Technical Data Pilot Burner GFI70 (2nd Generation)

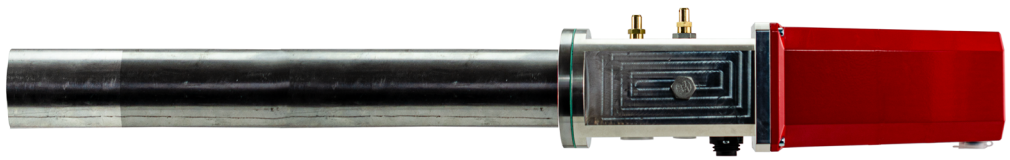

Fig. 1 Side view of GFI70 pilot burner design A/B

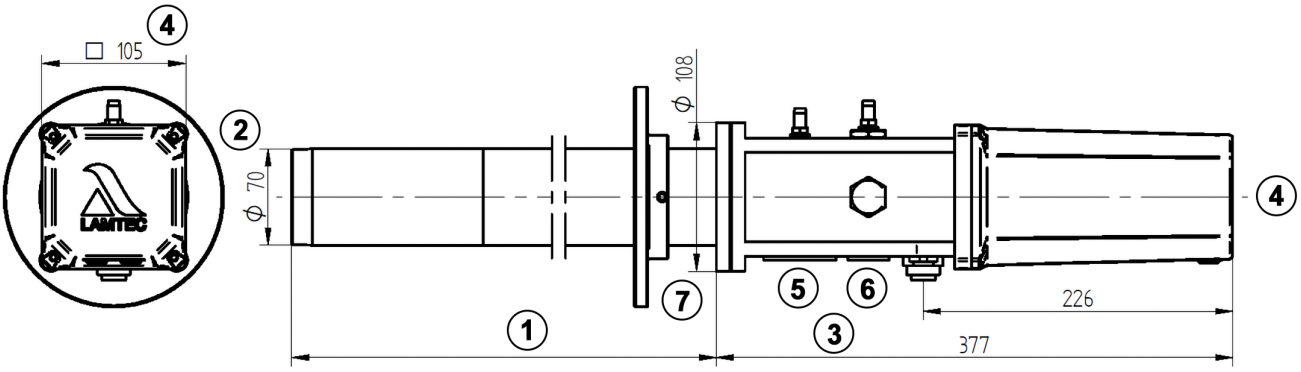

Fig. 2 Dimensions of GFI70 pilot burner design A/B (dimensions in mm)

Fig. 3 Side view of GFI70 pilot burner design C

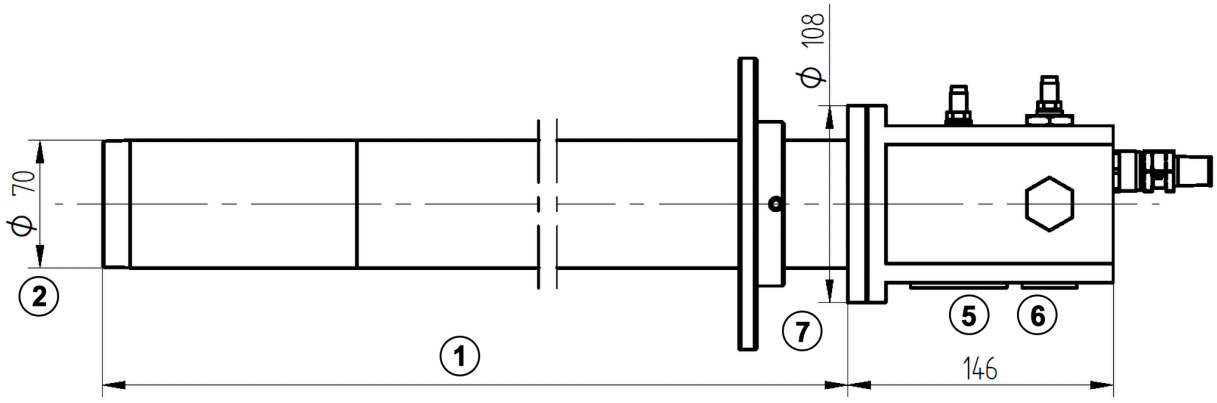

Fig. 4 Dimensions of GFI70 pilot burner design C (dimensions in mm)

1	Dimension outer tube length	customer-specific
2	Outer tube diameter	70 mm x 2 mm | 2.75 x 0.078 in
3	Housing length versions A and B	
4	Housing dimensions	
5	Air supply connection	1 1/2 inch (BSPP inner threads)
6	Gas supply connection	3/4 inch (BSPP inner threads)
7	Distance between housing and connection flange	

Technical Data Pilot Burner GFI70 (2nd Generation)

Technical data for design A, B and C

Technical Design Ignition and Ionisation	
GFI70	Two-electrode operation

Thermal Power*		**Propane**	**Natural gas**	**Hydrogen**
Thermal power	GFI35	25 ... 57 kW	25 ... 57 kW	15 ... 52 kW
	GFI48	70 ... 140 kW	70 ... 150 kW	45 ... 100 kW
	GFI70	150 ... 300 kW	150 ... 300 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	

NOTICE

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

Technical Data Pilot Burner GFI70 (2nd Generation)

Connection: Air		
Air type	Combustion air	
Operating pressure (natural gas and propane)	GFI35	4 - 8 mbar + 4 mbar per metre of tube length 0,058 - 0,116 psi + 0,058 psi
	GFI48	6 - 20 mbar + 6 mbar per metre of tube length 0,087 - 0,290 psi + 0,087 psi
	GFI70	5 - 16 mbar + 5 mbar per metre of tube length 0,072 - 0,232 psi + 0,072 psi
Operating pressure (Hydrogen)	GFI35	15 - 20 mbar + 4 mbar per metre of tube length 0,22 - 0,29 psi + 0,058 psi
	GFI48	15 mbar + 6 mbar per metre of tube length 0,22psi + 0,087 psi
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

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

Technical Data Pilot Burner GFI70 (2nd Generation)

Thermal rating with high power versions*			
		Natural Gas	**Propane**
Thermal rating	GFI48	250 ... 400 kW	250 ... 400 kW
	GFI70	500 ... 800 kW (power range I) 500 ... 1.000 kW (power range II)	500 ... 800 kW

Connection: Gas		
GFI48		
Flow rate (gas quantity)	25 ... 40 Nm^3/h | 32.69 ... 52.31 yd^3/h	9,5 ... 15 Nm^3/h | 12.42 ... 19.61 yd^3/h
Operating pressure	500 ... 1000 mbar | 7.25 ... 14.50 psi	400 ... 800 mbar | 5.80 ... 11.60 psi

Connection: Gas		
GFI70		
Flow rate (gas quantity)	50 ... 80 Nm^3/h (power range I) 65.39 ... 104.63 yd^3/h 50 ... 100 Nm^3/h (power range II) 65.39 ... 130.80 yd^3/h	19 ... 31 Nm^3/h
Operating pressure	500 ... 1000 mbar 7.25 ... 14.50 psi	500 ... 1000 mbar 7.25 ... 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
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

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

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.

Technical Data Pilot Burner GFI70 (2nd Generation)

Operating condition	
Relative humidity	3K5, 5 % ... 95 % according to DIN EN 60721-3-3

Environmental Conditions		
Operation	Permissible temperature range	-20 ... +65 °C | -4 ... +149 °F
Transport	Permissible temperature range	-20 ... +65 °C | -4 ... +149 °F
Storage	Permissible temperature range	-20 ... +65 °C | -4 ... +149 °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.

EU Declaration of Conformity	
2014/35/EU	Low Voltage Directive
2014/30/EU	EMC Directive
(EU) 2016/426	Gas Appliance Regulation (GAR)
2011/65/EU	RoHS

Technical Data Pilot Burner GFI70 (2nd Generation)

Technical data for design A and B

Auxiliary power/device supply	
Power supply voltage[1]	Factory setting 230 VAC +10 % -15 % or 120 VAC +10 % -20 %
Mains frequency[1]	47 Hz ... 63 Hz
Power consumption	≤ 7,5 VA (integrated flame scanner F120I Z) 92 VA (ignition transformer)
Device fuse F120I Z internal, replaceable	32 m AT for 230 V device 64 m AT for 120 V device

Integrated flame scanner - Ionisation input	
Ionisation voltage[1,2]	390 V
Ionisation current	Flame ON from 2 µADC ± 10 %, theoretical max. approx. 70 µADC
Single-electrode operation2	Spark igniter type max. 5 kV, 15 mA loss of voltage at ION input, against grounding approx. 100 V
Connection cable for the ionisation electrode	Possible length: normally max. 100 m | 328 ft, in special cases max. 300 m | 984 ft (under favourable conditions) (Note! The possible cable length depends on the attenuation properties of the cable used in connection with the depends on the high resistance of the individual flame. For a stable flame detection the minimum sensor current should not be undercut!)

1 The product may not be transported, stored or operated outside the specified range. If it is, any guarantees with regard to safety-related functions lose their validity.

2 Danger! - Please note the chapter ‘Safety during commissioning’ (operating instructions DLT7126).

Integrated flame scanner - Digital outputs	
Output ‘flame signal’ [1]	Relay contact
Contact type	Safety-oriented, floating contact NO, for ‘flame ON’ the contact is closed
Protection class	Safe disconnection (SKII)
Switching voltage/switching current	230 VAC/250 mA, 120 VAC/250 mA, 24 VDC/100 mA
Contact fuse (internal, soldered)	0,5 AT
Min. switching current [2]	2 mA
Safety time (FFDT) response time in the event of flame failure	t_VOff ≤ 1 s (setting 1 s) t_VOff ≤ 3 s (setting 3 s) t_VOff ≤ 5 s (setting 3 s at 5 s Variante)
Switch-on time [3] (flame detection)	t_VOn ≤ 0,7 s (setting 1 s) t_VOn ≤ 1,5 s (setting 3 s) t_VOn ≤ 3,0 s (setting 3 s for 5 s variant)
Switching the flame relay without load	when restart > 30 s A load-free switching of a flame relay in accordance with DIN EN 60730-2-5 is performed if, after the flame signal has dropped, the ionisation current returns after > 30 s.

Technical Data Pilot Burner GFI70 (2nd Generation)

Integrated flame scanner - Digital outputs	
Output 'Flame ON'	electronically, digital (status signal)
Contact	Open Drain, switch NO
Electrical safety by	PELV (SK III)
Reference potential	Device GND (connection at X14/3, F120I Z X3/3)
Switching voltage	max: 24 VDC +20 %
Fuse, internal	20 mA self-resetting, at +70 °C | +158 °F

[1] In the case of AC voltage with longer cable lengths, the possible influence of capacitive coupling on the flame signal must be noted.

[2]Note: Gold-plated relay contacts
The maximum firing rate for for external firing-rate (recurring current peaks during switching) is max. 100 mA.
If this is exceeded, even briefly (current peaks), the specified minimum value of 2 mA can no longer be guaranteed. Provide external spark quenching.

[3]The condition for ensuring the defined switch-on time is that the ionisation current corresponds to at least the 3-fold switch-on threshold..

Integrated flame scanner - Analogue outputs	
Output current loop "ionisation current"	electronically, analogue
Current	4 … 20 mA
Electrical safety by	PELV (SK III)
Load	max. 250 Ω
Basic error	≤10 % via measuring range

Integrated flame scanner - Technical capacity	
Connection cross section	flexible 1,5 mm^2 | AWG 16 rapid 1,5 mm^2 | AWG 16
Mode of operation	Continuous operation
Operating altitude above sea level	≤ 3.500 m NHN
Safety integrity level	DIN EN 61508 Teil 2 - SIL 3
Overvoltage category	DIN EN 60730-1, ÜK III
Susceptibility to interference	DIN EN 298
Emitted interference	DIN EN 55022, class B

Integrated spark igniter	
Secondary voltage RMS	1 x 5 kV
Secondary peak voltage	7,07 kV
Secondary current	15 mA
max. switching time	6,25% for 4 minutes (15" ON; 3' 45" OFF)

Technical Data Pilot Burner GFI70 (2nd Generation)

Integrated standard power unit safe area

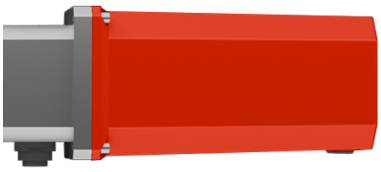

Fig. 5 Side view integrated standard power unit safe area

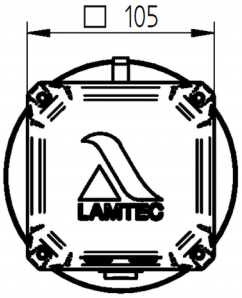

Fig. 6 Dimensions integrated standard power unit safe area

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
	Aluminium power unit	6061 T6
	Plastic power unit	ABS/PC UL94-V0
Coating	Power unit: C2 (Standard), C4 on request	

Technical Data Pilot Burner GFI70 (2nd Generation)

Technical data for design C

Connection of external flame scanner to the ionisation electrode	
Ionisation 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)

Connection of external ignition transformer to the ignition electrode	
Specification of ignition Cable	
Cable lengths	max. 20 m | 66 ft
Cable cross-section	1 x 1.0 mm^2 | 3 x 17 AWG
Isolation	Silicone, red-brown
Temperature range	-40 ... +180 °C | -40 ... 356 °F

Grounding cable	
Specification of grounding cable	
Cable lengths	max. 200 m | 656.168 ft
Cable cross-section	1 x 1.5 mm^2 | 1 x 16 AWG or according to regional regulations

Technical Data Pilot Burner GFI70 (2nd Generation)

Order Information

Ignition and Pilot Burner

70 mm | 2.76" in GFI70, Performance Range 150 ... 300 kW (2nd Generation)

Description / Type	Order no.
Ignition and pilot burner GFI70, 150 … 300 kW, installation diameter 70 mm | 2.76" in IP65 / NEMA 4 / NEMA 4X	**646R70…**

A10 “RANGE OF APPLICATION”	Selection
SAFETY AREA (NO EXPLOSIVE ATHMOSPHERE), -20 ... +60 °C | -4 ... +140 °F	SAF
For use with external ex-power unit (646r0500) in wall-mounted housing	EXH
For applications in EX zone 2 use GFI48 of 1st generation (646R0070) !	

A20 “COMBUSTIBLE”	Selection
NATURAL GAS	N
PROPANE / BUTANE (LPG)	P
HYDOGEN	H
COKE-OVEN GAS (analysis required)	C
2 GAS TYPES IN ALTERNATING OPERATION (NATURAL GAS / LPG)	X

A30 “IMMERSION DEPTH”	Selection
BASIC LENGTH 300 mm | 11.81 "in, material stainless steel 1.4301 / end section 1.4841	V2A
ADDITIONAL TUBE LENGTH PER 300 mm | 11.81 "in, material stainless steel 1.4301 (up to 3 m | 9.84 ft total length possible)	
BASIC LENGTH 300 mm | 11.81 "in, material stainless steel 1.4571 / end section 1.4841	V4A
ADDITIONAL TUBE LENGTH PER 300 mm | 11.81 "in, material stainless steel 1.4571 (up to 3 m| 9.84 ft total length possible)	
Excess length from 6 m | 19.69 ft total length BASIC LENGTH 6.000 mm | 236.22 "in	A2
ADDITIONAL TUBE LENGTH PER 500 mm | 19.69 "in, material stainless steel 1.4301 (up to 15 m| 49.21 ft total length possible)	

A40 “SPARK IGNITER”	Selection
WITHOUT SPARK IGNITER, EXTERNAL IGNITION	0
INTEGRATED SPARK IGNITER 5 kV / 15 mA /ESD 19%	5KV

A45 “FLAME MONITORING”	Selection
WITHOUT IONIZATION ELECTRODE, WITHOUT IONIZATION FLAME MONITORING, EXTERNAL MONITORING	0
IONIZATION ELECTRODE, WITHOUT IONIZATION FLAME MONITORING, EXTERNAL MONITORING	OI
INTEGRATED IONIZING FLAME MONITORING (F120i), 0 ... 60 °C | 32 ... +140 °F, SIL3 AND RELAY OUTPUT MAKE CONTACT (NO) 230VAC/0.5 A, SAFETY TIME ADJUSTABLE	II

A50 “POWER SUPPLY”	Selection
230 VAC, 50/60 Hz	230VAC
120 VAC, 50/60 Hz	120VAC

Technical Data Pilot Burner GFI70 (2nd Generation)

A55 “POWER UNIT”	Selection
WITHOUT INTEGRATED POWER UNIT (EXTERNAL IGNITION/MONITORING)	0
PLASTIC COVER WITHOUT DISPLAY, RAL3020	PC
METAL COVER WITHOUT DISPLAY, COATED ACCORDING TO C2 RAL3020	MC
METAL COVER WITHOUT DISPLAY, COATED ACCORDING TO C4 RAL3020	MC4
METAL COVER WITH DISPLAY, COATED ACCORDING TO C2 RAL3020	MCD
METAL COVER WITH DISPLAY, COATED ACCORDING TO C4 RAL3020	MC4D

A70“CONNECTION TYPE”	Selection
WITH PLUG (2X 7-POLE), WITHOUT COUNTER PLUG Additional required: Connecting cable order no. 646R0150	STE
WITH PLUG (2X 7-POLE), WITH COUNTER PLUG (FOR SELF-ASSEMBLY, WITHOUT CONNECTING CABLE	STEG
For integrated power unit without plug:	
5 m |16.40 ft CABLE, 7-WIRE, FIXED CONNECTION, WITH FREE CABLE ENDS	005M
10 m | 32.81 ft CABLE, 7-WIRE, FIXED CONNECTION, WITH FREE CABLE ENDS	010M
15 m | 49.21 ft CABLE, 7-WIRE, FIXED CONNECTION, WITH FREE CABLE ENDS	015M
20 m | 65.62 ft CABLE, 7-WIRE, FIXED CONNECTION, WITH FREE CABLE ENDS	020M
For external power unit:	
5 m |16.40 ft IGNITION CABLE and 5 m IONISATION CABLE, SILICONE, -50 ... +180 °C | -58 ... +356 °F	005ZI
10 m | 32.81 ft IGNITION CABLE and 10 m IONISATION CABLE, SILICONE, -50 ... +180 °C | -58 ... +356 °F	010ZI
15 m | 49.21 ft IGNITION CABLE and 15 m IONISATION CABLE, SILICONE, -50 ... +180 °C | -58 ... +356 °F	015ZI
20 m | 65.62 ft IGNITION CABLE and 20 m IONISATION CABLE, SILICONE, -50 ... +180 °C | -58 ... +356 °F	020ZI

A80 “MOUNTING”	Selection
WITHOUT FIXED FLANGE Additional required if necessary: Sliding flange (under accessories)	0
Further fixings on request	XY

A90 “CUSTOMER”	Selection
STANDARD	STD

A99 “SPECIAL CONFIGURATION”	Selection
CHANGE IN PERFORMANCE ON REQUEST	XY

Approvals

The information in this publication is subject to technical changes.

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