

Valve controller

AMTRONIC

AMTRONIC R1300
Compressed Air Supply and Position Sign

Type Series Booklet



Legal information/Copyright

Type Series Booklet AMTRONIC

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Automation

Valve Controller

AMTRONIC



Main applications

- Water
- Waste water
- Energy
- Industry
- Shipbuilding
- Oil and gas

Operating data

Operating data overview

Characteristic	Value
Standard enclosure	IP 67 to EN 60529
Electromagnetic compatibility	In conformity with the European EMC Directive 2004/108/EC and NF EN 61000-6-2/NF EN 61000-6-4
Operating temperature	-20 °C to +80 °C
Vibrations	To IEC 68-2-6 Test Fc
Compressed air purity class	ISO 8573-1 Class 5

Design details

- AMTRONIC is an open/close control unit for valves.
- Used for the control of:
 - Quarter-turn actuators from the ACTAIR and DYNACTAIR type series
 - Quarter-turn actuators with standardised VDI/VDE 3845 interface
 - Linear actuators to NAMUR
- AMTRONIC features a LEXAN housing (PC with 20% glass fibre) accommodating the following 3 components:

- Electrical connection
- Control and signalling board
- Compressed air supply
- The compressed air supply is connected via the base:
 - Direct connection to ACTAIR and DYNACTAIR
 - Connection via external piping for quarter-turn actuators with standardised VDI/VDE 3845 interface and for linear actuators to NAMUR
- All AMTRONIC versions incorporate the following electrical and pneumatic functions:
 - Open/closed position signalling via limit switches or proximity sensors, actual-position feedback via a 4-20 mA signal (optional)
 - Compressed air supply via integrated directional control valve (4/2 monostable, 4/2 bistable or 4/3 closed in centre position)
- To ensure a long service life of the pneumatic directional control valves, the compressed air is filtered.
- The actuating times for open/close operations are set via the easily accessible air flow reducer.

Variants

- AMTRONIC can be equipped with a wide range of limit switches and proximity sensors.
- Profibus DP version
- AS-i version
- Actual-position feedback via 4-20 mA signal
- Different supply voltages for the directional control valves

Product benefits

- For commissioning and maintenance, it is possible to manually operate the actuator via the pilot valve's manual override without having to open the cover.
- Fully enclosed design avoids protruding, moving components
- The adjustable cams are reliable and facilitate the setting of the open/closed positions.
- Position indicator under sight glass for remote indication
- Direct mounting to ACTAIR and DYNACTAIR
 - No installation components required (bracket and socket)
 - The compressed air is supplied directly supplied via the VDI/VDE interface.
- The AMTRONIC can be equipped with a variety of different limit switches and proximity sensors from leading suppliers in this field (Pepperl&Fuchs, IFM, Télémécanique, etc.), allowing the control unit to be individually equipped in compliance with customers' requirements.
- The integrated directional control valve is protected against shock, corrosion and dust.

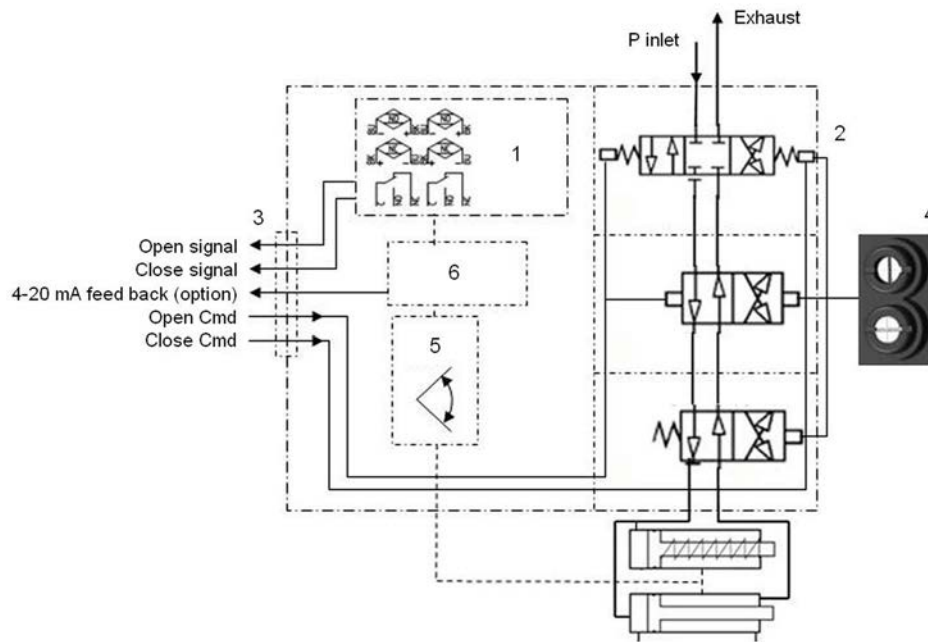
Related documents

Other applicable documents

Document	Reference No.
Operating manual	8514.8371
	42 812 299

Technical data

Functional schematic



1 - Limit switches or proximity sensors

2 - Compressed air supply via a 4/2 bistable, 4/2 monostable or a 4/3 directional control valve which is closed in centre position

3 - Terminal strip

4 - Manual override

5 - Angle sensor (optional)

6 - Actual-position feedback via 4-20 mA signal (optional)

Technical specification

Housing	
Material	LEXAN (PC with 20% glass fibre)
Position indicator	Visual position indicator on the cover
Compressed air connection	2 x 1/4" gas ports
Electrical connection	2 M20 ports for cable gland Connection to screw-type terminal strip (max. 1.5 mm ² cable)
Weight	1.5 kg

Compressed air supply	
Compressed air supply	1/4" gas port, marked "P" with filter fitted in the base
Exhaust	1/4" gas port, marked "E", with silencer or exhaust system connection
Operating pressure	3 to 8 bar (44 to 115 psi)
Filtration	ISO 8573-1 Class 5 (< 40 µm)
Dew point	ISO 8573-1 Class 5 (< 7 °C (pressure) and in all cases < 5 °C below the ambient temperature)
Lubrication	ISO 8573-1 Class 5 (< 25 mg/m ³)
Max. flow rate	400 Nl/min (at 25 °C)
Consumption in "at rest" position	Zero

Compressed air supply function

The directional control valve fitted in the AMTRONIC control unit uses a ceramic-slide technology design.
The compressed air can be dry or lubricated.
They are operated by one or two pilot valves.

Possible configurations:

Double-acting actuators

- 4/2 directional control valve, monostable
- 4/2 directional control valve, bistable
- 4/3 directional control valve, closed when under pressure

With:

Fail-safe position: 'Fail Close' in the event of a power failure
Fail-safe position: 'Fail Open' in the event of a power failure
'Fail-in-last' position when de-energised (4/3 directional control valve)

Single-acting actuators

- 4/2 directional control valve, monostable
- 4/3 directional control valve, closed when under pressure

With:

Fail-safe position: 'Fail Close' in the event of a power failure
Fail-safe position: 'Fail Open' in the event of a power failure
'Fail-in-last' position (4/3 directional control valve), fail-safe position being Fail Open or Fail Close in the event of compressed air supply failure (single-acting actuator)

Table for compressed air supply function

For ACTAIR double-acting actuators

Configuration	Case 1a	Case 1b	Case 2
Fail-safe position, power supply failure	Fail Open	Fail Close	Fail Close or Fail Open
Directional control valve	4/2, monostable	4/2, monostable	4/2, bistable
Pilot valve	1 PV 3/2 NC	1 PV 3/2 NC	2 PV 3/2 NC

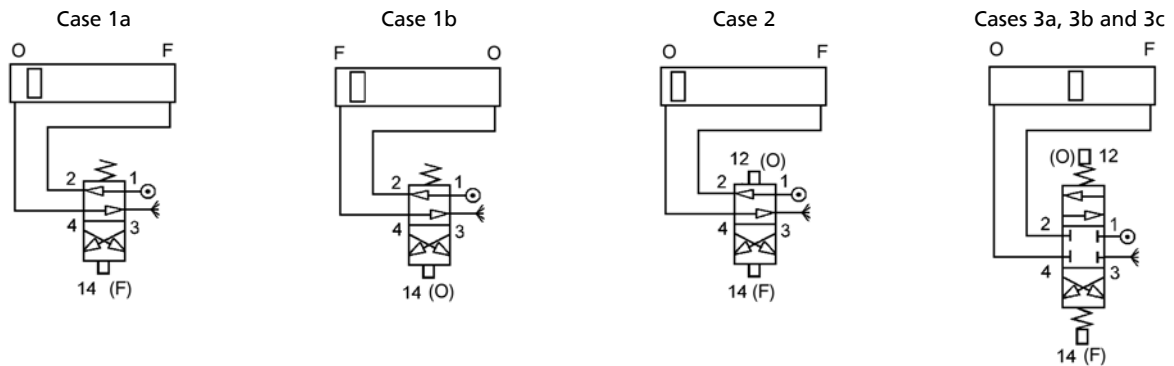
Configuration	Case 3a	Case 3b	Case 3c
Fail-safe position, power supply failure	Fail-in-last	Fail Open	Fail Close
Directional control valve	4/3, closed in centre position when under pressure	4/3, closed in centre position when under pressure	4/3, closed in centre position when under pressure
Pilot valve	2 PV 3/2 NC	1 PV 3/2 NO 1 PV 3/2 NC	1 PV 3/2 NO 1 PV 3/2 NC

For DYNACTAIR single-acting actuators

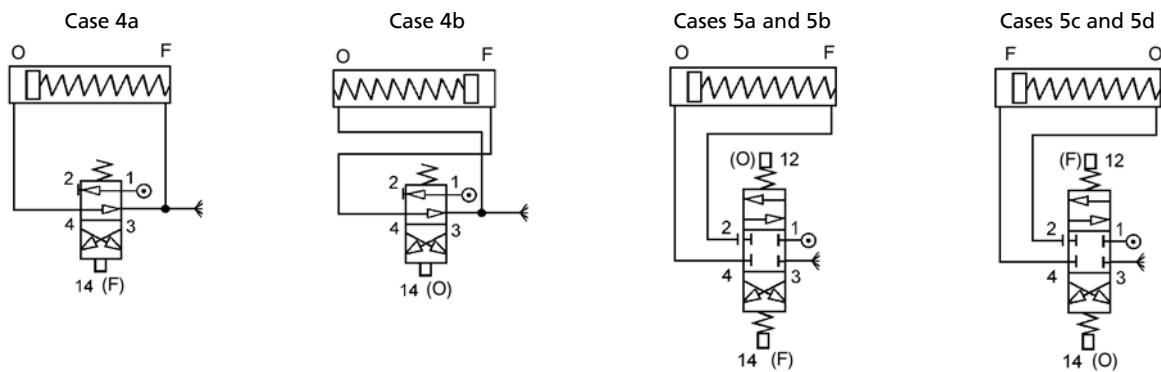
Configuration	Case 4a	Case 4b	Case 5a	Case 5b	Case 5c	Case 5d
Fail-safe position, power supply failure	Fail Open	Fail Close	Fail-in-last	Fail Close	Fail-in-last	Fail Open
Directional control valve	4/2, monostable	4/2, monostable	4/3, closed in centre position when under pressure	4/3, closed in centre position when under pressure	4/3, closed in centre position when under pressure	4/3, closed in centre position when under pressure
Pilot valve	1 PV 3/2 NC	1 PV 3/2 NC	2 PV 3/2 NC	1 PV 3/2 NO 1 PV 3/2 NC	2 PV 3/2 NC	1 PV 3/2 NO 1 PV 3/2 NC

Schematic for compressed air supply function

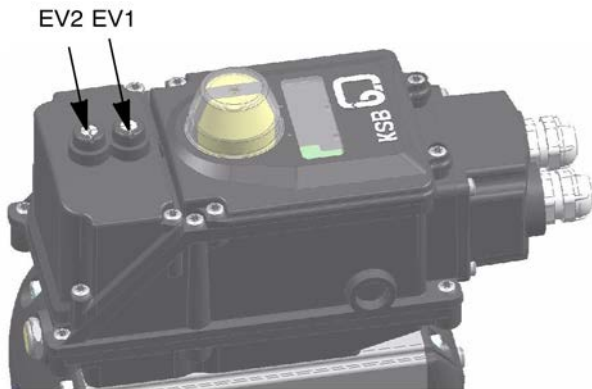
For ACTAIR double-acting actuators



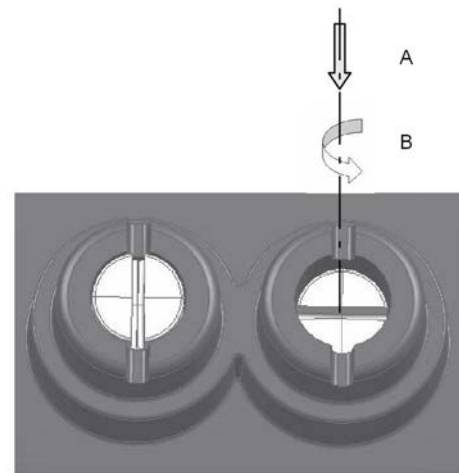
For DYNACTAIR single-acting actuators



Manual override of directional control valve



The pilot valves can be manually controlled via the buttons accessible from outside.



EV2 = 0

EV1 = 1

The manual override buttons can be locked.

How to use the manual override

A - Press the manual override button

B - Lock it in this position by turning it 90°

To avoid any interference with the pilot valves' electrical commands, it is recommended that the manual override only be used when the control unit is not energised.

Position signalling function

Two position signalling options are available for AMTRONIC:

- Via mechanical limit switches, Crouzet
- Via proximity sensors, IFM

A special feature of the AMTRONIC is that it can be fitted with limit switches or proximity sensors from other manufacturers according to the customer's specification.

Thanks to 20 years of experience in valve automation, a wide range of partner products is available from IFM, P&F, Télémécanique, etc.

Should customer processes require other limit switches or proximity sensors, please consult us.

Mechanical limit switches: technical data

Mechanical limit switches, Crouzet			
Supplier:	Crouzet		
Material:	Housing	Polyester UL94V0	
	Button	Polyester	
	Switching contact	Ag/Ni gold plated	
	Membrane	Silicone	
Switching capacity:	Breaking capacity 6 A at 24 V DC and 250 V AC		
Life expectancy:	Electrical	at I = 5 A	7 x 10 ⁴ operating cycles
		at I = 1 A	3 x 10 ⁵ operating cycles
		at I = 0,2 A	10 ⁶ operating cycles
	Mechanical	2 x 10 ⁶ operating cycles	
Vibration fatigue limit:	IEC 60068-2-6 / 3 axes / 50 g from 10 to 500 Hz		
EMC:	EN 50081-2, EN 50082-2		
Electrical connection:	Soldered on printed circuit board		
Enclosure:	IP 67		

Proximity sensors: technical data

Proximity sensors, IFM XC035	
Supplier:	IFM
Housing material:	IEC 60068-2-6 / 3 axes / 50 g from 10 to 500 Hz
Max. current rating:	
- Peak:	200 mA
- Maximum:	200 mA

Proximity sensors, IFM XC035	
Min. current rating:	4 mA
Max. voltage drop:	$\leq 4,6$ V
Leakage current:	≤ 0.8 mA
Max. switching frequency:	2 kHz
Operating status indication:	Yellow LED

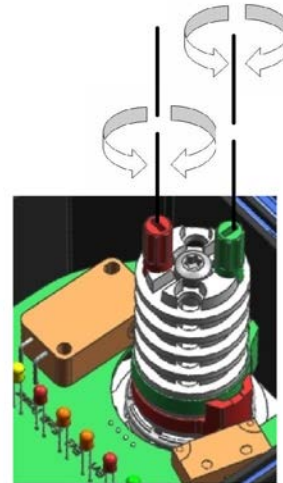
It is possible to add a third limit switch or proximity sensor for intermediate position signalling.

Setting the cams for position signalling

The cams are pre-set in the factory.

This setting can however be changed if the actuator's mechanical end stops are changed.

The limit switches or proximity sensors can be set independently of one another on the cams along the entire valve travel. (See Operating manual, ref. No. 8514.8371).



Option: actual-position feedback

Technical data of the passive actual-position feedback (4-20 mA signal/2-wire system)

Parameter	Minimum	Nominal	Maximum	Unit
Power supply	7.5	21.5	36	V DC
Output signal	3.6	/	28	mA
Resistance $[(U_{\text{Supply}} - 7.5 \text{ V}) / 0.02 \text{ A}]$	0	700	1425	Ohm
Zero adjustment (4 mA)	2	4	11	mA
Span adjustment (20 mA)	16	20	26	mA
Temperature range	-20	/	+70	°C
Temperature influence (from -20 to +70 °C)		± 0.12	± 0.28	% FS
Hysteresis and dead band		± 0.05	± 0.2	% FS
Linearity		± 0.05	± 0.2	% FS

Field bus communication version

Field bus communication is ensured by simply integrating an electronic printed circuit board.

A field bus system makes the wiring of control units for open/close applications straightforward and helps to reduce installation costs.

The AMTRONIC is compatible with the Profibus DP and AS-i field bus systems.

AMTRONIC AS-i

The AS-i (Actuator Sensor Interface) field bus is primarily used for sensors and actuators in open/close applications. The field bus is a master/slave bus system: The PLC as the master receives the open- and closed-loop control information from the AMTRONIC's slave components. This field bus is of a simple and robust design and can be easily installed. A two-wire cable is all that is required for power supply and transmission of digitalised information. 62 AS-i slave components can be connected to an AS-i field bus over a distance of 100 metres. Extensions are possible using repeaters. AMTRONIC has an AS-i interface with 2 inputs and 2 outputs. S-B.A.E and S-3.O profiles are available. The commands from the electro-pneumatic pilot valves are transmitted via the two outputs while the information from the limit switches (1 for Open and 1 for Closed) is provided via the two inputs. KSB recommends the use of the SMARTRONIC AS-i digital positioner for positioning applications using AS-i field bus.

AMTRONIC Profibus DP

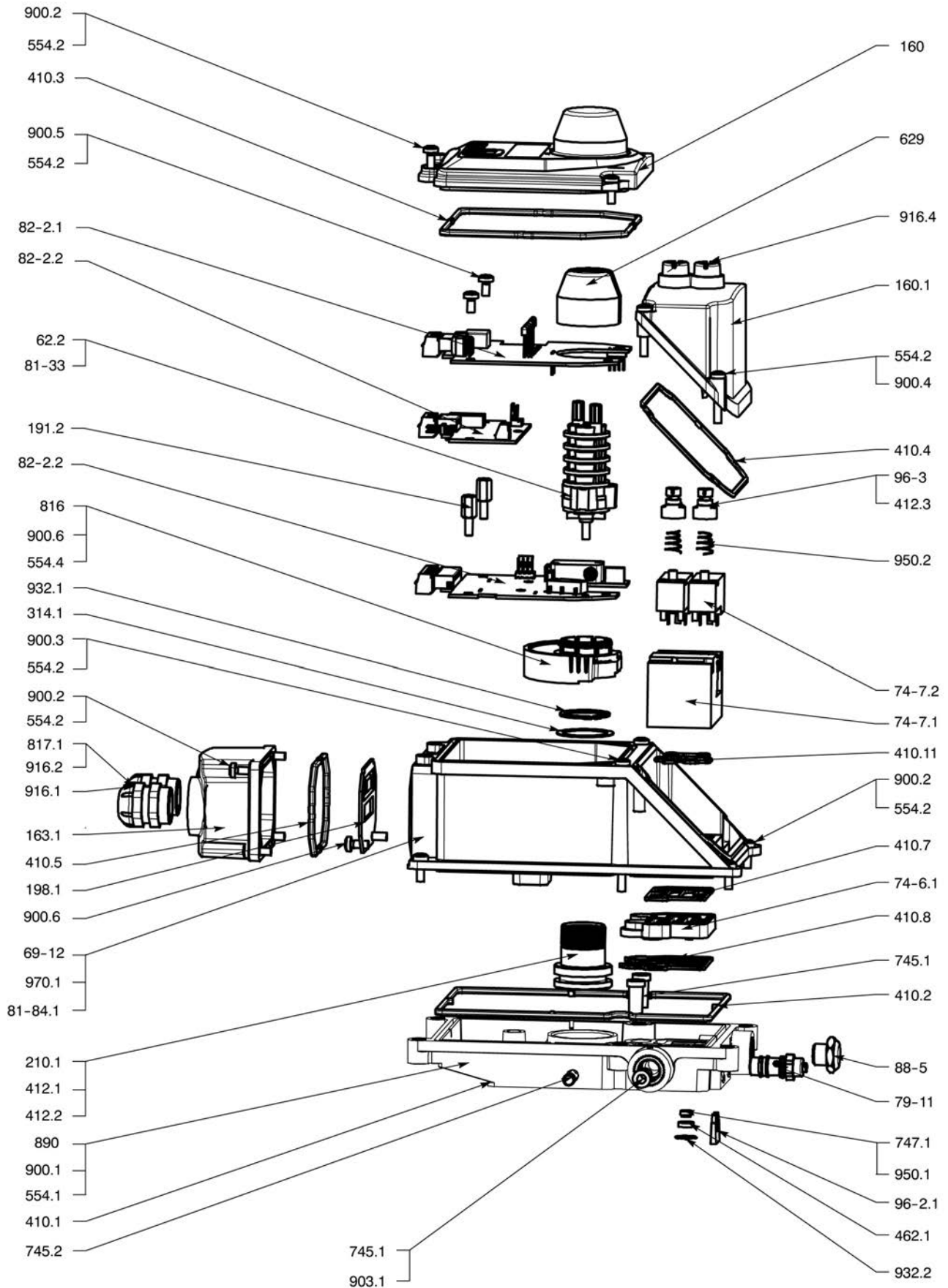
A slave interface is integrated in the AMTRONIC for Profibus DP (Decentralized Periphery) which allows the transmission of information to the PLC (master) via a twisted-pair, shielded cable. This interface ensures that up to 126 slave components can be connected over a distance of 1200 metres (up to 10 km when using repeaters with a speed of 1.5 Mbit/s). AMTRONIC Profibus DP processes information for two outputs for pilot valve control and two inputs for the limit switches' signals. The slave components are connected by a shielded cable (twisted pair) which transmits both the Profibus DP field bus information and the electrical voltage (24 V DC). KSB recommends the use of the SMARTRONIC PC Profibus DP intelligent positioner for positioning applications via Profibus DP.

Field buses: technical data

	AS-i	Profibus DP		
Topology	Bus, tree or ring	Bus, tree with repeaters		
Medium	2-wire cable/AS-i voltage supply	4-wire, shielded cable: twisted pair and 24 V DC power supply		
Network speed and length	Cycle time of 10 msec. Length from 100 to 300 m with repeaters	Speed (kbits/s)	Length (without repeater)	Length (with repeater)
Profile/Version	- S-B.A.E (for AS-i V2.11 and higher) - S-3.0 (for all AS-i types)	9.6	1200 m	10 km
		19.2	1200 m	10 km
		45.45	1200 m	10 km
		93.75	1200 m	10 km
		187.5	1000 m	6 km
		500	400 m	1 km
Max. number of stations	- S-B.A.E: 62 slaves - S-3.0: 31 slaves	32 per segment - max. 126		
Bus access	Polling	Polling master/slave: token ring between masters		
Addressing	EEPROM	Encoders		
Power consumption	3 W (max)	3 W (max)		
Power supply	26.5 to 31.5 V DC	24 V DC + 15%		

Materials

Exploded view

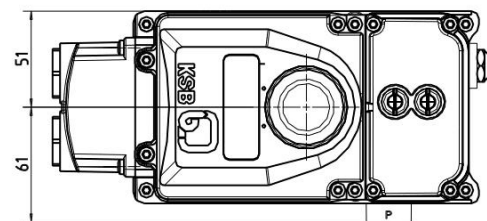
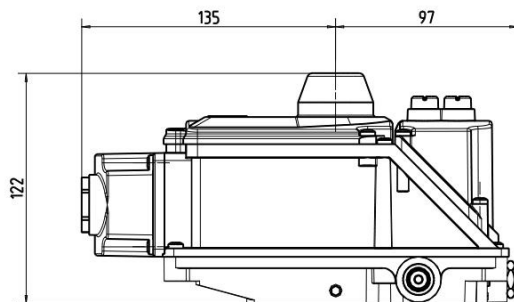


List of components

Part No.	Description	Materials
69-12	Housing	Polycarbonate SM60/0
160	Cover	Polycarbonate SM60/0
160.1	Cover (directional control valve)	Polycarbonate SM60/0
163.1	Cover	Polycarbonate SM60/0
191.2	Support	Nickel-plated brass
198.1	Connection plate	
210.1	Actuating stem	Polycarbonate SM60/0
314.1	Stop disc	Stainless steel 304L
410.1	Profile joint	NBR70
410.2	Profile joint	NBR70
410.3	Profile joint	NBR70
410.4	Profile joint	NBR70
410.5	Profile joint	NBR70
410.7	Profile joint	NBR70
410.8	Profile joint	NBR70
410.11	Profile joint	NBR70
412.1	O-ring	NBR70
412.2	O-ring	NBR70
412.3	O-ring	NBR70
462.1	Spring washer	
554.1	Washer	Stainless steel
554.2	Washer	Stainless steel
554.4	Serrated washer	Steel
629	Visual indicator assembly	
62-2	Adjustable cams assembly	
629	Visual indicator assembly	
745.1	Filter	
745.2	Filter	Bronze

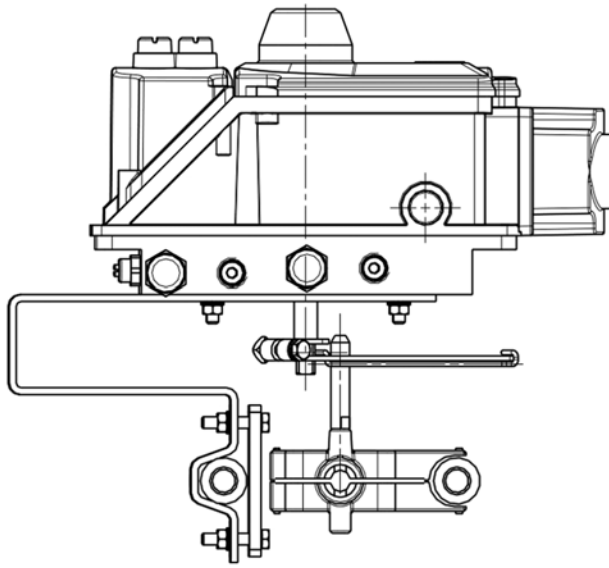
Part No.	Description	Materials
74-6.1	Distribution plate	
74-7.1	Directional control valve	
74-7.2	Pilot valve	
747.1	Profile joint (valve)	
79-11	Flow reducer	
816	Angle sensor assembly	
817.1	Cable gland	
81-33	Detection plate	Steel
81-84.1	Wiring diagram	
82-2.1	Printed circuit board	
82-2.2	Printed circuit board	
82-2.3	Actual-position feedback	
88-5	Silencer	Bronze
890	Base	Polycarbonate SM60/0
900.1	Screw	A2-70
900.2	Socket head cap screw	A2-70
900.3	Socket head cap screw	A2-70
900.4	Socket head cap screw	A2-70
900.5	Socket head cap screw	A2-70
900.6	Sheet metal screw	A2-80
903.1	Plug	
916.1	Screw plug	
916.2	Protective cap	Rubber
916.4	Elastomer string	NBR HT 70
932.1	Circlip	Steel
932.2	Reinforced circlip	Steel
950.1	Spring	
96-2.1	Locking plate	Polycarbonate SM60/0
96-3	Manual override	Polycarbonate SM60/0
970.1	Plate	Adhesive polyester

Dimensions

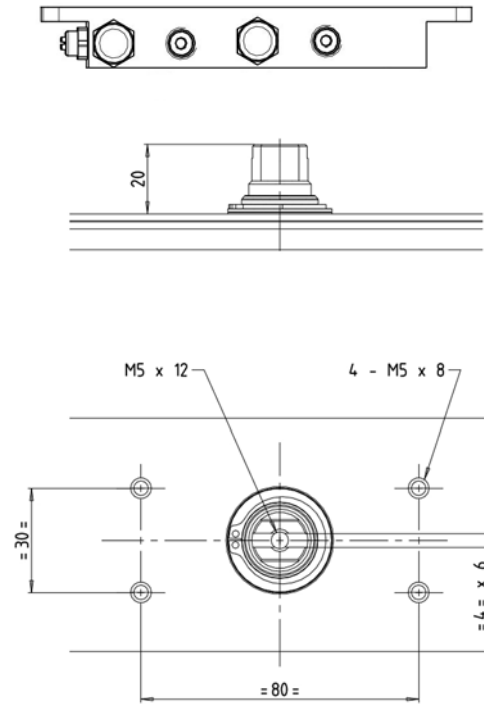


Variants

Mounting to linear actuator NAMUR



Base for actuators with VDI/VE 3845 interface, not applicable to ACTAIR and DYNACTAIR



Purchase order data
Code AMTRONIC R1300

AMTRONIC	R001300	.	.	.	.	.	.	.	.	.	.	.	.	.	0	.	.	6	0	0
Sensors																				
Limit switch on printed circuit board		1	0	0	0												0			
Proximity sensor on printed circuit board		2	0	0	0															
Limit switch V3 for wires		B	1	1													0			
Limit switch V3 for cables		B	2	1													0			
Limit switch V3 for cable socket 4.8		B	3	1													0			
Limit switch V3 for cable socket 6.3		B	4	1													0			
Limit switch V3 welding clamp		B	6	1													0			
Proximity sensor V3 PNP for 3-wire cable		H	2	1													0			
Proximity sensor V3 PNP for 3-wire cable		H	2	2													0			
Proximity sensor V3 AC/DC for 2-wire cable		H	A	3													0			
Proximity sensor V3 NAMUR for 2-wire cable		H	A	4													0			
Proximity sensor V3 PNP for 3 cable sockets 4.8		H	3	1													0			
Proximity sensor V3 AC/DC for 2 cable sockets 4.8		H	B	3													0			
Proximity sensor V3 NAMUR for 2 cable sockets 4.8		H	B	4													0			
Proximity sensor V3 PNP for 3 cable sockets 6.3		H	4	1													0			
Proximity sensor 40x26x12 PNP for 3-wire cable		J	2	1				0									0			
Proximity sensor 40x26x12 AC/DC for 2-wire cable		J	A	3				0									0			
Proximity sensor dia. 6.5 PNP for 3-wire cable		K	2	1				0									0			
Proximity sensor M8 PNP for 3-wire cable		L	2	1				0									0			
Proximity sensor M12 PNP for 3-wire cable		M	2	1				0									0			
Proximity sensor M12 AC/DC for 2-wire cable		M	A	3				0									0			
Proximity sensor M12 NAMUR for 2-wire cable		M	A	4				0									0			
Proximity sensor M14 NAMUR for 2-wire cable		N	A	4				0									0			
Proximity sensor M18 PNP for 3-wire cable		P	2	1				0									0			
Proximity sensor M18 NPN for 3-wire cable		P	2	2				0									0			
Proximity sensor M18 AC/DC for 2-wire cable		P	A	3				0									0			
Proximity sensor M18 NAMUR for 2-wire cable		P	A	4				0									0			
Position signalling																				
1/Open and 1/Closed								1												
1/Open								3												
1/Closed								4												
1/Open and 1/Closed and 1/Intermediate			0	0	0	6	0										0	0		
Actual-position feedback																				
None								0									.	.		
With angle sensor 5 kOhm								1									0	0		
Actual-position feedback via passive 4-20 mA signal (2 wires)								4									0	0		
Actual-position feedback via passive 20-4 mA signal (2 wires)								5									0	0		
Electrical connection																				
2 plugs, plastic, M20 IP67								0												
2 cable glands, plastic, M20 IP67 (diameter: 6 to 12)								1												
2 cable glands, metal, M20 IP67 (diameter: 6 to 12)								2												

AMTRONIC	R001300	0	.	.	6	0	0
Directional control valve																		
4/2 monostable - Open/Closed																		
4/2 bistable - Open/Closed																		
4/3 closed in centre position - Position (POS)																		
Voltage, directional control valve																		
230 V AC 50/60 Hz																		
115 V AC 50/60 Hz																		
48 V AC 50/60 Hz																		
24 V AC 50/60 Hz																		
24 V DC																		
Actuator																		
ACTAIR 3 to 200, stop position: Closed																		
ACTAIR 3 to 200, stop position: Open																		
ACTAIR 400 to 1600																		
DYNACTAIR 1.5 to 25, Fail Close in the event of air supply failure																		
DYNACTAIR 1.5 to 25, Fail Open in the event of air supply failure																		
DYNACTAIR 50 to 100, Fail Close in the event of air supply failure																		
DYNACTAIR 50 to 100, Fail Open in the event of air supply failure																		
DYNACTAIR 200 to 800, Fail Close in the event of air supply failure																		
DYNACTAIR 200 to 800, Fail Open in the event of air supply failure																		
Pneumatic quarter-turn actuator, double-acting																		
Pneumatic quarter-turn actuator, single-acting																		
Pneumatic linear actuator, double-acting																		
Pneumatic linear actuator, single-acting																		
Fail-safe position																		
Fail Close in the event of power supply failure																		
Fail Open in the event of power supply failure																		
Fail-in-last in the event of power supply failure																		
Undefined position in the event of power supply failure																		
Field bus																		
None																		
Profibus DP																		
AS-i profile S-B.A.E (62 slaves)																		
AS-i S-3.0 (31 slaves)																		
Heating resistor																		
None																		
With heating resistor 12 to 24 V DC																		
With heating resistor 100 to 240 V AC																		
Position indicator																		
3D sight glass																		
Configuration																		
None																		
Diagnosis																		
None																		



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