

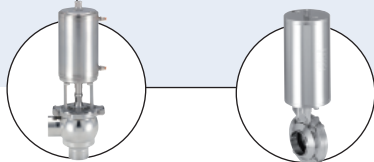
8681 Control head



Control head for hygienic process valves

- Universal attachment for hygienic process valves
- Contactless position measurement system with 3 switching points (Teach-In function)
- Coloured status display
- Manual override operative with closed housing
- Communication AS-Interface, DeviceNet (option)

Type 8681 can be combined with...



Single seat valve
Double seat valve

Butterfly valve
Ball valve

The type 8681 control head is optimised for decentralised automation of hygienic process valves. Thanks to its universal adapter it can be combined with all normal commercial butterfly valves, ball valves, single and double seated valves. With a decentralised automation concept, the control head takes over all pneumatic actuation, feedback and diagnostic functions up to and including field bus communication. The housing is easy to clean and features proven electrical IP protection and chemically resistant materials for use in hygienic processing in food, beverage and pharmaceutical industries.

Depending on the process valve type, up to 3 pneumatic actuator chambers can be controlled independently from each other. The switching speeds of both movement directions can be set separately. A built-in check valve prevents incorrect switching of process valve actuator chambers which could result from back-pressure.

The process valve switching positions are detected by an inductive, analogue position sensor and reported to the PLC system. Up to 3 switching points can be adjusted automatically by a Teach-In function. Additionally a fourth switching position can be read in and fed back via an external inductive proximity switch. The coloured status display signals the particular process valve switching position or indicates a diagnostic function such as maintenance required status or fault conditions.

The pilot valves are equipped with a manual override. If the device housing is closed, the patented magnetically encoded manual override tool can be used to open the process valve from the exterior. Bus communication is available with AS-interface or DeviceNet.

Technical data	
Material	
Body	PA, PPO, VA
Cover	PC
Seal	CR, EPDM
Control medium	neutral gases, air DIN ISO 8573-1 (filter 5 µm recommended)
Dust concentration	Class 7 (<40 µm particle size)
Particle density	Class 7 (<10 mg/m ³)
Pressure condensation point	Class 3 (<-20°C)
Oil concentration	Class X (<25 mg/m ³)
Supply pressure	2.5... 8 bar
Air capacity solenoid valve¹⁾ (supply and exhaust air per solenoid valve adjustable)	110 l _N /min - for pressurization and exhaust, lifting device 110 l _N /min - delivery condition 200 l _N /min - max. typical flow rate (throttle)
Pilot air ports	
Air inlet and outlet	G 1/4
Service ports	G 1/8
Position sensor	
Outlet current	non-contact position sensor, 3 self-regulated switching points PNP (Teach-In function) closer (normally open), PNP-output short-circuit proof, with clocking short-circuit protection
Stroke range	max. 100 mA per feedback signal
Resolution	0 to 80 mm
Total error	≤ 0.1 mm ± 0.5 mm - when using a target for the dimensional drawing, material 1.4021 and a piston rod (Ø 22 mm, material 1.4301) (error refers to the reproducibility of the teach-position)
Ambient temperature	
	-10 to +55°C +5 to +55°C (ATEX II 3G Ex nA IIC T4; ATEX II 3G Ex tD A22 T135°C)
Installation	As required, preferably with actuator in upright position

¹⁾ QNn-value acc. to the definition with decrease in pressure from 7 to 6 bar absolute with 20°C

Technical data, continued

Type of protection	IP 65/67 acc. to EN 60529
Protection class	3 (AS-Interface, 24 V DC, DeviceNet); 1 (120 V AC) acc. to DIN EN 61140
Fieldbus communication	AS-Interface, DeviceNet
EG-Conformity	EMV2004/108/EG; ATEX 94/9/EG
Ignition protection	ATEX II 3G Ex nA IIC T4 ATEX II 3G Ex tD A22 T135°C

Without fieldbus communication; 24 V DC	
Power supply	12 to 28 V DC
Residual ripple with DC	max. 10%
Power consumption	< 5 W (acc. to version and operating status, see instruction manual)
Valve control input (Y1 - Y3)	
Signal level - active	U > 10 V, max. 24 V DC + 10%
Signal level - inactive	U < 5 V
Impedance	U > 30 kOhm
Outputs / binary feedback signals	
Design	S1 out - S4 out
Switchable output current	Normally open contact, PNP output short circuit proof, with self-locking short circuit protection
Output voltage - active	max. 100 mA per feedback signal
Output voltage - inactive	≥ (operating voltage - 2 V) max. 1 V im in unloaded state
Input / proximity switch	
(external initiator: S4 in)	
Operating voltage	Voltage present at control head - 10%
Current carrying capacity, sensor power supply	max. 90 mA short-circuit protection
Design	DC 2- and 3-conductor, NO or NC (factory setting NO), PNP output
Input current 1 signal	$I_{\text{Sensor}} > 6.5 \text{ mA}$, limited internally to 10 mA
Input voltage 1 signal	$U_{\text{Sensor}} > 10 \text{ V}$
Input current 0 signal	$I_{\text{Sensor}} < 4 \text{ mA}$
Input voltage 0 signal	$U_{\text{Sensor}} < 5 \text{ V}$
Electrical connection	
Multipole	M12 12-pin with cable 8 cm, 1 x M16 x 1.5 cable glands for external initiator (clamping range 3... 6 mm)
Cable gland	M16 x 1.5 (cable-Ø 5... 10 mm, screw terminals 0.14... 1.5 mm ²), 1 x M16 x 1.5 Kabelverschraubung für externen Initiator (Klemmbereich 3... 6 mm)

Without Fieldbus communication; 120 V AC	
Power supply	110 to 130 V AC / 50/60 Hz
Current consumption (stand by current)	10 mA at 120 V AC
Valve control inputs (Y1 - Y3)	
Signal level - active	U > 60 V AC
Signal level - inactive	U < 20 V AC
Impedance	> 40 kOhm
Outputs / binary feedback signals	
Design	S1 out - S3 out
Switchable output current	Normally open contact, L switching, short-circuit protection via automatically resetting fuse
Output voltage - active	max. 50 mA per feedback signal
Output voltage - inactive	≥ (operating voltage - 2 V) max. 1 V in unloaded state
Input / proximity switches	
(external initiator: S4 in)	
Operating voltage	Voltage present at control head - $U_{\text{Nominal}} = 120 \text{ V AC}$, 50/60 Hz
Current carrying capacity, sensor power supply	max. 0.7 A
Design	DC 2- and 3-conductor, NO contact, L switching
Input current 1 signal	$I_{\text{Sensor}} < 2 \text{ mA}$
Electrical connection	
Cable gland	M16 x 1.5 (cable-Ø 5... 10 mm, screw terminals 0.4... 1.5 mm ²), 1 x M16 x 1.5 cable glands for external initiator (clamping range 3... 6 mm)

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With Fieldbus communication; AS-Interface	
Profil	S-7.A.E (A/B slave max. 62 slaves/master) S-7.F.F (max. 31 slaves/master)
Power supply above bus line from bus signal separated	as Specification reversible (Jumper)
Power consumption equipment without external power supply Max. current consumption Current consumption in normal operation (acc. to reduction of electric current; Valve + 1 end position achieved)	240 mA (incl. external initiator with 90 mA) ≤ 150 mA 3 valves activated, 1 position feedback with LED display, no external initiator
Power consumption equipment with external power supply The power supply unit must include a secure disconnect in accordance with IEC 364-4-41. It must conform to SELV standard. The ground potential may no have an earth connection.	19.2 V DC to 31.6 V DC ≤ 110 mA 24 V DC ≤ 150 mA type
Output (from master perspective) / solenoid valves Max. switching capacity Typ. continuous output Watchdog function Pull-in current Holding current Operating mode Valve type	0.9 W (per solenoid valve) 0.6 W (per solenoid valve) integrated 30 mA or 0.9 W / 200 ms (at 30.5 AS-i-voltage) 20 mA or 0.6 W / 200 ms (at 30.5 AS-i-voltage) Long-term operation (100% operation) 6524
Input / proximity switches (external initiator: S4 in) Operating voltage Current carrying capacity, sensor power supply Design Input current 1 signal Input voltage 1 signal Input current 0 signal Input voltage 0 signal	AS interface voltage present at control head - 10 % max. 30 mA short-circuit protection DC 2- and 3-conductor, NO or NC (factory setting NO), PNP output $I_{\text{Sensor}} > 6.5 \text{ mA}$, limited internally to 10 mA $U_{\text{Sensor}} > 10 \text{ V}$ $I_{\text{Sensor}} < 4 \text{ mA}$ $U_{\text{Sensor}} < 5 \text{ V}$
Electrical connection (ASI flat cable clip at cable 80 cm as standard)	M12 4-pin at cable 8 cm (acc. 0.3 m cable length acc. to AS-Interface Specification) 1 x M16 x 1.5 cable glands for external initiator (clamping range 3... 6 mm). M12 4-pin at cable 80 cm (acc. 1.0 m cable length acc. to AS-Interface Specification) 1 x M16 x 1.5 cable glands for external initiator (clamping range 3... 6 mm).
With Fieldbus communication; DeviceNet	
Power supply	11 to 24 V DC (acc. to specification)
Max. current consumption	200 mA at 24 V DC
Input / proximity switches (external initiator: S4 in) Operating voltage Current carrying capacity, sensor power supply Design Input current 1 signal Input voltage 1 signal Input current 0 signal Input voltage 0 signal	via DeviceNet power supply - 10 % Max. 30 mA DC 2- and 3-conductor, NO contact, PNP output $I_{\text{Sensor}} > 6.5 \text{ mA}$, limited internally to 10 mA $U_{\text{Sensor}} > 10 \text{ V}$ $I_{\text{Sensor}} < 4 \text{ mA}$ $U_{\text{Sensor}} < 5 \text{ V}$
Output (from master perspective) / solenoid valves Max. switching capacity Typ. continuous output Output reduction Pull-in current Holding current Operating mode Valve type	1.0 W 0.6 W integrated via DeviceNet interface electronics 120 mA typ. at 24 V DC (3 valves) 100 mA typ. at 24 V DC (3 valves) Long-term operation (100% operation) 6524
Electrical connection Multipole	M12, 5-pin at cable 80 cm, 1 x M16 x 1.5 cable glands for external initiator (clamping range 3... 6 mm.)

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Technical data, continued

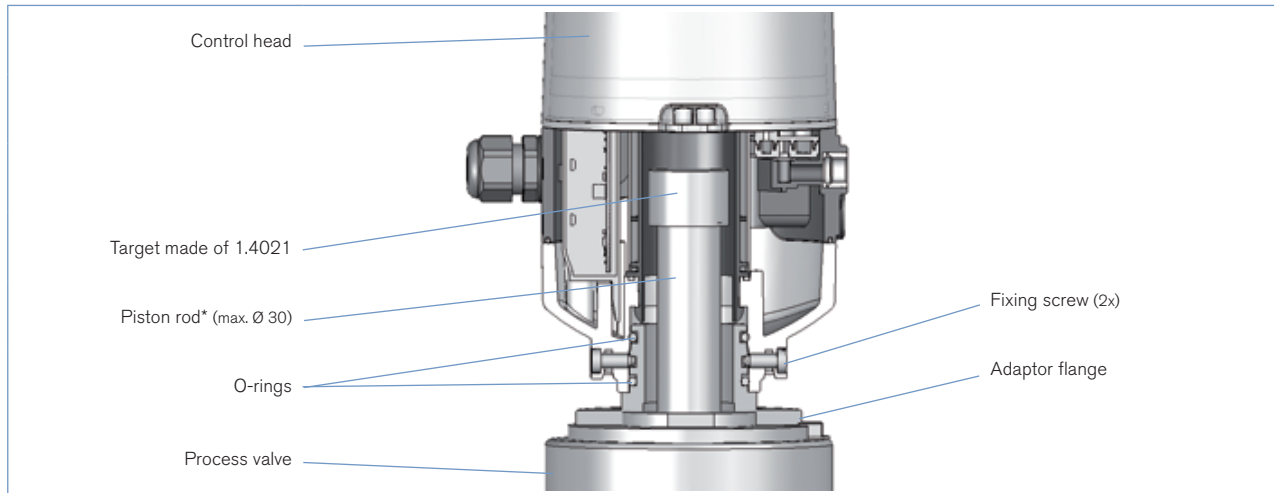
Bit configuration chart

Databit	D3	D2	D1	D0
Input	External initiator S4	Position 3	Position 2	Position 1
Output	not configured	solenoid valve 3	solenoid valve 2	solenoid valve 1
Parameterbit	D3	D2	D1	D0
Output	not configured	not configured	not configured	not configured

Programming data

Databit	Programming data with 62 slaves AS-Interface - Device for A/B-Slave-addressing (Standard device)	Programming data with 31 Slaves AS-Interface (optional)
E/A - configuration	7 hex (4 Inputs / 4 Outputs) see bit configuration chart	7 hex (4 Inputs / 4 Outputs) see bit configuration chart
ID-Code	A hex	F hex
combinative ID-code 1	7 hex	(F hex)
combinative ID-code 2	E hex	(F hex)
Profil	S-7.A.E	S-7.F.F

Flange for process valve



* Target and piston should not be made of ferromagnetic or material with high electrical conductivity (e.g. copper, aluminium). Stainless steel without ferromagnetic properties such as 1.4404 are suitable (if necessary verify after handling).

Materials

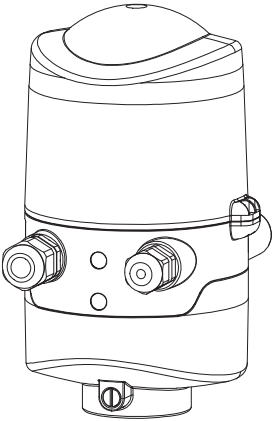
	1	Housing lower part	PPO
	2	Fluid part	PPO
	3	Cable glands	PA
	4	Screws/threaded ports	Stainless steel
	5	Seal	EPDM, CR
	6	Cover	PC

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Connections

Without fieldbus communication 24 V DC

Cable glands

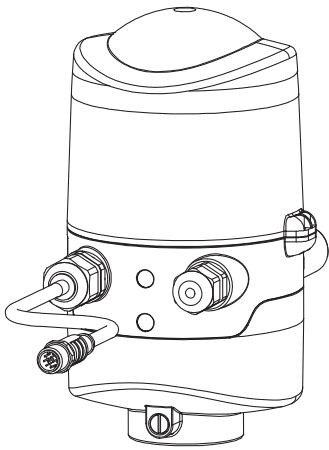


Connection left:
Voltage, signals

Connection right:
external initiator

Cable glands

Version with 12 pin plug (for 24 V)¹⁾



Connection left:
Voltage, signals

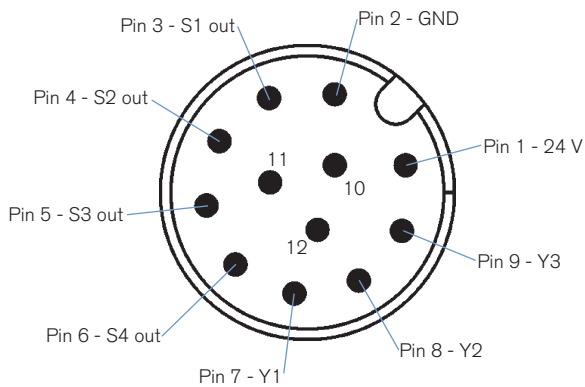
Connection right:
external initiator

¹⁾ M12-plug acc. to IEC 61076-2-101, 12-pin with cable 8 cm

Multipol connection M12, 12-pin

In- and Output signal for superordinated control (SPS):

12-pin round plug M12 x 1,0 (acc. to IEC 61076-2-101)



Pin	Description	Configuration
1	24 V	Power supply 24 V
2	GND	GND
3	S1 out	Output position S1
4	S2 out	Output position S2
5	S3 out	Output position S3
6	S4 out	Output external initiator S4
7	Y1	Input solenoid valve 1
8	Y2	Input solenoid valve 2
9	Y3	Input solenoid valve 3
10		not configured
11		not configured
12		not configured

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Connections, Continued

Without Fieldbus communication 24 V DC cable glands

Description terminal strip	Configuration
24 V	Power supply 24 V
GND	GND
S1 out	Output position 1
S2 out	Output position 2
S3 OUT	Output position 3
S4 OUT	Output external initiator
Y1	Input solenoid valve 1
Y2	Input solenoid valve 2
Y3	Input solenoid valve 3

Description terminal strip	Configuration
24 V	Power supply 24 V for external initiator
S4 IN	Input external initiator
GND	GND external initiator

Without fieldbus communication 120 V AC

Description terminal strip 1	Configuration
PE	Protection earth - protective conductor
L	Power supply 120 V AC
N	live conductor neutral conductor
S1 out	Output position 1
S2 out	Output position 2
S3 out	Output position 3
S4 out	Output external initiator
Y1	Input solenoid valve 1
Y2	Input solenoid valve 2
Y3	Input solenoid valve 3
Description terminal strip 2	Configuration (external initiator)
L	Power supply - live conductor
S4 IN	Input external initiator
N	Power supply - neutral conductor

Connection left: Voltage, signals Connection right: external initiator

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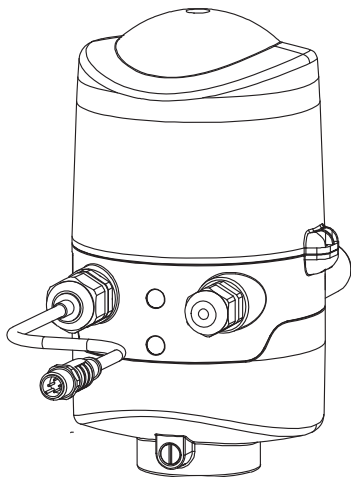
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Connections, continued

With fieldbus communication AS-Interface

with Multipol connection¹⁾

(M12-plug acc. to IEC 61076-2-101, 4-pin) at cable 8 cm

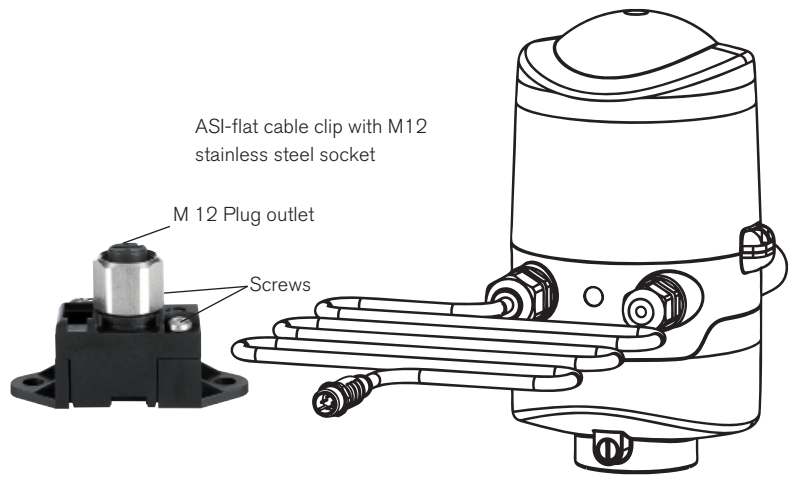


Connection left:
AS-Interface

Connection right:
external initiator

with Multipol connection

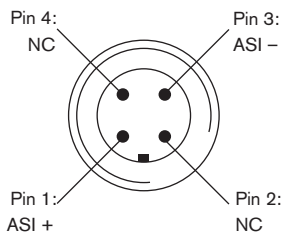
(M12-plug acc. to IEC 61076-2-101, 4-pin) with mounted ASI-flat cable clip at cable 80 cm



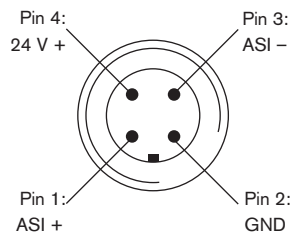
Connection left:
AS-Interface

Connection right:
external initiator

¹⁾ on request

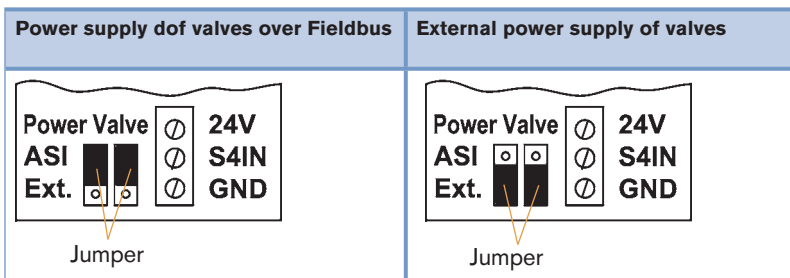


Fieldbus connector
Power supply over
Fieldbus



Fieldbus connector
with external power supply

Pin	Configuration (Power supply over Fieldbus)	Configuration (external power supply)	Wire colour
1	AS-Interface - ASI +	AS-Interface - ASI +	brown
2	not configured	GND	white
3	AS-Interface - ASI -	AS-Interface - ASI -	blue
4	not configured	24 V +	black



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Connections, continued

With fieldbus communication DeviceNet

View of plug from the front onto the pins

Pin 4: CAN_H

Pin 5: CAN_L

Pin 1: Drain

Pin 3: V-

Pin 2: V+

Pin	Signal	Wire colour
1	Drain	shield
2	V+	red
3	V	black
4	CAN_H	white
5	CAN_L	blue

Connection left: DeviceNet

Connection right: external initiator

Pneumatic connection

Exhaust air connection (3/R)
(Silencer has to be mounted)

Solenoid valve 3 (2/A3)

Solenoid valve 2 (2/A2)

Solenoid valve 1 (2/A1)

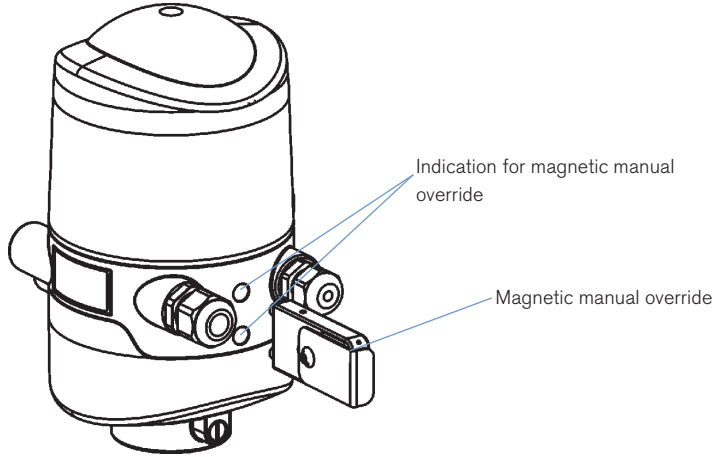
Supply-pressure connection (1/P)

Supply connection (2/A 1-3)

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Magnetic manual override

Activation / De-Activation solenoid valve 1 (process valve maintenance)



Version	Item no.
Magnetic manual override	196 490

Ordering chart control head Type 8681 (other versions on request)

Communication	Power supply	Connection	ATEX zone 2/22 cat. 3	Number of solenoid valves	Feedback	Item no.
Without	12... 28 V DC	Cable glands	without	0	3 int. + 1 ext.	196 410
			without	1	3 int. + 1 ext.	196 411
			without	2	3 int. + 1 ext.	196 412
			without	3	3 int. + 1 ext.	196 413
			with	1	3 int. + 1 ext.	196 415
	12... 28 V DC	M12, 12-pin, cable 8 cm	without	0	3 int. + 1 ext.	196 420
			without	1	3 int. + 1 ext.	196 421
			without	2	3 int. + 1 ext.	196 422
			without	3	3 int. + 1 ext.	196 423
			with	1	3 int. + 1 ext.	196 425
	120 V AC	Cable glands	without	0	3 int. + 1 ext.	196 470
			without	1	3 int. + 1 ext.	196 471
			without	2	3 int. + 1 ext.	196 472
			without	3	3 int. + 1 ext.	196 473
			with	1	3 int. + 1 ext.	196 475
	AS-Interface (62 slaves)	29.5... 31.6 V DC	Version with ASI flat cable clip and cable 80 cm	without	0	3 int. + 1 ext.
without				1	3 int. + 1 ext.	196 431
without				2	3 int. + 1 ext.	196 432
without				3	3 int. + 1 ext.	196 433
with				1	3 int. + 1 ext.	196 435
DeviceNet	via Bus	M12, 5-pin, cable 80 cm	without	0	3 int. + 1 ext.	196 450
			without	1	3 int. + 1 ext.	196 451
			without	2	3 int. + 1 ext.	196 452
			without	3	3 int. + 1 ext.	196 453
			with	1	3 int. + 1 ext.	196 455

i Further versions on request

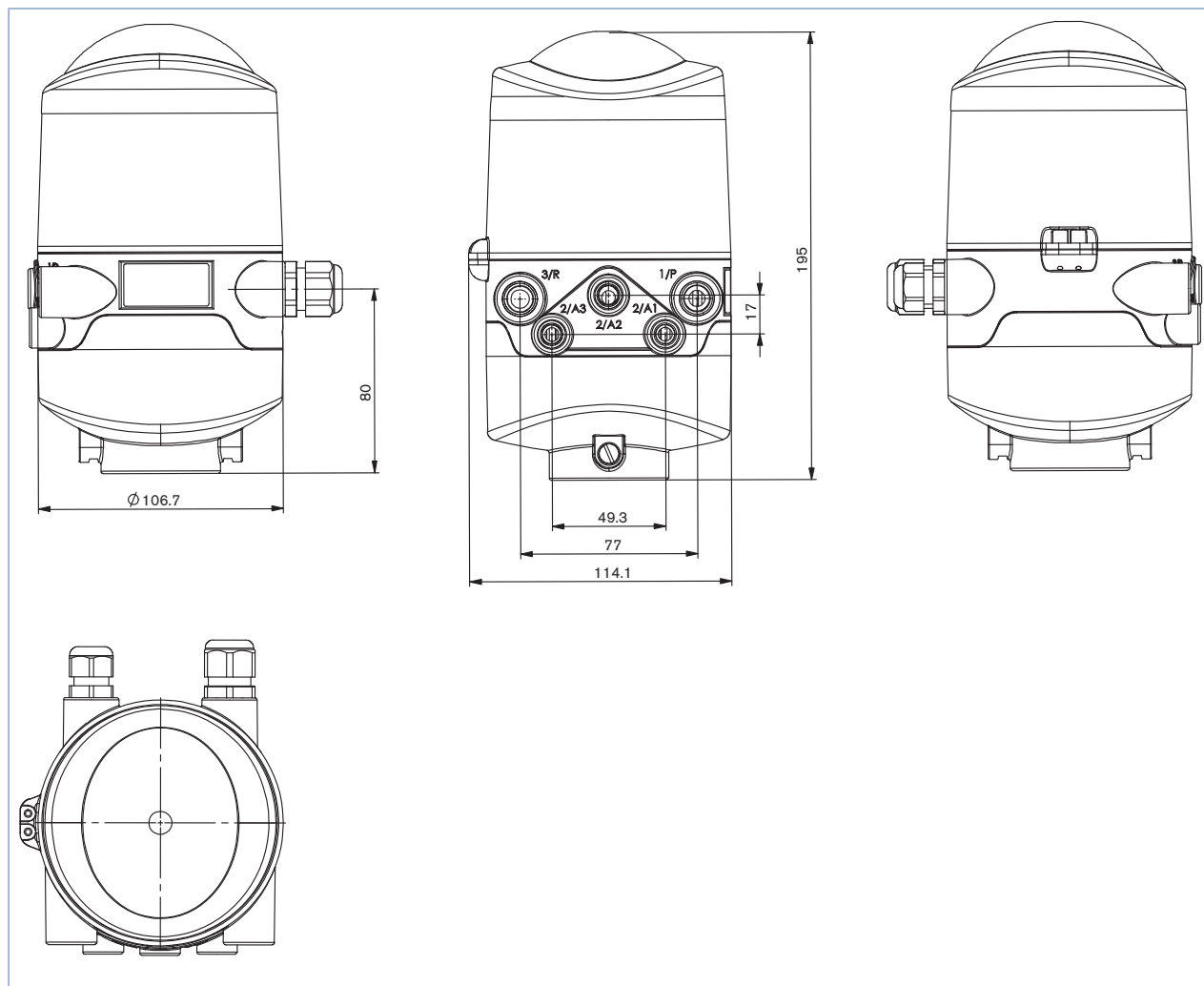
- >** **Additional**
AS-Interface: connection M12 4-pin cable 8 cm
AS-Interface (31 slaves)

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Ordering chart for accessories

Version	Item no.
Silencer PE G 1/4 (spare part)	780 780
Blind plug PP G 1/8 (spare part)	770 901
Rotary push-in fitting, brass nickel-plated G 1/4 for Ø tube 8/6	780 084
Rotary push-in fitting, brass nickel-plated G 1/8 for Ø tube 6/4	780 082
Universal Adaptor with O-ring	196 495
Position sensor target, stainless steel 1.4021	196 494
Magnetic tool for manual override	196 490
Cable 8 cm with M12-plug, 12-pin for 24 V DC (spare part)	217 574
Cable 80 cm with M12-plug, 4-pin for ASi (spare part)	217 572
Cable 8 cm with M12-plug, 4-pin for ASi (spare part)	217 573
ASi flat cable clip with M12 female stainless steel plug	799 646
Cable 80 cm with M12-plug, 5-pin for DeviceNet (spare part)	218 187
USB Adaptor Kit PC communication	227 093
Set with 20 lead seals, to avoid tool-free opening of the cover (spare part)	257 100

Dimensions [mm]

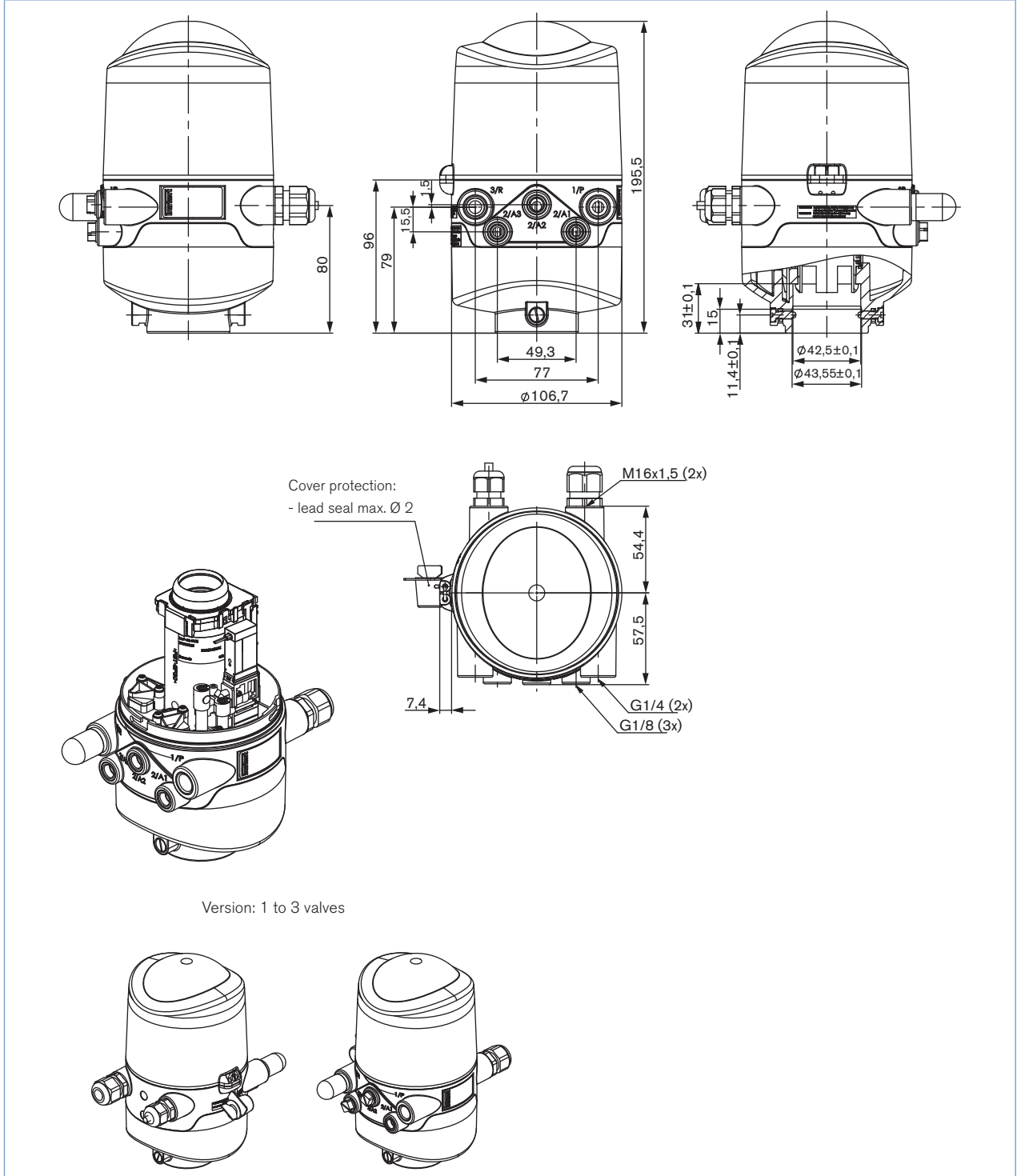


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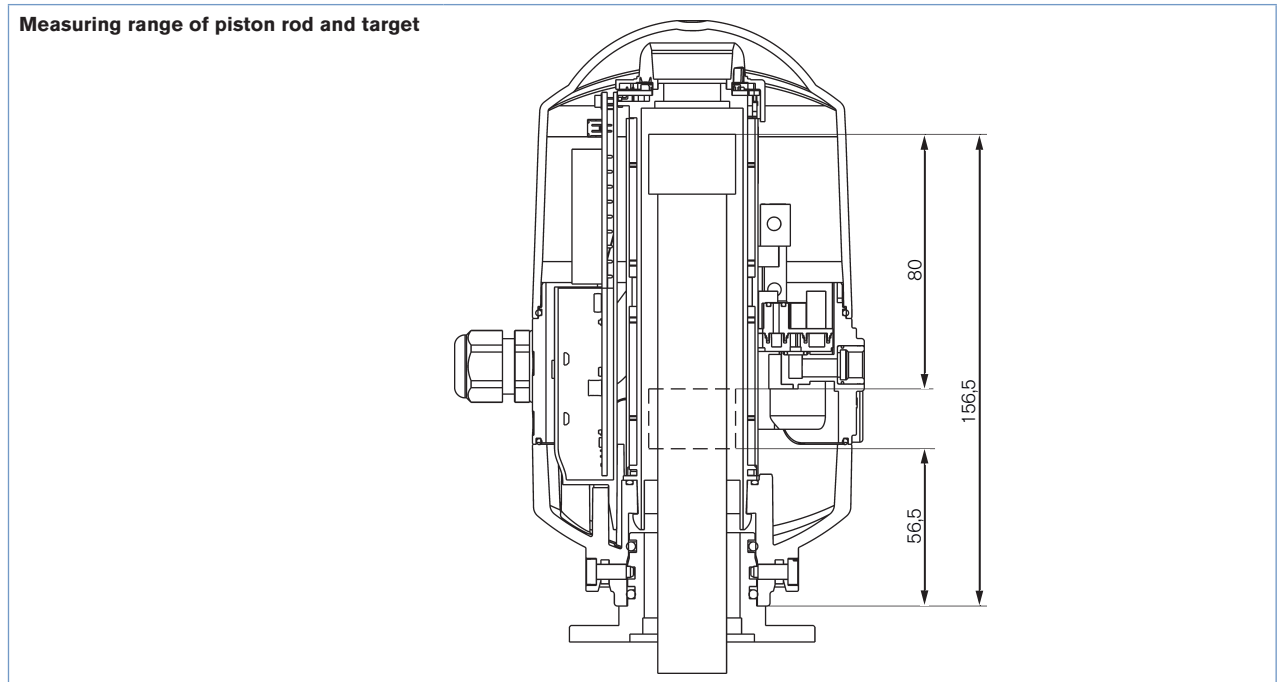
Dimensions [mm], continued

Feedback version (without pilot valves)

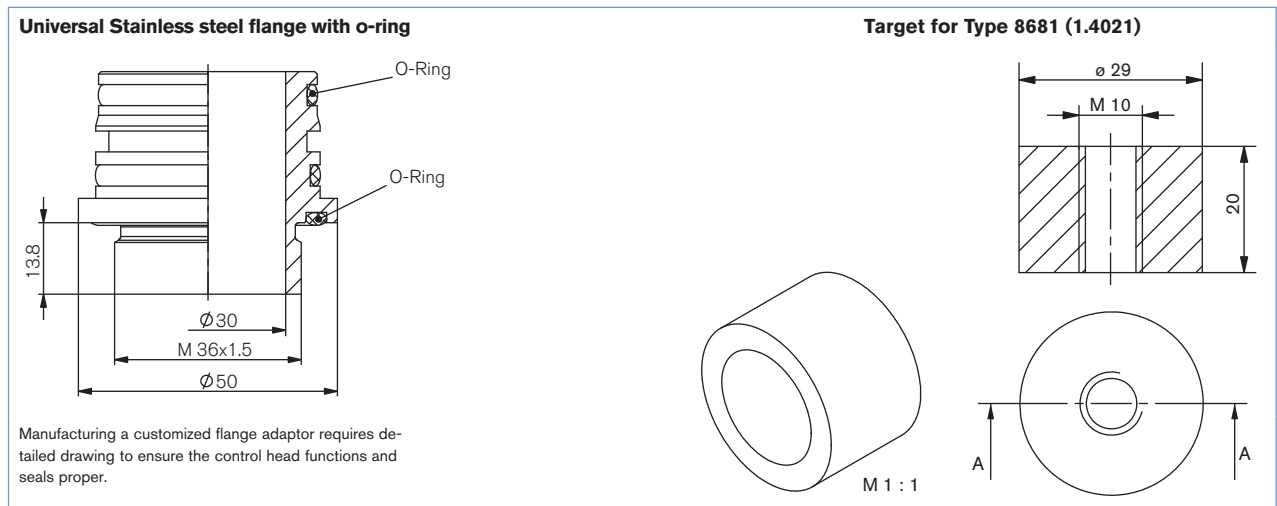


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Dimensions [mm], continued



Accessories dimensions [mm]



Version	Item no.
Universal Stainless steel flangewith O-ring	196 495
Target for Type 8681 made of 1.4021	196 494

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