

APV CU4plus AS-interface

CONTROL UNIT

FORM NO.: H333978 REVISION: UK-1

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 |
| EMV | Electromagnetic Compatibility |
| EU | European Union |
| GND | Ground/mass potential |
| IP | International Protection |
| LED | Luminous diode |
| N | Pneumatic Air Connection NOT element |
| NEMA | National Electrical Manufacturers Association |
| P | Supply Air Connection |
| PELV | Protected Extra-Low Voltage |
| PWM | Pulse-width modulation |
| Y | Pneumatic Air Connection |
| SLD | Seat Lift Detection / Seat Lift Gathering |

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 CU4plus AS-i control unit is only intended for use as described in chapter 3.1. Use beyond that described in chapter 3.1. do not comply with the regulations and SPX Flow Technology shall not be responsible for any damage resulting from this non-observance. The operator bears the full risk. Prerequisites for 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 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 should 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 electrical 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 installation 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.
- 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 specialized 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 arising from failure or malfunction of the device.

2. Safety Instructions

2.7. Important Safety Instructions for AS-interface networks

Aside from complying with the Installation Guidelines according to AS-i Specification, observe the following instructions!

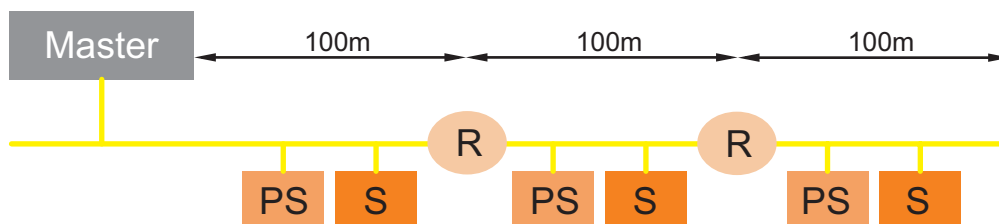
2.7.1 Earthing

- The PE connection of the AS-i power supply (protective earth) must (if existent) be grounded.
- The symmetry point of the AS-i network (GND, ground, shield) must be connected with the plant ground).
- Neither AS-i – nor AS-i + must be grounded.
- Use of earth-leakage relay, insulation monitoring modules is recommended.
- Use of surge protection modules is recommended.

2.7.2. Network design and voltage supply

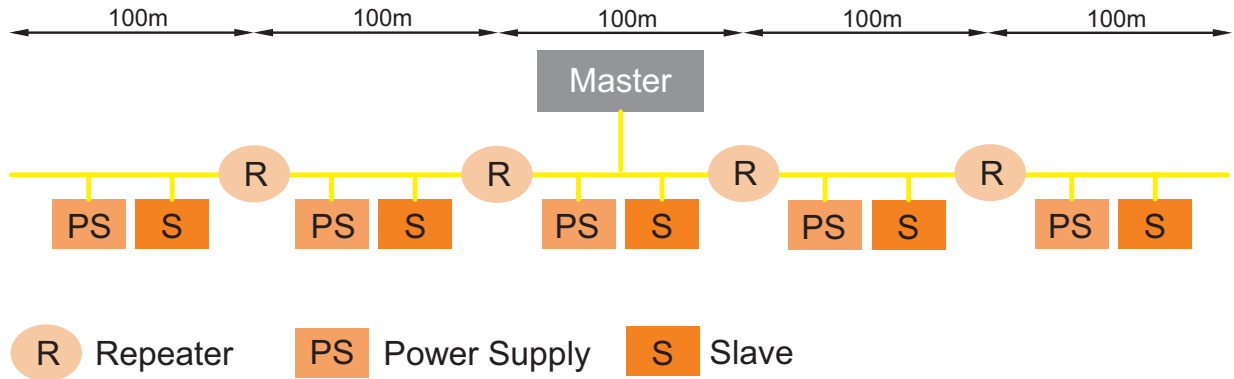
- Use only AS-i certified power supplies.
- Output voltage 26.5 to 31.6 VDC
- AS-i power supplies deliver up to 8A.
- The voltage drop between power supply and bus device must not exceed 3V. If required, the power supply must be set closer to the slaves. Alternatively power supplies with repeaters can be extended to such an extent that up to 3 power supplies can be distributed over the whole bus, see fig.
- An AS-i segment including all stubs must not be longer than 100 m.
- Additional 100 m AS-i cable may be connected to each repeater, whereas not more than 2 repeaters (max. 2 connected in series) may be set between a slave and the master.
- A galvanically isolated AS-i power supply must be connected in every segment.

Extension with repeater



2. Safety Instructions

Extension with repeater to max. 500 m (central positioning)



- AS-i power cables must be separated from the energy cables and must be as short as possible.
- External proximity switches must be connected to the slave as close as possible.
- Floating sensors/actuators: Grounding of galvanic peripheral devices connected with AS-i potential is not permitted. It must be avoided in terms of immunity to interference.

2.7.3. Selection of the appropriate power supply:

The max. electricity demand in the AS-i net (sum of all consumers) per segment must be smaller than the admissible current carrying capacity of the AS-i network (max. 90 %).

- The electricity demand of the individual slave results from the instruction manual. For the design of the networks a simultaneity factor can be integrated if necessary. A max. assignment of e.g. 62 slaves should be taken as a basis.
- At the end of each segment under full load, the AS-i voltage must be within the specification 26.5 to 31.6 V.

2.7.4. What has to be observed if a 8A AS-i power supply is used?

If more than the standard current of 2 A is transferred via the AS-i cables, the following boundary conditions must be considered when planning the net:

- The voltage drop along the AS-i line increases. For orientation purposes: If 2 A are transferred via one 100 m-long-cable with wire cross-section of 1.5 mm, the voltage drop amounts to 5 V.
- The contacts of the penetration technology are designed only for certain maximum permanent current which are partially below 8 A. Refer to the manufacturer datasheet!

2. Safety Instructions

2.7.5. Increase in interference resistance

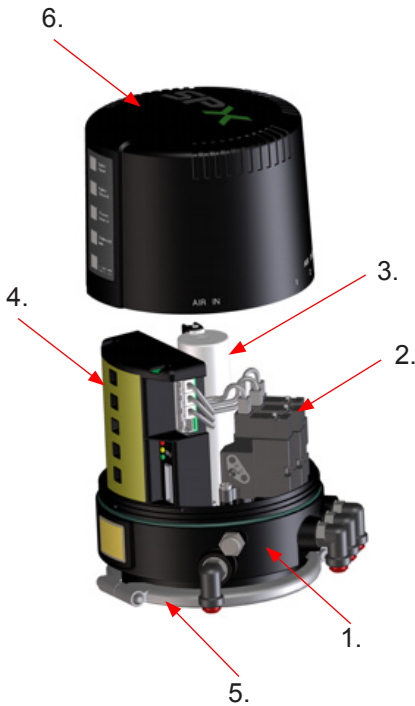
- The connection „Schirm“ (shield) at the AS-i power supply unit must be connected directly and with good RF characteristics with the potential equalization of the machine or plant. This is not a grounding measure for safety reasons, but a functional grounding so that the AS-i line can be operated symmetrically against the earth. If a shielded cable is used, the cable shield must be connected there - and there only, as well.
- A good symmetry must also be observed towards other electrical sources of interference (speed-controlled actuators, welding units etc.). The length of the connecting cables between the active slaves (CU4, CU4plus etc.) and the proximity switches connected to them must be limited to max. 2 m.
- When high electrostatic charge is expected (e.g. polishing machines, injection moulding machines, wrapping foils for plastic materials etc.) it may be required to take additional protective measures, such as the installation of arresters for static loads.

2.7.6. May the AS-i cable be laid in parallel to power cables?

- Although the communication via AS-i cable is not sensitive to EMC, it should be laid separately from line cables - also in control cabinets.
- Maximum distance to potential sources of interference (e.g. frequency converter) must be observed.
- Every AS-i wiring harness should have its own cable, i.e. AS-i cables should not be laid together with other cables in the same common cable.
- If it is required to lay single conductors (e.g. in control cabinets), parallel conductors must be laid. In case of standard stranded wires, lay and twist single conductors together.

3. General Terms

fig. 3.2.



3.1. Purpose of use

The control unit CU4plus AS-i has been developed for the control of process valves in food processing industry as well as related industries.

The CU4plus AS-i control unit operates as interface between process control and process valve and controls the electric and pneumatic signals.

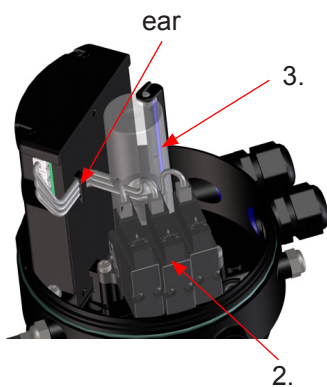
The pneumatic control of APV valves is undertaken via the solenoid valves. The control unit controls the valve positions, **open** and **closed**, via integrated and external sensors. The electronic module undertakes the task to process the switching signal from the control and to control the corresponding solenoid valves. The electronic module also provides for potential-free contacts. The corresponding light signals in the control unit provide for an external indication of the valve positions.

3.2. Design of CU4plus AS-interface (fig. 3.2.)

The CU4plus AS-interface control unit consist 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 integrated position measuring system for the detection of the valve position.
4. Electronic module for the electric supply, for the AS-i communication with the 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. 3.2.1



The cable/s by means of which the solenoid valves are connected with the electronic module must be guided through the ear 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. At 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. Observance of the required compressed air quality is imperative. Please also see **chapter 4.5** Technical Data.

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 equipped with 3 solenoid valves. For the manual actuation, the solenoid valves are provided with a safe handle which is easy to operate.

The electronic module installed in the control unit fulfils 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. Communication is undertaken via the standard AS-interface bus protocol according to specification V3.0.

Valve position detection is realized via a linear sensor which is integrated in the sensor module.

Control is effected via the solenoid switch cam mounted to the valve actuator rod. The measuring range of the linear sensor detects the complete valve stroke. By means of the teach-in function, the corresponding position for closed and open valve position are detected and seat lift positions are permanently saved in the electronic module if required. (see **chapter 7.3** Teach-in function)

For DA3+ double seat valves with active seat lift detection (SLD) additionally to the linear sensors integrated in the CU, two external proximity switches installed at the valve actuator are required. The corresponding signals of the linear sensor as well as external proximity switches are evaluated in an internal logic circuit and, thus, the corresponding valve position indications are generated. (see **chapter 6.7**. Data signals, AS-i communication)

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 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 indicators provides more details.

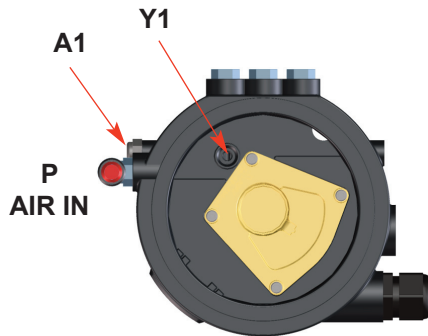


The complete control unit has been designed on the building block principle. By exchange of the electronic module, the control type can be changed, e.g. from direct control (Direct Connect) to communication with AS-Interface.

Attention: Wiring must be changed!

4. Mechanics and Pneumatics

4.1. Air connections for turning actuator



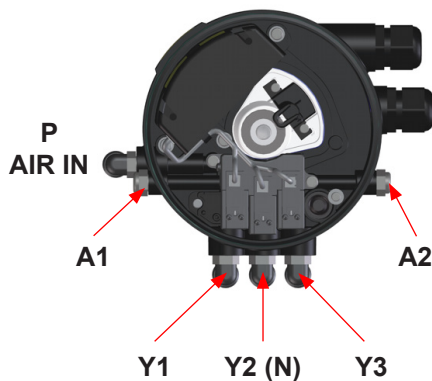
4.1.1. Function

CU41plus-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 seat valves and double seat mixproof valves



4.2.1. Function

CU41plus-S AS-i

design for seat valves

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

CU41Nplus-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 silencer

CU41plus-M AS-i

design for double seat valves without seat lift function

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

CU43plus-M AS-i

design for double seat valves with seat lift function

- 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 lifting
- Y3** pneumatic air connection for seat lift actuator of lower seat lifting
- A1/A2** exhaust air with 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 valve vents into the clearance between the base and the adapter of the control unit.



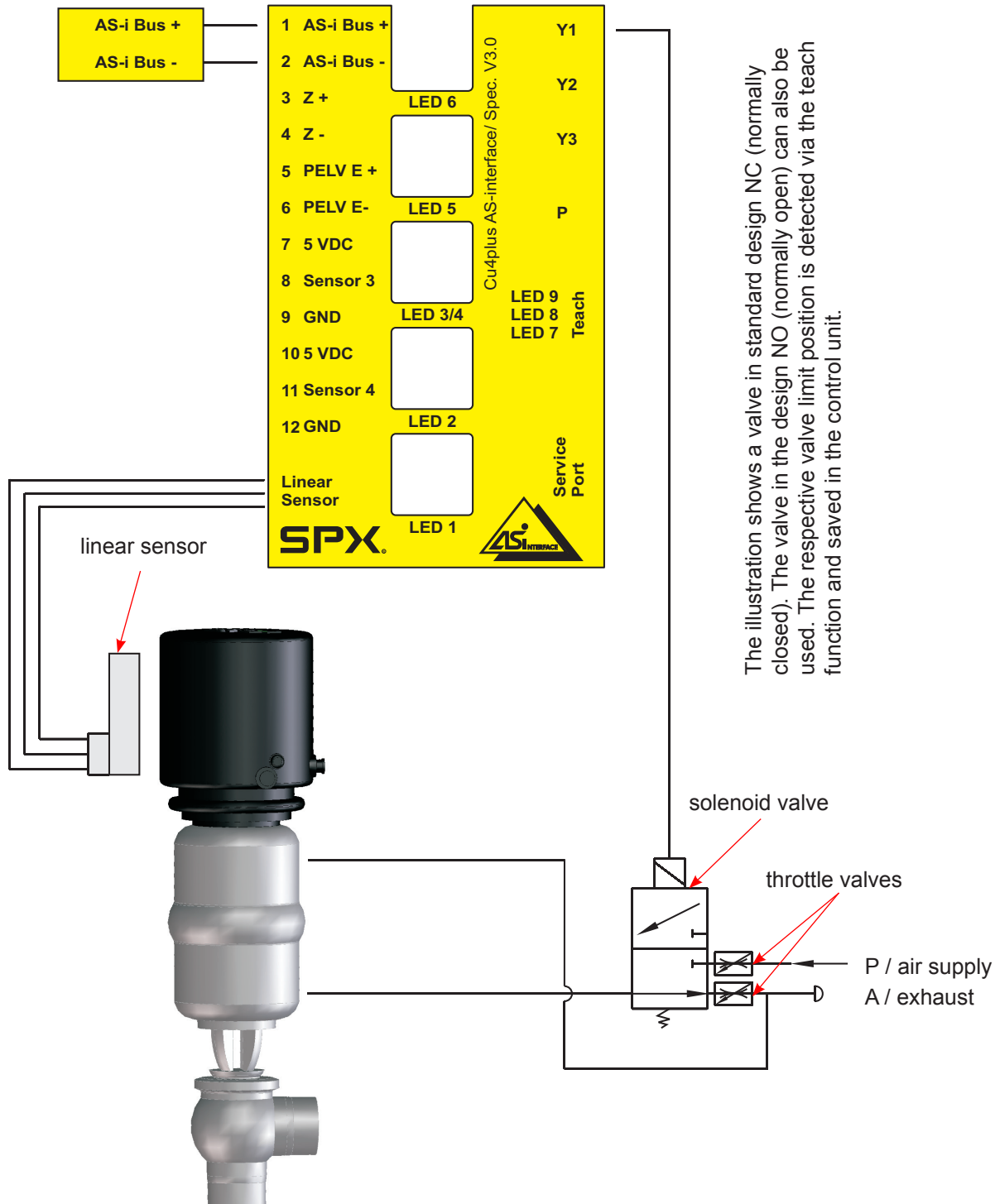
The pressure relief valve must not be mechanically blocked under any circumstances.

4. Mechanics and Pneumatics

4.4. CU41plus AS-interface (internal position measuring system)



Functional description - block diagram
Valve types: SW4, MS4, SV1, SVS1F

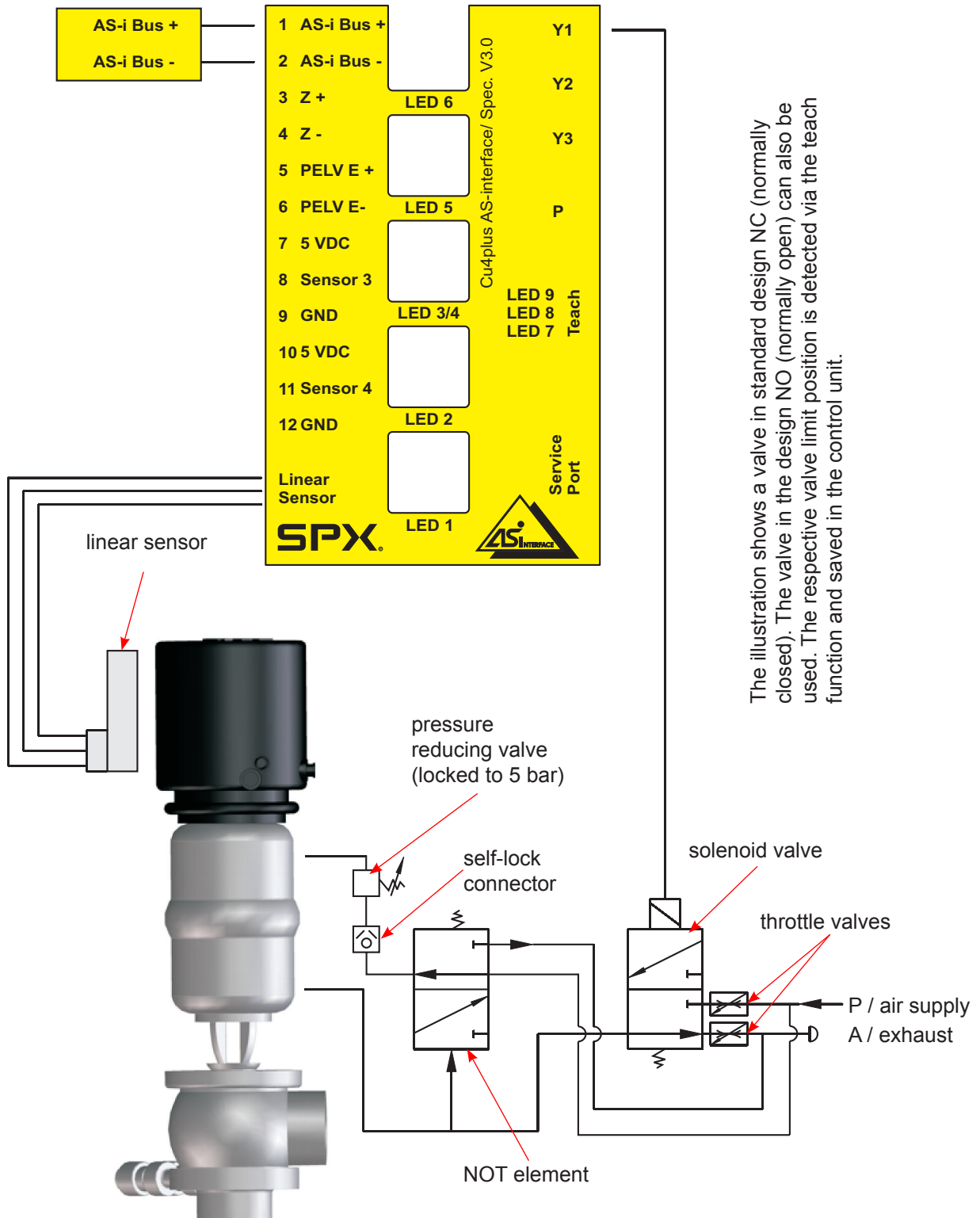


4. Mechanics and Pneumatics

4.4.1. CU41Nplus – AS-interface (internal position measuring system)



Functional description - block diagram
Valve type: SD4

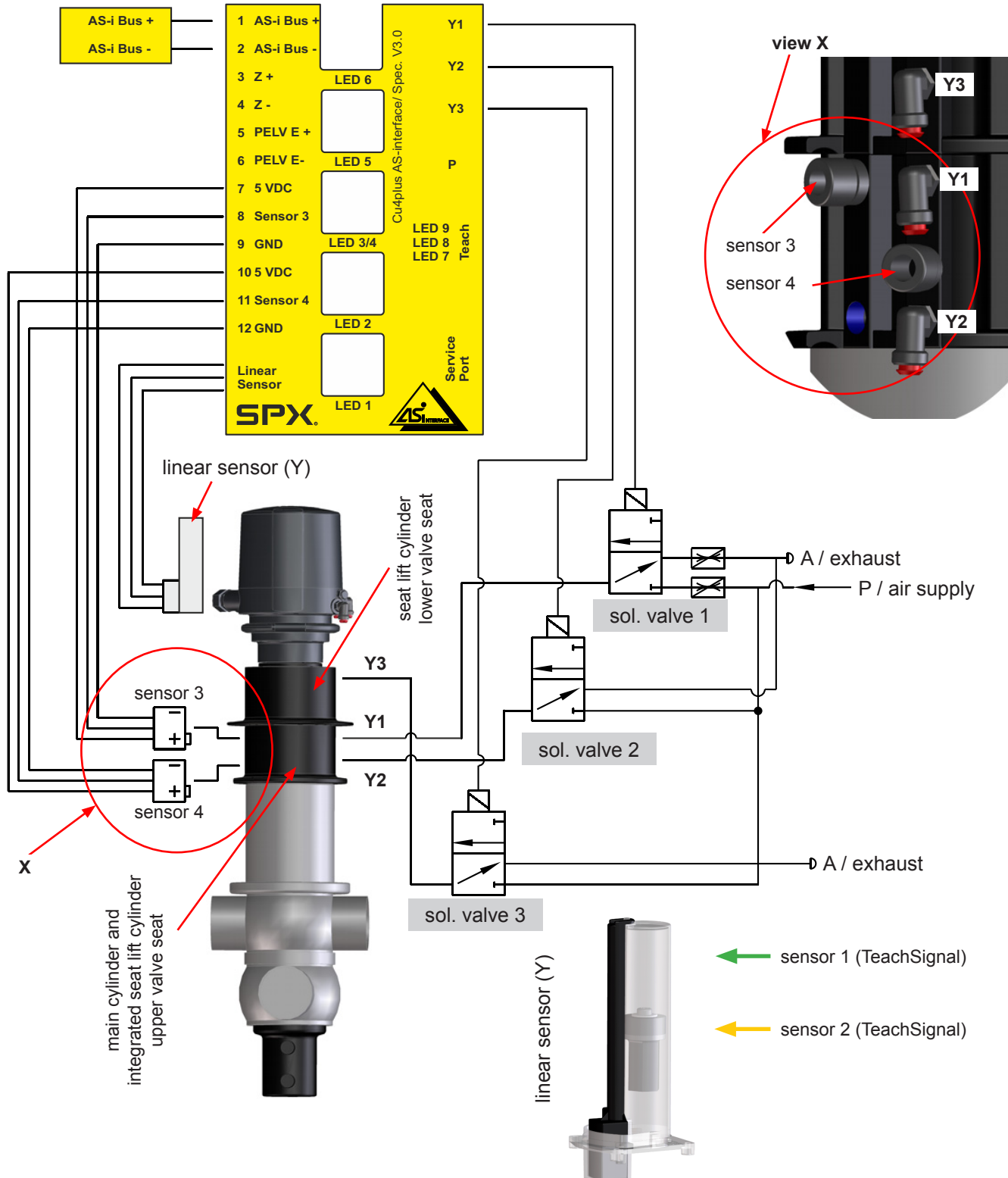


4. Mechanics and Pneumatics

4.4.2. CU43plus AS-interface for DA3+SLD double seat valve (internal position measuring system and 2 external proximity switches)



Functional description - block diagram



4. Mechanics and Pneumatics

4.5. Technical Data / Standards

Material: PA6.6/PA12

Ambient temperature: -20 to +70 °C, -4 to +158 °F

EU: EMC 2014/30/EU (89/336/EEC)

Standards and environmental audits:

protective class IP 67 EN 60529/
complies with NEMA 6
EMV interference resistance EN
61000-6-2
EMV emitted interference EN61000-6-4
AS-interface certification according to
specification V3.0

vibration/oscillation EN60068-2-6

safety of machinery DIN EN ISO
13849-1

Air hose: 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 m³
10000 of 0,5µm <d<1,0µm
500 of 1,0µm <d<5,0µm
- **content of water:** quality class 4,
max. dew point temperature +3 °C
For installations at lower temperatures
or at higher altitudes, additional
measures must be considered to reduce
the pressure dew point accordingly.
- **content of oil:** quality class 1,
max. 0,01 mg/m³

The oil applied must be compatible with Polyurethane elastomer materials.

4. Mechanics and Pneumatics

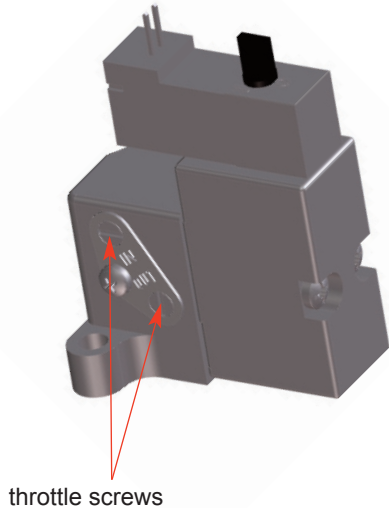
4.6. Solenoid valves

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 connector.

control: PWM signal
handle: 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.

Attention:

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. Valve with turning actuator, e.g. butterfly valve



5.2. Single seat valve



5.3. Double seat mixproof valve



6. Electronic module

6.1. Function/block diagram

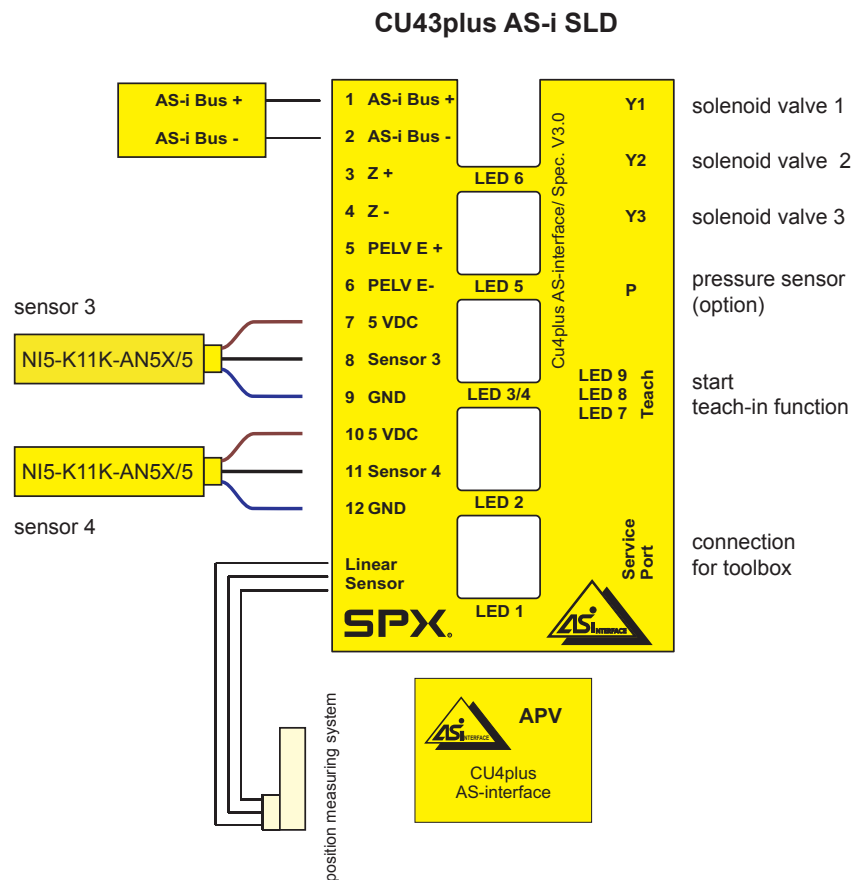
The CU4plus AS-i control unit is a slave for the fieldbus system AS-Interface according to specification V3.0. The profile is S-7.A.*.E (3 outputs and 2/4 inputs).

The CU4plus AS-i 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!

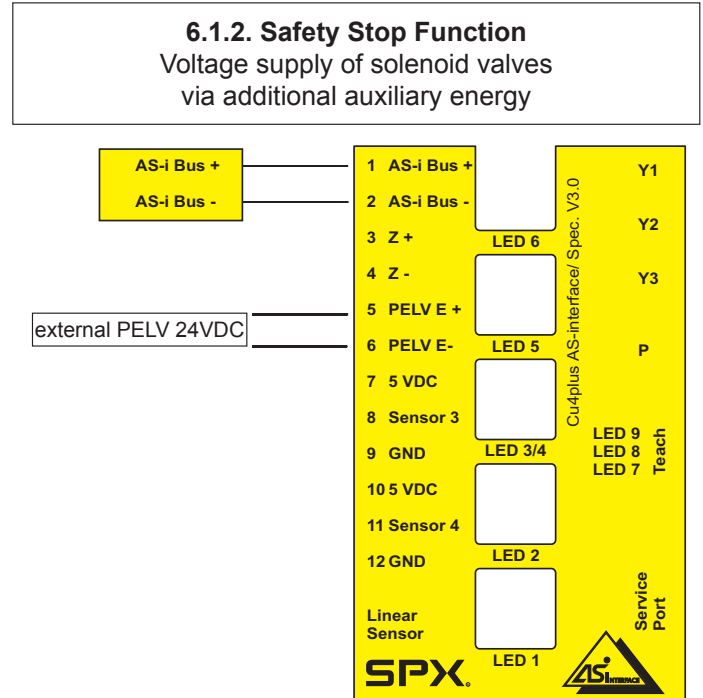
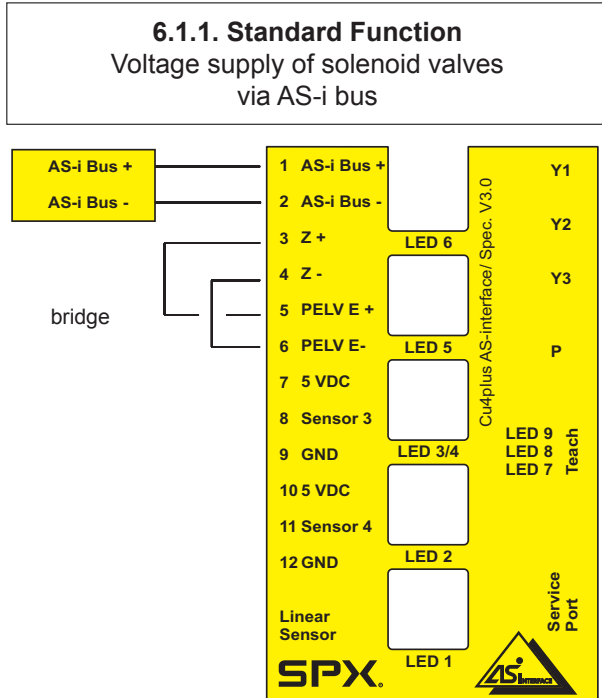
With the CU4plus AS-i energy supply of the control valves can be effected via the AS-i bus or via separate auxiliary energy lines. Thus, it is possible to realize an EMERGENCY STOP function: If the auxiliary voltage is safely shut off by conventional means, the control valves are deprived of electric energy and they fall into a safe position. The function of the inputs is preserved even if auxiliary energy is shut off.

The control of the solenoid valves is undertaken in energy-saving mode via the pwm signals.



6. Electronic module

6.1. Function/block diagram



6.2. Functional description of connections

| Terminal | Designation | Functional Description |
|---------------|-------------|--|
| 1 | AS-i + | connection AS-i network |
| 2 | AS-i - | connection AS-i network |
| 3 | Z + | bridge Z+ / PELV E+ (in case of energy supply for solenoid valves via AS-i bus) |
| 4 | Z - | bridge Z- / PELV E- (in case of energy supply for solenoid valves via AS-i bus) |
| 5 | PELV E+ | separate auxiliary energy PELV 24VDC + (for EMERGENCY STOP function, only) |
| 6 | PELV E- | separate auxiliary energy PELV 24VDC - (for EMERGENCY STOP function, only) |
| 7 | 5 VDC | voltage supply for external proximity switches |
| 8 | Sensor 3 | signal sensor 3 (evaluation of logic table for SLD) |
| 9 | GND | mass potential for sensor voltage supply |
| 10 | 5 VDC | mass potential for sensor voltage supply |
| 11 | Sensor 4 | signal sensor 4 (evaluation of logic table for SLD) |
| 12 | GND | mass potential for sensor voltage supply |
| linear sensor | | linear sensor for valve position detection (for suitable SPX FLOW sensor, only!) |
| Y1 | | solenoid valve 1 (main valve) |
| Y2 | | solenoid valve 2 (upper seat lift) |
| Y3 | | solenoid valve 3 (lower seat lift) |
| P | | optional connection - pressure sensor |
| service port | | connection serial/USB converter for CU4plus toolbox software |

6. Electronic module

6.3. Technical data / AS-interface

| | |
|--|-----------------------------------|
| AS-interface-profile: | S-7.A.*.E |
| Extended address mode: | is supported |
| Serial communication mode: | no |
| Inverse-polarity protection: | exists |
| Indication "Power": | LED 3 (green) |
| Indication "Fault": | LED 4 (red) |
| AS-interface voltage range: | 26.5...31.6 V |
| External voltage supply | |
| PELV | 24 VDC |
| max. current consumption: | 100 mA |
| (in case of supply of actuators from auxiliary energy) | 150 mA |
| (in case of supply of actuators from AS-interface) | |
| 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: | yes |
| 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, LED 3/4 flashes according to AS-interface specification alternately red/green.

Supply of sensors: 5 VDC, 4,75...5,25V (sum of all currents < 40mA)



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

AS-interface communication / data: see 6.7.

6. Electronic module

6.4. Connections

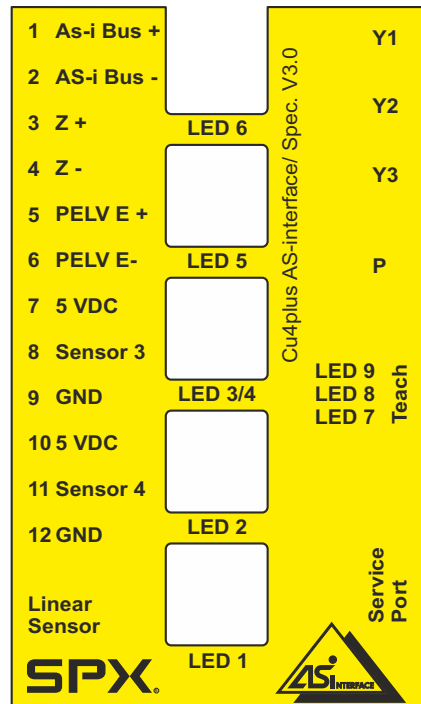
Sensors for valve position detection:

Internal sensors: internal linear sensor SPX FLOW type switching distance acc. to SPX FLOW specification














External sensors: inductive proximity switches, SPX FLOW UB 4.75-5.25 VDC switching distance acc. to SPX FLOW specification

6.5. LED indications

The meanings of the different colors of the LED indication are described in table 6.5.1. LED indications / Indicator lights.



6. Electronic module

| 6.5.1. LED indication / Indicator lights | | | | |
|--|------------------------------------|---|--|--|
| LED 1 | solenoid valve 2 / upper seat lift | blue, 1 blink |  | solenoid valve 2 controlled upper seat * lifted |
| | solenoid valve 3 / lower seat lift | blue, 2 blinks |  | solenoid valve 3 controlled lower seat * lifted |
| LED 2 | sol. valve 1 /main valve | blue, 2 blinks |  | main valve controlled |
| LED 3/4 | power and diagnosis | green, permanent light |  | operating voltage ok, no failure - AS-i status indication |
| | | red, green blink |  | peripheral failure (short circuit, excess voltage, cable break) - teach-in requested, flash data failure, valve failure, wrong number of valves, overload of sensor voltage supply |
| | | red, permanent light |  | AS-i communication failure - no data interchange with master - master in stop mode - slave cannot read master commands - master in protect mode and slave not in protect mode |
| | | green, blink |  | AUX voltage missing (connect either PELV or bridge Z/PELV) |
| | | green, permanent light red, blink = red-yellow blink |  | slave address = 0 |
| | | red, blink |  | duplicate addresses recognized |
| LED 5 | valve open | green, permanent light |  | valve open |
| LED 6 | valve closed | orange, permanent light |  | valve closed |
| LED 7 | pressure signal (option) | | | |
| LED 8 | service request | yellow, permanent light |  | imminent service request |
| LED 9 | teach-in | red, permanent light blink |  | teach-in is running teach-in required |
| LED Y1 | solenoid valve 1 | permanent light | | controlled |
| LED Y2 | solenoid valve 1 | permanent light | | controlled |
| LED Y3 | solenoid valve 1 | permanent light | | controlled |

* Depending on adjusted mode!

9. Electronic module

6.6. Adjustment of valve profiles

The adjustment of valve profiles is carried out with the Service Software CU4plus Toolbox (see CU4plus Toolbox manual). For the different process valves different logic profiles exist. These differ in view of the detection of the feedback and the logic profile of the valve.

Valve profile:

| Ventilprofil | Valve position measuring system | Tolerance band | Valve basic position NO/NC | Invert valve position indication | Number of solenoids |
|--|--|--------------------------------|----------------------------|----------------------------------|---------------------|
| Mixproof valve with seat lift detection (SLD) | internal linear sensor and 2 external proximity switches | fixed +/- 1 mm | NC only | possible | always 3 |
| Mixproof valve with seat lift detection (SLD) CU3 compatibility mode | internal linear sensor and 2 external proximity switches | fixed +/- 1 mm | NC only | possible | always 3 |
| Seat valve / butterfly valve with internal feedback detection | internal linear sensor | +/-1 mm +/- 3 mm +/-5 mm | NC / NO | possible | optional 1,2,3 |
| Mixproof / seat valve with external feedback detection | external proximity switches | not available | NC / NO | possible | optional 1,2,3 |

Valve basic position: Depending on the valve type, the basic position can be adjusted.

Tolerance band: Selection according to valve type.
(see chapter 7.2)

Valve position indication: LED can be inverted, e.g. for adaption of valve type

Delivery status: Mixproof valve with seat lift detection (SLD) profile is adjusted.

AS-i address: 0 LED 4 (red) ON
Adjusted valve characteristics: logic profile 1, for DA3+ with SLD

Teach-In: CU waits for teach-in with valve, LED 3-6 blink

Adjustment / change of valve profile is realized via ToolBox software (see Toolbox manual).

6. Electronic module

6.7. AS-i Communication / Data signals

| NC - normally closed | | | | | |
|--|--------------------|----------------------------|----------------------------|---|---|
| Application: Double seat mixproof valve with seat lift detection (SLD) | | | | | |
| AS-i Communication Input Data / IDI | valve state | sensor 4 | sensor 3 | sensor 2 | sensor 1 |
| | | external proximity switch | external proximity switch | signal generated by teach-in, (position of position sensor) | signal generated by teach-in, (position of position sensor) |
| DI0 | closed | 1 | 1 | 0 | 1 |
| DI1 | open | 0 | 0 | 1 | 0 |
| DI2 | upper seat lifting | 0 | 1 | 0 | 1 |
| DI3 | lower seat lifting | 1 | 1 | 0 | 0 |
| The appropriate AS-i signal for valve position will be generated within the CU by logic combination of the 4 sensor signals. The appropriate valve position is shown direct by the IDI AS-i signals. Further adjustments are not required! | | | | | |
| AS-i Communication Output Data / ODI | solenoid 1 main | solenoid 2 upper seat lift | solenoid 3 lower seat lift | | |
| DO0 | 1 | 0 | 0 | | |
| DO1 | 0 | 1 | 0 | | |
| DO2 | 0 | 0 | 1 | | |
| DO3 | not occupied | not occupied | not occupied | | |

When replacing a CU3 control unit, use the following profile:
 Double seat mixproof valve with seat lift detection (SLD) CU3 compatible mode
 (all signals similar to CU3) - see instruction manual of APV CU3 Control Unit.

6. Electronic module

6.7. AS-i Communication / Data signals

| NC - normally closed | | | |
|---|-----------------|--|--|
| Application: single seat / butterfly valve with internal feedback detection (SW4, SD4, MS4, SVS, SV etc.) | | | |
| AS-i Communication Input Data / IDI | valve state | sensor 1 | sensor 2 |
| | | signal generated by teach-in (position of position sensor) | signal generated by teach-in (position of position sensor) |
| DI0 | closed | 1 | 0 |
| DI1 | open | 0 | 1 |
| DI2 | not occupied | 1 | 1 |
| DI3 | not occupied | 1 | 1 |
| AS-i Communication Output Data / ODI | solenoid 1 Main | solenoid 2 | solenoid 3 |
| DO0 | 1 | 0 | 0 |
| DO1 | 0 | 1 | 0 |
| DO2 | 0 | 0 | 1 |
| DO3 | not occupied | not occupied | not occupied |
| NO - normally open | | | |
| Application: single seat / butterfly valve with internal feedback detection (SW4, SD4, MS4, SVS, SV etc.) | | | |
| AS-i Communication Input Data / IDI | valve state | sensor 1 | sensor 2 |
| | | signal generated by teach-in (position of position sensor) | signal generated by teach-in (position of position sensor) |
| DI0 | closed | 0 | 1 |
| DI1 | open | 1 | 0 |
| DI2 | not occupied | 1 | 1 |
| DI3 | not occupied | 1 | 1 |
| AS-i Communication Output Data / ODI | solenoid 1 Main | solenoid 2 | solenoid 3 |
| DO0 | 1 | 0 | 0 |
| DO1 | 0 | 1 | 0 |
| DO2 | 0 | 0 | 1 |
| DO3 | not occupied | not occupied | not occupied |

6. Electronic module

6.7. AS-i Communication / Data signals

| AS-i parameter data (inverted) | | | |
|--------------------------------|---------------|------------|--------------|
| inputs | | outputs | |
| PI3 | not occupied | PO3 | not occupied |
| PI2 | Teach mode | PO2 | not occupied |
| PI1 | Aux. Voltage | PO1 | not occupied |
| PI0 | Service requ. | PO0 | not occupied |

| AS-i status | |
|-------------|--------------------------------|
| inputs | |
| S3 | EEPROM error |
| S2 | Duplicate address detected |
| S1 | Periphery fault |
| S0 | Address not permanently stored |

| AS-i diagnosis | |
|----------------|--------------------------------|
| inputs | |
| 0 | Air pressure availed |
| 1 | Teach-i-successfully completed |

SPXFLOW

INSTRUCTION MANUAL

TOOLBOX Service & Maintenance Software for CU4plus AS-interface

CONTROL PROGRAM FOR WINDOWS® OPERATING SYSTEMS

FORM NO. 105551 | VERSION: 1.1.1

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

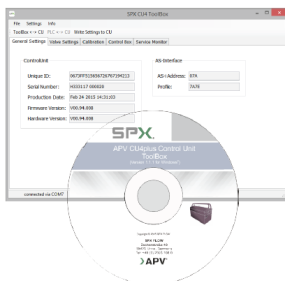
6.8. Service and Maintenance Software CU4plus Toolbox

For the parameterization of the CU4plus AS-i the CU4plus Toolbox Software is available.

This software is designed for PC system software Windows 7, Windows 8.1, Windows 10.

After installation of the CU4plus Toolbox the corresponding control unit is connected with the PC by means of an adapter cable.

The individual functions are described in the CU4plus Toolbox manual.



APV

7. Valve position indication

7.1. Continuously measuring valve position measuring system

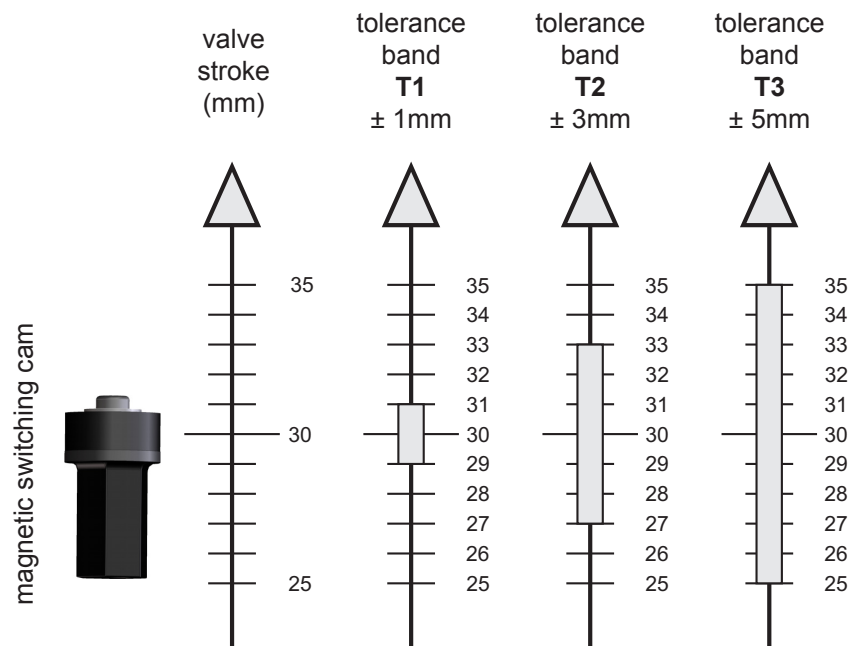
For the internal detection of the valve position indication, a contact-free operating linear sensor is used which is actuated via the magnetic switching cam installed at the valve rod. The nominal measuring range of the measuring system amounts to 0 - 72 mm, relative repetitive accuracy < 0.1 mm.

Within this measuring range, the corresponding positions for closed and open valve position as well as seat lift positions are generated via the teach-in function and permanently saved in the electronic.

7.2. Tolerance band of the valve position measuring system

The tolerance band of the valve position measuring system describes the active measuring range in which the corresponding feedback information, closed or open valve position, is registered. For different process valves also different tolerance bands exist. The adjustment is realized via the ToolBox software.

| Tolerance band | Output of feedback signals in range | Recommendation for valve type |
|----------------|-------------------------------------|-------------------------------|
| T1 | +/- 1 mm | e.g. DA3+ |
| T2 | +/- 3 mm | e.g. SW4, MS4 |
| T3 | +/- 5 mm | e.g. SV, SVS, DKR |



7. Valve position indication

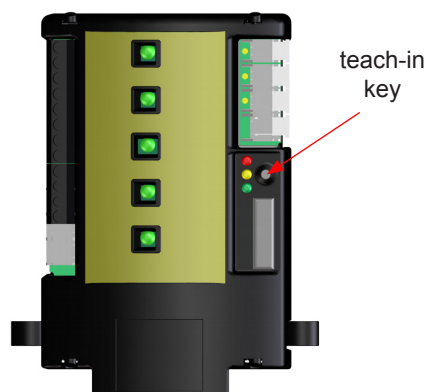
7.3. Adjustment of valve position indication / Teach-in

The continuously measuring valve position measuring system is taught via a reference valve movement.

The respective positions for the closed and open valve position as well as for further valve positions, e.g. seat lifting, are travelled to and the corresponding position of the sensor system is permanently stored in the memory of the electronic module. This process is called Teach-In.

The Teach-In is started by pressing the Teach-In key at the electronic module. The key must be pressed permanently for 3 seconds.

After the start of the Teach-In the LED 9 lights up and the valve travels into the corresponding final positions and back into the basic position. The positions of the corresponding valve positions are stored.



| Indication | Status | Action |
|----------------------------|---|---|
| LED 3-6,9 blink | Delivery status Waiting for teach-in | Start teach-in press teach-in for at least 3 seconds |
| LED 9 OFF LED 3/4 blink | Teach-in active | Wait Do not control valve via PLC. |
| LED 9 OFF | Successful teach-in | Valve can be controlled by PLC. |
| LED 9 ON | Valve service carried out | Start teach-in / press teach-in key for 3 sec. |
| LED 9 blink | Teach-in not successful, repetition required. Possible reasons for teach-in failure: Compressed air is missing. Supply voltage missing. Switching logic does not fit to valve. | Start teach-in / press teach-in key for 3 sec. |

7. Valve position indication

7.3.1. To be observed before teach-in:

- Corresponding switching cam is mounted to the valve guide rod.



Note!

The switching cam is not identical with the standard CU switching cam!

- CU4plus AS-i control unit is not duly installed on the valve. ist ordnungsgemäß auf dem Ventil installiert.
- Valve is duly installed in the process.
- **Valve is not manually controlled or controlled by PLC.**
- Control air is connected (requirements, see Technical Data, chapter 4.5.).
- Nominal valve stroke is not restricted, e.g. through chunky products in the valve.
- Selected switching logic complies with the installed process valve (adjustment is realized via CU4plus Toolbox software, delivery status is switching logic for DA3+ SLD).

During the Teach-In function, the valve is controlled and moves independently into all operating positions.

As a precaution, the Teach-In function is to be repeated after any valve service or maintenance!



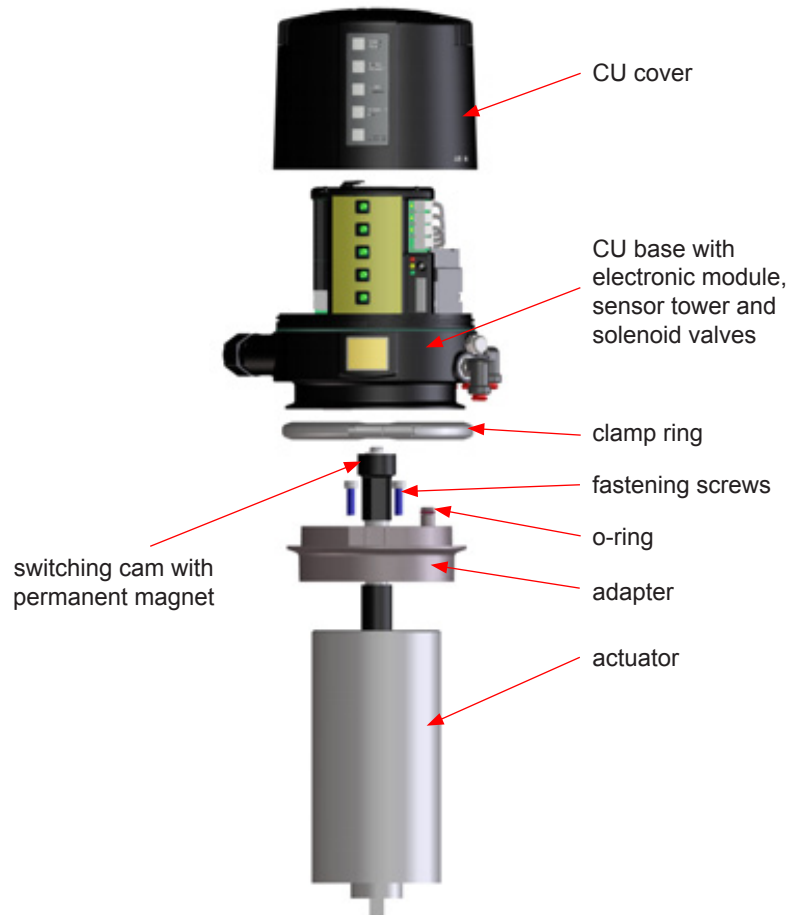
If these instructions are not observed, process failures, product loss or personal injury may occur!

7.4. Use of external sensors

For double seat valves with active seat lift detection (SLD) 2 additional proximity switches are required which are mounted in the actuator area of the DA3+ valve and connected at the electronic module of the CU4plus AS-i.

8. CU Assembly and Start-up

8.1. Turning actuator, e.g. for butterfly valve



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 switching 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 Start-up

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.

8.1.3. Start-up

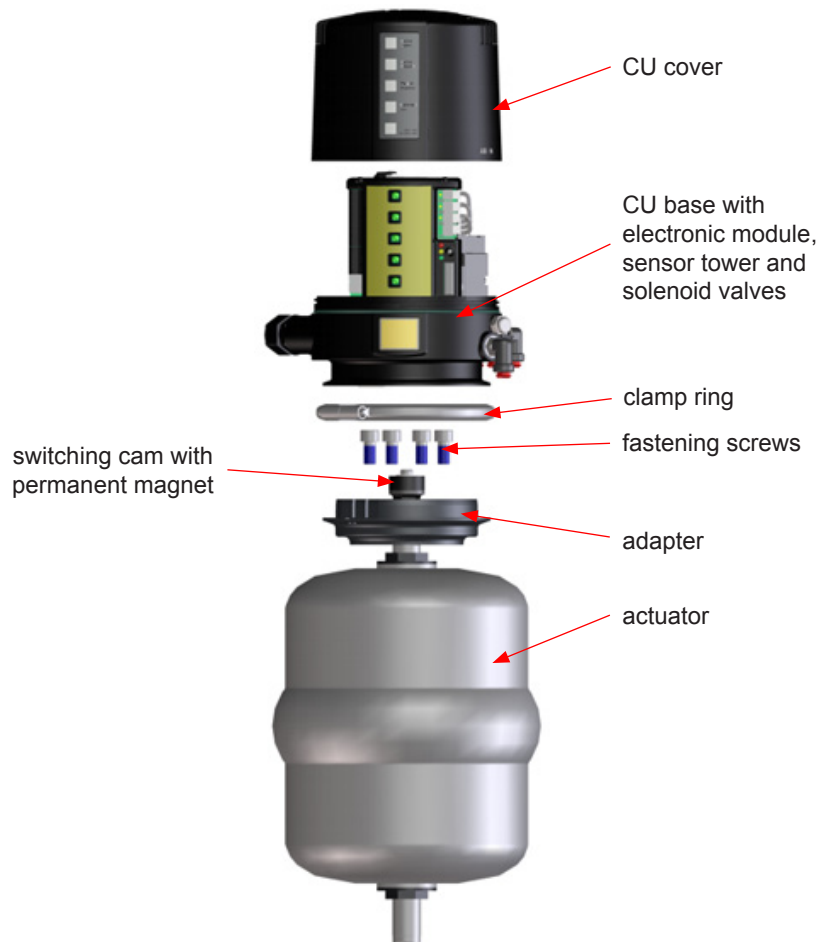
After proper assembly and installation of the control unit, start-up can be undertaken as described below:

1. Switch on the air supply.
2. Switch on the voltage supply.
3. Adjust AS-i address at the CU4plus AS-i.
4. Adjust corresponding logic profile in accordance with the process valve used (if this has not been determined for the delivery status).

Start Teach-In. It is mandatory to observe the corresponding prerequisites (**see chapter 7.3.**).

8. CU Assembly and Start-up

8.2. Single seat valve



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 switching cam with Loctite semi-solid and fasten it.
3. Place the control unit via the switching cam onto the adapter. Observe alignment!
4. Attach the clamp rings and fasten them with the screws.

8. CU Assembly and Start-up

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.

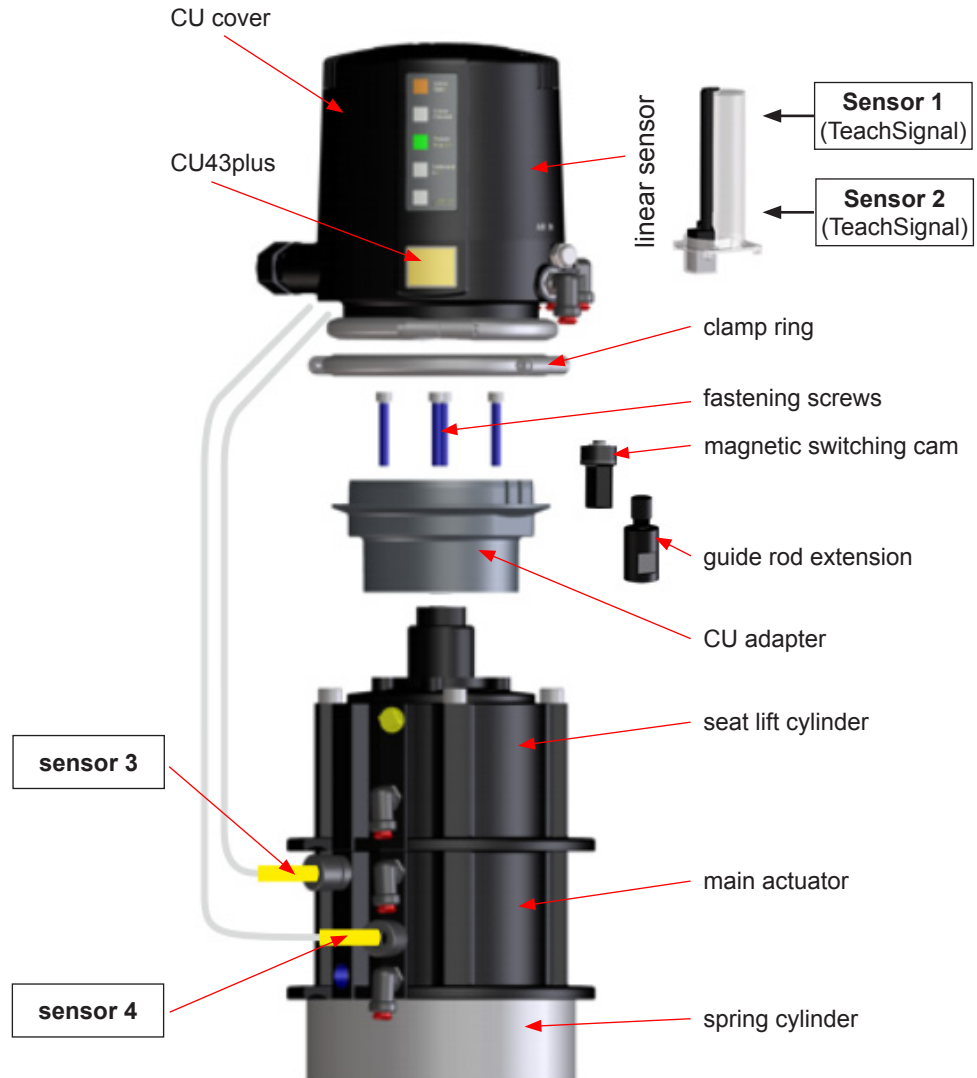
8.2.3. Start-up

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

1. Switch on the air supply.
2. Switch on the voltage supply.
3. Adjust AS-i address at the CU4plus AS-i.
4. Adjust corresponding logic profile in accordance with the process valve used (if this has not been determined for the delivery status).
5. Start Teach-In. It is mandatory to observe the corresponding prerequisites (**see chapter 7.3.**).

8. CU Assembly and Start-up

8.3. Double seat valve DA3+ with activated Seat Lift Detection (SLD)



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 Start-up

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 6.5.

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. CU Assembly and Start-up

8.3.4. Start-up

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

1. Switch on the air supply.
2. Switch on the voltage supply.
3. Adjust AS-i address at the CU4plus AS-i.
4. Adjust corresponding logic profile in accordance with the process valve used (if this has not been determined for the delivery status).
5. Start Teach-In. It is mandatory to observe the corresponding prerequisites (**see chapter 7.3.**).

8.4. Replacement of a standard CU3 AS-i

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.

Replacement of a standard CU33 AS-i SLD

Adjust the compatibility mode with the ToolBox software.

The CU43plus AS-i will work in the same manner as the CU33 AS-i SLD.

9. Accessories and Tools

Assembly/disassembly - adapter on valve actuator:

- hexagon socket wrench 6 mm
- screwdriver 4 mm

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 SW13

Assembly/disassembly – pressure relief valve:

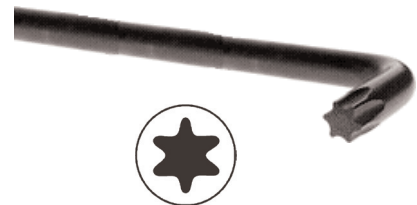
- Torx wrench TX10

Loctite semi-solid

jaw wrench



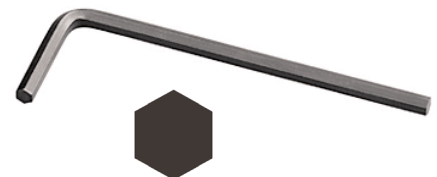
torx wrench



screwdriver



hexagon socket wrench



10. Service

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 1-8.
- + 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 linear 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.

Linear sensor

The linear sensor can only be replaced at the dismantled feedback unit.

- + Remove the 2 screws (14) TX10.
- + Release the plug connection at the electronic module.
Dismantle the linear sensor.
- + Assembly in reverse order.
- + Carry out Teach-In.

11. Trouble Shooting

| Failure | Remedy |
|---|---|
| Valve position is not indicated. | Carry out teach-in. |
| | Check fastening of magnetic switching cam. |
| | Check adjusted logic profile and process valve. |
| 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. |
| | |
| Control Unit CU41 installed on Butterfly valves | |
| Movement of valve flap is missing with actuated solenoid valve. | Check if right control unit is installed: Control Unit CU41-T-AS-interface (1 solenoid valve). Check label in type window of control unit. |
| | Check valve movement with manual 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 right control unit is installed: Control Unit CU41-S-AS-interface (1 solenoid) . Check label in type window of control unit. |
| | Check valve movement with manual at solenoid valve. |
| | Check cabeling 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 ainstalled on Double seat valves with SLD | |
| Valve position movement is missing with actuated solenoid valve. | Check if right control unit is installed: CU43-M-AS-interface (3 solenoids) . Check label in type window of control unit. |
| | Check valve movement with manual at solenoid valve. |
| | Check cabeling between electronic module and solenoid valve. |
| | Check compressed air (min. 6 bar). |
| | Check control air connection between the CU43 and the DA3 valve 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.

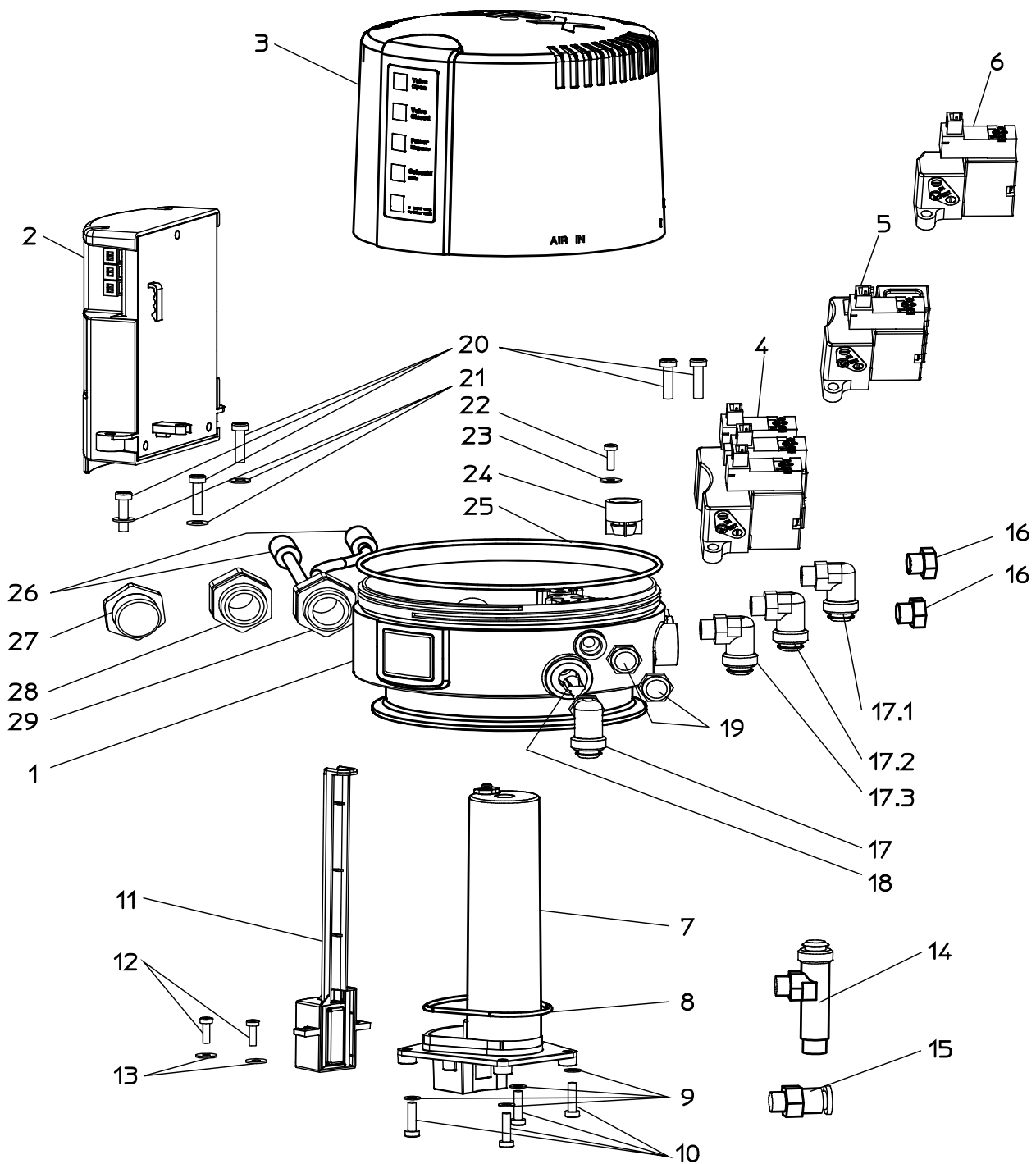
CU4plus AS-interface RN 01.044.6
CU4 Adapter RN 01.044.3-1

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

- number of parts required
- ID number
- reference number
- parts designation

Data are subject to change.

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| | | | | | | | | | | | | |
|----------|----------|--|--|--|--|--|--|--|--|--|--|--|
| Datum: | 04.01.16 | | | | | | | | | | | |
| Name: | Trytko | | | | | | | | | | | |
| Geprüft: | Schulz | | | | | | | | | | | |

Ersatzteilliste: spare parts list

Control Unit CU4 plus AS-i extended



SPX Flow Technology Rosista GmbH
D-59425 Unna Germany

Blatt 1 von 7

RN 01.044.6

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Ersatzteilliste: spare parts list

Control Unit CU4 plus AS-i extended

| pos. item | Menge quantity | Beschreibung description | Material | CU41plus-S AS-i extended | CU41plus-T AS-i extended | CU41plus-M AS-i extended | CU41Nplus-S AS-i extended | CU41Nplus-T AS-i extended | WS-Nr. ref.-no. |
|--------------|-------------------|---|------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|--------------------|
| | | | | WS-Nr. ref.-no. | WS-Nr. ref.-no. | WS-Nr. ref.-no. | WS-Nr. ref.-no. | WS-Nr. ref.-no. | |
| | | CU41plus AS-i extended kpl. (6x1) | PA 6.6 GF30 | 08-45-350/93 | 08-45-351/93 | 08-45-356/93 | 08-45-352/93 | 08-45-353/93 | |
| | | CU41plus AS-i extended cpl. (6x1) | schwarz | H333118 | H333119 | H335237 | H333120 | H333121 | |
| | | CU41plus AS-i extended kpl. (1/4" OD) | PA 6.6 GF30 | 08-45-360/93 | 08-45-361/93 | 08-45-366/93 | 08-45-362/93 | 08-45-362/93 | |
| | | CU41plus AS-i extended cpl. (1/4" OD) | schwarz | H333124 | H333125 | H335238 | H333126 | H333127 | |
| 1 | 1 | CU41-Base | GRILON | 08-46-552/93 | 08-46-553/93 | 08-46-554/93 | 08-46-552/93 | 08-46-553/93 | |
| | | CU41-Base | TSG30 schwarz | H319853 | H319854 | H319855 | H319853 | H319854 | |
| 2 | 1 | CU4plus AS-i-SLD E-Modul | Zytel 70G33L | | | 08-46-915/93 | | | |
| | | CU4plus AS-i-SLD E-Modul | schwarz | | | H333117 | | | |
| 3 | 1 | CU4 Haube kpl. mit solenoid LED | PA12/Grilamid | | | 08-46-659/93 | | | |
| | | CU4 cap cpl. with solenoid LED | LV-3H schw. GF30 | | | H325602 | | | |
| 4 | 1 | Magnetventilblock 1 EMV | PPS | | 08-46-578/93 | | | | |
| | | solenoid valve 1EMV | | | H319950 | | | | |
| 5 | 1 | Magnetventilblock 1 EMV + NOT-Element | PPS | | | | | 08-46-579/93 | |
| | | solenoid valve 1 EMV + NOT-element | | | | | | H319951 | |
| 6 | 1 | Magnetventilblock 3 EMV | PPS | | | | | | |
| | | solenoid valve 3 EMV | | | | | | | |
| 7 | 1 | CU4plus Sensortower | Grilamid TR90 | | | 08-46-584/93 | | | |
| | | CU4plus Sensortower | | | | H321498 | | | |
| 8 | 1 | O-Ring | NBR 70 Shore A | | | 58-06-218/83 | | | |
| | | O-ring | | | | H320401 | | | |
| 9 | 4 | Scheibe | A2 | | | 67-01-004/13 | | | |
| | | Washer | | | | H323771 | | | |
| 10 | 4 | Ejot Delta PT Schraube | A2 | | | 65-17-122/13 | | | |
| | | Ejot Delta PT screw | | | | H320364 | | | |
| 11 | 1 | CU4 techno Sensor kpl. mit Anschlusskabel | | | | 08-46-620/93 | | | |
| | | CU4 techno sensor cpl. With connec. cable | | | | H324877 | | | |
| 12 | 2 | Ejot Delta PT Schraube | A2 | | | 65-17-110/13 | | | |
| | | Ejot Delta PT screw | | | | H320363 | | | |
| 13 | 2 | Scheibe | A2 | | | 67-01-001/12 | | | |
| | | Washer | | | | H320404 | | | |
| 14 | 1 | Druckreduzierventil 5 bar | Ms / vern. | | | | | 08-60-766/93 | |
| | | Pressure reducer valve 5 bar | | | | | | H208841 | |

Datum: 04.01.16

Name: Trytko

Geprüft: Schulz

Datum:

Name:

Geprüft:

Blatt 2 von 7

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Ersatzteilliste : spare parts list

Control Unit CU4 plus AS-i extended

| pos. item | Menge quantity | Beschreibung description | Material | CU41plus-S AS-i extended | CU41plus-T AS-i extended | CU41plus-M AS-i extended | CU41Nplus-S AS-i extended | CU41Nplus-T AS-i extended | 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. | | |
| 15 | 1 | Steckverschraub. gerade selbstabsperr. IQSK Connection direct automatic lock | Ms / vern. | ----- ----- | ----- ----- | ----- ----- | 08-63-241/99 H320551 | | 08-63-241/99 H320551 | |
| 16.1 | 1 | Blindstopfen G1/8" mit O-Ring Plug G1/8" with o-ring | Ms / vern. | ----- ----- | 08-60-051/99 H320482 | ----- ----- | ----- ----- | 08-60-051/99 H320482 | ----- ----- | 08-60-051/99 H320482 |
| 16.2 | 1 | Blindstopfen G1/8" mit O-Ring Plug G1/8" with o-ring | Ms / vern. | ----- ----- | 08-60-051/99 H320482 | ----- ----- | ----- ----- | ----- ----- | ----- ----- | ----- ----- |
| 17 | 1 | W-Verschraubung G1/8" 6x1 Elbow connector G1/8" 6x1 | 1.4301 / PA | | | 08-60-750/93 H208825 | | | | |
| | | W-Verschraubung G1/8" 1/4" OD Elbow connector G1/8" 1/4" OD | 1.4301 / PA | | | 08-60-811/93 H312732 | | | | |
| 17.1 | 1 | W-Verschraubung G1/8" 6x1 Elbow connector G1/8" 6x1 | 1.4301 / PA | 08-60-750/93 H208825 | ----- ----- | ----- ----- | 08-60-750/93 H208825 | ----- ----- | ----- ----- | ----- ----- |
| | | W-Verschraubung G1/8" 1/4" OD Elbow connector G1/8" 1/4" OD | 1.4301 / PA | 08-60-811/93 H312732 | ----- ----- | ----- ----- | 08-60-811/93 H312732 | ----- ----- | ----- ----- | ----- ----- |
| 17.2 | 1 | W-Verschraubung G1/8" 6x1 Elbow connector G1/8" 6x1 | 1.4301 / PA | | | | | | | |
| | | W-Verschraubung G1/8" 1/4" OD Elbow connector G1/8" 1/4" OD | 1.4301 / PA | | | | | | | |
| 17.3 | 1 | W-Verschraubung G1/8" 6x1 Elbow connector G1/8" 6x1 | 1.4301 / PA | | | | | | | |
| | | W-Verschraubung G1/8" 1/4" OD Elbow connector G1/8" 1/4" OD | 1.4301 / PA | | | | | | | |
| 18 | 1 | CU4 Luftfilter CU4 air filter | PE-porös- hydrophob | | | 08-10-005/93 H320223 | | | | |
| 19 | 1 | Schalldämpfer sound reducer | Ms / vern. | | | 08-60-751/93 H208826 | | | | |
| 20 | 5 | Ejot Delta PT Schraube Ejot Delta PT screw | A2 | | | 65-17-131/13 H320365 | | | | |
| 21 | 3 | Scheibe Washer | A2 | | | 67-01-003/13 H79576 | | | | |
| 22 | 1 | Ejot Delta PT Schraube Ejot Delta PT screw | A2 | | | 65-17-110/13 H320363 | | | | |

Datum: 04.01.16

Name: Trytko

Geprüft: Schulz

Datum:

Name:

Geprüft:

Blatt 3

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RN 01.044.6




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Ersatzteilliste: spare parts list

Control Unit CU4 plus AS-i extended

| | |
|----------|----------|
| Datum: | 04.01.16 |
| Name: | Trytko |
| Geprüft: | Schulz |
| Datum: | |
| Name: | |
| Geprüft: | |

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|---|---------|
|  | |
| SPX Flow Technology Rosista GmbH D-59425 Umma Germany | |
| Blatt | 5 von 7 |
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| pos. item | Menge quantity | Beschreibung description | Material | CU43plus-S AS-i extended | CU43plus-M-SLD AS-i extended | WS-Nr. ref.-no. | WS-Nr. ref.-no. | WS-Nr. ref.-no. | WS-Nr. ref.-no. |
|--------------|-------------------|--|-----------------------------------|-----------------------------|---------------------------------|--------------------|--------------------|--------------------|--------------------|
| | | | | WS-Nr. ref.-no. | WS-Nr. ref.-no. | | | | |
| 1 | 1 | CU43plus AS-i extended kpl. (6x1) CU43plus AS-i extended cpl. (6x1) | PA 6.6 GF30 schwarz | 08-45-355/93 H333123 | 08-45-354/93 H333122 | | | | |
| 2 | 1 | CU43plus AS-i extended kpl. (1/4" OD) CU43plus AS-i extended cpl. (1/4" OD) | PA 6.6 GF30 schwarz | 08-45-365/93 H333129 | 08-45-364/93 H333128 | | | | |
| 3 | 1 | CU41-Base CU41-Base | GRILON TSG30 schwarz | 08-46-556/93 H319857 | | | | | |
| 4 | 1 | CU4plus AS-i-SLD E-Modul CU4plus AS-i-SLD E-Modul | Zytel 70G33L schwarz | 08-46-915/93 H333117 | | | | | |
| 5 | 1 | CU4 Haube kpl. mit solenoid LED CU4 cap cpl. with solenoid LED | PA12/Grilamid LV-3H schw. GF30 | 08-46-659/93 H325602 | | | | | |
| 6 | 1 | Magnetventilblock 1 EMV solenoid valve 1EMV | PPS | ----- ----- | ----- ----- | | | | |
| 7 | 1 | Magnetventilblock 1 EMV + NOT-Element solenoid valve 1 EMV + NOT-element | PPS | ----- ----- | ----- ----- | | | | |
| 8 | 1 | Magnetventilblock 3 EMV solenoid valve 3 EMV | PPS | 08-46-580/93 H319952 | | | | | |
| 9 | 1 | CU4plus Sensortower CU4plus Sensortower | Grilamid TR90 | 08-46-584/93 H321498 | | | | | |
| 10 | 1 | O-Ring O-ring | NBR 70 Shore A | 58-06-218/83 H320401 | | | | | |
| 11 | 4 | Scheibe Washer | A2 | 67-01-004/13 H323771 | | | | | |
| 12 | 4 | Ejot Delta PT Schraube Ejot Delta PT screw | A2 | 65-17-122/13 H320364 | | | | | |
| 13 | 1 | CU4 techno Sensor kpl. mit Anschlusskabel CU4 techno sensor cpl. With connec. cable | A2 | 08-46-620/93 H324877 | | | | | |
| 14 | 2 | Ejot Delta PT Schraube Ejot Delta PT screw | A2 | 65-17-110/13 H320363 | | | | | |
| 15 | 2 | Scheibe Washer | A2 | 67-01-001/12 H320404 | | | | | |
| 16 | 1 | Druckreduzierventil 5 bar Pressure reducer valve 5 bar | Ms / vern. | ----- ----- | ----- ----- | | | | |

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Ersatzteilliste: spare parts list

Control Unit CU4 plus AS-i extended

| | |
|----------|----------|
| Datum: | 04.01.16 |
| Name: | Trytko |
| Geprüft: | Schulz |
| Datum: | |
| Name: | |
| Geprüft: | |

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| APV | |
| SPX Flow Technology Rosista GmbH D-59425 Umma Germany | |
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| pos. item | Menge quantity | Beschreibung description | Material | CU43plus-S | CU43plus-M | WS-Nr. ref.-no. | WS-Nr. ref.-no. | WS-Nr. ref.-no. |
|--------------|-------------------|--|------------------------|-------------------------------------|-------------------------------------|--------------------|--------------------|--------------------|
| | | | | AS-i extended WS-Nr. ref.-no. | AS-i extended WS-Nr. ref.-no. | | | |
| 15 | 1 | Steckerschraub, gerade selbstabsperr. IQSK Connection direct automatic lock | Ms / vern. | ----- ----- | ----- ----- | | | |
| 16.1 | 1 | Blindstopfen G1/8" mit O-Ring Plug G1/8" with o-ring | Ms / vern. | 08-60-051/99 H320482 | ----- ----- | | | |
| 16.2 | 1 | Blindstopfen G1/8" mit O-Ring Plug G1/8" with o-ring | Ms / vern. | ----- ----- | ----- ----- | | | |
| 17 | 1 | W-Verschraubung G1/8" 6x1 Elbow connector G1/8" 6x1 | 1.4301 / PA | ----- ----- | 08-60-750/93 H208825 | | | |
| | | W-Verschraubung G1/8" 1/4" OD Elbow connector G1/8" 1/4" OD | 1.4301 / PA | ----- ----- | 08-60-811/93 H312732 | | | |
| 17.1 | 1 | W-Verschraubung G1/8" 6x1 Elbow connector G1/8" 6x1 | 1.4301 / PA | 08-60-750/93 H208825 | | | | |
| | | W-Verschraubung G1/8" 1/4" OD Elbow connector G1/8" 1/4" OD | 1.4301 / PA | 08-60-811/93 H312732 | | | | |
| 17.2 | 1 | W-Verschraubung G1/8" 6x1 Elbow connector G1/8" 6x1 | 1.4301 / PA | 08-60-750/93 H208825 | | | | |
| | | W-Verschraubung G1/8" 1/4" OD Elbow connector G1/8" 1/4" OD | 1.4301 / PA | 08-60-811/93 H312732 | | | | |
| 17.3 | 1 | W-Verschraubung G1/8" 6x1 Elbow connector G1/8" 6x1 | 1.4301 / PA | 08-60-750/93 H208825 | | | | |
| | | W-Verschraubung G1/8" 1/4" OD Elbow connector G1/8" 1/4" OD | 1.4301 / PA | 08-60-811/93 H312732 | | | | |
| 18 | 1 | CU4 Luftfilter CU4 air filter | PE-porös- hydrophob | 08-10-005/93 H320223 | | | | |
| 19 | 1 | Schalldämpfer sound reducer | Ms / vern. | 08-60-751/93 H208826 | | | | |
| 20 | 5 | Ejot Delta PT Schraube WN 5452 40 x 16 | A2 | 65-17-131/13 H320365 | | | | |
| | | Scheibe Washer | A2 | 67-01-003/13 H78576 | | | | |
| 22 | 1 | Ejot Delta PT Schraube WN 5452 30 x 10 | A2 | 65-17-110/13 H320363 | | | | |

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Ersatzteilliste: spare parts list

CU4plus Adapter

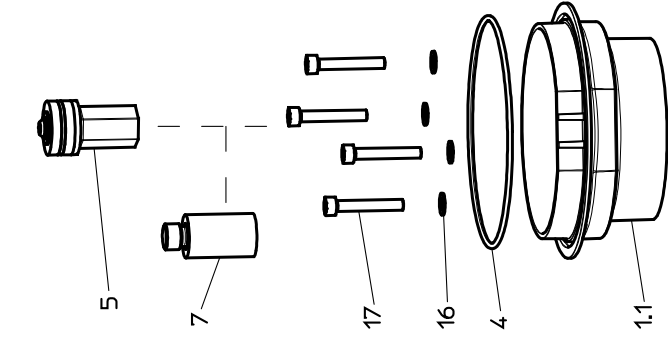
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|----------|----------|----------|
| Datum: | 26.01.16 | 04.04.16 |
| Name: | Trytko | Trytko |
| Geprüft: | Schulz | Schulz |

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| Datum: | 1 | von | 5 |
| Name: | RN01.044.3-1 | | |
| Geprüft: | | | |

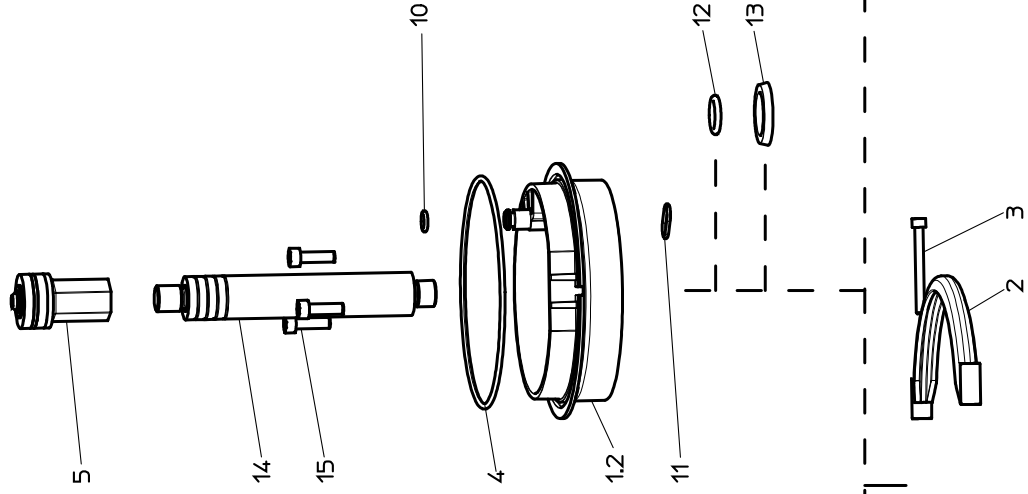
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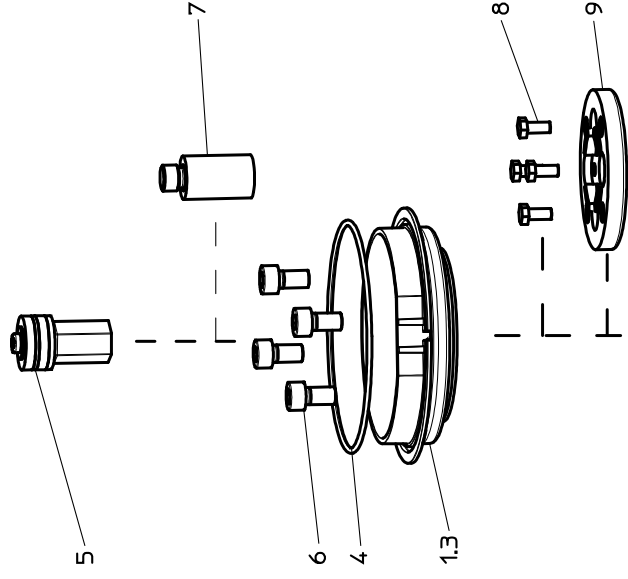
CU4plus M - Adapter



CU4plus T - Adapter



CU4plus S - Adapter



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Ersatzteilliste: spare parts list

CU4plus Adapter

| pos. item | Menge quantity | Beschreibung description | Material | CU4plus - S | | CU4plus - Smini | | CU4plus - T | |
|--------------|-------------------|---|-------------------------|-----------------------------------|---|---------------------------------------|--------------------------------------|-----------------------------------|--------------------------------------|
| | | | | CU4plus - S WS-Nr. ref.-no. | CU4plus - S Langhub ø165 WS-Nr. ref.-no. | CU4plus - Smini WS-Nr. ref.-no. | CU4plus - Smax WS-Nr. ref.-no. | CU4plus - T WS-Nr. ref.-no. | CU4plus - Tmax WS-Nr. ref.-no. |
| | | CU4 Adapter kpl. CU4 adapter cpl. | | 08-48-690/93 H333143 | 08-48-696/93 H335312 | 08-48-691/93 H333144 | 08-48-692/93 H333145 | 08-48-693/93 H333146 | 08-48-694/93 H333147 |
| 1.1 | 1 | CU4 Adapter M CU4 adapter M | Zytel 70G33L schwarz | | | | | | |
| 1.2 | 1 | CU4 Adapter T CU4 adapter T | Zytel 70G33L schwarz | | | | | | |
| 1.3 | 1 | CU4 Adapter S CU4 adapter S | Zytel 70G33L schwarz | 08-46-570/93 H319874 | | | | | |
| 2 | 2 | CU4 Clamphalbschale kpl. CU4 clamp cpl. | Grivory GH-5H1 | 08-46-569/93 H319873 | | | | | |
| 3 | 2 | Zylinderschraube Cyl. Screw | A2-70 | 65-05-040/13 H320360 | | | | | |
| 4 | 1 | O-Ring O-ring | NBR | 58-06-493/83 H148389 | | | | | |
| 5 | 1 | CU4 Magnetschaltnocke kpl. CU4 actuator screw cpl. | Zytel HTN | 08-46-767/93 H333099 | | | | | |
| 6 | 4 | Zylinderschraube Cyl. Screw | A2-70 | 65-05-120/13 M8x16 H79012 | 65-05-122/13 M8x25 H79014 | 65-05-120/13 M8x16 H79012 | 65-05-129/13 M8x60 H315760 | | |
| 7 | 1 | Zugstangenverlängerung Guide rod extension | PA6 | | | 15-26-070/93 H208096 | 15-26-058/93 H327149 | | |
| 8 | 4 | Skt. Schraube Hex. screw | 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 O-ring | NBR | | | | | | 58-06-059/83 H320505 |
| 11 | 1 | O-Ring O-ring | NBR | | | | | | 58-06-034/83 H321897 |
| 12 | 1 | O-Ring O-ring | NBR | | | | | | 58-06-039/83 H208632 |



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| | | |
|----------|----------|----------|
| Datum: | 26.01.16 | 04.04.16 |
| Name: | Trytko | Trytko |
| Geprüft: | Schulz | Schulz |
| Datum: | | |
| Name: | | |
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Ersatzteilliste: spare parts list

CU4plus Adapter

| | | Datum: 26.01.16 04.04.16 | | | | | | APV | |
|------|----------|---|-------------------------|-------------------------------|-------------------------|----------|----------|----------------------------------|----------|
| | | Name: Trytko | | Trytko | | | | SPX Flow Technology Rosista GmbH | |
| | | Geprüft: Schulz | | Schulz | | | | D-59425 Umma Germany | |
| | | Datum: | | | | | | Blatt 4 von 5 | |
| | | Name: | | | | | | RN01.044.3-1 | |
| | | Geprüft: | | | | | | | |
| pos. | Menge | Beschreibung | Material | CU41plus - M CU4-M is used | CU43plus - M | WS-Nr. | WS-Nr. | WS-Nr. | WS-Nr. |
| item | quantity | description | material | WS-Nr. ref.-no. | WS-Nr. ref.-no. | ref.-no. | ref.-no. | ref.-no. | ref.-no. |
| | | CU4 Adapter kpl. CU4 adapter cpl. | | 08-48-602/93 H320476 | 08-48-695/93 H333148 | | | | |
| 1.1 | 1 | CU4 Adapter M | Zytel 70G33L schwarz | 08-46-572/93 H319876 | | | | | |
| 1.2 | 1 | CU4 Adapter T | Zytel 70G33L schwarz | | | | | | |
| 1.3 | 1 | CU4 Adapter S | Zytel 70G33L schwarz | | | | | | |
| 2 | 2 | CU4 Clamphalbschale kpl. CU4 clamp cpl. | Grivory GH-5H1 | 08-46-569/93 H319873 | | | | | |
| 3 | 2 | Zylinderschraube Cyl. Screw | A2-70 | 65-05-040/13 H320360 | | | | | |
| 4 | 1 | O-Ring O-ring | NBR | 58-06-493/83 H148389 | | | | | |
| 5 | 1 | CU4 Magnetschaltnocke kpl. CU4 actuator screw cpl. | Zytel HTN | | 08-46-767/93 H333099 | | | | |
| 6 | 4 | Zylinderschraube Cyl. Screw | A2-70 | | | | | | |
| 7 | 1 | Zugstangenverlängerung Guide rod extension | PA6 | | 08-46-920/93 H333136 | | | | |
| 8 | 4 | Skt. Schraube Hex. screw | A2-70 | | | | | | |
| 9 | 1 | CU Adapter SW4 CU adapter SW4 | PA6 | | | | | | |
| 10 | 1 | O-Ring O-ring | NBR | | | | | | |
| 11 | 1 | O-Ring O-ring | NBR | | | | | | |
| 12 | 1 | O-Ring O-ring | NBR | | | | | | |

APV CU4plus AS-interface

CONTROL UNIT

SPXFLOW

SPX FLOW

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