

APV CU4 AS-interface

CONTROL UNIT

FORM NO.: H326406 REVISION: UK-5

READ AND UNDERSTAND THIS MANUAL PRIOR TO OPERATING OR SERVICING THIS PRODUCT.



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**IT IS ESSENTIAL TO READ THIS INSTRUCTION MANUAL
BEFORE USE OF THE CONTROL UNIT!**

1. Abbreviations and Definitions

A	Exhaust Air
AWG	American Wire Gauge
CE	Communauté Européenne
CU	Control Unit
DI	Digital Input
DO	Digital Output
EMC	Electromagnetic Compatibility
EU	European Union
GND	Ground
IP	International Protection
LED	Luminous Diode
N	Pneumatic Air Connection NOT element
NEMA	National Electrical Manufacturers Association
P	Supply Air Connection
PWM	Pulse-Width Modulation
Y	Pneumatic Air Connection

2. Safety Instructions

2.1. Sentinels

Meaning:



Danger!

Direct danger which can lead to severe bodily harm or to death!



Caution!

Dangerous situation which can lead to bodily harm and/or material damage.



Attention!

Risk as a result of electric current.



Note!

Important technical information or recommendation.

These special safety instructions point directly to the respective handling instructions. They are accentuated by the corresponding symbol. Carefully read the instructions to which the sentinels refer. Continue handling the control unit only after having read these instructions.

2. Safety Instructions

2.2. Intended Use

The CU4 control unit is only intended for use as described in chapter 3.1. Use beyond that described in chapter 3.1. is not according to the regulations and SPX FLOW shall not be held responsible for any damage resulting from this non-observance.

The operator bears the full risk. Conditions for the proper and safe operation of the control unit are the appropriate transport and storing as well as the professional assembly. Intended use also means the observance of all operating, service and maintenance conditions.

2.3. General Regulations for Careful Handling

To ensure a faultless function of the unit and a long service life, the information given in this instruction manual as well as the operating conditions and permissible data specified in the data sheets of the control unit for process valves must be strictly adhered to.

- The operator is committed to operating the control unit in faultless condition, only.
- Observe the general technical rules while using and operating the unit.
- Observe the relevant accident prevention regulations, the national rules of the user country as well as your company-internal operating and safety regulations during operation and maintenance of the unit.
- Switch off the electric power supply before carrying out any work on the system!
- Note that piping or valves that are under pressure must not be removed from a system!
- Take suitable measures to prevent unintentional operation or impermissible impairment.
- Following an interruption of the electrical or pneumatic supply, ensure a defined and controlled re-start of the process!
- If these instructions are not observed, we will not accept any liability. Warranties on units, devices and accessories will expire.

2. Safety Instructions

2.4. Welding instructions

It is generally recommended to avoid welding work in process installations in which control units are installed and connected. If welding is nonetheless required, earthing of the electrical devices in the welding area is a necessity.

2.5. Persons



- Installation and maintenance work may only be carried out by qualified personnel and by means of appropriate tools.
- The qualified personnel must get a special training with regard to possible risks and must know and observe the safety instructions indicated in the instruction manual.
- Work at the electrical installation may only be carried out by personnel specialised in electrics!

2.6. Warranty

This document does not contain any warranty acceptance. We refer to our general terms of sale and delivery. Prerequisite for a guarantee is the correct use of the unit in compliance with the specified conditions of application

Attention! This warranty only applies to the control unit. No liability will be accepted for consequential damage of any kind that could arise from the failure or malfunction of the device

2.7 Important Safety Instructions for AS-interface networks



- Always use protective modules against excess voltage in the AS-interface installation.
- Grounding

For the AS-interface network a potential-free operation must be guaranteed. Use isolation monitoring modules to provide for proper grounding conditions.

Grounding of the bus cable or connected components or their charging with external voltage leads to malfunction in the bus system.

3. General Terms

3.1. Purpose of use

The CU4 AS-interface Control Unit was developed for the control of process valves used in the food and related industries. The CU4 control unit operates as interface between process control and process valve and controls the electric and pneumatic signals. The pneumatic control of valves is undertaken via the solenoid valves. The control unit controls the valve positions, **open** and **closed**, via integrated and external sensors. The electronic module undertakes the task to process the switching signal from the control and to control the corresponding solenoid valves. The electronic module also provides potential-free contacts. The corresponding light signals in the control unit provide for an external indication of the valve positions.

3.2. Design of CU4 AS-interface (fig. 3.2.)

The CU4 AS-interface control unit mainly consists of the following components:

1. The control unit base with integrated air channels and electric and pneumatic connections as well as viewing windows with type label.
2. 1 or 3 solenoid valves for the control of the valve actuators and for the seat lifting of double seat valves.
1 solenoid valve with 1 logic NOT element for the control of the valve actuators.
3. Sensor module with 2 integrated Hall sensors or 2 external proximity switches to detect the valve position.
4. The electronic module for the electric supply, communication with control, evaluation of feedback signals and control of solenoid valves as well as valve position indication through LED.
5. Clamp ring to fasten the CU4 on the adapter.
6. Cover with LED optics.

fig. 3.2.

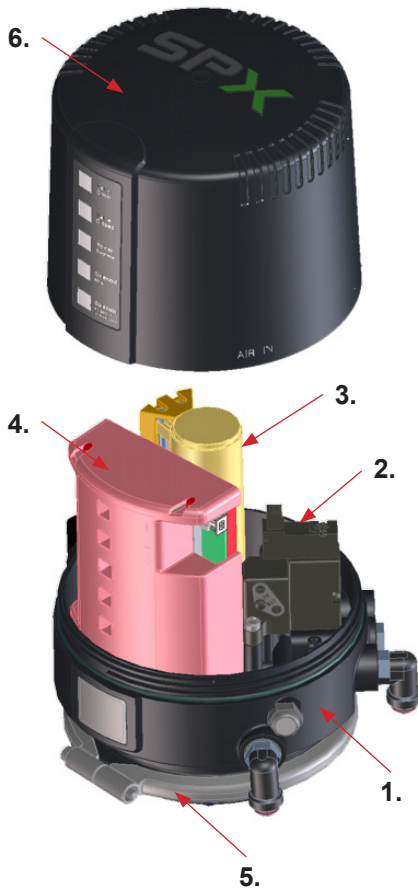
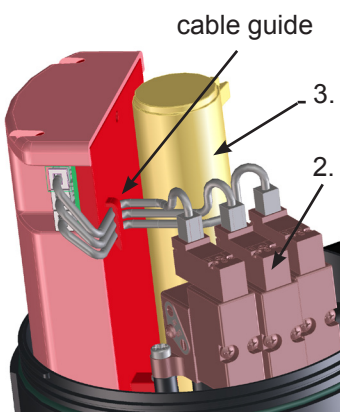


fig. 3.2.1



The cable/s by means of which the solenoid valves are connected with the electronic module must be guided through the cable guide at the rear side of the electronic module (fig. 3.2.1).

3. General Terms

3.3. Function of the individual components

The installation of the control unit is undertaken by special adapters which are available for the different valves types, see chapter 5. Adapter. The snap connectors for supply air and pneumatic air to the individual cylinders at the valves are located at the outside of the control unit. In case of the control units for valves with turning actuator, the pneumatic air is transferred internally to the actuator. The air supply of the control unit is equipped with an exchangeable air filter. Observe the required compressed air quality! Please also see chapter 4.5.

The number of the solenoid valves installed in the CU4 depends on the valve actuators to be controlled. Single seat and butterfly valves and double seat valves without seat lift function require 1 solenoid valve. Control units for double seat valves are equipped with 3 solenoid valves. For the manual actuation, the solenoid valves are provided with a safe lever which is easy to operate.

The electronic module installed in the control unit fulfills the task to process the electric signals from the control, to control the solenoid valves and to evaluate the feedback signals from the feedback unit. Moreover, the signalling and indication of the valve positions as well as additional diagnostic functions are undertaken via the electronic module.

The electronic module is the interface between control actuators or sensors. Depending on the control type, different modules are available, e.g. Direct Connect, AS-interface, Profibus and DeviceNet.

A feedback unit is required to detect the valve position. The CU4 AS-interface is equipped with 2 adjustable Hall effect sensors.

These are activated by a valve control rod installed at the operating cam. In this way, the **open** and **closed** valve position can be detected.

The 2 Hall effect sensors are continuously adjustable over an additional range. Thus, feedback messages for different valves with different stroke lengths can be adjusted properly. As an alternative, external proximity switches can be connected instead of the integrated Hall effect sensors when the valve position indication is undertaken direct at the process valve.

3. General Terms

3.3. Function of the individual components

The luminous diodes are located on the front side of the electronic module. Their signals are visibly indicated to the outside by an optical window in the cover of the control unit. Beside the open and closed valve position, the existence of the operating voltage as well as different diagnostic information are indicated. Chapter 6.6. LED indication provides more details.

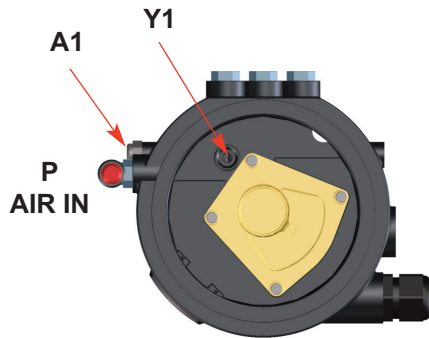
The complete control unit is designed according to the building block principle. By exchange of the electronic module, the control type can be changed, e.g. from direct control (Direct Connect) to communication with AS-interface.



Note! Wiring must be changed.

4. Mechanics and Pneumatics

4.1. Air connection for valves with turning actuator



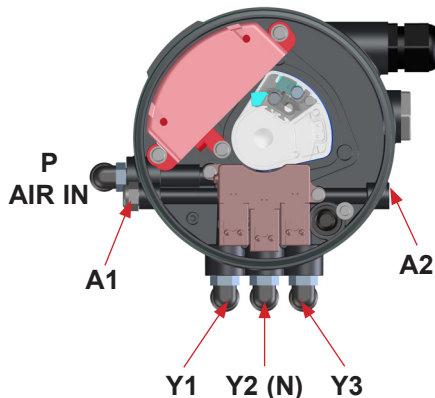
4.1.1. Function

CU41-T-AS-i

design for valve with turning actuator, e.g. butterfly valves

- P air supply with integrated particle filter
- Y1 bore to transfer control air to turning actuator
- A1 exhaust air with exhaust silencer

4.2. Air connections for single seat and double seat mix proof valves



4.2.1. Function

CU41-S-AS-i / CU41-M-AS-i / CU41-D4

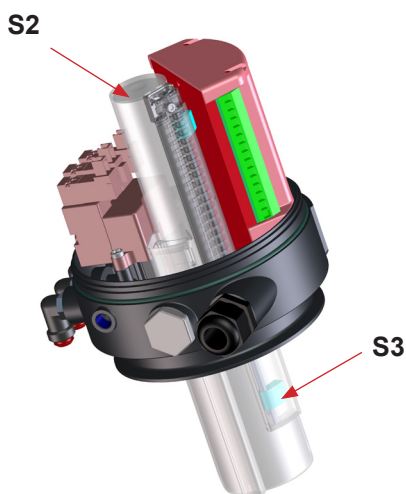
design for seat valves and double seat mix proof valves without seat lift

- P air supply with integrated particle filter
- Y1 control air connection for main actuator
- A1 exhaust air with exhaust silencer

CU41N-S-AS-i

design for seat valves with NOT element

- P air supply with integrated particle filter
- Y1 pneumatic air connection for main actuator
- N pneumatic air connection for the spring support of the actuator by compressed air, via NOT element
- A1 exhaust air with exhaust silencer



CU43-M-AS-i / CU43-D4

design for double seat mixproof valves with seat lift

- P air supply with integrated particle filter
- Y1 pneumatic air connection for main actuator
- Y2 pneumatic air connection for seat lift actuator of upper seat lift
- Y3 pneumatic air connection for seat lift actuator of lower seat lift
- A1/A2 exhaust air with exhaust silencer

4. Mechanics and Pneumatics

4.3. Pressure relief valve

The base of the control unit is equipped with a pressure relief valve which prevents an inadmissible pressure build-up in the inner control unit.

If required, the pressure relief vents into the clearance between the base and the adapter of the control unit.

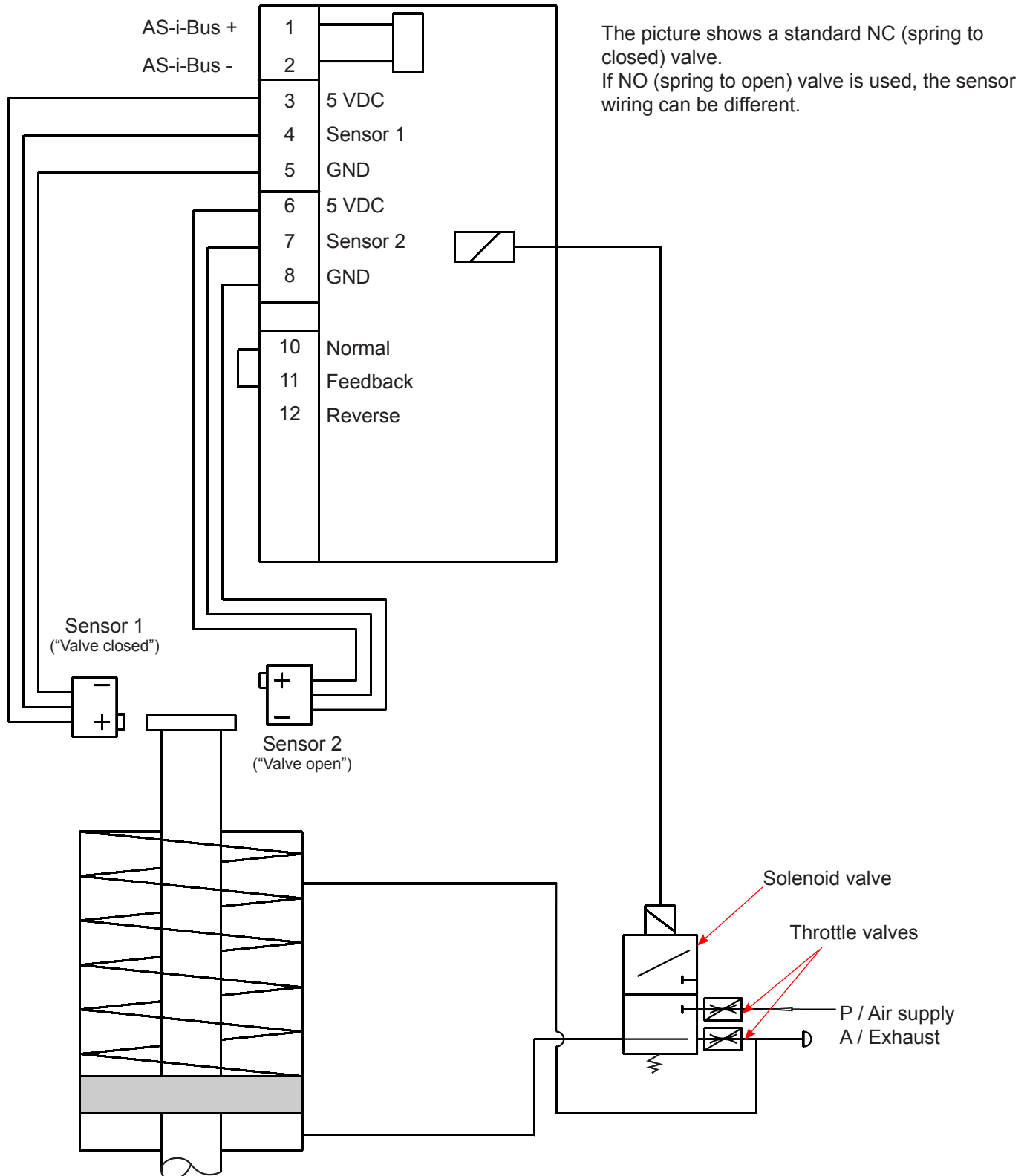


The pressure relief valve must not be mechanically blocked under any circumstances!

4. Mechanics and Pneumatics

4.4 Functional description - block diagrams

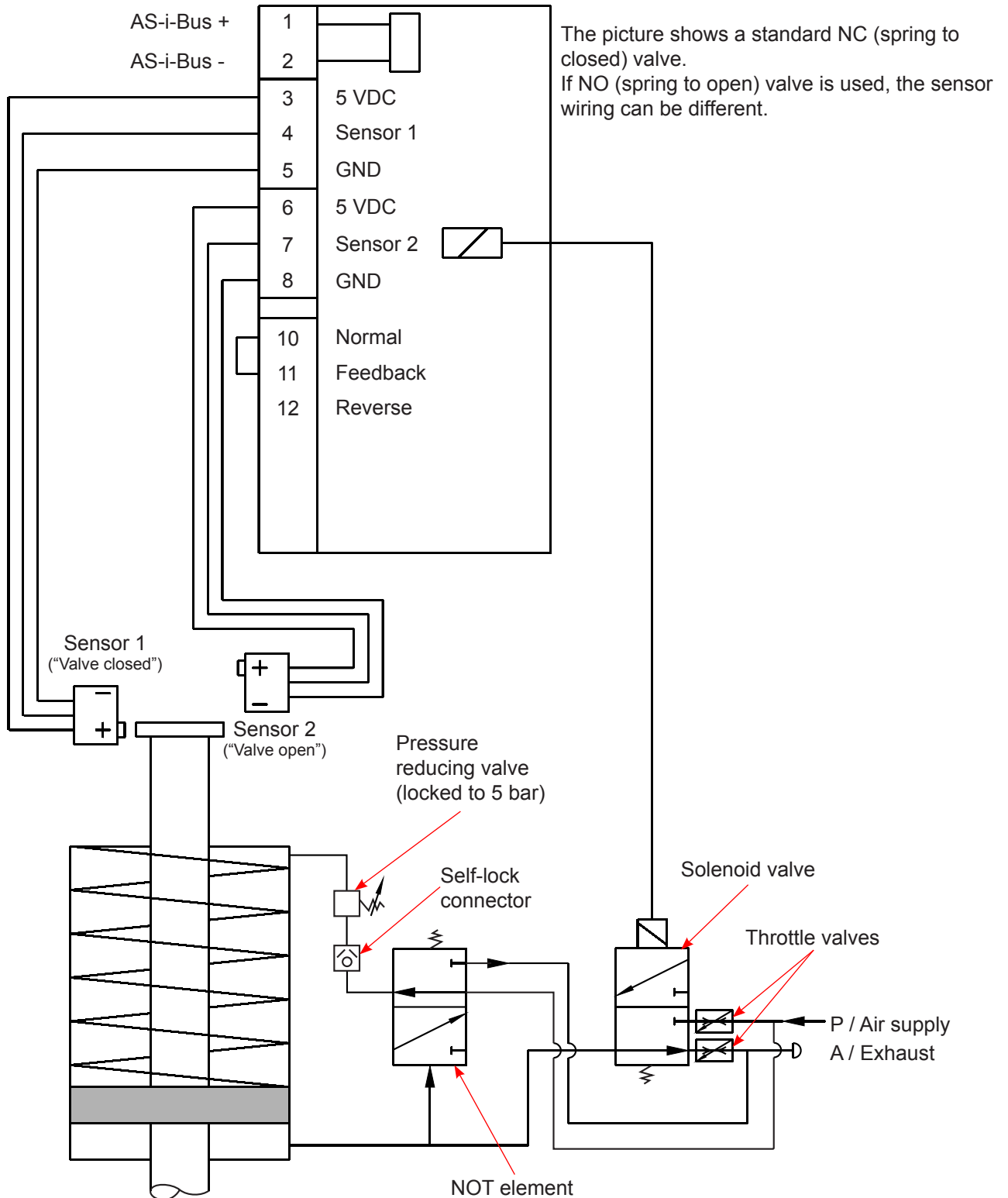
4.4.1 CU41 AS-interface



4. Mechanics and Pneumatics

4.4.2 CU41N – AS-interface

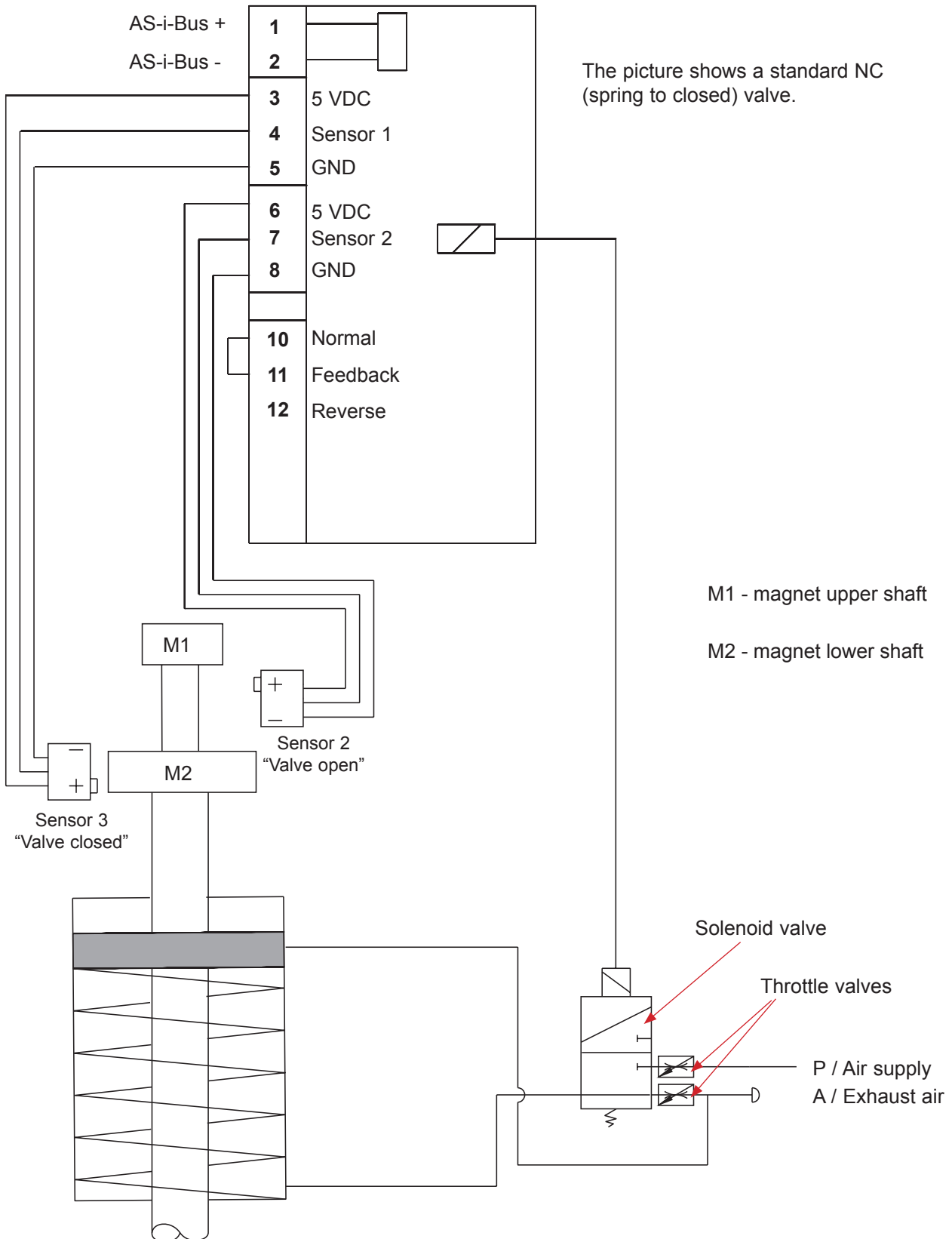
Functional description - block diagram



4. Mechanics and Pneumatics

4.4.3. CU41-D4 AS-interface for D4 double seat mix proof valve

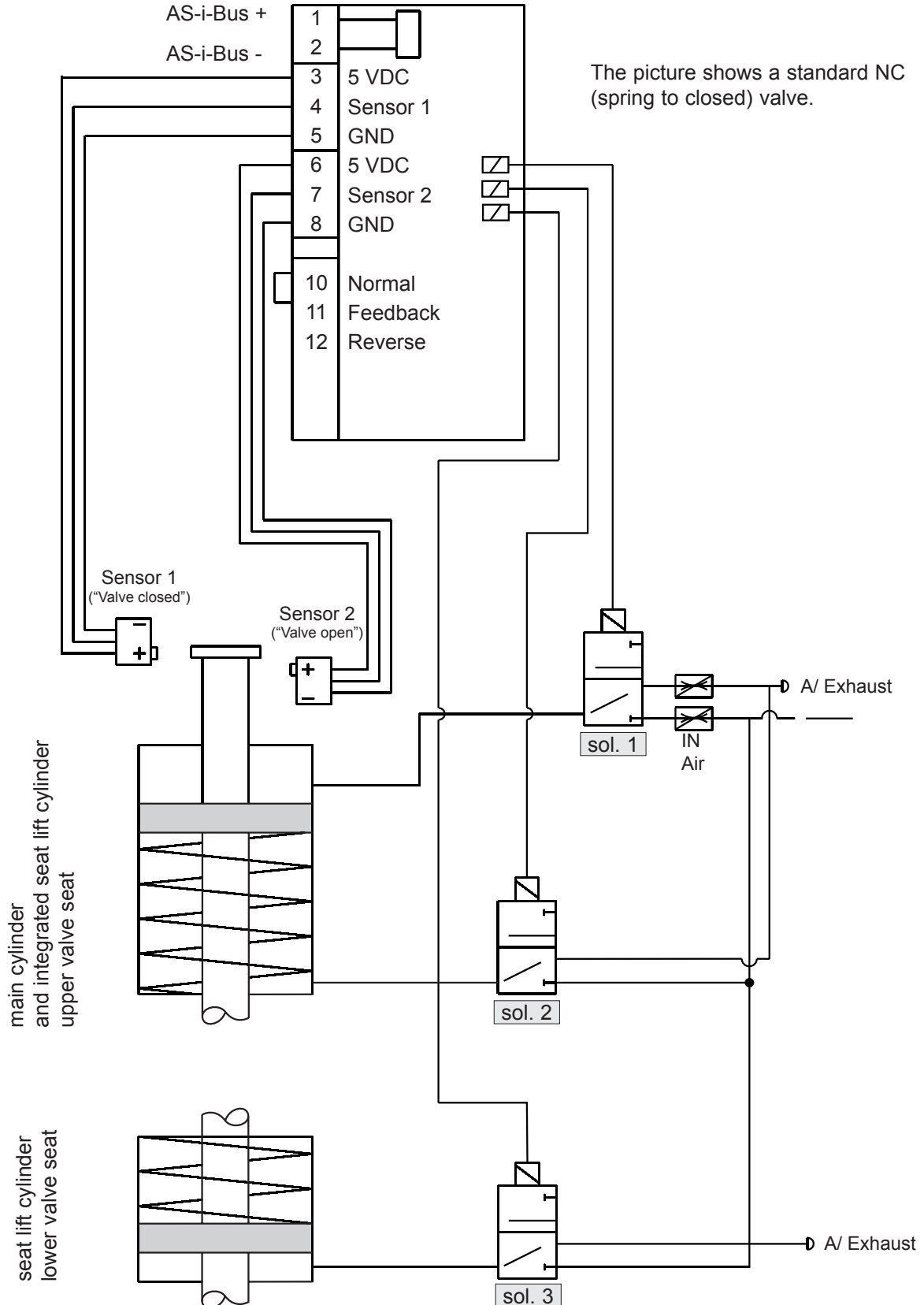
Functional description - block diagram



4. Mechanics and Pneumatics

4.4.4 CU43 AS-interface for DE3, DA3+ double seat mix proof valves

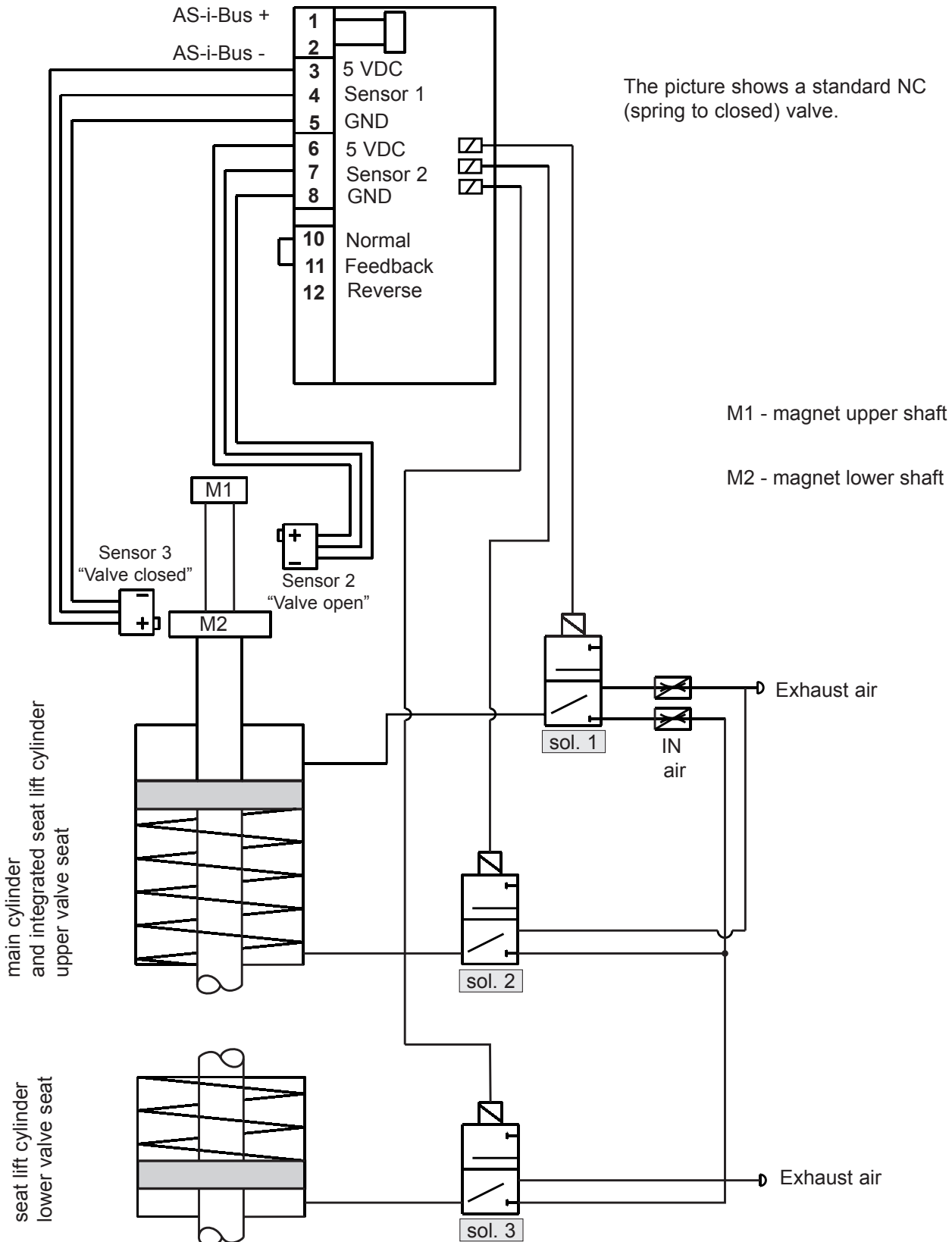
Functional description - block diagram



4. Mechanics and Pneumatics

4.4.5. CU43-D4 AS-interface für DA4 / D4 SL double seat mix proof valves

Functional description - block diagram



4. Mechanics and Pneumatics

4.5. Technical Data / Standards

Material:	PA6.6
Ambient temperature:	-20°C to +70°C
EU:	EMC 2014/30/EU (89/336/EEC)
Standards and environmental audits:	Protection class IP 67 EN60529/ complies with NEMA 6 EMC interference resistance EN61000-6-2 EMC emitted interference EN61000-6-4 Vibration/oscillation EN60068-2-6 Safety of machinery DIN EN ISO 13849-1
Air connection:	6 mm / ¼" OD
Pressure range:	6–8 bar
Compressed air quality:	Quality class acc. to DIN ISO 8573-1
- Content of solid particles:	Quality class 3, max. size of solid particles per m ³ 10000 of 0,5 µm < d < 1,0 µm 500 of 1,0 µm < d < 5,0 µm
- Content of water:	quality class 3, max. dew point temperature -20 °C For installations at lower temperatures or at high altitude, additional measures must be considered to adopt the pressure dew point accordingly.
- Content of oil:	quality class 1, max. 0,01 mg/m ³

The oil applied must be compatible with Polyurethane elastomer materials.

4. Mechanics and Pneumatics

4.6. Solenoid valves

In the base of the control unit max. 3 solenoid valves are installed. The 3/2-way solenoid valves are connected with the electronic module by moulded cables and plug connectors.

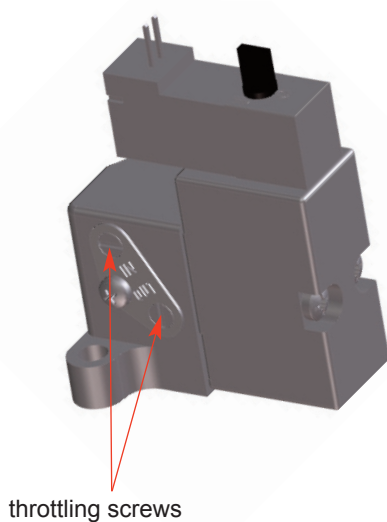
Control: effected by pwm-signal

Lever: rotary switch at valve

4.7. Throttling function

The operating speed of the valve actuator can be varied or reduced. This may be necessary to slacken the actuation of the valve in order to prevent pressure hammers in the piping installation. For this purpose, the supply and exhaust air of the **first solenoid valve** can be adjusted via the throttling screws respectively allocated in the interface of the solenoid valve.

By turning the screws in anticlockwise direction, the inlet or outlet air is throttled



4.8. NOT element

Through the installation of the logic NOT element, the closing force of the valve actuator can be increased by additional compressed air. The NOT element conveys the compressed air via an external reducing valve (max. 5 bar) to the spring side of the valve actuator.

The pressure reducing valve is fixed to 5 bar.



Note:

The air connection of the NOT element is equipped with an integrated non-return valve.

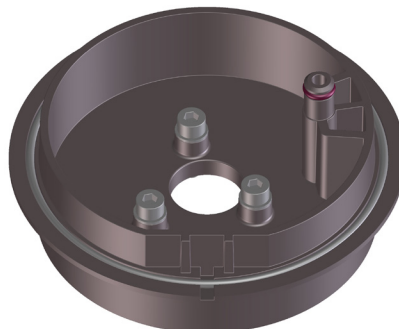
The air hose must be slid into the air connection until it stops in order to open the non-return valve.

The NOT element is also used for air/air actuators.

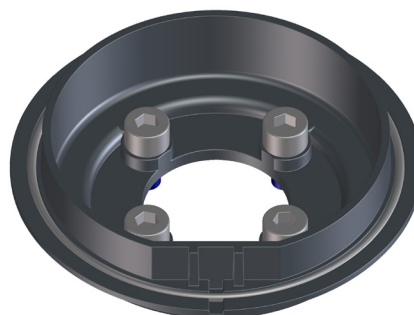
5. Adapter

Adapter for different process valves

5.1. Valves with turning actuator, e.g. butterfly valves



5.2. Single seat valves



5.3. Double seat mix proof valves DE3, DA3+



5.4. Double seat mix proof valves D4, D4 SL, DA4



6. Electronic module

6.1. Function / Block diagram

The Control Unit CU4 AS-interface is a slave for the fieldbus system AS-interface.

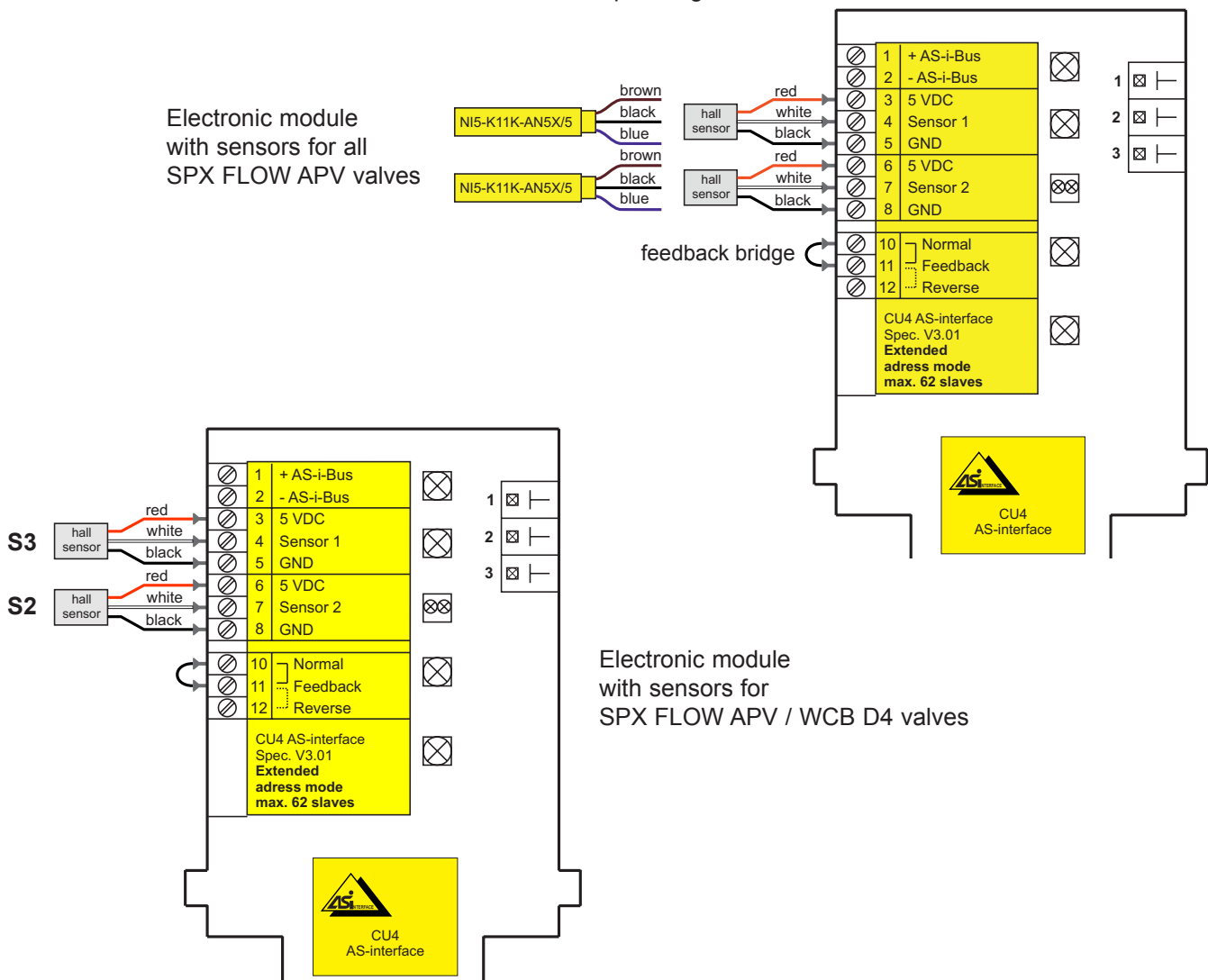
It complies with the specification V3.0. The profile is S-7.A.*.E (3 outputs and 2 inputs).

By means of a connecting terminal, the inputs can either be connected with internal APV Hall effect sensors or with external inductive proximity switches (compare 6.5.).

The AS-interface CU4 is designed for the extended address range. With these devices in the extended address range up to 62 slaves (formerly known as 2.1) can be connected with one AS-interface cable.

Attention: Consider cumulative power input and simultaneity factor! For reasons of compatibility with older versions, a version with the profile S-7.F.F.F (formerly known as 2.0) is alternatively available.

All operating ranges within the electronic module such as the control of the solenoid valves, position feedback and LED indication are separated galvanically and can, thus, be operated with different voltages. Control of the solenoid valves is effected in energy-saving manner via pwm-signals.



6. Electronic module

6.1.1 Switch-over of feedback signals

The signals to the control can be switched over via the bridge between the terminals 10, 11 and 12.

If a bridge is located between the terminals 10 and 11 (normal), the signal is transferred from sensor 1 (**closed valve position**) to input DI0 of the control. The signal of sensor 2 (**open valve position**) is sent to input DI1.

In case of a bridge between terminals 11 and 12 (reverse), the signal of sensor 1 (**closed valve position**) is sent to input DI1 of the control. At input DO0, the signal of sensor 2 (**open valve position**) switched.

If there is no bridge between the terminals 10, 11 and 12, this will lead to an error message.

The two LEDs '**valve open**' and '**valve closed**' will flash in this case.

6.2. Functional description of connections

Terminal	Designation	Functional description for all valve types	Funtional description for D4, D4 SL and DA4 valve types
1	AS-i +	AS-i network connection	AS-i network connection
2	AS-i -	AS-i network connection	AS-i network connection
3	5 VDC	voltage supply for valve sensor	voltage supply for valve sensor
4	Sensor 1	sensor signal 1 (closed valve position)	connection Hall sensor 3 (closed valve position)
5	GND	ground for sensor supply	
6	5 VDC	voltage supply for valve sensor	voltage supply for valve sensor
7	Sensor 2	sensor signal 2 (open valve position)	connection Hall sensor 2 (open valve position)
8	GND	ground for sensor supply	ground for sensor supply
10	Normal	normal allocation of feedback signals	normal allocation of feedback signals
11	Feedback	tie point for cable bridge	tie point for cable bridge
12	Reverse	reverse allocation of feedback signals	reverse allocation of feedback signals

6. Electronic module

6.3. Use of data bits

Communication data

The use of the data bits shall be drawn from the following table:

Data bit	Info	Connection	Level
DO0	0	main valve	Low (no electric current)
(output)	1		High (current)
DO1	0	upper seat lifting (optional)	Low (no electric current)
(output)	1		High (current)
DO2	0	lower seat lifting (optional)	Low (no electric current)
output)	1		High (current)
DO3		free	
(output)			
Feedback bridge			
Data bit		normal (10 <u>11</u> 12)	reverse (10 11 <u>12</u>)
DI0		valve position, sensor 1 (closed valve position)	valve position, sensor 2 (open valve position)
(input)			
DI1		valve position, sensor 2 (open valve position)	valve position, sensor 1 (closed valve position)
(input)			
DI2		Permanent "1"	Permanent "1"
(input)			
DI3		Permanent "1"	Permanent "1"
(input)			

6. Electronic module

6.4. Technical Data

AS-interface profile:	S-7.A.*.E (S-7.F.F.F as option)
Extended address range:	is supported
Serial communication mode:	no
Inverse polarity protection:	exists
Indication "Power":	LED3 (green)
Indication "Fault":	LED3 (red)
AS-interface voltage range:	26,5...31,6 V
Max. power input:	≤ 150 mA
Input delay time:	< 1 s
AS-interface specification:	V3.0
Supply of solenoid valves:	PWM signal from electronic module
Short-circuit protection:	yes
Excess voltage protection:	100 mA
Induction protection:	ja
Status indication of outputs:	LED on board
Response time of watchdog:	--- (watchdog not activated)

Short-circuit or excess voltage of actuator supply or cable break at valves is signalled to the master via the peripheral failure bit (profile S-7.A.*.E only). Simultaneously LED3 flashes according to AS-interface specification alternately red/green.

Supply of sensors: 5 VDC (±5%)

Note: The sensor inputs and the peripheral supply must not be connected with installation-GND.

Connecting terminals: conductor cross section 0,5-1,5 mm² (with conductor sleeve) complying with AWG 20-16

6. Electronic module

6.5. Connections

Sensors to detect the valve positions:

Internal sensors:












Hall effect sensors,
APV valves: H320385
APV / WCB D4 valves: H337014
UB 4,75-5,25 VDC
operating distance according to
SPX FLOW specification

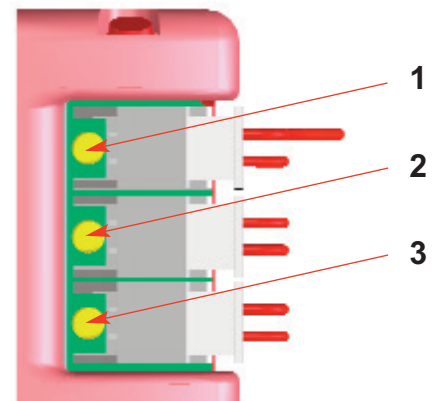
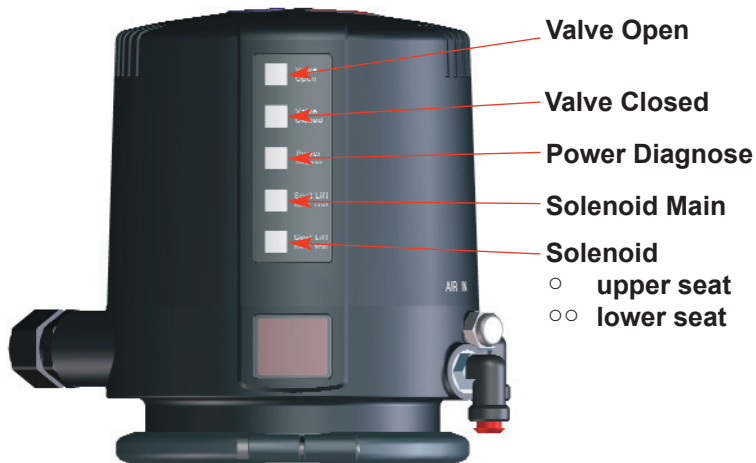
External sensors:

Inductive proximity switches: H208844
UB 4,75-5,25 VDC
operating distance according to
SPX FLOW specification

6. Electronic module

6.6. LED indication

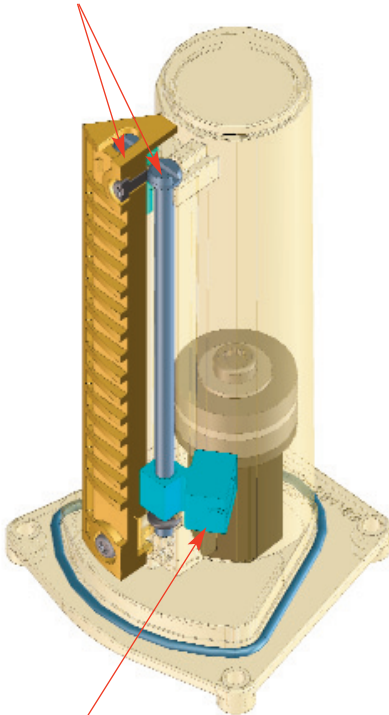
External luminous displays			
Valve Open	colour: green, permanent light		Valve in open position
Valve Closed	colour: orange, permanent light		Valve in closed position
Valve Open	colour: green, flashing		Bridge missing at terminals 10, 11, 12
Valve Closed	colour: orange, flashing		
Power Diagnose	colour: green, permanent light		operating voltage at module - faultless
	colour: red /green		AS-i status + peripheral failure, e.g. shortcircuit, excess voltage, cable break (profile S-7.A.*.E only)
	colour: red, permanent light		Communication failure
Solenoid Main	colour: blue, permanent light		1st solenoid valve (1) controlled
Solenoid Main ○ upper seat ○○ lower seat	colour: blue, 1 blink		2nd solenoid valve (2) controlled
	colour: blue, 2 blinks		3rd solenoid valve (3) controlled
	colour: blue, 1 blink		solenoid valve 2nd and 3rd (2) + (3) controlled.
Internal luminous displays			
Luminous diode	1		1st solenoid valve (1) controlled
Luminous diode	2		2nd solenoid valve (2) controlled
Luminous diode	3		3rd solenoid valve (3) controlled



7. Feedback unit

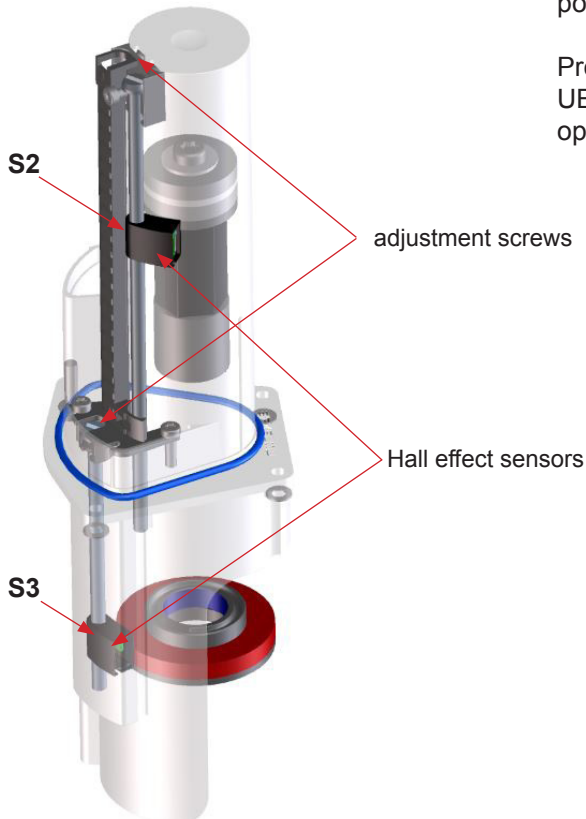
Feedback unit for
SPX FLOW APV valves

adjustment screws



Hall effect sensor

Feedback unit for
SPX FLOW APV / WCB D4 valves



7.1. General terms

For the internal registration of the valve position indication, the feedback unit with 2 Hall effect sensors is applied. It is used when single seat and butterfly valves are installed.

The control of these sensors is effected by magnets assembled on the valve shaft rod. The Hall effect sensors are installed on a movable threaded rod. By means of this assembly, the sensors can be adjusted via a large range, in accordance with the valve stroke.

7.2. Sensors

Hall effect sensors (APV valves): H320385

Hall effect sesonrs (APV / WCB D4 valves): H337014

UB 4,75-5,25 VDC

operating distance according to SPX FLOW specification

7.3. Adjustment of valve position feedback

By turning of the adjustment screws on which the Hall effect sensors are installed, the sensors can be moved into the respectively required position to detect the valve position.

The o-rings on the adjusting screws prevent unintended accidental displacement of these positions. After the installation of the control unit, check the correct adjustment of the position of the Hall sensor.

7.4. Use of external sensors

Instead of the internal Hall effect sensors, also 2 external proximity switches can be connected to the CU4 DC, e.g. for the valve position indication at double seat valves.

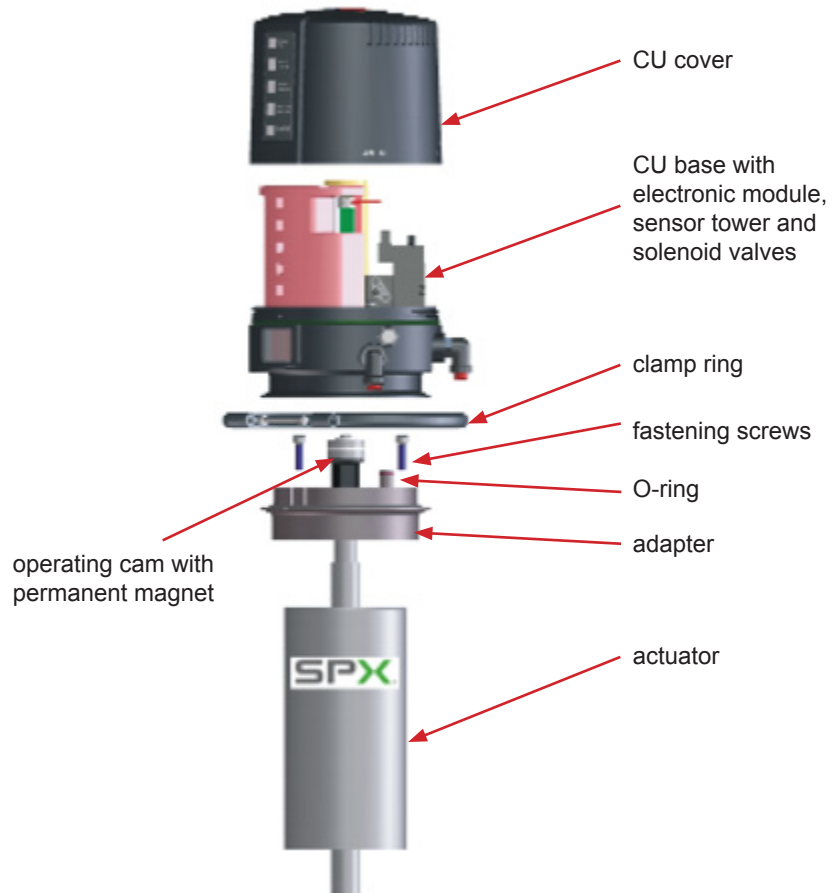
Proximity switch: H208844

UB 4,75-5,25 VDC

operating distance according to SPX FLOW specification

8. CU Assembly and Startup

8.1. Valves with turning actuator, e.g. butterfly valves



Caution!

The permanent magnet is made of fragile material and must be protected against mechanical load. – Risk of fracture!
The magnetic fields can damage or delete data carrier or influence electronic and mechanic components.

Assembly of the control unit on the valve

1. Assembly of the adapter on the turning actuator. Fasten with 3 screws. See to the right positioning of the o-rings on the lower side of the adapter and in the groove of the air transfer stud.
2. Install operating cam with shaft rod prolongation. Secure with Loctite semi-solid and fasten it.
3. Place the control unit via the operating cam onto the adapter. Observe alignment.
4. Attach the clamp rings and fasten them with the screws.

8. CU Assembly and Startup

8.1.1 Pneumatic connection

**Supply air:****CAUTION!**

Shut off the compressed air supply before connecting the air hose!

See that the air hose is professionally cut to length. Use a hose cutter for this purpose.

Pneumatic air for valve actuator:

For the assembly of the control unit on the turning actuator with integrated air transfer, air hosing between the control unit and the actuator is not necessary.

Exhaust air:

As a standard, the exhaust air connection is equipped with a silencer. If required, the silencer can be removed and the exhaust air can be hosed separately when it must be led off to the exterior, for example.

8.1.2 Electric connection

**CAUTION!**

Electric connections shall only be carried out by qualified personnel.

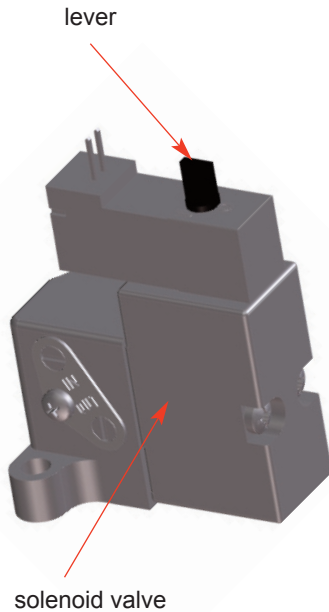
See to a professional execution and installation of the AS-interface network.

Observe the Safety Instructions specified in chapter 2.

8. CU Assembly and Startup

8.1.3 Startup

After proper assembly and installation of the control unit, startup can be undertaken as described below:



1. Switch on the air supply.
2. Switch on the voltage supply.
3. Check the solenoid valves by turning the lever on the upper side of the valve by 90°.
4. Check the valve position indicator and adjust feedbacks for **open** and **closed** valve position as described below.

For valves in normally closed (air-to-raise, spring-to-lower) /normally open (air-to-lower, spring-to-raise) design with turning actuator, the following allocation applies:

Closed valve position feedback – sensor 1 controlled

For the adjustment, Hall sensor 1 with **non-controlled** (controlled) solenoid valve 1 is moved into the required position by turning the adjustment screw 1. The **LED Valve Closed** lights up.

Open valve position feedback – sensor 2 controlled

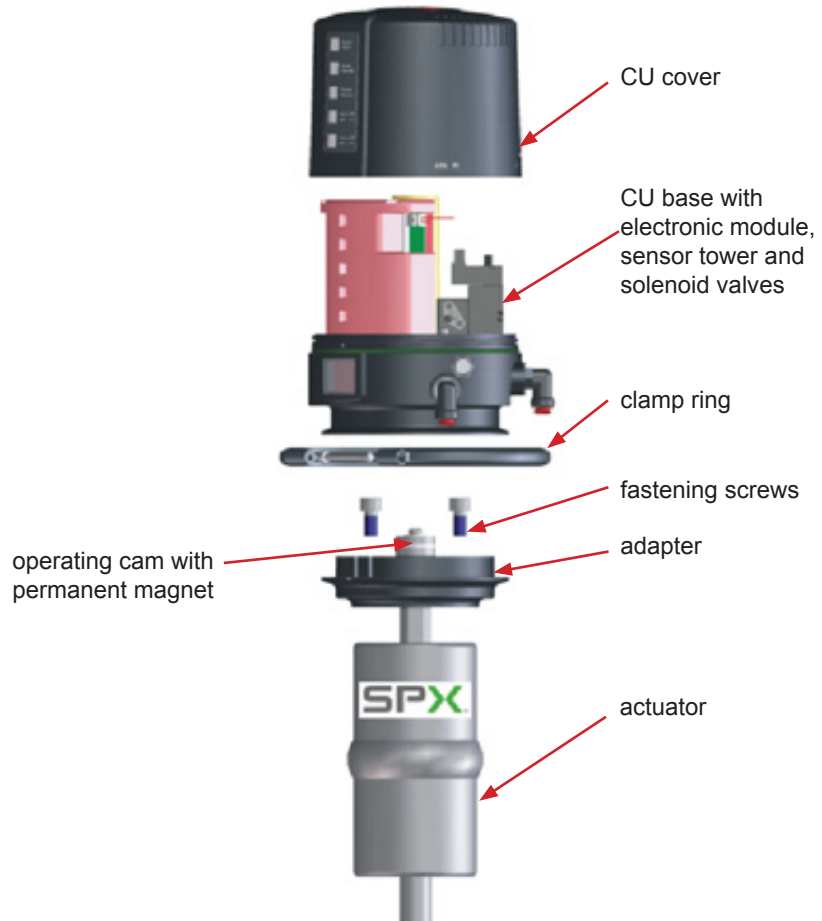
For the adjustment of Hall sensor 2, at first, the (non-controlled) solenoid valve 1 is **controlled**. This can optionally be made manually or electrically. The open valve position and the corresponding feedback can be adjusted. This is undertaken by turning the adjustment screw 2 until the required position is reached and the **LED Valve Open** lights up.



Observe the switching hysteresis of the Hall effect sensors! Therefore, adjust the switch-point of the sensors with overlap in order to permit small variations and, thus, to prevent failures!

8. CU Assembly and Startup

8.2. Single seat valves



Caution!

The permanent magnet is made of fragile material and must be protected against mechanical load. – Risk of fracture! The magnetic fields can damage or delete data carrier or influence electronic and mechanic components.

Assembly of the control unit on the valve

1. Assembly of the adapter on the single seat valve. Fasten with 4 screws.
2. Secure operating cam with Loctite semi-solid and fasten it.
3. Place the control unit via the operating cam onto the adapter. Observe alignment.
4. Attach the clamp rings and fasten them with the screws.

8. CU Assembly and Startup

8.2.1 Pneumatic connection

**Supply air:****CAUTION!**

Shut off the compressed air supply before connecting the air hose!

See that the air hose is professionally cut to length. Use a hose cutter for this purpose.

Pneumatic air for valve actuator:

Connect the pneumatic air connection **Y1** with the valve actuator.

- For the CU41N (**with logic NOT element**), the pneumatic air connection **N** must be connected with the spring side of the actuator.

See to the spring side of the actuator during the assembly of the pressure-reducing valve.

Exhaust air:

As a standard, the exhaust air connection is equipped with a silencer. If required, the silencer can be removed and the exhaust air can be hosed separately when it must be led off to the exterior, for example.

8.2.2 Electric connection

**CAUTION!**

Electric connections shall only be carried out by qualified personnel.

See to a professional execution and installation of the AS-interface network.

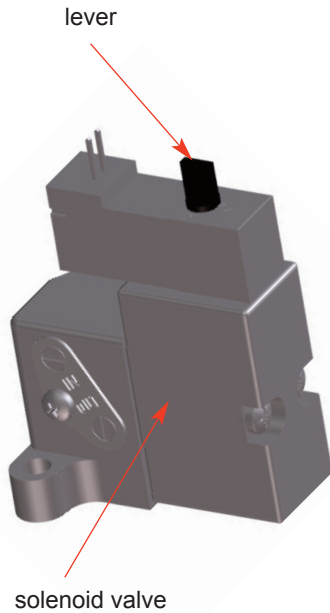
Observe the Safety Instructions specified in chapter 2.

8. CU Assembly and Startup

8.2.3 Startup

After proper assembly and installation of the control unit, startup can be undertaken as described below:

1. Switch on the air supply.
2. Switch on the voltage supply.
3. Check the solenoid valves by turning the lever on the upper side of the valve by 90°.
4. Check the valve position indicator and adjust feedbacks for **open** and **closed** valve position as described below



For single seat valves in normally closed (normally open) the following allocation applies:

Closed valve position feedback – sensor 1 controlled

For the adjustment, Hall sensor 1 with **non-controlled** (controlled) solenoid valve 1 is moved into the required position by turning the adjustment screw 1. The **LED Valve Closed** lights up.

Open valve position feedback – sensor 2 controlled

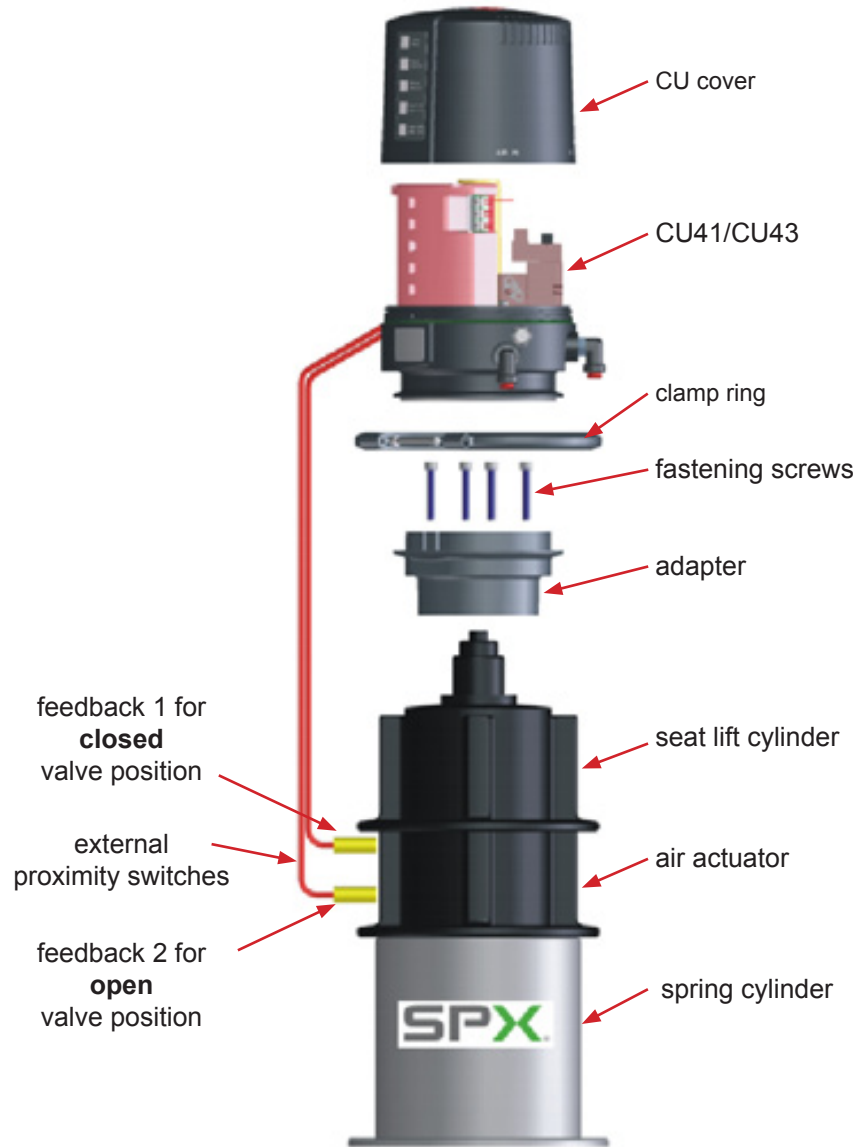
For the adjustment of Hall sensor 2, at first, the (non-controlled) solenoid valve 1 is **controlled**. This can optionally be made manually or electrically. The open valve position and the corresponding feedback can be adjusted. This is undertaken by turning the adjustment screw 2 until the required position is reached and the **LED Valve Open** lights up.



Observe the switching hysteresis of the Hall effect sensors! Therefore, adjust the switch-point of the sensors with overlap in order to permit small variations and, thus, to prevent failures!

8. CU Assembly and Startup

8.3. Double seat mix proof valves DE3, DA3+



Assembly of the control unit on the valve

1. Assembly of the adapter on the double seat valve. Fasten with 4 screws.
2. Align air connections of the control unit to the valve actuator.
3. Place the control unit onto the adapter. Observe alignment!
4. Attach the clamp rings and fasten them with the screws.
5. Assemble the external proximity switches at the actuator.

8. CU Assembly and Startup

8.3.1 Pneumatic connection





Supply air:
CAUTION!


Shut off the compressed air supply before connecting the air hose!

See that the air hose is professionally cut to length. Use a hose cutter for this purpose.

Pneumatic air to valve actuator:

Connect pneumatic air connection **Y1** with the valve actuator. 
Main actuator

Connect pneumatic air connection **Y2** with the valve actuator. 
(seat lifting - upper valve seat)

Connect pneumatic air connection **Y3** with the valve actuator. 
(seat lifting – lower valve seat)

Exhaust air:

As a standard, the exhaust air connections **A1** and **A2** are equipped with a silencer. If required, the silencer can be removed and the exhaust air can be hoses separately when it must be led off to the exterior, for example

8.3.2 Electric connection



CAUTION!

Electric connections shall only be carried out by qualified personnel.

See to a professional execution and installation of the AS-interface network.

Observe the Safety Instructions specified in chapter 2.

8.3.3 Connection of external proximity switches

The electric connection of the proximity switches specified by SPX is undertaken according to the terminal layout described in chapter 6.1.

The mechanic assembly of the proximity switches is carried out at the actuator of the corresponding double seat valves.

Observance of the operating manual for double seat valves is essential!

8. CU Assembly and Startup

8.3.4 Startup

After proper assembly and installation of the control unit, startup can be undertaken as described below:

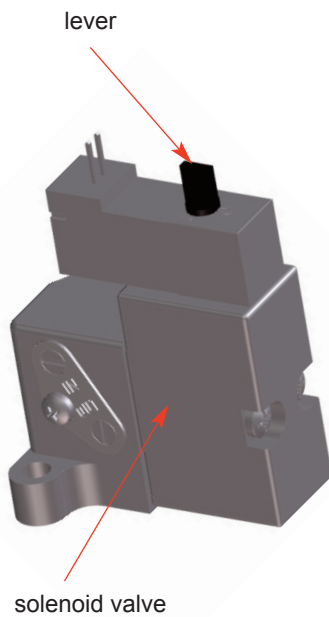
1. Switch on the air supply.
2. Switch on the voltage supply.
3. Check the solenoid valves by turning the lever on the upper side of the valve by 90°.
4. Check the valve position indicator. The proximity switches are installed at the double seat valves with a mechanical stop. Adjustment is not required!

The following allocation applies for double seat valves:

Closed valve position feedback – sensor 1 controlled

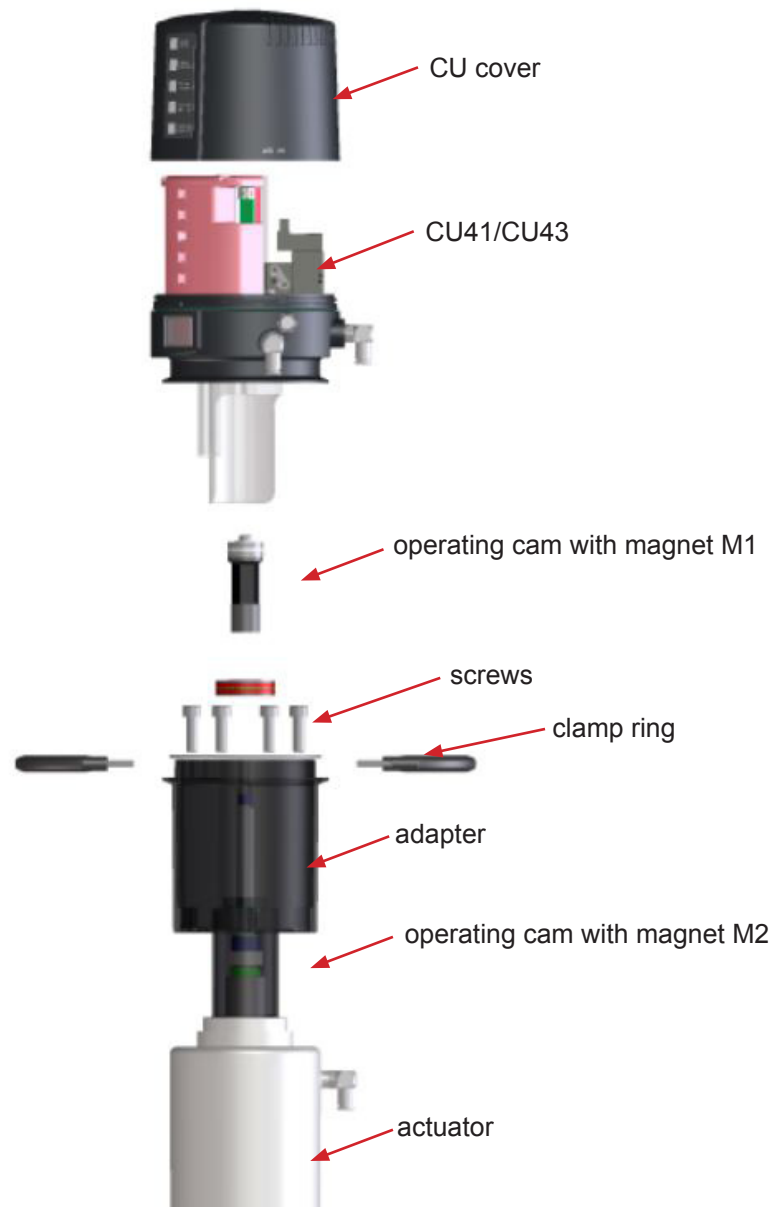
Open valve position feedback – sensor 2 controlled

Check the proper fit of the proximity switches to provide for the accurate transfer of the signals for the corresponding valve position.



8. CU Assembly and Startup

8.4. Double seat mix proof valves D4, D4 SL, DA4



Assembly of the control unit on the valve

1. Assemble the magnet M2 on the upper shaft under the stop screw.
2. Assemble the adapter with the 4 screws on the double seat valve.
3. Assemble the operating cam M1 with guide rod extension on the guide rod.
4. Place the control unit onto the adapter. Observe alignment!
5. Attach the clamp rings and fasten them with the 2 screws.
6. Align air connections of the control unit to the valve actuator.

8. CU Assembly and Startup

8.4.1 Pneumatic connection

Supply air:



Caution!

Shut off the compressed air supply before connecting the air hose!

Make sure that the air hose is professionally cut to length. Use a hose cutter for this purpose.

Pneumatic air to valve actuator:

Connect pneumatic air connection **Y1** with the valve actuator. Main actuator



Connect pneumatic air connection **Y2** with the valve actuator. (seat lifting - upper valve seat)



Connect pneumatic air connection **Y3** with the valve actuator. (seat lifting – lower valve seat)



Exhaust air:

As a standard, the exhaust air connections **A1** and **A2** are equipped with a silencer. If required, the silencer can be removed and the exhaust air can be hosed separately when it must be led off to the exterior, for example.

8.4.2 Electric connection



Attention!

Electric connections shall only be carried out by qualified personnel!

See to a professional execution and installation of the AS-interface network.

Observe the Safety Instructions specified in chapter 2.

Tighten the cable gland in order to ensure the corresponding protective class.

8. CU Assembly and Startup

8.4.3 Connection of external proximity switches

The electric connection of the proximity switches specified by SPX FLOW is undertaken according to the terminal layout described in chapter 6.1.

The mechanic assembly of the proximity switches is carried out at the actuator of the corresponding double seat valves.

Observance of the instruction manual for double seat valves is essential!

8.4.4 Startup

After proper assembly and installation of the control unit, startup can be undertaken as described below

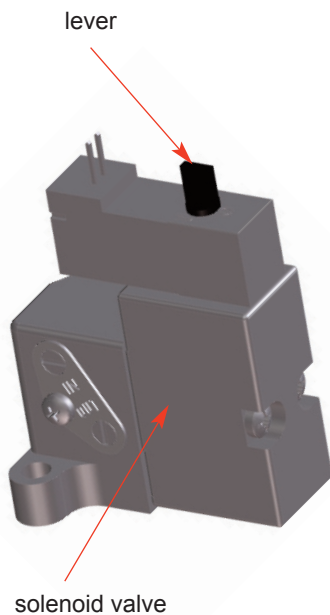
1. Switch on the air supply
2. Switch on the voltage supply.
3. Check the solenoid valves by turning the lever on the upper side of the valve by 90°.
4. Check the valve position indicator.
The proximity switches are installed at the double seat valves with a mechanical stop.
Adjustment is not required!

The following allocation applies for double seat valves:

Closed valve position feedback – sensor 3 controlled

Open valve position feedback – sensor 2 controlled

Check the proper fit of the proximity switches to provide for the accurate transfer of the signals for the corresponding valve position.



8. CU Assembly and Startup

8.5. Replacement of a CU3 control unit

All CU41 variants can substitute a CU3 control unit without changing the signal routing. When replacing the CU3, the larger dimensions of the CU4 control unit must, however, be considered. If a CU43 is to replace a CU33 control unit, the change of the seat lifting signals must be observed.

The following table shows the details.

AS-interface output data bit	CU33	CU43
DO0	main valve	main valve
DO1	lower seat lifting	upper seat lifting
DO2	upper seat lifting	lower seat lifting

In order to prevent the activation of the wrong seat lift after CU replacement, the following adaptations can be carried out:

- Change in the control software. – or -
- The interchange of the electrical connections of the pneumatic valves 2 and 3 at the electronic module of CU43. In this case, the signals of CU43 as well as of CU33 can be controlled.



The air hoses leading to the actuators must not be exchanged.

For the lower seat lift, the CU is equipped with a separate exhaust air channel due to the larger volume of the actuator. A mix-up of the air hoses can lead to disruption in operation.

9. Accessories and Tools

Assembly/disassembly - adapter on valve actuator:

- hexagon socket wrench 6 mm
- screwdriver 4mm

Assembly/disassembly – CU on adapter:

- hexagon socket wrench 3 mm

Assembly/disassembly – electronic module:

- torx wrench TX20
- screwdriver 3.5 mm

Assembly/disassembly – feedback unit:

- torx wrench TX15

Assembly/disassembly – electronic modules:

- torx wrench TX20

Assembly/disassembly – air connections:

- jaw wrench M13

Assembly/disassembly – pressure relief valve:

- torx wrench TX10

Loctite semi-solid

jaw wrench



torx wrench



screwdriver

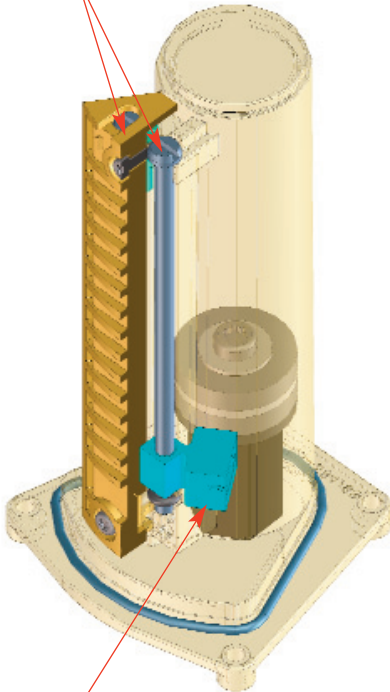


hexagon socket wrench



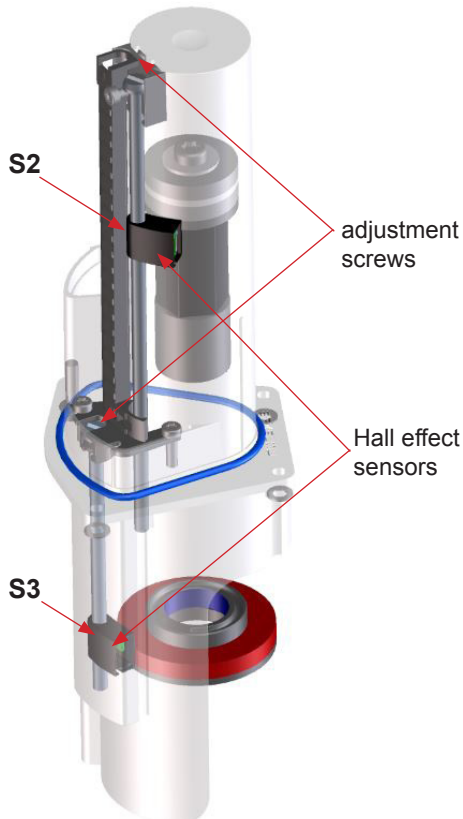
10. Service

Feedback unit for
SPX FLOW APV valves
adjusting screws



Hall effect sensor

Feedback unit for
SPX FLOW APV / WCB D4 valves



10.1. Dismantling

Before disassembly, verify the following items:

- The valve must be in safety position and must not be controlled!
- Shut off air supply!
- Cut off current to control unit, i.e. interrupt the supply voltage!

Solenoid valve (4, 5, 6)

- + Open the CU cover by turning in anticlockwise direction.
- + Release the plug connection at the electronic module for the corresponding solenoid valve.
- + Release and remove the 2 screws (20) TX20.
- + Replace the solenoid valve.
- + Assembly in reverse order. See to a proper fit of the flat seal!

Electronic module (2)

Before releasing the cable connections make sure that all lines are de-energised!

- + Open the CU cover by turning in anticlockwise direction.
- + Release the plug connection of the solenoid valves.
- + Release the cable from the terminal strip, all terminals 1-15.
- + Release and remove the 3 screws (20) TX20.
- + Replace the electronic module.
- + Assembly in reverse order.

Feedback unit

Before releasing the cable connections make sure that all lines are de-energised!

- + Open the cover.
- + Release the cable for the Hall effect sensors from the terminal strip, terminals 3-8.
- + Release the clamp ring and lift the CU4 from the adapter.
- + Remove the 4 screws (9) TX15 at the lower side of the CU base (1).
- + Take out the feedback unit to the bottom.

Hall effect sensors

The Hall effect sensors can only be replaced at the dismantled feedback unit.

- + Remove the 3 screws (14) TX10.
- + Remove the tower lid (13).
- + Remove the o-rings (11).
- + Dismantle the sensors by turning of the adjusting screw (12).

To simplify adjustment of feedbacks:

- + Mark the position of the sensor on the adjusting screw!
- + Assembly in reverse order.
- + Check the correct position of the Hall effect sensors and their functions as described in chapter 8 CU assembly and startup.

11. Trouble Shooting

General Failures	Remedy
Valve position is not indicated.	Re-adjust Hall sensors.
	Check fastening of magnetic operating cam.
	Check cabling of the Hall sensors to the electronic module.
Feedback via proximity switches is missing	Check positioning of proximity switches.
	Check AS-i bus communication.
	Check cabling to the electronic module.
LED indication is missing	Check AS-i bus communication.
	Check cabling to the electronic module..
LEDs ' valve open ' and ' valve closed ' are flashing	No bridge between the terminals 10, 11 and 12. Install the corresponding bridge.
Failure	Remedy
Control Unit CU41 installed on Butterfly valves	
Movement of valve flap is missing with actuated solenoid valve.	Check if the right control unit is installed. Check label in type window of control unit: CU41-T-AS-interface (1 EMV/solenoid valve)
	Check valve movement with lever at solenoid valve..
	Check cabling between electronic module and solenoid valve.
	Check compressed air (min. 6 bar).
	Bore for transfer of control air to turning actuator must be open.
Air leakage at lower side of adapter.	Check o-rings of adapter.

11. Trouble Shooting

Failure	Remedy
Control Unit CU41 installed on Single seat and Double seat valves	
Valve position movement is missing with actuated solenoid valve.	Check if the right control unit is installed. Check label in type window of control unit: CU41-S-AS-interface (1 solenoid) CU41-M-AS-interface CU41-D4-AS-interface
	Check valve movement with lever at solenoid valve.
	Check cabling between electronic module and solenoid valve.
	Check compressed air (min. 6 bar).
	Check control air connection between the CU41 and the valve actuator.
Control Unit CU43 installed on Double seat valves	
Valve position movement is missing with actuated solenoid valve.	Check if the right control unit is installed. Check label in type window of control unit: CU43-M-AS-interface (3 solenoids) CU43-D4-AS-interface
	Check valve movement with lever at solenoid valve.
	Check cabling between electronic module and solenoid valve.
	Check compressed air (min. 6 bar).
	Check control air connection between the CU43 and the DA3 / DA4 / D4 SL actuator.

12. Spare Parts Lists

The reference numbers of spare parts for the different control unit designs and adapters are included in the attached spare parts drawings with corresponding lists.

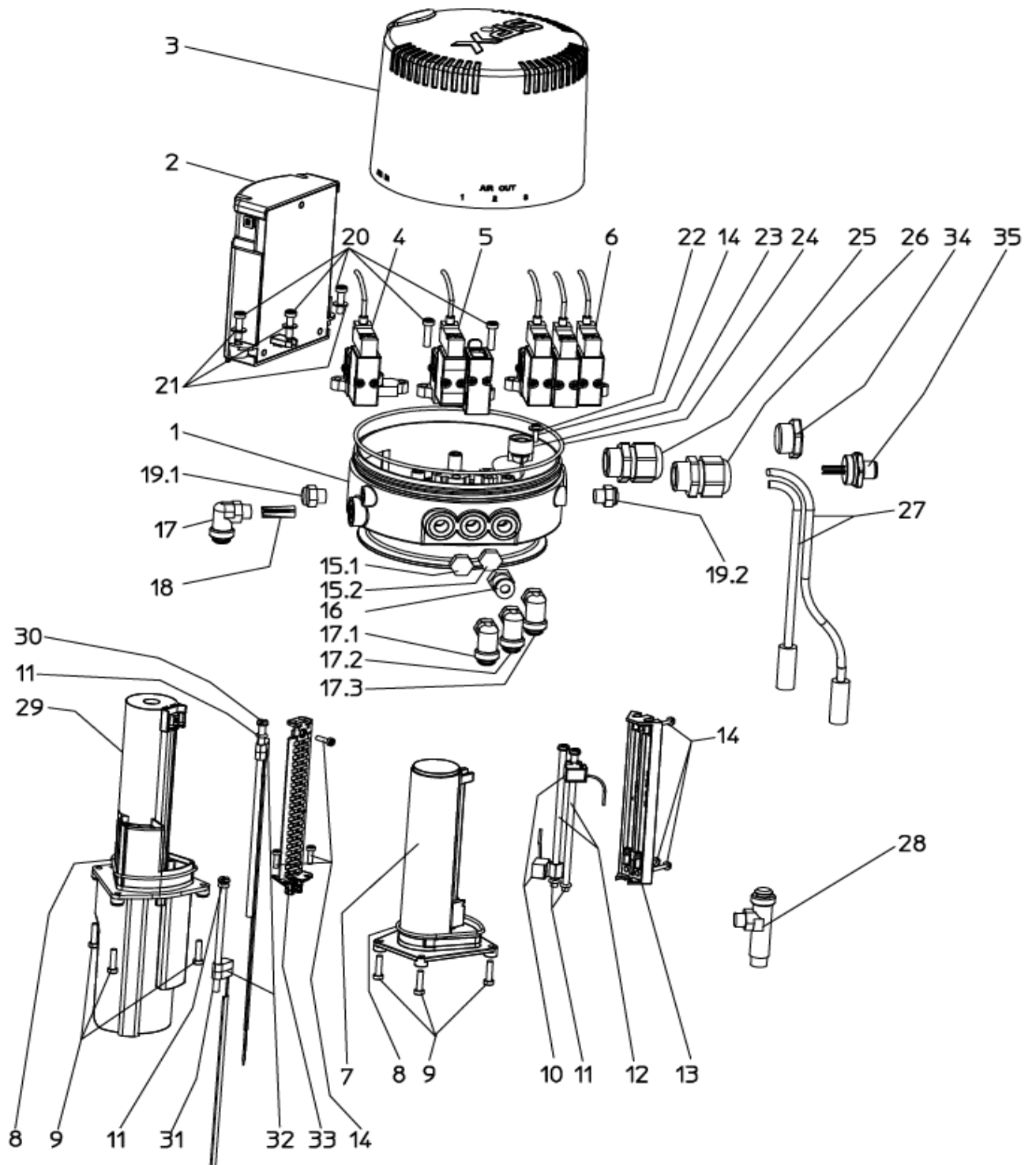
CU4 AS-interface	RN 01.044.5
CU4 adapter	RN 01.044.3

When you place an order for spare parts, please indicate the following data:

- number of parts required
- reference number
- parts designation

Data are subject to change..

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Datum:	05/10	06/10	09/10	07/18														
Name:	D.Schulz	D.Schulz	D.Schulz	C.Keil														
Geprüft:																		

Ersatzteilliste: spare parts list

CU4 AS-interface



SPX FLOW
Germany

Blatt 1 von 9

RN 01.044.5

Ersatzteilliste: spare parts list

CU4 AS-interface

		Datum: 05/10 06/10 09/10 01/13				Blatt 2 von 9				
		Name: D.Schulz		D.Schulz		Trytko				
		Geprüft: C.Keil				RN 01.044.5				
		Datum: 07/18								
		Name: C.Keil								
		Geprüft:								
pos.	Menge	Beschreibung	Material	CU41-S	CU41-T	CU41-M	CU41N-S	CU41N-T	CU43-M	CU43-S
item	Quantity	description	material	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.
		CU4 AS-i extended 62 slaves kpl. (6x1)		08-45-110/93 H320467	08-45-111/93 H320468	08-45-112/93 H320469	08-45-113/93 H320470	08-45-114/93 H320471	08-45-115/93 H320472	08-45-116/93 H320473
		CU4 AS-i extended 62 slaves cpl. (6x1)		08-45-130/93 H324666	08-45-131/93 H324667	08-45-132/93 H324668	08-45-133/93 H324669	08-45-134/93 H324670	08-45-135/93 H324671	08-45-136/93 H324672
		CU4 AS-i Standard 31 slaves kpl. (6x1)		08-45-250/93 H324673	08-45-251/93 H324674	08-45-252/93 H324675	08-45-253/93 H324676	08-45-254/93 H324677	08-45-255/93 H324678	08-45-256/93 H324679
		CU4 AS-i Standard 31 slaves cpl. (1/4"OD)		08-45-270/93 H324682	08-45-271/93 H324683	08-45-272/93 H324684	08-45-273/93 H324685	08-45-274/93 H324686	08-45-275/93 H324687	08-45-276/93 H324688
		CU4 AS-i extended 62 slaves kpl. (6x1) M12		08-45-150/93 H337701	08-45-151/93 H337702	08-45-152/93 H337703	08-45-153/93 H337704	08-45-154/93 H337705	08-45-155/93 H337706	08-45-156/93 H337707
		CU4 AS-i extended 62 slaves cpl. (1/4"OD) M12		08-45-160/93 H337708	08-45-161/93 H337709	08-45-162/93 H337710	08-45-163/93 H337711	08-45-164/93 H337712	08-45-165/93 H337713	08-45-166/93 H337714
		CU4 AS-i Standard 31 slaves kpl. (6x1) M12		on request	on request	on request	on request	on request	on request	on request
		CU4 AS-i standard 31 slaves cpl. (6x1) M12		on request	on request	on request	on request	on request	on request	on request
1	1	CU4 base	PA6.6 GF30	08-46-552/93 H319853	08-46-553/93 H319854	08-46-554/93 H319855	08-46-552/93 H319853	08-46-553/93 H319854	08-46-556/93 H319857	
2.0	1	CU4 e-module AS-i extended 62 slaves cpl.		08-46-595/93 H320388		08-46-595/93 H320388			08-46-596/93 H320389	
2.01	1	CU4 e-module AS-i extended 62 slaves cpl. (6x1) incl. label for valve type		08-46-730/93 H330604	08-46-731/93 H330605	08-46-732/93 H330606	08-46-733/93 H330607	08-46-734/93 H330608	08-46-735/93 H330609	08-46-736/93 H330610
2.02	1	CU4 e-module AS-i extended 62 slaves cpl. (1/4" OD) incl. label for valve type		08-46-740/93 H330611	08-46-741/93 H330612	08-46-742/93 H330613	08-46-743/93 H330614	08-46-744/93 H330615	08-46-745/93 H330616	08-46-746/93 H330617
2.03	1	CU4 e-module AS-i extended 62 slaves cpl. (6x1) M12 incl. label for valve type		on request	on request	on request	on request	on request	on request	on request
2.04	1	CU4 e-module AS-i extended 62 slaves cpl. (1/4" OD) M12 incl. label for valve type		on request	on request	on request	on request	on request	on request	on request



Ersatzteilliste: spare parts list

CU4 AS-interface

pos. item	Menge quantity	Beschreibung description	Material	CU41-S	CU41-T	CU41-M	CU41N-S	CU41N-T	CU43-M	CU43-S
				WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	
2.1	1	CU4 e-module AS-i extended 31 slaves cpl.				08-46-598/93 H324760				
2.11	1	CU4 e-module AS-i extended 31 slaves cpl. (6x1) incl. label for valve type		08-46-781/93 H330620	08-46-782/93 H330621	08-46-783/93 H330622	08-46-784/93 H330623	08-46-785/93 H330624	08-46-786/93 H330625	
2.12	1	CU4 e-module AS-i extended 31 slaves cpl. (1/4" OD) incl. label for valve type		08-46-790/93 H330626	08-46-791/93 H330627	08-46-792/93 H330628	08-46-793/93 H330629	08-46-794/93 H330630	08-46-795/93 H330631	08-46-796/93 H330632
2.13	1	CU4 e-module AS-i extended 31 slaves cpl. (6x1) M12 incl. label for valve type								
2.14	1	CU4 e-module AS-i extended 31 slaves cpl. (1/4" OD) M12 incl. label for valve type								
3	1	CU4 Haube kpl. CU4 cover cpl.	PA12 GF30				08-46-659/93 H325602			
4	1	Magnetventilblock 1 EMV Solenoid valve 1 sol.	PPS	08-46-578/93 H319950						
5	1	Magnetventilblock 1 EMV + NOT-Element Solenoid valve 1 sol. + NOT-element	PPS	----- -----			08-46-579/93 H319951			
6	1	Magnetventilblock 3 EMV Solenoid valve 3 sol.	PPS						08-46-580/93 H319952	
7	1	CU4 Sensortower CU4 sensor tower	PA12							
8	1	O-Ring 45,6 x 2,4 O-ring 45,6 x 2,4	NBR							
9	4	Ejot Delta PT Schraube WN5452 35x14 Ejot Delta PT screw WN5452 35x14	A2							
10	2	Hall Sensor Hall sensor		08-46-581/93 H320385			08-46-581/93 H320385			08-46-581/93 H320385
11	2	O-Ring 3x2 O-ring 3x2	NBR	58-06-043/83 H208644			58-06-043/83 H208644			58-06-043/83 H208644
12	2	Zyl.-Schraube M4x100 Cyl. screw M4x100	A2-50	65-03-290/13 H320361			65-03-290/13 H320361			65-03-290/13 H320361
13	1	CU4 Towerabdeckung CU4 tower cover	PA12	08-46-565/93 H319869			08-46-565/93 H319869			08-46-565/93 H319869

Datum:	05/10	06/10	09/10	01/13
Name:	D.Schulz	D.Schulz	D.Schulz	Trytko
Geprüft:				

Datum:	07/18			
Name:	C.Keil			
Geprüft:				

Blatt	3	von	9
RN 01.044.5			



Ersatzteilliste: spare parts list

Datum:	05/10	06/10	09/10	01/13
Name:	D.Schulz	D.Schulz	D.Schulz	Trytko
Geprüft:				

Datum:	04/13	07/18		
Name:	Trytko	C.Keil		
Geprüft:				

CU4 AS-interface

pos. item	Menge quantity	Beschreibung description	Material	CU41-S	CU41-T	CU41-M	CU41N-S	CU41N-T	CU43-M	CU43-S
				WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	
21	3	Scheibe ø4,3 DIN125 Washer ø4,3 DIN125	A2				67-01-003/13 H79576			
22	1	Scheibe A 3,2 DIN9021 Washer A 3,2 DIN9021	A2				67-01-001/12 H320404			
23	1	CU4 Überströmventil CU4 pressure relief valve	PPS				08-46-037/93 H320352			
24	1	O-Ring 120,32 x 2,62 O-ring 120,32 x 2,62	NBR				58-06-583/83 H320402			
25	1	Kabelverschraubung M20x1,5 Kabel ø5-9 Screwed cable gland M20x1,5 cable ø5-9	PA				08-46-041/93 H320372			
26	1	Kabelverschraubung M20x1,5 Kabel 2x ø5 Screwed cable gland M20x1,5 cable 2x ø5	PA	----- -----		08-46-040/93 H320371	----- -----		08-46-040/93 H320371	08-60-053/93 H324895
27	2	Initiator Ni5 K11K-AN 5X/5 Proximity switch Ni5 K11K-AN 5X/5		----- -----		08-60-769/93 H208844	----- -----		08-60-769/93 H208844	----- -----
28	1	Druckreduzierventil Pressure reducing valve	Ms / vern.	-----			08-60-766/93 H208841			----- -----

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Ersatzteilliste: spare parts list

CU4 AS-interface

pos. item	Menge quantity	Beschreibung description	Material	CU41-D4		CU43-D4		Datei				Blatt 6	von 9
				WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	05/10 D.Schulz	06/10 D.Schulz	09/10 D.Schulz	01/13 Trytko		
		CU4 D4 AS-i extended 62 slaves kpl. (6x1)		08-45-382/93	08-45-383/93								
		CU4 D4 AS-i extended 62 slaves cpl. (6x1)		H336956	H336957								
		CU4 D4 AS-i extended 62 slaves kpl. (1/4"OD)		08-45-432/93	08-45-433/93								
		CU4 D4 AS-i extended 62 slaves cpl. (1/4"OD)		H336961	H336962								
		CU4 D4 AS-i Standard 31 slaves kpl. (6x1)		08-45-384/93	08-45-385/93								
		CU4 D4 AS-i standard 31 slaves cpl. (6x1)		H338150	H338152								
		CU4 D4 AS-i Standard 31 slaves kpl. (1/4"OD)		08-45-434/93	08-45-435/93								
		CU4 D4 AS-i standard 31 slaves cpl. (1/4"OD)		H338151	H338153								
		CU4 D4 AS-i extended 62 sla. kpl. (6x1) M12		08-45-386/93	08-45-387/39								
		CU4 D4 AS-i extended 62 sla. cpl. (6x1) M12		H338878	H338897								
		CU4 D4 AS-i extended 62 sla. kpl. (1/4"OD) M12		08-45-392/93	08-45-393/39								
		CU4 D4 AS-i extended 62 sla. cpl. (1/4"OD) M12		H338900	H338901								
		CU4 D4 AS-i Standard 31 sla. kpl. (6x1) M12		08-45-388/93	08-45-391/39								
		CU4 D4 AS-i standard 31 sla. cpl. (6x1) M12		H338898	H338899								
		CU4 D4AS-i Standard 31 sla. kpl. (1/4"OD) M12		08-45-394	08-45-395/39								
		CU4 D4AS-i standard 31 sla. cpl. (1/4"OD) M12		H338902	H338903								
1	1	CU4 base	PA6.6 GF30	08-46-552/93	08-46-556/93								
		CU4 base		H319855	H319857								
2.0	1	CU4 e-module AS-i extended 62 slaves cpl.		08-46-595/93	08-46-596/93								
		CU4 e-module AS-i extended 62 slaves cpl. (6x1) incl. label for valve type		H320388	H320389								
2.01	1	CU4 e-module AS-i extended 62 slaves cpl. (1/4" OD) incl. label for valve type		on request	on request								
2.02	1	CU4 e-module AS-i extended 62 slaves cpl. (1/4" OD) incl. label for valve type		on request	on request								
2.03	1	CU4 e-module AS-i extended 62 slaves cpl. (6x1) M12 incl. label for valve type		on request	on request								
2.04	1	CU4 e-module AS-i extended 62 slaves cpl. (1/4" OD) M12 incl. label for valve type		on request	on request								



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Ersatzteilliste: spare parts list

CU4 AS-interface

pos. item	Menge quantity	Beschreibung description	Material	CU41-D4		CU43-D4		Datei					
				WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	05/10	06/10	09/10	01/13		
2.1	1	CU4 e-module AS-i extended 31 slaves cpl.		08-46-598/93 H324760	08-46-599/93 H324761			D.Schulz	D.Schulz	D.Schulz	Trytko	Blatt 7	von 9
2.11	1	CU4 e-module AS-i extended 31 slaves cpl. (6x1) incl. label for valve type		on request	on request								
2.12	1	CU4 e-module AS-i extended 31 slaves cpl. (1/4" OD) incl. label for valve type		on request	on request								
2.13	1	CU4 e-module AS-i extended 31 slaves cpl. (6x1) M12 incl. label for valve type		on request	on request								
2.14	1	CU4 e-module AS-i extended 31 slaves cpl. (1/4" OD) M12 incl. label for valve type		on request	on request								
3	1	CU4 Haube kpl. CU4 cover cpl.	PA12 GF30	08-46-578/93 H319950	08-46-659/93 H325602								
4	1	Magnetventilblock 1 EMV Solenoid valve 1 sol.	PPS										
5	0	Magnetventilblock 1 EMV + NOT-Element Solenoid valve 1 sol. + NOT-element	PPS										
6	1	Magnetventilblock 3 EMV Solenoid valve 3 sol.	PPS		08-46-580/93 H319952								
7	0	CU4 Sensortower CU4 sensor tower	PA12										
8	1	O-Ring 45,6 x 2,4 O-ring 45,6 x 2,4	NBR		58-06-218/83 H320401								
9	4	Ejot Delta PT Schraube WN5452 35x14 Ejot Delta PT screw WN5452 35x14	A2		65-17-122/13 H320364								
10	0	Hall Sensor Hall sensor											
11	2	O-Ring 3x2 O-ring 3x2	NBR		58-06-043/83 H208644								
12	0	Zyl.-Schraube M4x100 Cyl. screw M4x100	A2-50										
13	0	CU4 Towerabdeckung CU4 tower cover	PA12										



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Ersatzteilliste: spare parts list

CU4 AS-interface

pos. item		Menge quantity	Beschreibung description	Material	CU41-D4 WS-Nr. ref.-no.	CU43-D4 WS-Nr. ref.-no.	WS-Nr. ref.-no.	05/10 D.Schulz	06/10 D.Schulz	09/10 D.Schulz	01/13 Trytko	Blatt 9 von 9	
Datum: 05/10 06/10 09/10 01/13												RN 01.044.5	
Name: D.Schulz													
Geprüft: Trytko													
Datum: 04/13 07/18													
Name: Trytko C.Keil													
Geprüft:													
21	3		Scheibe ø4,3 DIN125	A2	67-01-003/13 H79576		-----						
22	1		Washer ø4,3 DIN125	A2	67-01-001/12 H320404		-----						
23	1		Scheibe A 3,2 DIN9021										
23	1		Washer A 3,2 DIN9021	PPS	08-46-037/93 H320352		-----						
24	1		CU4 Überströmventil	NBR	58-06-583/83 H320402		-----						
24	1		CU4 pressure relief valve										
24	1		O-Ring 120,32 x 2,62	PA	08-46-041/93 H320372		-----						
24	1		O-ring 120,32 x 2,62										
25	1		Kabelverschraubung M20x1,5 Kabel ø5-9	PA									
25	1		Screwed cable gland M20x1,5 cable ø5-9										
26	0		Kabelverschraubung M20x1,5 Kabel 2x ø5	PA									
26	0		Screwed cable gland M20x1,5 cable 2x ø5										
27	0		Initiator Ni5 K11K-AN 5X/5										
27	0		Proximity switch Ni5 K11K-AN 5X/5										
28	1		Druckreduzierventil	Ms / vern.									
28	1		Pressure reducing valve										
29	1		D4 Sensortower Kmpl.	Grilamid TR55	08-46-933/93 H338146	08-46-933/93 H338146	-----						
29	1		D4 sensor tower compl.										
30	1		Zylinder Schraube ISO 1207 M4x140	A2	65-03-294/13 H337011	65-03-294/13 H337011	-----						
30	1		Cylinder head screw ISO 1207 M4x140										
31	1		Zylinder Schraube ISO 1207 M4x80	A2	65-03-288/13 H336896	65-03-288/13 H336896	-----						
31	1		Cylinder head screw ISO 1207 M4x80										
32	2		CU4 Hall Sensor D4	Grilamid TR55	08-46-589/93 H337014	08-46-589/93 H337014	-----						
32	2		CU4 Hall sensor D4										
33	2		CU4 Hall Sensorabdeckung D4	Grilamid TR90	08-46-932/93 H336041	08-46-932/93 H336041	-----						
33	2		CU4 Hall sensor bracket D4										
34	1		Blindstopfen M20x1.5	PA	08-60-053/93 H324985		-----						
34	1		Blind plug M20x1.5										
35	1		Blindstopfen M20x1.5		08-46-632/99 H338108		-----						
35	1		Blind plug M20x1.5										



Ersatzteilliste: spare parts list

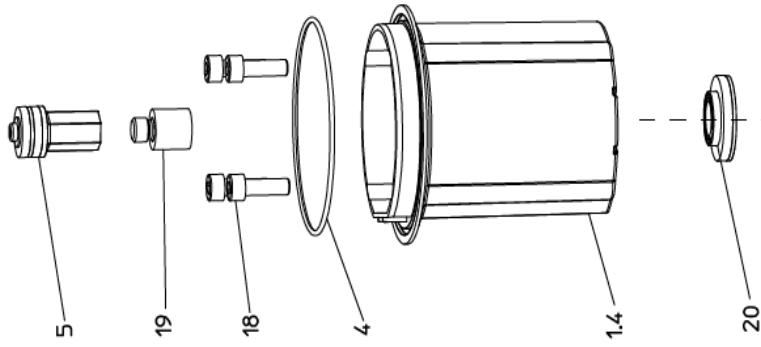
CU4 Adapter

Datum:	11/08	01/09	03/09	11/10
Name:	Peters	Peters	Trytko	Schulz
Geprüft:	Spliehoff	Spliehoff	Peters	Spliehoff
Datum:	03/13	11/14	05/18	
Name:	Trytko	Trytko	C.Keil	
Geprüft:	Schulz			

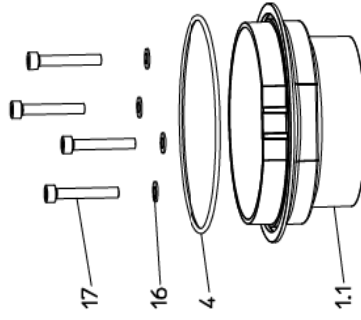


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RN 01.044.3			

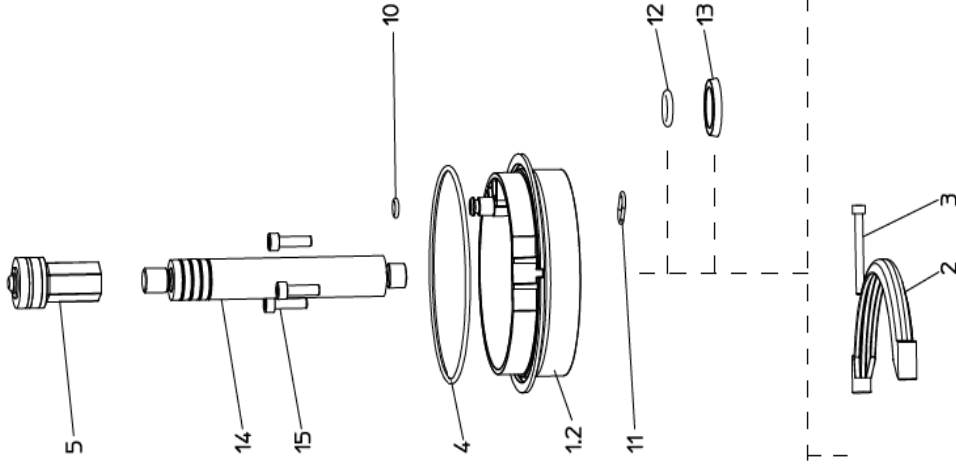
CU4 D4 - Adapter



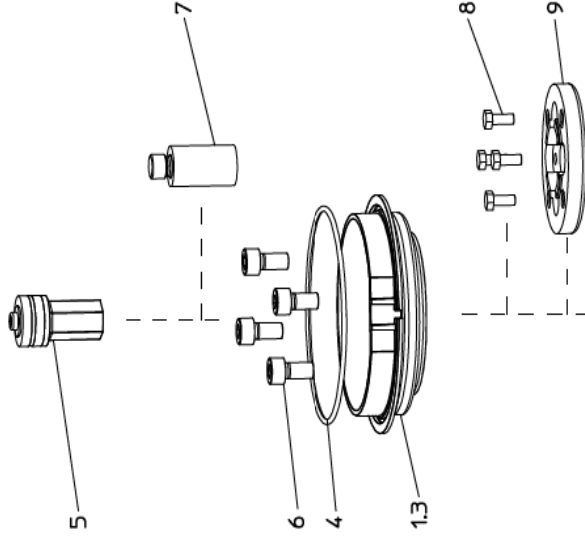
CU4 M - Adapter



CU4 T - Adapter



CU4 S - Adapter



Ersatzteilliste: spare parts list

CU4 Adapter

pos. item	Menge quantity	Beschreibung description	Material	CU4 - S WS-Nr. ref.-no.	CU4 - S WS-Nr. ref.-no.	CU4 - S Langhub ø165 WS-Nr. ref.-no.	CU4 - Smini WS-Nr. ref.-no.	CU4 - Smax		CU4 - T		CU4 - Tmax		CU4 - M
								11/08 Peters Spiethoff	01/09 Peters Spiethoff	03/09 Trytko Peters	11/10 Schulz Spiethoff	WS-Nr. ref.-no.	WS-Nr. ref.-no.	
		CU4 Adapter kpl. CU4 adapter cpl.		08-48-600/93 H320474	08-48-613/93 H321989	08-48-633/93 H330897	08-48-610/93 H321988	08-48-601/93 H320475	08-48-611/93 H321987	08-48-602/93 H320476				
1.1	1	CU4 Adapter M CU4 adapter M	PA6.6 GF30											
1.2	1	CU4 Adapter T CU4 adapter T	PA6.6 GF30					08-46-571/93 H319875	08-46-571/93 H319875					
1.3	1	CU4 Adapter S CU4 adapter S	PA6.6 GF30	08-46-570/93 H319874	08-46-570/93 H319874		08-46-570/93 H319874							
1.4	0	CU4 Adapter D4 CU4 adapter D4	PA6.6 GF30											
2	2	CU4 Clamphalbschale kpl. CU4 clamp cpl.	Grivory GH-5H1	08-46-569/93 H319873	08-46-569/93 H319873	08-46-569/93 H319873	08-46-569/93 H319873	08-46-569/93 H319873	08-46-569/93 H319873	08-46-569/93 H319873				
3	2	Zylinderschraube M4x40 Cyl. screw M4x40	A2-70	65-05-040/13 H320360	65-05-040/13 H320360	65-05-040/13 H320360	65-05-040/13 H320360	65-05-040/13 H320360	65-05-040/13 H320360	65-05-040/13 H320360				
4	1	O-Ring 101,27x2,62 O-ring 101,27x2,62	NBR	58-06-493/83 H148389	58-06-493/83 H148389	58-06-493/83 H148389	58-06-493/83 H148389	58-06-493/83 H148389	58-06-493/83 H148389	58-06-493/83 H148389				
5	1	CU4 Magnetschaltnocke kpl. CU4 magnet operating cam cpl.	Zytel HTN	08-60-900/93 H320479	08-60-900/93 H320479	08-60-900/93 H320479	08-60-900/93 H320479	08-60-900/93 H320479	08-60-900/93 H320479	08-60-900/93 H320479				
6	4	Zyl. Schraube Cyl. screw	A2-70	65-05-120/13 H79012	65-05-120/13 H79012	65-05-122/13 H79014	65-05-129/13 H315760							
7	1	Zugstangenverlängerung Guide rod extension	PA6		15-26-070/93 H208096		15-26-057/93 H204747							
8	4	Skt. Schraube M5x12 Hex. screw M5x12	A2-70		65-01-033/15 H78737									
9	1	CU Adapter SW4 CU adapter SW4	PA6	08-48-359/93 H330879	08-48-355/93 H207570		08-48-361/93 H327150							
10	1	O-Ring 6x2 O-ring 6x2	NBR					58-06-059/83 H320505	58-06-059/83 H320505					
11	1	O-Ring 11x2 O-ring 11x2	NBR					58-06-034/83 H321897	58-06-034/83 H321897					
12	1	O-Ring 11x3 O-ring 11x3	NBR							58-06-039/83 H208632				



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APV CU4 AS-interface

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