

PROCESS OPTIMISATION WITH HOT AIR



 **HAPRO**
Thermodynamic Engineering.

Product Line of WiTec Elektrotechnik GmbH

WiTec Elektrotechnik GmbH

Hauptstraße 41 · D-42799 Leichlingen / Witzhelden

Phone: +49 (0) 2174 / 7901-0

info@hapro.de · www.hapro.de



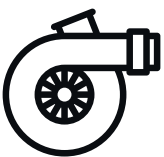
HAPRO PRODUCTION MACHINERY ENGINEERING: EFFICIENCY GAINS INCLUDED

Optimising processes with hot air is our passion. HAPRO systems apply hot air with pin-point accuracy. This enables you, the customer, to achieve tremendous efficiency gains in the manufacture, processing and finishing of products. Integrated in our customers' systems, hot air is used in this precision process for activation, spot-on riveting, residue-free deburring, fast drying, accurate temperature control and sales-promoting finishing.

Our specialists at HAPRO Thermodynamic Engineering regularly develop solutions for almost every technical challenge in production in close cooperation with our customers – individual, process-orientated, technologically outstanding. From initial briefing to commissioning, our employees supervise the entire development and integration process of hot air systems.

THE INSTALLATION PRINCIPLE

Thermodynamic installations work according to a simple principle, which is implemented in all applications.



Generate an air flow

Powerful, tried-and-tested blowers generate the airflow required for the application.



Guide the air

Air ducting systems made of heat-resistant air hoses guide the airflow from the blower to the point of use.



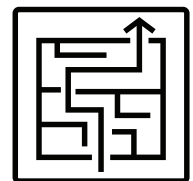
Heat the air

Electrically powered air heaters ensure the air is heated to the required temperature.



Regulate the temperature

Microprocessor controlled regulators ensure precisely maintained temperatures when hot air is used.



Apply the hot air

At the point of use, the hot air is accurately fed through special nozzles for use in the respective application.



ACTIVATE SELECTIVELY

Temperature-dependent adhesives can be quickly, easily and safely activated – even in inaccessible places.



PINPOINT RIVETING

Temperature-controlled hot air can be directed precisely onto surfaces by means of special nozzles.



RESIDUE-FREE DEBURRING

We deliver solutions that deburr without leaving any residue in the shortest possible processing time.



FAST DRYING

Hot air allows you to dry easily, quickly and contact-free.

PROMOTE SALES BY ENHANCING SURFACE FINISH

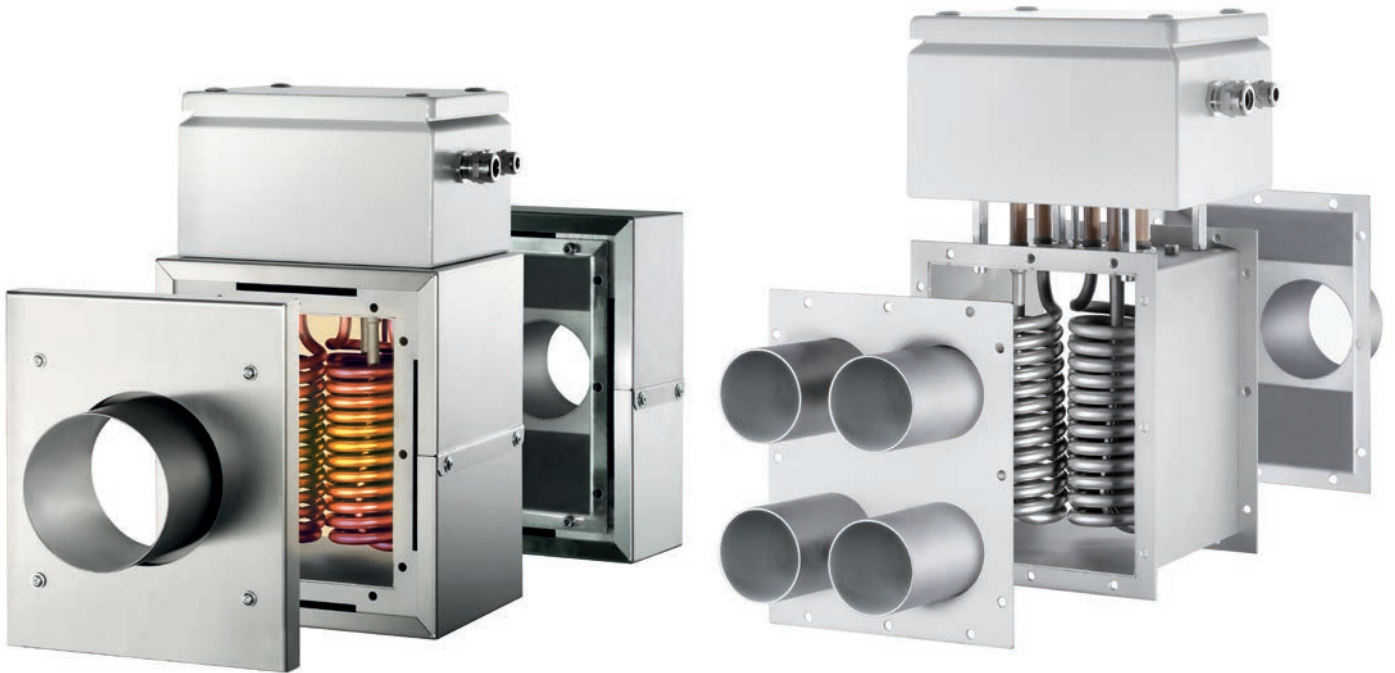
We are in a position to provide you with extremely cost-effective solutions that enable you to make more out of your products.



PRECISE TEMPERATURE EQUALISATION

Any specified temperature can be maintained with accuracy of close to 100% in a range from +30 °C to +900 °C.

LE-R AIR HEATERS



The electrically powered air heaters of the LE-R series can be used universally, e.g. in drying systems, hot air shrink systems, heating cabinets, hot air ducts and preheating systems. The heating elements and housings are made of high-quality stainless steel, which is why they heat dry, moist and mildly aggressive air as well as nitrogen in fresh air or recirculating air operation. The equipment is easy to control and, with its compact dimensions, can be installed with only a small footprint. All versions are designed for continuous operation. The devices are available with an output of 3-18 kW, and special designs are possible. Inlet temperature in recirculating operation is max. 300 °C, outlet temperature is 350 °C. Customized layout pressure-resistant up to 5 bar (LE-D).

Base set

- Housing made of stainless steel (1.4301)
- Heating elements made of stainless steel(1.4301)
- Terminal boxes made of powder-coated sheet steel

Optional items:

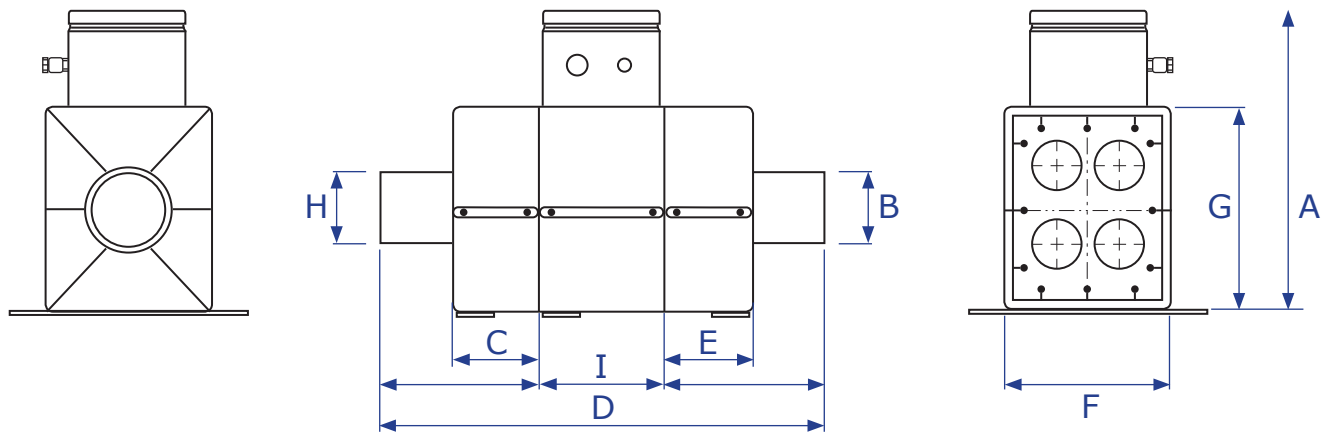
- Throttle valves
Order No. 400190601 [outlet side]
Order No. 400190605 [inlet side]
- Temperature sensor
Order No. 40019002, Order No. 40019004
- Mounting brackets Order No. 901100

Options

- Air volume throttle damper on inlet or outlet side
- Outlet flange plate is manufactured according to customer specifications
- Connecting flanges for inlet and outlet are manufactured according to customer specifications
- Mounting brackets
- Nozzles for hot air distribution, special systems on request
- DIN-compliant overtemperature protection relay has an adjustable cut-off temperature
- Temperature sensor Pt 100 C600 on outlet side
- Temperature sensor NiCr-Ni or similar on outlet side
- Air flow monitoring on inlet side by means of differential pressure switch, pressure-wave switch or air flow monitor
- Temperature regulated by means of electronic controllers
- Power electronics: solid-state relay complete with heat sinks



Installation dimensions



Designation (details in mm)	Dimensions	3 - 9 kW thermally insulated	10 - 18 kW thermally insulated
Total height	A	380	380
Diameter of inlet nozzle	B	150 max.	150 max.
Length of outlet nozzle, including funnel	C	200	200
Total length with inlet and outlet nozzles	D	564	728
Length of inlet nozzle, incl. funnel	E	200	200
Width of the housing	F	220	220
Height of the housing	G	260	260
Diameter of the outlet nozzle	H	150 max.	150 max.
LE-R body	I	164	328

Model	Order No.	Output kW	Voltage V	Description
LE-R 103	40018103	3,0	400	Thermally insulated, with overtemperature protection
LE-R 104	40018104	4,5	400	Thermally insulated, with overtemperature protection
LE-R 106	40018106	6,0	400	Thermally insulated, with overtemperature protection
LE-R 107	40018107	7,5	400	Thermally insulated, with overtemperature protection
LE-R 109	40018109	9,0	400	Thermally insulated, with overtemperature protection
LE-R 110	40018110	10,5	400	Thermally insulated, with overtemperature protection
LE-R 112	40018112	12,0	400	Thermally insulated, with overtemperature protection
LE-R 113	40018113	13,5	400	Thermally insulated, with overtemperature protection
LE-R 115	40018115	15,0	400	Thermally insulated, with overtemperature protection
LE-R 118	40018118	18,0	400	Thermally insulated, with overtemperature protection

Other sizes and capacities on request

LE-P AIR HEATERS



The electrically powered air heaters of the LE-P series are mainly used where large quantities of gaseous media have to be heated. LE-P air heaters can be found, for example, in drying systems, hot-air shrink systems, heating cabinets, hot-air ducts and preheating systems. The heating elements and housings are made of high-quality stainless steel, which is why they heat dry, moist and mildly aggressive air as well as nitrogen in fresh air or recirculating air operation. The equipment is easy to control and, with its compact dimensions, can be installed with only a small footprint. All versions are designed for continuous operation. The air heaters are fully thermally insulated (with the exception of the inlet and outlet nozzles). The devices are available with an output of 24 – 72 kW, and special designs are possible. Inlet temperature in recirculating operation is max. 300 °C, continuous outlet temperature is 350 °C. Customized layout pressure-resistant up to 5 bar (LE-D).

Base set

- Housing made of stainless steel (1.4301)
- Heating elements made of stainless steel (1.4301)
- Terminal boxes made of powder-coated sheet steel

Optional items:

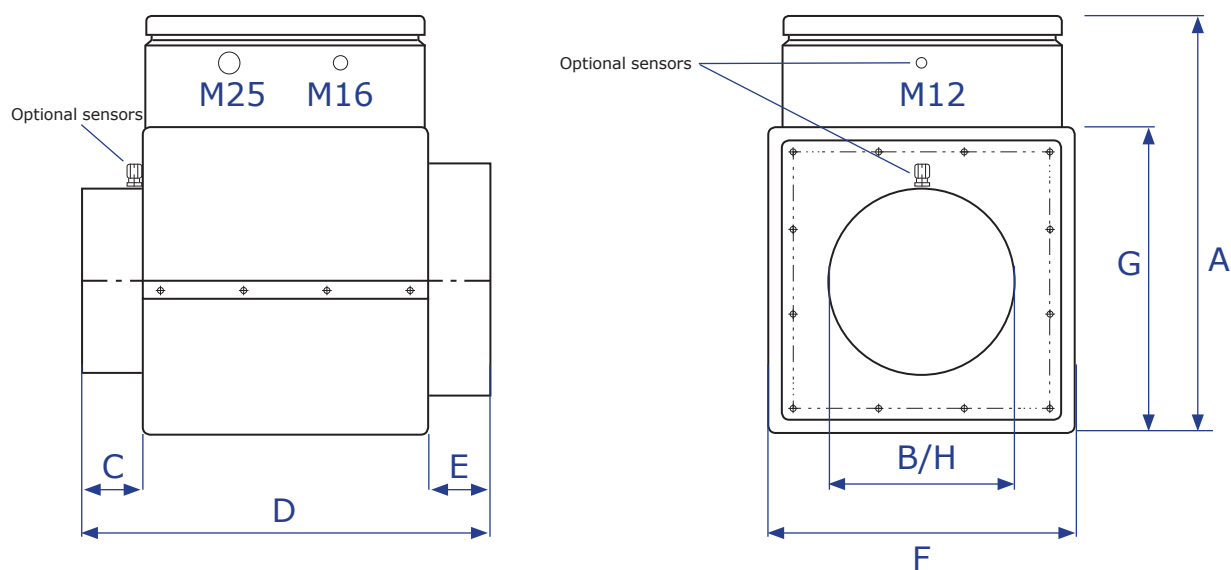
- Throttle valves
Order No. 400190601 [outlet side]
Order No. 400190605 [inlet side]
- Temperature sensor
Order No. 40019002, Order No. 40019004
- Mounting brackets Order No. 901101

Options

- Air volume throttle damper on inlet or outlet side
- Outlet flange plate is manufactured according to customer specifications
- Connecting flanges for inlet and outlet are manufactured according to customer specifications
- Mounting elements for enclosures are manufactured according to customer specifications
- Nozzles for hot air distribution, special systems on request
- DIN-compliant overtemperature protection relay has an adjustable cut-off temperature
- Temperature sensor Pt 100 C600 on outlet side
- Temperature sensor NiCr-Ni or similar on outlet side
- Air flow monitoring on inlet side by means of differential pressure switch, pressure-wave switch or air flow monitor
- Temperature regulated by means of electronic controllers
- Power electronics: solid-state relay complete with heat sinks



Installation dimensions



Designation (details in mm)	Dimensions	LE-P 124 24 kW	LE-P 136 36 kW	LE-P 148 48 kW	LE-P 172 72 kW
Total height	A	450	450	450	450
Diameter of inlet nozzle	B	250 max.	250 max.	250 max.	250 max.
Length of outlet nozzle, including funnel	C	50	50	50	50
Total length with inlet and outlet nozzles	D	405	600	705	905
Length of inlet nozzle, incl. funnel	E	50	50	50	50
Width of the housing	F	330	330	330	330
Height of the housing	G	330	330	330	330
Diameter of the outlet nozzle	H	250 max.	250 max.	250 max.	250 max.

Model	Order No.	Output kW	Voltage V	Description
LE-P 124	40018124	24,0	3 x 400	With overtemperature protection
LE-P 136	40018136	36,0	3 x 400	With overtemperature protection
LE-P 148	40018148	48,0	3 x 400	With overtemperature protection
LE-P 172	40018172	72,0	3 x 400	With overtemperature protection

Other sizes and capacities on request

SIDE CHANNEL BLOWERS: HAPROVENT H SCL

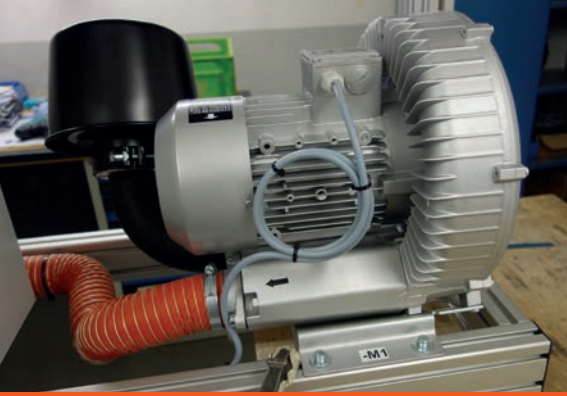


The high-pressure blowers of the HAPROVENT H SCL series can be used universally when high pressures are required, e.g. for special nozzles with high air outlet speeds, blow-off devices, etc. These blowers are also ideal air supply units for the LE-R and LE-P series air heaters. These low-noise units are designed for unrestricted continuous operation and are, to a large extent, maintenance-free. For taking in dry, non-aggressive media up to 45 °C. The blowers are made of an aluminium light alloy and can be installed in any axial alignment. The two-pole motors comply with DIN/VDE 0530 and are designed to meet ingress protection class IP 55 and insulation class F. The blowers are also available in special designs, for example gas-tight or explosion-proof. Special types (e.g. with deviating pressure or air volume), as well as further accessories are available on request. Different motor configurations or special designs are available on request.

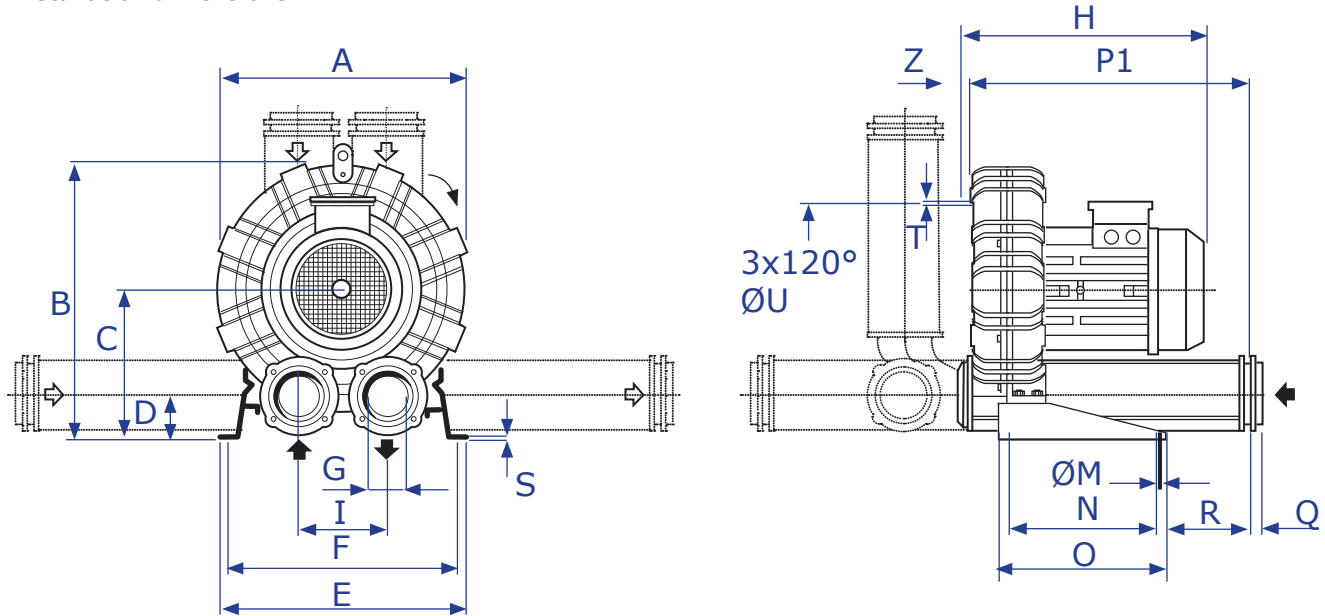
Side channel compressors can generate both blast and suction air by means of centrifugal acceleration with multi-stage compression. Due to the special mode of operation and construction, there is no contact between rotating and stationary components.

Benefits of side-channel compressors

- Wear-free operation
- Absolutely oil-free compression
- Made to customer specification
- No pulsation of the fluid
- No lubrication required
- Quiet operation



Installation dimensions

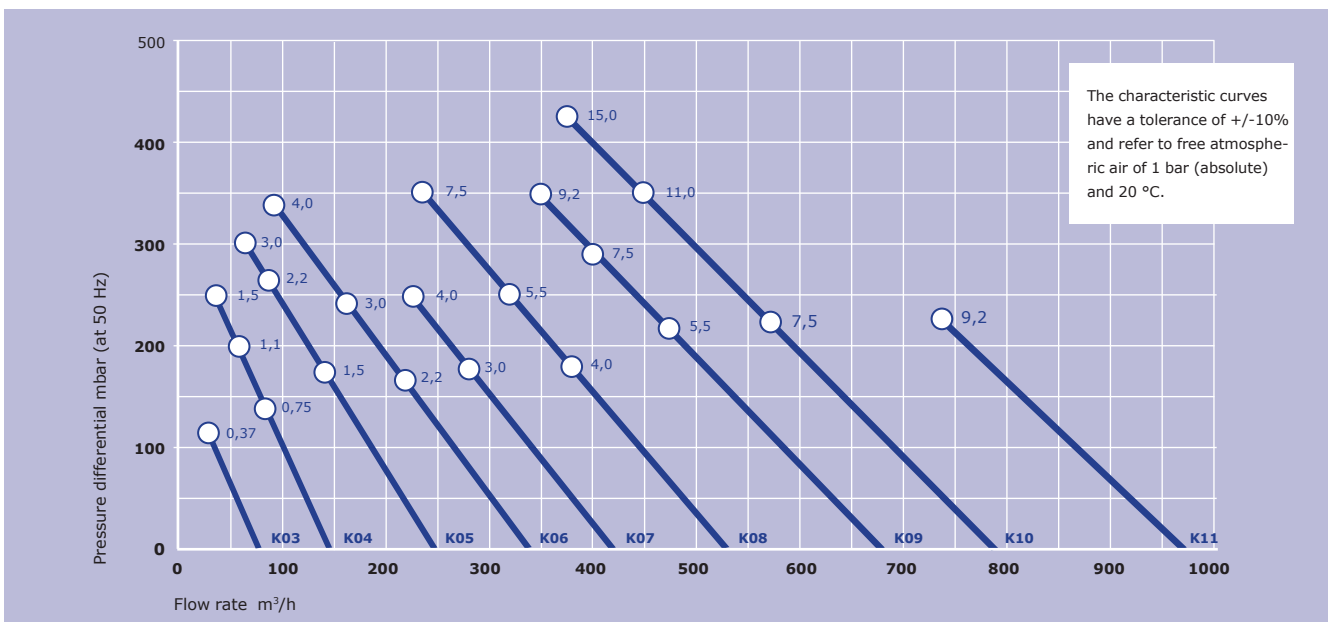


Dimensions in mm	SCL KO3	SCL KO4	SCL KO5	SCL KO6	SCL KO7	SCL KO8	SCL KO9	SCL K10	SCL K11
A	241	285	327	376	424	457	492	516	542
B	268	315	365	393	481	498	561	573	603
C	147	172	200	205	269	269	315	315	332
D	43	49	54	54	82	82	96	96	91
E	230	255	325	325	470	480	510	510	540
F	205	225	260	290	438	448	478	478	508
G	G 1 1/4"	G 1 1/2"	G 2"	G 2"	G 3"	G 3"	G 4"	G 4"	G 4"
H	235	258	357	371	603	603	685	685	695
I	86	102	120	125	155	155	182	182	200
M	10	12	15	15	13	13	13	13	13
N	83	95	115	140	300	300	300	300	300
O	142	171	265	265	350	350	350	350	350
P1	205	222	320	334	512	512	586	586	586
Q	18	18	18	18	25	25	25	25	25
R	75	70	98	85	137	137	199	199	204
S	4	4	4	4	5	5	5	5	5
T	M6	M6	M8	M8	M8	M8	M8	M8	M8
U	140	175	200	240	295	310	360	360	390
Z	12	18	19	19	16	16	16	16	16

The data given refers to air with a temperature of 20 °C and an atmospheric pressure of 1013 mbar (abs), measured at the inlet. Tolerance for values given +/- 10%. The values shown in this table are non-binding guide values and are only suitable for rough pre-selection.

SIDE CHANNEL BLOWERS: HAPROVENT H SCL

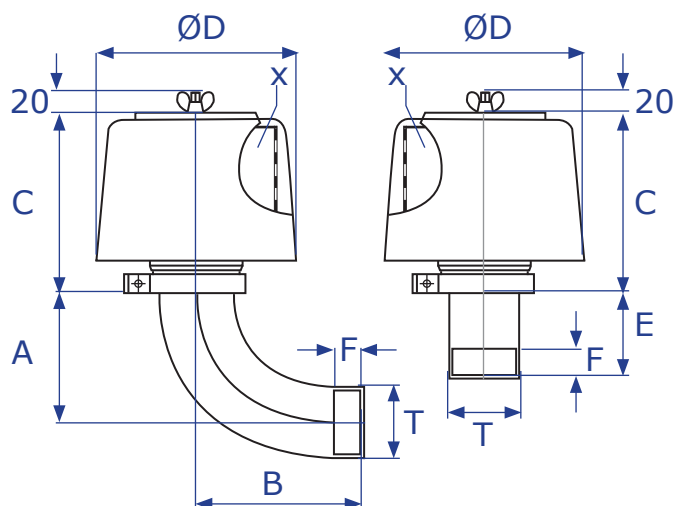
Model	Order No.	Output kW	Voltage V	Air volume m ³ /h self-clearing	Pressure mbar	Weight kg	Sound pressure dB/A
Haprovent H SCL K03	4162240300	0,37	230/400V 50Hz	74	110	11,0	58,7
Haprovent H SCL K04	4162240407	0,75	230/400V 50Hz	137	140	16,5	61,6
Haprovent H SCL K04	4162240411	1,1	230/400V 50Hz	137	200	18,2	61,6
Haprovent H SCL K04	4162240415	1,5	230/400V 50Hz	137	250	21,5	61,6
Haprovent H SCL K05	4162240515	1,5	230/400V 50Hz	219	175	25,5	67,2
Haprovent H SCL K05	4162240522	2,2	230/400V 50Hz	219	250	27,5	67,2
Haprovent H SCL K05	4162240530	3,0	230/400V 50Hz	219	300	34,5	67,2
Haprovent H SCL K06	4162240622	2,2	230/400V 50Hz	304	160	31,0	70,0
Haprovent H SCL K06	4162240630	3,0	230/400V 50Hz	304	240	37,0	70,0
Haprovent H SCL K06	4162240640	4,0	230/400V 50Hz	304	340	38,5	70,0
Haprovent H SCL K07	4162240730	3,0	230/400V 50Hz	414	175	52,5	74,5
Haprovent H SCL K07	4162240740	4,0	230/400V 50Hz	414	250	53,7	74,5
Haprovent H SCL K08	4162240840	4,0	230/400V 50Hz	536	180	56,5	76,5
Haprovent H SCL K08	4162240855	5,5	230/400V 50Hz	536	250	70,0	76,5
Haprovent H SCL K08	4162240875	7,5	230/400V 50Hz	536	350	75,0	76,5
Haprovent H SCL K09	41622409055	5,5	230/400V 50Hz	663	210	79,0	77,1
Haprovent H SCL K09	41622409075	7,5	230/400V 50Hz	663	290	84,0	77,1
Haprovent H SCL K09	41622409092	9,2	230/400V 50Hz	663	350	89,0	77,1
Haprovent H SCL K10	41622410075	7,5	230/400V 50Hz	782	225	85,5	77,4
Haprovent H SCL K10	41622410110	11,0	230/400V 50Hz	782	350	97,0	77,4
Haprovent H SCL K10	41622410150	15,0	230/400V 50Hz	782	425	114,0	77,4
Haprovent H SCL K11	41622411092	9,2	230/400V 50Hz	915	230	95,5	80,0





AIR INLET FILTER ACCESSORIES

Designation	Order No.	Dimensions in mm					
		A	B	C	ØD	E	F
HOF 32 1 ¼"	42260007	76	95	175	170	81	19
HOF 40 1 ½"	424500091	86	105	175	170	81	19
HOF 50 2"	427000091	130	130	185	208	156	24
HOF 80 3"	431400091	190	130	200	280	170	30



PRESSURE TABLE

Model	Output kW	Air volume at: x mbar														
		0	50	75	100	125	150	175	200	225	250	300	350	400	450	500
SCL K03	0,37	74	57	48	38	29	-	-	-	-	-	-	-	-	-	-
SCL K04	0,75	137	114	109	97	86	-	-	-	-	-	-	-	-	-	-
SCL K04	1,1	137	-	-	-	-	75	68	53	-	-	-	-	-	-	-
SCL K04	1,5	137	-	-	-	-	-	-	-	41	36	-	-	-	-	-
SCL K05	1,1	219	193	180	165	154	-	-	-	-	-	-	-	-	-	-
SCL K05	1,5	219	-	-	-	-	144	125	-	-	-	-	-	-	-	-
SCL K05	2,2	219	-	-	-	-	-	-	114	100	89	-	-	-	-	-
SCL K05	3,0	219	-	-	-	-	-	-	-	-	-	60	-	-	-	-
SCL K06	2,2	304	272	258	242	225	212	196	-	-	-	-	-	-	-	-
SCL K06	3,0	304	-	-	-	-	-	181	166	150	-	-	-	-	-	-
SCL K06	4,0	304	-	-	-	-	-	-	-	-	117	-	-	-	-	-
SCL K07	2,2	414	375	350	330	316	-	-	-	-	-	-	-	-	-	-
SCL K07	3,0	414	-	-	-	-	295	280	255	-	-	-	-	-	-	-
SCL K07	4,0	414	-	-	-	-	-	-	-	230	215	-	-	-	-	-
SCL K07	5,5	414	-	-	-	-	-	-	-	-	-	175	130	95	-	-
SCL K08	3,0	536	495	470	450	430	-	-	-	-	-	-	-	-	-	-
SCL K08	4,0	536	-	-	-	-	405	382	-	-	-	-	-	-	-	-
SCL K08	5,5	536	-	-	-	-	-	-	360	345	320	-	-	-	-	-
SCL K08	7,5	536	-	-	-	-	-	-	-	-	-	300	235	190	-	-
SCL K08	9,2	536	-	-	-	-	-	-	-	-	-	-	-	-	145	-
SCL K09	4,0	663	616	594	569	543	-	-	-	-	-	-	-	-	-	-
SCL K09	5,5	663	-	-	-	-	520	497	476	-	-	-	-	-	-	-
SCL K09	7,5	663	-	-	-	-	-	-	-	451	429	-	-	-	-	-
SCL K09	9,2	663	-	-	-	-	-	-	-	-	-	387	338	-	-	-
SCL K09	11,0	663	-	-	-	-	-	-	-	-	-	-	-	292	246	-
SCL K10	5,5	782	735	710	685	660	635	-	-	-	-	-	-	-	-	-
SCL K10	7,5	782	-	-	-	-	-	610	585	560	535	-	-	-	-	-
SCL K10	9,2	782	-	-	-	-	-	-	-	-	-	490	-	-	-	-
SCL K10	11,0	782	-	-	-	-	-	-	-	-	-	-	440	390	-	-
SCL K10	15,0	782	-	-	-	-	-	-	-	-	-	-	-	-	340	295
SCL K11	7,5	915	-	-	-	783	760	737	-	-	-	-	-	-	-	-
SCL K11	9,2	915	-	-	-	-	-	-	710	684	-	-	-	-	-	-
SCL K11	11,0	915	-	-	-	-	-	-	-	-	656	609	-	-	-	-
SCL K11	15,0	915	-	-	-	-	-	-	-	-	-	-	551	503	-	-
SCL K11	18,5	915	-	-	-	-	-	-	-	-	-	-	-	-	451	385

The data given refers to air with a temperature of 20 °C and an atmospheric pressure of 1013 mbar (abs), measured at the inlet. Tolerance for values given +/- 10%. The values shown in this table are non-binding guide values and are only suitable for rough pre-selection.

RADIAL BLOWER: HAPROVENT M MODEL S



The medium-pressure blowers of the HAPROVENT M Model S series (clockwise rotation shown) can be used universally, e.g. in drying systems, hot-shrink systems, heating cabinets, as cooling blowers, etc. These blowers are the ideal air suppliers for the air heaters of the LE-R and LE-P series. The units are designed for continuous operation and can convey dry and humid air up to 65 °C (with a temperature restriction up to 300 °C). The housings are welded from sheet steel. The impellers are made of aluminium. Due to their low weight and compact dimensions, the blowers can be easily integrated into machines and installations. The mounting position of the blower can also be reversed.

The units are supplied with a fan base as standard, dimensions table, see page 16.

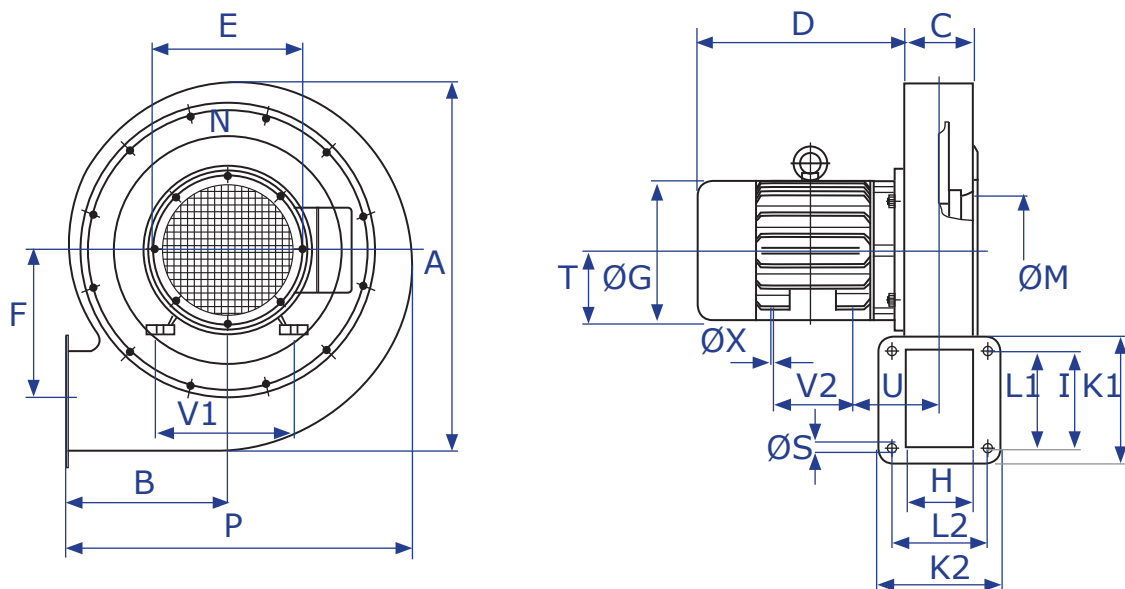
Special designs such as individual voltages or ex-protection according to ATEX are available on request.

Options

- Blower also available inverted, anticlockwise rotating
- Outlet position: Available in 90-degree steps
- Throttle valve: For manual adjustment on the air outlet side
- Air heater: Suitable air filter elements for all applications
- Temperature restriction: For media temperatures up to 300 °C
- Nozzles/air distribution: Air distribution, nozzles and special systems on request
- Condenser: For 230 V single-phase alternating voltage
- Quiet operation

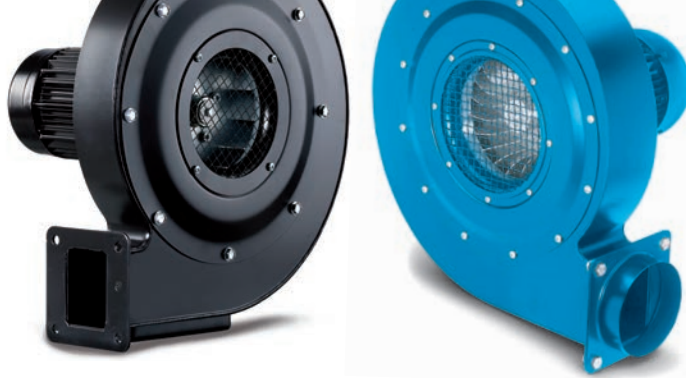


Installation dimensions

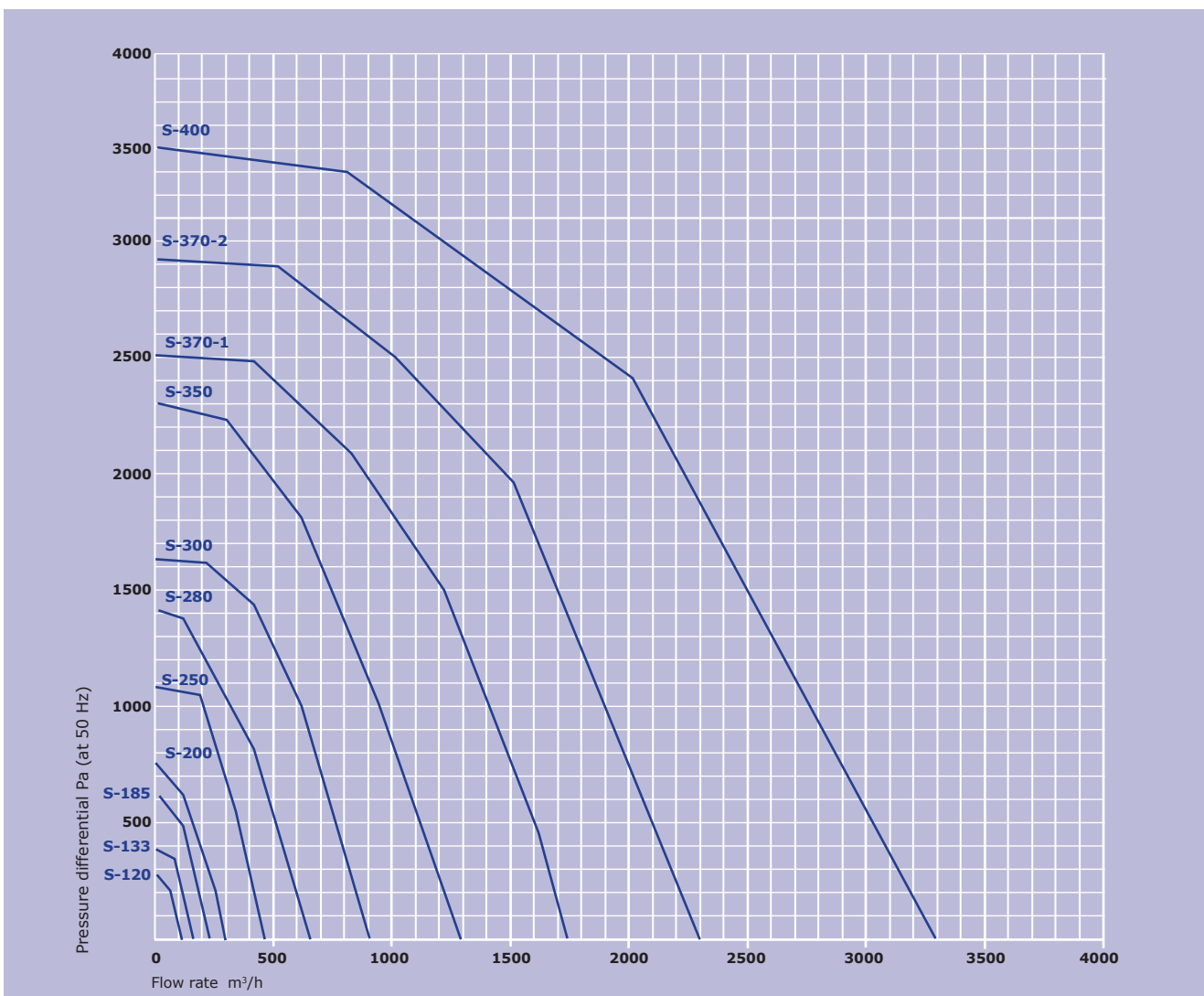


3D and 2D drawings available

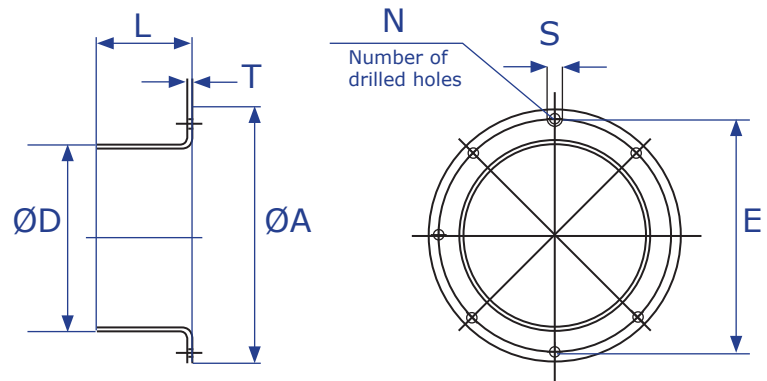
Dimensions in mm	S-120	S-133	S-185	S-200	S-250	S-280	S-300	S-350	S-370-1	S-370-2	S-400
A	199	199	274	295	351	408	422	496	529	529	575
B	94	94	122	130	155	182	185	219	228	228	247
C	40	40	41	41	52	58	65	66	71	97	105
D	94	94	138	141	170	196	213	270	255	280	337
E	95	95	116	116	144	144	157	175	212	232	232
F	78	78	116	126	154	181	183	216	221	221	231
G	108	108	109	110	111	123	138	158	179	179	221
H	36	36	37	37	46	52	60	60	65	91	99
I	66	66	60	65	67	75	86	100	125	125	155
K1	85	85	85	85	105	120	125	140	155	175	195
K2	60	60	85	85	105	120	125	140	155	175	195
L1	60	60	70	70	80	90	95	115	117	140	150
L2	50	50	70	70	80	90	95	115	117	140	150
M	65	65	80	80	103	103	126	143	152	178	178
N	M3	M3	M3	M3	M4	M4	M5	M5	M5	M5	M5
P	191	191	258	277	330	385	395	466	491	491	534
S	6	6	6	6	9	9	9	9	11	11	11
T	-	-	-	-	-	-	-	-	-	-	112
U	-	-	-	-	-	-	-	-	-	-	126
V1	-	-	-	-	-	-	-	-	-	-	190
V2	-	-	-	-	-	-	-	-	-	-	140
X	-	-	-	-	-	-	-	-	-	-	12



Model	Order No.	Output kW	Voltage V	Air volume m ³ /h self-clearing	Pressure Pa fully throttled	Weight kg
Haprovent M TYP S-120	41650120	0,045	400	140	270	3,7
Haprovent M TYP S-133	41650133	0,045	400	150	335	3,8
Haprovent M TYP S-185	41650185	0,090	400	200	640	6,0
Haprovent M TYP S-200	41650200	0,090	400	240	740	6,0
Haprovent M TYP S-250	41650250	0,120	400	420	1100	9,0
Haprovent M TYP S-280	41650280	0,250	400	615	1410	15,0
Haprovent M TYP S-300	41650300	0,550	400	900	1650	22,0
Haprovent M TYP S-350	41650350	1,1	400	1260	2380	28,0
Haprovent M TYP S-370-1	416503701	1,5	400	1700	2600	34,0
Haprovent M TYP S-370-2	416503702	2,2	400	2360	2880	35,0
Haprovent M TYP S-400	41650400	4,0	400	3350	3400	65,0



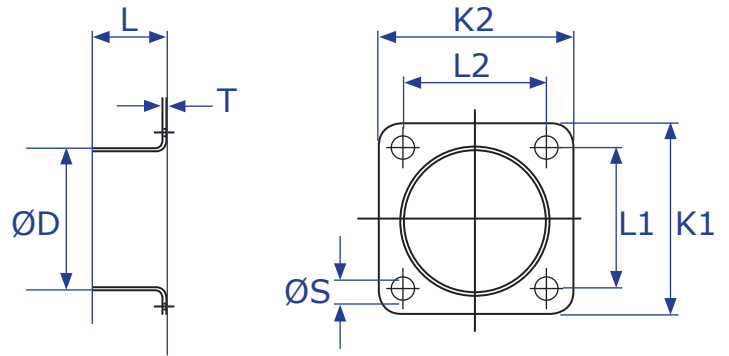
HAPROVENT M MODEL S ACCESSORIES



Inlet connector for HAPROVENT M Model S

HAPROVENT M Typ	Order No.	Dimensions in mm						
		D	L	A	E	S	N	T
S-120	401660120060	60	40	102	95	3	4	1
	401660120080	80	40	102	95	4	4	1
S-133	401660133060	60	40	102	95	3	4	1
	401660133080	80	40	102	95	4	4	1
S-185	401660185080	80	40	123	116	4	4	1
	401660185100	100	40	123	116	4	4	1
S-200	40166020080	80	40	123	116	4	4	1
	401660200100	100	40	123	116	4	4	1
S-250	401660250100	100	40	152	144	5	4	1
	401660250125	125	40	152	144	5	4	1
S-280	401660280100	100	40	152	144	5	4	1
	401660280125	125	40	152	144	5	4	1
S-300	401660300125	125	40	165	157	6	4	1
	401660300140	140	40	165	157	6	4	1
S-350	401660350140	140	40	186	175	6	4	1
	401660350160	160	40	186	175	6	4	1
S-370-1	4016603701160	160	40	222	212	6	8	1
	4016603701180	180	40	222	212	6	8	1
S-370-2	4016603702180	180	40	244	232	6	8	1
	4016603702200	200	40	244	232	6	8	1
S-400	401660400180	180	40	244	232	6	8	1
	401660400200	200	40	244	232	6	8	1

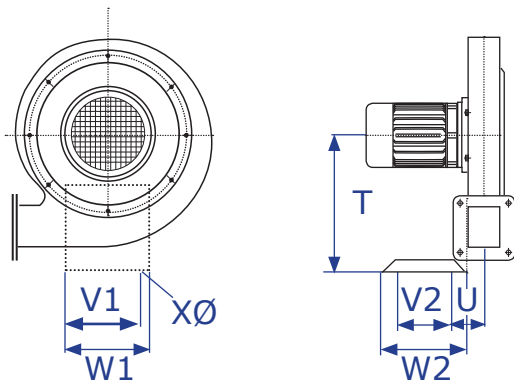
HAPROVENT M MODEL S ACCESSORIES



Outlet connector for HAPROVENT M Model S

HAPROVENT M TYP	Order No.	Dimensions in mm							
		D	L	K1	K2	L1	L2	S	T
S-120	40167012040	40	32	85	60	60	50	6	1
	40167012060	60	42	85	60	60	50	6	1
S-133	40167013340	40	32	85	60	60	50	6	1
	40167013360	60	42	85	60	60	50	6	1
S-185	40167018580	80	40	85	85	70	70	6	1
S-200	40167020080	80	40	85	85	70	70	6	1
S-250	40167025080	80	40	105	105	80	80	9	1
	40167025090	90	40	105	105	80	80	9	1
S-280	40167028090	90	40	120	120	90	90	9	1
S-300	401670300112	112	40	125	125	95	95	9	1
S-350	401670350125	125	40	140	140	115	115	9	1
	401670350140	140	42	140	140	115	115	9	1
S-370-1	4016703701125	125	40	155	155	117	117	11	1
	4016703701140	140	40	155	155	117	117	11	1
S-370-2	4016703702140	140	40	175	175	140	140	11	1
	4016703702160	160	40	175	175	140	140	11	1
S-400	40167400180	180	40	195	195	150	150	11	1

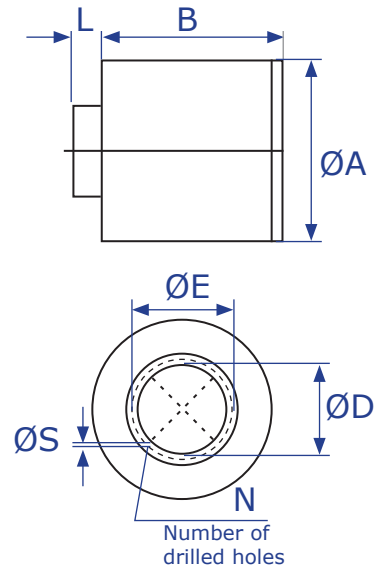
Fan base for HAPROVENT M Model S, supplied



HAPROVENT M TYP	Dimensions in mm						
	W ₁	W ₂	V ₁	V ₂	U	X	T
S-120	130	100	80	60	42	7	135
S-133	130	100	80	60	42	7	135
S-185	130	100	80	60	48	7	170
S-200	130	100	80	60	51	7	180
S-250	140	120	110	75	54	9	215
S-280	165	150	120	100	54	9	255
S-300	165	150	120	100	60	9	255
S-350	200	170	150	120	61	9	295
S-370-1	230	200	170	140	69	12	335
S-370-2	230	200	170	140	82	12	335
S-400	380	250	350	200			

Intake round filter für HAPROVENT M Model S

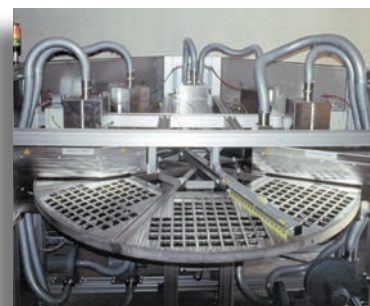
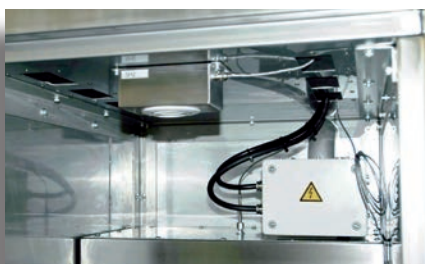
HAPROVENT M TYP	Order No.	Dimensions in mm						
		A	B	D	E	L	N	S
S-185 / S-200	40168200	150	142	100	116	25	3	4
S-250	40168250	205	237	120	144	25	4	5
S-280	40168280	205	237	120	144	25	4	5
S-300	40168300	252	297	135	157	25	4	6
S-350	40168350	306	297	155	175	25	4	6
S-370/1	4016837001	410	357	175	212	25	8	6
S-370/2	4016837002	410	573	175	232	25	8	6
S-400	40168400	410	573	175	232	25	8	6



OUR REFERENCES



- Abiomed
- AEG Hausgeräte
- Argo-Hythos
- AVL (früher Pierburg Instruments)
- BMW
- BMW Motorsport
- Braun
- Continental
- Daimler
- Emitec
- Frimo
- GKN Walterscheid
- Kautex Textron
- Osram
- Pferd
- Philips
- Robert Bosch
- Schumag
- SGH Carbon
- Siemens
- SIG Blowtec
- Stabilus
- Volkswagen AG



GENERAL ACCESSORIES

COMPACT CONTROLLERS

The microprocessor controlled **HAPRO 0235** compact controller is a versatile universal controller with digital display of set and actual values.

It can be configured as a two-state controller, three-state controller, modulating controller or proportional controller. All the important components are freely adjustable (e.g. control response, control range, measured values, servo-drive outputs, control response, type and function of alarm control). The device is able to adjust itself for optimum operation (P, PD, PI, PD/I - self-optimising function). Equipped for use with Pt 100 DIN probes and thermocouples. Standard signal 0/4.20 mA, DC 0-10 V.



Model	Order No.	Voltage V	Frequency Hz	Outputs	Dimensions in mm: width/height/depth
0235	4001001483	230/115 +/-10%	48-62	Relay AC 250 V, max 3 A/bistable DC 0/18 V, max. 10 mA	48 / 96 / 80
0235	4001001484	24 +/-10%		Relay AC 250 V, max 3 A/bistable DC 0/18 V, max. 10 mA	48 / 96 / 80

SWITCHING ELEMENTS



Solid-state relays

Two-phase, complete with heat sink

Order No.: 400100192



Pressure-wave switches

Suitable for overpressure or underpressure from 0.2 to 0.5 mbar response sensitivity, optionally with 5 m air hose and push-in sleeve **Order no: 40010045** or 10 m air hose and 2 push-in sleeves

Order no: 40010046

HEAT-RESISTANT AIR HOSES UP TO 600 °

Flexible HAPRO-FLEX air hoses for hot air systems are characterised by their high manufacturing quality and the associated safety in use. Depending on the application, air hoses are made of coated woven glass fabric, plastic, neoprene, aluminium with or without coating, zinc-plated steel or stainless steel for special requirements. The range of heat resistance extends from -85 °C to +600 °C. The standard length of the hoses is 4 metres and longer hoses can also be provided by the metre. For special applications that have to fulfil requirements beyond the standard range of products we can supply suitable hoses at short notice.



- Hapro-FLEX S1:** Single-layer silicone-coated woven glass fabric, reinforced by exposed spiral cover, slightly corrugated inside and outside, highly flexible, colour red, temperature-resistant up to 250°C, short term up to 310°C.
- Hapro-FLEX S1W:** as above, thermal insulation, temperature-resistant up to 250°C, short term up to 310°C.
- Hapro-FLEX S2:** Double-layer silicone-coated woven glass fabric, non-flammable according to FAR 25.853, slightly corrugated inside and outside, highly flexible, colour red, temperature-resistant up to 250°C, short term up to 310°C.
- Hapro-FLEX S2HT:** as above, thermal insulation, temperature-resistant up to 310°C, short term up to 350°C.
- HAPRO-FLEX Dx:** Suction/blower hose, zinc-plated steel or wound stainless steel, polygonal cross section, inter locked angular profile, with thermal thread, flexible.

Model	Inside Ø in mm	temperature-resistant to
Hapro-FLEX S1	13 / 19 / 32 / 38 / 41 / 50 / 63 / 80 / 90 / 102 / 114 / 125 / 140 / 150 / 160 / 180 / 200	-85°C to 250°C
Hapro-FLEX S1W	13 / 38 / 51 / 63 / 80 / 90 / 100 / 110	-85°C to 250°C
Hapro-FLEX S2	19 / 63 / 80 / 102	-85°C to 250°C
Hapro-Flex S2HT	63 / 80 / 100 / 125 / 150	-85°C to 310°C
Hapro-FLEX Dx zinc-plated	20 / 30 / 40 / 50 / 60 / 75 / 80 / 90 / 100 / 110 / 125 / 150 / 160	400°C
Hapro-FLEX Dx stainless steel	20 / 25 / 30 / 35 / 50 / 60 / 80 / 90 / 110 / 150	600°C

THERMOCOUPLES



Thermocouple

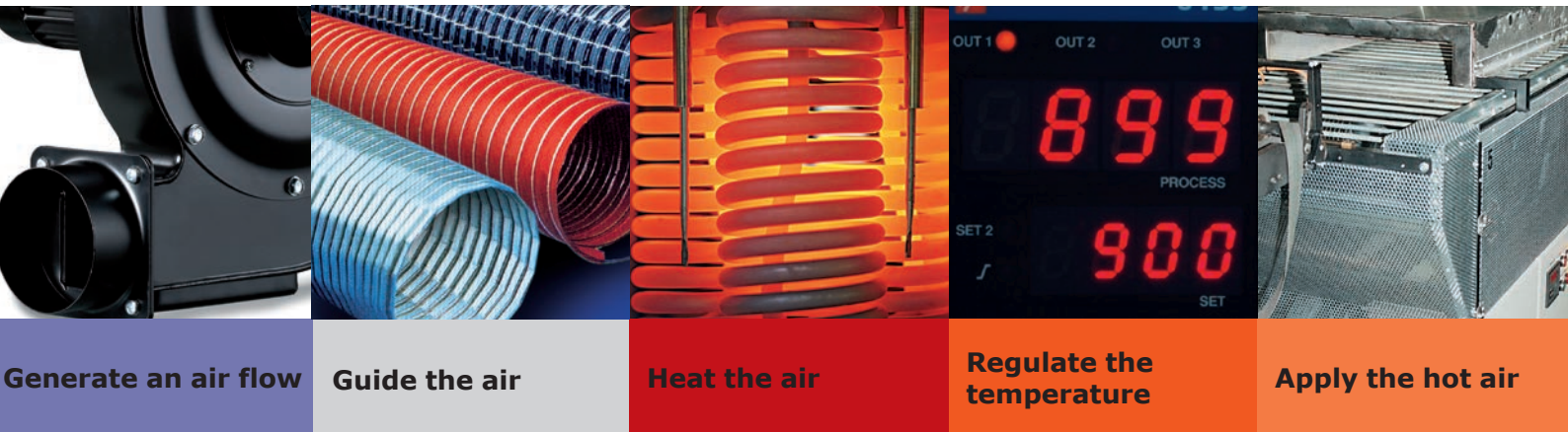
NiCr-Ni with 2 m silicone cable
 Art.-Nr: 40010024



Temperature sensor

Pt 100 with Ermeto self-sealing coupling and 0.5 m cable.
 Order no.: 40010022 / 40010023

Individual problems require tailor-made solutions



Hapro Engineering develops, designs and builds custom-made special-purpose equipment. The processing of perfectly matched materials and components coupled with peak precision in our craftsmen's and -women's approach to their work is the HAPRO standard that makes every installation an efficient, durable investment.

Should you have further questions, please contact our team.

info@hapro.de


HAPRO
Thermodynamic Engineering.

Product Line of WiTec Elektrotechnik GmbH

WiTec Elektrotechnik GmbH

Hauptstraße 41

D-42799 Leichlingen / Witzhelden

Phone: +49 (0) 2174 / 7901-0

info@hapro.de

www.hapro.de