33	84.5	40	115.3	38	142.4	36	166.8	35
	51.7	36	67.3	34	80.7	32	92.5	31	64.3	39	86.0	37	104.9	36	121.8	35	69.4	41	94.2	39	115.9	37	135.5	36
	144.6	23	189.5	19	227.9	15	262.1	13	176.5	32	237.7	27	291.0	24	338.8	21	191.0	36	261.3	31	323.3	28	379.4	25
	131.7	26	172.4	21	207.1	18	237.9	16	161.4	34	217.1	29	265.5	26	309.0	23	174.6	37	238.5	33	294.7	30	345.5	27
	118.9	28	155.4	24	186.5	21	214.1	19	146.5	35	196.8	31	240.4	28	279.5	26	158.4	39	215.9	35	266.4	32	312.0	29
	106.3	30	138.6	26	166.2	23	190.6	21	131.8	37	176.7	33	215.5	30	250.4	28	142.4	40	193.6	36	238.5	33	279.0	31
	93.8	32	122.1	28	146.1	26	167.4	24	117.3	38	156.8	35	191.0	32	221.6	30	126.5	41	171.5	38	210.8	35	246.2	33
	81.4	34	105.7	30	126.2	28	144.4	27	102.8	40	137.0	37	166.6	34	193.0	32	110.8	42	149.6	39	183.4	37	213.8	35
	69.2	35	89.4	33	106.5	31	121.7	29	88.4	41	117.4	38	142.4	36	164.7	34	95.0	43	127.8	40	156.2	38	181.7	36
	56.9	37	73.2	35	87.0	33	99.1	32	74.0	42	97.8	40	118.3	38	136.4	36	79.3	44	105.9	41	129.0	39	149.6	38
	169.3	30	223.0	24	269.0	21	309.9	18	203.8	39	275.9	34	338.8	30	395.4	27	220.5	43	303.6	39	377.0	35	443.7	32
	156.3	32	205.7	27	247.9	24	285.5	21	188.8	41	255.2	36	313.2	32	365.4	30	204.2	45	280.7	41	348.3	37	409.6	34
	143.5	35	188.6	30	227.2	26	261.5	24	173.9	43	234.8	38	288.0	35	335.7	32	188.1	47	258.1	42	320.0	39	376.1	36
	130.8	37	171.7	32	206.7	29	237.7	27	159.2	45	214.7	40	263.0	37	306.5	34	172.2	48	235.9	44	292.0	41	342.9	38
	118.3	39	155.1	35	186.4	32	214.3	29	144.7	46	194.8	42	238.4	39	277.6	37	156.4	50	213.8	46	264.4	43	310.2	40
	105.9	41	138.6	37	166.4	34	191.1	32	130.3	48	175.1	44	214.1	41	249.0	39	140.8	51	192.1	47	237.1	44	277.8	42
	93.7	43	122.3	39	146.6	37	168.2	35	116.1	49	155.6	46	189.9	43	220.7	41	125.3	52	170.5	49	210.0	46	245.7	44
	81.5	45	106.1	41	127.0	39	145.5	38	102.0	51	136.3	47	166.0	45	192.6	43	110.0	53	149.0	50	183.2	48	213.9	46
	177.9	32	235.4	27	284.8	23	328.9	20	211.2	41	287.2	36	353.9	32	414.0	29	228.4	46	316.3	41	394.4	37	465.6	34
	164.8	35	218.0	29	263.7	26	304.4	23	196.1	43	266.6	38	328.2	34	383.9	32	212.1	48	293.4	43	365.7	39	431.5	37
	152.0	37	200.9	32	242.8	28	280.2	26	181.3	45	246.2	40	303.0	37	354.2	34	196.1	49	270.9	45	337.4	42	397.8	39
	139.3	39	184.3	35	222.2	31	256.3	29	166.6	47	226.1	42	278.1	39	324.9	37	180.2	51	248.7	47	309.5	43	364.7	41
	126.8	41	167.3	37	201.9	34	232.8	32	152.2	49	206.2	44	253.5	41	296.0	39	164.6	52	226.8	48	281.9	45	332.0	43
	114.5	43	150.8	39	181.9	36	209.6	34	137.9	50	186.6	46	229.2	43	267.4	41	149.1	53	205.1	50	254.7	47	299.7	45
	102.3	45	134.5	42	162.1	39	186.6	37	123.8	52	167.3	48	205.2	45	239.3	43	133.8	55	183.7	51	227.8	49	267.8	47
	90.2	47	118.4	44	142.5	41	163.9	40	109.9	53	148.1	50	181.4	47	211.4	45	118.7	56	162.6	53	201.2	50	236.3	48
	176.2	32	230.9	26	277.6	22	319.0	19	215.4	42	290.0	36	355.0	32	413.3	29	232.8	47	318.5	41	393.9	37	462.1	34
	163.1	34	213.5	28	256.5	25	294.6	22	200.2	44	269.3	39	329.3	35	383.1	31	216.4	48	295.5	43	365.0	39	427.9	36
	150.2	36	196.4	31	235.6	27	270.5	25	185.2	46	248.7	41	303.9	37	353.3	34	200.1	50	272.7	45	336.5	41	394.1	38
	137.5	39	179.4	34	215.1	30	246.7	28	170.4	48	228.4	43	278.7	39	323.8	36	183.9	52	250.2	47	308.3	43	360.7	40
	124.9	41	162.6	36	194.7	33	223.1	30	155.7	49	208.3	45	253.9	41	294.7	39	168.0	53	227.9	48	280.4	45	327.6	42
	112.3	43	146.0	38	174.6	35	199.8	33	141.1	51	188.3	47	229.2	43	265.8	41	152.1	54	205.8	50	252.7	47	294.9	44
	99.9	45	129.5	41	154.6	38	176.7	36	126.6	52	168.5	48	204.7	45	237.1	43	136.3	55	183.8	51	225.2	48	262.3	46
	87.6	46	113.1	43	134.7	40	153.8	39	112.1	54	148.8	50	180.4	47	208.5	45	120.5	56	161.9	52	197.8	50	230.0	48
	193.4	36	255.7	30	309.1	26	356.8	23	230.3	46	313.8	40	385.4	36	450.7	33	249.0	51	344.3	46	429.1	42	506.2	39
	180.3	39	238.2	33	287.9	29	332.2	26	215.3	48	292.3	43	359.7	39	420.4	35	232.7	53	321.5	48	400.3	44	471.9	41
	167.4	41	221.0	36	267.0	32	307.9	29	200.4	50	271.8	45	334.3	41	390.6	38	216.6	55	298.9	50	371.9	46	438.2	43
	154.7	43	204.0	38	246.3	35	283.9	32	185.7	52	251.7	47	309.3	43	361.2	41	200.7	56	276.6	52	343.9	48	405.0	45
	142.1	46	187.3	41	225.9	37	260.3	35	171.2	54	231.7	49	284.6	46	332.2	43	185.0	58	254.6	53	36.2	50	372.1	48
	129.7	48	170.7	43	205.8	40	236.9	38	156.9	56	212.1	51	260.2	48	303.5	45	169.5	59	232.9	55	288.9	52	339.7	50
	117.5	50	154.3	45	185.9	42	213.8	40	142.7	57	192.6	53	236.1	50	275.2	48	154.2	61	211.4	57	261.9	54	307.6	51
	105.3	52	138.1	48	166.2	45	191.0	43	128.7	59	173.3	55	212.2	52	247.1	50	139.0	62	190.1	58	235.2	55	275.9	53
	216.8	42	287.7	36	348.5	31	402.8	28	256.1	53	349.2	47	431.0	42	504.8	39	276.4	58	383.8	53	479.6	49	566.9	45
	203.7	45	270.1	39	327.1	34	378.0	31	241.0	55	328.4	49	405.1	45	474.3	41	260.1	60	360.9	55	450.7	51	532.5	48
	190.7	48	252.7	41	306.0	37	353.5	34	226.1	57	307.9	52	379.6	47	444.4	44	244.0	62	338.3	57	422.2	53	498.7	50
	178.0	50	235.6	44	285.2	40	329.3	37	211.4	59	287.7	54	354.5	50	414.8	47	228.1	64	316.0	59	394.1	55	465.3	52
	165.4	52	218.8	47	264.6	43	305.5	40	196.9	61	267.7	56	329.7	52	385.6	49	212.5	66	294.0	61	366.5	57	432.3	54
	152.9	54	202.1	49	244.3	46	281.9	43	182.5	63	248.0	58	305.2	54	356.8	51	197.1	67	272.3	63	339.1	59	399.8	57
	140.6	57	185.7	52	224.3	48	258.7	46	168.4	65	228.5	60	281.0	57	328.4	54	181.8	69	250.9	64	312.1	61	367.7	59
	128.5	59	169.4	54	204.5	51	235.7	48	154.4	66	209.2	62	257.1	59	300.2	56	166.7	70	2229.6	66	285.4	63	336.0	60

Exchanger for cold pump water PKW / direct evaporator

Performance data for direct evaporator for cooling agent R134a, for other cooling agents on request.



Air direction: horizontal:

Connections: in air direction right or left

Equipment:

Exchanger for cold water with Cu pipes and aluminium lamellas, collecting tank made of Cu.

Direct evaporator with Cu pipes and aluminium lamellas, cooling agent distributor.

Mist eliminator,
Condensate basin with condensate connector on side, male thread 1¼",
Droplet catcher for air direction vertical.

Type	Connections	Contents
7	3"	44 l
8	3"	75 l
A	DN 35 cooling agent inlet DN 60 cooling agent outlet	42 l
B	DN 42 cooling agent inlet DN 60 cooling agent outlet	59 l

permissible operating pressure: 16 bar
Test pressure 30 bar

on request:

Exchanger with Cu pipes and corrosion-resistant aluminium lamellas

Exchanger with Cu pipes and Cu lamellas

Exchanger with bleed and drain connector

Note:

Allow for sufficient room for extraction of the exchanger.
Build in siphon on site with the condensate connector.

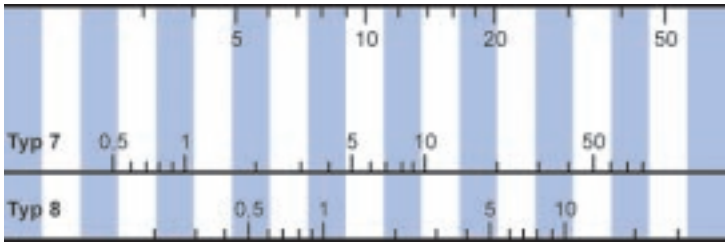
Water resistance max. 50kPa

Quantity of water $w = \frac{0.86 \cdot \dot{Q}}{\Delta t_W}$ (m³/h)

$\dot{Q}$ = Power in kW

$\Delta t_w = t_{WI} - t_{WO}$

Quantity of water w (m³/h)



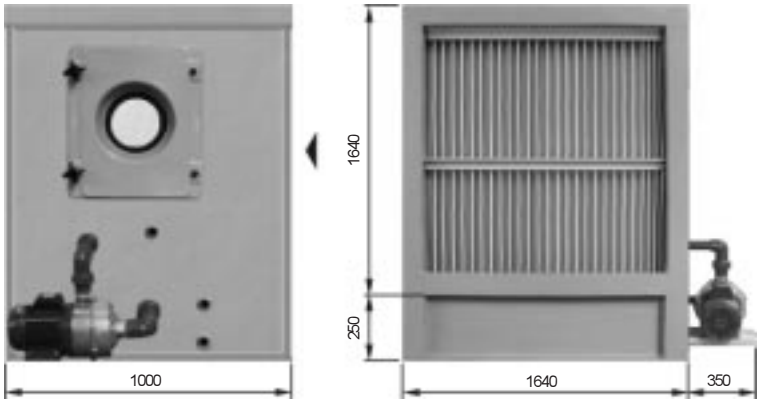
$\dot{V}$ (m³/h)		10 000		15 000		20 000		25 000	
PKW	t_{AI} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C	$\dot{Q}$ kW	t_{AO} °C
		Exchanger for cold water type 7							
4/8	32	107.7	10.6	147.7	12.4	183.1	13.7	215.0	14.8
	28	91.8	10.1	125.4	11.7	155.0	12.8	181.8	13.7
	26	81.9	9.6	111.9	11.0	138.4	12.1	162.3	12.9
	25	77.0	9.4	105.2	10.7	130.1	11.7	152.5	12.5
5/10	32	99.0	11.7	135.3	13.4	167.4	14.7	196.4	15.7
	28	83.0	11.3	113.0	12.7	139.4	13.8	163.2	14.6
	26	73.1	10.8	99.5	12.1	122.7	13.0	143.6	13.8
	25	68.1	10.5	92.7	11.7	114.4	12.7	133.9	13.4
6/12	32	89.9	12.8	122.7	14.4	151.5	15.6	177.5	16.5
	28	73.9	12.3	100.3	13.7	123.5	14.7	144.3	15.5
	26	64.0	11.8	86.7	13.0	106.7	13.9	124.7	14.6
	25	59.0	11.6	80.0	12.7	98.4	13.5	114.9	14.2
8/12	32	86.5	13.3	118.9	14.7	147.6	15.8	173.6	16.7
	28	70.5	12.8	96.5	14.0	119.5	14.9	140.4	15.6
	26	60.5	12.2	82.8	13.3	102.6	14.1	120.5	14.7
	25	55.4	12.0	76.0	13.0	94.1	13.7	110.6	14.3
		Type 8							
4/8	32	129.1	6.5	184.3	7.6	235.2	8.6	282.6	9.5
	28	111.2	6.5	158.1	7.5	201.1	8.4	241.1	9.2
	26	99.2	6.3	140.9	7.3	179.3	8.1	214.9	8.8
	25	93.2	6.2	132.4	7.2	168.4	7.9	201.8	8.6
5/10	32	119.4	7.7	169.9	8.9	216.1	9.8	259.1	10.7
	28	101.4	7.7	143.4	8.8	181.9	9.6	217.6	10.4
	26	89.3	7.6	126.2	8.5	159.9	9.3	191.3	9.9
	25	83.2	7.5	117.6	8.4	149.0	9.1	178.1	9.7
6/12	32	109.2	8.9	154.7	10.1	196.3	11.0	234.9	11.8
	28	90.9	9.0	128.1	10.0	161.9	10.8	193.2	11.5
	26	78.7	8.8	110.7	9.7	139.8	10.4	166.7	11.0
	25	72.6	8.7	102.0	9.6	128.8	10.3	153.5	10.8
8/12	32	102.7	10.0	146.8	10.9	187.4	11.6	225.4	12.3
	28	84.6	9.9	120.4	10.7	153.3	11.4	183.9	12.0
	26	72.4	9.7	102.9	10.4	131.1	11.0	157.2	11.5
	25	66.3	9.6	94.2	10.3	119.9	10.8	143.9	11.3
Ev. temp. °C		**Direct evaporator Type A**							
2.0	32	89.3	13.1	110.9	15.8	126.4	17.6	138.3	19.0
	28	78.4	11.9	97.1	14.3	110.5	15.9	120.8	17.1
	26	71.0	11.2	87.7	13.4	99.7	14.9	108.9	16.0
	25	67.3	10.8	83.0	12.9	94.4	14.4	103.0	15.4
5.0	32	79.3	14.5	98.3	16.8	111.9	18.5	122.3	19.8
	28	68.4	13.3	84.5	15.4	96.1	16.8	104.9	17.9
	26	60.9	12.6	75.1	14.5	85.4	15.8	93.1	16.8
	25	57.2	12.2	70.5	14.0	80.0	15.3	87.3	16.3
8.0	32	67.9	15.9	84.0	18.0	95.5	19.5	104.3	20.7
	28	57.0	14.8	70.3	16.5	79.8	17.8	87.1	18.8
	26	49.5	14.1	61.0	15.7	69.2	16.8	75.4	17.7
	25	45.8	13.7	56.4	15.2	63.9	16.3	69.6	17.1
		Typ B							
2.0	32	107.9	9.8	140.3	12.1	165.0	13.9	184.5	15.4
	28	95.1	9.0	123.2	11.1	144.6	12.7	161.5	14.0
	26	86.2	8.5	111.5	10.4	130.7	11.9	145.8	13.1
	25	81.7	8.2	105.7	10.1	123.8	11.5	138.0	12.6
5.0	32	95.8	11.4	124.4	13.5	146.2	15.1	163.3	16.4
	28	82.9	10.7	107.4	12.5	125.9	13.9	140.4	15.0
	26	74.0	10.2	95.6	11.9	112.0	13.1	124.8	14.2
	25	69.5	10.0	89.8	11.5	105.1	12.8	117.1	13.7
8.0	32	82.2	13.2	106.5	150.0	125.0	16.4	139.4	17.6
	28	69.2	12.5	89.4	14.0	104.7	15.2	116.7	16.2
	26	60.2	112.0	77.7	13.4	90.9	14.5	101.2	15.3
	25	55.8	11.8	71.9	13.1	84.1	14.1	93.5	14.9

Air inlet state: 32°C / 40 % r.h., 28°C / 47 % r.h.
26°C / 49 % r.h., 25°C / 50 % r.h.

Note: min. evaporation temperature 2°C.

Other operating conditions on request.

Washer element



Casing
Plastic (glass fibre reinforced plastic)

Inspection door and connections
in air direction right or left

Equipment
Block pump 4.0 kW, 230/400 V, D, 8.5 A, 50 Hz;
Pump housing made of grey cast iron;
Rotor wheel and shaft made of stainless steel
Nozzle holder with self-cleaning nozzles spraying against air flow
Washer basin with all-round inclination towards the drain connector
Pump with complete piping on suction and pressure side

Inspection door with inspection window
Flow rectifier
Mist eliminator
} temperature-resistant to 70°C, dismantable

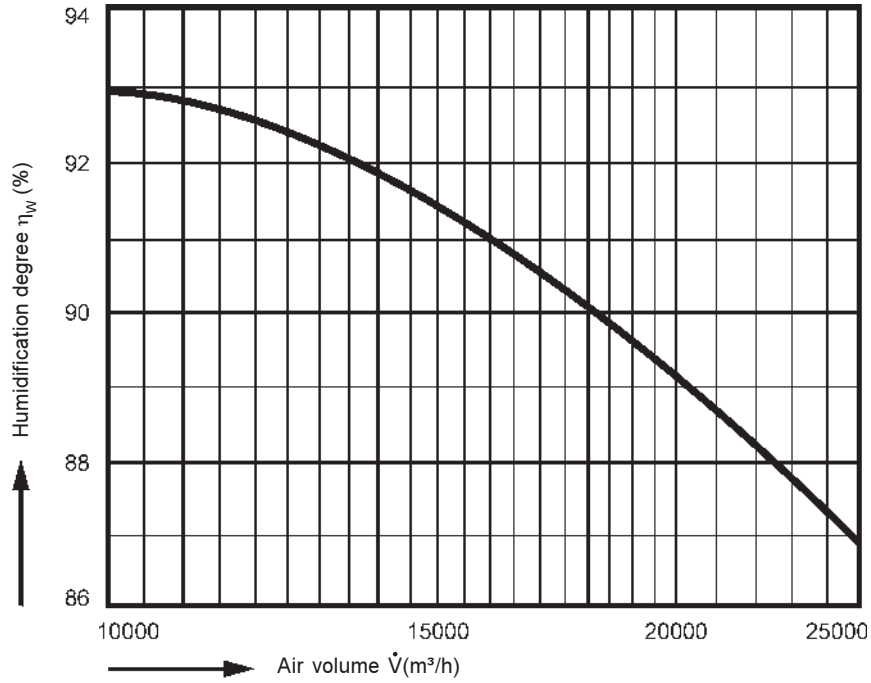
Inlet device, male thread 3/4", with float valve and float, overflow spout DN 40, outlet chute DN 40, dry-run protection for pump, de-sludging system, lighting 230 V / 60 W, darkening for inspection window.
On request:
Drain and overflow device with siphon on the inside, thermometer, pressure gauge

Humidification degree η_W

$$\eta_W = \frac{x_2 - x_1}{x_s - x_1}$$

Index
x = water content of air
1 = air inlet
2 = air outlet
S = saturation state

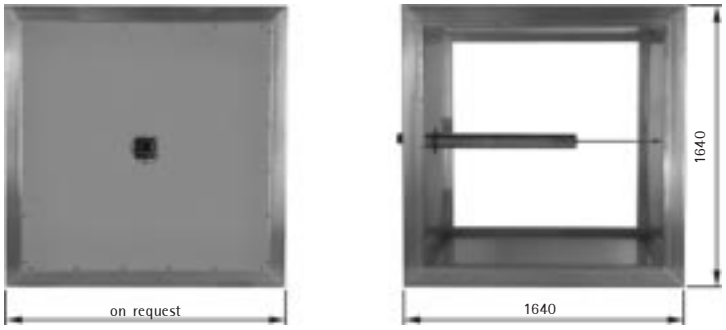
with air temperature 20°C, density 1.2 kg/m³, water pressure 2.2 bar, quantity of water 23,600 l/h



Vapour humidifier element

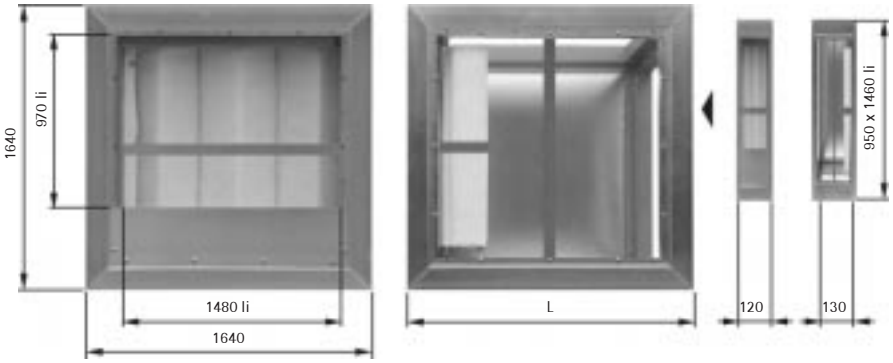
suitable for vapour lances of different manufacturers

Design:
- Humidifier chamber with basin made of corrosion-resistant material
- Inspection door
- Basin with drain 1¼" male thread made of corrosion-resistant material
- Lengths on request
- Inspection hole double-walled Ø 150mm
- Lighting

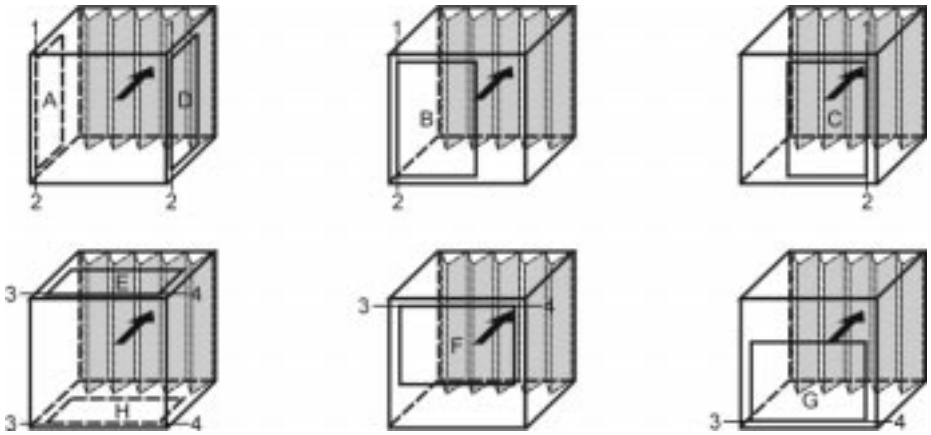


Filter/air mixture element L = 1640 mm
combined

Air mixture element/exhaust air element
L = 1130 mm



Suction variations:



One external flap		Two external flaps joined with linkage.	
Flap arrangement	Flap drive	Flap arrangement	Flap drive
A	1, 2	A + B	1, 2
B	1, 2	A + C	1, 2
C	1, 2	A + D	1, 2
D	1, 2	B + D	1, 2
E	3, 4	C + D	1, 2
F	3, 4	E + F	3, 4
G	3, 4	E + G	3, 4
H	3, 4	E + H	3, 4
		F + H	3, 4
		G + H	3, 4

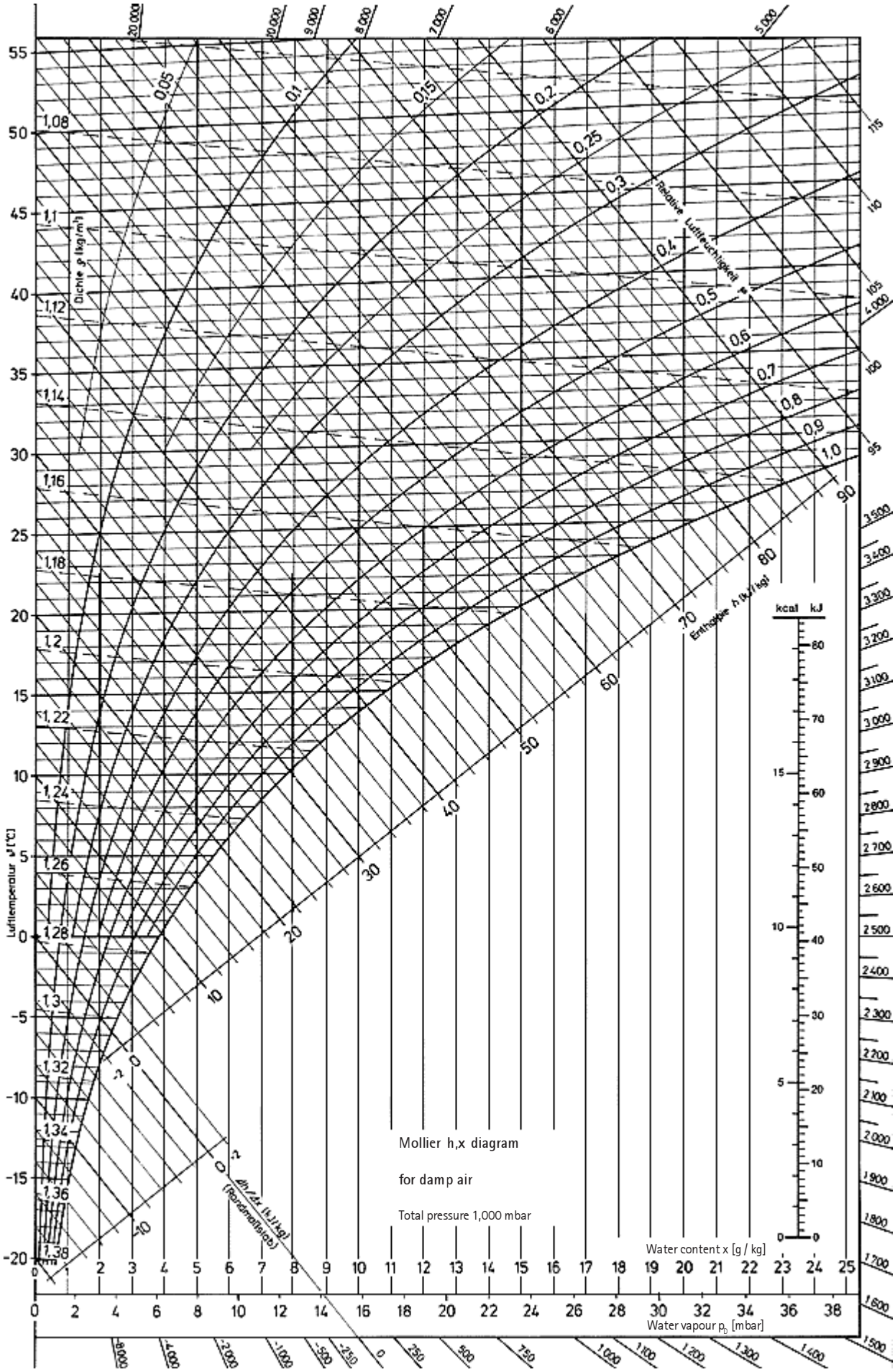
One internal flap		Two internal flaps joined with linkage.	
Flap arrangement	Flap drive	Flap arrangement	Flap drive
A	1, 2	A + C	1, 2
B	1, 2	A + D	1, 2
C	1, 2	B + D	1, 2
D	1, 2	E + G	3, 4
E	3, 4	E + G	3, 4
F	3, 4	F + H	3, 4
G	3, 4		
H	3, 4		

Drive torque for 1 flap 6 Nm (airtight flap according to DIN 1946: 54 Nm)

Inspection door:

in air direction right or left
required space for filter extraction: min. 0.8 m
for air mixture element/exhaust air element inspection door only on request in air direction right/left

h, x Diagram


Mollier h,x diagram
for damp air
Total pressure 1,000 mbar
Water content x [g / kg]
Water vapour p_D [mbar]
Enthalpie h [kJ/kg]
kcal kJ
Relative Luftfeuchtigkeit φ
Dichte ρ [kg/m³]
Luftemperatur ϑ [°C]
Δh/Δx [kJ/kg] (Raumluftstrahl)

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01/02 TV E