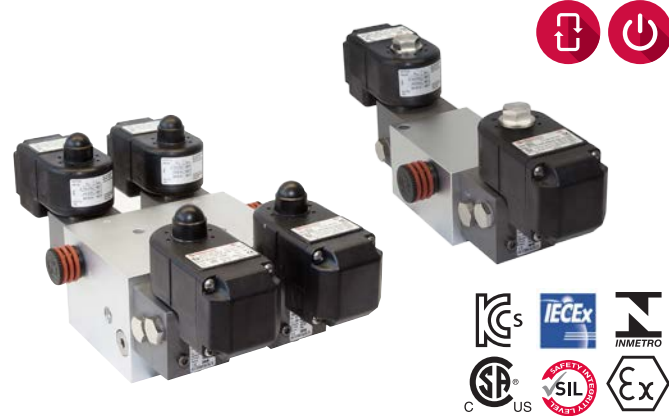


- > Compact design - Herion valves
- > Exhaust guards as standard
- > Optional electrical position indicators for valves
- > Cable terminations inside coil housing
- > Utilizing industry proven technology

- > SIL certified components and system
- > International approvals
- > Standard in aluminium, stainless steel on request
- > 1oo2 and 2oo2 systems available as NAMUR version *1)



Technical features

Medium:
Filtered, non-lubricated or dry compressed air, instrument air nitrogen and other nonflammable neutral dry fluids

Operation:
3/2 Direct solenoid operated poppet valves

Operating pressure:
1 ... 10 bar
2...8 bar (with 98025 Valves)

Port size:
G1/4, 1/4 NPT, G1/2, 1/2 NPT

Flow:
Standard valves 170 ... 250 l/min
High flow valves 740 ... 1050 l/min
details see page 2

Additional filter:
Installation of an in-line filter is recommended (in the direction of flow from the actuator to the RVM).

Ambient/Media temperature:
Up to -40 ... +80°C, see option selector page 2
Depending on solenoid system
Air supply must be dry enough to avoid ice formation at temperatures below +2°C (35°F).
For outdoor installations must be protected all connections against the penetration of moisture and a solenoid with IP66 protection must be used!

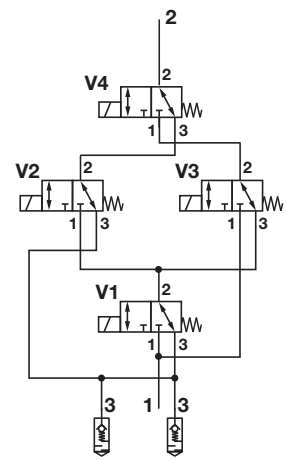
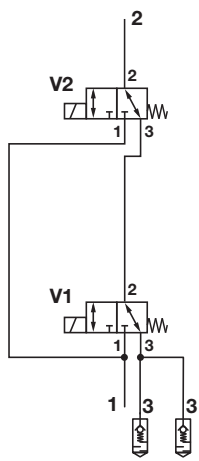
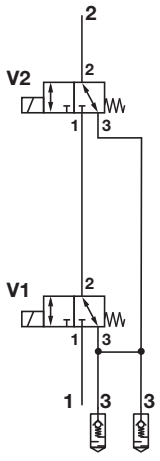
Materials:
Manifold and valve body: Anodized aluminium or stainless steel
Seal: NBR, VMQ
Internal parts: stainless steel, brass

Flow conversion:
Cv US Gallon/min (water) = l/min (air) x 0,001
Kv m³/h (water) = l/min (air) x 0,000906

1oo2 with exhaust guards

2oo2 with exhaust guards

2oo3 with exhaust guards *2)



V Solenoid actuated valves

*2) for 2oo3 *2) for 3oo4
V1 = channel 1 V1 = channel 1
V2 & V3= channel 2 V2 = channel 2
V4 = channel 3 V3 = channel 3
 V4 = channel 4

Please have a look to instructions

*1) Details on data sheet en 5.8.300

Option selector

V82*****04**0000

Valve function	Substitute	
1oo2 normally closed	1	
2oo2 normally closed	3	
2oo3 normally closed	5	
Port sizes	Substitute	
G1/4 (Standard flow, 24011/24010)	11	
1/4 NPT (Standard flow, 24011/24010)	12	
G1/2 (High flow, 98015/98025)	23	
1/2 NPT (High flow, 98015/98025)	24	
Valve type	Temperature *1)	Substitute
24011 series		
Aluminium	-40°C ... +60°C	01
Stainless steel	-40°C ... +60°C	02
Aluminium with proximity sensor	-25°C ... +70°C	03
Stainless steel with proximity sensor	-25°C ... +70°C	04
Aluminium	-25°C ... +80°C	05
Stainless steel	-25°C ... +80°C	06
98015 series		
Aluminium	-25°C ... +60°C	07
Stainless steel	-25°C ... +60°C	08
Aluminium with proximity sensor	-25°C ... +60°C	09
Stainless steel with proximity sensor	-25°C ... +60°C	10
24010 series		
Aluminium	-25°C ... +60°C	21
Stainless steel	-25°C ... +60°C	22
Aluminium with proximity sensor	-25°C ... +60°C	23
Stainless steel with proximity sensor	-25°C ... +60°C	24
98025 series		
Aluminium	-25°C ... +60°C	31
Stainless steel	-25°C ... +60°C	32

Country of manufacture			
Norgren internal use			
Silencers*2)		Temperature	
Exhaust guard - included in the scope of supply		-55°C ... +80°C	
Solenoids coil	Temperature Standard (*3) (°C)	EX-certificat	Substitute
24011 series + 98015 *4)			
3824.024.00	-20 ... +60	FM/CSA	02
3825.120.60	-20 ... +60	FM/CSA	03
3826.024.00	-20 ... +60	FM/CSA	04
3827.120.60	-20 ... +60	FM/CSA	05
4270.024.00	-40 ... +65/55	ATEX/IECEX	08
4271.230.50	-40 ... +65/55	ATEX/IECEX	09
4670.024.00	-40 ... +70/40	ATEX/IECEX	14
4671.230.50	-40 ... +70/40	ATEX/IECEX	15
4672.024.00	-40 ... +70/40	ATEX/IECEX	16
4673.230.50	-40 ... +70/40	ATEX/IECEX	17
4872.024.00	-40 ... +50/40	ATEX/IECEX	18
4873.230.50	-40 ... +50/40	ATEX/IECEX	19
Intrinsically safe versions			
Series 24010			
2003	-40...+70/55		55
Series 98025 *5)			
2050	-40...+60		40

*2) Other silencers can be ordered separately, see page 3

*3) Temperature depending on classification T4, T5 or T6, see pages 11, 12, 16, 19 and 23.

*4) Other performance categories and currents see pages 11, 12, 16, 19 and 23.

*5) Other versions see page 22

*1) please note solenoid temperature

Flow rates and valve combinations

Flow direction (port to port)	Standard flow systems (24011/24010)	High flow systems (98015/98025)
1oo2	2 x 24011	2 x 98015
1 » 2 *6) [l/min]	170	750
2 » 3 *7) [l/min]	1000	3400
2oo2	2 x 24011	2 x 98015
1 » 2 *6) [l/min]	250	1050
2 » 3 *7) [l/min]	710	2690
2oo3	4 x 24011	4 x 98015
1 » 2 *6) [l/min]	190	740
2 » 3 *7) [l/min]	710	2420

*6) Flow characteristics conforms to ISO6358 from port 1 to port 2 (sub-base) [6 » 5 bar], see page 1

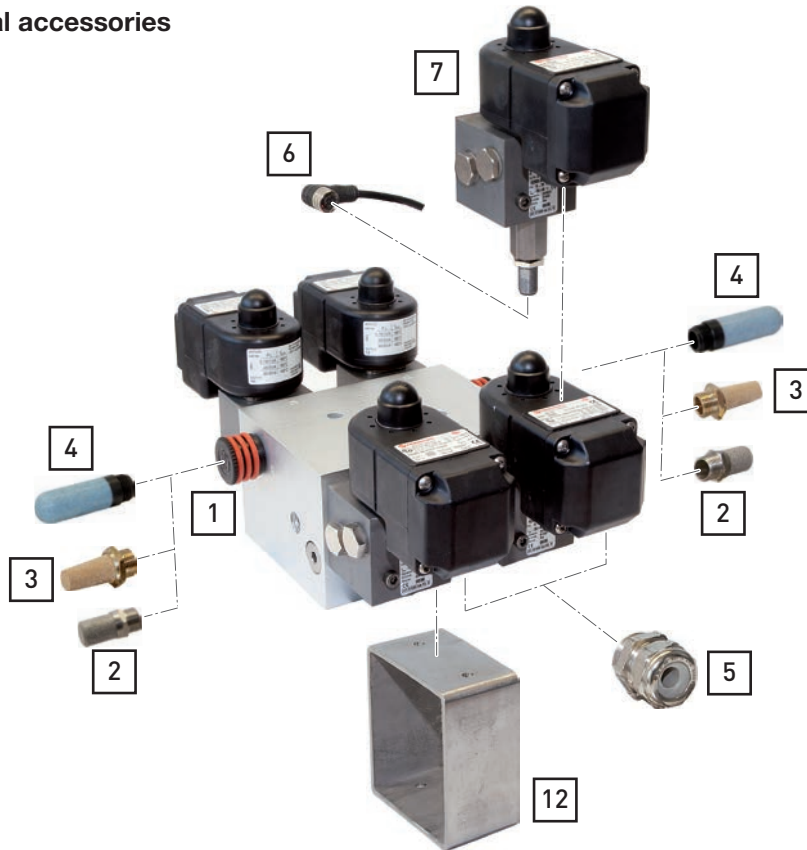
*7) Flow characteristics conforms to ISO6358 from port 2 (sub-base) to port 3 (sub-base) [10 » 0 bar], see page 1

Standard

Port size	Valve type	Temperature (°C)	Materials	Weight (kg)	Drawing	Model
1oo2 (SIL 3)						
1/4 NPT	2401109	-25...+80°C	Aluminium	3,7 kg	Page 4	V821120504**0000
1/2 NPT	9801595	-25...+60°C	Aluminium	4,4 kg	Page 7	V821240704**0000
2oo2 (SIL 2)						
1/4 NPT	2401109	-25...+80°C	Aluminium	3,7 kg	Page 5	V823120504**0000
1/2 NPT	9801595	-25...+60°C	Aluminium	4,4 kg	Page 8	V823240704**0000
2oo3 (SIL 3)						
1/4 NPT	2401109	-25...+80°C	Aluminium	8,2 kg	Page 6	V825120504**0000
1/2 NPT	9801595	-25...+60°C	Aluminium	9,3 kg	Page 9	V825240704**0000

** Solenoid code

Standard and optional accessories



Accessories

Standard (Included in the scope of supply)

Can be ordered separately
Other silencers, connectors (for valve position sensor)

Exhaust guard *2)

1



Page 24

0613422 (G 1/4, 1/4 NPT)

0613422 (G 1/4, 1/4 NPT)

*1) For indoors use

*2) For outdoors use, opening pressure ~ 0,2 bar

Silencer (stainless steel) *1)

2



Page 24

0014613 (G 1/4)

0613678 (1/4 NPT)

0014813 (G 1/2)

0613679 (1/2 NPT)

Silencer (brass) *1)

3



Page 24

T40C2800 (G 1/4)

MS002A (1/4 NPT)

T40C4800 (G 1/2)

MS004A (1/2 NPT)

Silencer (plastic) *1)

4



Page 24

M/S2 (G 1/4)

C/S2 (1/4 NPT)

M/S4 (G 1/2)

C/S4 (1/2 NPT)

Connector M12 x 1 (straight)

6



Page 25

0523055 (without cable)

0523057 (cable length 2 m)

0523052 (cable length 5 m)

M12 x 1 (90°)

6



Page 25

0523056 (90°, without cable)

0523058 (90°, cable length 2 m)

0523053 (90°, cable length 5 m)

Cable glands (ordered separately)

Cable gland
Protection class Ex e, Ex d (ATEX),
Nickel plated brass/stainless steel

5



Page 25
For solenoid

Thread	Cable Ø (mm)	Material	Protection class (ATEX)	Model	
42xx, 46xx	M 20x1,5	5,0...8,0	Nickel plated brass	II2GD Ex e	0588819
46xx	M 20x1,5	10...14	Nickel plated brass	II2GD Ex d	0588851
46xx	1/2-14-NPT	7,5...11,9	Nickel plated brass	II2GD Ex d	0588925
48xx	M 20x1,5	9,0...13	Stainless steel 1.4571	II2GD Ex e	0589385
48xx	M 20x1,5	7,0...12	Stainless steel 1.4404	II2GD Ex d	0589395
48xx	M 20x1,5	10...14	Stainless steel 1.4404	II2GD Ex d	0589387

Alternative valves with position sensors

7



Note: Valve position sensors are supplied complete with the valve. See pages 10, 15 & 18 for valve part numbers

Optional - For use with valves fitted with position sensors

Bracket, (stainless steel)

12



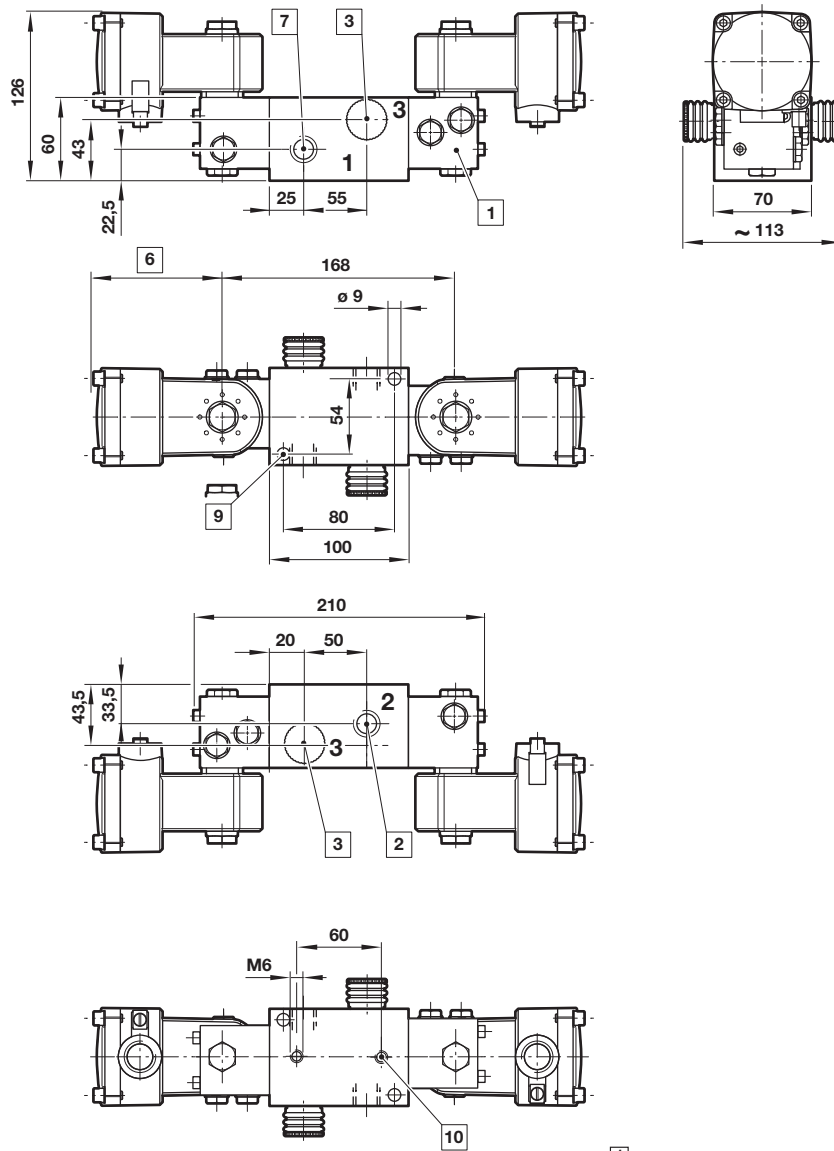
Page 24

A165-95

1oo2 (standard flow)

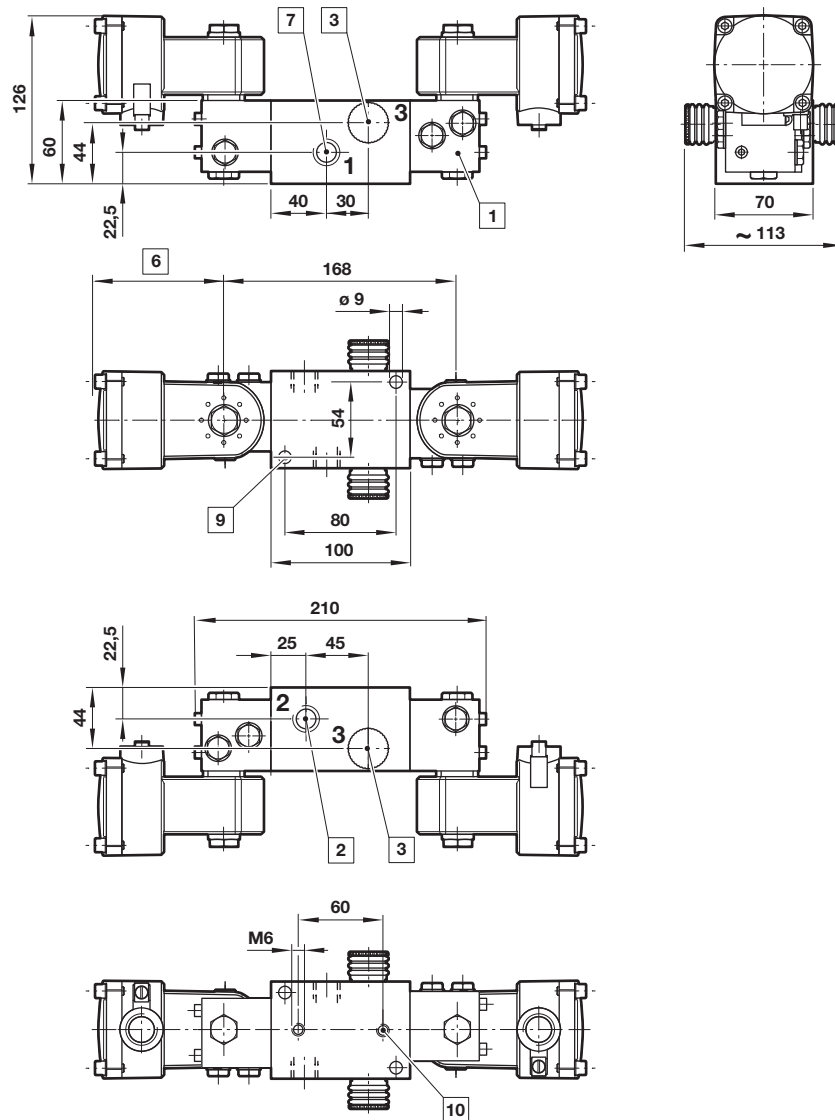
Weight: 1,0 kg aluminium (2,8 kg stainless steel) sub-base only, valves and accessories see refer pages 10 and 15

Dimensions in mm
 Projection/First angle



- 1 Valve 24011 and 24010 series
- 2 Outlet port G 1/4 or 1/4 NPT
- 3 Exhaust guard (sub-base), ports G1/2 or 1/2 NPT
- 6 Dependent on solenoid models (see solenoid drawing)
- 7 Inlet port G1/4 or 1/4 NPT
- 9 Through mounting holes
- 10 Mounting threads as standard or alternative to fix the bracket

2oo2 (standard flow)
**Weight: 1,00 kg aluminium (2,8 kg stainless steel) sub-base only, valves and accessories
see refer pages 10 and 15**

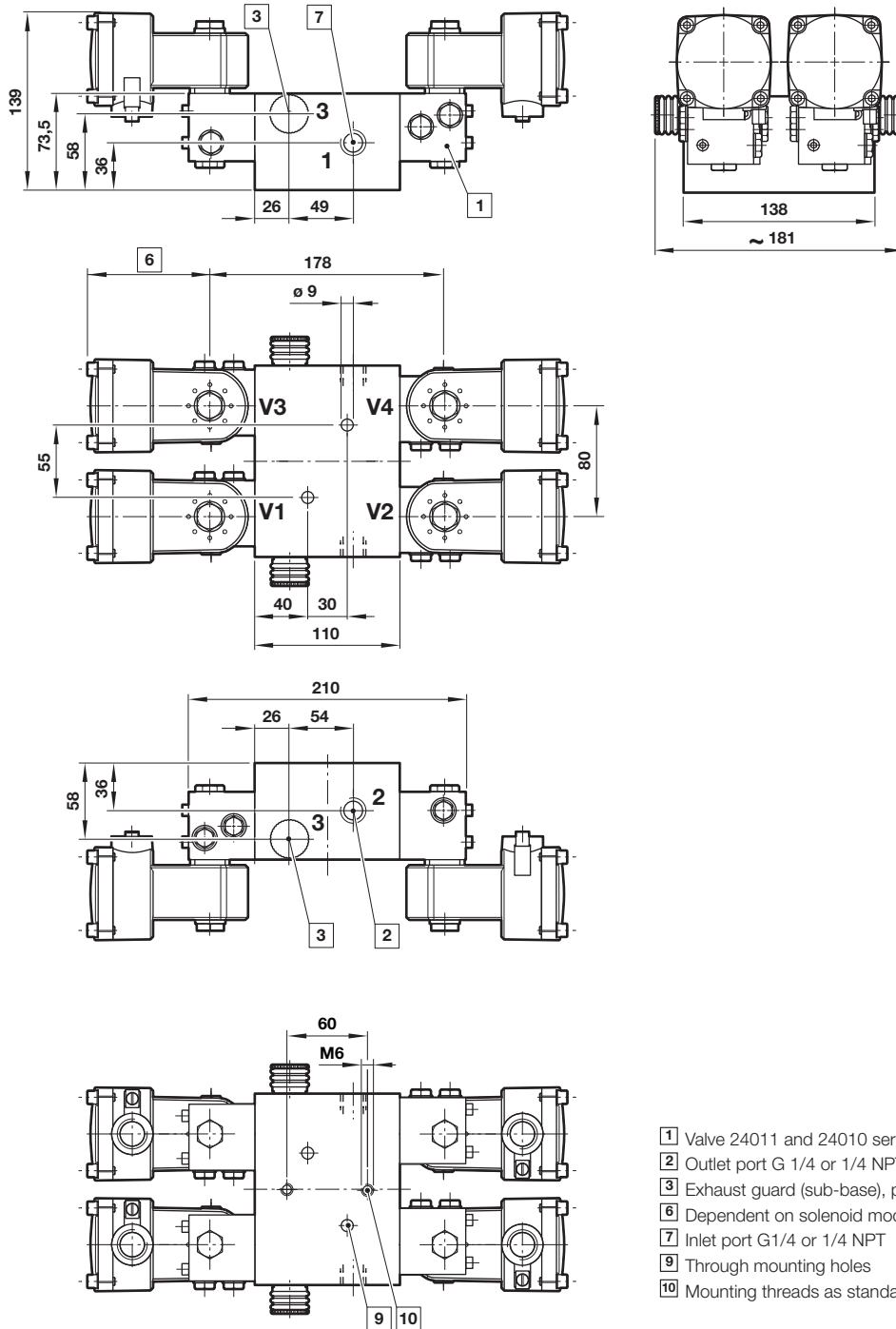
 Dimensions in mm
Projection/First angle


- 1** Valve 24011 and 24010 series
- 2** Outlet port G 1/4 or 1/4 NPT
- 3** Exhaust guard (sub-base), ports G1/2 or 1/2 NPT
- 6** Dependent on solenoid models (see solenoid drawing)
- 7** Inlet port G1/4 or 1/4 NPT
- 9** Through mounting holes
- 10** Mounting threads as standard or alternative to fix the bracket

2oo3 (standard flow)

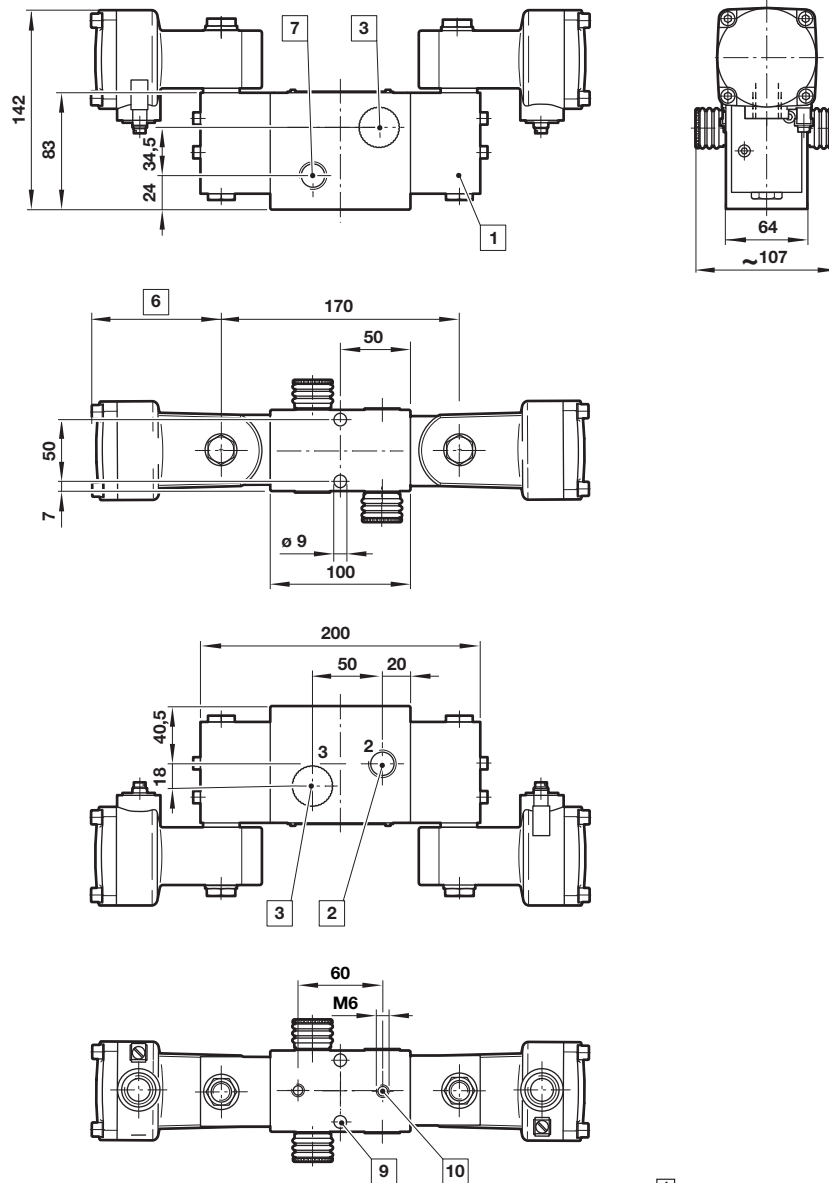
Weight: 2,8 kg aluminium (8 kg stainless steel) sub-base only, valves and accessories
 see refer pages 10 and 15

Dimensions in mm
 Projection/First angle



- 1 Valve 24011 and 24010 series
- 2 Outlet port G 1/4 or 1/4 NPT
- 3 Exhaust guard (sub-base), ports G1/2 or 1/2 NPT
- 6 Dependent on solenoid models (see solenoid drawing)
- 7 Inlet port G1/4 or 1/4 NPT
- 9 Through mounting holes
- 10 Mounting threads as standard or alternative to fix the bracket

1oo2 (high flow)
**Weight: 1,4 kg aluminium (4 kg stainless steel) sub-base only, valves and accessories
see refer pages 18 and 22**

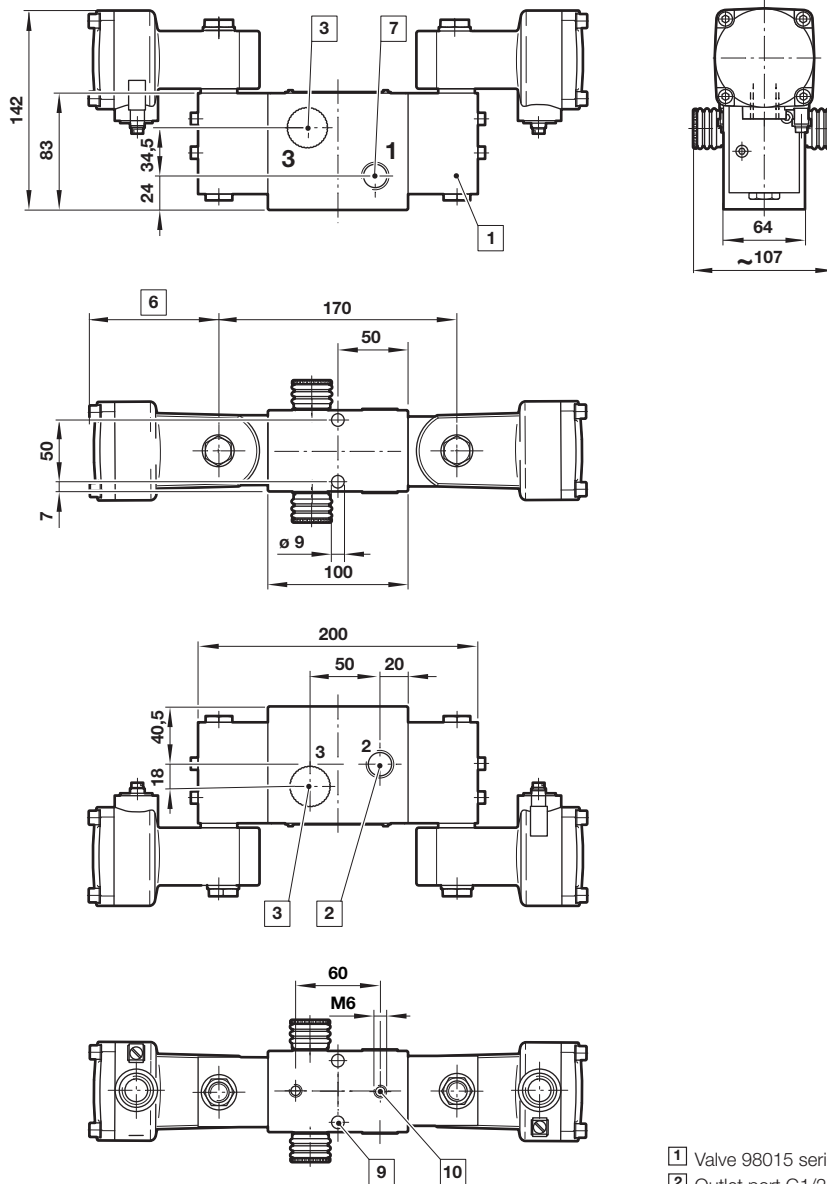
 Dimensions in mm
Projection/First angle


- 1** Valve 98015 series
- 2** Outlet port G1/2 or 1/2 NPT
- 3** Exhaust guard (sub-base), ports G1/2 or 1/2 NPT
- 6** Dependent on solenoid models (see solenoid drawing)
- 7** Inlet port G1/2 or 1/2 NPT
- 9** Through mounting holes
- 10** Mounting threads as standard or alternative to fix the bracket

2oo2 (high flow)

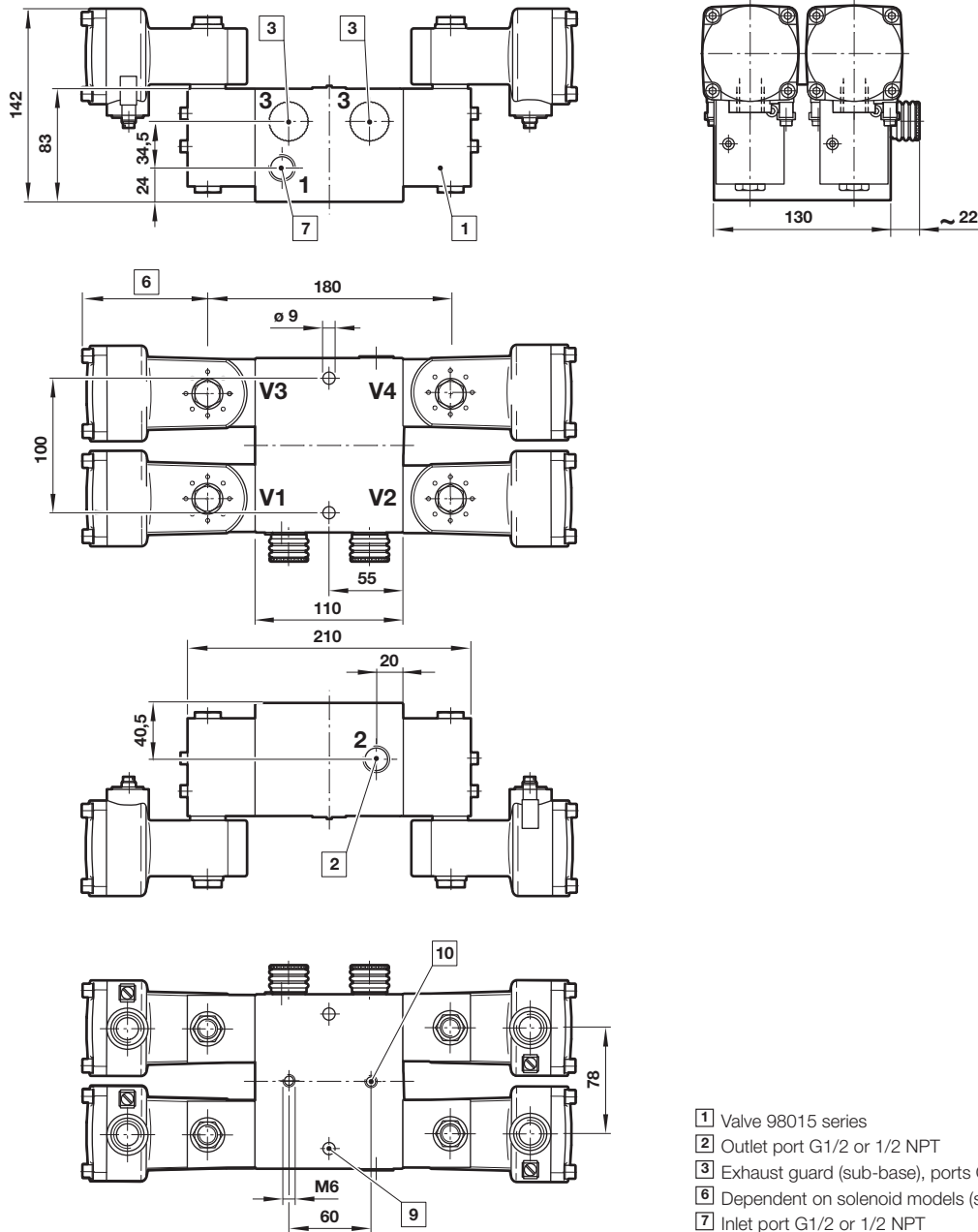
Weight: 1,4 kg aluminium (4 kg stainless steel) sub-base only, valves and accessories
 see refer pages 18 and 22

Dimensions in mm
 Projection/First angle



- 1 Valve 98015 series
- 2 Outlet port G1/2 or 1/2 NPT
- 3 Exhaust guard (sub-base), ports G1/2 or 1/2 NPT
- 6 Dependent on solenoid models (see solenoid drawing)
- 7 Inlet port G1/2 or 1/2 NPT
- 9 Through mounting holes
- 10 Mounting threads as standard or alternative to fix the bracket

2oo3 (high flow)
**Weight: 3,3 kg aluminium (9,3 kg stainless steel) sub-base only, valves and accessories
see refer pages 18 and 22**

 Dimensions in mm
Projection/First angle


- 1** Valve 98015 series
- 2** Outlet port G1/2 or 1/2 NPT
- 3** Exhaust guard (sub-base), ports G1/2 or 1/2 NPT
- 6** Dependent on solenoid models (see solenoid drawing)
- 7** Inlet port G1/2 or 1/2 NPT
- 9** Through mounting holes
- 10** Mounting threads as standard or alternative to fix the bracket

- > Standard flow range (340 l/min)
- > Main application: Single and double acting actuators
- > TÜV-approval based on type examination DGRL 97/23/EC and IEC 61508, multichannel up to SIL 3 (12 years)
- > Optional valve position sensors
- > Suited for outdoor use under critical environment conditions.
- > Variable valve solenoid combination



Technical features

Medium:

Compressed air, filtered, non-lubricated and dry. Other gase and liquid fluids on request. (Viscosity for gaseous or liquid fluids up to 40 mm²/s)

Operation:

Direct solenoid operated poppet valve

Operating pressure:

0 ... 10 bar (0 ... 145 psi)

Orifice:

5 mm

Flow:

Gaseous fluids: 340 l/min

Port size:

Flanged
NAMUR Interface

Flow direction:

Optional

Ambient/Media temperature:

NBR:

-25 ... +80°C (-13 ... +176°F)

VMQ:

-40... +60°C (-40 ... +140°F)

Depending on solenoid system

Air supply must be dry enough to avoid ice formation at

temperatures below +2°C (35°F).

For outdoor installations must be

protected all connections against

the penetration of moisture and

a solenoid with IP66 protection

must be used!

Materials:

Body: Aluminium anodized

or stainless steel 1.4404 (316 L)

Seal: NBR, VMQ

Inner parts: stainless steel, brass

Technical data

Symbol	Temperature (°C)	Material seat seal	housing	Position sensor	Weight (kg)	Test certificate IEC 61508 *2)	Dimension No.	Model *1)	Code
	-40 ... +60	VMQ	aluminium	without	0,55	X	1	1025390	01
	-40 ... +60	VMQ	stainless steel	without	1	X	1	1160007	02
	-25 ... +70	NBR	aluminium	integrated	0,62	X	2	1025352	03
	-25 ... +70	NBR	stainless steel	integrated	1,07	X	2	1160006	04
	-25 ... +80	NBR	aluminium	without	0,55	X	1	2401109	05
	-25 ... +80	NBR	stainless steel	without	1	X	1	1025212	06

*1) When ordering please indicate solenoid, voltage and current type (frequency).

*2) Particular for valves with TÜV approval and attachment in plants based on safety standards IEC 61508, taking into account to the operating and maintenance instructions document 7503444.

Solenoids operator, standard voltages

	Power consumption		Rated current		Protection class IP/NEMA	Ex-Protection (ATEX-Category)	Temperature Ambient/ Media (°C)	Electrical connection	Weight (kg)	Drawing No.	Circuit diagram No.	Model
	24 V d.c. (W)	230 V a.c. (VA)	24 V d.c. (m A)	230 V a.c. (m A)								
	8,9	—	369	—	NEMA 4, 4X, 6, 6P, 7, 9	XP/DIP, Div. 1 & 2 Cl. I, Gr. A-D Cl. II/III, Gr. E-G T3 (160°C)	-20 ... +60	Flying leads 450 mm	0,5	8	1	3824
	—	9,5	—	41	NEMA 4, 4X, 6, 6P, 7, 9	XP/DIP, Div. 1 & 2 Cl. I, Gr. A-D Cl. II/III, Gr. E-G T3 (160°C)	-20 ... +60	Flying leads 450 mm	0,5	8	5	3825
	13,6	—	567	—	NEMA 4, 4X, 6, 6P, 7, 9	XP/DIP, Div. 1 & 2 Cl. I, Gr. A-D Cl. II/III, Gr. E-G T3 (160°C)	-20 ... +60	Flying leads 450 mm	0,5	8	1	3826
	—	15,7	—	68	NEMA 4, 4X, 6, 6P, 7, 9	XP/DIP, Div. 1 & 2 Cl. I, Gr. A-D Cl. II/III, Gr. E-G T3 (160°C)	-20 ... +60	Flying leads 450 mm	0,5	8	5	3827
	3,9	—	162	—	IP66 (with cable gland)	II 2 G Ex e mb IIC T4/ T6 Gb II 2 D Ex tb IIC T130°C Db IP66	T4: -40 ...+80 T6: -40 ... +55 -40 ...+80	M20 x 1,5 *1)	0,6	6	4	4260
	—	5,3	—	23	IP66 (with cable gland)	II 2 G Ex e mb IIC T4/ T6 Gb II 2 D Ex tb IIC T130°C Db IP66	T4: -40 ...+80 T6: -40 ... +55 -40 ...+80	M20 x 1,5 *1)	0,6	6	7	4261
	8,9	—	369	—	IP66 (with cable gland)	II 2 G Ex e mb IIC T4/ T5 Gb II 2 D Ex tb IIC T130°C Db IP66	T4: -40 ... +65 T5: -40 ... +55 -40 ... +65	M20 x 1,5 *1)	0,5	6	4	4270
	—	10,0	—	43	IP66 (with cable gland)	II 2 G Ex e mb IIC T4/ T5 Gb II 2 D Ex tb IIC T130°C Db IP66	T4: -40 ... +65 T5: -40 ... +55 -40 ... +65	M20 x 1,5 *1)	0,5	6	7	4271
	3,9	—	162	—	IP66 (with cable gland)	II 2 G Ex d mb IIC T4/ T6 Gb II 2 G Ex e mb IIC T4/ T6 Gb II 2 D Ex tb IIC T130°C Db	T4: -40 ...+80 T6: -40 ... +55 -40 ...+80	1/2 NPT *1)	0,8	7	20	4660
	—	5,3	—	23	IP66 (with cable gland)	II 2 G Ex d mb IIC T4/ T6 Gb II 2 G Ex e mb IIC T4/ T6 Gb II 2 D Ex tb IIC T130°C Db	T4: -40 ...+80 T6: -40 ... +55 -40 ...+80	1/2 NPT *1)	0,8	7	21	4661
	3,9	—	162	—	IP66 (with cable gland)	II 2 G Ex d mb IIC T4/ T6 Gb II 2 G Ex e mb IIC T4/ T6 Gb II 2 D Ex tb IIC T130°C Db	T4: -40 ...+80 T6: -40 ... +55 -40 ...+80	M20 x 1,5 *1)	0,8	7	20	4662
	—	5,3	—	23	IP66 (with cable gland)	II 2 G Ex d mb IIC T4/ T6 Gb II 2 G Ex e mb IIC T4/ T6 Gb II 2 D Ex tb IIC T130°C Db	T4: -40 ...+80 T6: -40 ... +55 -40 ...+80	M20 x 1,5 *1)	0,8	7	21	4663

Standard voltages (±10%) 24 V d.c., 230 V a.c., other voltages on request. Design according to VDE 0580, EN 50014/50028. 100% duty cycle.



*1) Connector/cable gland is not scope of delivery, see table »Accessories«

Attention: The protection class for coil series 46xx and 48xx is determined by the choice of cable gland. Example: if an ATEX-certified cable gland is used that has Ex d type of protection, the solenoid will have the protection class Ex d mb; if a cable gland with Ex e type of protection is used, the solenoid will have protection class Ex e mb.

Approvals

Model	Approvals ATEX	IECEX	FM	Datasheet
372x, 382x	—	—	CSA-LR 57643-6	N/en 7.1.575
42xx	KEMA 98 ATEX 4452 X	IECEX KEM 09.0068X	—	N/en 7.1.580
46xx	PTB 02 ATEX 2085 X	IECEX PTB 11.0094X	—	N/en 7.1.585

Solenoids operator, standard voltages

	Power consumption		Rated current		Protection class IP/NEMA	Ex-Protection (ATEX-Category)	Temperature Ambient/ Media (°C)	Electrical connection	Weight (kg)	Drawing No.	Circuit diagram No.	Model
	24 V d.c. (W)	230 V a.c. (VA)	24 V d.c. (m A)	230 V a.c. (m A)								
	8,9	—	369	—	IP66 (with cable gland)	II 2 G Ex d mb IIC T4/ T6 Gb II 2 G Ex e mb IIC T4/ T6 Gb II 2 D Ex tb IIIC T130°C Db	T4: -40 ... +70 T6: -40 ... +40 -40 ... +70	1/2 NPT *1)	0,8	7	20	4670
	—	10,0	—	43	IP66 (with cable gland)	II 2 G Ex d mb IIC T4/ T6 Gb II 2 G Ex e mb IIC T4/ T6 Gb II 2 D Ex tb IIIC T130°C Db	T4: -40 ... +70 T6: -40 ... +40 -40 ... +70	1/2 NPT *1)	0,8	7	21	4671
	8,9	—	369	—	IP66 (with cable gland)	II 2 G Ex d mb IIC T4/ T6 Gb II 2 G Ex e mb IIC T4/ T6 Gb II 2 D Ex tb IIIC T130°C Db	T4: -40 ... +70 T6: -40 ... +40 -40 ... +70	M20 x 1,5 *1)	0,8	7	20	4672
	—	10,0	—	43	IP66 (with cable gland)	II 2 G Ex d mb IIC T4/ T6 Gb II 2 G Ex e mb IIC T4/ T6 Gb II 2 D Ex tb IIIC T130°C Db	T4: -40 ... +70 T6: -40 ... +40 -40 ... +70	M20 x 1,5 *1)	0,8	7	21	4673
	8,9	—	369	—	IP66 (with cable gland)	II 2 G Ex mb d IIC T4/T6 II 2 G Ex mb e II T4/T6	T4: -40 ... +50 T6: -40 ... +40	M20 x 1,5 *1)	1,2	10	4	4872
	—	10	—	43	IP66 (with cable gland)	II 2 G Ex mb d IIC T4/T6 II 2 G Ex mb e II T4/T6	T4: -40 ... +50 T6: -40 ... +40	M20 x 1,5 *1)	1,2	10	7	4873

Standard voltages (±10%) 24 V d.c., 230 V a.c., other voltages on request. Design according to VDE 0580, EN 50014/50028. 100% duty cycle.

*1) Connector/cable gland is not scope of delivery, see table »Accessories«

Attention: The protection class for coil series 46xx and 48xx is determined by the choice of cable gland.

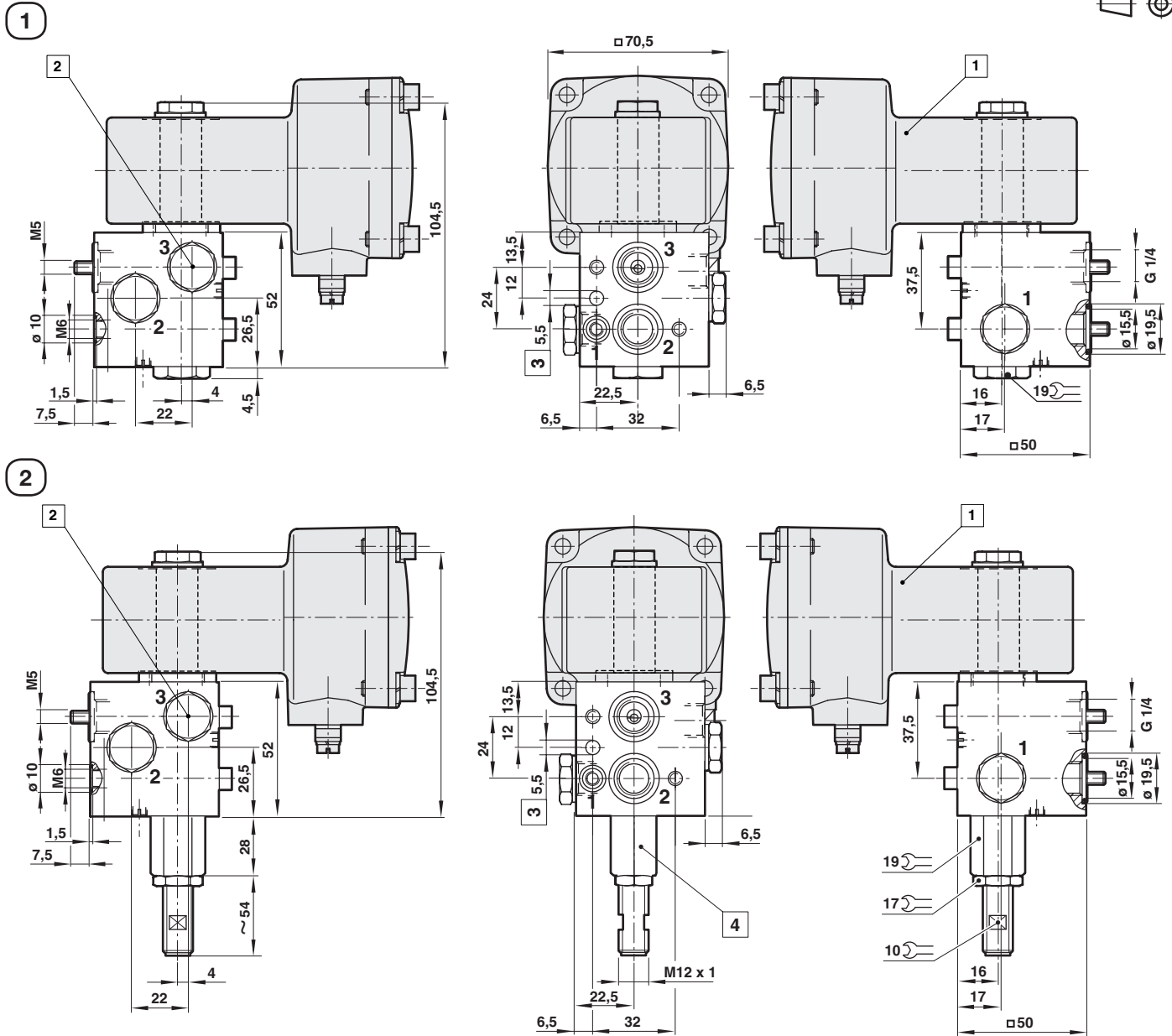
Example: if an ATEX-certified cable gland is used that has Ex d type of protection, the solenoid will have the protection class Ex d mb; if a cable gland with Ex e type of protection is used, the solenoid will have protection class Ex e mb.

Approvals

Model	Approvals ATEX	IECEX	Datasheet
46xx	PTB 02 ATEX 2085 X	IECEX PTB 11.0094X	N/en 7.1.585
48xx	PTB 06 ATEX 2054 X	IECEX PTB 07.0039X	N/en 7.1.590

Drawings
Valves

Dimensions in mm
Projection/First angle



- 1 Solenoids optional
- 2 Locked with plug and sealing washer
- 3 3 mm deep
- 4 Position sensor

Position sensor

Supply voltage (U_b):

7,7 ... 9 V d.c.

Ripple:

15%

Frequency of operating cycles:

1000 Hz

Protection class:

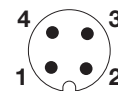
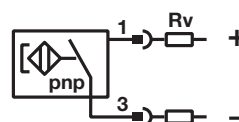
IP68

Pressure-resistant:

500 bar

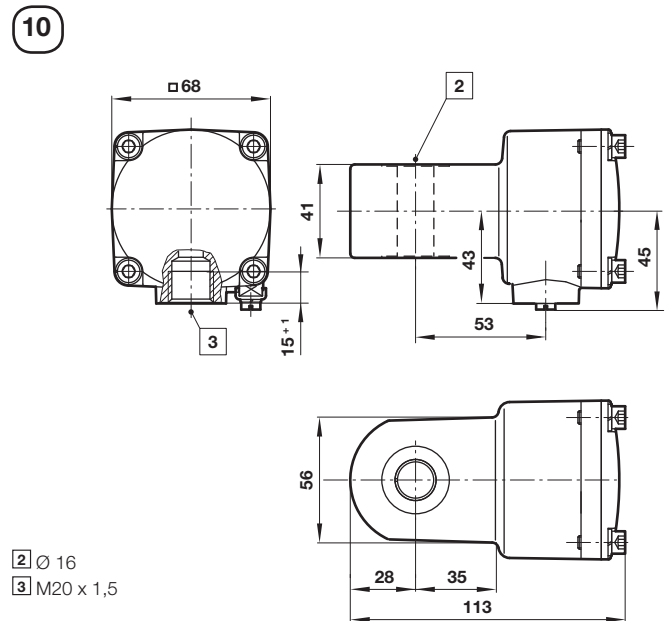
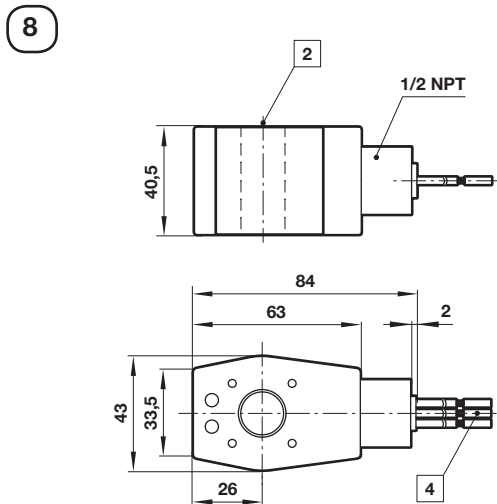
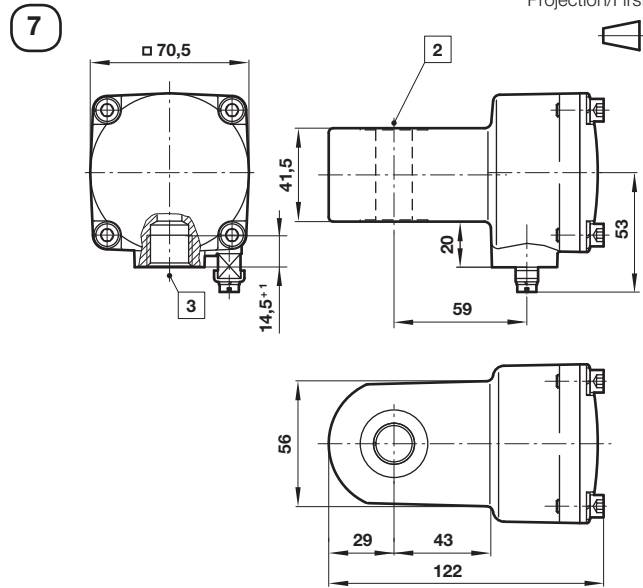
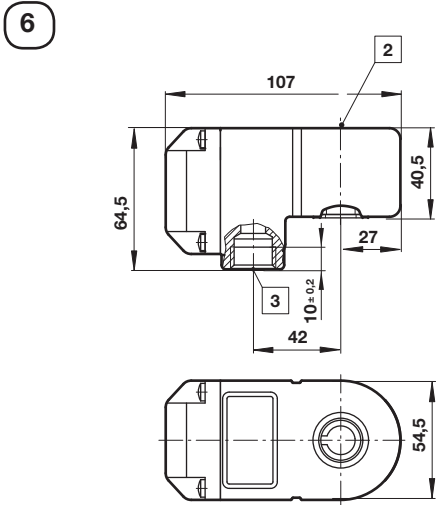
Ambient temperature:

-25 ... +70°C



Solenoids

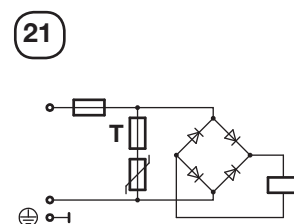
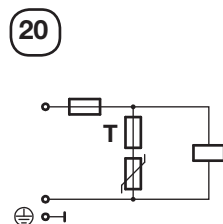
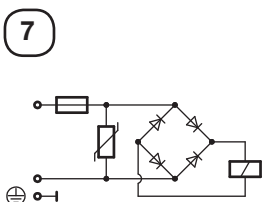
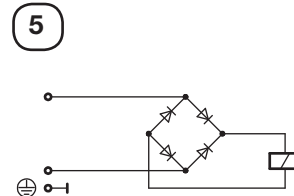
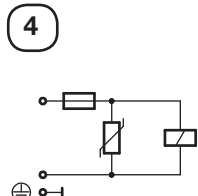
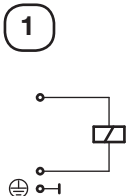
Dimensions in mm
Projection/First angle



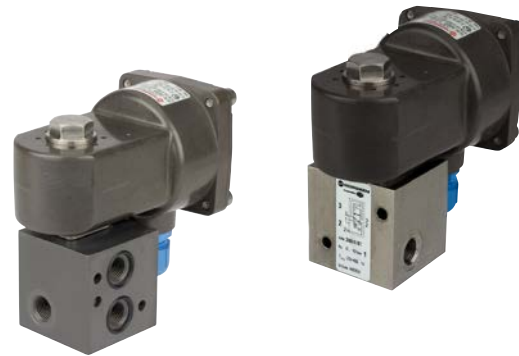
- 1 Connector can be indexed by 4x90°
- 2 Ø 16 or 13 (with spacer tube)
- 3 M20 x 1,5 or 1/2 NPT
- 4 Flying leads AWG 18 (450 mm long)
- 5 With cable gland, Pg 13,5

- 2 Ø 16
- 3 M20 x 1,5

Circuit diagrams



- > **Standard flow range**
(340 l/min)
- > **Main application:**
Single acting actuators
in intrinsically safe
circuits
- > **TÜV-approval based on
type examination
IEC 61508, multichannel
up to SIL 3**
- > **Solenoid valve also
suitable for use in low
power non hazardous
areas**
- > **High operational
reliability even after
long periods of non-
operation**
- > **Suited for outdoor use
under critical
environment conditions.**
- > **Optional valve position
sensors**



Technical features

Medium:

Compressed air, filtered, non-lubricated and dry. Other gase and liquid fluids on request. (Viscosity for gaseous or liquid fluids up to 40 mm²/s)

Operation:

Direct solenoid operated poppet valve

Operating pressure:

0 ... 10 bar (0 ... 145 psi)

Orifice:

5 mm

Flow:

Gaseous fluids: 340 l/min

Port size:

Flanged
NAMUR Interface

Flow direction:

Optional

Ambient/Media temperature:

-25 ... +80°C (-13 ... +176°F)
Depending on solenoid system
Air supply must be dry enough to avoid ice formation at temperatures below +2°C (35°F).
For outdoor installations must be protected all connections against the penetration of moisture and a solenoid with IP66 protection must be used!

Materials:

Body: Aluminium anodized or stainless steel 1.4404 (316 L)
Inner parts: stainless steel, brass
Solenoid housing: aluminium, anodized
Seals: NBR


Technical data

Symbol	Temperature (°C)	Material seat seal	housing	Position sensor	Weight (kg)	Test certificate IEC 61 508 *2)	Dimension No.	Model *1)	Code
	-25 ... +60	NBR	aluminium	without	0,55	X	1	2401009.2003	21
	-25 ... +60	NBR	stainless steel	without	1,00	X	1	2401097.2003	22
	-25 ... +60	NBR	aluminium	integrated	0,62	X	2	1025353.2003	23
	-25 ... +60	NBR	stainless steel	integrated	1,07	X	2	2401098.2003	24

*1) Solenoid to be included in scope of supply


*2) Particular for valves with TÜV approval and attachment in plants based on safety standards IEC 61508, taking into account to the operating and maintenance instructions document 7503444.

Solenoid parameters for use in non hazardous locations (25)

	Switch-on voltage	Allowed current	Holding current	Power consumption	Protection class IP	Ex-Protection (ATEX-Category)	Temperature Ambient/Fluid (°C)	Electrical connection	Weight	Operating sequence	Model
	(V)	(mA)	(mA)	(W)					(kg)		
	22 ... 26,4	< 75	> 40	1,8 at 24 V	IP66 (with cable gland)	—	-40 ... +80	M20 x 1,5 *2)	0,85	see below	2003

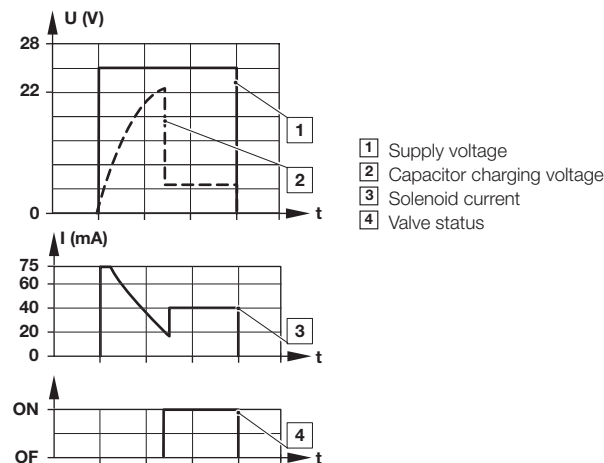
Standard voltages (±10%), Design according to VDE 0580, EN 50014/50028. 100% duty cycle.
Pick-up delay typical: 0,3 ... 2 s, depending on intrinsic current supply
*2) Connector cable gland is in scope of delivery

Solenoid parameters for use in intrinsically safe circuits (25)

	Switch-on voltage	Holding current	Holding voltage	Pick-up delay typical *3)	Protection class IP	Ex-Protection (ATEX-Category)	Temperature Ambient/Fluid (°C)	Weight	Model
	(V)	(mA)	(V)	(s)				(kg)	
	22 ... 28	40	approx. 5	0,3 ... 5	IP66 (with cable gland)	II 2 G Ex ia IIC T5/T6 II 2 D Ex D IP66 T95°C	T5: -40 ... +70 T6: -40 ... +55 -40 ... +70	0,85	2003

*3) depending on intrinsic current supply

Operating sequence



Approvals

Model	Approvals ATEX	IECEX	Datasheet
2003	PTB 04 ATEX 2010	IECEX PTB 05.0020	N/en 7.1.530

Function of solenoid drive

To switch the direct operated valve, a certain energy is required. This energy is stored in a capacitor. The charging voltage is 22 V. The higher the supply voltage, the shorter the charging time. As soon as the charging voltage has been reached, the valve switches. The small current now flowing through the coil is sufficient to hold the valve in the open position. At least 40 mA are required for this.

Current supply units:

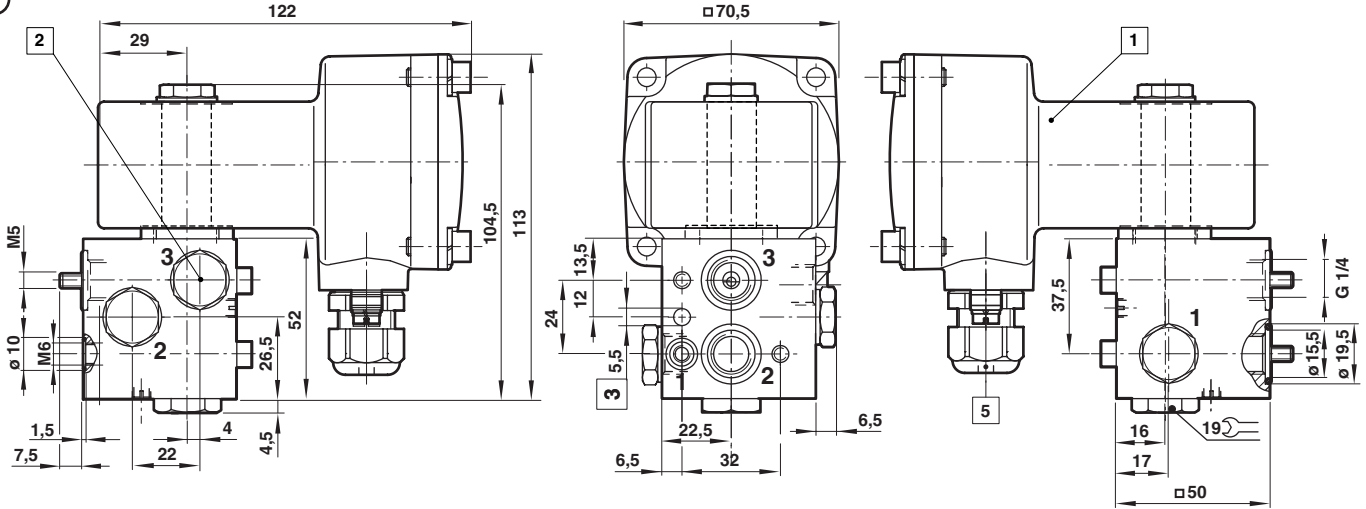
Intrinsically safe power supply units can be chosen in a list of compatibility in www.norgren.com. When selecting an intrinsically safe power supply, it is important to observe the maximum permissible values acc. to the EC-Type-Examination Certificate PTB 04 ATEX 2010 respectively IECEx PTB 05.0020 Ui 28 V, Ii 110 mA, Pi 1,5 W. The effective internal capacities Ci; and inductivities li of the solenoid are negligibly low.

Drawings
Valves

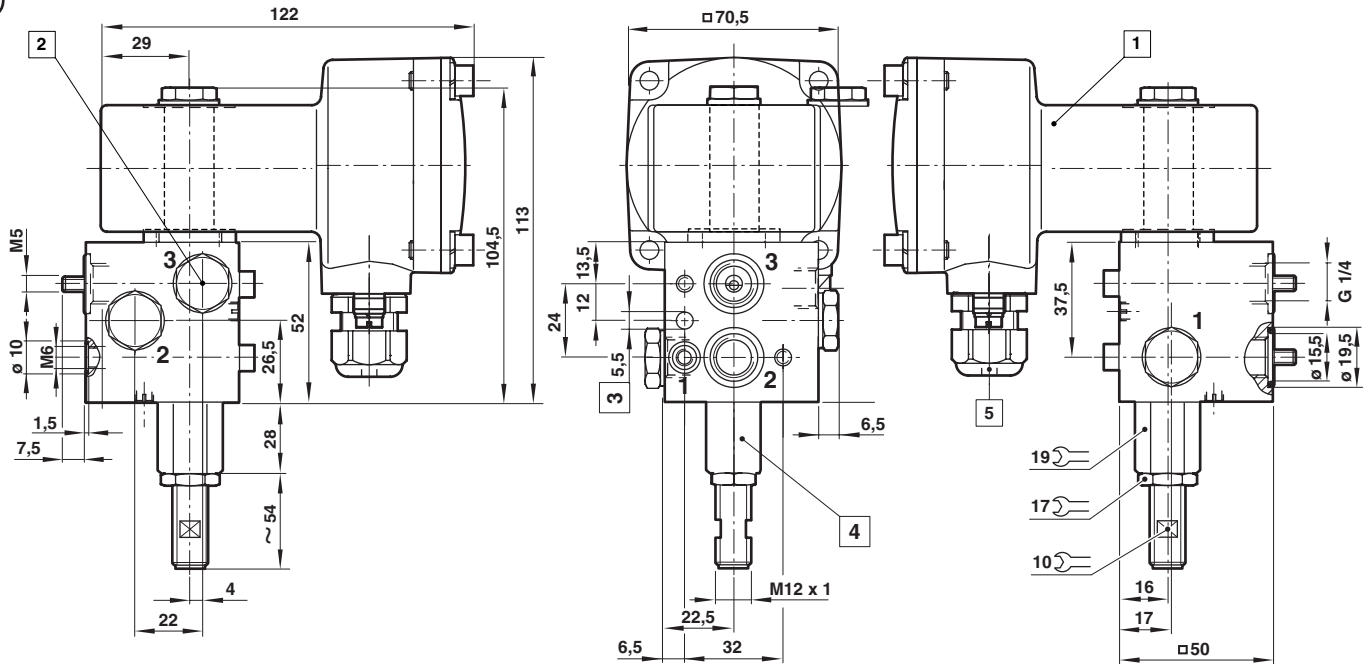
Dimensions in mm
Projection/First angle



1



2



- 1 Solenoid
- 2 Locked with plug and sealing washer
- 3 3 mm deep
- 4 Position sensor
- 5 Cable gland included in scope of supply

Position sensor

Supply voltage (U_b):

7,7 ... 9 V d.c.

Ripple:

15%

Frequency of operating cycles:

1000 Hz

Protection class:

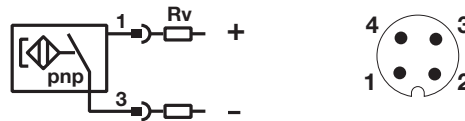
IP68

Pressure-resistant:

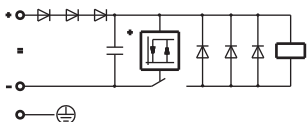
500 bar

Ambient temperature:

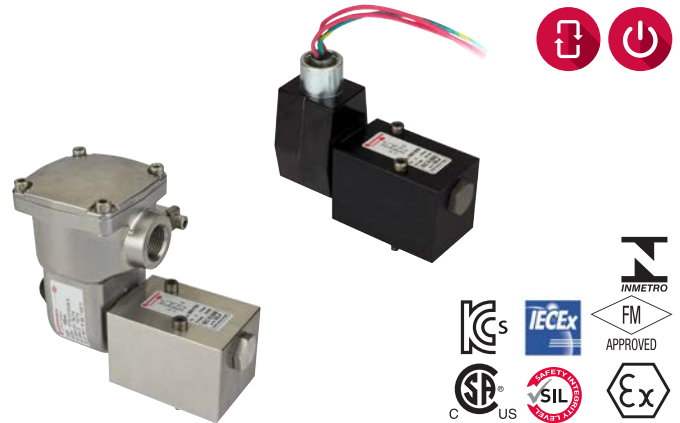
-25 ... +70°C



Circuit diagram



- > High flow range (950 l/min)
- > Main application: Single acting actuators
- > TÜV-approval based on type examination DGRL 97/23/EG and IEC 61 508, multichannel up to SIL 3
- > Optional valve position sensors
- > Suited for outdoor use under critical environment conditions
- > Variable valve solenoid combination



Technical features

Medium:
Filtered, non-lubricated and dried compressed air, instrument air, nitrogen and other non-flammable neutral, dry fluids

Operation:
Direct solenoid operated poppet valve

Operating pressure:
0 ... 10 bar (0 ... 145 psi)

Orifice:
8 mm

Flow:
Gaseous fluids: 950l/min

Port size:
Flanged

Flow direction:
Optional

Ambient/Media temperature:
-40 ... +60°C (-40 ... +140°F)
-25 ... +60°C (-13 ... +140°F) (SIL version)

Depending on solenoid system
Air supply must be dry enough to avoid ice formation at temperatures below +2°C (35°F).
For outdoor installations must be protected all connections against the penetration of moisture and a solenoid with IP66 protection must be used!





Materials:
Body: Aluminium anodized or stainless steel 1.4404 (316 L)
Seals: NBR

Technical data

Symbol	Temperature (°C)	Material seat seal	housing	Inductive limit sensor	Weight (kg)	Test certificate IEC 61 508 *2)	Dimension No.	Model *1)	Substitute
	-40 ... +60	NBR	aluminium	without	0,65	X	1	9801595	07
	-40 ... +60	NBR	stainless steel	without	1,50	X	1	9801795	08
	-25 ... +60	NBR	aluminium	integrated	0,72	X	2	9801594	09
	-25 ... +60	NBR	stainless steel	integrated	1,57	X	2	9801794	10

*1) When ordering please indicate solenoid, voltage and current type (frequency).
*2) For operation in plants according to IEC 61511/61508 (-25 ... +60°C)

Solenoids

	Power consumption		Rated current		Protection class IP/NEMA	Ex-Protection (ATEX-Category)	Temperature Ambient/ Media (°C)	Electrical connection	Weight (kg)	Drawing No.	Circuit diagram No.	Model
	24 V d.c. (W)	230 V a.c. (VA)	24 V d.c. (mA)	230 V a.c. (mA)								
	8,9	—	369	—	NEMA 4, 4X, 6, 6P, 7, 9	XP/DIP, Div. 1 & 2 Cl. I, Gr. A-D Cl. II/III, Gr. E-G T3 (160°C)	-20 ... +60	Flying leads 450 mm	0,5	8	1	3824
	—	9,5	—	41	NEMA 4, 4X, 6, 6P, 7, 9	XP/DIP, Div. 1 & 2 Cl. I, Gr. A-D Cl. II/III, Gr. E-G T3 (160°C)	-20 ... +60	Flying leads 450 mm	0,5	8	5	3825
	13,6	—	567	—	NEMA 4, 4X, 6, 6P, 7, 9	XP/DIP, Div. 1 & 2 Cl. I, Gr. A-D Cl. II/III, Gr. E-G T3 (160°C)	-20 ... +60	Flying leads 450 mm	0,5	8	1	3826
	—	15,7	—	68	NEMA 4, 4X, 6, 6P, 7, 9	XP/DIP, Div. 1 & 2 Cl. I, Gr. A-D Cl. II/III, Gr. E-G T3 (160°C)	-20 ... +60	Flying leads 450 mm	0,5	8	5	3827
	8,9	—	369	—	IP66 (with cable gland)	II 2 G Ex e mb IIC T4/ T5 Gb II 2 D Ex tb IIC T130°C Db IP66	T4: -40 ... +65 T5: -40 ... +55 -40 ... +65	M20 x 1,5 *1)	0,5	6	4	4270
	—	10,0	—	43	IP66 (with cable gland)	II 2 G Ex e mb IIC T4/ T5 Gb II 2 D Ex tb IIC T130°C Db IP66	T4: -40 ... +65 T5: -40 ... +55 -40 ... +65	M20 x 1,5 *1)	0,5	6	7	4271
	8,9	—	369	—	IP66 (with cable gland)	II 2 G Ex d mb IIC T4/ T6 Gb II 2 G Ex e mb IIC T4/ T6 Gb II 2 D Ex tb IIC T130°C Db	T4: -40 ... +70 T6: -40 ... +40 -40 ... +70	1/2 NPT *1)	0,8	7	20	4670
	—	10,0	—	43	IP66 (with cable gland)	II 2 G Ex d mb IIC T4/ T6 Gb II 2 G Ex e mb IIC T4/ T6 Gb II 2 D Ex tb IIC T130°C Db	T4: -40 ... +70 T6: -40 ... +40 -40 ... +70	1/2 NPT *1)	0,8	7	21	4671
	8,9	—	369	—	IP66 (with cable gland)	II 2 G Ex d mb IIC T4/ T6 Gb II 2 G Ex e mb IIC T4/ T6 Gb II 2 D Ex tb IIC T130°C Db	T4: -40 ... +70 T6: -40 ... +40 -40 ... +70	M20 x 1,5 *1)	0,8	7	20	4672
	—	10,0	—	43	IP66 (with cable gland)	II 2 G Ex d mb IIC T4/ T6 Gb II 2 G Ex e mb IIC T4/ T6 Gb II 2 D Ex tb IIC T130°C Db	T4: -40 ... +70 T6: -40 ... +40 -40 ... +70	M20 x 1,5 *1)	0,8	7	21	4673
	8,9	—	369	—	IP66 (with cable gland)	II 2 G Ex mb d IIC T4/T6 II 2 G Ex mb e II T4/T6	T4: -40 ... +50 T6: -40 ... +40	M20 x 1,5 *1)	1,2	10	4	4872
	—	10	—	43	IP66 (with cable gland)	II 2 G Ex mb d IIC T4/T6 II 2 G Ex mb e II T4/T6	T4: -40 ... +50 T6: -40 ... +40	M20 x 1,5 *1)	1,2	10	7	4873

Standard voltages (±10%) 24 V d.c., 230 V a.c., other voltages on request. Design according to VDE 0580, EN 50014/50028. 100% duty cycle.

*1) Connector/cable gland is not scope of delivery, see table »Accessories«

Attention: The protection class for coil series 46xx and 48xx is determined by the choice of cable gland.

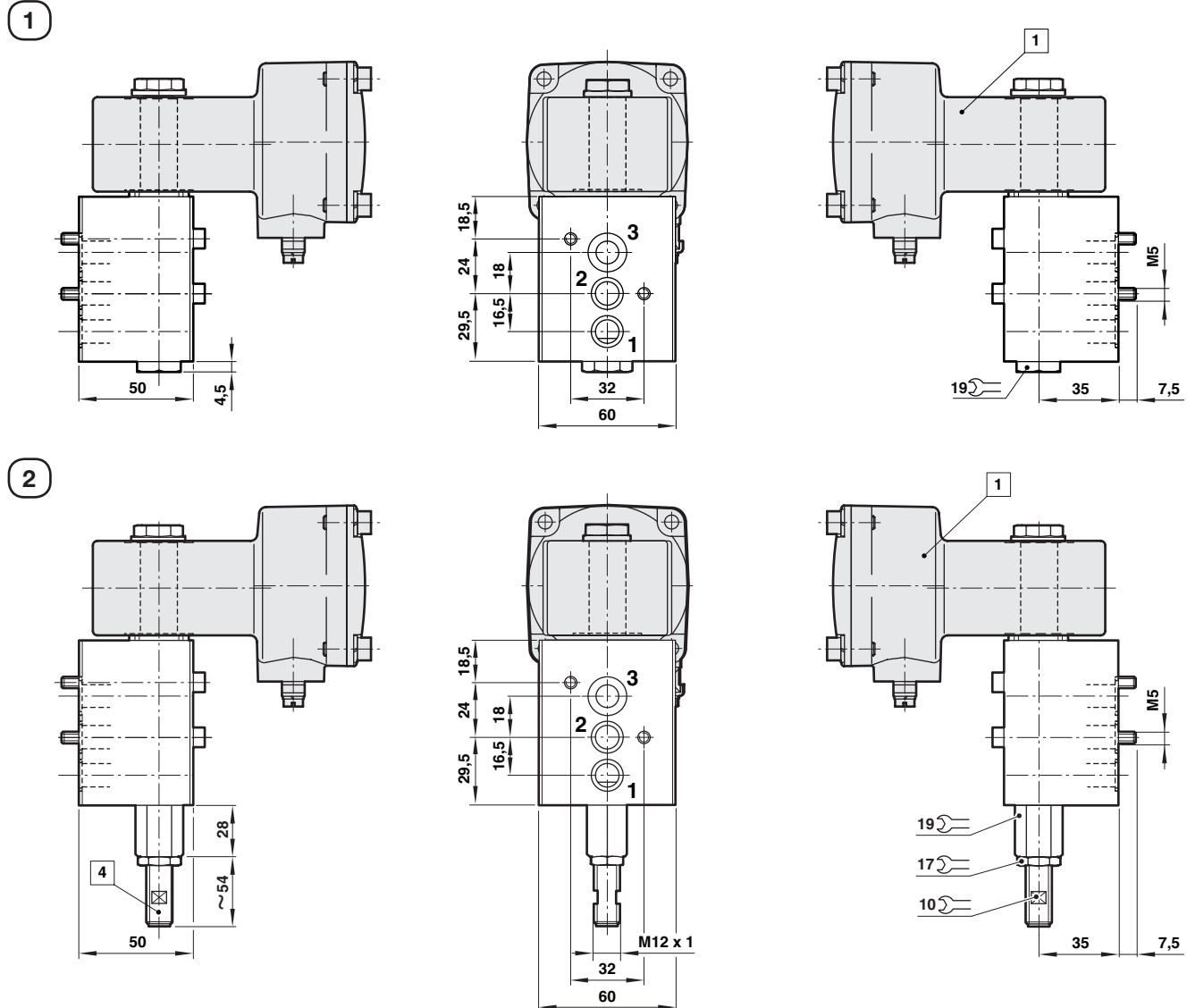
Example: if an ATEX-certified cable gland is used that has Ex d type of protection, the solenoid will have the protection class Ex d mb; if a cable gland with Ex e type of protection is used, the solenoid will have protection class Ex e mb.

Approvals

Model	Approvals ATEX	IECEX	FM	Datasheet
372x, 382x			CSA-LR 57643-6	N/en 7.1.575
42xx	KEMA 98 ATEX 4452 X	IECEX KEM 09.0068X		N/en 7.1.580
46xx	PTB 02 ATEX 2085 X	IECEX PTB 11.0094X		N/en 7.1.585
48xx	PTB 06 ATEX 2054 X	IECEX PTB 07.0039X		N/en 7.1.590

Drawings
Valves

Dimensions in mm
Projection/First angle



- 1 Solenoid optional
- 4 Position sensor

Position sensor

Supply voltage (U_b):
7,7 ... 9 V d.c.

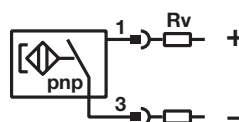
Ripple:
15%

Frequency of operating cycles:
1000 Hz

Protection class:
IP68

Pressure-resistant:
500 bar

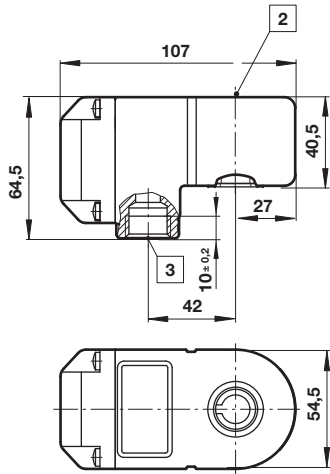
Ambient temperature:
-25 ... +70°C



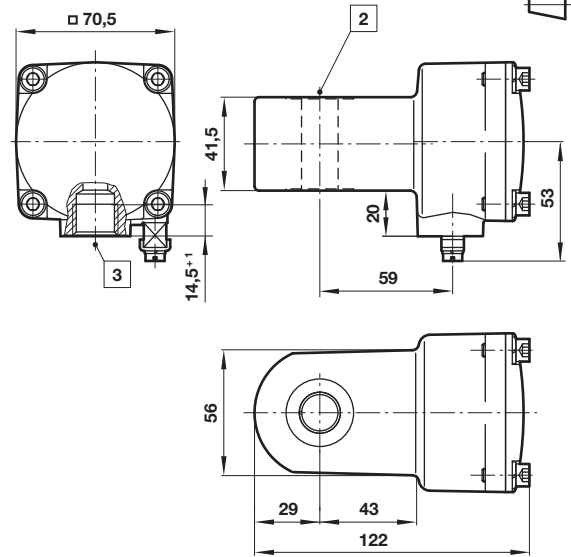
Solenoids

Dimensions in mm
Projection/First angle

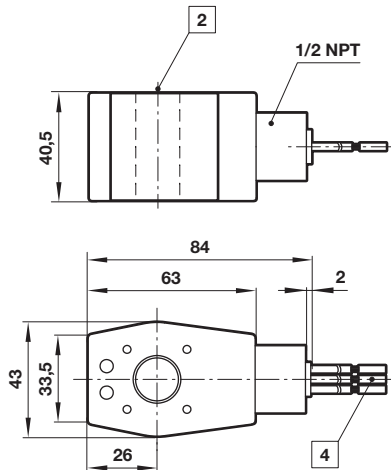
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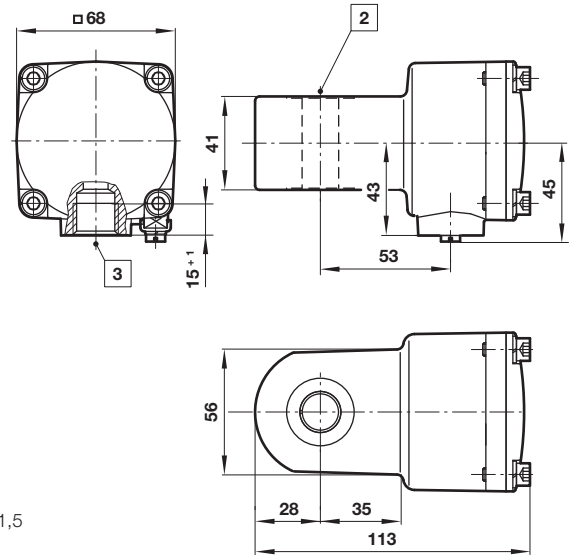
7



8



10

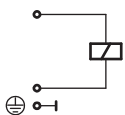


- 1 Connector can be indexed by 4x90°
- 2 Ø 16 or 13 (with spacer tube)
- 3 M20 x 1,5 or 1/2 NPT
- 4 Flying leads AWG 18 (450 mm long)
- 5 With cable gland, Pg 13,5

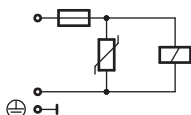
- 2 Ø 16
- 3 M20 x 1,5

Circuit diagrams

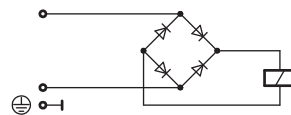
1



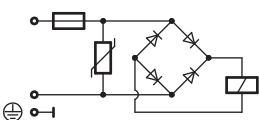
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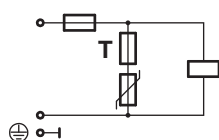
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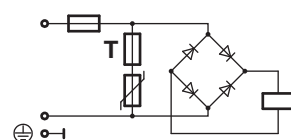
7



20



21



- > High flow range (950 l/min)
- > Main application: Single acting actuators
- > TÜV-approval based on type examination DGRL 97/23/EG and IEC 61 508, multichannel up to SIL 3
- > Suited for outdoor use under critical environment conditions



Technical features

Medium:
Filtered, non-lubricated and dried compressed air, instrument air, nitrogen and other non-flammable neutral, dry fluids

Operation:
Indirect solenoid operated poppet valve.

Operating pressure:
2 ... 8 bar (29 ... 116 psi) with internal air supply

Flow:
Gaseous fluids: 950l/min

Orifice:
8 mm

Port size:
Flanged

Flow direction:
Fixed

Ambient/Media temperature:
-40 ... +60°C (-40 ... +140°F)
-25 ... +60°C (-13 ... +140°F) (SIL version)

Depending on solenoid system
Air supply must be dry enough to avoid ice formation at temperatures below +2°C (35°F).
For outdoor installations must be protected all connections against the penetration of moisture and a solenoid with IP66 protection must be used!

Materials:
Body: Aluminium anodized (suitable for high humidity, sulphuric, sodium chloride or ammonia environments), stainless steel 1.4404 (316 L)
Seal: NBR
Inner parts: stainless steel

Technical data


Symbol	Temperature (°C)	Material seat seal	housing	Inductive limit sensor	Weight (kg)	Test certificate IEC 61 508 *2)	Dimension No.	Model *1)	Substitute
	-40 ... +60	NBR	aluminium	without	0,75	X	1	9802595	31
	-40 ... +60	NBR	stainless steel	without	1,70	X	1	9802795	32

In order to ensure full flow and proper function make sure that sufficient pressure supply with feed pipe diameters according to the port size is available. (Minimum pressure: 3 bar)

*1) When ordering please indicate solenoid, voltage and current type (frequency).

*2) For operation in plants according to IEC 61511/61508 (-25 ... +60°C)

Solenoid actuators for intrinsically-safe circuits

	Nominal resistance RN coil (Ω)	Min. required switching current (mA)	Resistance Rw 60 coil (Ω)	Required voltage at terminal Rw 60 (V)	IP Protection class	Ex-Protection (ATEX-Category)	Temperature Ambient/Media (°C)	Weight (kg)	Circuit diagram No.	Model
	200	33	240	8	IP66 (with cable gland)	II 2 G Ex ia IIC T4/ T6 Gb II 2 D Ex ia IIIC T80°C Db II 2 D Ex ia IIIC T100°C Db	T4: -40 ... +80 T6: -40 ... +60 -40 ... +60 -40 ... +80	0,85	10	2050
	391	24	460	11	IP66 (with cable gland)	II 2 G Ex ia IIC T4/ T6 Gb II 2 D Ex ia IIIC T80°C Db II 2 D Ex ia IIIC T100°C Db	T4: -40 ... +80 T6: -40 ... +60 -40 ... +60 -40 ... +80	0,85	10	2051
	736	17	880	15	IP66 (with cable gland)	II 2 G Ex ia IIC T4/ T6 Gb II 2 D Ex ia IIIC T80°C Db II 2 D Ex ia IIIC T100°C Db	T4: -40 ... +80 T6: -40 ... +60 -40 ... +60 -40 ... +80	0,85	10	2052
	1220	13	1460	19	IP66 (with cable gland)	II 2 G Ex ia IIC T4/ T6 Gb II 2 D Ex ia IIIC T80°C Db II 2 D Ex ia IIIC T100°C Db	T4: -40 ... +80 T6: -40 ... +60 -40 ... +60 -40 ... +80	0,85	10	2053

Cable gland (cable Ø 5 ... 10 mm) is in scope of delivery

When selecting an intrinsically safe power supply, the permissible maximum values according to the Certificate of Conformity should be taken into account.

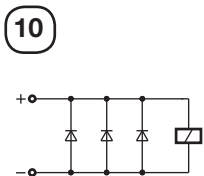
Ui = 45 V, Ii = 500 mA according to Tab. A. 1, EN 60079-11

Pi = 2,0 W, Li and Ci can be ignored.

Approvals

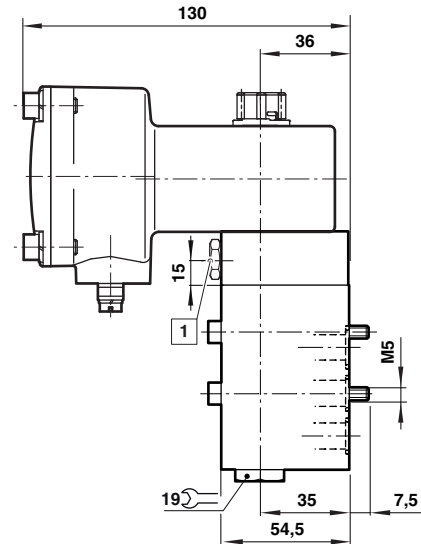
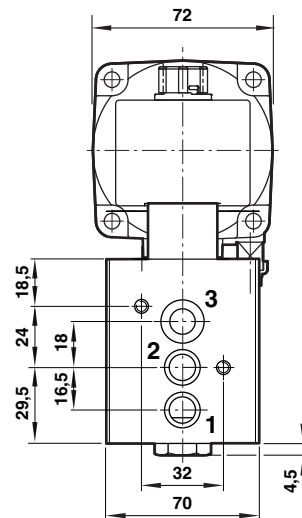
Model	Approvals ATEX	IECEX	Datasheet
205x	PTB 07 ATEX 2019	IECEX PTB 07.0017	N/en 7.1.535

Circuit diagrams



Drawings Valves

1



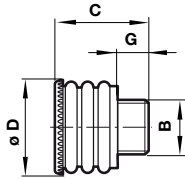
Dimensions in mm
Projection/First angle



Accessories

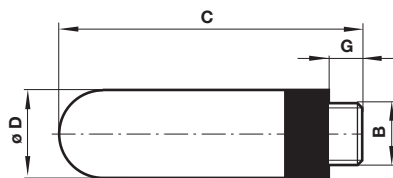
Exhaust guard (plastic) - standard option

Dimensions in mm
 Projection/First angle



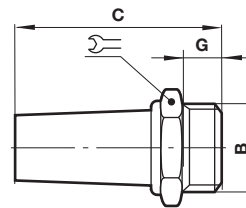
B	Suitable for	G	C	Ø D	Weight (g)	Model
1/4"	G 1/4, 1/4 NPT	10	26,5	21	5	0613422
1/2"	G1/2, 1/2 NPT	12	33,5	29	11	0613423


Silencer



B	G	C	Ø D	Weight (g)	Model
G 1/4	7	35,5	15,5	2,9	M/S2
1/4 NPT	7	35,5	15,5	2,9	C/S2
G1/2	12	67	23	11,5	M/S4
1/2 NPT	12	67	23	11,5	C/S4

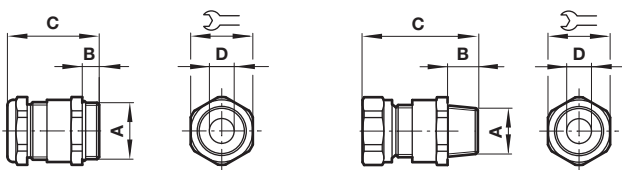
Silencer (brass or stainless steel)




B	C	G		Weight (g)	Model
G 1/4	33	8	17	18	T40C2800
1/4 NPT	35	8	9/16	18	MS002A
G 1/4	36	8	16	23	0014613 *1)
1/4 NPT	36	8	16	67	0613678 *1)
G 1/2	56	12	27	63	T40C4800
1/2 NPT	48	12	7/8	63	MS004A
G 1/2	49	12	24	81	0014813 *1)
1/2 NPT	49	12	24	235	0613679 *1)

*1) Stainless steel

Cable gland

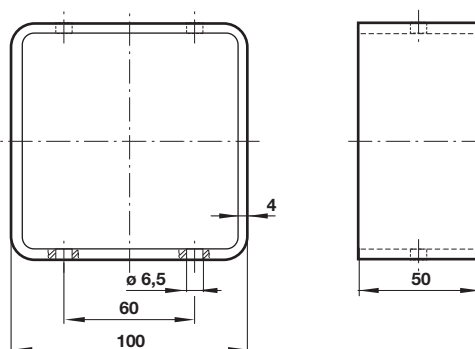


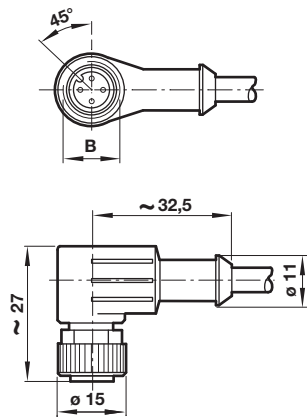
0588925 only

A	B	C	Ø D		Model
M20 x 1,5	9	36	5 ... 8	22	0588819
M20 x 1,5	6,5	27,5	9 ... 13	22	0589385
M20 x 1,5	14	39	10 ... 14	24	0588851
1/2 NPT	15	58	7,5 ... 11,9	24	0588925
M20 x 1,5	14	39	7 ... 12	24	0589395
M20 x 1,5	10	34	10 ... 14	24	0589387

Bracket

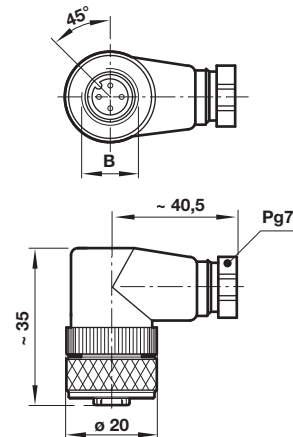
Model: A165-95
 Weight: 0,61 kg



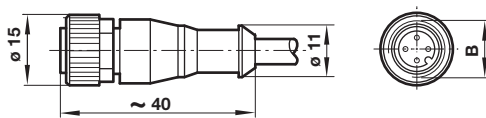
**Connector - valve position sensor
90°, 4 pin, with cable**


B	Cable Wire x dim.	Cable Material	Cable length	Weight (g)	Model
M12 x 1,5	4 x 0,34 mm ²	PUR	2 m	90	0523058
M12 x 1,5	4 x 0,34 mm ²	PUR	5 m	180	0523053

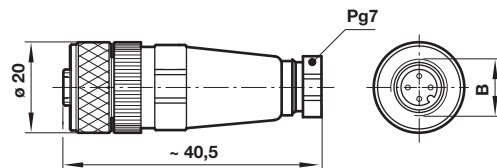
90°, 4 pin, without cable

 Dimensions in mm
Projection/First angle


B	Weight (g)	Model
M12 x 1,5	30	0523056

straight, 4 pin, with cable


B	Cable Wire x dim.	Cable Material	Cable length	Weight (g)	Model
M12 x 1,5	4 x 0,34 mm ²	PUR	2 m	80	0523057
M12 x 1,5	4 x 0,34 mm ²	PUR	5 m	200	0523052

straight, 4 pin, without cable


B	Weight (g)	Model
M12 x 1,5	26	0523055

Warning

These products are intended for use in industrial compressed air and fluid systems only. Do not use these products where pressures and temperatures can exceed those listed under »**Technical features/data**«. Before using these products with fluids other than those specified, for non-industrial applications, life-support systems, or other applications not within published specifications, consult IMI NORGREN.

Through misuse, age, or malfunction, components used in fluid power systems can fail in various modes. The system designer is warned to consider the failure modes of all component parts used in fluid power systems and to provide adequate safeguards to prevent personal injury or damage to equipment in the

event of such failure.

System designers must provide a warning to end users in the system instructional manual if protection against a failure mode cannot be adequately provided.

System designers and end users are cautioned to review specific warnings found in instruction sheets packed and shipped with these products.

Functional safety (SIL):

Suitable for certain applications can only be evaluated through examination of each safety-related overall system with regard to the requirements of IEC 61508/61511.