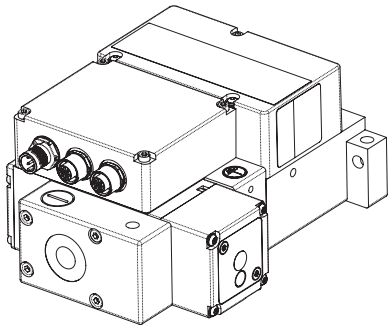
LASGAR PLUS

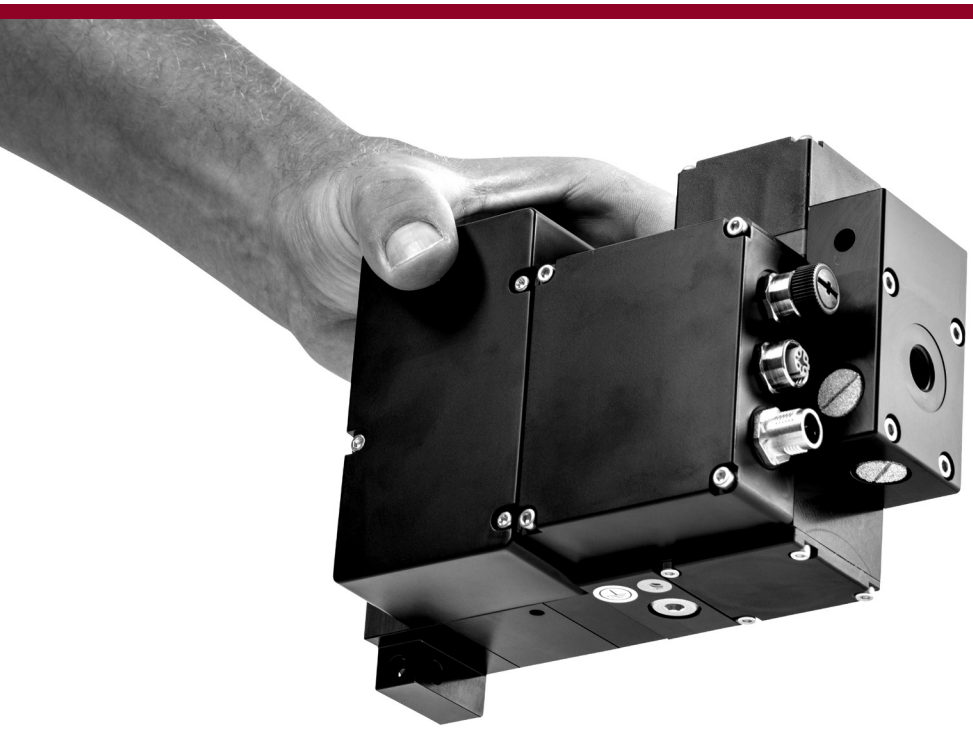
Laser gas control valve
optimized for high-power
laser cutting systems

Technical Data

EN MET

HOERBIGER
because performance counts





LasGAR Plus Type LGRP0

LasGAR Plus Type LGRP2, LGRP3, LGRPF2, LGRPF3

CUTTING GAS REGULATION IS ONE OF THE KEY FACTORS FOR OUTSTANDING CUTTING RESULTS AND MACHINE PRODUCTIVITY. WE AT HOERBIGER CAN HELP YOU OPTIMIZE YOUR ENTIRE GAS SUPPLY AND OFFER YOU SOPHISTICATED CUTTING GAS SOLUTIONS IN ORDER TO ACHIEVE THE BEST CUTTING PERFORMANCE WITH YOUR MACHINE.

LASGAR PLUS

Laser gas control valve optimized for high-power laser cutting systems

The LasGAR plus is used in the high-end range, where machines are operated at their performance limits and more pressure and flow are required. With a proportional control valve, it is optimized for laser cutting machines with high laser power, and very high speeds at the same time.

Thanks to Piezo technology, the control system offers outstanding pressure stability and control speed in the lower pressure range starting at 0.4 bar and controls an output pressure up to 30 bar. In addition, the geometry was optimized for the highest flow rate available on the market, which guarantees a safe blowing out of the melted material even with thicker sheets and high speeds at the same time. This way, you can achieve an even better cutting quality while simultaneously increasing performance.

The system can be combined as a stand-alone device or as component with gas selection valves. There are analog and digital communication interfaces available. A large toolbox of accessories and innovative software allows individual configuration. Thus, even challenging installations and retrofittings of existing gas regulation systems are possible without problems on the LasGAR plus.

For 30 years, the proven HOERBIGER Piezo technology has made the small but crucial difference when it comes to regulation quality and speed.

YOUR BENEFITS AT A GLANCE

SAVE TIME AND MONEY	LasGAR cutting gas regulators are very compact systems with reduced interfaces. Therefore, they are easy to install and integrate. With a minimum of work for piping, cabling, and machine programming.
INCREASE THE SPEED OF YOUR MACHINE	The regulators are optimized for the minimum possible weight and tested for acceleration with weights of up to 20 g. At the same time, the regulators offer extremely fast gas and pressure change times in every situation. You can further optimize your cutting and machine parameters in order to achieve the maximum dynamic in your machine and thus increase machine productivity.
IMPROVE YOUR CUTTING QUALITY	LasGAR cutting gas controllers have been optimized for the best low-pressure stability, the highest flow rate, and the lowest hysteresis. As a result, you can achieve smoother cutting surfaces and less burr formation, while reducing your gas consumption thanks to lower input pressure. Moreover, you can cut thicker sheets or simply cut faster than previously. This also reduces the reworking required for the lasered parts.
REMAIN FLEXIBLE	The LasGAR toolbox system is very flexible and can be adapted to your individual situation and converted or expanded at any time.
MAKE THE CONDITION OF YOUR GAS REGULATION VISIBLE AND SMART	The whole LasGAR family is also available with the SMART option. Via a Bluetooth connection, you receive information about the device condition, the remaining service life, and important performance data in real time via the associated app.
ENJOY FULL SERVICE & SUPPORT	Our global partner network and our core team in Altenstadt guarantee you excellent service and support in every case – regardless of whether you want to optimize the gas flow, repair, or service. Just contact us and let us know which of our service packages will fit you the best!

GENERAL PROPERTIES
LasGAR plus

GENERAL PROPERTIES

LASGAR PLUS

Type	LGRP0	LGRP2	LGRP3	LGRPF2	LGRPF3
Fastening type	Flange	Bolts, 3 x through bore for M6			
Installation position	Any				
Connection sizes					
Pneumatic connection type	Flange[1]	Threads			
Cutting gas inputs	G 3/8				
Cutting gas outputs	G 1/4				
Control air input	G 1/8	M 5			

Weight	0,6 kg[1]	2.5 kg	2.65 kg	3.3 kg	3.45 kg
Protection type	IP 50 (DIN EN 60529 A1:2000)				
Storage temperature	–20 °C to +70 °C				
Ambient temperature	–5 °C to +45 °C				
Medium temperature	–10 °C to +50 °C				
Rel. humidity	5 % to 95 % (non-condensing)				
Material					
Housing	Al anodized				
Internal parts in contact with media	Al coated, PA-GF, CuZn, stainless steel				
Seals	FKM, NBR				

Behavior in case of electrical or pneumatic energy failure	Cutting gas output ventilated exhaust	Close cutting gas inputs, cutting gas output ventilated exhaust
Max. permissible accelerations		
Positioning	30 m/s^2 (vector sum)	
Cutting (x/y axis)	20 m/s^2 (vector sum)	
Shock	30 m/s^2	

Conformity	CE, RoHS 2011/65/EU
Other checks	EMC (ECC), BAM

[1] Optional with adapter plate (+0,3 kg)

ELECTRICAL PROPERTIES

LasGAR plus

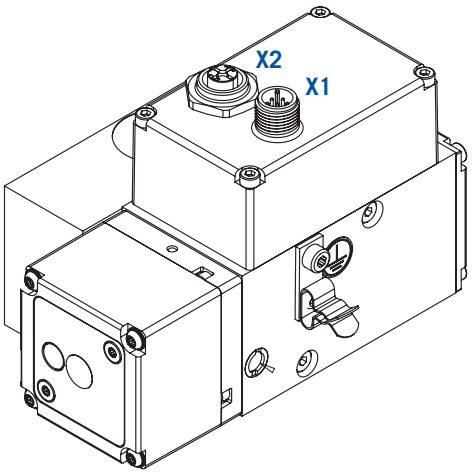
ELECTRICAL PROPERTIES

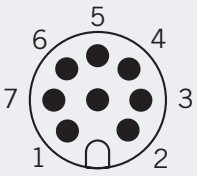
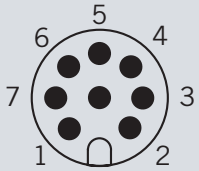
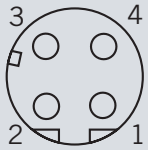
	LASGAR PLUS ANALOG		LASGAR PLUS DIGITAL	
Type	LGRP0	LGRP2, LGRP3, LGRPF2, LGRPF3	LGRP0	LGRP2, LGRP3, LGRPF2, LGRPF3
Electromagnetic compatibility (EMC)				
Immunity to interference	EN 61000-6-2			
Emitted interference	EN 61000-6-4			
Electrical connection	1 x M12 A-coded 8-pin male (X1)	1 x M12 A-coded 4-pin male (X1) 1 x M12 A-coded 8-pin male (X2) 1 x M12 B-coded 5-pin male (X3)	1x M12 A-coded 8-pin male (X1) 1x M12 D-coded 4-pin female (X2)	1 x M12 A-coded 4-pin male (X1) 2 x M12 D-coded 4-pin female (X2, X3)
Supply				
Nominal voltage (U_N)	24 V DC± 10%			
Max. residual ripple (U_N)	10%			
Current consumption (I_{max})	100 mA	300 mA	100 mA	300 mA
Nominal power (P_N)	2 W	8 W	2 W	8 W
Target value input				
Target value specification (W)	0 – 10 V		Digital – Ethercat or Profinet	
Input resistance (R_i)	≥ 60 kOhm	≥ 80 kOhm	n/a	
Resolution (W/p2)	0,333 V/bar		n/a	
Actual value output monitoring input pressure p1				
Output voltage	0 – 10 V		Digital – Ethercat or Profinet	
Accuracy	1% Full Scale		n/a	
Resolution (X/p1)	0,333 V/bar		n/a	
Output current max. (short circuit-proof) (I_{max})	1 mA		n/a	
Actual value output monitoring output pressure p2				
Output voltage	0 – 10 V		Digital – Ethercat or Profinet	
Accuracy	1% Full Scale		n/a	
Resolution (X/p2)	0,333 V/bar		n/a	
Output current max. (short circuit-proof) (I_{max})	1 mA		n/a	
Upstream valves gas 1, 2, and 3				
Switching voltage ON (U_{on})	24 V DC± 10 % (only split version)	24 V DC± 10 % (internal via power supply)	24 V DC± 10 % (only split version)	24 V DC± 10 % (internal via power supply)
Switching voltage OFF (U_{off})	0 V			
Nominal power per switching valve	2,5 W			
Digitale I/O‘s				
Output voltage (U_{out})	OFF = 0 VDC ON = U(Nom) – 0.7		OFF = 0 VDC ON = U(Nom) – 0.7	n/a
Output current (I_{out})	≤ 200 mA / short circuit-proof		≤ 100 mA / short circuit-proof	n/a

ELECTRICAL CONNECTIONS

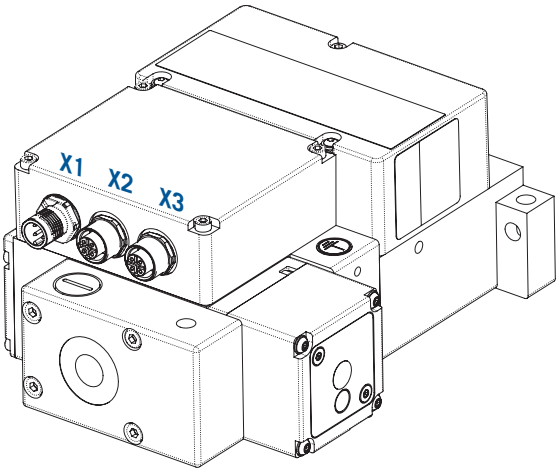
LasGAR plus

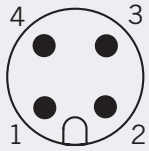
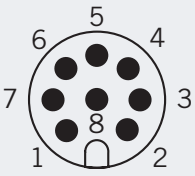
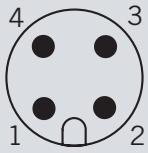
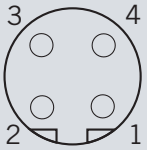
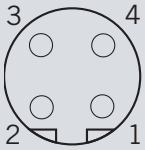
LGRP0 ELECTRICAL CONNECTIONS



	X1	X2
LASGAR PLUS ANALOG	 1 +24VDC power 2 target value 3 GND 4 p1 pressure 5 p2 pressure 6 ready / pressure reached 7 UART RxD 8 UART TxD	
LASGAR PLUS DIGITAL	 1 +24VDC power 2 NC 3 GND 4 Out 1 / Gas_1 5 Out 2 / Gas_2 6 Out 3 / Gas_3 7 UART RxD 8 UART TxD	 BUS_IN 1 TX + 2 RX + 3 TX – 4 RX –

LGRP2, LGRP3, LGRPF2, LGRPF3 ELECTRICAL CONNECTIONS

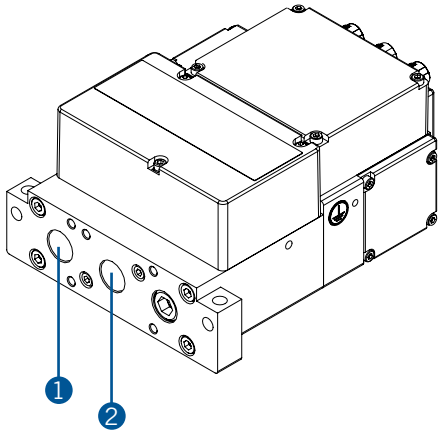


	X1	X2	X3
LASGAR PLUS ANALOG	 1 +24VDC power 2 UART RxD (internal) 3 GND 4 UART TxD (internal)	 1 +Set value (0...10 V/ input 1 V = 3 bar) 2 –Set value (GND / input) 3 GND 4 Input pressure (0...10 V output 0.33 V/bar) 5 Output pressure (0...10 V output 0.33 V/bar) 6 Digital_IO1 ready (0/24 V output) 7 Digital_IO2 pressure reached (0/24 V output) 8 Digital_IO3 calibration (0/24 V input)	 1 Gas 1 (0/24V Input) 2 Gas 2 (0/24V Input) 3 GND 4 Gas 3 (0/24V Input) 5 n.c.
LASGAR PLUS DIGITAL	 1 +24VDC power 2 UART RxD (internal) 3 GND 4 UART TxD (internal)	 BUS_IN 1 TX + 2 RX + 3 TX – 4 RX –	 BUS_OUT 1 TX + 2 RX + 3 TX – 4 RX –

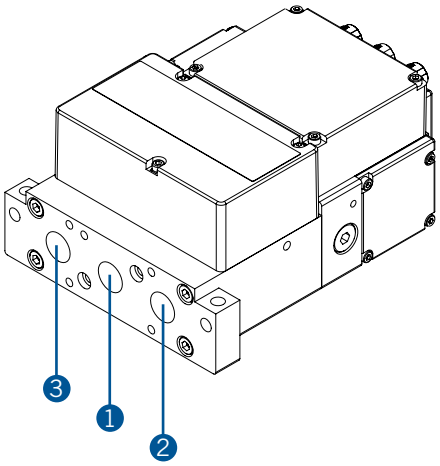
PNEUMATIC CONNECTIONS

LasGAR plus

LASGAR PLUS 2-GAS



LASGAR PLUS 3-GAS



	DESCRIPTION	DIGITAL	ANALOG
1	Gas 1	Bit_0	X3 - 2
2	Gas 2	Bit_1	X3 - 1
3	Gas 3	Bit_2	X3 - 4

PNEUMATIC PROPERTIES

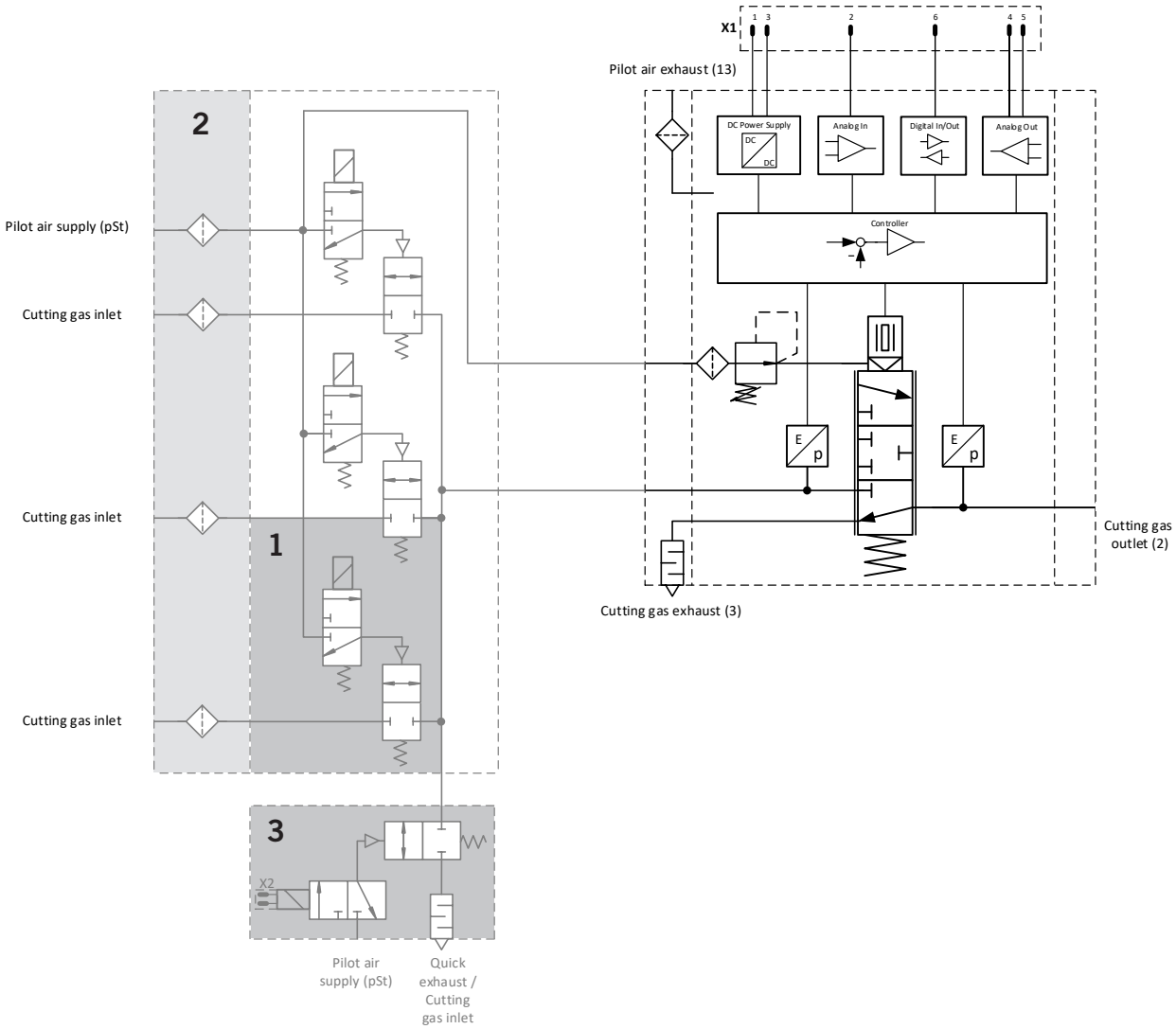
LasGAR plus

PNEUMATIC PROPERTIES

	LASGAR PLUS		LASGAR PLUS FILTER
Type	LGRP0	LGRP2, LGRP3	LGRPF2, LGRPF3
Cutting gases			
Media	Compressed air, oxygen, nitrogen, argon		
Quality	According to ISO 8573-1:2010 (3:2:2)		
Nominal pressure (P_N)	40 bar		
Cutting gases input pressure ranges			
All gases min ($p1_{min}$)	0 bar		
Compressed air max. ($p1_{max}$)	40 bar		
Oxygen max. ($p1_{max}$)	16 bar		
Nitrogen max. ($p1_{max}$)	40 bar		
Argon max. ($p1_{max}$)	40 bar		
Cutting gases output pressure ranges			
All gases min ($p2_{min}$)	0,4 bar		
Compressed air max. ($p2_{max}$)	30 bar		
Oxygen max. ($p2_{max}$)	15 bar		
Nitrogen max. ($p2_{max}$)	30 bar		
Argon max. ($p2_{max}$)	30 bar		
Regulation accuracy of output pressure			
Regulation range <10 bar; Ambient temperature 5 °C to 45 °C	± 0,06 bar		
Regulation range <10 bar; Ambient temperature <5 °C	± 0.1 bar		
Regulation range > 10 bar; Ambient temperature –5 °C to 45 °C	± 0,5 bar		
Gas flow rate (Q) (with p1 = 6 bar and p2 = 0 bar)	1600 l/min		
Control air			
Medium	Compressed air, nitrogen		
Quality	According to ISO 8573-1:2010 (6:3:3)		
Input pressure min. (p St_{min})	3 bar		4,5 bar
Input pressure max. (p St_{max})	10 bar		7 bar
Filter			
Recommended filter size for cutting gases	10 µm		
Recommended filter size for control air	100 µm		

LGRP0 – LASGAR PLUS SINGLE CONTROLLER ANALOG

With 2-gas or 3-gas[1] connection with filter[2] and quick-exhaust valve (QEV)[3]

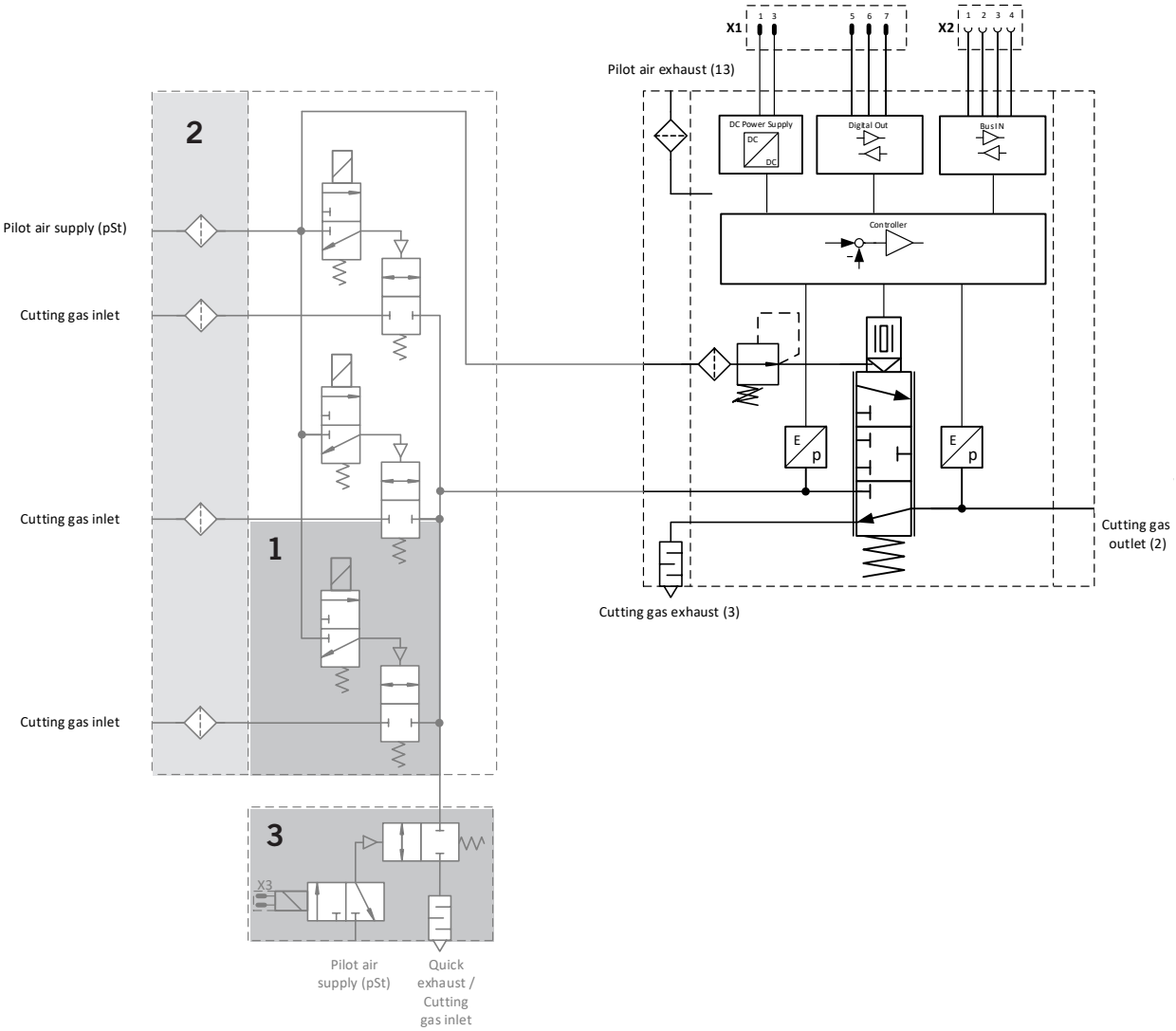


Optional

1	3-gas version
2	3-gas version with filter
3	Quick-exhaust valve (QEV)

LGRP0 – LASGAR PLUS SINGLE CONTROLLER DIGITAL

With 2-gas or 3-gas[1] connection with filter[2] and quick-exhaust valve (QEV)[3]

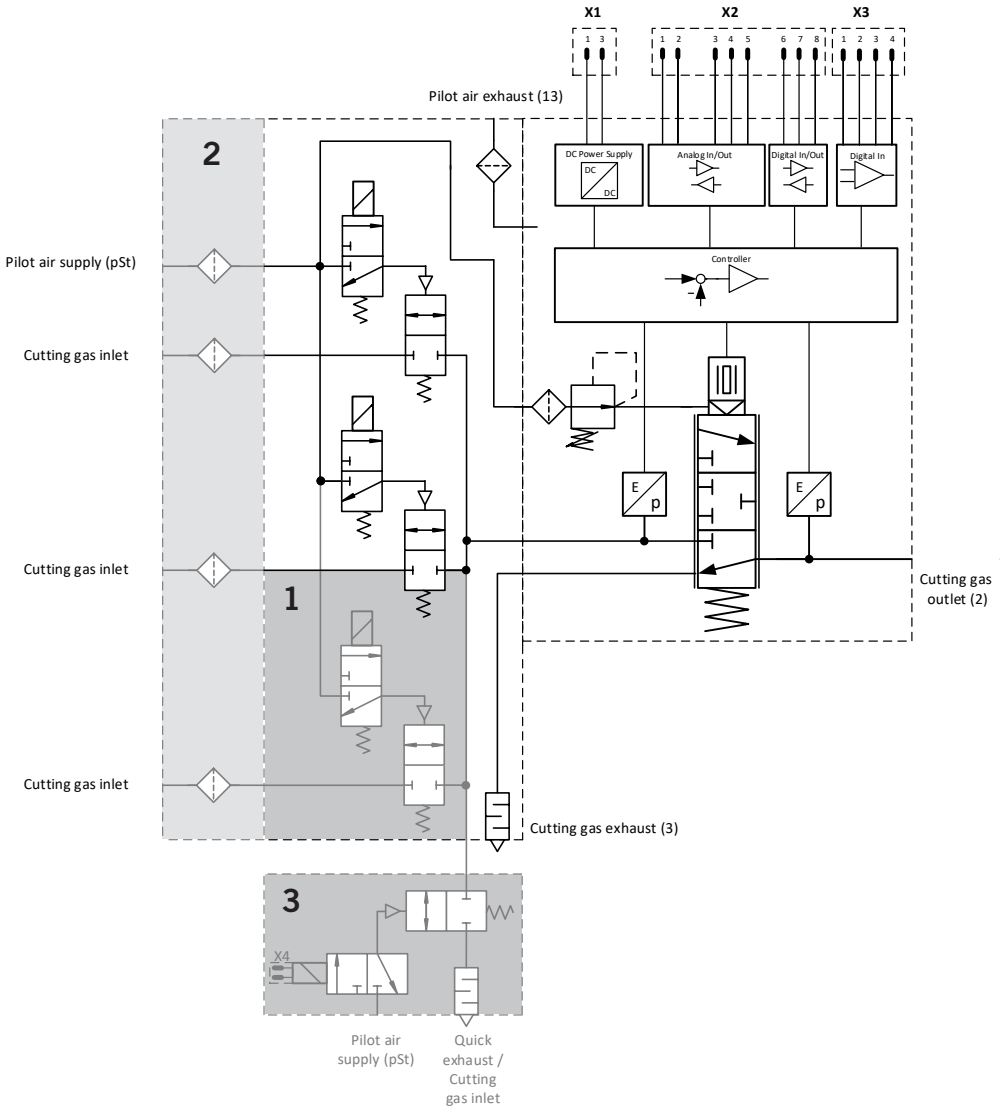


Optional

1	3-gas version
2	3-gas version with filter
3	Quick-exhaust valve (QEV)

LGRP2, LGRPF2, LGRP3, LGRPF3 – LASGAR PLUS ANALOG

With 2-gas or 3-gas[1] connection with filter[2] and quick-exhaust valve (QEV)[3]

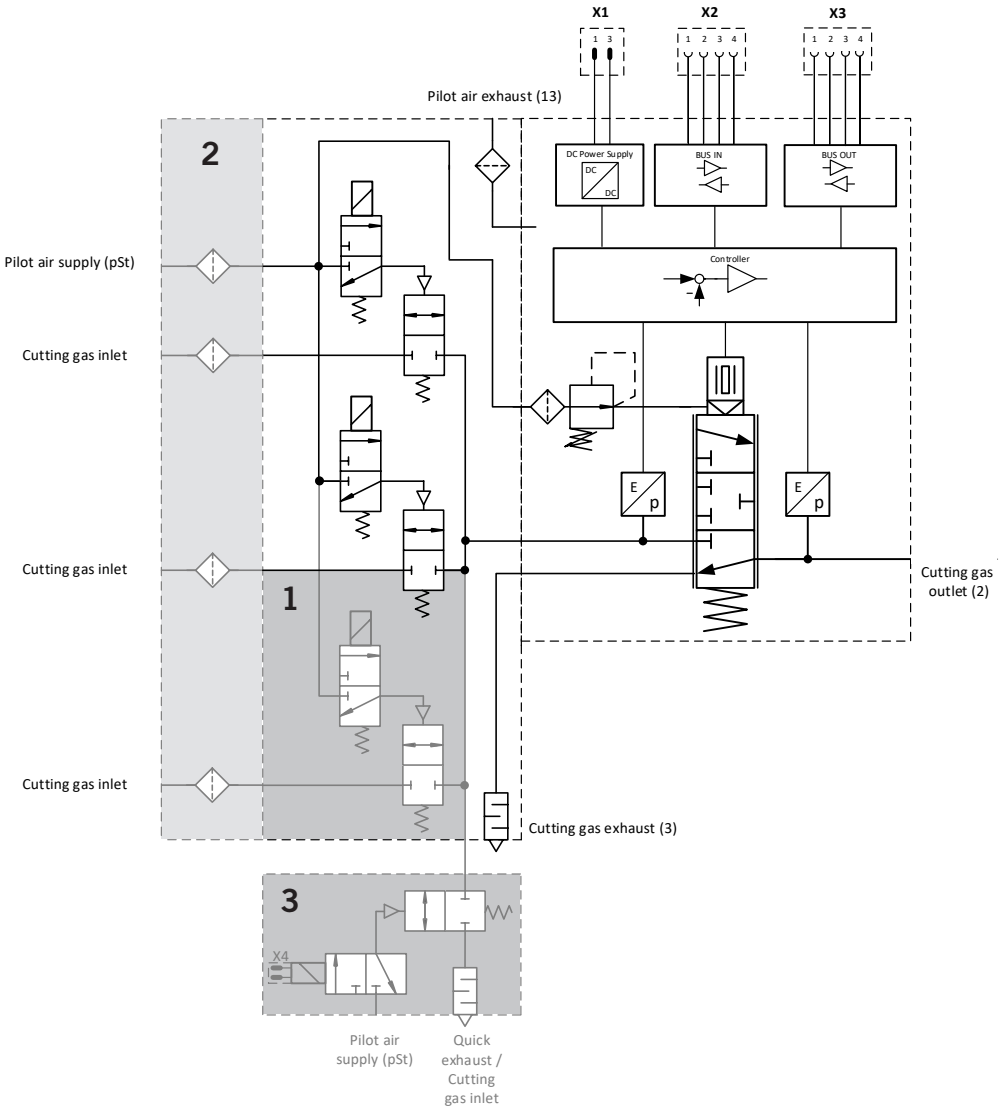


Optional

1	3-gas version
2	3-gas version with filter
3	Quick-exhaust valve (QEV)

LGRP2, LGRPF2, LGRP3, LGRPF3 – LASGAR PLUS DIGITAL

With 2-gas or 3-gas[1] connection with filter[2] and quick-exhaust valve (QEV)[3]



Optional

1	3-gas version
2	3-gas version with filter
3	Quick-exhaust valve (QEV)

LGRP0 SERVICE AND PROCESS DATA OBJECTS (PDO) ETHERCAT/PROFINET PROCESS

OBJECTS Brief description	FUNCTION	SIZE	VALUE	DESCRIPTION
PR_RE Pressure reached Window [%]	Output	1 Word	Format 0x0000	Display of the currently set upper and lower limit values for 'Pressure reached window [%]'
P_IST Actual value of output pressure		1 Word	0 – 30000 digits = 0...30.000 mbar	Response 'current output pressure', 0-30 bar
PV_IST Actual value of input pressure		1 Word	0 – 40000 digits = 0...40.000 mbar	Response 'current input pressure', 0-40 bar
GAS_STA Gas status		1 Word	Bit 0	Response 'pressure reached': Value = 1 = pressure reached Condition: P_IST in the window of PR_RE
			Bit 1	Response 'regulator ready': Value = 1 = ready
			Bit 2	Warning, input pressure low Condition: if 'PV_IST < (110% * P_SOLL)' then 'bit 2 = 1'
			Bit 3	Warning, input pressure too low Condition: if 'PV_IST < (105% * P_SOLL)' then 'bit 3 = 1'
			Bit 4	1=Calibration active 0=Calibration not active
REG_ST Set value of D-regulator		1 Word	0...10000 digits = 0...100%	Internal set value of the Piezo pressure regulation
SER_NR		1 Word	Decimal number	Serial no. of device
SW_VER		1 Word	Hexadecimal number	Software version
DATA_1		1 Word	Reserve	No data content
PAR_SEL		1 Word	Reserve	No data content
DATA_3		1 Word	Reserve	No data content
PR_RE Pressure reached Window [%]	Input	1 Word	Higher byte 0x0000 .... 0xFF00 (0-17%) --- Lower byte 0x000 ... 0x00FF (0...17.0%)	Setting of the upper limit value of PR_RE in the range +0...17.0% (default +17%) --- Setting of the lower limit value of PR_RE in the range -0...17.0% (default -17%)
P_SOLL Output pressure target value		1 Word	0...30000 digits = 0...30.000 mbar	Target value specification for output pressure
GAS_SEL Gas selection		1 Word	Bit 0	Switch upstream valve 1 0=OFF / 1=ON
			Bit 1	Switch upstream valve 2 0=OFF / 1=ON
			Bit 2	Switch upstream valve 3 0=OFF / 1=ON
			Bit 3	Start self-calibration of the regulator

LGRP2, LGRP3, LGRPF2, LGRPF3 SERVICE AND PROCESS DATA OBJECTS (PDO) ETHERCAT/PROFINET PROCESS

OBJECTS Brief description	FUNCTION	SIZE	VALUE	DESCRIPTION
PR_RE Pressure reached Window [%]	Output	1 Word	Format 0x0000	Display of the currently set upper and lower limit values for 'Pressure reached window [%]'
P_IST Actual value of output pressure		1 Word	0...30000 digits = 0...30.000 mbar	Response 'current output pressure', 0-30 bar
PV_IST Actual value of input pressure		1 Word	0...40000 digits = 0...40.000 mbar	Response 'current input pressure', 0-40 bar
GAS_STA Gas status		1 Word	Bit 0	Response 'pressure reached': Value = 1 = pressure reached Condition: P_IST in the window of PR_RE
			Bit 1	Response 'regulator ready': Value = 1 = ready
			Bit 2	Warning, input pressure low Condition: if 'PV_IST < (110% * P_SOLL)' then 'bit 2 = 1' Info: Valve still functions, but it may not be possible to reach max. output pressure
			Bit 3	Warning, input pressure too low Condition: if 'PV_IST < (105% * P_SOLL)' then 'bit 3 = 1' Info: Valve still functions, but it may not be possible to reach max. output pressure
			Bit 4	1=Calibration active 0=Calibration not active
REG_ST Set value of D-regulator		1 Word	0...10000 digits = 0...100%	Internal set value of the Piezo pressure regulation
SER_NR		1 Word	Decimal number	Serial no. of device
SW_VER		1 Word	Hexadecimal number	Software version
DATA_1		1 Word	Reserve	No data content
DATA_2		1 Word	Reserve	No data content
DATA_3		1 Word	Reserve	No data content
PR_RE Pressure reached Window [%]	Input	1 Word	Higher byte 0x0000 .... 0xFF00 (0-17%) --- Lower byte 0x000 ... 0x00FF (0...17.0%)	Setting of the upper limit value of PR_RE in the range +0...17.0% (default +17%) --- Setting of the lower limit value of PR_RE in the range -0...17.0% (default -17%)
P_SOLL Output pressure target value		1 Word	0...30000 digits = 0...30.000 mbar	Target value specification for output pressure
GAS_SEL Gas selection		1 Word	Bit 0	Gas 1 0=OFF / 1=ON
			Bit 1	Gas 2 0=OFF / 1=ON
			Bit 2	Gas 3 0=OFF / 1=ON
			Bit 3	Start self-calibration of the regulator

ACCESSORIES
LasGAR plus

ACCESSORIES

		ORDER NO.
	Screw plug \ G 1/4 NBR	KX6215
	Screw plug \ G 3/8 NBR	KW0428
	Silencer short \ D1K-08	KW0705
	Protective cap \ M12X1, IP 67	KC9314
	Straight Screw-in connector \ D12 G3/8	KC9313
	Straight Screw-in connector \ D10 G3/8	KC9312
	Straight Screw-in connector \ D6 M5X0.8	KC9311
	Elbow union \ D10 G1/4	KC9307
	Plug \ D12	KC9310
	Plug \ D10	KC9309
	Plug \ D6	KC9308

	Cable set \ LGR..digital (1 x socket KB3229, 2 x cable plugs KB3230	HB54647-060
	Cable set \ LGR..analog	HB54646-060
	Cable socket \ M12-A, number of pins: 4, overmolded and screened, length 5 m, cable PUR	KB3229
	Cable plug \ M12-D, number of pins: 4, screened, sprayed onto the cable, length 2 m, cable PUR	KB3230
	Cable socket \ M12-A, number of pins: 8; overmolded and screened, length 5 m, cable PUR	KB3231
	Cable socket \ M12-B, number of pins: 5, overmolded, length 5 m, cable PUR	KB3232
	Cable socket angled \ M12-A, number of pins: 8; overmolded and screened, length 5 m, cable PUR	KB3592

ACCESSORIES
LasGAR plus

ACCESSORIES

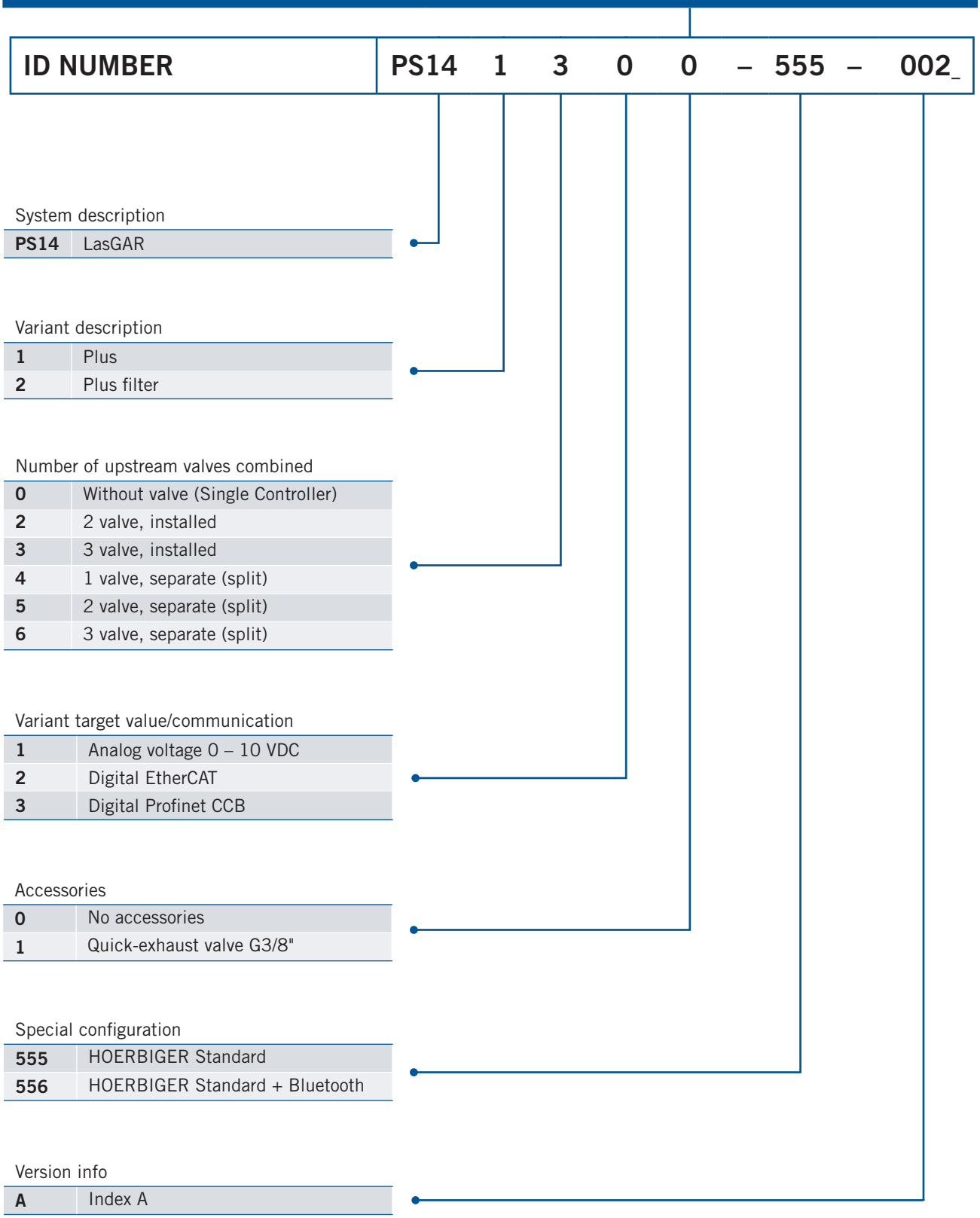
		ORDER NO.
	Lasfil Compact Retrofit \ 2-gas (sw)	PS12732
	Lasfil Compact Retrofit \ 3-gas (sw)	PS12721
	Filter set for cutting gas inputs -> scope of delivery 1 filter cartridge with O-rings mounted and pre-greased with oxygen grease	PS12739
	Filter set for control air input ---> scope of delivery: 1 filter element, 1 O-ring	PS12740
	Connection block 1-gas cpl. \ PRE-5	KC4616
	Connection block 2-gas cpl. \ PRE-5	PS14093
	Connection block 3-gas cpl. \ PRE-5	PS14094

ORDER KEYS

LasGAR plus

EXAMPLE

ID NUMBER	PS14	1	3	0	0	–	555	–	002_



System description

PS14	LasGAR

Variant description

1	Plus
2	Plus filter

Number of upstream valves combined

0	Without valve (Single Controller)
2	2 valve, installed
3	3 valve, installed
4	1 valve, separate (split)
5	2 valve, separate (split)
6	3 valve, separate (split)

Variant target value/communication

1	Analog voltage 0 – 10 VDC
2	Digital EtherCAT
3	Digital Profinet CCB

Accessories

0	No accessories
1	Quick-exhaust valve G3/8"

Special configuration

555	HOERBIGER Standard
556	HOERBIGER Standard + Bluetooth

Version info

A	Index A

CONVERSION FACTORS

LasGAR plus

CONVERSION FACTORS

VALUE	UNIT	CONVERSION UNIT	FACTOR
Length	mm	in	0.03934
	in	mm	25.4
	m	ft	3.28084
	ft	m	0.3048
Weight	kg	lb	2.204622
	lb	kg	0.453592
Pressure	bar	psi	14.5035
	psi	bar	0.06895
	MPa	psi	145.035
	psi	MPa	0.006895
	bar	MPa	0.1
	MPa	bar	10
Temperature	°C	°F	1.8 °C + 32
	°F	°C	0.5556 °F – 32
Torque	Nm	ft/lbs	0.7375
	ft/lbs	Nm	1.3558

ADDITIONAL DOCUMENTATION

LasGAR plus

WWW.HOERBIGER.COM

This data sheet and additional documentation are available in the download area of the company's website.

www.hoerbiger.com

NOTES

LasGAR plus

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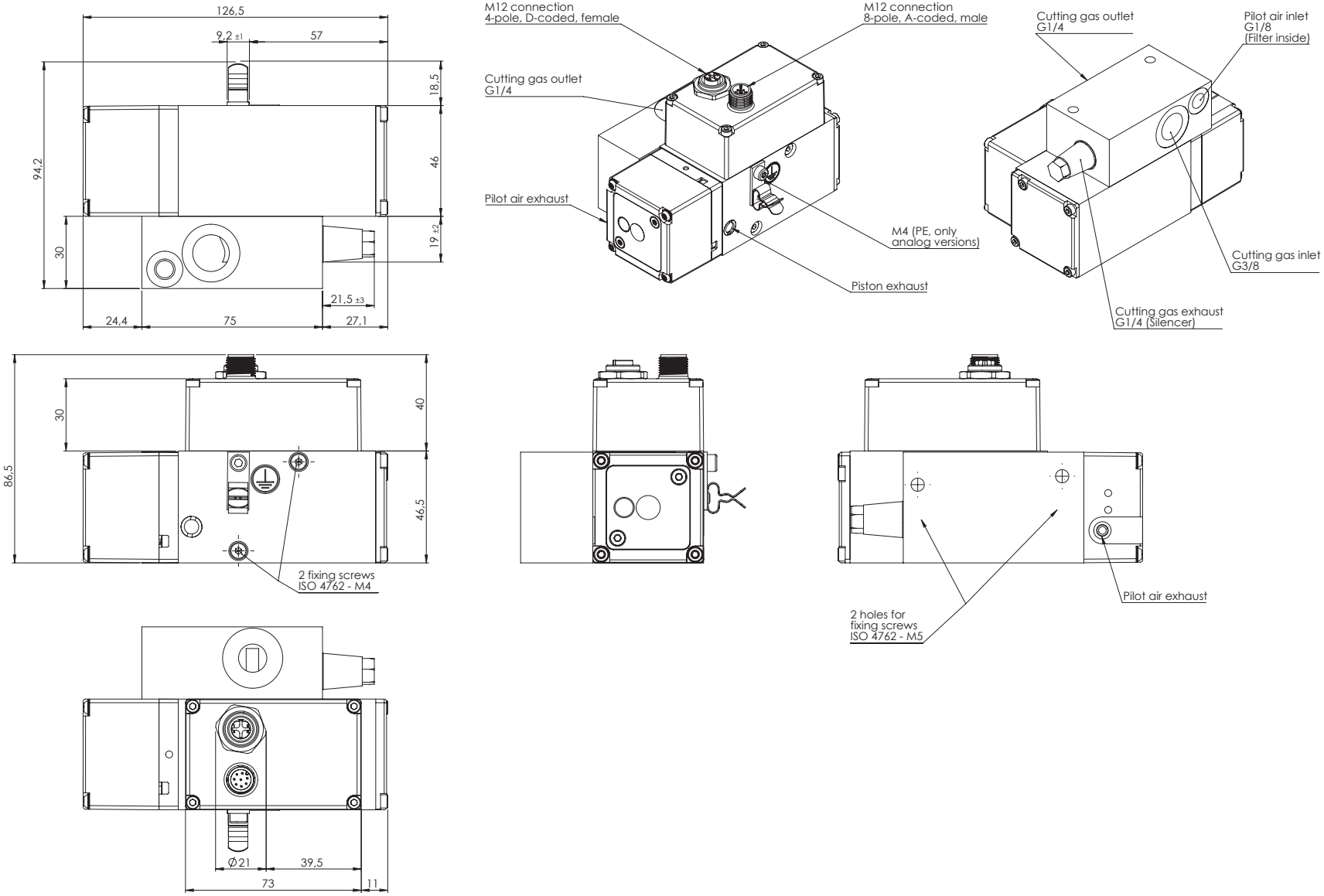
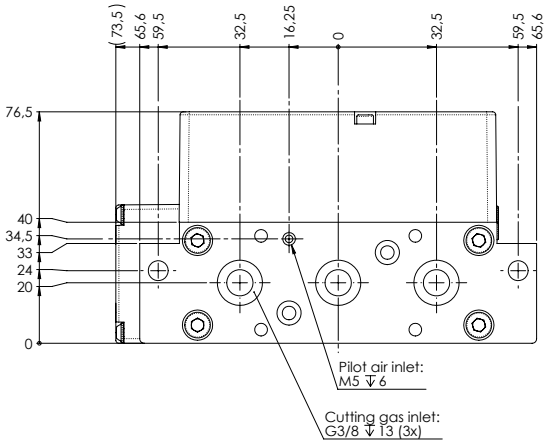
HOERBIGER
because performance counts

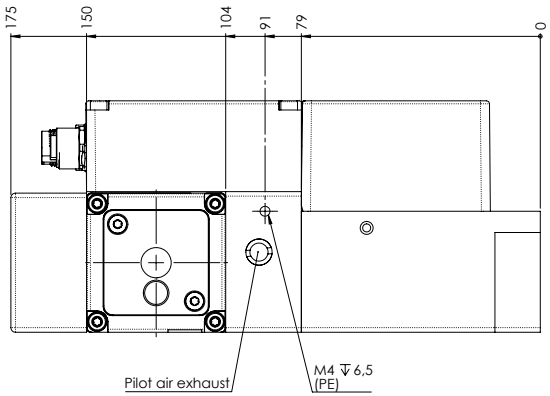
VARIANTS

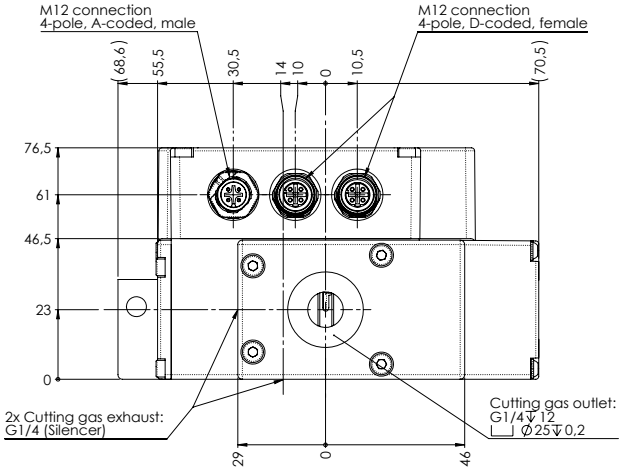
LasGAR plus LGRP0VDE30-00-00

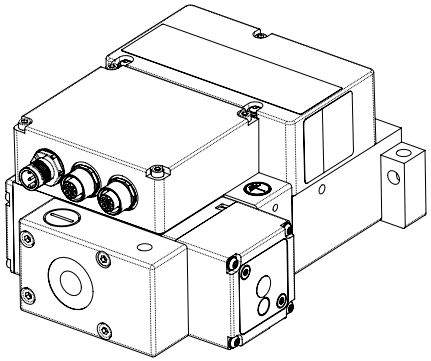
Dimensions in mm, Conversion factor to “in = 0.03934”
For conversion factors, see conversion table in the data sheet

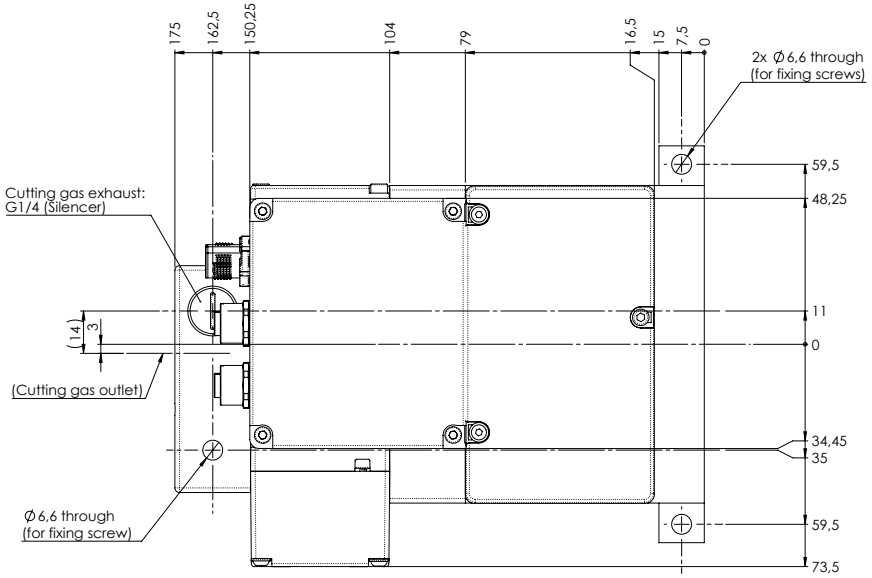








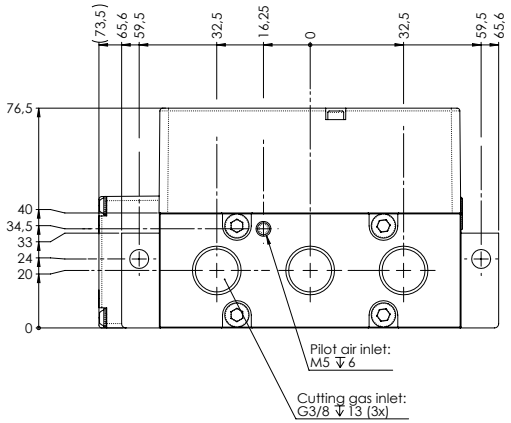


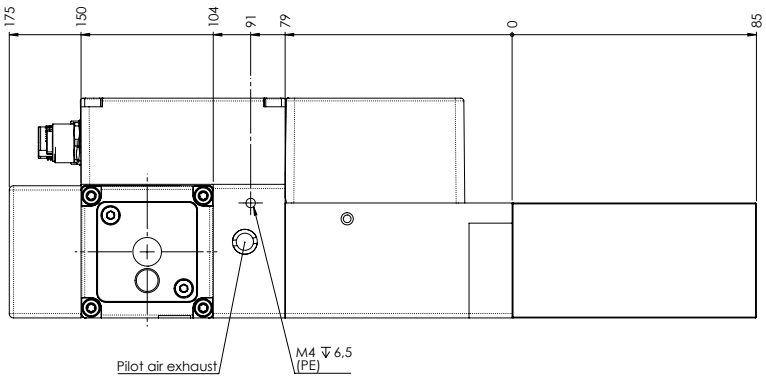


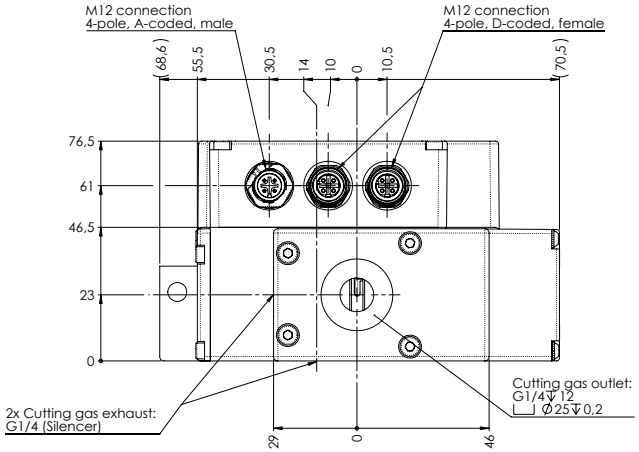
VARIANTS

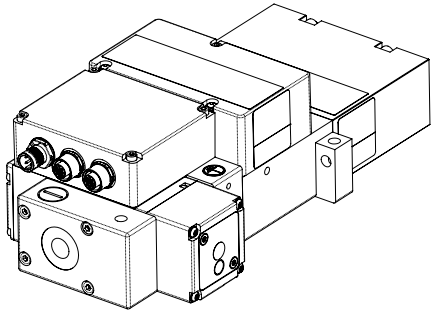
LasGAR plus filter digital 3-Gas LGRPF3VDE0030-00-00

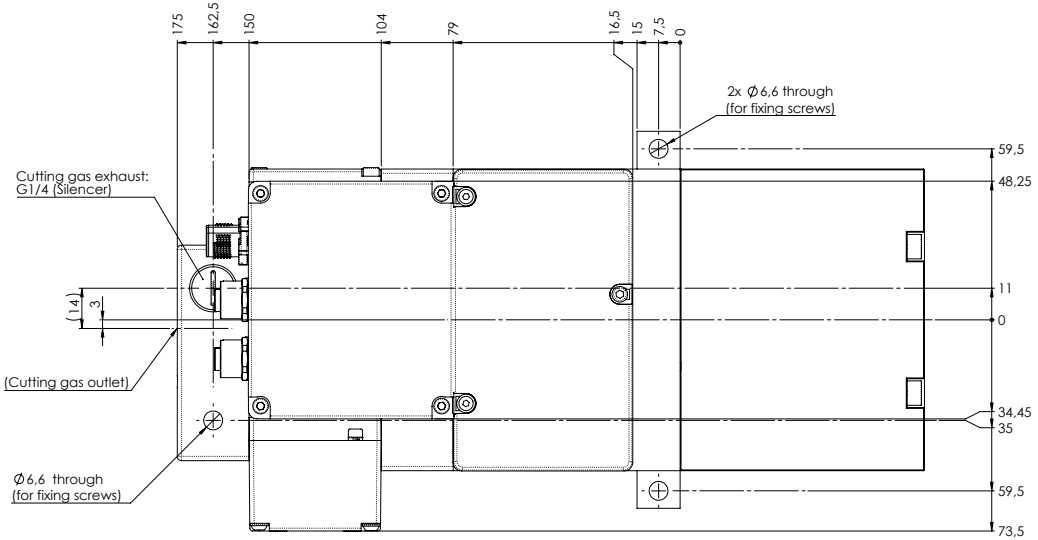
Dimensions in mm, Conversion factor to “in = 0.03934”
For conversion factors, see conversion table in the data sheet







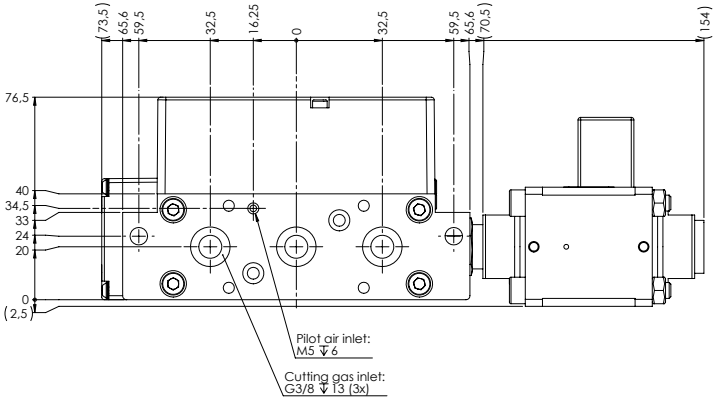


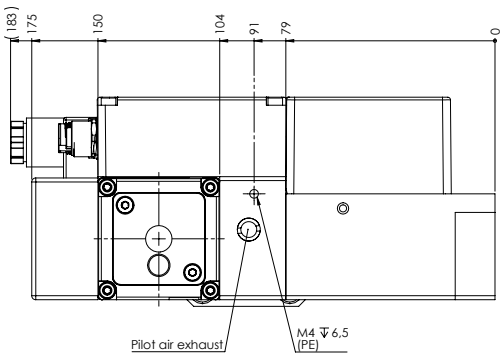


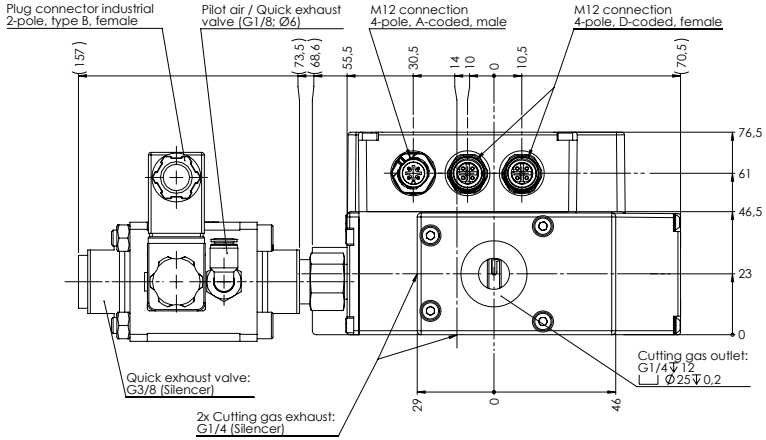
VARIANTS

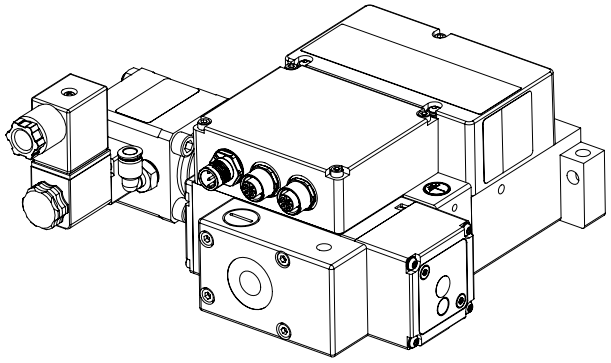
LasGAR plus digital 3-Gas LGRP3VDE0030-00-01

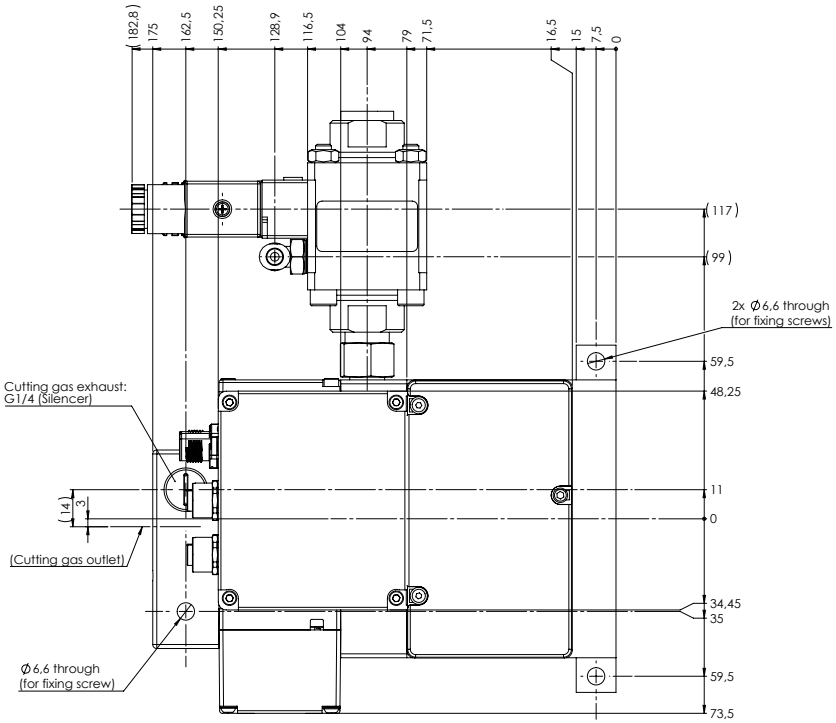
Dimensions in mm, Conversion factor to “in = 0.03934”
For conversion factors, see conversion table in the data sheet









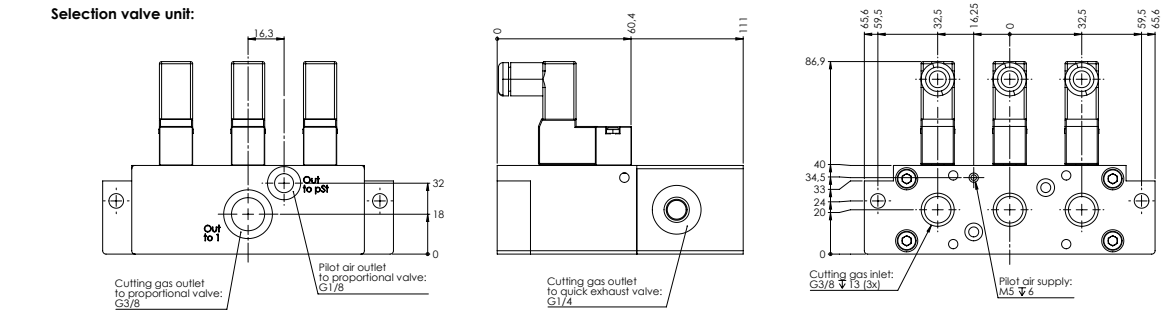


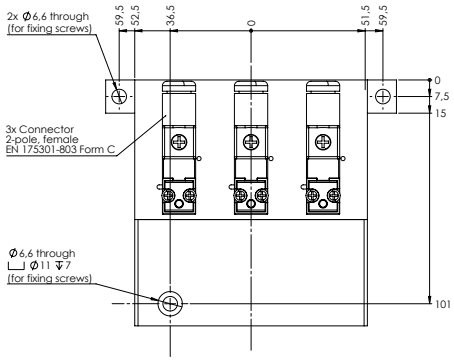
VARIANTS

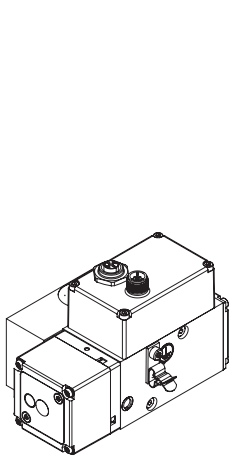
LasGAR plus LGRP3SDE30-00-01

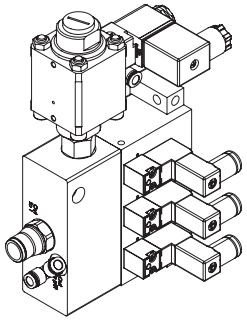
Dimensions in mm, Conversion factor to “in = 0.03934”
For conversion factors, see conversion table in the data sheet

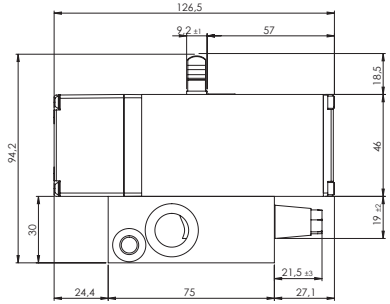
Selection valve unit:

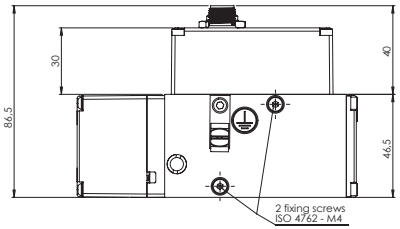


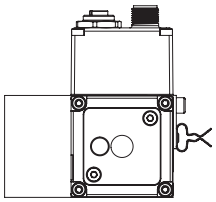


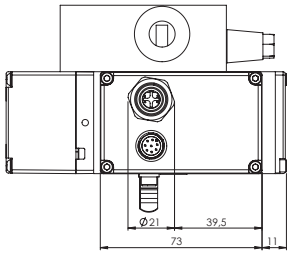




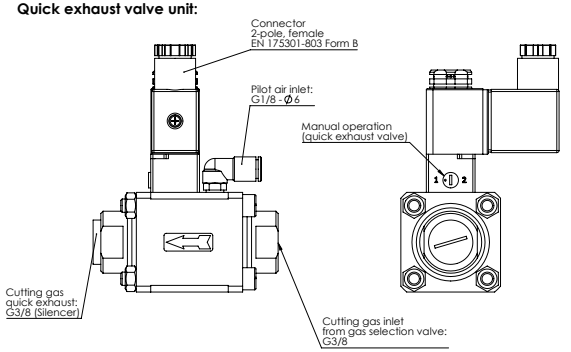








Quick exhaust valve unit:



VARIANTS

LasGAR plus BYS LGRP3VDE0030-S1089-00

Dimensions in mm, Conversion factor to “in = 0.03934”
For conversion factors, see conversion table in the data sheet