Base Load Power Hub (BLPH)

HVAC System

B-300 AC UPS Switch Room

Component List and DS

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Rev.	Date	Description	Prepared	Reviewed	Approved

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Revision / Change Log

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1 INTRODUCTION

1.1 PROJECT OVERVIEW

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.

Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.2 PROJECT LOCATION

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

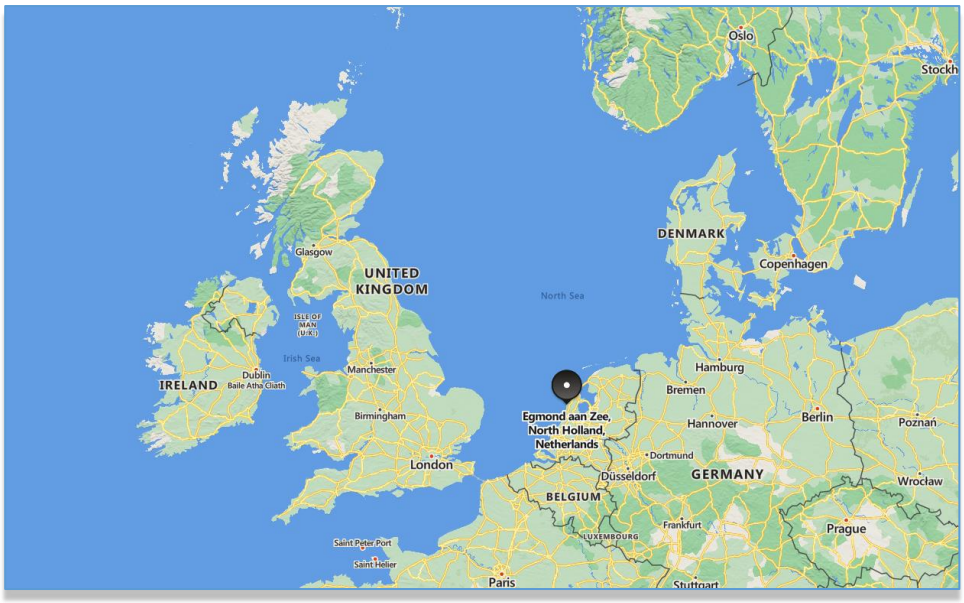


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map

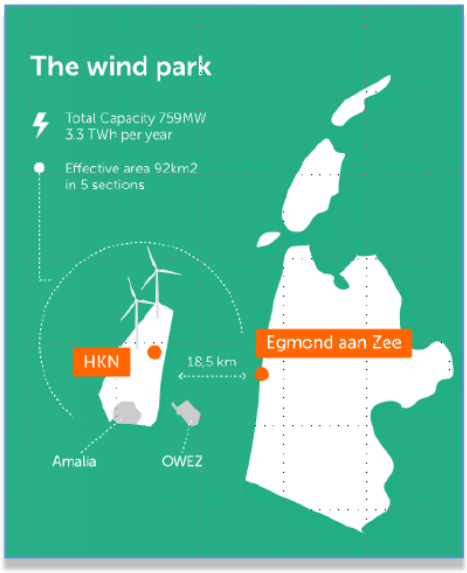


Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

1.3 PROJECT CONCEPT

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

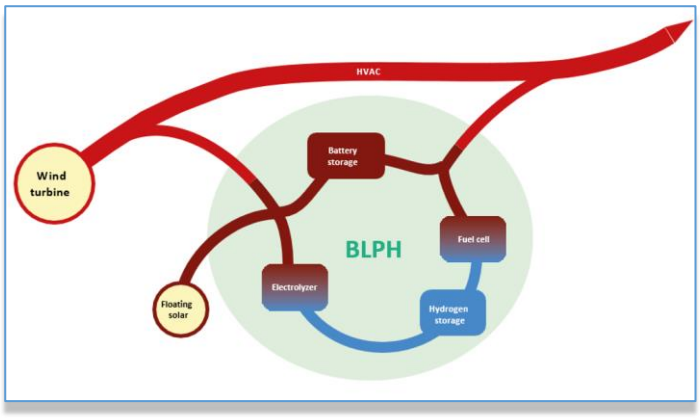


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting

wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

2 DOCUMENT SCOPE

Scope of the document is to collect the main equipment technical data sheet relevant to the HVAC system provided for Hollandse Kust Noord Wind Park Project

2.1 REFERENCES

Doc. No.	Description

Table 1 - Reference Documents

2.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project

Table 2 - Definitions and Abbreviations

3 INTRODUCTION

3.1 SCOPE OF WORK

Scope of the document is to collect the main equipment technical data sheet relevant to the HVAC system provided for Hollandse Kust Noord Wind Park Project

4 MAIN PACKAGE HVAC UNIT

Main unit data for HHU-77005 and HHU-77006

4.1 MAIN UNIT DATA

Description	Unit measure	Value
Type of unit	-	Rooftop Unit
Package unit model	-	4112-DMPD-200
Configuration	-	no.1 Duty + no.1 Stand-By
Total cooling capacity	kW	11.96
Sensible cooling capacity	kW	11.96
Heating capacity	kW	6
Outdoor design temperature & humidity	°C (D.B.)	Summer: +25°C (D.B.) Rh90%
	-	Winter: -8.4°C (D.B.) Rh 100%
Air flow rate - Supply	m^3/h	2700
Air flow rate - Return	m^3/h	1588
Air flow rate – Fresh air	m^3/h	1112
External static pressure	Pa	800
Refrigerant	-	R513a
Length x Width x Height (external unit)	mm	2100x1000x1550
Weight	kg	950
Number of compressors	-	1

Supply air duct connection (50mm flange)	mm	500x410
Fresh air duct connection (50mm flange)	mm	200x210
Return air duct connection	mm	300x310
Panel and thermal insulation (Material – Tk)	mm	Poliuretan / 20mm
Materials on main base frame	-	Inox 316L
Materials on internal panel skin	-	Inox 316L
Materials on external panel skin	-	Inox 316L
Execution	-	Safe zone

4.2 SUPPLY FAN & MOTOR DATA

Description	Unit measure	Value
Type	-	RDH E2-0250
Manufacturer	-	Nikotra
Casing material	-	Galvanized steel
Weight	kg	16
Air flow rate	m^3/h	3200
Nominal static pressure	Pa	750
Nominal total pressure	Pa	720
Fan power consumption	kW	2.1
Fan speed	rpm	3019
Impeller type	-	Forward
Earthing boss	-	Yes
Drive arrangement	-	Belt SPA
Fan pulley	Ø (mm)	90
Motor fan pulley	Ø (mm)	190
Belt type and quantity	-	A47-1227 2pc
Manufacturer	-	SMEM
Nominal motor power	kW	3
Winding configuration	-	DOL
Motor speed	Rpm	1420
Nominal current	A	6.3

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Description	Unit measure	Value
Starting current	A	25
Electrical supply	V / Ph / Hz	400 / 3 / 60
IP rating	-	IP55
Execution	-	Safe zone

4.3 ELECTRICAL HEATING COIL DATA

Description	Unit measure	Value
Frame	-	AISI 316 L
Dimension	mm	500x410
Heater depth	mm	200
Heating capacity – 1st step	kW	6
Absorbed current – 1st step	A	8.7
Heating capacity – 2nd step	kW	n.a.
Absorbed current – 2nd step	A	n.a.
Power supply	-	400 V 3 PH 50HZ
Safety accessories	-	THERMOSTATE ON BOARD
Manufacturer	-	Diamanti

4.4 FILTER DATA

Primary filter		
Filter type	-	G4 (EN779)
Filter section size (Q.ty - W x H x tkh)	no. / mm	1
		593x593x48
Pressure drop (clean filter)	Pa	65

Final pressure drop (dirty filter)	Pa	97
Manufacturer	-	F&F
Filter type	-	G4 (EN779)
Filter section size (Q.ty - W x H x tkh)	no. / mm	1
		287x593x48
Pressure drop (clean filter)	Pa	65
Final pressure drop (dirty filter)	Pa	97
Manufacturer	-	F&F
Model	-	FCZ-OS4
Secondary filter		
Filter type	-	F7 (EN779)
Filter section size (Q.ty - W x H x THK)	no. / mm	1
		593x593x98
Pressure drops (clean filter)	Pa	85
Final pressure drops (dirty filter)	Pa	102
Manufacturer	-	F&F
Model	-	PFM4-8-23.23
Filter type	-	F7 (EN779)
Filter section size (Q.ty - W x H x THK)	no. / mm	1
		287x593x98
Pressure drops (clean filter)	Pa	85
Final pressure drops (dirty filter)	Pa	102
Manufacturer	-	F&F
Model	-	PFM4-6-11.23

4.5 COALESCENT FILTER DATA

Coalescent filter		
Manufacturer		EuropAir
Filter type	-	SG41R-X
Filter section size (Q.ty - W x H x tkh)	no. / mm	1

		500x500x170
Pressure drop (clean filter)	Pa	50
Final pressure drop (dirty filter)	Pa	75

4.6 COOLING COIL DATA

Description	Unit measure	Value
Total cooling load (design)	kW	12
Number of refrigerant circuits	N°	1 x 100%
Evaporating temperature / Pressure	°C / kPa	+7 – 411
Design pressure	kPa	2100
On-coil air condition	°C (D.B. / W.B.)	+26 / +18.8
Off-coil air condition	°C (D.B. / W.B.)	+15.54 / 14.2
Air flow rate	m^3/h	2700
Air pressures drop	Pa	40 (Wet fins 92)
Coil face velocity	m/s	1.95
Number of rows	-	5
Fin thickness / Fin spacing	mm	0,10 / 2,5
Drop eliminators required	-	Included
Drain size / Type	Inch	1"
Weight	kg	41
Tube materials / Thickness	mm	CuSn/ 12.45 X 0.35
Fins material / Thickness	mm	CuSn / 0,25
Casing material / Thickness	mm	Inox 316 / 1.5
AISI 316 Drain pain	-	Required – 50mm

4.7 REFRIGERANT COMPRESSOR DATA

Description	Unit measure	Value
Type	-	Ermetic scroll compressor
Manufacturer	-	Panasonic
Electrical supply	V / Ph / Hz	400 / 3 / 50
Electrical supply - Auxiliary	V / Ph / Hz	230 / 1+N / 50
IP rating	-	IP54
Cooling capacity	kW	11.96
no. of compressors	no.	1
Steps capacity	no.	1
Nominal compressor power & Current	kW / A	5.8 / 9.8
Absorber power & Current at design conditions	kW / A	3.78 / 7.3
Starting method	-	DOL
Starting current	A	50
Oil heater power	W	50
Oil charge	L	1.7
Weight	kg	39
Safety accessories	-	

4.8 CONDENSING COIL DATA

Description	Unit measure	Value
Total heat rejection	kW	16
Number of refrigerant circuits	-	1
Condensing temperature / Pressure	°C / kPa	+54.40 / 1531
Refrigerant coil leaving temperature	°C	54.4
Design pressure	kPa	2100
No. Of coils / Sections	-	1

Description	Unit measure	Value
On-coil temperature / Wet bulb	°C / °C	35 / 24
Off-coil temperature / Wet bulb	°C / °C	41 / 25.5
Air flow rate	m^3/h	7300
Air pressure drop	Pa	71
Coil face velocity	m/s	2.94
Number of rows	-	4
Fin thickness / Fin spacing	mm	0,10 / 2,5
Weight	kg	64
Tube materials / Thickness	mm	CuSn 12.45 X 0.35
Fins material / Thickness	mm	CuSn 0.10
Casing material / Thickness	mm	INOX 316 / 1.5

4.9 CONDENSER FAN MOTOR DATA

Description	Unit measure	Value
Type	-	Axial
Fan diameter	mm	450
Quantity	no.	2
Casing material	-	AISI 316L
Weight	kg	35
Air flow rate	m^3/h	3650
Nominal static pressure	Pa	110
Fan speed	rpm	1.450
Earthing boss	-	Yes
Drive arrangement	-	Direct
Nominal motor power	kW	0.37
Winding configuration	-	DOL
Nominal current	A	1
Electrical supply	V / Ph / Hz	400 / 3 / 60
IP rating	-	IP66 - Tropicalized

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Description	Unit measure	Value
Max. operating temperature	°C	+55
Min. operating temperature	°C	-10
Lubrication	-	Self-lubricated bearing
Painting	-	n.a.
Finish color	-	RAL 7035

4.10 PRESSURIZING FAN DATA

1 Description	Unit measure	Value
Type	-	RM250/2
Manufacturer	-	Moro
Casing material	-	Galvanized steel
Weight	kg	26
Air flow rate	m^3/h	1112
Nominal static pressure	Pa	700
Nominal total pressure	Pa	600
Fan power consumption	kW	0.37
Fan speed	rpm	2980
Impeller type	-	Forward
Earthing boss	-	Yes
Drive arrangement	-	Direct
Fan pulley	Ø (mm)	n.a.
Motor fan pulley	Ø (mm)	n.a.
Belt type and quantity	-	n.a.
Manufacturer	-	Belk

Nominal motor power	kW	0.75
Winding configuration	-	DOL
Motor speed	Rpm	2980

Nominal current	A	1.5
Starting current	A	7
Electrical supply	V / Ph / Hz	400 / 3 / 60
IP rating	-	IP55
Execution	-	Safe zone
Max. operating temperature	°C	+50
Min. operating temperature	°C	-10
Lubrication	-	Self-lubricated bearing
Painting	-	Standard
Finish color	-	Green

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5 ATTACHMENTS

5.1 COMPRESSOR DATASHEET

SPECIFICATIONS OF COMPRESSOR

Model No: C-SBN453H8G

Output : 6 HP



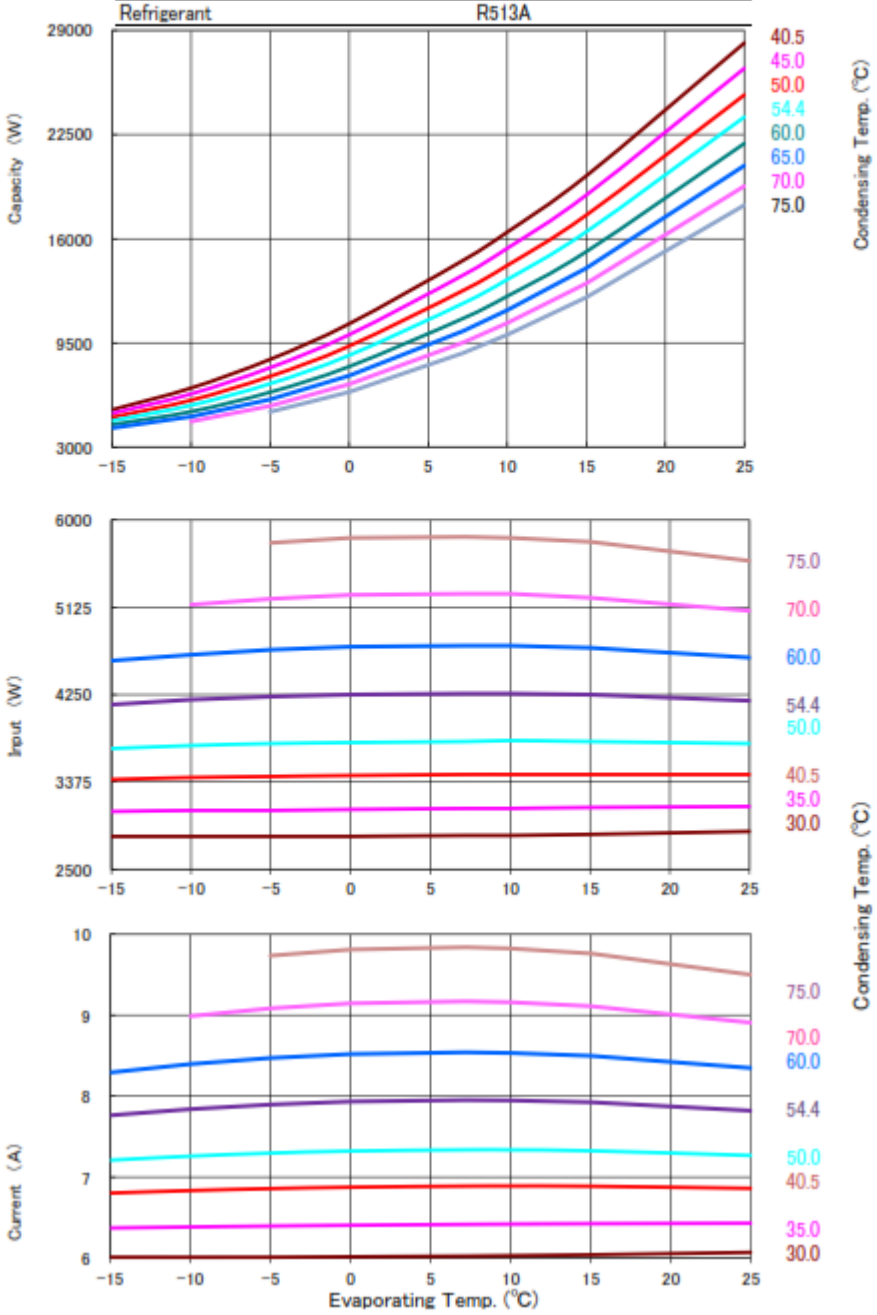
Temporary

Panasonic Appliances Compressor (Dalian) Co.,Ltd.

11/May/18

PERFORMANCE CURVE

Code No.	C-SBN453H8G
Power Source	3-PH 50Hz 380-415V
Condensing Temp.(℃)	40.5, 45, 50, 54.4, 60, 65, 70, 75
Super Heating (K)	11.1
Sub Cooled(K)	8.3
Compressor Cooling	Natural Cooling
Refrigerant	R513A



GENERAL SPECIFICATIONS

Model No:		C-SBN453H8G
Application		
Evaporating Temp Range	(℃)	-15 ~ 25
Refrigerant		R513A
Compressor Cooling		Natural Cooling
Rated Performance		
Capacity	(W)	11960/15040
Input	(W)	3780/4570
Current	(A)	7.3/7.3
Revolution	(min^{-1})	2950/3450
Sound Level	(dB(A))	62max / 67max
Rating Conditions		
Power Source		3-PH 50Hz 380V / 60Hz 440V
Evaporating Temp	(℃)	7.2
Condensing Temp	(℃)	54.4
Suction Gas Temp	(℃)	18.3
Liquid Temp	(℃)	46.1
Ambient Temp	(℃)	35.0
Measuring Point of Sound Level		
Distance from the Compressor	(m)	1.0
Compressor		
Design		Hermetic Scroll
Displacement	(cm3)	100.0
Suction Line Connection	(Φmm OD)	22.22
Discharge Line Connection	(Φmm OD)	12.7
Oil	(ml)	1700 (FV68S)
Mass(Incl.Oil)	(kg)	39
Motor		
Type		3-PH Induction Motor(3IR)
Pole		2
Rated Power Source		3-PH 50Hz 380-415V / 60Hz 440-460V
Voltage Range	(V)	342~456 / 396~506
Starting Current	(A)	-

Panasonic Appliances Compressor (Dalian) Co.,Ltd.

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PERFORMANCE DATA

Code No.	C-SBN453H8G
Power Source	3-PH 50Hz 380-415V
Condensing Temp.(℃)	40.5, 45, 50, 54.4, 60, 65, 70, 75
Super Heating (K)	11.1
Sub Cooled(K)	8.3
Compressor Cooling	Natural Cooling
Refrigerant	R513A

Capacity (W)

Condensing Temp.(℃) \ Evaporating Temp.(℃)	-15	-10	-5	0	7.2	10	15	25
40.5	5,320	6,680	8,470	10,690	14,640	16,410	19,920	28,210
45.0	5,090	6,310	7,950	10,010	13,720	15,400	18,720	26,630
50.0	4,850	5,920	7,410	9,300	12,760	14,330	17,470	24,970
54.4	4,640	5,600	6,950	8,720	11,960	13,450	16,430	23,590
60.0	4,390	5,210	6,420	8,020	11,020	12,410	15,190	21,940
65.0	4,180	4,890	5,970	7,450	10,240	11,540	14,160	20,560
70.0		4,590	5,560	6,920	9,520	10,740	13,210	19,280
75.0			5,190	6,430	8,860	10,010	12,340	18,090

Input (W)

Condensing Temp.(℃) \ Evaporating Temp.(℃)	-15	-10	-5	0	7.2	10	15	25
40.5	2,830	2,830	2,830	2,830	2,840	2,840	2,850	2,880
45.0	3,080	3,090	3,090	3,100	3,110	3,110	3,120	3,130
50.0	3,400	3,420	3,430	3,440	3,450	3,450	3,450	3,450
54.4	3,710	3,740	3,760	3,770	3,780	3,790	3,780	3,760
60.0	4,150	4,200	4,230	4,250	4,260	4,260	4,250	4,190
65.0	4,590	4,650	4,700	4,730	4,740	4,740	4,720	4,620
70.0		5,150	5,210	5,250	5,260	5,260	5,220	5,090
75.0			5,770	5,820	5,830	5,820	5,780	5,590

Current (A)

Condensing Temp.(℃) \ Evaporating Temp.(℃)	-15	-10	-5	0	7.2	10	15	25
40.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.1
45.0	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4
50.0	6.8	6.8	6.9	6.9	6.9	6.9	6.9	6.9
54.4	7.2	7.3	7.3	7.3	7.3	7.3	7.3	7.3
60.0	7.8	7.8	7.9	7.9	8.0	7.9	7.9	7.8
65.0	8.3	8.4	8.5	8.5	8.5	8.5	8.5	8.3
70.0		9.0	9.1	9.1	9.2	9.2	9.1	8.9
75.0			9.7	9.8	9.8	9.8	9.8	9.5

Coefficients of Polynominal Formula

380V-50Hz	Capacity (W)	Input (W)	Current (A)
C1	1.837469E+04	1.974348E+03	3.820386E+00
C2	8.553049E+02	1.143672E+00	-6.418516E-04
C3	-2.256596E+02	-1.407106E+01	2.401665E-02
C4	1.011283E+01	7.487938E-01	1.121369E-03
C5	-1.086156E+01	-1.088724E-01	-8.245470E-05
C6	8.851898E-01	8.682915E-01	7.428248E-04
C7	-5.444298E-04	-5.254716E-04	-1.043913E-06
C8	-3.766916E-02	-1.675745E-02	-2.574407E-05
C9	4.342613E-02	2.435254E-03	3.099436E-06
C10	-3.486738E-09	2.780799E-09	-7.716818E-13

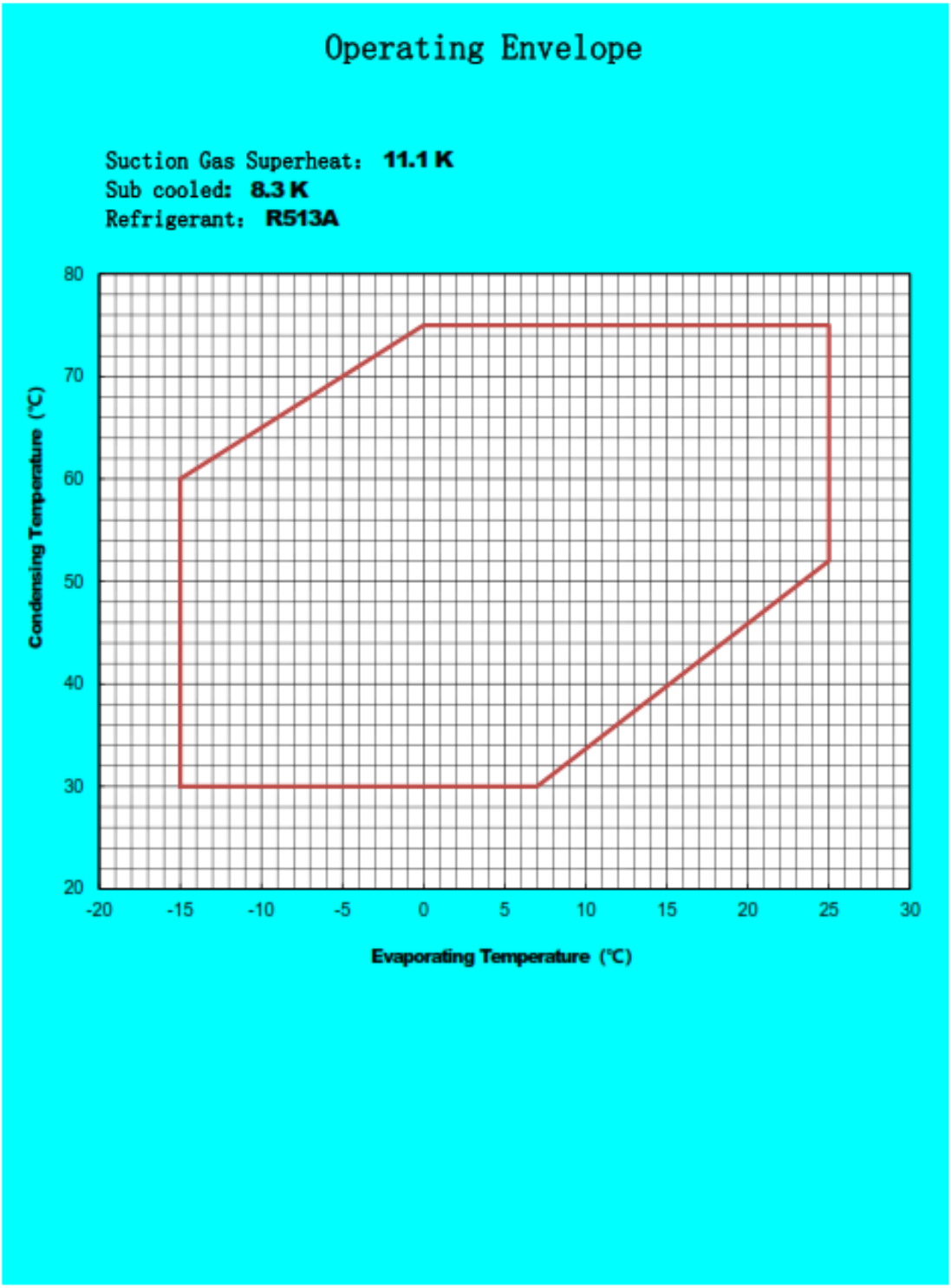
Note:The polynomial coefficients subject to change without notice.

$X=C1+C2*(S)+C3*D+C4*(S^2)+C5*(S*D)+C6*(D^2)+C7*(S^3)+C8*(D*S^2)+C9*(S*D^2)+C10*(D^3)$

X——CAPACITY(W) OR POWER(W) OR CURRENT(A)

S——EVAPORATING TEMP, ℃

D——CONDENSING TEMP, ℃


Operating Envelope
Suction Gas Superheat: 11.1 K
Sub cooled: 8.3 K
Refrigerant: R513A
Condensing Temperature (℃)
80
70
60
50
40
30
20
-20
-15
-10
-5
0
5
10
15
20
25
30
Evaporating Temperature (℃)

Application Standard for B、C fixed speed with R513A

The following requirements apply to vertical type hermetic scroll compressors:

Standard: Applicable to ordinary conditions in Japan JIS B8616 or equivalent conditons, such as standard rating conditions, maximum operating conditions, low temperature conditions, etc.

No.	Item	Standard	Note
1	Refrigerant	R513A	
2	Evaporating Temp.	-15~25℃(5~77 ° F) 0.08~0.61MPa(G)(12~89psig)	Comp. Suction Pressure
3	Condensing Temp.	30~75℃(86~167° F) 0.72~2.33MPa(G)(104~338psig)	Comp.Discharge Pressure
4	Compression Ratio	2 ~ 9.5	
5	Winding Temp.	115℃(240 °F) Max.	
6	Shell Bottom Temp.	Upper Limit:90℃(194 °F) Max. Lower Limit:Evaporating Temp.+12℃(21 °F) Min.	When compressor is running
		Lower Limit:Ambient Temp.+11℃(20 °F) Min.	When compressor shuts off
7	Discharge Gas Temp.	120℃(248 °F) Max.	Temp. within 100mm(4in) of the discharge fitting.
			Temp. inside of the well pipe on the top of compressor
8	Suction Gas Temp.	Superheat: 5K(10 °F)Min.	It should meet the requirement of item 5, 6, 7 and 14 within 30cm of the suction fitting.
9	Abnormal Pressure Rise/Drop	Pressure Rise: 2.5MPa(G) (362psig) Max.	By high pressure switch
		Pressure Drop: 0.03MPa(G) (4.35psig) Min.	By low pressure switch
10	Discharge Thermostat	130±5℃(266 ±10 °F)	Trip Temperature
		95±11℃ (205 ± 20 °F)	Reset Temperature

Operation beyond the above limits must be approved by Panasonic Appliances Compressor (Dalian) Co., Ltd.

(G): Gauge Pressure

5.2 EVAPORATING COIL

D.B.M. SpA a Socio Unico
Via Ugo La Malfa 10 – 28040 Varallo Pombia (NO) – Italy
Tel. +39 0321 956794 – E mail: sales@dbmcoils.com

FRIGOTERMICA S.r.l.
Sig. Matteo Grassi

4112 RDA 100-002PD

NOTE

Offer	**OF03691-24**
Contact	Francesco Travaini
Delivery Schedule	5/6 weeks da order
Goods rendered	FCA
Packing	Eventuale al costo
Payment	Solito in uso
Offer validity	30 GG

24 months guarantee according to DBM sales terms

DESIGN DATA — CC fi-104736-54699/2 3 128 — Rel. 6.5.0.5 18-02-2(

EXTERNAL FLUID:	**Air**				
Ambient pressure	mmHg	760			
Capacity	**kW**	**12.00**			
Gas quantity	**Sm³/h**	**2700**			
Air treated weight	kg/h	3251	Sensible heat factor		0.80
Inlet temperature	**°C**	**26.00**	Condensed water	kg/h	3.30
Relative humidity	%	50.00	Actual velocity	m/s	1.95
Outlet temperature	**°C**	**15.54**	Pressure drop	Pa	92
Outlet relative humidity	%	86.51	Dry fin pressure drop	Pa	40
INTERNAL FLUID:	**R513A**				
Evaporating pressure	**bar(a)**	**4.11**	**Evaporating temperature**	**°C**	**7.00**
Condensing pressure	bar(a)	15.30	Liquid temperature	°C	54.40
Superheating	°C	5.00	Subcooling	°C	2.00
Liquid weight	kg/h	392	Pressure drop	bar	0.10
Distributor diameter	mm	22.00	Distributors pressure drop	bar	0.63
Capillars Ø 5 lenght 550 mm			Capillars pressure drop	bar	0.87

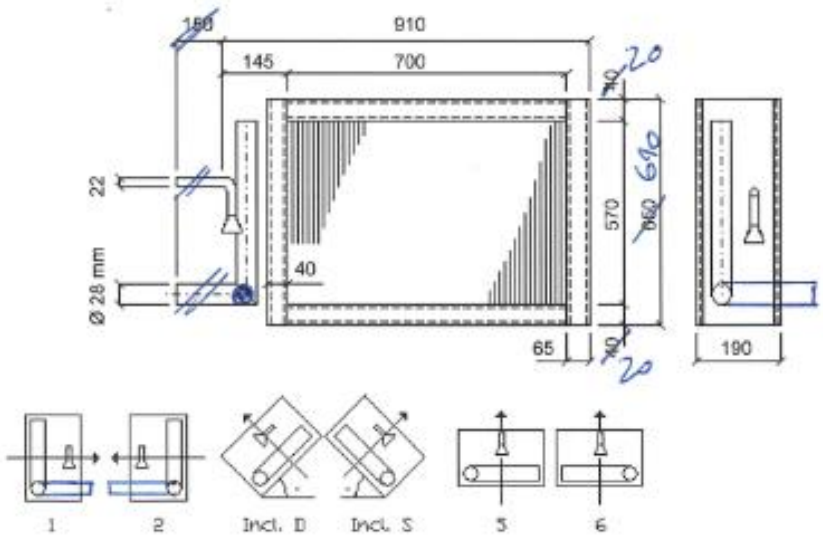
N°2 Coils CuSn-CuSn-Inox316 P3012ED 5R-19T-700A-2.5pa 9C 28 mm €

TECHNICAL FEATURES

Tubes	CuSn	12.45 x 0.35	mm	Weight	41 Kg
Fins	CuSn	0.10	mm	Internal volume	10 dm3
Frame	Inox316	1.50 / 1.50	mm	Total exchange surface	37.41 m2
Manifolds material	Cu			**PED 2014/68/UE Cat.**	**Article 4.3**
				Maximum allowable pressur	21.0 bar
				Min/Max allowable temp	-10/80 °C

ACCESSORIES
Curvette e collottori non stagnati

Certified calculation - Counterflow



5.3 CONDENSING COIL

D.B.M. SpA a Socio Unico
Via Ugo La Malfa 10 – 28040 Varallo Pombia (NO) – Italy
Tel. +39 0321 956794 – E mail: sales@dbmcoils.com

14/06/2024

FRIGOTERMICA S.r.l.
Sig. Matteo Grassi

4112 RDA 100-002PD

NOTE

Offer	**OF03691-24**
Contact	Francesco Travaini
Delivery Schedule	5/6 weeks da order
Goods rendered	FCA
Packing	Eventuale al costo
Payment	Solito in uso
Offer validity	30 GG

24 months guarantee according to DBM sales terms

DESIGN DATA — CC fi-104737-36579/3 20 128 — Rel. 6.5.0.5 18-02-2023

Safety on surface 35%

EXTERNAL FLUID:	**Air**				
Ambient pressure	mmHg	760			
Capacity	**kW**	**16.00**			
Gas quantity	**Sm³/h**	**7300**			
Air treated weight	kg/h	8791	Sensible heat factor		1.00
Inlet temperature	**°C**	**35.00**	Condensed water	kg/h	0.00
Relative humidity	%	40.00	Actual velocity	m/s	2.94
Outlet temperature	**°C**	**41.15**	Pressure drop	Pa	71
Outlet relative humidity	%	28.68			
INTERNAL FLUID:	**R513A**				
Condensing pressure	**bar(a)**	**15.31**	**Condensing temperature**	**°C**	**54.40**
Superheating	°C	0.00	Subcooling	°C	2.00
Liquid weight	kg/h	444	Outlet temperature	°C	51.68
Pressure drop	bar	0.12	Pressure drop	°C	0.31
Vapour velocity inside tubes	m/s	2.65			

N°2 Coils CuSn-CuSn-Inox316 P3012COND 4R-45T-550A-2.5pa 5C 28 mm 22 mm €

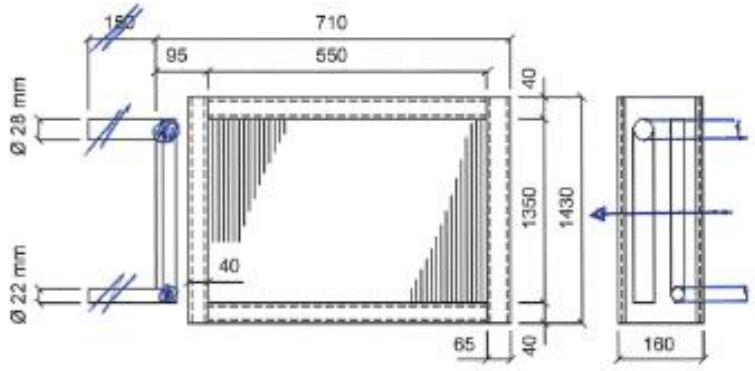
TECHNICAL FEATURES

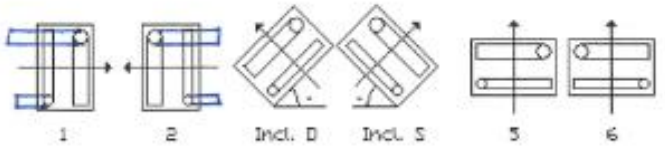
Tubes	CuSn	12.45 x 0.35	mm	Weight	64 kg
Fins	CuSn	0.10	mm	Internal volume	16 dm3
Frame	Inox316	1.50 / 1.50	mm	Total exchange surface	55.69 m2
Manifolds material	Cu			PED 2014/68/UE Cat.	Article 4.3
				Maximum allowable pressure	21.0 bar
				Min/Max allowable temp.	-10/60 °C

ACCESSORIES

Curvette e collottori non stagnati

Certified calculation - Counterflow





5.4 ACTUATOR WITH SPRING RETURN

Item TAG: HDZ-77-NNN

ACTUATOR WITH SPRING RETURN

| DA03S... |



TYPE OVERVIEW

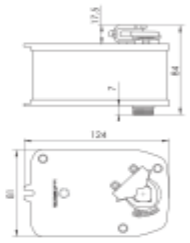
Torque	Controls	Damper surface	Voltage	Auxiliary switches	Weight	Type
3Nm	On/off	< 0,5 m² *	24V AC/DC	-	0,98 kg	DA03S24
				2SPDT**	1,08 kg	DA03S24S
	Modulating			-	1,02 kg	DA03S24P
				2 SPDT**	1,07 kg	DA03S24PS
	On/off		230V AC	-	0,99 kg	DA03S220
				2 SPDT**	1,09 kg	DA03S220S

TECHNICAL SPECIFICATION

Type	DA03S24 (S)	DA03S24P (S)	DA03S220 (S)
Torque	3Nm		
Running time - motor/spring return	50 -70s / < 30s	50 -70s / < 30s	50 -70s / < 30s
Controls	on/off	0 -10V	on/off
Voltage	24V AC/DC	24V AC/DC	230V AC
Frequency	50/60Hz (AC)		
Power consumption			
- in operation	2,5W	2,5W	2,5W
- at rest	1,6W	1,6W	1,6W
- for wire sizing	10,0VA	7,0VA	10,0VA
Angle of rotation	-5°~90°		
- setting	45°~90° (5° step)		
Direction of rotation	can be selected by mounting L/R		
Sound power level - motor/spring return	<50 dB(A) / <65 dB(A)		
Position feedback	-	0 - 10V DC	-
Electrical connection	1m cable		
Auxiliary switches	3 (1.5)A, 230V		
Degree of protection	IP54		
Protection class	III low voltage	III low voltage	II
Ambient humidity	95% RH, without condensation		
Ambient temperature	-30~+50 °C		
Non-operating temperature	-40~+70 °C		
Service life	60 000 emergency positions		
Mechanical connection			
- round shaft	from ø6 to ø12mm		
- square shaft	from 5x5 to 8x8mm		
Manual override	not possible		
Norms and standards	Declaration of conformity, ISO, CE, EAC		

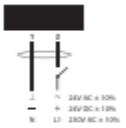
* Maximum damper surface is calculated for optimum conditions (without the influence of air flow, pressure difference, etc.).
** SPDT (Single-Pole Double-Throw)

DIMENSIONS (mm)

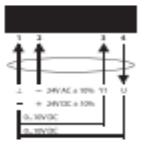


ELECTRIC INSTALATION

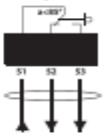
On/off



Modulating



Auxiliary switches



LUFBERG CONSTRUCTIVE DECISIONS

5.5 MANUAL VOLUME CONTROL DAMPERS

Item TAG: HDB-77-NNN

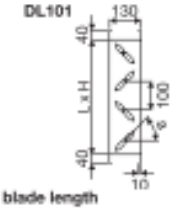
Volume control dampers in galvanised steel

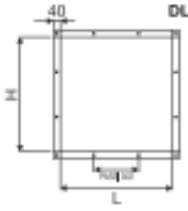
EUROPAIR TECHNOLOGY

Air flow control

DL 101







L: blade length

DL 151



Description

- Galvanised steel frame th. 10/10 Z200, depth 130 mm, 40 mm flange with Ø 8 mm holes in the middle, pitch 300 mm
- "Double Skin" aerofoil blades in galvanised steel th. 0.6+0.6 Z200, pitch 100 mm
- External control linkages in galvanised steel
- Sprung side seal
- Drive shaft Ø 12 mm L = 100 mm
- Nylon bearings, temp. -20°C / +70°C
- **Leakage class 1/A EN 1751**

Available execution (see page 11)

- Intermediate dimensions (larger sizes price list +€52)
- Execution with leakage class 3B EN 1751 (price list +€35 per blade)
- Frame 15/10 (list price x1.5) / frame 20/10 (list price x1.5) / frame 30/10 (list price x2)
- In 304 STAINLESS STEEL (list price x3)
- In 316L STAINLESS STEEL (list price x3.5)

ATEX execution: II 2G Ex h IIB/IIC T1...T6Gb
II 2D Ex h IIIC T 450°C...T 85°C Db (list price +40% +€120 each)

Accessories (see page 10)

- Galvanised manual drives (R11 up to 1 sqm €15) - (R12 over €21)
- Electric actuators / Pneumatic cylinder
- Atex actuators (see page 12)

Description

- Galvanised steel frame th. 15/10 Z200, prof. 160 mm, 40 mm flanges with Ø 8 mm holes in the middle, pitch 300 mm
- "Double Skin" aerofoil blades in galvanised steel th. 0.8+0.8 Z200, pitch 150 mm
- External control linkages in galvanised steel
- Sprung side seal
- Drive shaft Ø 12 mm L = 100 mm
- Nylon bearings, temp. -20°C / +70°C
- **Leakage class 2/B EN 1751**

Available execution (see page 11)

- Intermediate dimensions (larger sizes price list +€52)
- Frame 20/10 (list price x1.5) / frame 30/10 (list price x2)
- In 304 STAINLESS STEEL (list price x3)
- In 316L STAINLESS STEEL (list price x3.5)

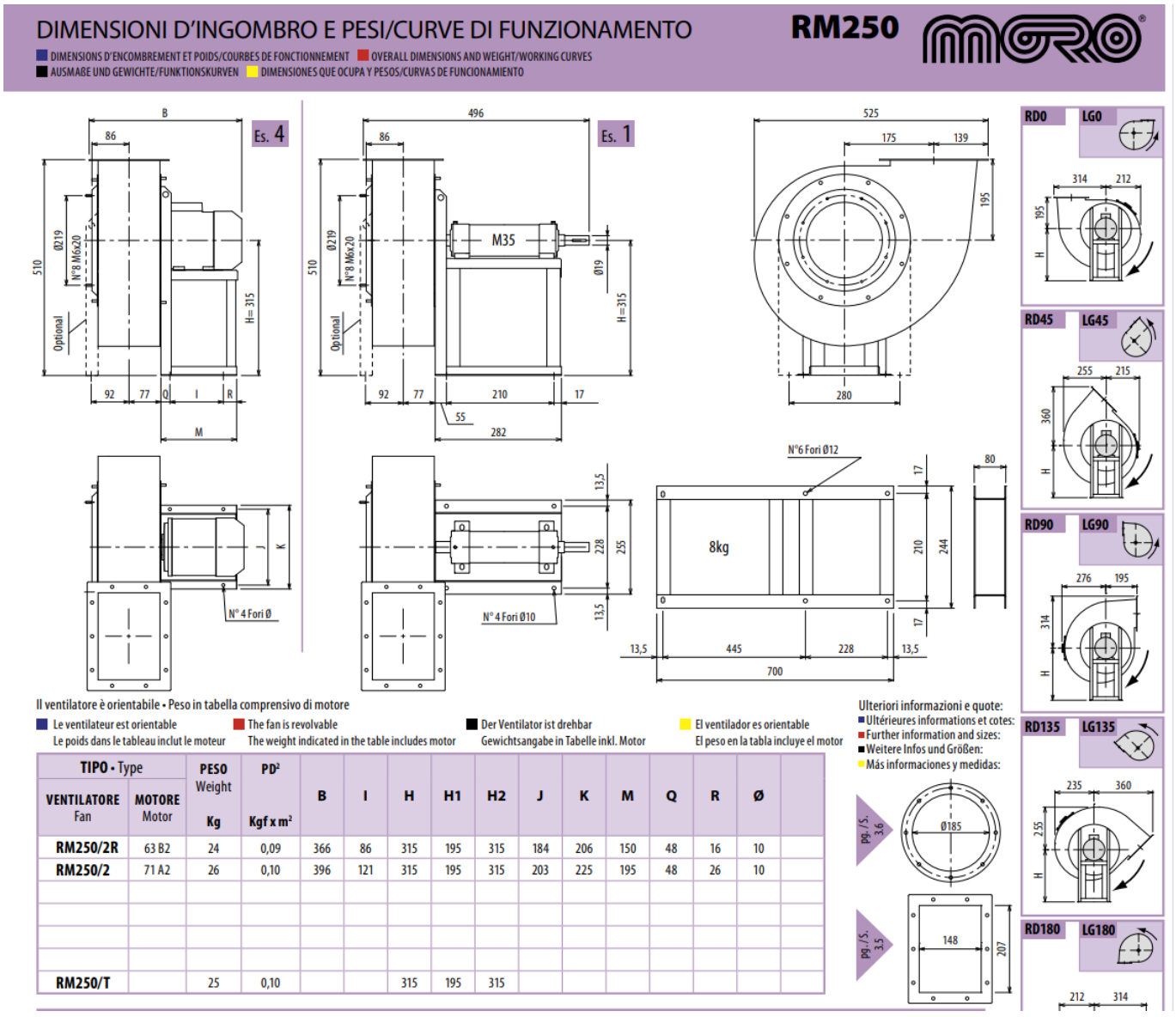
ATEX execution: II 2G Ex h IIB/IIC T1...T6Gb
II 2D Ex h IIIC T 450°C...T 85°C Db (list price +40% +€120 each)

Accessories (see page 10)

- Galvanised manual drives (R11 up to 1 sqm €15) - (R12 over €21)
- Electric actuators/ Pneumatic cylinder
- Atex actuators (see page 12)

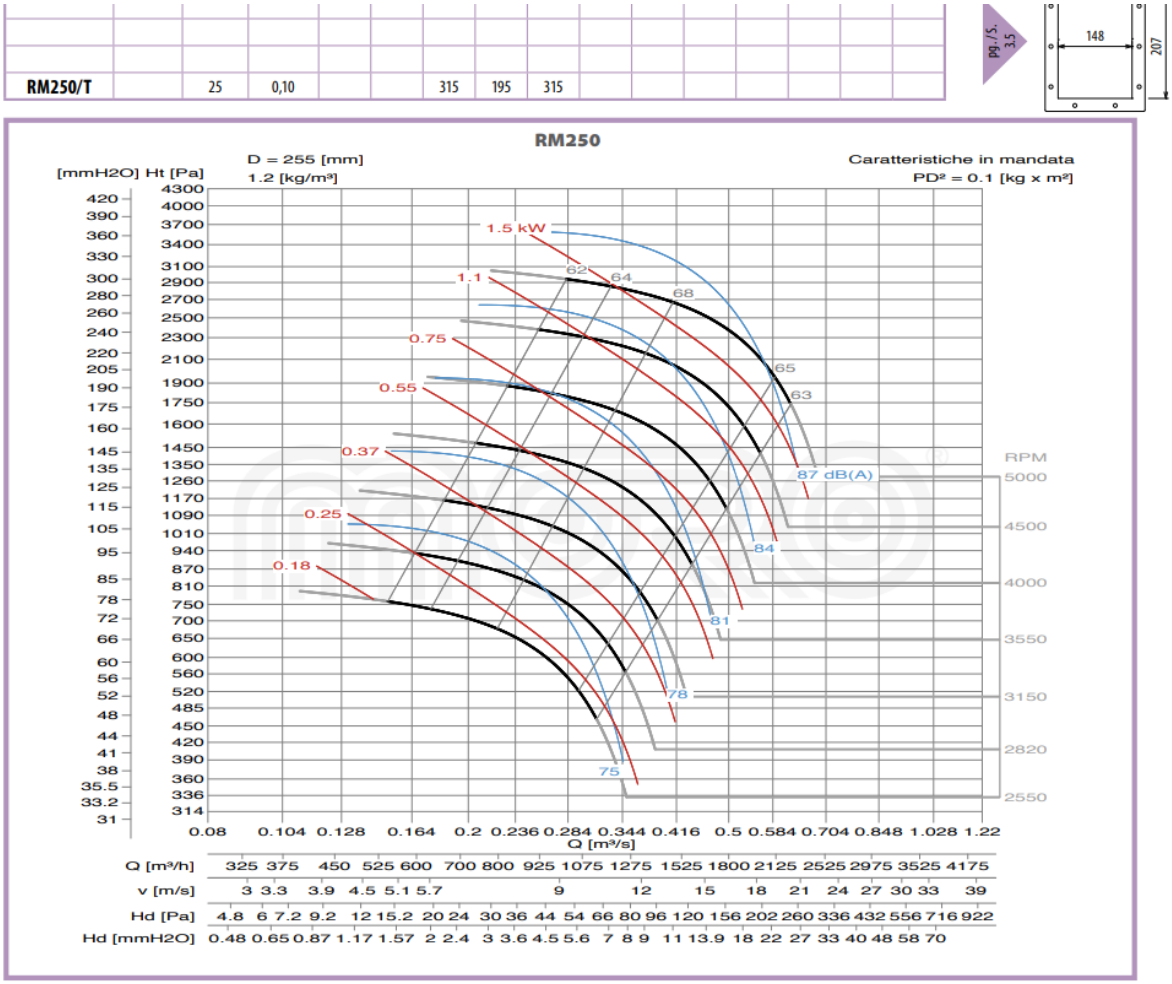
5.6 PRESSURIZING FAN

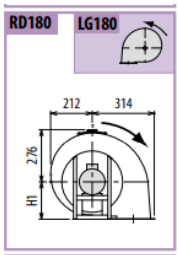
Item TAG: HFM-77-NNN

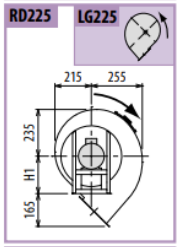


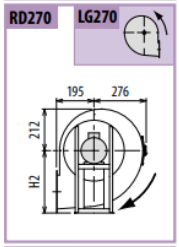
TIPO • Type		PESO Weight	PD²	B	I	H	H1	H2	J	K	M	Q	R	Ø
VENTILATORE Fan	MOTORE Motor	Kg	Kgf x m²											
RM250/2R	63 B2	24	0,09	366	86	315	195	315	184	206	150	48	16	10
RM250/2	71 A2	26	0,10	396	121	315	195	315	203	225	195	48	26	10
RM250/T		25	0,10			315	195	315						

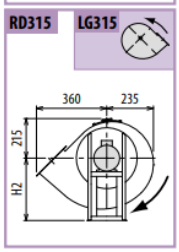
RM250/T		25	0,10		315	195	315











5.7 SUPPLY FAN

Item TAG: HFA-77-NNN

NICOTRA Gebhardt — Ventilatori centrifughi per trasmissione a cinghia / RDH / Dati tecnici

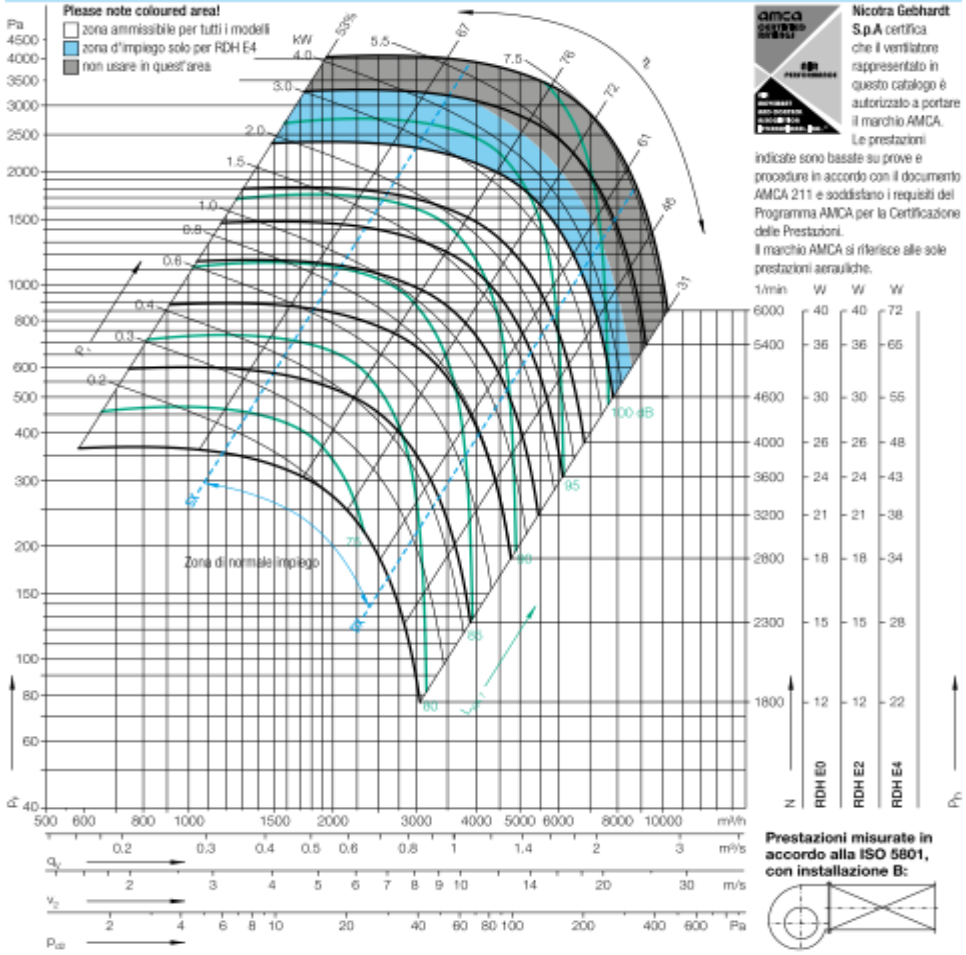
RDH E_-0250

Le prestazioni certificate si riferiscono ad installazione B, aspirazione libera – mandata canalizzata.
La potenza assorbita non include le perdite nella trasmissione.
Le prestazioni indicate non tengono conto di eventuali accessori nel flusso d'aria.

Dati tecnici

Dati ventola				Dati ventola			
Diametro ventola	D_2	252	mm	Peso ventola	m	4,87	kg
Numero di pale	z	11		Densità della sostanza estratta	ρ_1	1,2	kg/m³
Momento d'inerzia	J	0,044	kgm²	Classe di precisione (DIN 24166)		2	

Performance Curves



Nicotra Gebhardt S.p.A certifica che il ventilatore rappresentato in questo catalogo è autorizzato a portare il marchio AMCA. Le prestazioni indicate sono basate su prove e procedure in accordo con il documento AMCA 211 e soddisfano i requisiti del Programma AMCA per la Certificazione delle Prestazioni. Il marchio AMCA si riferisce alle sole prestazioni aerauliche.

Prestazioni misurate in accordo alla ISO 5801, con installazione B:

$\Delta L_{Wrel(A)}$

Punto di lavoro	Velocità 1/min	dB
SX	4600	3
SX	3200	3
SX	2300	2
$q_{V\,opt}$	4600	4
$q_{V\,opt}$	3200	4
$q_{V\,opt}$	2300	3
DX	4600	3
DX	3200	3
DX	2300	3

Fattori di correzione per determinare la rumorosità relativa all'aspirazione L_{WrelO}, per bande d'ottava f_c

63	125	250	500	1000	2000	4000	8000	Hz
-8	-7	-5	-4	-4	-9	-13	-18	dB
-7	-3	-4	0	-8	-9	-13	-19	dB
-4	-3	-3	-1	-6	-10	-15	-20	dB
-10	-10	-8	-8	-3	-7	-10	-17	dB
-9	-8	-7	-1	-7	-7	-12	-19	dB
-8	-6	-7	-1	-5	-8	-15	-21	dB
-10	-9	-9	-7	-5	-6	-9	-15	dB
-7	-8	-8	-3	-6	-6	-10	-19	dB
-7	-7	-8	-3	-4	-7	-13	-21	dB

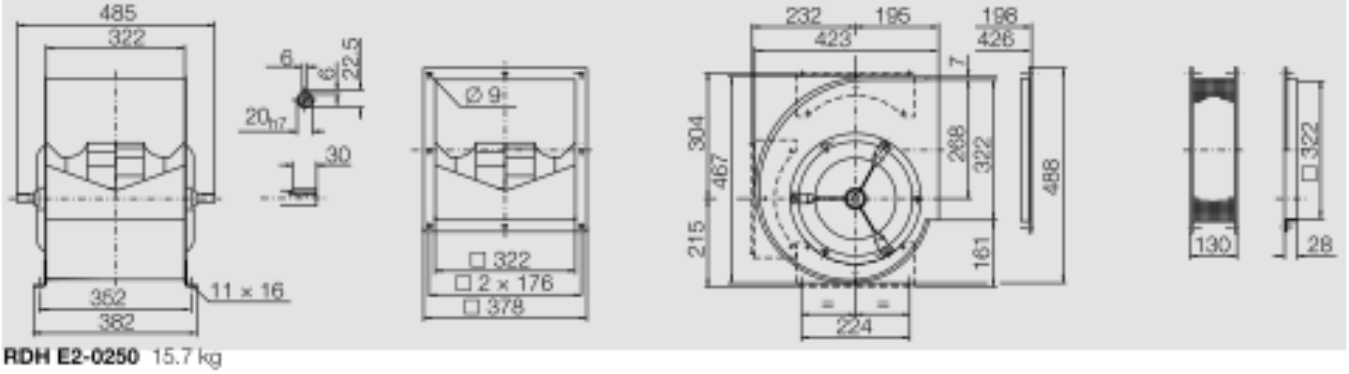
Fattori di correzione per determinare la rumorosità relativa alla mandata L_{WrelE}, per bande d'ottava f_c

63	125	250	500	1000	2000	4000	8000	Hz
6	7	3	-2	-4	-6	-8	-16	dB
9	7	3	0	-7	-4	-11	-18	dB
10	6	2	-1	-3	-5	-13	-19	dB
6	5	0	-5	-4	-3	-5	-15	dB
7	4	-1	-2	-5	-1	-9	-18	dB
6	2	-2	-2	-1	-3	-13	-20	dB
5	4	-2	-4	-4	-2	-4	-13	dB
7	3	-2	-2	-5	-1	-8	-16	dB
6	1	-2	-3	-1	-3	-11	-19	dB

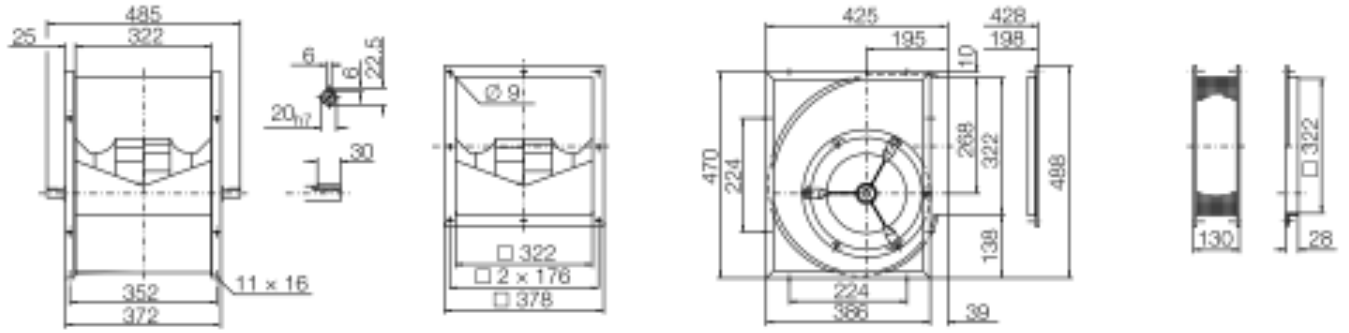
RDH E_-0250

Dimensioni in mm, salvo modifiche

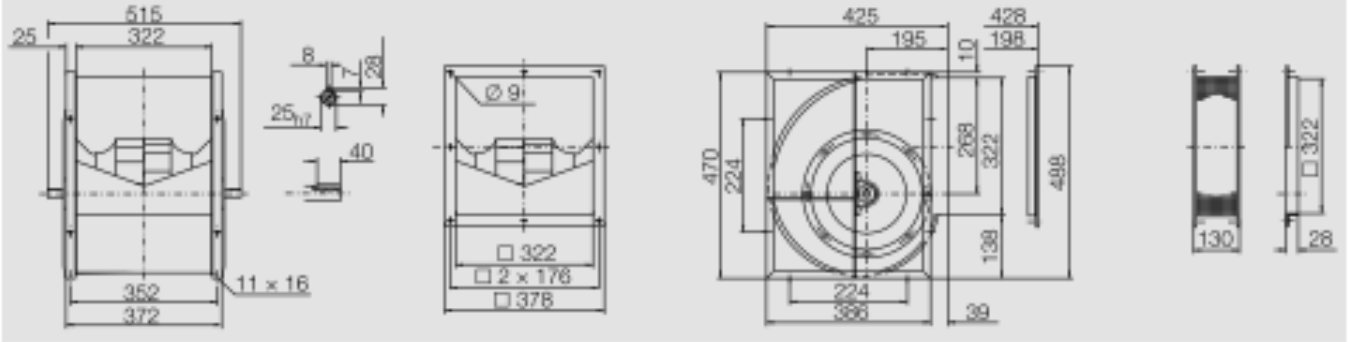
RDH E0-0250 13.3 kg



RDH E2-0250 15.7 kg



RDH E4-0250 21 kg



5.8 SUPPLY GRILLE

Item TAG: HSG-77-NNN

BMA



CARATTERISTICHE:
Bocchette di mandata ad alette orientabili passo 20 mm.

COSTRUZIONE:
Alluminio anodizzato.

IMPIEGO:
A parete, in mandata.
Altezza di installazione: 2,5-3,5 m.

FISSAGGIO:
- Fissaggio standard con clips.
- Fori per viti a richiesta.
- Calamite a richiesta (CL).
- Morsetti a richiesta (KC).

ACCESSORI:
- Plenum in acciaio zincato standard o isolato.
- Serranda di taratura in acciaio zincato con alette a movimento contrapposto.
- Controtelaio di montaggio in lamiera di acciaio zincata.

CHARACTERISTICS:
Supply grilles with adjustable blades 20 mm pitch.

CONSTRUCTION:
Anodized aluminium.

UTILIZATION:
For wall installation and for air delivery.
Installation height: 2,53,5 m.

FIXING:
- Standard fixing by clips.
- Holes for screws upon request.
- Magnets on request (CL).
- Clamps upon request (KC).

ACCESSORIES:
- Galvanized steel plenum, standard or insulated.
- Calibration damper made of galvanized steel and fins with opposite movement.
- Mounting counterframes made of galvanized steel sheet.

PREZZI - PRICES — STOCK

BxH	BMAV BMAO	BMAVO BMAOV	SC	CT CTKC	PBZ1	PBZI1	PBZ2	PBZI2
mm	€	€	€	€	€	€	€	€
200x100		■	■					
300x100		■	■					
400x100		■	■					
500x100		■	■					
• 600x100		■						
• 700x100								
• 800x100								
•1000x100								
200x150		■	■					
300x150		■	■					
400x150		■	■					
500x150		■	■					
• 600x150		■	■					
• 700x150								
• 800x150								
•1000x150								
200x200								
300x200		■	■					
400x200		■	■					
500x200		■	■					
• 600x200		■	■					
• 700x200								
• 800x200								
•1000x200								
300x300								
400x300								
500x300		■	■					
• 600x300		■	■					
• 700x300								
• 800x300								
•1000x300								
400x400								
500x400								
• 600x400								
• 700x400								
• 800x400								
•1000x400								
500x500								
• 600x500								
• 800x500								
•1000x500								

Per misure fuori tabella prezzi a richiesta - For bigger sizes prices on request
• **Rinforzo intermedio** - Intermediate reinforcing

VERNICIATURA - PAINTING:
Colori RAL 9010: + 15% - Color RAL 9010: + 15%
Altri colori: prezzi a richiesta - Different colors: prices on request

5.9 RETURN GRILLE

Item TAG: HEG-77-NNN

GRAI



CARATTERISTICHE:
Griglie di ripresa industriali ad alette fisse inclinate di 45° passo 60 mm.

COSTRUZIONE:
Alluminio anodizzato.

IMPIEGO:
A parete, per presa aria esterna o espulsione.

FISSAGGIO:
Fissaggio con clips o viti frontali a richiesta.

ACCESSORI:
- Serranda di taratura in acciaio zincato con alette a movimento contrapposto.
- Controtelaio di montaggio in lamiera di acciaio zincata.
- Rete antivolatile.
- Serranda di sovrappressione a gravità.

CHARACTERISTICS:
Industrial return grilles grilles with fixed and 45° inclined bars 60 mm pitch.

CONSTRUCTION:
Anodized aluminium.

UTILIZATION:
For wall installation and for external air intake or exhaust air flow.

FIXING:
Fixing by clips or frontal screws on request.

ACCESSORIES:
- Calibration damper made of galvanized steel and fins with opposite movement.
- Mounting counterframes made of galvanized steel sheet.
- Bird screen.
- Overpressure damper.

PREZZI - PRICES

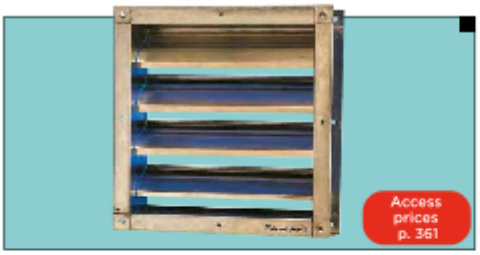
BxH	GRAI	GRAIR	GRAIRZ	GRAIRSS	SCAI	CTP
mm	€	€	€	€	€	€
400x400						
500x400						
600x400						
800x400						
1000x400						
• 1200x400						
• 1400x400						
• 1600x400						
• 1800x400						
• 2000x400						
400x500						
500x500						
600x500						
800x500						
1000x500						
• 1200x500						
• 1400x500						
• 1600x500						
• 1800x500						
• 2000x500						
400x600						
600x600						
800x600						
1000x600						
• 1200x600						
• 1400x600						
• 1600x600						
• 1800x600						
• 2000x600						
400x800						
600x800						
800x800						
1000x800						
• 1200x800						
• 1400x800						
• 1600x800						
• 1800x800						
• 2000x800						
400x1000						
600x1000						
800x1000						
1000x1000						
• 1200x1000						
• 1400x1000						
• 1600x1000						

5.10 NOT REURN DAMPER

Item TAG: HDN-77-NNN

DIFFUSION

France Air



SPG

Pressure relief flap for rectangular ducts

MATERIAL	INSTALLATION	MOUNTING
Al/u + steel	Rectangular duct	Visible screws

Espace Pro

Order online at www.espacepro.france-air.com

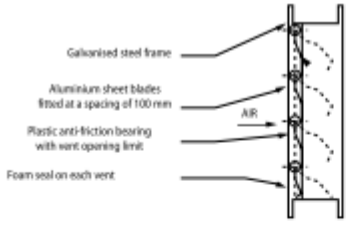
ADVANTAGES
- Excellent sealing.
- Low noise level.

RANGE
- SPG vent for rectangular duct.
- Standard dimensions from 200 x 200 mm to 2 000 x 2 000 mm:
  - in 100 mm intervals up to 1200 x 1200 mm,
  - then in steps of 200 mm.

APPLICATION/USE
- To maintain an overpressure or underpressure in a room with respect to the outside or to another adjoining room.
- Non-return flap.
- Use in air conditioning, ventilation or heating.

DESIGNATION
SPG (Pressure relief flap) **400 x 200** (Length x height (mm))

CONSTRUCTION/COMPOSITION
- Ducted - Type SPG



OPTIONS
- Bronze bearings.
- Stainless steel construction.
- Non-standard dimensions (consult us).
- High speed version (up to 10 m/s): shaft through coupled blades and central reinforcement

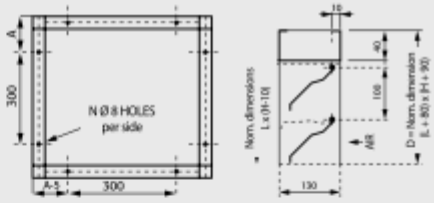
SPECIFICATION TEXT
- Available on www.france-air.com, Espace Pro area.

ASSEMBLY AND CONNECTION
- **Fitting in duct in a network**
  - Maximum flow speed = 6 m/s.
  - Above 4 m/s, the vent is fully open.
  - Max. temperature : + 50°C.

TECHNICAL DESCRIPTION
- Dimensions, cut-out

Dimension (mm)	Number of holes per side	Dimension A (mm)
200	0	-
300	0	-
400	1	245
500	1	295
600	1	345
700	2	245
800	2	295
900	2	345
1000	3	245
1100	3	295
1200	3	345
1400	4	295
1600	5	245
1800	5	345
2000	6	295

N. B.: above L = 1 200 mm, a central reinforcement is provided.



- Pressure drop/speed curve



Optimal selection values: from 2 m/s to 4 m/s*
* to 4 m/s: the flap is fully open.

Selection limit values at 6 m/s.

5.11 DUCT INSULATING MATERIAL

Technical datasheet
Felt CLIMCOVER ROLL ALU 1



DESCRIPTION
Blanket with grid alu foil. Made with glass and with a new generation of thermo-hardening resin that associates organic and vegetal components and minimizes emissions of pollutant substances, like formaldehyde and others volatile organic compounds (VOC).

APPLICATION
Product for use in technical applications, such as ventilation ducts and industrial equipments, with need thermal and acoustic insulation

BENEFITS
- Long life span
- Impact resistance
- Dimensional stability in case of temperature and humidity variation
- Thermal and acoustic insulation
- Certified according to EN 14303
- Easy workability

STORAGE
The product must be stocked inside, in ventilated areas and away from heat sources.

Characteristics		Value	Unit	According to
Declared thermal conductivity	10°C	0,032	W/(m·K)	EN 12667
Declared thermal conductivity	40°C	0,037	W/(m·K)	EN 12667
Declared thermal conductivity	100°C	0,049	W/(m·K)	EN 12667
Fire class EUROCLASS		A1	-	EN 13501-1
Maximum service temperature		125	°C	EN 14706
Width tolerance		+-10	mm	
Length tolerance		-0+excess	mm	

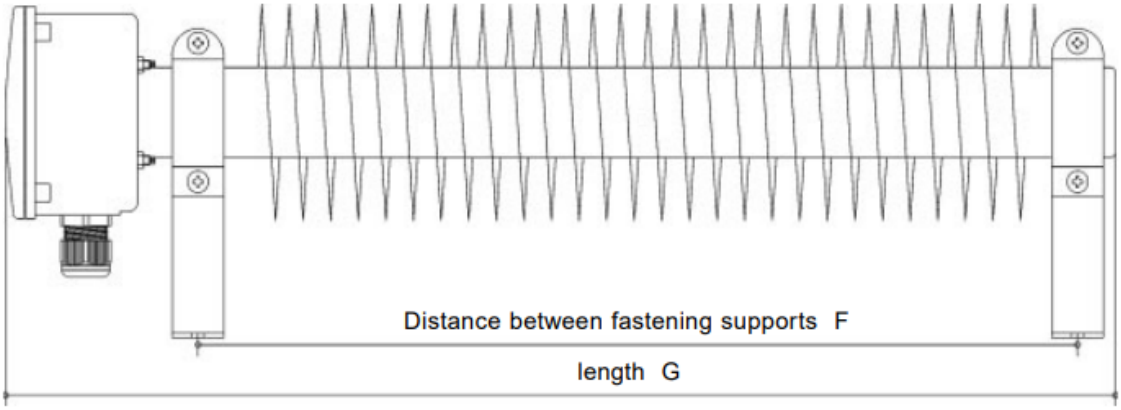
Thickness (mm)	Dimensions (m)	m²/pallet
25	1,15 x 10	345,00
50	1,15 x 5	172,50

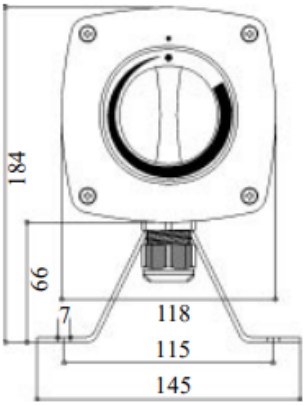
CODE: STC 255
REVISION: 00
DATE: March 2013

Product produced in France-Chalon Sur Saone plant
As regards the CE marking, this insulating product is in accordance with the standard 89/106/CE received by the DPR 246 of 21/4/1993 based on the standards EN 14303.
The CE data indicated on this datasheet are the ones required for the thermal insulation of industrial applications by the standard EN 14303 common to all applications.
The Quality Management System of Saint-Gobain PPC Italia S.p.A. has been assessed and found in accordance with the requirements of the EN ISO 9001:2008, EN ISO 14001:2004 and OHSAS 18001:2007.
The values stated in this datasheet, except for the values required by the CE marking, are not binding and Saint-Gobain PPC Italia S.p.A. may change them, without any notice.
Supplies are subjected to our production possibilities.
Saint-Gobain PPC Italia S.p.A. reserves the right to alter or amend product specification or stop the production without notice

5.12 SPACE HEATER

Item TAG: HHS-77-(007/008/009)





Typ	G mm	F mm
RRH TR 500	500	365
RRH TR 1000	700	565
RRH TR 1500	900	765
RRH TR 2000	1100	965
RRH TR 3000	1500	1365

Typ	G mm	F mm
RRH ST 1000	700	565
RRH ST 1500	900	765
RRH ST 2000	1100	965
RRH ST 3000	1500	1365

Kraemer & Kraus Wärmetechnik GmbH
Eiserntalstr. 374
57080 Siegen

Telefon (02 71) 3 93 70 26
Telefax (02 71) 3 93 70 27
Internet http:/www.Kraemer-Kraus.de
eMail Info@Kraemer-Kraus.de

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5.13 PRESSURE RELIEF DAMPER

Item TAG: HDR-77-301

SagiCofim

Overpressure damper with combined blades and counterweight

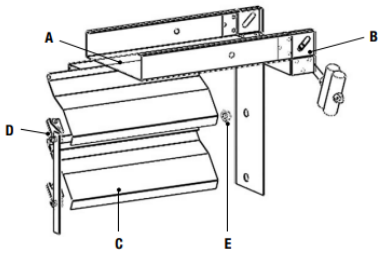
GP100KC-C



Duct overpressure damper with blades combined inside the air flow with return to closing position by own gravity and counterweight outside the flow. Vertical installation with single direction flow. In the case of counter-flow, the damper functions as a non-return element. The combination allows simultaneous opening of the blades, preventing an uneven air flow from creating high turbulence zones and low velocity zones.

MATERIAL AND FINISH

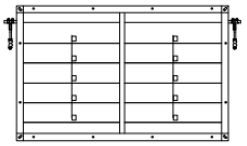
A Frame in galvanized steel Z140, duct-mounting.
B Flange 36 mm, thickness 1 mm.
C Galvanized blades combined internally, movement by gravity with counterweight that can be calibrated, anti-noise gasket.
D Through galvanized pins.
E NYLON bushes.



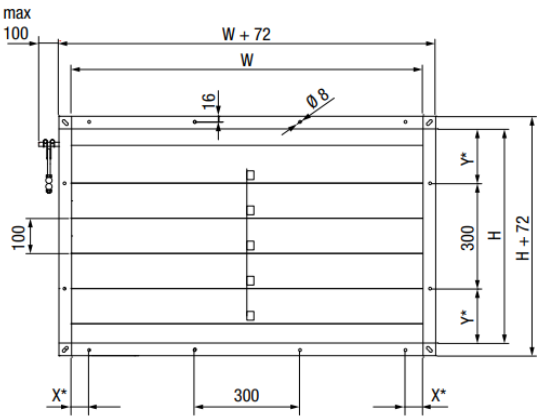
VERSIONS

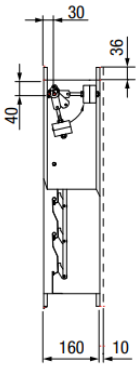
• AISI316	**(PRICES UPON REQUEST)**
• ATEX II 2 GD	**+ 36** €

NB: For the prices of the intermediate sizes, consider the next size on the table.
Ex.: 650 x 410 mm = 700 x 410 mm
For basic sizes > 1000 mm, construction in double section with centre separator



*See tech data sheet





The damper is supplied with a counterweight made up of a threaded rod 200 mm long and 300 g of metal masses.
In vertical axis, the counterweight is irrelevant for increasing the opening pressure, minimum reference value 30 Pa.
By tilting the counterweight in the direction of the blade opening, the minimum opening pressure increases up to + 100% for a 45° angle
For pressures higher than 100 Pa, the oscillating masses have to be increased.

5.14 BACKDRAFT DAMPER

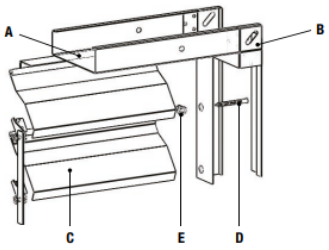
SagiCofim

Overpressure damper with combined blades

GP100KC



Overpressure damper with blades combined inside the air flow with return to closing position by gravity. Vertical installation with single direction flow. In the case of counter-flow, the damper functions as a non-return element. The combination allows simultaneous opening of the blades, preventing an uneven air flow from creating high turbulence zones and low velocity zones.
Minimum opening pressure 30 Pa



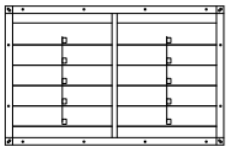
MATERIAL AND FINISH

A Frame in galvanized steel Z140, duct-mounting.
B Flange 36 mm, thickness 1 mm.
C Combined aluminum blades (series 5005), movement by gravity, anti-noise gasket, thickness 0.5 mm.
D Rotation pins.
E NYLON bushes.

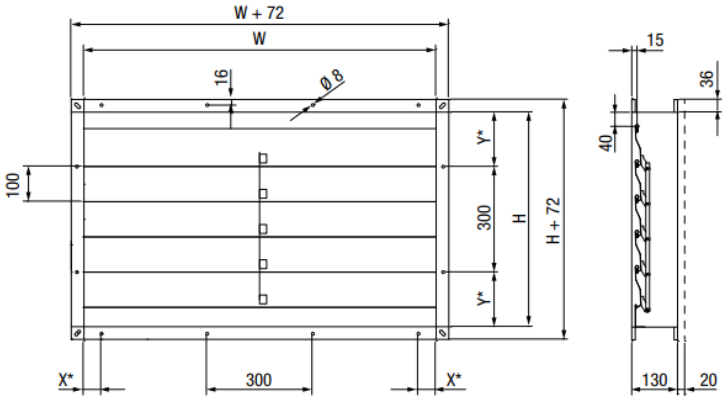
VERSIONS

• AISI316	(PRICES UPON REQUEST)
• ATEX II 2 GD	**+ 36** €

NB: For the prices of the intermediate sizes, consider the next size on the table.
Ex.: 650 x 410 mm = 700 x 410 mm
For basic sizes > 1000 mm, construction in double section with centre separator

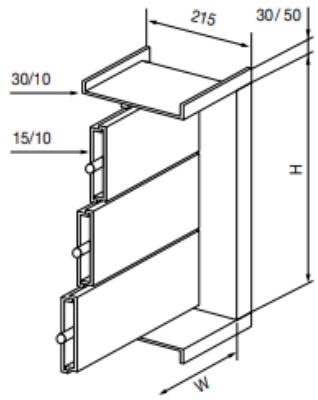


*See tech data sheet

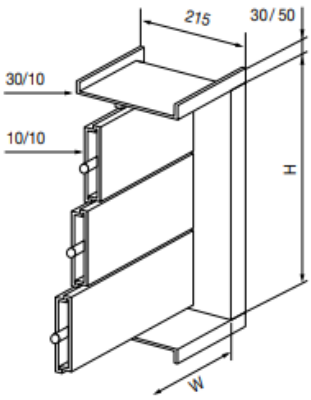


5.15 SHUT-OFF DAMPER

SDL - SDLT 0
dimensions in [mm]



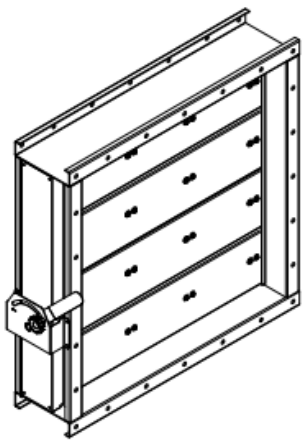
SDL - SDLT 2 - 6
dimensions in [mm]



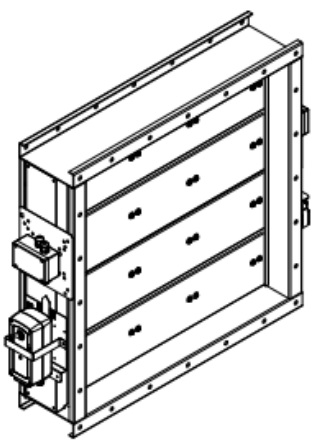
General features Shut-off dampers & Gas Shut-off dampers		
Models	**SDL**	**SDLT**
Gas leakage EN 1751 *Ambient temperature - Pressure: 2000 Pa*	Class B Class 1	**Class C** **Class 3**
Installation	Deck and bulkhead, duct, wall	
Maximum air inlet dimensions in single arrangement*	Width [W] and Height [H] from 150 to 2000 mm	
Standard flanges dimensions	30 mm (HVAC systems) or 50 mm (engine ventilation)	
Drilling	Standard Ø 12 or on demand	
Control types	Manual / Electrical / Electrical ATEX / Pneumatic / Pneumatic ATEX	
Accessories	Circular connections, junction box, quick connections, heating cable, box limit switch, ...	

* Dampers can be supplied on request with special dimensions by multiple welded arrangement.

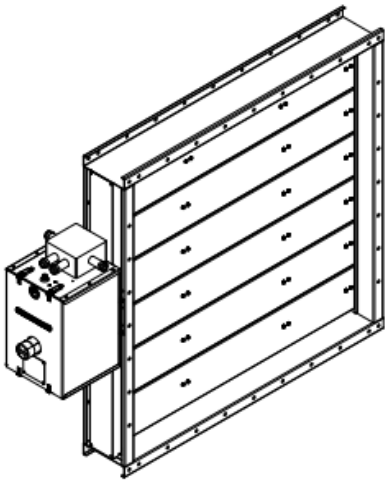
With manual control



With electrical control



With pneumatic control



SDL - SDLT



Damper operating range:

ATEX area	$-20\,°C \le t \le +50\,°C$ - V_{max} 15 m/s - P_{max} 3000 Pa
SAFE area	$-20\,°C \le t \le +70\,°C$ - V_{max} 25 m/s - P_{max} 3000 Pa

Damper components materials

		STANDARD		
	Type	0	2	6
A	**Casing** (depth 215 mm)	Hot bath galvanized steel, tk. 3 mm	Hot bath galvanized steel, tk. 3 mm	AISI 316 L, tk. 3 mm
B	**Blades** (parallel movement)	Galvanized steel, tk. 1.5 + 1.5 mm	AISI 316 L - tk. 1 + 1 mm	AISI 316 L - tk. 1 + 1 mm
C	**Shafts**	AISI 316 L, Ø 18,1 x 1.5 mm	AISI 316 L, Ø 18,1 x 1.5 mm	AISI 316 L, Ø 18,1 x 1.5 mm
D	**Levers**	Galvanized steel tk. 2 mm	AISI 316 L tk. 2 mm	AISI 316 L tk. 2 mm
E	**Bushes**	Self lubricating bronze, 9010	Self lubricating bronze, 9010	Self lubricating bronze, 9010
F	**Stops**	AISI 316 L tk. 1 mm	AISI 316 L tk. 1 mm	AISI 316 L tk. 1 mm
G	**Lever protection carter**	Galvanized steel tk. 1 mm	AISI 316 L tk. 1 mm	AISI 316 L tk. 1 mm
H	**Side sealing plates**	AISI 301	AISI 301	AISI 301
	Actuator support plate	Galvanized steel	AISI 316 L	AISI 316 L
	Position indicator	Galvanized steel	Galvanized steel	AISI 304

Silicone seals and thin blades only for models SDLT

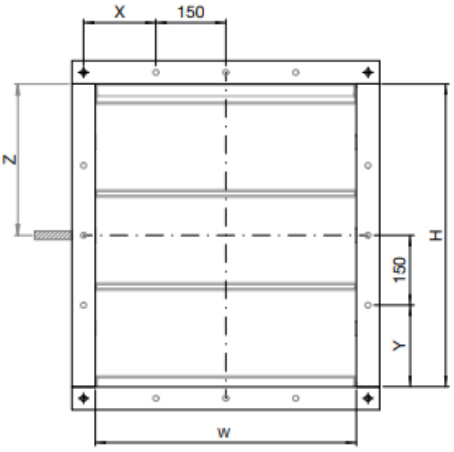
Shut-off - Gas Shut-off Damper Marine - Oil & Gas Industry SagiCofim

SDL - SDLT

Dimensions of flanges and drilling

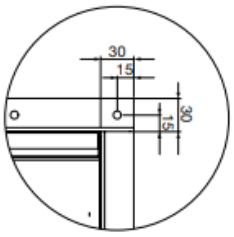
Models SDL - SDLT / 0 - 2 - 6

Air inlet size W / H [mm]	N° holes	flange 30 [mm]		flange 50 [mm]		0		2 / 6	
		X	Y	X	Y	Z	N° blades	Z	N° blades
150	1	90	75	100	75	75	1	75	1
200	1	115	100	125	100	100	1	100	1
250	1	140	125	150	125	125	1	125	1
300	1	165	150	175	150	50	2	75	2
350	3	40	175	50	175	75	2	100	2
400	3	65	50	75	50	100	2	100	2
450	3	90	75	100	75	125	2	225	3
500	3	115	100	125	100	250	3	250	3
550	3	140	125	150	125	275	3	275	3
600	3	165	150	175	150	300	3	300	3
650	5	40	175	50	175	325	3	325	3
700	5	65	50	75	50	450	4	350	3
750	5	90	75	100	75	475	4	375	5
800	5	115	100	125	100	500	4	500	4
850	5	140	125	150	125	525	4	525	4
900	5	165	150	175	150	450	5	375	6
950	7	40	175	50	175	475	5	400	6
1000	7	65	50	75	50	500	5	500	5
1050	7	90	75	100	75	525	5	525	7
1100	7	115	100	125	100	450	6	550	7
1150	7	140	125	150	125	475	6	575	7
1200	7	165	150	175	150	500	6	500	6
1250	9	40	175	50	175	525	6	525	6
1300	9	65	50	75	50	650	7	550	6
1350	9	90	75	100	75	675	7	675	9
1400	9	115	100	125	100	700	7	700	7
1450	9	140	125	150	125	725	7	725	7
1500	9	165	150	175	150	650	8	675	10
1550	11	40	175	50	175	675	8	700	10
1600	11	65	50	75	50	700	8	700	8
1650	11	90	75	100	75	725	8	825	11
1700	11	115	100	125	100	850	9	850	11
1750	11	140	125	150	125	875	9	875	11
1800	11	165	150	175	150	900	9	900	9
1850	13	40	175	50	175	925	9	925	9
1900	13	65	50	75	50	850	10	950	9
1950	13	90	75	100	75	875	10	975	13
2000	13	115	100	125	100	900	10	900	10

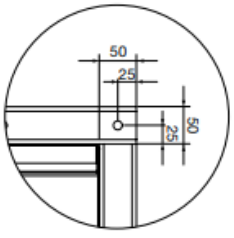


◆ Fixed holes at corner
○ Intermediate holes

SDL - SDLT flange 30



SDL - SDLT flange 50



Shut-off - Gas Shut-off Damper **Marine - Oil & Gas Industry** SagiCofim

SDL - SDLT

Damper weights [Kg]

Damper weights [Kg]

H [height]	W [width]																			
	150	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
150	9	11	13	16	18	21	24	26	29	32	34	37	40	42	45	47	50	53	55	58
200	11	12	15	18	21	24	27	30	32	35	38	41	44	47	50	53	56	58	61	64
300	13	15	18	21	25	28	31	34	38	41	44	47	50	54	57	60	63	67	70	73
400	16	18	22	25	29	33	36	40	44	47	51	54	58	62	65	69	73	76	80	84
500	19	21	25	29	33	37	41	45	49	53	57	61	65	69	73	77	81	85	89	93
600	22	24	28	33	37	41	46	50	55	59	63	68	72	77	81	85	90	94	99	103
700	24	27	31	36	41	46	50	55	60	65	69	74	79	84	88	93	98	103	107	112
800	27	30	35	40	45	50	55	61	66	71	76	81	86	92	97	102	107	112	117	123
900	30	32	38	43	49	54	60	65	71	76	82	87	93	98	104	109	115	120	126	131
1000	32	35	41	47	53	59	65	71	77	83	89	95	101	106	112	118	124	130	136	142
1100	35	38	44	51	57	63	69	76	82	88	95	101	107	113	120	126	132	138	145	151
1200	38	41	48	54	61	68	75	81	88	95	101	108	115	121	128	135	141	148	155	162
1300	40	44	51	58	65	72	79	86	93	100	107	114	121	128	135	142	149	156	163	170
1400	43	47	54	62	69	77	84	92	99	106	114	121	129	136	144	151	159	166	174	181
1500	46	50	57	65	73	81	89	96	104	112	120	128	135	143	151	159	167	174	182	190
1600	49	53	61	69	77	85	94	102	110	118	127	135	143	151	159	168	176	184	192	201
1700	51	55	64	73	81	90	98	107	115	124	132	141	150	158	167	175	184	192	201	209
1800	54	58	67	76	85	94	103	112	121	130	139	148	157	166	175	184	193	202	211	220
1900	57	61	71	80	89	98	108	117	126	136	145	154	164	173	182	192	201	210	220	229
2000	59	64	74	84	93	103	113	123	132	142	152	162	171	181	191	201	210	220	230	239

Average values valid for all standard types (approx. ± 5%)
Values in the table refer to the standard material manufcturing types. Different material manufacturing does not have significant variance to the above mentioned values. Controls and actuators weights are not included.

Shut-off - Gas Shut-off Damper Marine - Oil & Gas Industry SagiCofim

SDL - SDLT

Torque requirements (Nm) for actuating systems selection

Damper torque

H [height]	W [width]																			
	150	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
150	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
200	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
300	7	7	7	7	7	7	7	7	7	7	7	7	7	8	8	9	9	10	10	11
400	7	7	7	7	7	7	7	7	7	7	8	9	9	10	11	12	12	13	14	14
500	7	7	7	7	7	7	7	7	8	9	10	11	12	13	14	14	15	16	17	18
600	7	7	7	7	7	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22
700	7	7	7	7	7	8	9	10	11	13	14	15	16	18	19	20	21	23	24	25
800	7	7	7	7	7	9	10	12	13	14	16	17	19	20	22	23	24	26	27	29
900	7	7	7	7	8	10	11	13	15	16	18	19	21	23	24	26	28	29	31	32
1000	7	7	7	7	9	11	13	14	16	18	20	22	23	25	27	29	31	32	34	36
1100	7	7	7	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
1200	7	7	7	9	11	13	15	17	19	22	24	26	28	30	32	35	37	39	41	43
1300	7	7	7	9	12	14	16	19	21	23	26	28	30	33	35	37	40	42	44	47
1400	7	7	8	10	13	15	18	20	23	25	28	30	33	35	38	40	43	45	48	50
1500	7	7	8	11	14	16	19	22	24	27	30	32	35	38	41	43	46	49	51	54
1600	7	7	9	12	14	17	20	23	26	29	32	35	37	40	43	46	49	52	55	58
1700	7	7	9	12	15	18	21	24	28	31	34	37	40	43	46	49	52	55	58	61
1800	7	7	10	13	16	19	23	26	29	32	36	39	42	45	49	52	55	58	62	65
1900	7	7	10	14	17	21	24	27	31	34	38	41	44	48	51	55	58	62	65	68
2000	7	7	11	14	18	22	25	29	32	36	40	43	47	50	54	58	61	65	68	72

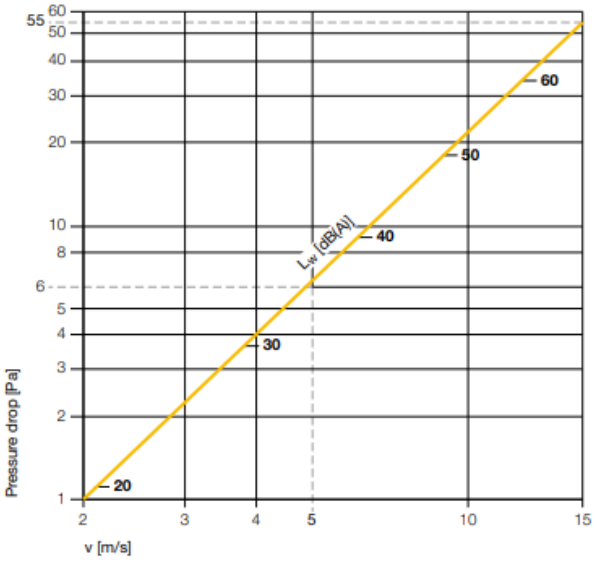
Note: for SDL model, actual required torque value can be up to 20% lower than the above mentioned values.

SDL - SDLT

Performances

Pressure drop and noise level

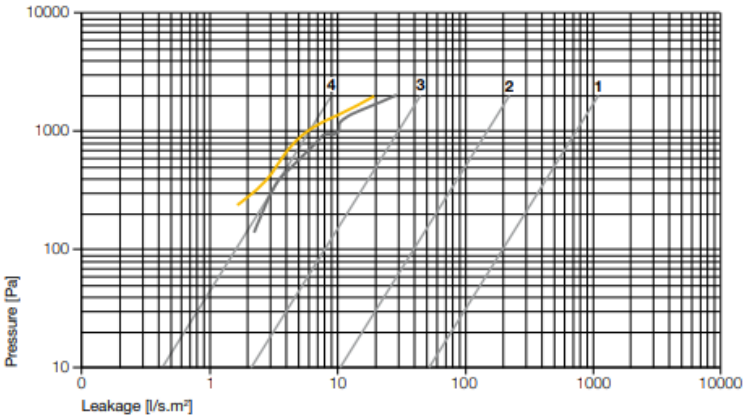
- Max noise level: **60 dB(A)**
- Standard pressure drop: **6 Pa**
  With damper fully open and air speed of 5 m/s at maximum rate.
- Max pressure drop: **55 Pa**
  With damper fully open and air speed of 15 m/s at maximum rate.



SDLT gas leakage according to EN1751

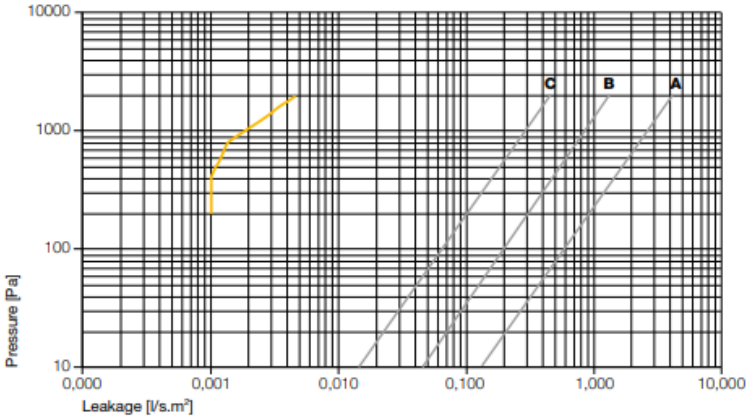
Leakage test across closed blades

Positive pressure
Negative pressure



Leakage test for casing

Positive pressure



Shut-off - Gas Shut-off Damper Marine - Oil & Gas Industry SagiCofim

SDL - SDLT

Damper controls Type **C 22 - Manual drive**

This damper version is provided with a control handle (C22).
SDL or SDLT + C22 can be used also as a balancing damper; in fact the handle can be fixed in all different positions from fully open to fully closed.
A safety clamp blocks the handle in the selected position.



Manual command



Damper closed



Damper open

Maintenance procedures

Mechanical couplings and electrical connections are tested before shipping.
Maintenance cadence depends by the dampers features (material) and the location where they are installed (fresh air inlet or exhaust duct)
During the damper installation and working life the following advices should be considered:

- Do not distort the frame and blades alignment;
- Check the blades free movement (avoid any solid sediment on shafts near to the bushes);
- Check the presence of extraneous objects inside the damper;
- Only the external damper frame except levers can be painted;
- Do not use cleaning acid liquids or abrasive tools (the hot bath galvanized surface film can be damaged);
- Do not dismantle dampers components;
- Do not modify the electrical connections prearrangement.

Only for fresh air inlet location:

- Lubricate shafts, bushes and levers (use only spray grease, avoid any paste);
- Check sea water corrosion effects on exposed damper surfaces.

Actuator disassembling

- Switch-off the actuator voltage input;
- Screw-out carter protection (if there) front panel;
- Pull out additional limit switches (if there) from the auxiliary shaft;
- Screw-out the metal actuator fixing plate and the remaining parts of the protection carter (if there);
- Pull out the actuator from the drive shaft;
- Insert new actuator and fix it;
- Screw-in carter protection and mount additional limit switches (if there);
- Check damper conditions;
- Restore voltage input.

Shut-off - Gas Shut-off Damper **Marine - Oil & Gas Industry** SagiCofim

SDL - SDLT

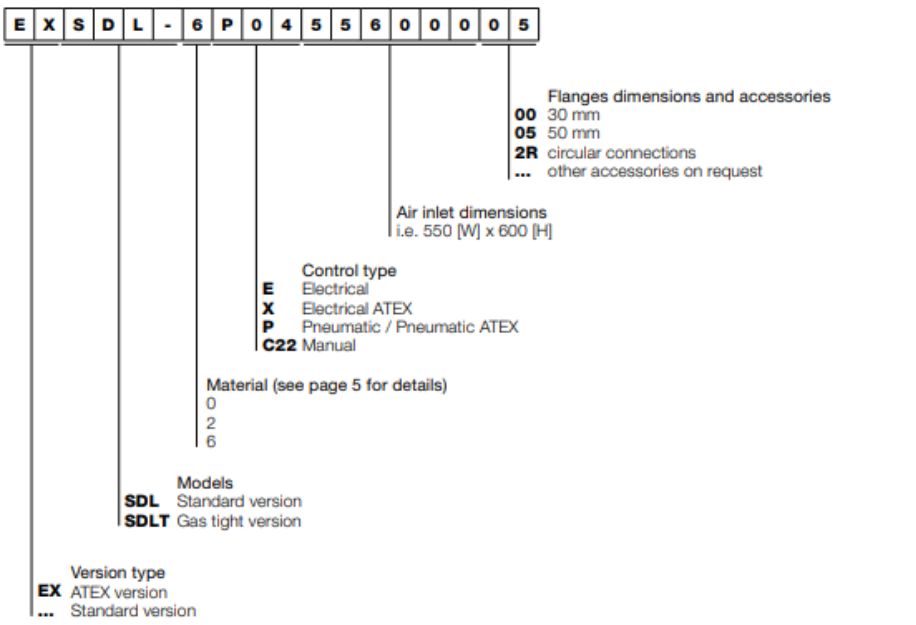
References

Shipyards
Barreras (Spain)
Cantieri Apuania (Italy)
Ferrol (Spain)
Fincantieri (Italy)
Flender Werft (Germany)
Jurong (Singapore)
Keppel Fels (Singapore)
Lloyd Werft (Germany)
Meyer Werft (Germany)
Navantia (Spain)
Rosetti Marino (Italy)
Sembawang (Singapore)
SMOE (Singapore)
STX France (France)
T. Mariotti (Italy)

Owners
Carnival
Corsica Ferries
Costa Crociere
Cunard
Finnlines
Grimaldi Group
Holland America Line
Marina Militare Italiana
Minoan Lines
Norwegian Cruise Line
P&O
Radisson Seven Seas
Renaissance Cruises
Royal Caribbean Cruise Line
Seabourn
Silversea Cruise
Tirrenia

Companies & Contractors
Agip KCO
ATP
Cocono Philips
Eni CONGO
Eni NORGE
ERSAI
Pearl
Petrobras
PTTEP
Saipem
Saudi Aramco
Shell
SOC
Total
Transocean
W.P.

Product code



5.16 DIFFERENTIAL PRESSURE TRANSMITTER

Item TAG: 77-PT-301



SDT
Differential pressure transmitter

Accuracy max ± 0.075%
Range 1 mbar ÷ 20 bar
Hart communication
LCD backlight display
Settings via display
Fast time responsive self-diagnostics
ATEX

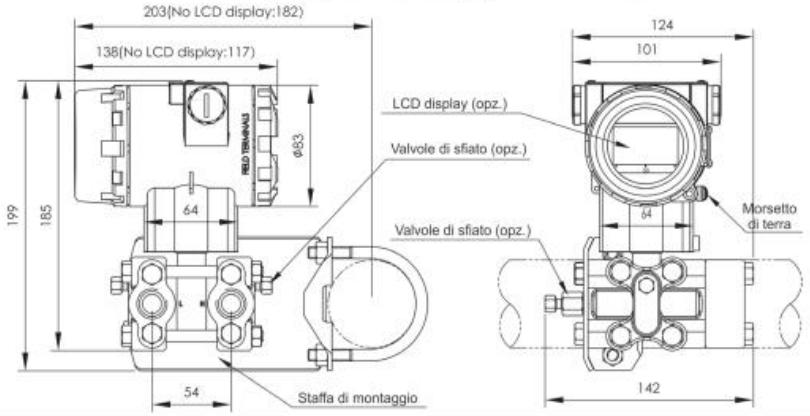
SDT is a differential pressure transmitter with performance at the top of the range and is designed for specific installations in processes where accuracy and stability over time are essential characteristics. Thanks to its technology it measures very low differential pressures from 1 mbar (10 mm H2O). The SDT is fully programmable by means of two external watertight buttons and a matrix backlight display. The programming or modification of the measurement parameters can be carried out in heavy duty ambient conditions without having access to the internal instrument parts thus maintaining the degree of protection IP67.

Technical Feature

Measure range
Differential pressure Max. 0÷20bar (0÷2Mpa); Min. 0÷0.001bar (0÷100Pa)
Accuracy
±0.075; ±0.1 for range A
Analog output resolution
15 bit

Power supply
12÷42Vdc (2-wires)
Communication protocol
HART
Zero and span calibration
onboard buttons
Data display
backlit alphanumeric display

IP rating
IP67
Stability
> ±0.1%FS
Working temperature
-40°÷+85°C
Certificazion
Atex



SDT Differential pressure transmitter

IP67 - Operation temperature: -40 ÷ +85°C
Power supply: 12÷42Vdc (2-wire)
4÷20mA HART

Accuracy	
H	± 0,075% (for range A ± 0,1%)
Measure range	
A	0 - 100Pa ÷ 1kPa (0 - 1 ÷ 10mbar) (0 - 10 ÷ 100 mmH²O) - accuracy ± 0,1%
B	0 - 200Pa ÷ 6kPa (0 - 2 ÷ 60mbar) (0 - 20 ÷ 600 mmH²O)
C	0 - 400Pa ÷ 40kPa (0 - 4 ÷ 400mbar) (0 - 40 ÷ 4000 mmH²O)
D	0 - 2,5kPa ÷ 250kPa (0 - 25 ÷ 2500mbar) (0 - 0,25 ÷ 25 mH²O)
E	0 - 20kPa ÷ 2MPa (0 - 0,2 ÷ 20bar) (0 - 2 ÷ 200 mH²O)
Membrane / filling liquid	
A	SS316L / silicone oil
B	SS316L / fluorinated oil
C	Hastelloy C / silicone oil
D	Hastelloy C / fluorinated oil
E	SS316L gold plated / silicone oil
F	SS316L gold plated/ fluorinated oil
G	SS316L EFP plated / silicone oil
T	Tantalum / silicone oil
Working pressure	
1	16MPa (range A = 7MPa)
2	25MPa (not for range A)
3	40MPa (not for range A)
Process connection	
B	¼" - 18 NPT female SS316 thread with relief valves at the end of the flange
D	¼" - 18 NPT female SS316 thread with relief valve on the lower part of the flange side
N	¼" - 18 NPT female SS316 thread without relief valves
U	¼" - 18 NPT female SS316 thread with relief valve on the upper part of the flange side
Z	Special
Sealed material	
F	Viton (FKM)
N	Perbunan (NBR)
P	Teflon (PTFE)
Special functions	
N	None
O	Degrease cleansing treatment (just with fluorinated oil and Viton seal, max 60°C)
P	Line noise filter
Fixing bracket for panel and pipe mounting (2")	
1	SS304
2	Galvanized carbon steel
N	None
Process connection accessories	
1	SS316 oval-shaped flange with ½" NPT female thread
2	SS316 D-shaped connector with M20x1.5 male thread (welded connection)
N	None
Display	
2	Backlit LCD
N	None
Certification	
A	Intrinsically Safe ATEX II 1/2G Ex ia IIC T4 Ga/Gb
D	Explosion proof ATEX II 2 G D Ex db IIC T4/T5/T6 Gb Ex tb IIIC T80°C/T90°C/T130°C - Ta = -40°C ÷ +60°C
N	None

5.17 TEMPERATURE TRANSMITTER TT

Item TAG: 77-TT-(301/302/303/304)

Product lines: temperature sensor

In order to get a precise temperature sensor in a wide range of different application, it's possible to choose between resistance thermometers and thermocouples. Temperature sensors are also available with temperature transmitter, thermowell and other options, in order to satisfy requirements of every industrial applications.



Resistance thermometers

Resistance thermometers have a platinum sensor element which changes it electrical resistance as a function of temperature.
In our products portfolio are available resistance thermometers with cable and with connection head.
A temperature transmitter can be installed directly in the connection head.
Resistance thermometers are available in classes A, 1/3 DIN, 1/5 DIN and 1/10 DIN in accordance with IEC 60751. They are available also the ATEX versions (Ex ia and Ex d)



Thermocouples (TC)

Thermocouples directly supply a temperature-dependent voltage.
They are particularly suitable for high temperatures.
In our products portfolio are available thermocouples with cable and with connection head.
For thermocouples, the accuracy classes in accordance with IEC 60584-1 or ASTM E230.
The type J, K, N, T, S, E are available in our products portfolio.
A temperature transmitter can be installed in the connection head.
They are available also the ATEX versions (Ex ia and Ex d)



Temperature transmitters

The transmitters for DIN/B head or for DIN rails convert a signal acquired by RTD (with 2, 3 and 4 wire connections) or Thermocouples into a 4 ... 20 mA signal (2 wires technology) or 0 ... 10 VDC signal (3 wires technology). These converters ensure high accuracy on the reading scale with 16-bit conversion and they are available with parameterization via NFC-smartphone App (Android) and with integrated datalogger. Available also the ATEX version (Ex ia) and with galvanic isolation.



Thermowells

Thermowells are available for different applications whether in aggressive or abrasive process media, to prevent direct exposure of their temperature probes to the medium.
Thermowells can be manufactured from solid-body material or from tube sections and can either be screw, weldor flange fitted.
They are available in standard and special versions (stainless steel 1.4571, 316L, Hastelloy® or titanium).

DTP 8180

Data sheet
www.trafag.com

The DTP 8180 is a temperature transmitter with analogue output, 2 switch points and display

Features

- Parameterization also via NFC-smartphone App (Android)
- Display and electrical connection are independently rotatable 335°/343°
- Analogue output switchable mA or V
- Integrated datalogger
- Temperature measuring range adjustable 50, ... 100% of the nominal range

Reference

- IEC 60751



Standard parameters	
Measuring principle	PT 1000, DIN EN 60751 class A, 2 conductors
Measuring range	-50°C ... +150°C / -58°F ... 302°F adjustable 50 ... 100% FS
Output signal	4 ... 20 mA, 0 ... 5 VDC, 1 ... 6 VDC, 0 ... 10 VDC, switchable mA or V
Switching output	2 transistors PNP
Accuracy@25°C typ	0.5% FS typ + temperature sensor
Ambient temperature	-25°C ... +85°C
Unit for display	°C, °F, °K, user scale
Logger	Ring buffer: 3518 data points Sampling time: 0.1 ... 999.9 s, Off (0)

TCTT

Data sheet
www.trafag.com

The TCTT is a compact system used to measure liquid and gaseous fluid.
PC configuration allows the user to select range and units, without requiring calibration equipment.

Features

- PC programmable temperature range
- High sensibility
- Free configuration software
- Materials and surface finish quality in accordance with standards of hygenics design

Reference

- EN 60751
- EN 61326



Standard parameters	
Output	Analogue 4 ... 20 mA
Measuring range	-50 ... + 250°C
Ambient temperature	-40 ... +85°C
Protection	IP67
Accuracy	Class AA, 1/5 DIN, 1/10 DIN
Electrical connection	M12x1

T1

Data sheet

RTD and TC with connection head.

The resistance thermometers and thermocouples with connection head offers a wide range of options and features for different applications.

RTD Standard specifications	
Sensing element	PT100, PT1000, NI100, PTC, NTC
Connection wires	Single or Double element, 2, 3 or 4 wires
Construction types	Traditional insulation or mineral MgO insulation
Material	AISI304, AISI316 L, PTFE (1)
Connection head	Mignon, DIN B, DIN A, DIN43650 A, M12x1, AD-PE (1)
Process connection	From 1/8" to 1", BSP or NPT, male or female, CLAMP and other sanitary versions (1)
Stem diameter	From 3 to 12 mm (1)

1) Other RTD versions are available on request
2) They are available in the ATEX versions (Ex ia and Ex d)

TC Standard specifications	
Sensing element	J, K, N, T, S, E (1)
Connection wires	Single or Double element, 2 wires
Construction types	Traditional insulation or mineral MgO insulation
Material	AISI304, AISI316 L, Ceramic type 610, Alumina type 710, Hastelloy (1)
Connection head	Mignon, DIN B, DIN A, DIN43650 A, AD-PE (1)
Process connection	From 1/8" to 1", BSP or NPT, male or female (1)
Stem diameter	From 1 to 12 mm (1)

1) Other TC versions are available on request
2) They are available in the ATEX versions (Ex ia and Ex d)



RTD or TC for immersion with connection head, suitable for generical measurements and regulations on plant with low pressures. The process connection is realized by means of an under-head threaded nipple (fix) or by means of a compression fittings or a slidable flanges.
The electrical connection is made by a ceramic terminal block situated inside the connection head. Available also with analogic output.



RTD for immersion with AISI 316 sheath suitable for temperature measurement in chemical and food industry with sanitary clamp process connection. The immersed part of the stem have a mirror finishing surface.
The electrical connection is made by a ceramic terminal block situated inside the connection head. Available also with analogic output.



RTD or TC with mineral oxide insulation for immersion with connection head, suitable for generical measurements and regulations on plants with low pressures and with high vibrations. The process connection is realized by means of an under-head threaded nipple (fix) or by means of a compression fittings or a slidable flanges.
The electrical connection is made by a ceramic terminal block situated inside the connection head. Available also with analogic output.



RTD or TC for immersion with exchangeble thermometric insert and orientable connection. The process connection is realized by means of an under-head threaded nipple (fix) or by means of a compression fittings or a slidable flanges.
The electrical connection is made by a ceramic terminal block situated inside the connection head. Available also with analogic output.



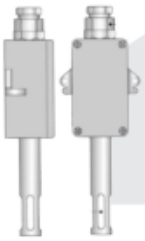
Immersion RTD or TC with exchangeable MgO insulated thermometric insert, orientable connection head and tapered protective sheath for fast response time. The process connection is realized by means of an under-head threaded nipple (fix) or by means of a compression fittings or a slidable flanges.
The electrical connection is made by a ceramic terminal block situated inside the connection head. Available also with analogic output.



RTD or TC for immersion with exchangeble thermometric insert (available also in MgO) and orientable connection head. The process connection is realized by means of a 316SS flange and the electrical connection is made by a ceramic terminal block situated inside the connection head. Available also with analogic output.



RTD for immersion suitable for measurements in narrow space on plant with low pressures. The electrical connection is made by a connector EN 175301-803 standard. The process connection is realized by means of an under-head threaded nipple (fix) or by means of a compression fittings or a slidable flanges. The electrical connection is made by a ceramic terminal block situated inside the connection head. Available also with analogic output.



RTD probe for the measurement of internal room temperatures realized in plastic material, aluminium (for external ambient) or 316SS. Available also with analogic output.



TC for high temperature with ceramic protective tube and connection head. It is possible to select between a 610 ceramic sheath type or a 710 (single or double) alumina sheath type. Available also with analogic output.



Mineral oxide MgO insulated thermocouples.

T2

Data sheet

RTD and TC with cable output.

The resistance thermometers and thermocouples with cable output offers a wide range of options and features for different applications.

RTD Standard specifications	
Sensing element	PT100, PT1000, NI100, PTC, NTC
Connection wires	Single or Double element, 2, 3 or 4 wires
Construction types	Traditional insulation or mineral MgO insulation
Material	AISI304, AISI316 L, PTFE (1)
Type of cable	PVC, Kapton, PTFE / MFA, Silicone, Glass-Fiber (1)
Process connection	From 1/8" to 1", BSP or NPT, male or female, CLAMP and other sanitary versions (1)
Stem diameter	From 3 to 12 mm (1)

1) Other RTD versions are available on request
2) They are available in the ATEX versions (Ex ia)

TC Standard specifications	
Sensing element	J, K, N, T, S, E (1)
Connection wires	Single or Double element, 2 wires
Construction types	Traditional insulation or mineral MgO insulation
Material	AISI304, AISI316 L, Ceramic type 610, Alumina type 710, Hastelloy (1)
Type of cable	PVC, Kapton, PTFE / MFA, Silicone, Glass-Fiber (1)
Process connection	From 1/8" to 1", BSP or NPT, male or female (1)
Stem diameter	From 1 to 12 mm (1)

1) Other TC versions are available on request
2) They are available in the ATEX versions (Ex ia and Ex d)



Cylindrical RTD or TC with AISI 304 sheath or with AISI 316 sheath insulated with compact magnesium oxide (MgO) suitable for generical measurement.
The output of the cable from the tube is protected with a stainless steeel spring.



Cylindrical RTD or TC with AISI 304 sheath suitable for generical measurements. The probe fixing is realized by means of a threaded nipple welded on the sheath.



RTD or TC with stainless steel sheath suitable for generical measurements.
The probe fixing is realized by means of a brass ring soldered on the tip of the tube; it can be fixed on a surface with a normal screw.
The output cable is protected with a stainless steel spring.



Spring-loaded RTD or TC indicated for measurements into metallic plates; the fixing is by threaded connection with bayonet fitting.



Resistance thermometer suitable for the measurement of the pipe temperatures.
The special design of the aluminium body allow an high thermal exchange with the internal sensing element with a consirable reduction in measuring error. The fixing can be realized by means of a normal clamp.

9 Distributed by trafag sensors controls

Signal converters



The transmitters for DIN/B head convert a signal acquired by temperature probes PT100, PT1000 or Ni100 (with 2-, 3- and 4-wire connections) or Thermocouples into a 4 … 20 mA signal (2-wire technology), current-loop. These converters ensure high accuracy on the reading scale with 16-bit conversion and possibility to rescale the output 4 … 20mA basing on input range. Available also Atex version and with galvanic isolation



The signal transmitter from DIN rail converts a signal received through probes PT100, Ni100 (with 2-, 3- and 4-wire connections), thermocouples or process signals (0/4 … 20mA, 0 … 10V) into a normalised current signal 4 ... 20 mA (2-wire power loop). The characteristics of these converters ensure high precision on the reading scale with 16 bit conversion and the possibility to rescale the analogue output 4 ... 20 mA according to the input set. The RTD/TC input is galvanically isolated at 2500 V from the analogue output, which ensure safer cables in environment where they may be disturbed or in cases where there different voltages in the same system.

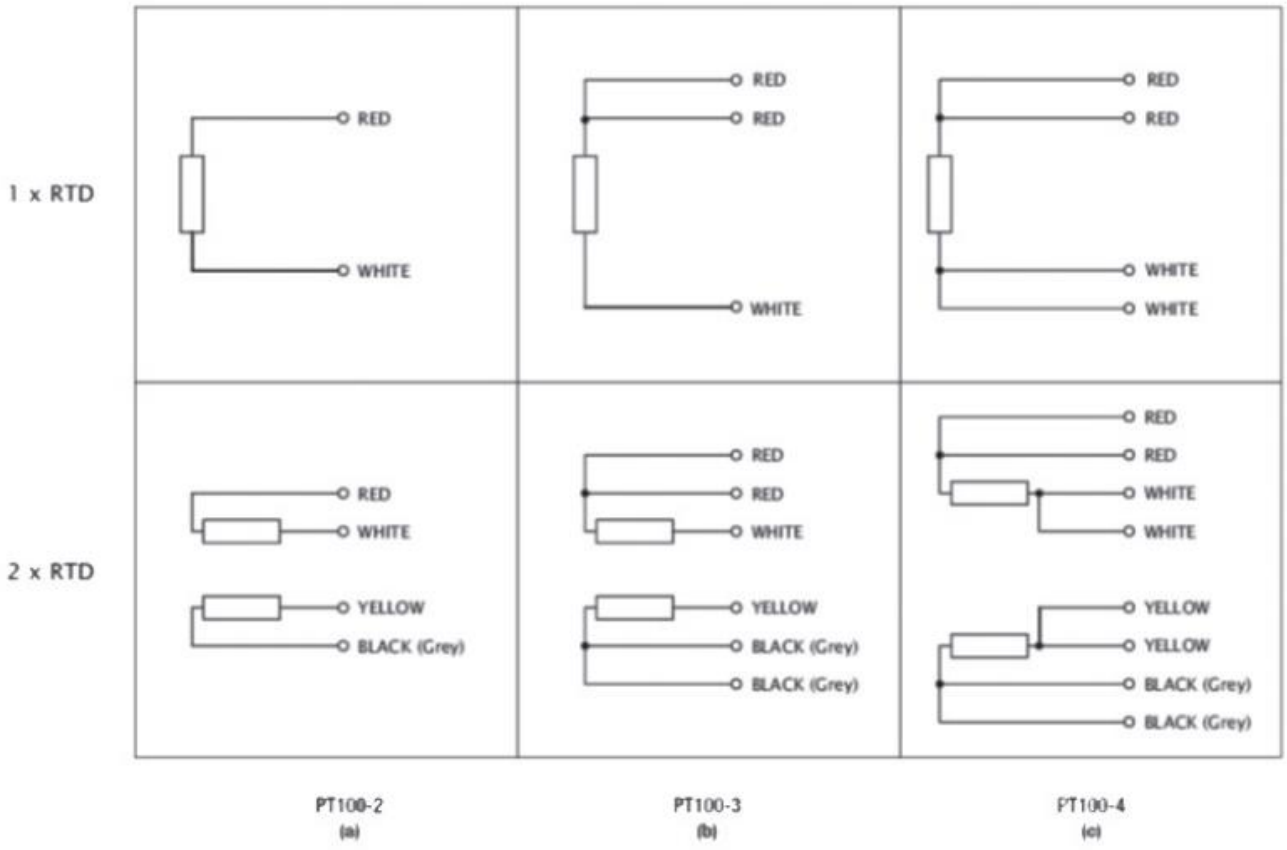
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Type of connection for resistance thermometer

a) 2 wires - the two-wire technique is the least precise and is used only in cases where the connection of the thermoresistance is carried out with short and low resistivity wires

b) 3 wires - the three-wire technique is the most used in the industrial field.
With this measurement technique the errors caused by the resistance of the conductors used for the connection of the thermoresistance are eliminated.

c) 4 wires - the technique offers the greatest precision possible but it is almost exclusively used in laboratory applications.



Resistance thermometer type PT100 ohm 0°C (EN 60751)

The resistance thermometers and thermocouples with cable output offers a wide range of options and features for different applications.

Tolerance class	Temperature range of validity		RTD Standard specifications
	Wire wound resistors	Fil resistors	
1/5 DIN	-196 ÷ +600	-50 ÷ +600	(0,1 + 0,0017* | t |)
1/3 DIN	-196 ÷ +600	-50 ÷ +600	(0,15 + 0,002* | t |)
A	-196 ÷ +600	-50 ÷ +600	(0,3 + 0,005* | t |)
B	-196 ÷ +600	-50 ÷ +600	(0,6 + 0,01* | t |)

| t | = Moduls of temperature in °C without regards to the sign

Standard thermocouples

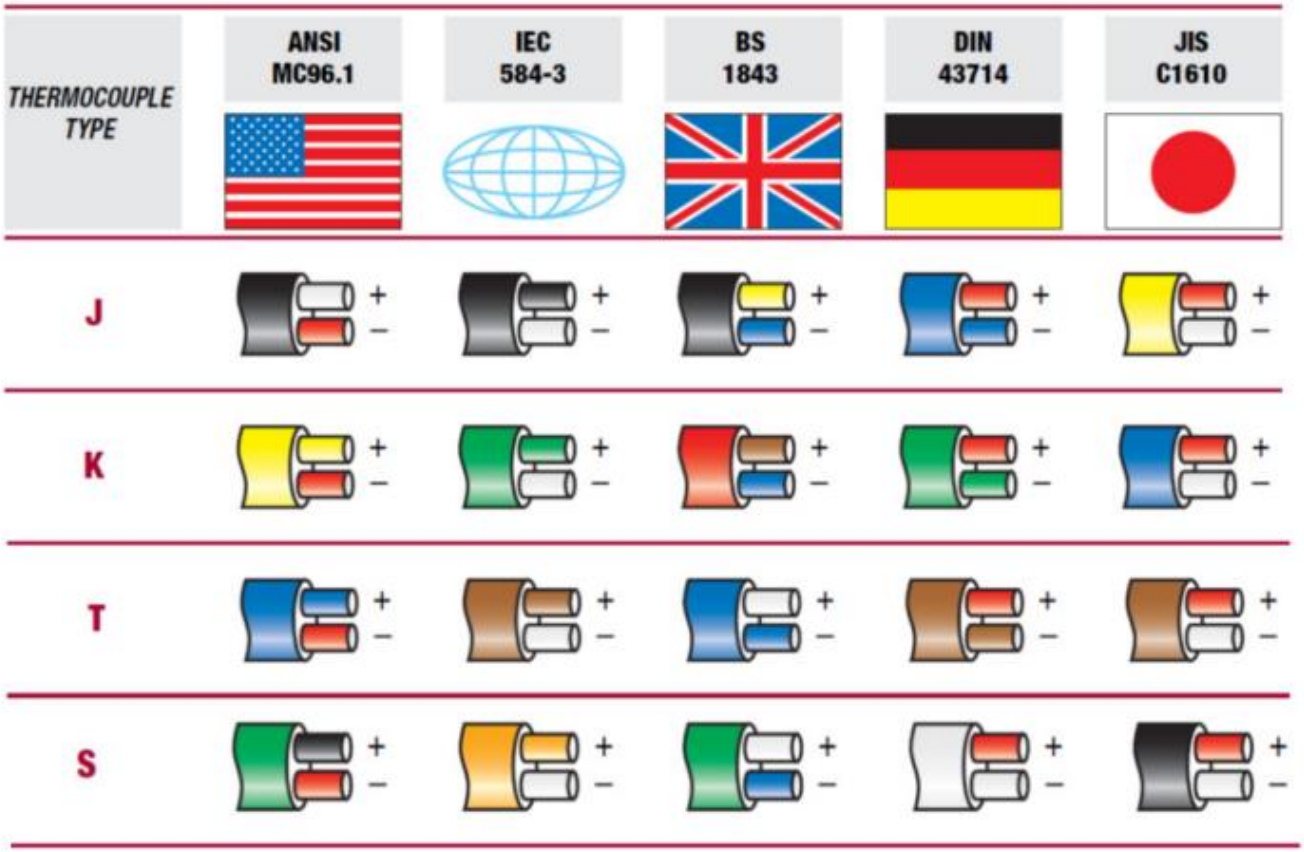
Type	Materials	Temperature range °C	Tolerance values °C
J	Fe-Co	-210 ÷ 800	± 2,5 o 0.0075* |t|
K	Cr-Al	-270 ÷ 1300	± 2,5 o 0.0075* |t|
T	Cu-Co	-270 ÷ 400	± 1 o 0.0075* |t|
S	Pt10%Rh - Pt	-50 ÷ 1800	± 1,5 o 0.0025* |t|

| t | = Moduls of temperature in °C without regards to the sign

Standard cables for temperature sensors

Type	Rh resistance	Temperature range °C	Abrasion resistance
Glass – Fiber	D	-50 ÷ 400	D
Silicone	C	-40 ÷ 200	B
PTFE/ MFA	A	-200 ÷ 250	A
PVC	B	-20 ÷ 105	B
Kapton	B	-200 ÷ 400	B

Standard color coding of compensating cables



5.18 FIRE AND GAS DAMPER WITH ACTUATOR

Item TAG: HFD-(77007/77008/77009/77010/77011)

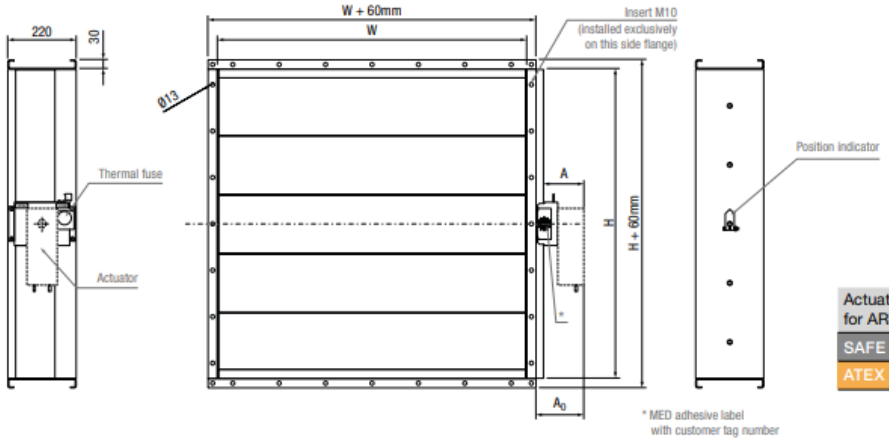
Technical data
SOLAS A0 frame 220mm
SAFE AREA - ATEX AREA

Features	
Dimensional range	from 150x150mm to 1000x1000mm step 50mm
Flange	Standard 30mm On request 50mm
Operating temperature range	-40°C / +50°C
Operating air velocity (damper in working condition)	12m/s max
Peak limits (sporadic and for a few seconds)	P=2500Pa, v=18m/s
Leakage Class acc. to EN 1751	Standard 2B On request 3C

		Version **3** (220GW)	Version **4** (2206W)
Description		**Material**	
Casing (riveted)		hot dip galv. steel - tk. 3mm	AISI316L - tk. 3mm
Blades		galv. steel Z200 double skin 1.2mm+1.2mm fiber glass gasket*	AISI316L double skin 1.2mm+1.2mm fiber glass gasket*
Shafts		AISI316 - Ø12mm	AISI316 - Ø12mm
Bushes		bronze self lub. - Ø12mm	bronze self lub. - Ø12mm
Actuator for	SAFE AREA	Belimo BF - Schischek InMax	Belimo BF - Schischek InMax
	ATEX AREA	Schischek ExMax - RedMax	Schischek ExMax - RedMax

** Non-classified SVF, 20x5mm*

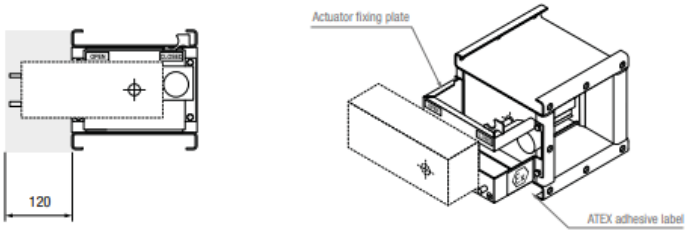
ACTUATOR MOUNTED VERTICALLY FOR H>250mm



Actuator for AREA	A [mm]	A_0 [mm]
SAFE	110	135
ATEX	130	155

ACTUATOR MOUNTED HORIZONTALLY FOR H≤250mm

Drilling scheme, see pag. 10



S-LFD Fire and Gas-Fire Damper SOLAS A0-A60

SagiCofim

Dimensions and Weights

frame 220mm

H [mm]	W [mm]																	
	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
150	7,5	8,5	9,5	10,5	11,5	12,5	13,5	14,4	15,4	16,4	17,4	18,4	19,3	20,3	21,3	22,3	23,3	24,3
200	8,6	9,6	10,6	11,7	12,7	13,7	14,8	15,8	16,8	17,9	18,9	19,9	21,0	22,0	23,0	24,1	25,1	26,1
250	9,4	10,5	11,5	12,5	13,6	14,6	15,6	16,7	17,7	18,7	19,8	20,8	21,8	22,8	23,9	24,9	25,9	27,0
300	11,0	12,1	13,3	14,5	15,6	16,8	18,0	19,1	20,3	21,5	22,6	23,8	25,0	26,1	27,3	28,5	29,6	30,8
350	12,0	13,2	14,4	15,6	16,8	18,0	19,2	20,4	21,6	22,9	24,1	25,3	26,5	27,7	28,9	30,1	31,3	32,5
400	12,9	14,2	15,5	16,7	18,0	19,2	20,5	21,7	23,0	24,3	25,5	26,8	28,0	29,3	30,5	31,8	33,0	34,3
450	14,3	15,6	17,0	18,3	19,6	21,0	22,3	23,6	24,9	26,3	27,6	28,9	30,3	31,6	32,9	34,3	35,6	36,9
500	15,3	16,7	18,1	19,4	20,8	22,2	23,6	24,9	26,3	27,7	29,0	30,4	31,8	33,2	34,5	35,9	37,3	38,7
550	16,3	17,7	19,1	20,6	22,0	23,4	24,8	26,2	27,7	29,1	30,5	31,9	33,3	34,8	36,2	37,6	39,0	40,4
600	17,3	18,7	20,2	21,7	23,1	24,6	26,1	27,5	29,0	30,5	31,9	33,4	34,9	36,3	37,8	39,3	40,7	42,2
650	18,6	20,2	21,7	23,3	24,8	26,3	27,9	29,4	31,0	32,5	34,0	35,6	37,1	38,6	40,2	41,7	43,3	44,8
700	19,6	21,2	22,8	24,4	26,0	27,6	29,1	30,7	32,3	33,9	35,5	37,1	38,6	40,2	41,8	43,4	45,0	46,6
750	20,6	22,3	23,9	25,5	27,1	28,8	30,4	32,0	33,7	35,3	36,9	38,5	40,2	41,8	43,4	45,1	46,7	48,3
800	21,6	23,3	25,0	26,6	28,3	30,0	31,7	33,3	35,0	36,7	38,4	40,0	41,7	43,4	45,1	46,7	48,4	50,1
850	23,0	24,7	26,5	28,2	30,0	31,7	33,5	35,2	37,0	38,7	40,5	42,2	44,0	45,7	47,4	49,2	50,9	52,7
900	24,0	25,8	27,6	29,3	31,1	32,9	34,7	36,5	38,3	40,1	41,9	43,7	45,5	47,3	49,1	50,9	52,7	54,5
950	25,0	26,8	28,6	30,5	32,3	34,1	36,0	37,8	39,7	41,5	43,3	45,2	47,0	48,9	50,7	52,5	54,4	56,2
1000	25,9	27,8	29,7	31,6	33,5	35,4	37,2	39,1	41,0	42,9	44,8	46,7	48,6	50,4	52,3	54,2	56,1	58,0
	Weight* [Kg]																	

* tollerance ± 10%

Actuator weights:

- BELIMO BF... 18Nm = 3,1Kg
- SCHISCHEK ExMax 15Nm = 3,5Kg

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Electrical actuator
SCHISCHEK

Description		On-off 3-pos., spring-return, 2 micro switches, IP66
Torque		15Nm
Power		24...240VAC/DC (at rest 5W)
Angle of rotation		95°
Running time	(M)	3s / 15s / 30s / 60s / 120s
		3s / 10s
Dimensions (LxWxH)		210x95x80mm
Shaft		square 12x12mm

..Pro-TT



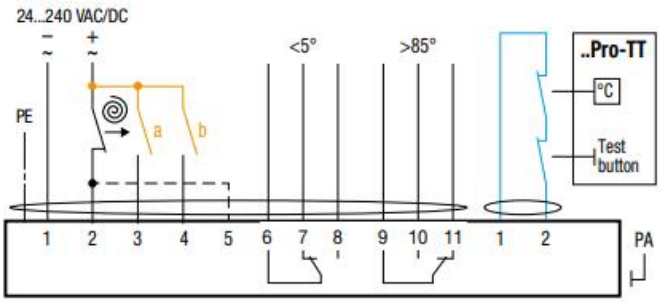
Safety temperature trigger
Thermal fuse
(Available for 72-95°C)

Model	InMax 15-BF	RedMax 15-BF	ExMax 15-BF
			
Zone	SAFE AREA	ATEX AREA ZONE 2, 22 GAS + DUST	ATEX AREA ZONE 1, 2, 21, 22 GAS + DUST

ELECTRICAL INSTALLATION

For 3-pos variation: add orange connection (a and b on 3 and 4)
For standard wiring: Spring return in 10s
For additional wiring on terminal 5: Spring return in 3s

On-off / 3 pos. - spring return + tripping circuit



5.19 JUNCTION BOXES

Casse di derivazione CDE
CDE junction boxes

Cieca
Blind



Struttura
lamiera d'acciaio sp. 10/10 verniciata RAL 7035 bucciato.

Coperchio o porta incernierata
verniciati RAL 7035 bucciato con guarnizione in colata continua.

Composizione
Struttura, porta o coperchio, confezione di viteria.

Grado di resistenza meccanica secondo IEC EN 62208: IK10

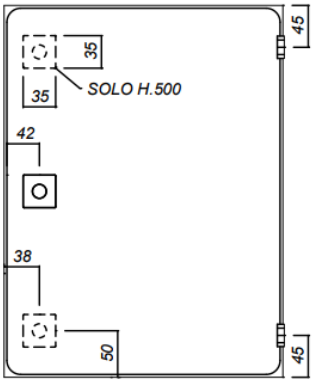
Structure
10/10 thick steel sheet, painted textured RAL 7035.

Cover or hinged door
Painted textured RAL 7035, provided with a gasket applied in continuous casting.

Composition
Structure, door or cover, set of accessories and screws for assembly.

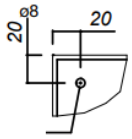
Mechanical resistance degree as per IEC EN 62208: IK10

IP66 IP55

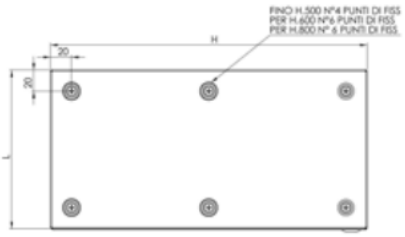


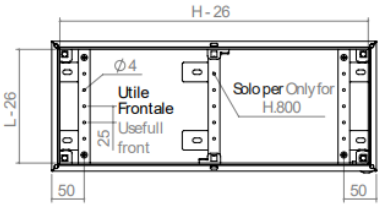
CASSA SENZA FLANGE IP 66 SODDISFA TYPE 4 BOX WITHOUT FLANGES IP 66 COMPLIES WITH TYPE 4	CASSA CON COPERCHIO INCERNERATO IP 55 SODDISFA TYPE 12 BOX WITH HINGED COVER IP 55 COMPLIES WITH TYPE 12	DIMENSIONE DIMENSIONS ALTEZZA, H HEIGHT, H	LARGHEZZA, L WIDTH, L	PROFONDITÀ, P DEPTH, P
R5CDE1180	-	150	150	80
R5CDE9180	-	180	150	80
R5CDE2980	-	200	180	80
R5CDE2280	R5CDE2280C	200	200	80
R5CDE3180	-	300	150	80
R5CDE3280	R5CDE3280C	300	200	80
R5CDE4280	R5CDE4280C	400	200	80
R5CDE6280	-	600	200	80
R5CDE8280	-	800	200	80
R5CDE11120	-	150	150	120
R5CDE22120	R5CDE22120C	200	200	120
R5CDE31120	-	300	150	120
R5CDE32120	R5CDE32120C	300	200	120
R5CDE33120	R5CDE33120C	300	300	120
R5CDE42120	R5CDE42120C	400	200	120
R5CDE43120	R5CDE43120C	400	300	120

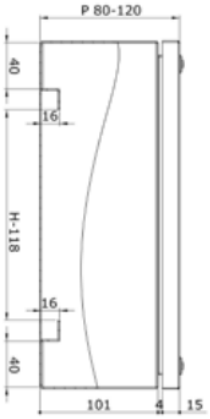
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R5CDE44120	-	400	400	120
R5CDE52120	**R5CDE52120C**	500	200	120
R5CDE53120	-	500	300	120
R5CDE62120	-	600	200	120
R5CDE63120	-	600	300	120
R5CDE64120	-	600	400	120
R5CDE82120	-	800	200	120
R5CDE84120	-	800	400	120







5.20 CAVO SCALDANTE

etelec electrical technology

SCHEDA TECNICA **HTC-P**



DESCRIZIONE ESTESA

Cavo scaldante a potenza autoregolante per tutte le applicazioni fino a 65°C per contatto continuo e fino a 85 °C per contatto intermittente.

Applicazioni:

- protezione antigelo di tubazioni e serbatoi industriali contenenti liquidi e gas;
- mantenimento in temperatura e riscaldamento di tubazioni e serbatoi industriali contenenti liquidi e gas;
- tracciamento di tetti e grondaie;
- tracciamento superfici non carrabili.

GAMMA DI PRODOTTO				
Famiglia		Cavi Scaldanti		
Serie		HTC-P		
Codice Metel		**HTC10P**	**HTC15P**	**HTC25P**
Nome commerciale		**HTC-10P**	**HTC-15P**	**HTC-25P**

INFORMAZIONI DIMENSIONALI		
Dimensioni sezione cavo	mm	11,5 x 6,3
Min. raggio di curvatura	mm	40
Sezione conduttori	mm^2 | AWG	0,8 | 18
Peso	kg/m	0,13

INFORMAZIONI FISICHE		
Materiale conduttori		Rame
Materiale matrice		Autoregolante
Materiale isolante primario		Poliolefina modificata
Materiale calza metallica		Rame stagnato
Materiale rivestimento esterno		Poliolefina reticolata
Halogen Free	(F), (Cl), (Br), (I), (At)	Si
Lead Free	Pb	Si

INFORMAZIONI TECNICHE					
			HTC10P	HTC15P	HTC25P
Potenza nominale a 10 °C	W/m		10	15	25
Potenza massima a 0°C	W/m		12	18	28
Temperatura massima di contatto	°C	65		Cavo alimentato	
Temperatura massima di contatto	°C	85		Cavo non alimentato	
Classe Temperatura		T6			
Temperatura minima di utilizzo	°C	- 40			
Alimentazione	V	230			
Resistenza elettrica della schermatura	Ω/m	0,018			
Resistenza all'acqua	%	100			

CONFORMITA' DI PRODOTTO E DI SISTEMA			
Norme di riferimento		EN 62395	
Conformità		EN 62395	
Comportamento al fuoco		n.a.	
Classificazione ETIM	Ver. 7.0	EC000339	
Grado di isolamento		IP66	EN60529

INFORMAZIONI DI SICUREZZA	
Prodotto tossico	No
Prodotto pericoloso	No
Conformità CLP (Regolamento 1272/2008/CE)	n.a.

INFORMAZIONI LOGISTICHE				
Codice	Q.tà (m)	Dimensioni (m)	Peso (kg)	Barcode
HTC10P	300	0,45 x 0,45 x 0,45	40	8053323900085
HTC15P	300	0,45 x 0,45 x 0,45	40	8053323900092
HTC25P	300	0,45 x 0,45 x 0,45	40	8053323900115

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5.21 PIPE

DESCRIPTION	CHARACTERISTICS
PIPE	MATERIAL : PVC
	EXTERNAL DIAMETER : 50 mm
	INTERNAL DIAMETER : 40,8 mm
	PN RATING : 20
	MAX OPERATIONAL PRESSURE (at 20°C) : 20 bar (290 psi)

PIPE	MATERIAL : PVC
	EXTERNAL DIAMETER : 50 mm
	INTERNAL DIAMETER : 42,6 mm
	PN RATING : 16
	MAX OPERATIONAL PRESSURE (at 20°C) : 16 bar (232 psi)

PIPE	MATERIAL : PVC
	EXTERNAL DIAMETER : 25 mm
	INTERNAL DIAMETER : 21,2 mm
	PN RATING : 16
	MAX OPERATIONAL PRESSURE (at 20°C) : 16 bar (232 psi)

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5.22 ELECTRICAL CLAMP

DESCRIPTION	CHARACTERISTICS
ELECTRICAL CLAMP	COD. : ETQ76290N
	MATERIAL : NYLON (PA6.6)
	COLOR : BLACK
	LENGTH : 300 mm
	WIDTH : 7,6 mm
	TENSILE STRENGTH : 54 daN
	SELF-EXTINGUISHING CLASS : UL 94 - V 2

ELECTRICAL CLAMP	COD. : ETQ25100N
	MATERIAL : NYLON (PA6.6)
	COLOR : BLACK
	LENGTH : 100 mm
	WIDTH : 2,5 mm
	TENSILE STRENGTH : 8 daN
	SELF-EXTINGUISHING CLASS : UL 94 - V 2

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