

Technical Data Pilot Burner GFI89



Fig. 1 Side view of GFI89 pilot burner design A/B

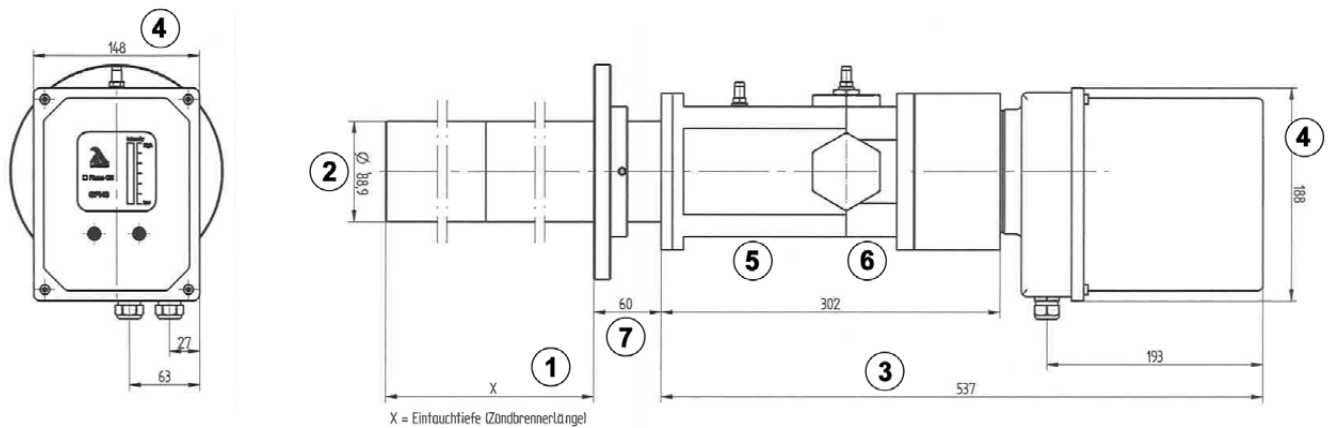


Fig. 2 Dimensions of GFI89 pilot burner design A/B



Fig. 3 Side view of GFI89 pilot burner Ex-Zone 2

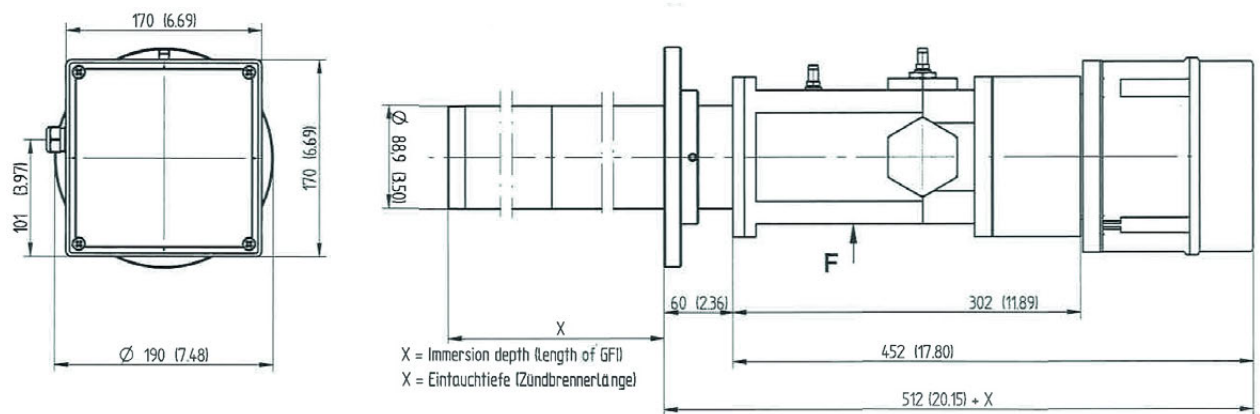


Fig. 4 Dimensions of GFI89 pilot burner Ex-Zone 2

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Fig. 5 Side view of GFI89 pilot burner design C

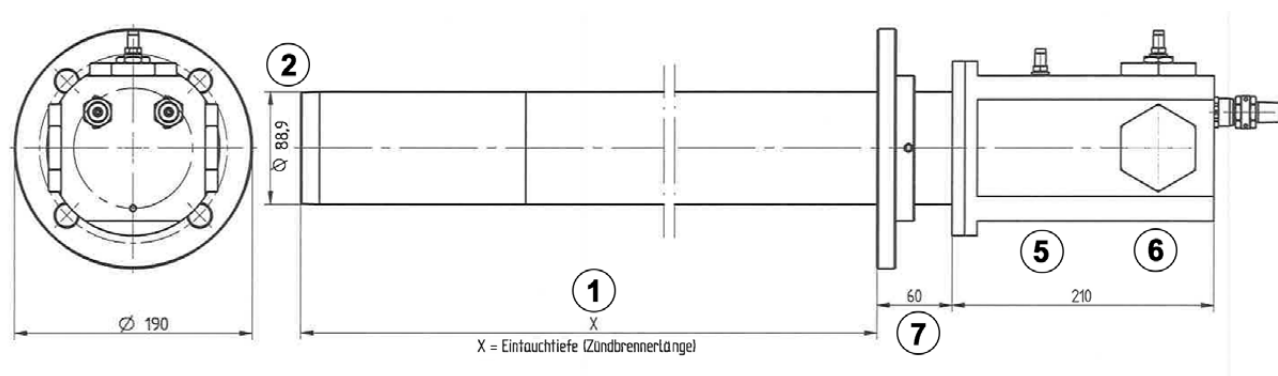


Fig. 6 Dimensions of GFI89 pilot burner design C

1	Dimension outer tube length	customer-specific
2	Outer tube diameter	GFI89: 88.9 mm x 2 mm (3.5 x 0.078 in)
3	Housing length versions A and B	
4	Housing dimensions	
5	Air supply connection	2 inch (BSPP inner threads)
6	Gas supply connection	1 1/2 inch (BSPP inner threads)
7	Distance between housing and connection flange	

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NOTICE

The electrical data are identical for all devices, only the air and gas volume flows differ.

Technical design Ignition and ionisation

GFI35	Single-electrode operation
GFI48/70/89	Two-electrode operation

Design A and B:

Power supply voltage connection

Electrical data	120/230 VAC (within the scope of the EU Gas Appliances Directive), cf. rating plate Mains tolerance according to DIN EN 60730-1
Mains frequency	50/60 Hz
Power consumption	at rated voltage = 230 V 230 VA ignition transformer, 10 VA flame scanner at rated voltage = 120 V, 192 VA ignition transformer, 10 VA flame scanner
External device fuse (mandatory)	4 A

Integrated flame scanner

SIL-classification level	SIL 3
Ionisation input	
Ionisation current	from 1 μ ADC flame ON
Operating mode	continuous operation capable
Flame signal output contact	
Contact type	safety-oriented, floating contact
Contact type	NO, for "flame on", the contact is closed
Level of protection	SKII, base isolation for the status signal
Permissible switching voltage ¹	≤ 230 VAC ≤ 48 VDC
Permissible switching current ^{1, 2}	max. 0.5 A cos φ 0.4 Min. 10 mA
Contact fusing	0.5 AT (internal, soldered)
Safety time (FFDT)	
Response time in the event of the flame failure	t_V off configurable via DIP switches to 1 s or 3 s (standard 1 s)
Switch-on time	t_V on ≤ 1 s
Measuring shunt	runs mains potential
Transmission ratio of measurement voltage to ionisation current	10 mV (DC) = 1 μ A (DC)
Basic error	≤ 2 %
Electrical safety	contact protection by means of protective impedances
Min. impedance of the connected measuring device	1 M Ω
Output voltage (UN= 230 V)	GFI48/70/89, Safe Area: 8 kV GFI48/70/89, Ex-Zone 2: 5 kV GFI35, Safe Area: 5 kV

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Integrated flame scanner

Output voltage (UN= 120 V)	GFI48/70/89, Safe Area: 7 kV GFI48/70/89, Ex-Zone 2: 5 kV GFI35, Safe Area: 5 kV
Ignition transformer duty cycle	switch-on duration = 16 % on 1 min. (10"on; 50" off) - 20 °C<Ta<60 °C

¹ The product is not permitted to be transported, stored or operated outside the specified range.
Doing so will invalidate any guarantees with regard to safety relevant functions.

² Provide external spark quenching for inductive loads, do not connect any capacitive loads.

NOTICE

Use device manufacturer recommended silicone shielded cable. The device manufacturer will only guarantee proper functioning if this cable is used. This cable is available in any length up to the maximum cable length.

Design B and C:

Connection of external flame scanner to the ionisation electrode

Recommended cable specifications	
Cable type	RG62 coaxial cable
Cable lengths	< 10 m 32,8 ft
Inner conductor	solid copper-plated steel wire, uninsulated Ø: 0.64 ± 0.025 mm 0.025 ± 0,00098 in
Wire insulation	PE hollow space insulation (helix made from PE strands with PE hose on top) Ø: 3.7 mm 0.14 in
Shield	braided from bare Cu wires, 96 % coverage (nominal value)
Outer shell	PVC, black outside diameter: 6.15 ± 0.18 mm 0.24 ± 0.0070 in
Conductor resistance	max. 144 Ohm/km
Operating capacity	max. 43 pF/m (1 kHz)
Rated voltage	0.8 kV (50 Hz)
Test voltage	2 kV
Temperature range	-40 ... 80 °C -40 ... 176 °F (fixed installation)

Power supply voltage connection to the external ignition transformer

Recommended cable specifications	
Cable lengths	max. 200 m 656.168 ft
Cable cross-section	3 x 1.0 mm ² 3 x 17 AWG
Isolation	PVC
Temperature range	-40 ... +90 °C -40 ... 194 °F

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Connection of external ignition transformer to the ignition electrode		
Electrical data		
Ignition voltage to earth		See section ‘Integrated ignition transformer’
Recommended cable specifications		
Cable lengths		max. 20 m 65.62 ft
Cable cross-section		1 x 1.0 mm ² 1 x 17 AWG
Isolation		Silicone, red-brown
Temperature range		-60 ... +180 °C -76 ... +356 °F
Ground cable		
Recommended cable specifications		
Cable lengths		max. 200 m 656.168 ft
Cable cross-section		1 x 1.5 mm ² 1 x 15 AWG and/or according to regional regulation
Mode of operation		
Permitted mode of operation		intermittent operation/continuous operation
Operating condition		
Relative humidity		max. 85 % (non-condensing)
Environmental conditions		
Operation	Permissible temperature range	Safe Area: -20...+60 °C -4 ... +140 °F (Standard, without display) -40...+60 °C -40 ... +140 °F (Special, without display) 0...+60 °C -32 ... +140 °F (with display) Ex-Zone 2: -20...+60 °C -4 ... +140 °F
Transport	Permissible temperature range	-20 ... +60 °C -4 ... +140 °F
Storage	Permissible temperature range	-20 ... +60 °C -4 ... +140 °F
Degree of protection	DIN EN 60529	IP65 / NEMA 4 / NEMA 4X



DANGER!

High voltage on the bare ignition electrode!

- ▶ Pilot burner is only permitted to be operated with correct earthing.
With version C in particular there is a danger of death when removing or omitting the earthing, the housing earthing must be connected directly to the ignition transformer earthing!
- ▶ In the event of damage to the earthing insulation, the device should be shut down; further operation without repair is not permitted.

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Integrated standard power unit safe area

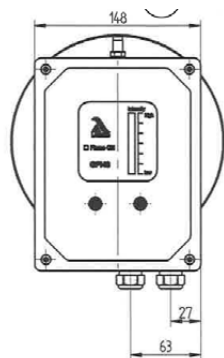


Fig. 7 Side view integrated standard power unit safe area

Fig. 8 Dimensions integrated standard power unit safe area

Degree of protection	IP65/NEMA 4/NEMA 4X
Design	with or without display
Material	Gas-air block: AlMg4.5Mn Power unit: G-ALSi9Cu3 226/G-ALSi5Mg
Coating	Power unit: C2 (Standard), C4 on request

Integrated power unit Ex-Zone 2

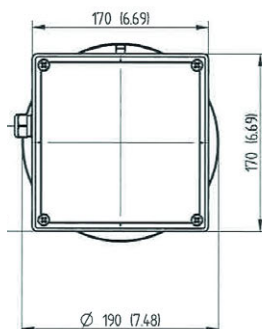


Fig. 9 Side view integrated power unit Ex-Zone 2

Fig. 10 Dimensions integrated power unit Ex-Zone 2

Degree of protection	IP65/NEMA 4/NEMA 4X
Type	no display possible
Device marking	Ex ec nC IIB + H2 T4 Gc (with flame scanner) Ex ec IIB + H2 T4 Gc (without flame scanner)
IEC Standards	IEC 60079-0:2017; IEC 60079-7:2015; IEC 60079-15:2010
certificate no.:	IECEx KIWA 20.0005X

NOTICE

The free ends of the unterminated cable shall be connected in a suitable certified enclosure (e.g. Ex e) or outside the hazardous area.

-The equipment shall only be used in an area of at least pollution degree 2, as defined in IEC 60664-1.

-Transient protection shall be provided that is set to a level not exceeding 140 % of the peak rated voltage value at the supply terminals to the equipment.

- The cable glands are tested with a reduced tensile force (25 %) in accordance with clause A.3.1 of IEC 60079-0 and may only be used for fixed installation apparatus. The user shall ensure adequate clamping of the cable.

- The cable gland size M16 is tested for low risk of mechanical danger (drop height 0.4 m with 1 kg mass) and shall be protected against higher impact energy levels.

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Thermal Power*		Propane	Natural gas	Hydrogen
Thermal power	GFI35:	25 ... 57 kW	25 ... 57 kW	15 ... 52 kW
	GFI48:	70 ... 140 kW	70 ... 140 kW	45 ... 100 kW
	GFI70:	150 ... 300 kW	150 ... 300 kW	not available
	GFI89:	400 ... 700 kW	400 ... 700 kW	not available

Connection: Gas

GFI35

Flow rate (gas quantity)	2,7 ... 5,6 Nm ³ /h 3.53 ... 7.32 yd ³ /h	2,7 ... 5,6 Nm ³ /h 3.53 ... 7.32 yd ³ /h	4,0 ... 17,5 Nm ³ /h 5.23 ... 22,88 yd ³ /h
Operating pressure	min. 50 mbar 0.725 psi max. 200 mbar 2.90 psi	min. 50 mbar 0.725 psi max. 200 mbar 2.90 psi	min. 16 mbar 0,23 psi max. 150 mbar 2,17 psi

GFI48

Flow rate (gas quantity)	3,2 ... 6,0 Nm ³ /h 4.18 ... 7.84 yd ³ /h	8,0 ... 15,0 Nm ³ /h 10.46 ... 19.61 yd ³ /h	15 ... 33,3 Nm ³ /h 19.61 ... 43,55 yd ³ /h
Operating pressure	min. 50 mbar 0.725 psi max. 200 mbar 2.90 psi	min. 50 mbar 0.725 psi max. 200 mbar 2.90 psi	min. 10 mbar 0,14 psi max. 47 mbar 0,68 psi

GFI70

Flow rate (gas quantity)	6 ... 12,0 Nm ³ /h 7.84 ... 15.69 yd ³ /h	15,0 ... 30,0 Nm ³ /h 19.61 ... 39.23 yd ³ /h	
Operating pressure	min. 50 mbar 0.725 psi max. 200 mbar 2.90 psi	min. 50 mbar 0.725 psi max. 200 mbar 2.90 psi	

GFI89

Flow rate (gas quantity)	14 ... 28,0 Nm ³ /h 18.31 ... 36.62 yd ³ /h	35,0 ... 70,0 Nm ³ /h 45.77 ... 91.55 yd ³ /h	
Operating pressure	min. 50 mbar 0.725 psi max. 200 mbar 2.90 psi	min. 50 mbar 0.725 psi max. 200 mbar 2.90 psi	

NOTICE

Higher pressure ratings can be realised by connecting a restrictor upstream.

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Connection: Air

Air type	Combustion air
Operating pressure (natural gas and propane)	GFI35: 4 - 8 mbar 0,058 - 0,116 psi + 4 mbar 0,058 psi per metre of tube length GFI48: 6 - 20 mbar 0,087 - 0,290 psi + 6 mbar 0,087 psi per metre of tube length GFI70: 5 - 16 mbar 0,072 - 0,232 psi + 5 mbar 0,072 psi per metre of tube length GFI89: min. 15 mbar 0,217 psi + 5 mbar 0,072 psi per metre of tube length
Operating pressure (Hydrogen)	GFI35: 15 - 20 mbar 0,22 - 0,29 psi + 4 mbar 0,058 psi per metre of tube length GFI48: 15 mbar 0,22psi + 6 mbar 0,087 psi per metre of tube length
Air temperature	max. 80 °C 176 °F
Relative air humidity	max. 70 %
Air quality	Free of dust, oil, grease and aerosols The quality for the compressed air supply should conform to ISO 8573-1:2010 class (7 : 4 : 4). Non-observance can result in short-circuits due to material deposits in the housing.
Air ratio	0.3 ... 0.5 (the remaining air quantity must be provided by the combustion chamber)
Flow rate (air quantity)	GFI35: max. 22 Nm ³ /h 28.77 yd ³ /h GFI48: max. 50 m ³ /h 65.39 yd ³ /h GFI70: max. 150 m ³ /h 196.19 yd ³ /h GFI89: max. 250 m ³ /h 326.98 yd ³ /h

NOTICE

At temperatures in the combustion chamber of over 500 °C | 932 °F, if the pilot burner is off, a cooling air supply of 50 % of the max. combustion air should be provided.

* At International Standard Atmosphere, ISA: 15 °C, 1013,25 hPa

Thermal rating with high power versions*

GFI48	natural gas: 250 ... 400 kW propane: 250 ... 400 kW
GFI70	natural gas: 500 ... 800 kW propane: 500 ... 800 kW
GFI89	natural gas I: 2300 ... 3000 kW natural gas II: 4600 ... 6000 kW propane: 2300 ... 3000 kW

Connection: GFI48 gas

Flow rate (gas quantity)	natural gas: 25 ... 40 m ³ /h 32.69 ... 52.31 yd ³ /h propane: 9.5 ... 15 m ³ /h 12.42 ... 19.61 yd ³ /h
Operating pressure	natural gas: 500 ... 1000 mbar 7.25 ... 14.50 psi propane: 400 ... 800 mbar 5.80 ... 11.60 psi

Connection: GFI70 gas

Flow rate (gas quantity)	natural gas: 50 ... 80 m ³ /h 65.39 ... 104.63 yd ³ /h propane: 19 ... 31 m ³ /h 24.85 ... 40.54 yd ³ /h
Operating pressure	natural gas: 500 ... 1000 mbar 7.25 ... 14.50 psi propane: 500 ... 1000 mbar 7.25 ... 14.50 psi

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Connection: GFI89 gas

Flow rate (gas quantity)	natural gas I: 230 ... 300 m ³ /h 300.82 ... 392.38 yd ³ /h natural gas II: 460 ... 600 m ³ /h 601.65 ... 784.76 yd ³ /h propane: 90 ... 115 m ³ /h 117.71 ... 150.41 yd ³ /h
Operating pressure	natural gas I: 700 ... 1000 mbar 10.15 ... 14.50 psi natural gas II: 700 ... 1000 mbar 10.15 ... 14.50 psi propane: 700 ... 1000 mbar 10.15 ... 14.50 psi

NOTICE

This is not a control range as for a burner as the appropriate air volume must be set accordingly when changing the gas pre-pressure.

Connection: Air

Air type	combustion air
Operating pressure	GFI48/70: min. 15 mbar + 6 mbar 0.217 psi + 0.087 psi per metre of tube length GFI89: min. 15 mbar + 5 mbar 0.217 psi + 0.072 psi per metre of tube length
Air temperature	max. 80 °C 176 °F
Relative air humidity	max. 70 %
Air quality	free of dust, oil, grease and aerosols The quality for the compressed air supply should conform to ISO 8573-1:2010 class (7 : 4 : 4). Non-observance can result in short-circuits due to material deposits in the housing.
Air ratio	0.3 ... 0.5 (the remaining air quantity must be provided by the combustion chamber)
Flow rate (air quantity)	GFI48: max. 50 m ³ /h 65.39 yd ³ /h GFI70: max. 150 m ³ /h 196.19 yd ³ /h GFI89: max. 250 m ³ /h 326.98 yd ³ /h

NOTICE

At temperatures in the combustion chamber of over 500°C | 932 °F, if the pilot burner is off, a cooling air supply of 50% of the max. combustion air should be provided.

* At International Standard Atmosphere, ISA: 15 °C, 1013,25 hPa

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Order Information

Igniter and Pilot Burner

89 mm | 3.5 "in GFI89, Performance Range 400 ... 700 kW

Configuration

Description / Type	Order-no.
Igniter and pilot burner GFI89, 400 ... 700 kW, installation diameter 89 mm 3.5 "in IP65 / NEMA 4 / NEMA 4X	646R0089...
A10 "RANGE OF APPLICATION"	Selection
SAFETY AREA (NO EXPLOSIVE ATMOSPHERE), -20 ... +60 °C -4 ... +140 °F	SAF
SAFETY AREA (NO EXPLOSIVE ATMOSPHERE), -40 ... +60 °C -40 ... +140 °F	SAF-40
Ex-ZONE 2	EX2
Ex-ZONE 1	EX1
FOR USE WITH EXTERNAL POWER UNIT IN WALL-MOUNTED HOUSING	EXS
FOR USE WITH EXTERNAL EX-POWER UNIT IN WALL-MOUNTED HOUSING	EXH
A20 "FUEL"	Selection
NATURAL GAS	N
PROPANE/BUTANE (LPG)	P
COKE-OVEN GAS (ANALYSIS REQUIRED)	C
2 GAS TYPES IN ALTERNATING OPERATION (NATURAL GAS / LPG)	X
A30 "TUBE LENGTH"	Selection
BASELINE 300 mm 11.81 "in, Material stainless steel 1.4301 / end section 1.4841	V2A
ADDITIONAL PIPE LENGTH 300 mm 11.81 "in each, Material stainless steel 1.4301 (up to 6 m total length possible)	
BASELINE 300 mm 11.81 "in, Material stainless steel 1.4571 / end section 1.4841	V4A
ADDITIONAL PIPE LENGTH 300 mm 11.81 "in each, Material stainless steel 1.4571 (up to 6 m total length possible)	
A40 "IGNITION TRANSFORMER"	Selection
WITHOUT IGNITION TRANSFORMER, EXTERNAL IGNITION	0
INTEGRATED IGNITION TRANSFORMER	TR
A45 "IONISATION FLAME MONITOR"	Selection
WITHOUT IONISATION ELECTRODE, WITHOUT IONISATION FLAME MONITORING, EXTERNAL MONITORING	0
IONISATION ELECTRODE, WITHOUT IONISATION FLAME MONITORING, EXTERNAL MONITORING	IO
INTEGRATED IONISING FLAME MONITORING (IFM), 0 ... 60 °C 32 ... 140 °F, SIL3 AND RELAY OUTPUT MAKE CONTACT (NO) 230 VAC/0.5 A, FFDT 1S	IFM
INTEGRATED IONISING FLAME MONITORING (IFM), 0 ... 60 °C 32 ... 140 °F, SIL3 AND RELAY OUTPUT MAKE CONTACT (NO) 230 VAC/0.5 A, FFDT 3S	IFM3
A50 "SUPPLY VOLTAGE"	Selection
230 VAC, 50/60 Hz	230VAC
120 VAC, 50/60 Hz	120VAC

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A60 "CONNECTION TYPE"	Selection
WITH PLUG (2X 7-PIN), WITHOUT MATING CONNECTOR *	STE
WITH PLUG (2X 7-PIN), WITH MATING PLUG (FOR SELF-ASSEMBLY)	STEG
2 m 6.6 ft CABLE, 7-CORE FIRMLY CONNECTED WITH FREE CABLE ENDS	2M
5 m 16.54 ft CABLE, 7-CORE FIRMLY CONNECTED WITH FREE CABLE ENDS	5M
10 m 32.81 ft CABLE, 7-CORE FIRMLY CONNECTED WITH FREE CABLE ENDS	10M
20 m 65.62 ft CABLE, 7-CORE FIRMLY CONNECTED WITH FREE CABLE ENDS	20M
5 m 16.54 ft IGNITIONCABLE, SILICONE, -50 ... +180 °C -58 ... +356 °F	5Z
10 m 32.81 ft IGNITIONCABLE, SILICONE, -50 ... +180 °C -58 ... +356 °F	10Z
5 m 16.54 ft IGNITION and 5 m 16.54 ft IONISATION CABLE, SILICONE, -50 ... +180 °C -58 ... +356 °F	5ZI
10 m 32.81 ft IGNITION and 10 m 32.81 ft IONISATION CABLE, SILICONE, -50 ... +180 °C -58 ... +356 °F	10ZI
A62 "CABLE GLAND"	Selection
WITHOUT CABLE GLAND	0
1X CABLE GLAND M20, NICKEL-PLATED BRASS	M20
1X ATEX CABLE GLAND M20 CONDUIT, ½" NPT, NICKEL-PLATED BRASS	M20CU
A65 "GAS/ AIR CONNECTION"	Selection
GAS CONNECTION G2" ISO, AIR CONNECTION G2" ISO (STANDARD)	G2
A70 "PRESSURE STAGE"	Selection
UP TO 200 mbar BACK PRESSURE	0,2B
A80 "MOUNTING"	Selection
WITHOUT FIXED FLANGE*	0
DN80 PN6 FIXED FLANGE, WELDED, STAINLESS STEEL 1.4571	WE80SS
* Additionally required if necessary: Sliding flange (under accessories)	
A85 "POWER UNIT"	Selection
WITHOUT POWER UNIT FOR TRANSFORMER/IFM (EXTERNAL IGNITION/MONITORING)	0
POWER UNIT, SAFE AREA, IN ALUMINIUM HOUSING WITHOUT BAR GRAPH	AL
POWER UNIT, SAFE AREA, IN ALUMINIUM HOUSING WITH BAR GRAPH	ALIN
POWER UNIT, EX ZONE II (NO BAR GRAPH POSSIBLE)	GEX2
A87 "HOUSING SURFACE"	Selection
C2 POWDER COATING, RAL3020 TRAFFIC RED / RAL 7016 ANTHRACITE GREY	STD
C4 TWO-COAT PAINT, RAL3020 TRAFFIC RED	C4
A90 "CUSTOMER"	Selection
STANDARD	STD
A99 "SPECIAL CONFIGURATION"	Selection
THERMAL POWER 3,000 kW (IN THE SCOPE OF THE NFPA)	L20
THERMAL POWER 6,000 kW (IN THE SCOPE OF THE NFPA)	L21

Approvals



The information in this publication is subject to technical changes.

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