SPXFLOW®

INSTRUCTION MANUAL

CU4plus Direct Connect Control Unit

SAFETY AGAINST EXPLOSION - FOR ATEX ZONE 2 GAS APPLICATIONS

FORM NO.: H345316 REVISION: GB-0

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

EU Declaration of Conformity

Product

Nomenclature	:	**Control Unit**
Model / Type	:	CU4, CU4plus
Variants	:	AS-interface, Direct Connect

Manufacturer

Name	:	SPX FLOW Technology Poland sp.z o.o.
Address		Stanisława Jana Rolbieskiego 2, PL-85-862 Bydgoszcz, Poland

Design Center

Name	:	SPX FLOW Technology Germany GmbH
Address:		Gottlieb-Daimler-Straße 13, D-59439 Holzwickede, Germany

:

Applicable EU Harmonisation Legislation

EU Declaration of Conformity in accordance with

ATEX Directive 2014/34/EU

- Essential Health and Safety Requirements have been met by complying with the harmonised standard/s - EN 60079-0:2018, EN 60079-7:2015+A1:2018 and EN 60079-18:2015+A1:2017.
- Equipment Marking: **II 3 G Ex ec mc IIC T4 Gc**
  0 °C ≤ Ta ≤ +55 °C

This declaration of conformity is issued under the sole responsibility of the manufacturer and design center. It will lose its validity if the product is modified without the written permission from the manufacturer and/or if the safety instructions specified in the instruction manual are not being followed.

Authorised Signatory:

Signature: ppa. Baumbach ---------- **Date: 14.09.2021**

Frank Baumbach, Regional Engineering Manager - F&B Components.
SPX FLOW, Gottlieb-Daimler-Str. 13, D-59439 Holzwickede, Germany.

Content

NOTE:

In addition to D4 and D4 SL double seat valves and different other process valve ranges, also other SPX FLOW process valves are in preparation for ATEX Zone 2 application requirements.

0. ATEX Specific Instructions

0.1. General Information

These ATEX Specific Safety Instructions apply for CU4 / CU4 plus ATEX Control Units used in Potentially Explosive Atmospheres according to **Zone 2 ATEX, GAS** applications (according to Directive 2014/34/EU), **ONLY**.

These instructions shall be read carefully by the competent operating and maintenance personnel.

We point out that we will not accept any liability for damage or malfunctions resulting from the non-compliance with these instructions.

0.2. ATEX Specific Symbol

DANGER! WARNING! CAUTION!
This symbol draws your attention to important directions which have to be observed for the operation in explosive areas.

Failure to observe the warning may result in fatal or serious injury as well as damage to property!

0.3. Authorized Use

The CU4 / CU4plus ATEX Control Unit is designed to be mounted to pneumatic actuators of process valves for the control of media as used in the food and beverage industries as well as in pharmaceutical and chemical applications.

The control unit is installed on a pneumatic actuator of a process valve. The process valve and the actuator must have at least the ATEX approval of the control unit.

SPX FLOW will be held responsible only for the control units supplied and selected according to the operating conditions indicated by the customer or end user and as stated in the order confirmation. If in doubt, contact your local supplier.

Observe the admissible data, operating conditions and conditions of use as specified in the contract documents, instruction manuals and on the type label.

The control unit must only be used with SPX FLOW valves and components recommended and authorized by SPX FLOW.

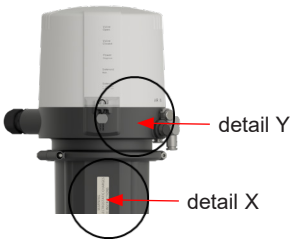
Adequate transport, storage and installation, careful handling and maintenance are essential for a faultless and reliable function of the control unit.

Observe the intended use of the control unit.

0. ATEX Specific Instructions

0.4. Specific Safety Instructions

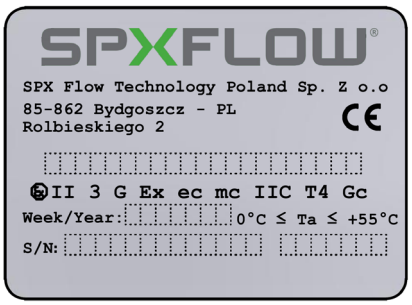
lead seal



electrostatic risk

detail X: electrostatic risk label
CU4 ATEX 3G

detail Y: type label
CU4 ATEX 3G



Removing the electric plug

- Remove the electric circular plug or disconnect terminal connections only after the power supply has been separated.

Opening the device

- Do not open the control unit in the presence of explosive atmosphere.
- Do not install and set the proximity switches in the presence of explosive atmosphere.
- Before startup, secure the cover with the enclosed lead seal. Opening the cover without tools must be prevented.

Electrostatic discharge

- In case of sudden discharge from electrostatically charged devices or individuals, risk of explosion in the explosive area exists.
- Prevent the occurance of electrostatic discharges by suitable measures.
- Clean the control unit surface by gently wiping it with a damp or antistatic cloth, only.

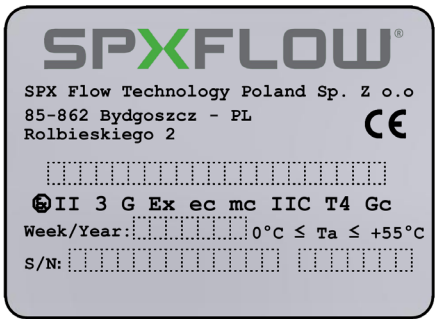
In order to prevent the emergence of explosion risks observe the safety instructions of the instruction manual and adhere to the following:

- Observe information on temperature classes, ambient temperatures, degree of protection and voltage on the approval ID label.
- Do not use control units in areas subject to gas with lower ignition temperatures than indicated on the approval ID label.
- Installation, operation and maintenance may only be performed by qualified personnel.
- Observe the applicable international and national safety regulations as well as the general rules of technology for construction and operation.
- Do not repair the control unit yourself. Replace it by an equivalent device.
- Repairs may only be performed by the manufacturer.
- Do not expose the control unit to mechanical and/or thermal loads which may exceed the limits described in the instruction manual.
- Only use cable and/or line entry points approved for the respective application area and which are screwed in place according to the respective installation instructions.
- The cable glands may be used for fixed installations, only.
- Close all unnecessary cable glands with locking screws approved for the explosive area.
- The required degree of protection (IP67) is guaranteed only in connection with suitable adaption sets. All pneumatic and electrical connections must be equipped with suitable connectors.

0. ATEX Specific Instructions

0.5. Identification of CU4 / CU4plus control units for use in ATEX environment

ATEX - identification:



Equipment group II

Explosion subcategory / Equipment marking
II 3 G Ex ec mc IIC T4 Gc

Ambient temperature
0 °C ≤ T_{amb} ≤ +55 °C

0.6. Responsibilities

It is within the operator`s responsibility to ensure that the specified product temperatures are not exceeded and that regular inspections and maintenance are carried out to provide for proper function of the control unit and valve.

The following pages show the operating instructions for the standard control unit for non-ATEX applications.

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/mass potential**
IP	**International Protection**
LED	**Light Emitting 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 Direct Connect 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 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!

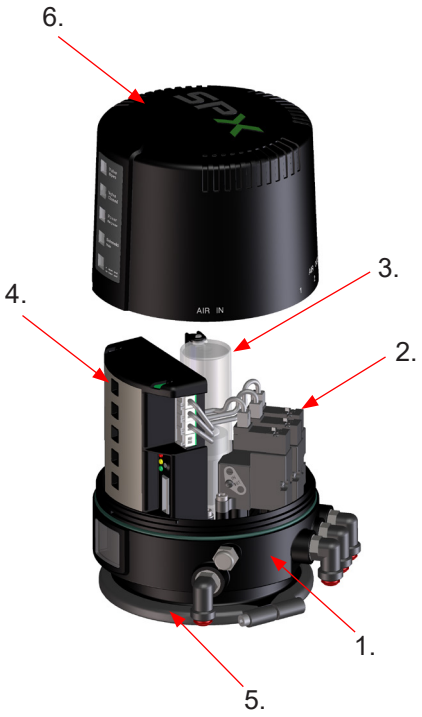
2.6. Warranty

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.

Note! 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.

3. General Terms

fig. 3.2.



3.1. Purpose of use

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

The CU4plus Direct Connect control unit operates as interface between process control and process valve and controls the electric and pneumatic signals.

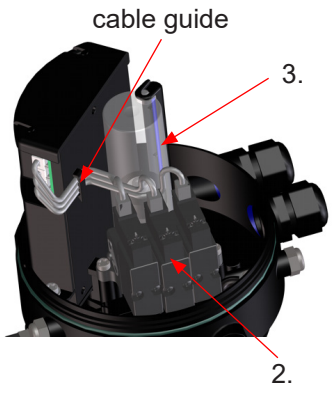
The pneumatic control of valves is undertaken via the solenoid valves. The control unit controls the valve positions, **open** and **closed**, via sensors. The electronic module undertakes the task to process the switching signal from the control and to control the corresponding solenoid valves. The 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 Direct Connect (fig. 3.2.)

The CU4plus Direct Connect 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 Direct Connect communication with the PLC, evaluation of feedback signals and control of solenoid valves as well as valve position indication through LED.
5. Clamp ring to fasten the CU4plus 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 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. 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 CU4plus 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. Commnication is undertaken via Direct Connect wiring with single parallel cables.

Valve position detection is realized via linear sensors which are 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 the D4 valve generation, additionally to the linear sensor integrated in the control unit, an additional sensor is installed in the lower part of the sensor tower.

3. General Terms

3.3. Function of the individual components

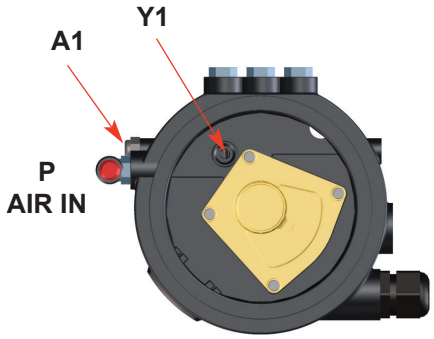
The luminous diodes are located on the front side of the electronic module. Their signals are visibly indicated to the outside by an optical window in the cover the control unit. Beside the open and closed valve position, the existence of the operating voltage as well as different diagnostic information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

Note! Wiring must be changed!

4. Mechanics and Pneumatics

4.1. Air connections for turning actuator

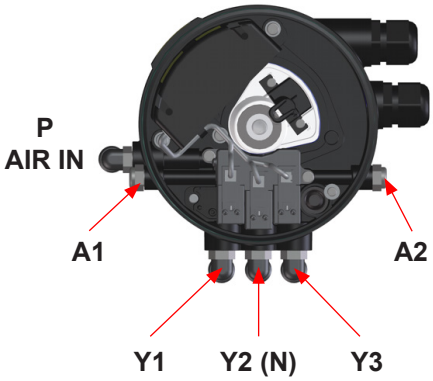


4.1.1. Function

CU41plus-T DC
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 mix proof valves



4.2.1. Function

CU41plus-S DC
design for seat valves

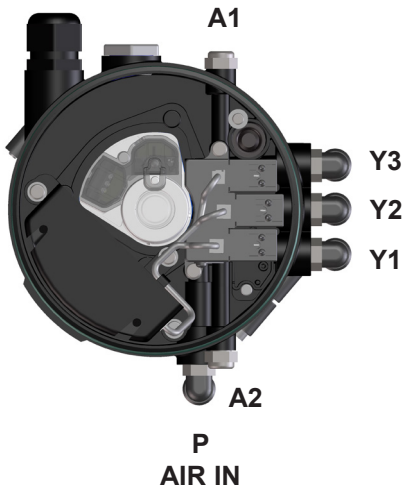
P air supply with integrated particle filter
Y1 pneumatic air connection for main actuator
A1 exhaust air with silencer

CU41Nplus-S DC
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

4. Mechanics and Pneumatics

4.2.1. Function



CU41plus-D4
design for D4 double seat mix proof valves without seat lift function

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

CU43plus-D4
design for D4 SL, DA4 double seat mix proof valves with seat lift function

P	air supply with integrated particle filter
Y1	control 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 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 valve vents into the clearance between the base and the adapter of the control unit.

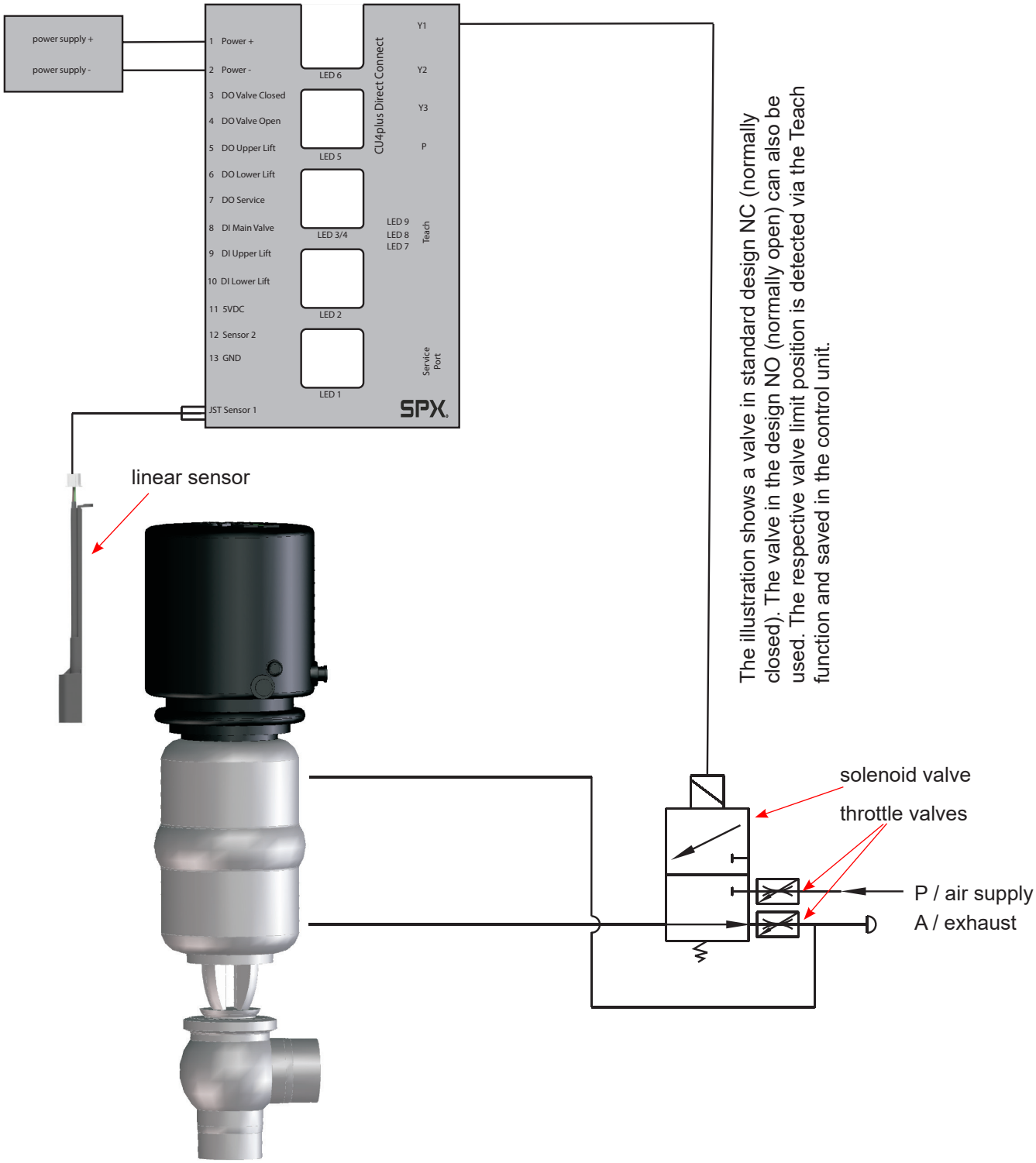
The pressure relief valve must not be mechanically blocked under any circumstances.

4. Mechanics and Pneumatics

4.4. Functional description - block diagrams

4.4.1. CU41plus Direct Connect
(internal position measuring system)

Valve types: SW4, MS4, SV1, SVS1F

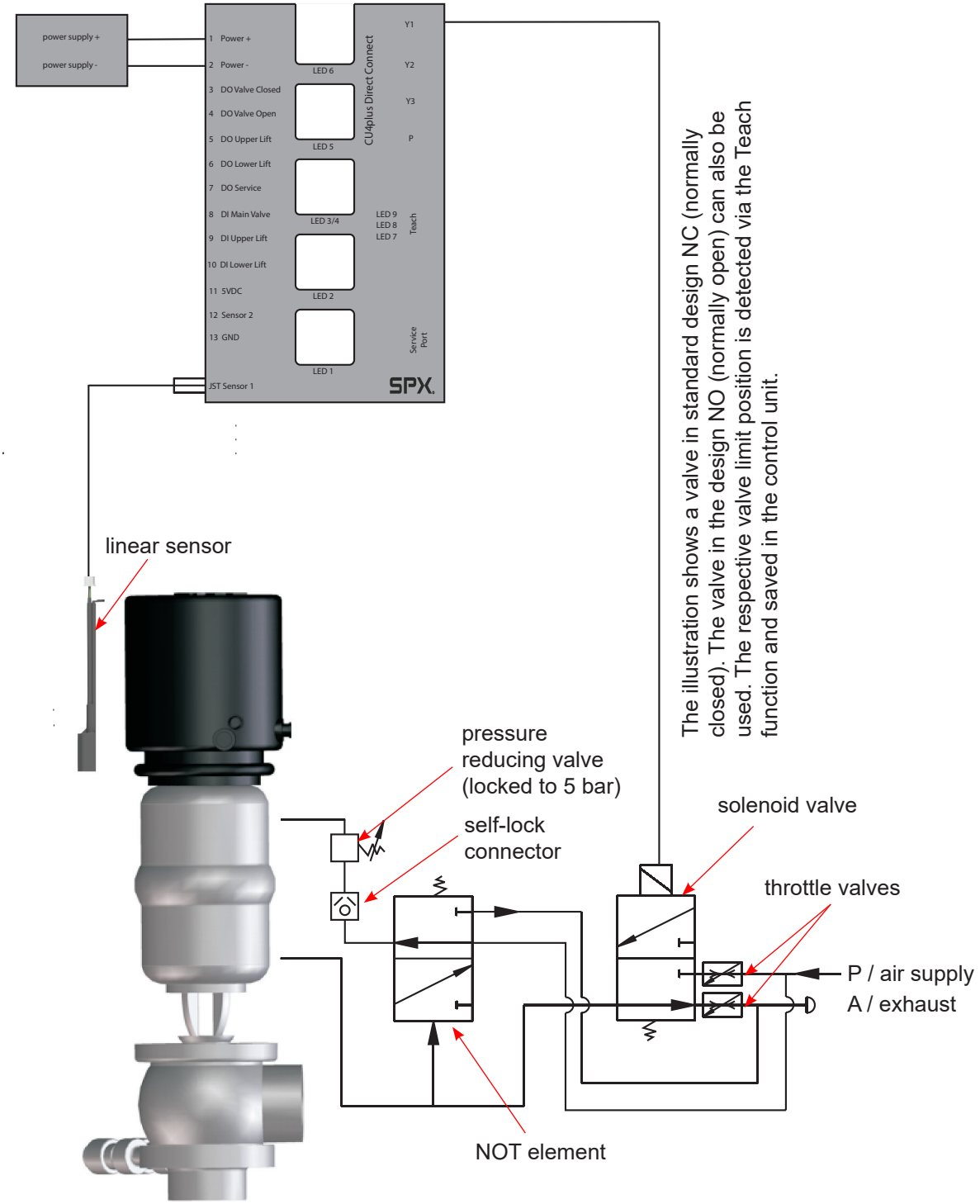


4. Mechanics and Pneumatics

4.4. Functional description - block diagrams

4.4.2. CU41Nplus Direct Connect
(internal position measuring system)

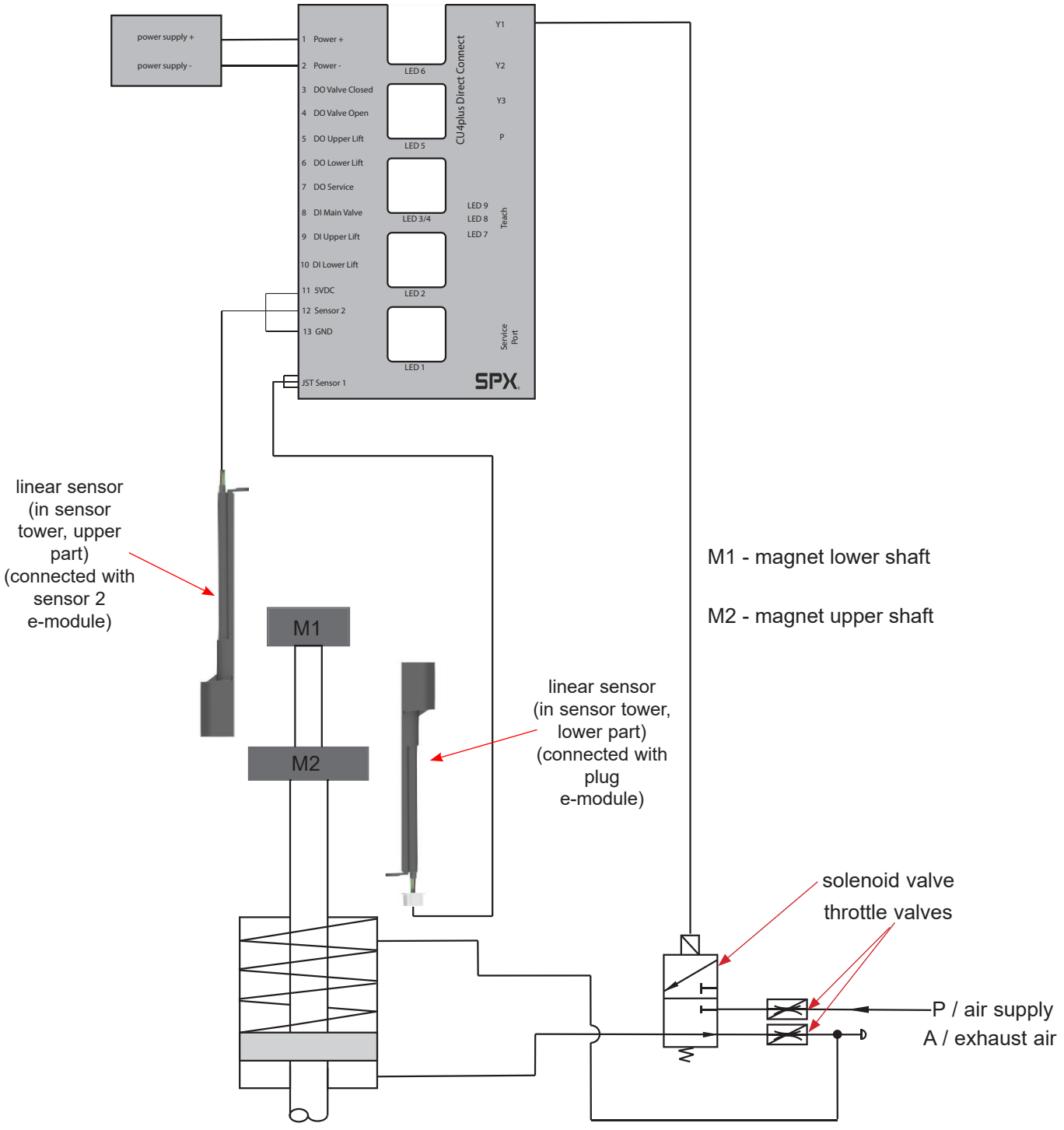
Valve type: SD4



4. Mechanics and Pneumatics

4.4. Functional description - block diagrams

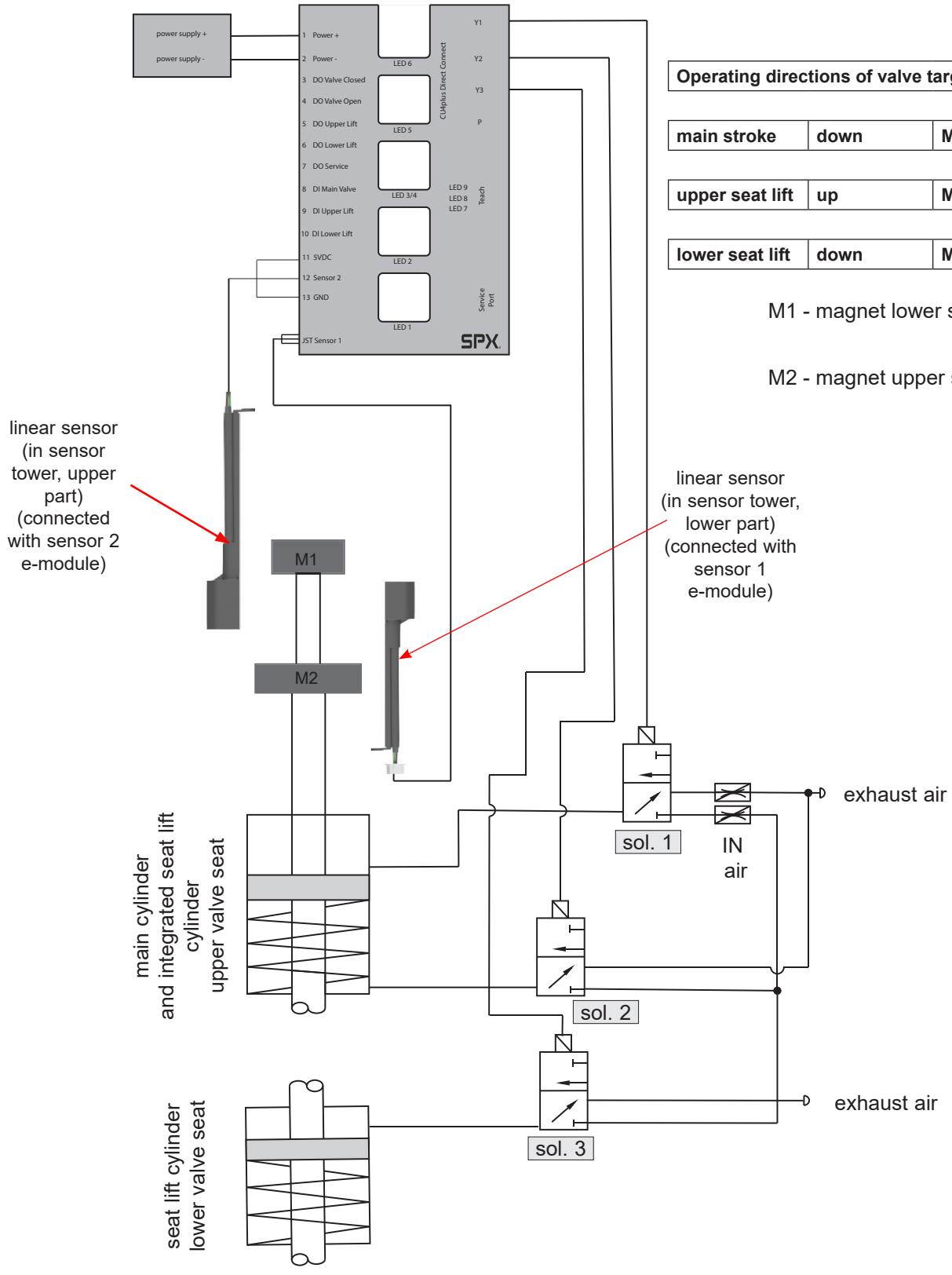
4.4.3. CU41plus-D4 for D4 double seat mix proof valves



4. Mechanics and Pneumatics

4.4. Functional description - block diagrams

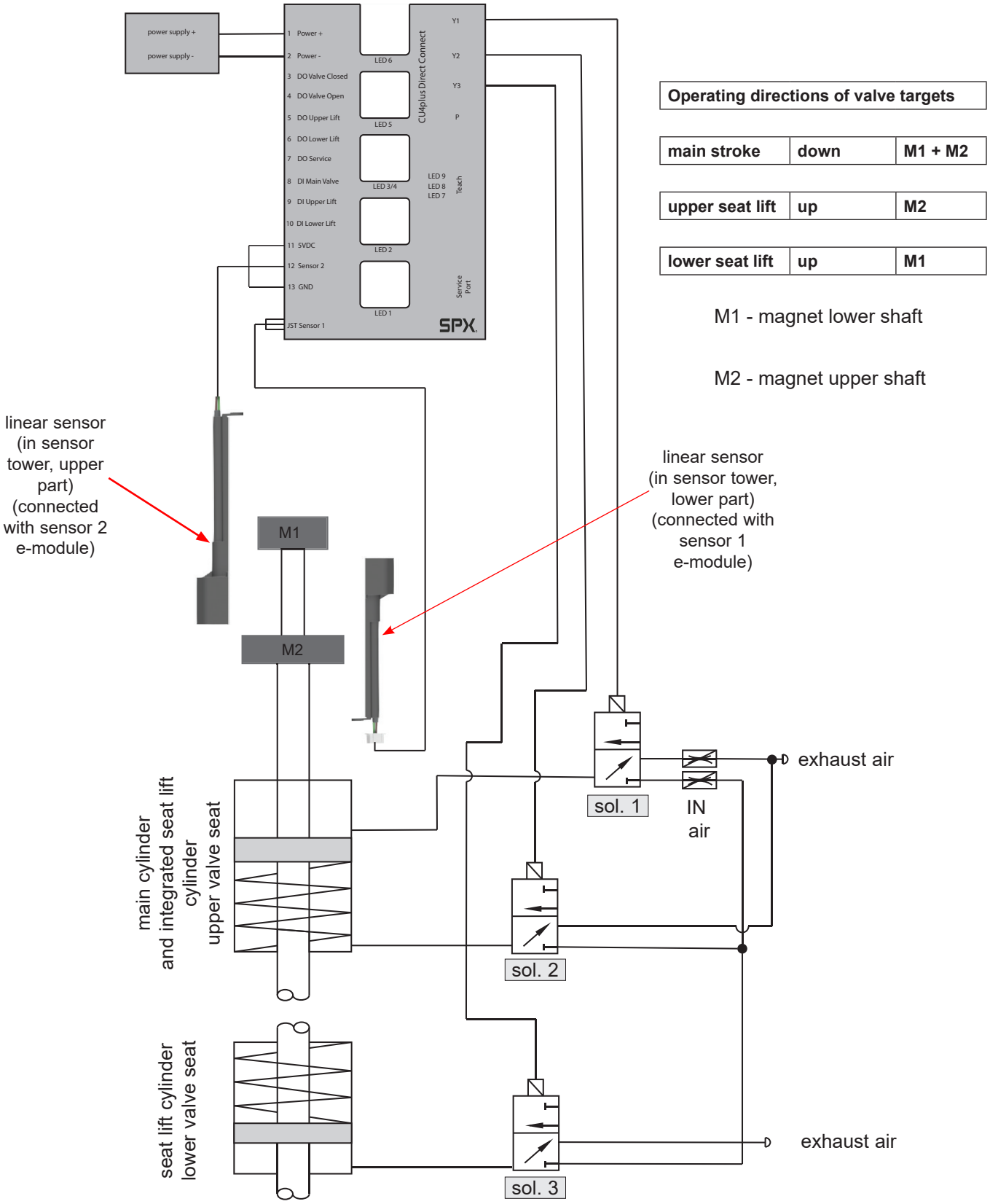
4.4.4. CU43plus-D4 for D4 SL double seat mix proof valves



4. Mechanics and Pneumatics

4.4. Functional description - block diagrams

4.4.5. CU43plus-D4 for DA4 double seat mix proof valves



4. Mechanics and Pneumatics

4.5. Technical data / Standards

Material: PA6.6/PA12

Ambient temperature: 0°C to +55°C (limitation due to ATEX application)

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

Standards and environmental audits:
protective class IP 67 EN 60529/
complies with NEMA 6
EMC
DIN EN 55011
DIN EN 6100-4-2,3,4,5,6

vibration/oscillation EN60068-2-6

safety of machinery DIN EN ISO 13849-1,2

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 0,5 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 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

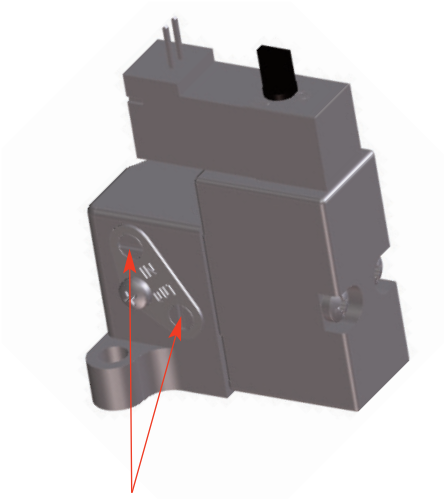
The oil applied must be compatible with Polyurethane elastomer materials.

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



throttle screws

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 slided into the air connection until it stops in order to open the non-return valve.

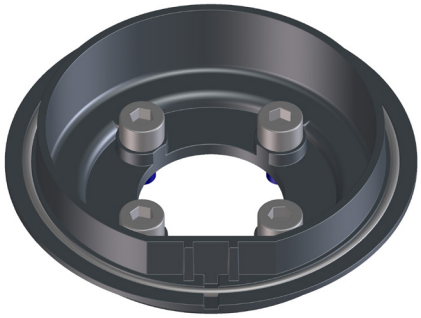
The NOT element is also used for air/air - actuators.

5. Adapter

Adapter for different process valves

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

5.2. Single seat valve



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

6. Electronic Module

6.1. Function/block diagram

The electronic module of the SPX FLOW CU4plus Direct Connect control unit is designed to be part of the PLC Input/Output system. It should be supplied with the same protected power supply as the other I/O devices. This power supply should not be used for other kinds of loads. The unit is reverse polarity and short cut protected. The power supply must meet EN 61131-2.

For mix proof valves of the D4 family the electronic module works with 2 SPX linear sensor systems.

For single seat valves and butterfly valves the electronic module only works with 1 SPX linear sensor system.

For special valves or previous valve generations the electronic module can also work with 2 SPX proximity switches or in combination of proximity switches and linear sensor.

Make sure that only SPX feedback sensors are used with the CU4plus DC electronic module.

PNP/NPD polarity

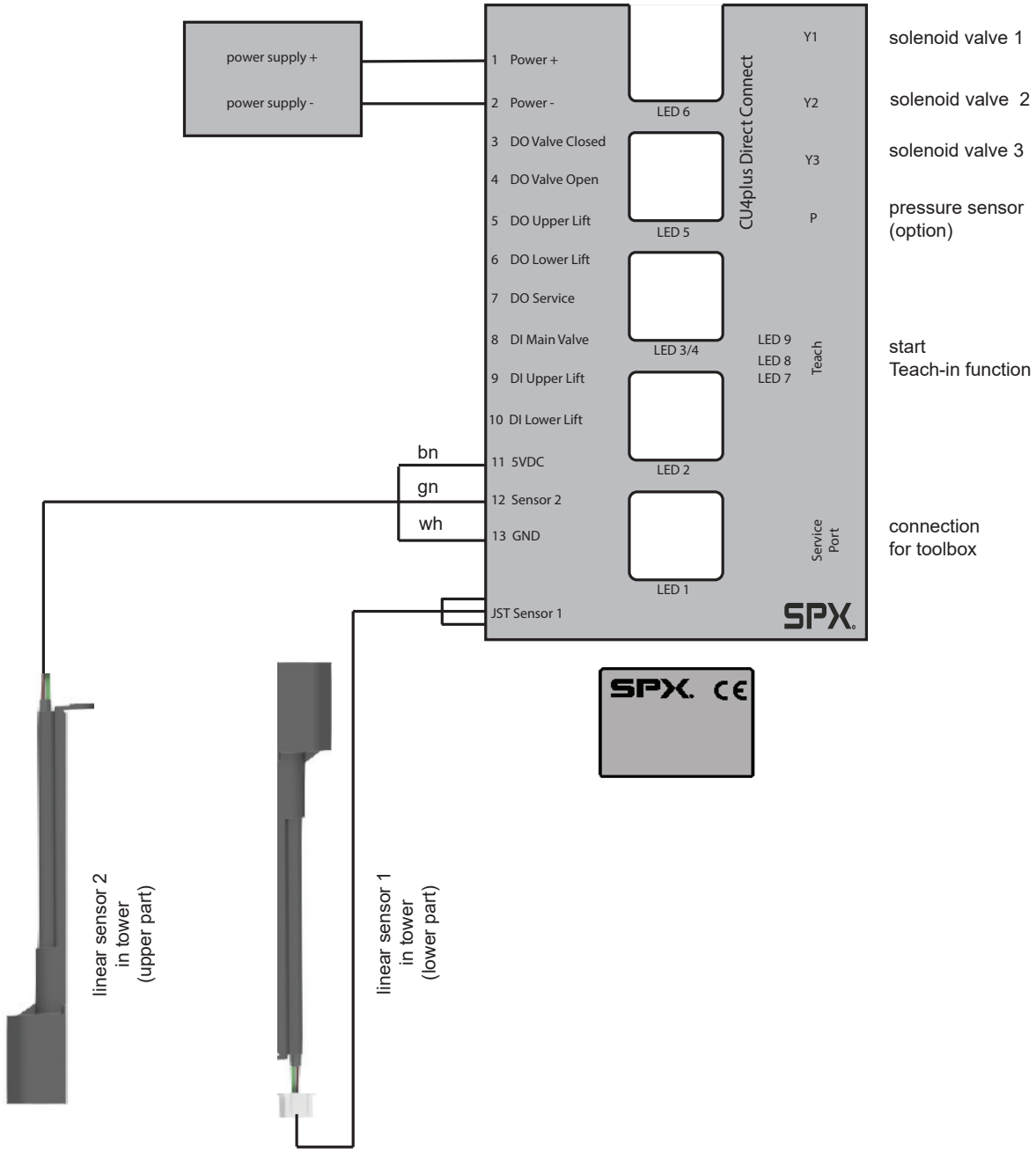
PNP (sourcing) or NPN (sinking) function can be selected with PC software Toolbox. Delivery default is PNP.

Please refer to chapter 6. Electronic module / Technical Data.

6. Electronic Module

6.1. Function/block diagram

6.1.1. CU41plus-D4
CU43plus-D4



6. Electronic Module

6.2. Functional description of connections

Terminal	Designation	Functional Description
1	Power+	power supply 24VDC+
2	Power-	power supply 24VDC-
3	O0 Digital Output	PLC input valve status / closed
4	O1 Digital Output	PLC input valve status / open
5	O2 Digital Output	PLC input valve status / upper seat lift
6	O3 Digital Output	PLC input valve status / lower seat lift
7	SV Digital Output	PLC input service request
8	I0 Digital Input	PLC output to activate solenoid 1 / main valve
9	I1 Digital Input	PLC output to activate solenoid 2 / upper seat lift
10	I2 Digital Input	PLC output to activate solenoid 2 / lower seat lift
11	+5VDC	supply voltage for SPX prox. sensor / linear sensor
12	S	signal SPX prox. sensor
13	0V	potential for SPX prox. sensor / linear sensor
linear sensor		
Y1	PWM Output	solenoid valve 1 (main valve)
Y2	PWM Output	solenoid valve 2 (upper seat lift)
Y3	PWM Output	solenoid valve 3 (lower seat lift)
service port		connection serial/USB converter for CU4plus toolbox

6. Electronic Module

6.3. Technical data

Power supply:	24 VDC +/- 20%
Typical power consumption:	
No solenoid active, 1 feedback active	75 mA
1 solenoid active, 1 feedback active	85 mA
Signal voltage inputs	max. 30 VDC
Input impedance	6 kOhm, linear (ohmic charateristic curve)
PNP input	
switching threshold ON	≥ 12 V / ≥ 2 mA
switching threshold OFF	≤ 10 V / ≤ 1,6 mA
voltage output ON	≥ U+ - 2V
output current	≤ 100 mA
	Current is limited by overload protection. In case of overload, the service request is set.
NPN input	
switching threshold ON	≤ 12 V / ≥ 1,8 mA
switching threshold OFF	≥ 14 V / ≤ 1,4 mA
voltage output ON	≤ 2 V
output current	≤ 100 mA
	Current is limited by overload protection. In case of overload, the service request is set.
Supply of solenoids	PWM controlling signal from electronic module
Supply of sensors	5 VDC, 4,75…5,25V (sum of all currents < 40mA)

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

Connecting terminals:	conductor cross section 0.5 – 1,0 mm² (with conductor sleeve) complying with AWG 20-17 (max. 11 mm)

Note! Observe that only one cable should be installed. If more than one cable is required, follow the max. cross section limitations!

Torque for screw terminal:	0,8 Nm +/- 0,1

6. Electronic Module

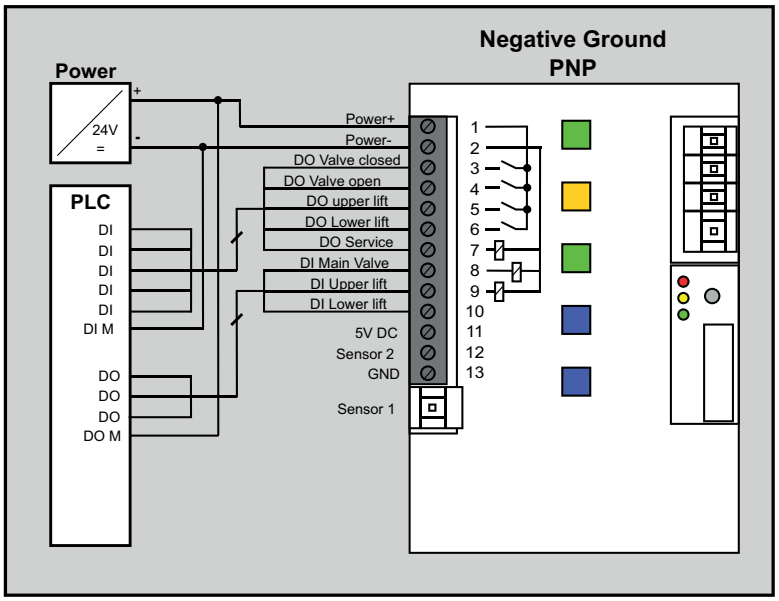
6.4. Connections

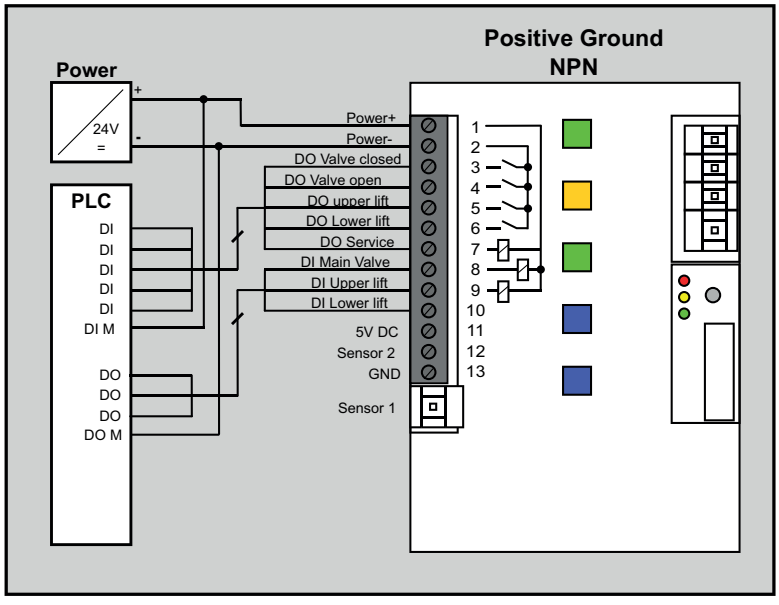
Sensors for valve position detection:

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

Internal hall sensors: "magnetic hall sensor" SPX FLOW UB 4.75 - 5.25 VDC switching distance acc. to SPX FLOW specification

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





6. Electronic Module

6.5. 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
LED 3/4	power and diagnosis	green / red alternate blink		Teach required
together with				
LED 5/6	valve open / closed	green / orange blink		
LED 3/4	power and diagnosis	green / red alternate blink		service request caused by: solenoid valve wiring open loop or short circuit
together with				
LED 8	service request	yellow, permanent light		
LED 5	valve closed	orange, permanet light		valve closed
LED 6	valve open	green, permanent light		valve open
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 the adjusted mode!**

6. Electronic Module

6.6. Adjustement 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:

Type	Valve profile	Valve position measuring system	Tolerance band	Valve basic position NO/NC	Invert - valve position indication	Number of solenoids
0	Mix proof valve DA4	2 internal linear sensors	fixed +/- 1 mm	NC only	possible	always 3
1	Mix proof valve D4	2 internal linear sensors	fixed +/- 1 mm	NC only	possible	always 1
2	Mix proof valve D4 SL	2 internal linear sensors	fixed +/- 1 mm	NC only	possible	always 3
8	Mix proof / seat valve with external feedback detection	external proximity switches	not available	NC / NO	possible	optional 1,2,3
9	Seat valve / butterfly valve with internal feedback detection	internal linear sensor	+/-1 mm +/- 3 mm +/-5 mm	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: Mix proof valve DA4 profile is adjusted.

Adjusted valve characteristics: logic profile 1

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. Data signals

6.7.1. Single seat valves with internal feedback detection

NC - normally closed			
Application: single seat / butterfly valve with internal feedback detection (SW4, SD4, MS4, SVS, SV etc.)			
Output signals	**valve state**	**sensor 1**	**sensor 2**
		signal generated by Teach-in (position of position sensor)	signal generated by Teach-in (position of position sensor)
O0	closed	**1**	0
O1	open	0	**1**
O2	not occupied	**1**	**1**
O3	not occupied	**1**	**1**
Input signals	**solenoid 1 Main**	**solenoid 2**	**solenoid 3**
I0	**1**	0	0
I1	0	**1**	0
I2	0	0	**1**

NO - normally open			
Application: single seat / butterfly valve with internal feedback detection (SW4, SD4, MS4, SVS, SV etc.)			
Output signals	**valve state**	**sensor 1**	**sensor 2**
		signal generated by Teach-in (position of position sensor)	signal generated by Teach-in (position of position sensor)
O0	closed	0	**1**
O1	open	**1**	0
O2	not occupied	1	1
O3	not occupied	1	1
Input signals	**solenoid 1 Main**	**solenoid 2**	**solenoid 3**
I0	**1**	0	0
I1	0	**1**	0
I2	0	0	**1**

6. Electronic Module

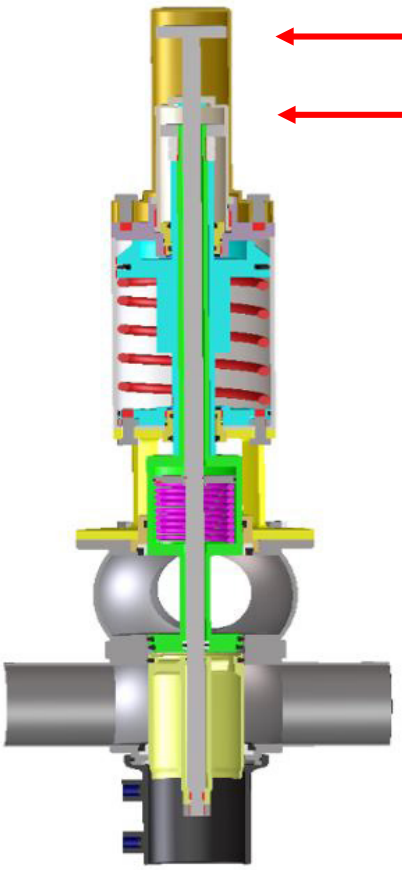
6.7. Data signals

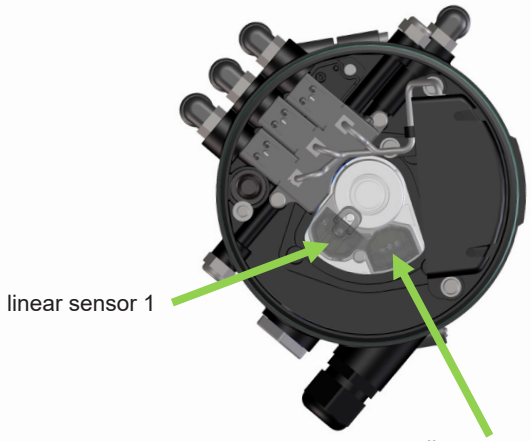
6.7.2. Mix proof valve D4

operating	main stroke downwards	

main stroke	valve operating direction: downwards	

lower shaft	signal S3 signal S4	linear sensor 1	valve target M1
upper shaft	signal S2 signal S1	linear sensor 2	valve target M2





Output signals	valve status	linear sensor 2 / (Teach data)		linear sensor 1 / (Teach date)		tolerance band
		sensor signal S1	sensor signal S2	sensor signal S3	sensor signal S4	
O0	closed	1	0	not used	0	+1 mm, -1 mm
O1	open	0	0	not used	1	+1 mm, -1 mm
DI2						
DI3						

Input signal	solenoid 1 Main	solenoid 1 upper seat lift	solenoid 1 lower seat lift
I0	1	0	0
I1			
I2			

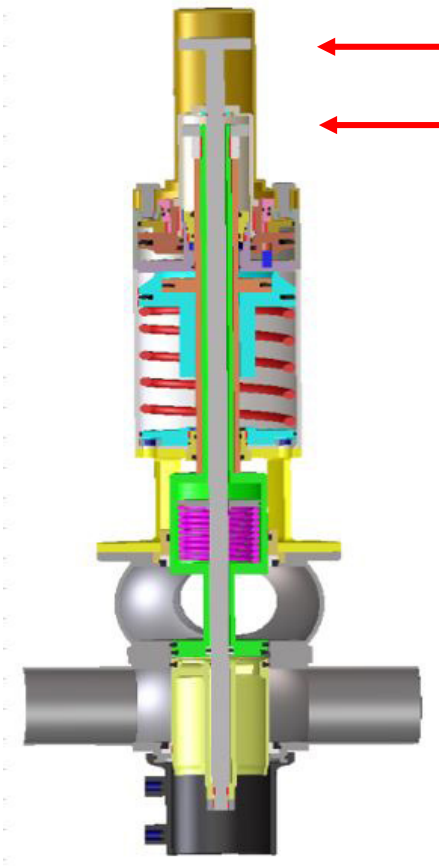
6. Electronic Module

6.7. Data signals

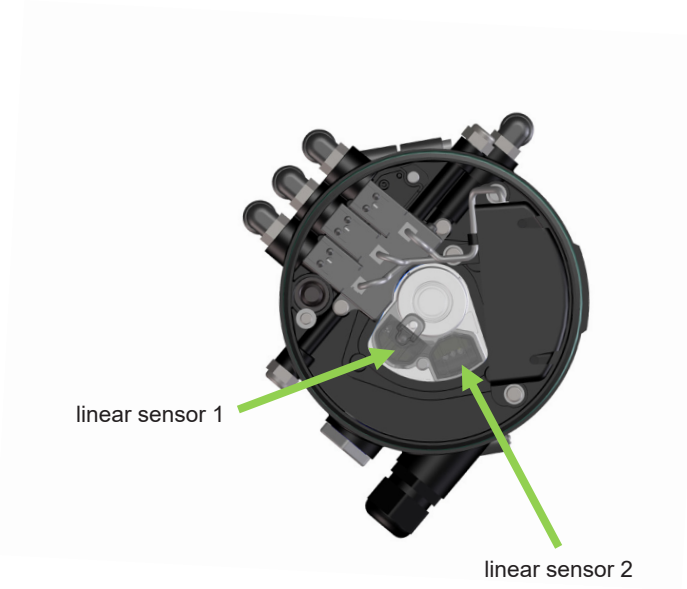
6.7.3. Mix proof valve D4 SL

operating	main stroke downwards upper seat lift upwards lower seat lift downwards	

main stroke	valve operating direction: downwards	



lower shaft	signal S3 signal S4	linear sensor 1	valve target M1
upper shaft	signal S2 signal S1	linear sensor 2	valve target M2



Output signals	valve status	linear sensor 2 / (Teach data)		linear sensor 1 / (Teach data)		tolerance band
		sensor signal S1	sensor signal S2	sensor signal S3	sensor signal S4	
O0	closed	1	0	1	0	+1 mm, -1 mm
O1	open	0	0	0	1	+1 mm, -1 mm
O2	upper seat lift	0	1	1	0	+1 mm, -1 mm
O3	lower seat lift	1	0	0	0	+1 mm, -1 mm

Input signal	solenoid 1 Main	solenoid 2 upper seat lift	solenoid 3 lower seat lift
I0	1	0	0
I1	0	1	0
I2	0	0	1

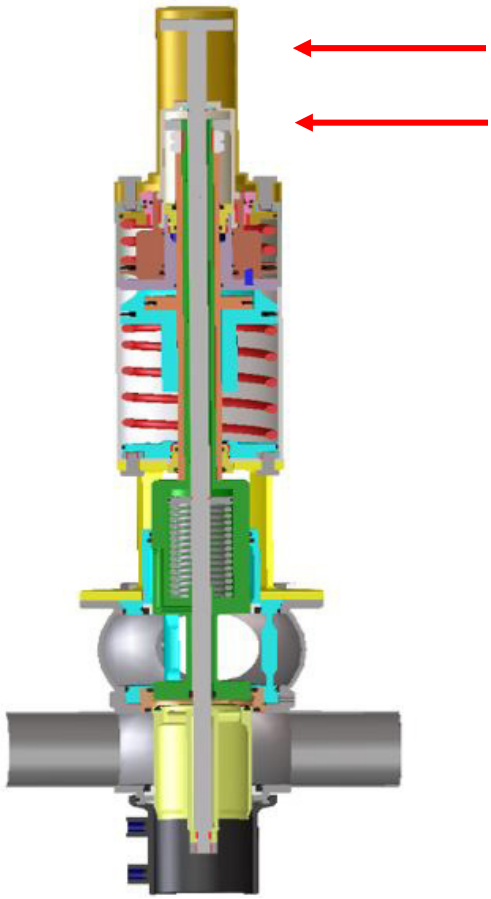
6. Electronic Module

6.7. Data signals

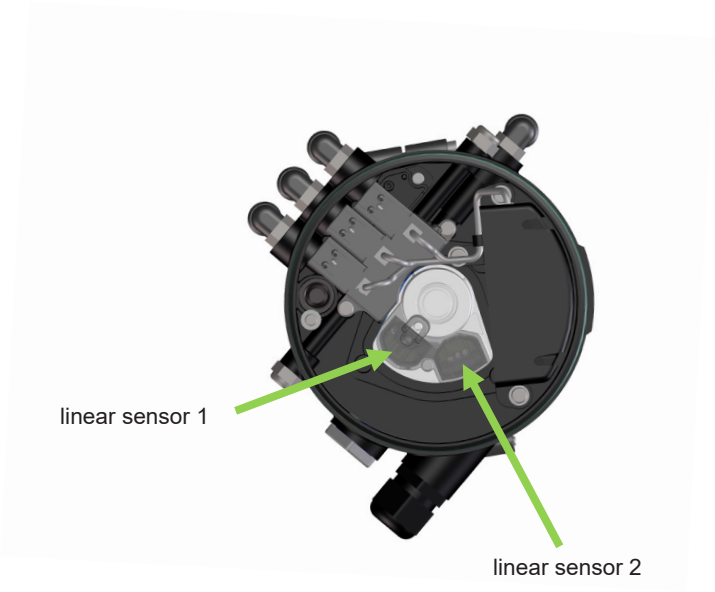
6.7.4. Mix proof valve DA4

operating	main stroke downwards upper seat lift upwards lower seat lift upwards	

main stroke	valve operating direction: downwards	



lower shaft	signal S3 signal S4	linear sensor 1	valve target M1
upper shaft	signal S2 signal S1	linear sensor 2	valve target M2



Output signals	valve status	linear sensor 2 / (Teach data)		linear sensor 1 / (Teach data)		tolerance band
		sensor signal S1	sensor signal S2	sensor signal S3	sensor signal S4	
O0	closed	1	0	0	0	+1 mm, -1 mm
O1	open	0	0	0	1	+1 mm, -1 mm
O2	upper seat lift	0	1	0	0	+1 mm, -1 mm
O3	lower seat lift	1	0	1	0	+1 mm, -1 mm

Input signals	solenoid 1 Main	solenoid 2 upper seat lift	solenoid 3 lower seat lift
I0	1	0	0
I1	0	1	0
I2	0	0	1

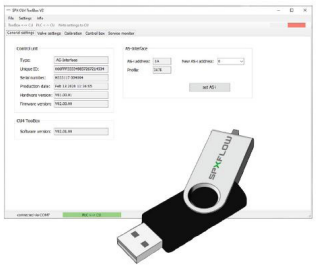
6. Electronic Module

6.7. Data signals

6.7.5. Parameter data / status / diagnosis

not relevant because of Direct Connect

6.8. Service and Maintenance Software CU4plus Toolbox



For the parameterization of the CU4plus DC the CU4plus Toolbox Software is available.

The Toolbox kit with appropriate USB/serial cable can be purchased from SPX Flow using the article number H333470.

The latest version of the Toolbox Software is always available from the SPX Flow F&B Sharepoint. Please contact your SPX Flow Sales representative.

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

6. Electronic Module

6.9. Seat Pulsation - Efficiency in Cleaning

For increasing seat cleaning efficiency there is a function called "Pulsation". With this function, the seat lifts can be operated in plusation mode if the PLC signal activates the seat lift.

For the pulsation the ON and OFF time can be adjusted with the CU4plus Toolbox.

The selection of the pulsation times must be done in accordance with the process situation and the appropriate valve size. The selected times must ensure complete opening and closing of the seats. We recommend to adjust pulsing times which are not shorter than 30 seconds.

During pulsation, the feedback for the appropriate seat lift will always be active!

7. Valve Position Indication

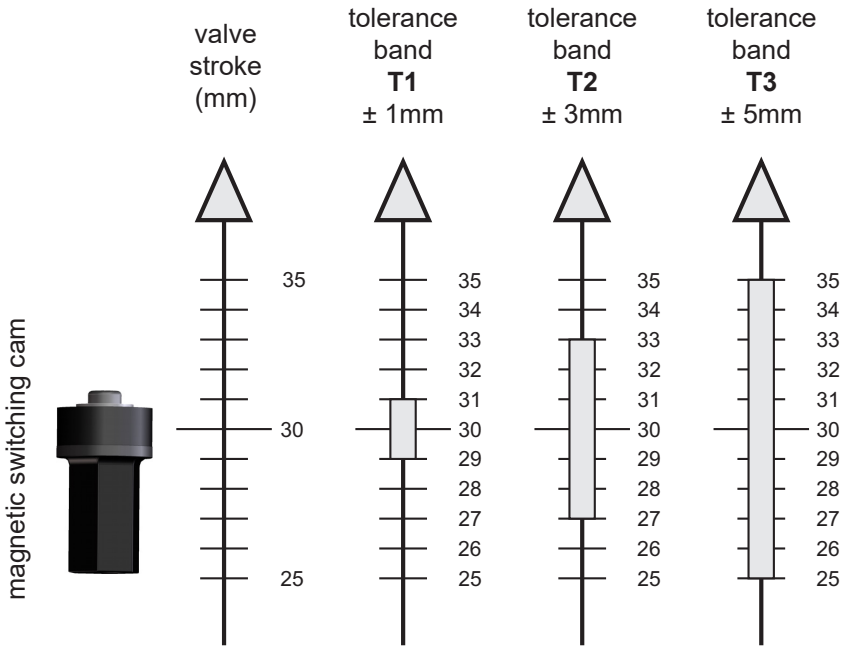
7.1. Continuously measuring valve position measuring system

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. D4, D4 SL, DA4
T2	+/- 3 mm	e.g. SW4, MS4
T3	+/- 5 mm	e.g. SV, SVS, DKR

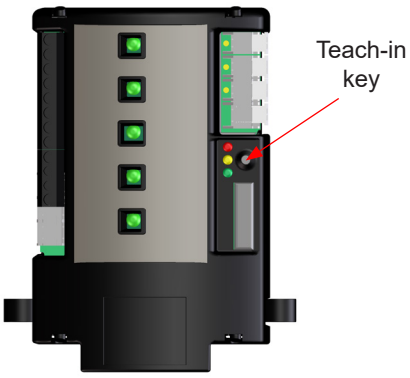


7. Valve Position Indication

7.3. Adjustment of valve position indication / Teach-in

The continuously measuring valve position measuring system is tought 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 Teach carried out	Wait for Teach result
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! Caution!
The switching cam is not identical with the standard CU switching cam!

- CU4plus Direct Connect control unit is not duly installed on the valve.
- 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 DA4).

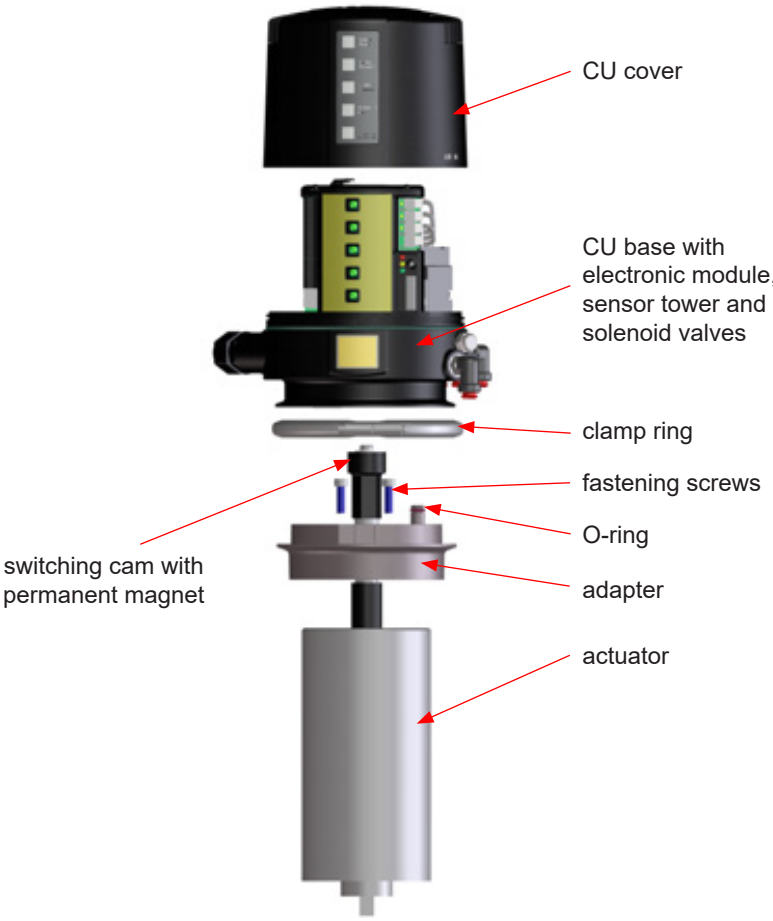
During the Teach-in function, the valve is controlled and moves independently into all operating positions.

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!

8. CU Assembly and Startup

8.1. Valves with 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 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

Attention! Electric connections shall only be carried out by qualified personnel!

Observe the Safety Instructions specified in chapter 2.

8.1.3. Startup

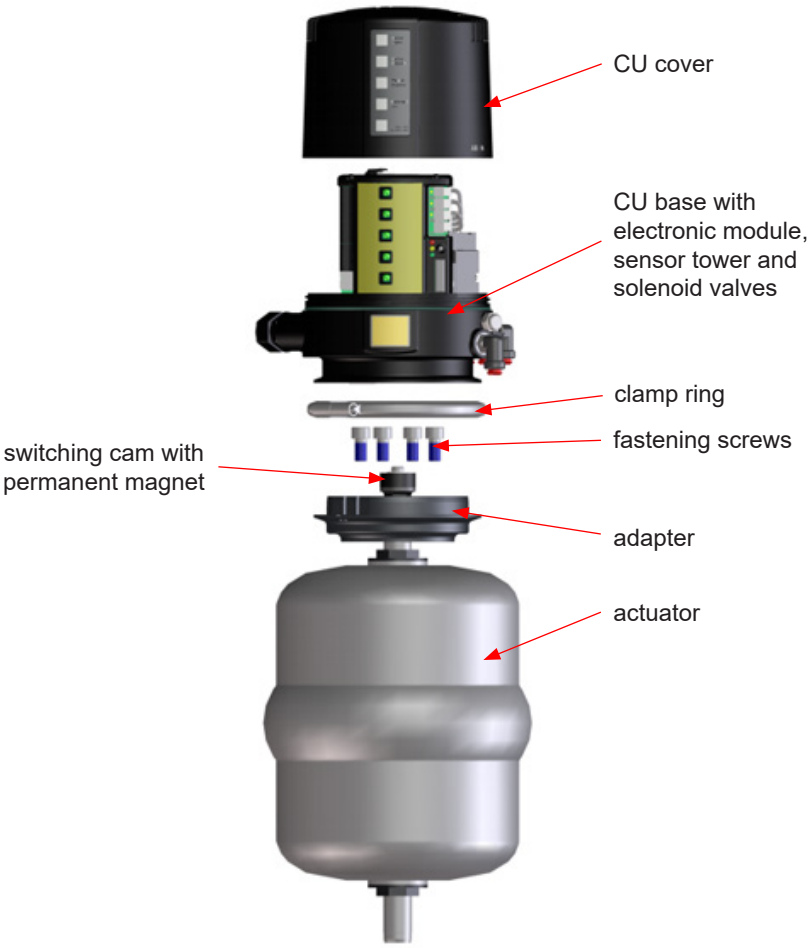
After proper assembly and installation of the control unit, startup can be undertaken as described below:

1. Switch on the air supply.
2. Switch on the voltage supply.
3. 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 Startup

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 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

Attention! Electric connections shall only be carried out by qualified personnel.

Observe the Safety Instructions specified in chapter 2.

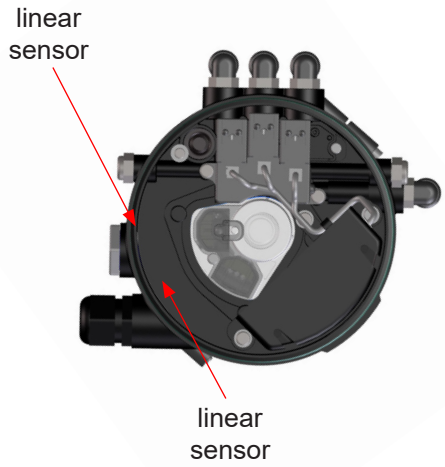
8.2.3. Startup

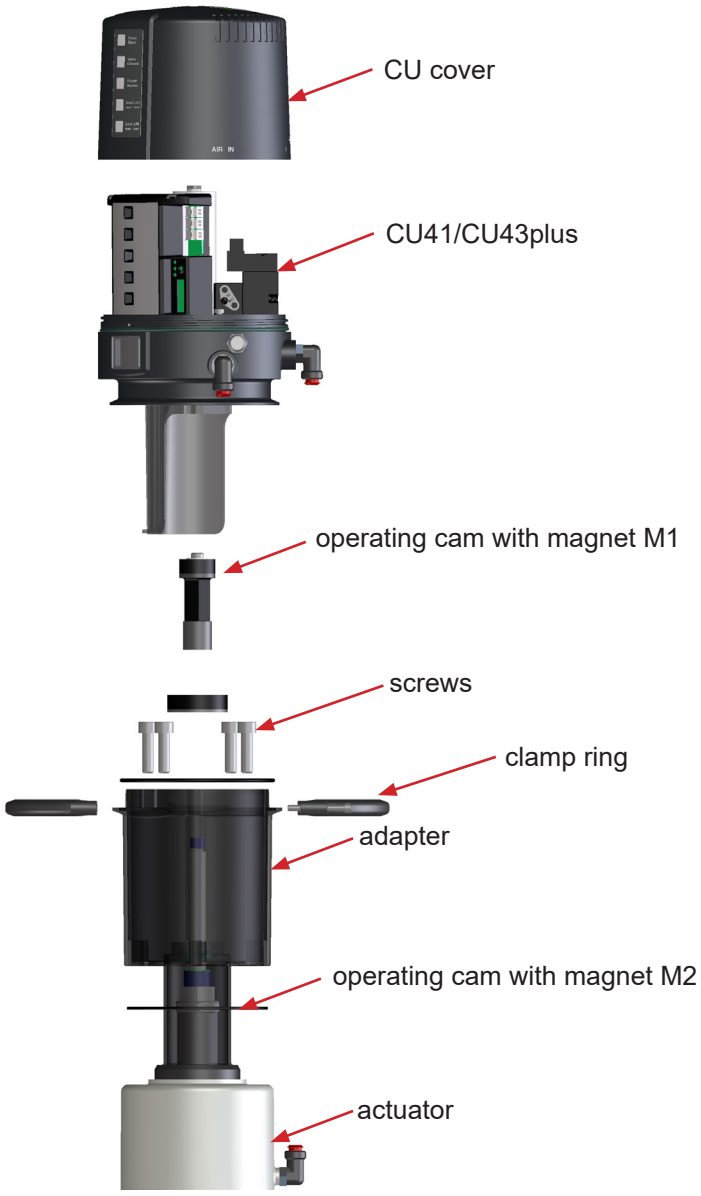
After proper assembly and installation of the control unit, startup can be undertaken as described below:

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

8. CU Assembly and Startup

8.3. 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

8.3.1 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

1

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

2

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

3

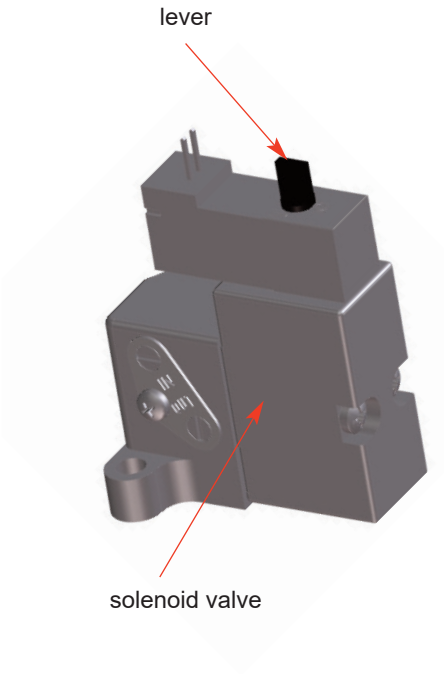
Exhaust air:
As a standard, the exhaust air connections **A1** and **A2** are equipped with a silencer. If required, the silencer can be removed and the exhaust air can be hosed separately when it must be led off to the exterior, for example.

8.3.2 Electric connection

Attention! Electric connections shall only be carried out by qualified personnel.

Observe the Safety Instructions specified in chapter 2.

8. CU Assembly and Startup



8.3.3 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.
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!

8.3.4 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 by 90°.
4. For final adjustments of the feedback position switches please use the Teach function.

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

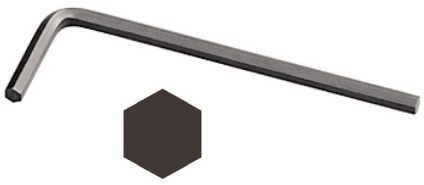
Loctite semi-solid

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 counterclockwise 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 counterclockwise 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 cabeling to the electronic module.
LED indication is missing.	Check cabeling 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. Check label in type window of control unit: CU41plus-T DC
	Check valve movement with manual at solenoid valve.
	Check cabeling 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, Double seal and Double seat valves	
Valve position movement is missing with actuated solenoid valve.	Check if right control unit is installed. Check label in type window of control unit: CU41plus-S DC CU41Nplus-S DC CU41plus-D4-DC
	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 installed on Double seat valves with SLD	
Valve position movement is missing with actuated solenoid valve.	Check if right control unit is installed. Check label in type window of control unit: CU43plus-D4-DC
	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 CU43plus and the 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.

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

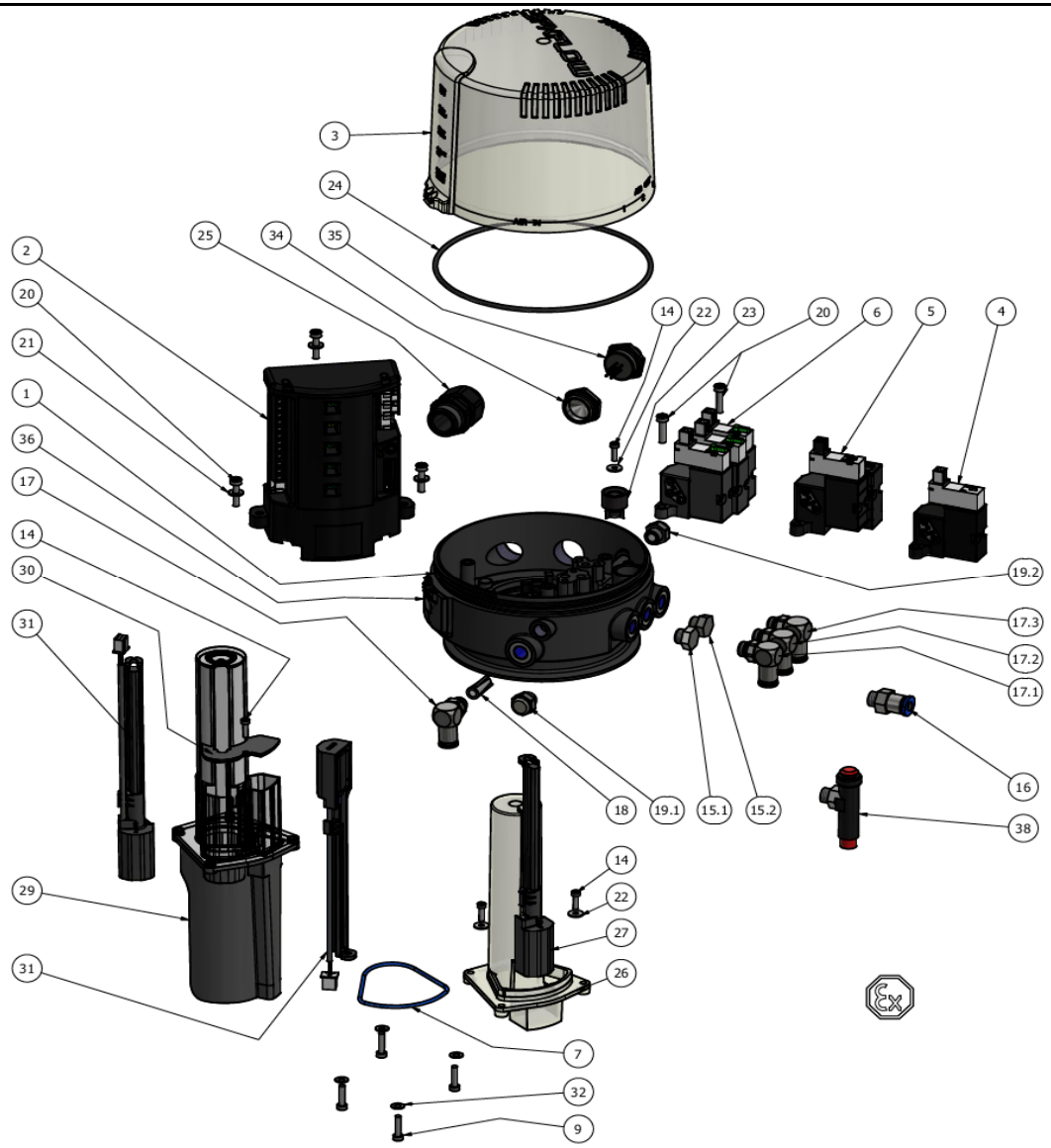
- number of parts required
- ID number
- reference number
- parts designation

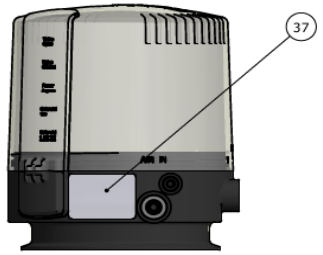
Data are subject to change.

Spare Parts list

CU4plus Direct Connect
II 3 G Ex ec mc IIC T4 Gc
ATEX 3G - Zone 2

Date:	13.10.21				SPX FLOW
Name:	C.Keil				
Reviewed:	C.Keil				
Date:					Page 1 of 6
Name:					
Reviewed:					RN ATEX 01.044.7





Spare parts list

CU4plus D4 Direct Connect
II 3 G Ex ec mc IIC T4 Gc
Zone 2

Date:	13.10.21			
Name:	C.Keil			
Reviewed:				
Date:				
Name:				
Reviewed:				

SPX FLOW

RN ATEX 01.044.7

pos. item	Quantity	Description	required in version	Material	Part no.
		CU4plus D4 DC ATEX 3G		PA6.6 GF30	H345104
		CU41plus D4 DC ATEX 3G M12		PA6.6 GF30	H345105
		CU43plus D4 DC ATEX 3G		PA6.6 GF30	H345100
		CU43plus D4 DC ATEX 3G M12		PA6.6 GF30	H345101
1	1	CU41 Ex Base M cpl.	CU41	PA6.6 GF30 +PA12	H344231
1	1	CU43 Ex Base M cpl.	CU43	PA6.6 GF30 +PA12	H344232
2	1	CU4plus DC SLD E-Modul	CU41+43	Zytel 70G33L black	H343238
3	1	CU4 cover translucent	CU41+43	Lexan 945AU	H337948
4	1	Solenoid valve 1 sol.	CU41	PPS	H319950
6	1	Solenoid valve 3 sol.	CU43	PPS	H319952
8	1	O-ring 45,6 x 2,4	CU41+43	NBR	H320401
9	4	Ejot Delta PT screw WN5452 35x14	CU41+43	A2	H320364
11	2	O-ring 3x2	CU41+43	NBR	H208644
14	4	Ejot Delta PT screw WN5452 30x10	CU41+43	A2	H320363
15.1	1	Blind plug G1/8"	CU41	Ms / nickel-plated	H320482
15.2	1	Blind plug G1/8"	CU43	Ms / nickel-plated	H320482
17	1	Elbow connector G1/8" 6x1	CU41+43	1.4301 / PA	H208825
17.1	1	Elbow connector G1/8" 6x1	CU41+43	1.4301 / PA	H208825
17.2	1	Elbow connector G1/8" 6x1	CU43	1.4301 / PA	H208825
17.3	1	Elbow connector G1/8" 6x1	CU43	1.4301 / PA	H208825
18	1	CU4 air filter	CU41+43	PE-porous	H320223
19.1	1	Sound reducer	CU41+43	Ms / nickel-plated	H208826
19.2	1	Sound reducer	CU43	Ms / nickel-plated	H208826

pos. item	Quantity	Description	required in version	Material	Part no.
20	5	Ejot Delta PT screw WN5452 40x16	CU41+43	A2	H320365
21	3	Washer ø4,3 DIN125	CU41+43	A2	H79576
22	1	Washer A 3,2 DIN9021	CU41+43	A2	H320404
23	1	CU4 pressure relief valve	CU41+43	PPS	H320352
24	1	O-ring 120,32 x 2,62	CU41+43	NBR	H320402
25	1	Screwed cable gl. M20x1,5 cable ø6-12	CU41+43	PA black	H344599
29	1	CU4plus sensortower D4 V2	CU41+43	PET	H339461
30	1	Cap CU4plus sensor tower	CU41+43	Noryl 731 S	H339432
31	2	CU4plus Sensor V2	CU41+43	Noryl 731 S	H339463
32	4	Washer A=3,7	CU41+43	A2	H323771
34	1	Blind plug V-inox FPM ex. M20x1.5	CU41+43	PA	H337788
35	1	Female Flange M12x1,5 - 5 Pin	CU41-M12	Ms / nickel-plated	H341353
35	1	Female Flange M12x1,5 - 8 Pin	CU43-M12	Ms / nickel-plated	H341354
36	1	ATEX CU label - Electrostatic risk	all versions	Tevus	H345151
37	1	ATEX CU4 type label	all versions	Tevus	H345150

CU4plus Adapter

	1	CU4plus D4 V2 adapter cpl.	all versions		H341891

Adapter spareparts information to be found in document: RN 01.044.3-1

Spare parts list

CU4plus S Direct Connect
II 3 G Ex ec mc IIC T4 Gc
Zone 2

Date:	13.10.21				SPX FLOW
Name:	C.Keil				
Reviewed:	C.Keil				
Date:					Page 3 of 6
Name:					RN ATEX 01.044.7
Reviewed:					

pos. item	Quantity	Description	required in version	Material	Part no.
		CU41plus S DC ATEX 3G		PA6.6 GF30	H345720
		CU41plus S DC ATEX 3G M12		PA6.6 GF30	H345721
		CU43plus S DC ATEX 3G		PA6.6 GF30	H345734
		CU43plus S DC ATEX 3G M12		PA6.6 GF30	H345735
1	1	CU41 Ex Base S cpl.	CU41	PA6.6 GF30 +PA12	H345506
1	1	CU43 Ex Base S cpl.	CU43	PA6.6 GF30 +PA12	H345507
2	1	CU4plus DC SLD E-Modul	CU41+43	Zytel 70G33L black	H343238
3	1	CU4 cover translucent	CU41+43	Lexan 945AU	H337948
4	1	Solenoid valve 1 sol.	CU41	PPS	H319950
6	1	Solenoid valve 3 sol.	CU43	PPS	H319952
7	1	CU4 sensor tower	CU41+43	PA12	H319868
8	1	O-ring 45,6 x 2,4	CU41+43	NBR	H320401
9	4	Ejot Delta PT screw WN5452 35x14	CU41+43	A2	H320364
10	2	Hall sensor	CU41+43	Grilamid TR55	H320385
11	2	O-ring 3x2	CU41+43	NBR	H208644
12	2	Cylinder screw M4x100	CU41+43	A2-50	H320361
13	1	CU4 tower cover	CU41+43	PA12	H319869
14	4	Ejot Delta PT screw WN5452 30x10	CU41+43	A2	H320363
15.2	1	Blind plug G1/8"	CU43	Ms / nickel-plated	H320482
17	1	Elbow connector G1/8" 6x1	CU41+43	1.4301 / PA	H208825
17.1	1	Elbow connector G1/8" 6x1	CU41+43	1.4301 / PA	H208825
17.2	1	Elbow connector G1/8" 6x1	CU43	1.4301 / PA	H208825
17.3	1	Elbow connector G1/8" 6x1	CU43	1.4301 / PA	H208825
18	1	CU4 air filter	CU41+43	PE-porous	H320223
19.1	1	Sound reducer	CU41+43	Ms / nickel-plated	H208826
19.2	1	Sound reducer	CU43	Ms / nickel-plated	H208826

pos. item	Quantity	Description	required in version	Material	Part no.
20	5	Ejot Delta PT screw WN5452 40x16	CU41+43	A2	H320365
21	3	Washer ø4,3 DIN125	CU41+43	A2	H79576
22	3	Washer A 3,2 DIN9021	CU41+43	A2	H320404
23	1	CU4 pressure relief valve	CU41+43	PPS	H320352
24	1	O-ring 120,32 x 2,62	CU41+43	NBR	H320402
25	1	Screwed cable gl. M20x1,5 cable ø6-12	CU41+43	PA black	H344599
26	1	CU4plus Sensortower	CU41+43	Grilamid TR90	H321498
27	1	CU4plus sensor cpl.	CU41+43	Noryl 731 S	H324877
32	4	Washer A=3,7	CU41+43	A2	H323771
34	1	Blind plug V-inox FPM ex. M20x1.5	CU43	PA	H337788
35	1	Female Flange M12x1,5 - 5 Pin	CU41-M12	Ms / nickel-plated	H341353
35	1	Female Flange M12x1,5 - 8 Pin	CU43-M12	Ms / nickel-plated	H341354
36	1	ATEX CU label - Electrostatic risk	all versions	Tevus	H345151
37	1	ATEX CU4 type label	all versions	Tevus	H345150

CU4plus Adapter

Adapter spareparts information to be found in document: RN 01.044.3-1

Spare parts list

CU41plus T AS-i ext.
II 3 G Ex ec mc IIC T4 Gc
Zone 2

Date:	13.10.21				SPX FLOW
Name:	C.Keil				
Reviewed:	C.Keil				
Date:					Page 4 of 6
Name:					RN ATEX 01.044.7
Reviewed:					

pos. item	Quantity	Description	required in version	Material	Part no.
		CU41plus T DC ATEX 3G		PA6.6 GF30	H345724
		CU41plus T DC ATEX 3G M12		PA6.6 GF30	H345725
1	1	CU41 Ex Base T cpl.	CU41	PA6.6 GF30 +PA12	H345508
2	1	CU4plus DC SLD E-Modul	CU41	Zytel 70G33L black	H343238
3	1	CU4 cover translucent	CU41	Lexan 945AU	H337948
4	1	Solenoid valve 1 sol.	CU41	PPS	H319950
7	1	CU4 sensor tower	CU41	PA12	H319868
8	1	O-ring 45,6 x 2,4	CU41	NBR	H320401
9	4	Ejot Delta PT screw WN5452 35x14	CU41	A2	H320364
10	2	Hall sensor	CU41	Grilamid TR55	H320385
11	2	O-ring 3x2	CU41	NBR	H208644
12	2	Cylinder screw M4x100	CU41	A2-50	H320361
13	1	CU4 tower cover	CU41	PA12	H319869
14	4	Ejot Delta PT screw WN5452 30x10	CU41	A2	H320363
15.1	1	Blind plug G1/8"	CU41	Ms / nickel-plated	H320482
15.2	1	Blind plug G1/8"	CU41	Ms / nickel-plated	H320482
17	1	Elbow connector G1/8" 6x1	CU41	1.4301 / PA	H208825
18	1	CU4 air filter	CU41	PE-porous	H320223
19.1	1	Sound reducer	CU41	Ms / nickel-plated	H208826

pos. item	Quantity	Description	required in version	Material	Part no.
20	5	Ejot Delta PT screw WN5452 40x16	CU41	A2	H320365
21	3	Washer ø4,3 DIN125	CU41	A2	H79576
22	3	Washer A 3,2 DIN9021	CU41	A2	H320404
23	1	CU4 pressure relief valve	CU41	PPS	H320352
24	1	O-ring 120,32 x 2,62	CU41	NBR	H320402
25	1	Screwed cable gl. M20x1,5 cable ø6-12	CU41	PA black	H344599
26	1	CU4plus Sensortower	CU41	Grilamid TR90	H321498
27	1	CU4plus sensor cpl.	CU41	Noryl 731 S	H324877
32	4	Washer A=3,7	CU41	A2	H323771
35	1	Female Flange M12x1,5 - 5 Pin	CU41-M12	Ms / nickel-plated	H341353
36	1	ATEX CU label - Electrostatic risk	all versions	Tevus	H345151
37	1	ATEX CU4 type label	all versions	Tevus	H345150

CU4plus Adapter

Adapter spareparts information to be found in document: RN 01.044.3-1

Spare parts list

CU41plus N-S Direct Connect
II 3 G Ex ec mc IIC T4 Gc
Zone 2

Date:	13.10.21				SPX FLOW
Name:	C.Keil				
Reviewed:	C.Keil				
Date:					Page 5 of 6
Name:					RN ATEX 01.044.7
Reviewed:					

pos. item	Quantity	Description	required in version	Material	Part no.
		CU41N-S DC ATEX 3G		PA6.6 GF30	H345728
		CU41N-S DC ATEX 3G M12		PA6.6 GF30	H345729
1	1	CU41 Ex Base S cpl.	CU41	PA6.6 GF30 +PA12	H345506
2	1	CU4plus DC SLD E-Modul	CU41	Zytel 70G33L black	H343238
3	1	CU4 cover translucent	CU41	Lexan 945AU	H337948
5	1	Solenoid valve 1 sol. + NOT-element	CU41N	PPS	H319951
7	1	CU4 sensor tower	CU41	PA12	H319868
8	1	O-ring 45,6 x 2,4	CU41	NBR	H320401
9	4	Ejot Delta PT screw WN5452 35x14	CU41	A2	H320364
10	2	Hall sensor	CU41	Grilamid TR55	H320385
11	2	O-ring 3x2	CU41	NBR	H208644
12	2	Cylinder screw M4x100	CU41	A2-50	H320361
13	1	CU4 tower cover	CU41	PA12	H319869
14	4	Ejot Delta PT screw WN5452 30x10	CU41	A2	H320363
16	1	Connector self-locking	CU41N	Ms / nickel-plated	H320551
17	1	Elbow connector G1/8" 6x1	CU41	1.4301 / PA	H208825
17.1	1	Elbow connector G1/8" 6x1	CU41	1.4301 / PA	H208825
18	1	CU4 air filter	CU41	PE-porous	H320223
19.1	1	Sound reducer	CU41	Ms / nickel-plated	H208826

pos. item	Quantity	Description	required in version	Material	Part no.
20	5	Ejot Delta PT screw WN5452 40x16	CU41	A2	H320365
21	3	Washer ø4,3 DIN125	CU41	A2	H79576
22	3	Washer A 3,2 DIN9021	CU41	A2	H320404
23	1	CU4 pressure relief valve	CU41	PPS	H320352
24	1	O-ring 120,32 x 2,62	CU41	NBR	H320402
25	1	Screwed cable gl. M20x1,5 cable ø6-12	CU41	PA black	H344599
26	1	CU4plus Sensortower	CU41	Grilamid TR90	H321498
27	1	CU4plus sensor cpl.	CU41	Noryl 731 S	H324877
32	4	Washer A=3,7	CU41	A2	H323771
35	1	Female Flange M12x1,5 - 5 Pin	CU41-M12	Ms / nickel-plated	H341353
36	1	ATEX CU label - Electrostatic risk	all versions	Tevus	H345151
37	1	ATEX CU4 type label	all versions	Tevus	H345150
38	1	Pressure reducing valve	CU41N	Ms / nickel-plated	H208841

CU4plus Adapter

Adapter spareparts information to be found in document: RN 01.044.3-1

Spare parts list

CU41plus N-T Direct Connect
II 3 G Ex ec mc IIC T4 Gc
Zone 2

Date:	13.10.21			
Name:	C.Keil			
Reviewed:	C.Keil			
Date:				
Name:				
Reviewed:				

SPX FLOW

RN ATEX 01.044.7

pos. item	Quantity	Description	required in version	Material	Part no.
		CU41N-T DC ATEX 3G		PA6.6 GF30	H345732
		CU41N-T DC ATEX 3G M12		PA6.6 GF30	H345733
1	1	CU41 Ex Base T cpl.	CU41	PA6.6 GF30 +PA12	H345508
2	1	CU4plus DC SLD E-Modul	CU41	Zytel 70G33L black	H343238
3	1	CU4 cover translucent	CU41	Lexan 945AU	H337948
5	1	Solenoid valve 1 sol. + NOT-element	CU41N	PPS	H319951
7	1	CU4 sensor tower	CU41	PA12	H319868
8	1	O-ring 45,6 x 2,4	CU41	NBR	H320401
9	4	Ejot Delta PT screw WN5452 35x14	CU41	A2	H320364
10	2	Hall sensor	CU41	Grilamid TR55	H320385
11	2	O-ring 3x2	CU41	NBR	H208644
12	2	Cylinder screw M4x100	CU41	A2-50	H320361
13	1	CU4 tower cover	CU41	PA12	H319869
14	4	Ejot Delta PT screw WN5452 30x10	CU41	A2	H320363
15.1	1	Blind plug G1/8"	CU41	Ms / nickel-plated	H320482
16	1	Connector self-locking	CU41N	Ms / nickel-plated	H320551
17	1	Elbow connector G1/8" 6x1	CU41	1.4301 / PA	H208825
18	1	CU4 air filter	CU41	PE-porous	H320223
19.1	1	Sound reducer	CU41	Ms / nickel-plated	H208826

pos. item	Quantity	Description	required in version	Material	Part no.
20	5	Ejot Delta PT screw WN5452 40x16	CU41	A2	H320365
21	3	Washer ø4,3 DIN125	CU41	A2	H79576
22	3	Washer A 3,2 DIN9021	CU41	A2	H320404
23	1	CU4 pressure relief valve	CU41	PPS	H320352
24	1	O-ring 120,32 x 2,62	CU41	NBR	H320402
25	1	Screwed cable gl. M20x1,5 cable ø6-12	CU41	PA black	H344599
26	1	CU4plus Sensortower	CU41	Grilamid TR90	H321498
27	1	CU4plus sensor cpl.	CU41	Noryl 731 S	H324877
32	4	Washer A=3,7	CU41	A2	H323771
35	1	Female Flange M12x1,5 - 5 Pin	CU41-M12	Ms / nickel-plated	H341353
36	1	ATEX CU label - Electrostatic risk	all versions	Tevus	H345151
37	1	ATEX CU4 type label	all versions	Tevus	H345150
38	1	Pressure reducing valve	CU41N	Ms / nickel-plated	H208841

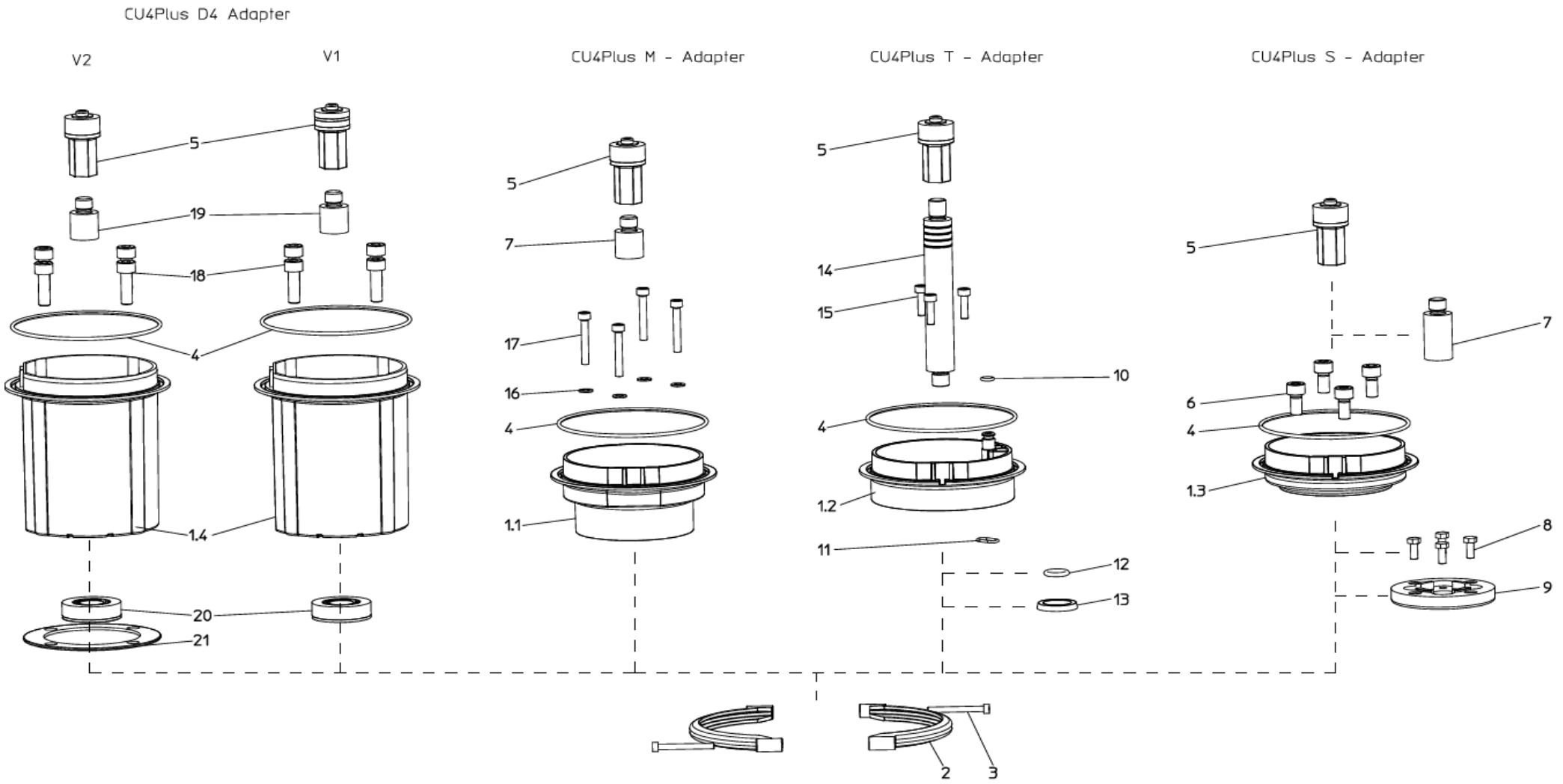
CU4plus Adapter

Adapter spareparts information to be found in document: RN 01.044.3-1

Ersatzteilliste: spare parts list

CU4plus Adapter

Datum:	26.01.16	04.04.16	20.05.19	09.11.19	SPX FLOW
Name:	Trytko	Trytko	C.Keil	C.Keil	
Geprüft:	Schulz	Schulz	C.Keil	C.Keil	
Datum:	26.01.21				Blatt 1 von 6
Name:	C.Keil				RN01.044.3-1
Geprüft:	C.Keil				

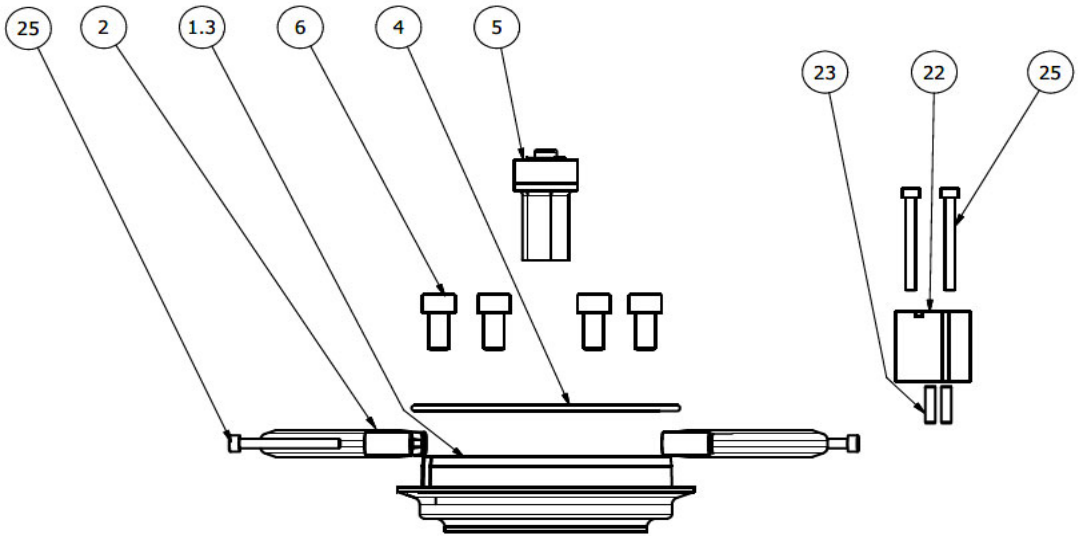


Ersatzteilliste: spare parts list

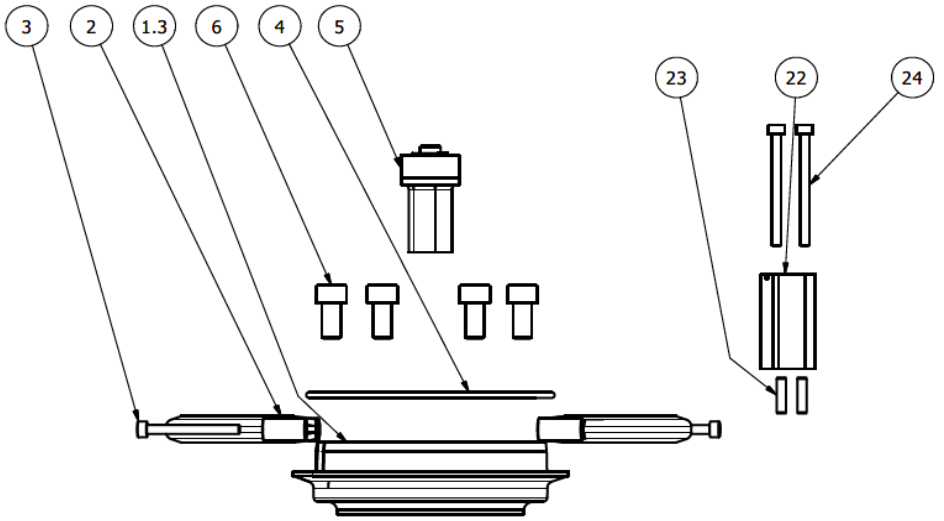
CU4plus Adapter

Datum:	26.01.16	04.04.16	20.05.19	09.11.19	
Name:	Trytko	Trytko	C.Keil	C.Keil	**SPX FLOW**
Geprüft:	Schulz	Schulz	C.Keil	C.Keil	
Datum:	26.01.21				Blatt 2 von 5
Name:	C.Keil				**RN01.044.3-1**
Geprüft:	C.Keil				

CU4Plus DT4 -62 Adapter



CU4Plus DT4 -92 Adapter



Ersatzteilliste: spare parts list

CU4plus Adapter

Datum:	26.01.16	04.04.16	20.05.19	
Name:	Trytko	Trytko	C.Keil	
Geprüft:	Schulz	Schulz	C.Keil	

SPX FLOW

Datum:				
Name:				
Geprüft:				

Blatt 3 von 6

RN01.044.3-1

pos. item	Menge quantity	Beschreibung description	Material material	CU4plus - S	CU4plus - S Langhub ø165	CU4plus-Smini	CU4plus-Smax	CU4plus - T	CU4plus-Tmax
				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 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					08-46-571/93 H319875	
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 DIN EN ISO 4762 M4x40 Cyl. Screw	A2-70	65-05-040/13 H320360					
4	1	O-Ring OR 101,27x2,62 O-ring	NBR	58-06-493/83 H148389					
5	1	CU4 Magnetschaltnocke kpl. CU4 magnet switch cam cpl.	Zytel HTN	08-46-767/93 H333099					
6	4	Zylinderschraube DIN EN ISO 4762 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 DIN EN 24017 M5x12 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 OR 6x2 O-ring	NBR					58-06-059/83 H320505	
11	1	O-Ring OR 11x2 O-ring	NBR					58-06-034/83 H321897	
12	1	O-Ring OR 11x3 O-ring	NBR						58-06-039/83 H208632

Ersatzteilliste: spare parts list

CU4plus Adapter

Datum:	26.01.16	04.04.16	20.05.19		**SPX FLOW**
Name:	Trytko	Trytko	C.Keil		
Geprüft:	Schulz	Schulz	C.Keil		
Datum:					Blatt 4 von 6
Name:					**RN01.044.3-1**
Geprüft:					

pos. item	Menge quantity	Beschreibung description	Material material	**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.
13	1	V-Dichtung V-sealing	NBR						58-06-039/83 H171060
14	1	CU4 Schaltstange CU4 guide rod	1) PA6.6 2) 1.4301					08-60-905/93 1) H320480	08-60-906/12 2) H321990
15	3	Zylinderschraube Cyl. Screw DIN EN ISO 4762 M5x16	A2-70					65-05-054/13 H79000	
16	4	Scheibe Washer DIN EN ISO 7092 9x5,48	A2						
17	4	Zylinderschraube Cyl. Screw DIN EN ISO 4762 M5x35	A2-70						

Ersatzteilliste: spare parts list

CU4plus Adapter

Datum:	26.01.16	04.04.16	20.05.19	09.11.19
Name:	Trytko	Trytko	C.Keil	C.Keil
Geprüft:	Schulz	Schulz	C.Keil	C.Keil

Datum:	26.01.21			
Name:	C.Keil			
Geprüft:	C.Keil			

SPX FLOW

Blatt 5 von 6

RN01.044.3-1

pos. item	Menge quantity	Beschreibung description	Material material	CU41plus - M CU4-M is used WS-Nr. ref.-no.	CU43plus - M WS-Nr. ref.-no.	CU4plus - D4 V1 WS-Nr. ref.-no.	CU4plus - D4 V2 WS-Nr. ref.-no.	CU4plus DT4-62 WS-Nr. ref.-no.	CU4plus DT4-92 WS-Nr. ref.-no.
		CU4 Adapter kpl. CU4 adapter cpl.		08-48-602/93 H320476	08-48-695/93 H333148	08-48-666/93 H336441	08-48-668/93 H341891	08-48-699/93 H343619	08-48-700/93 H343620
1.1	1	CU4 Adapter M CU4 adapter M	Zytel 70G33L schwarz	08-46-572/93 H319876					
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	
1.4	1	CU4 Adapter D4 CU4 Adapter D4	PA6.6 GF30			08-46-940/93 H336038			
2	2	CU4 Clamphalbschale kpl. CU4 clamp cpl.	Grivory GH-5H1	08-46-569/93 H319873					
3	2	Zylinderschraube DIN EN ISO 4762 M4x40 Cyl. Screw	A2-70	65-05-040/13 H320360					
4	1	O-Ring OR 101,27x2,62 O-ring	NBR	58-06-493/83 H148389					
5	1	CU4 Magnetschaltnocke kpl. CU4 magnet switch cam cpl.	Zytel HTN		08-46-767/93 H333099				
6	4	Zylinderschraube DIN EN ISO 4762 Cyl. Screw	A2-70					65-05-120/13 M8x16 H79012	
7	1	Zugstangenverlängerung Guide rod extension	PA6		08-46-920/93 H333136				
8	4	Skt. Schraube DIN EN 24017 M5x12 Hex. screw	A2-70						
9	1	CU Adapter SW4 CU adapter SW4	PA6						
10	1	O-Ring OR 6x2 O-ring	NBR						
11	1	O-Ring OR 11x2 O-ring	NBR						

Ersatzteilliste: spare parts list

CU4plus Adapter

Datum:	26.01.16	04.04.16	20.05.19	09.11.19	**SPX FLOW**
Name:	Trytko	Trytko	C.Keil	C.Keil	
Geprüft:	Schulz	Schulz	C.Keil	C.Keil	
Datum:	26.01.21				Blatt 6 von 6
Name:	C.Keil				**RN01.044.3-1**
Geprüft:	C.Keil				

pos. item	Menge quantity	Beschreibung description	Material material	CU41plus - M CU4-M is used WS-Nr. ref.-no.	CU43plus - M WS-Nr. ref.-no.	CU4plus - D4 V1 WS-Nr. ref.-no.	CU4plus - D4 V2 WS-Nr. ref.-no.	CU4plus DT4-62 WS-Nr. ref.-no.	CU4plus DT4-92 WS-Nr. ref.-no.
12	1	O-Ring O-ring OR 11x3	NBR						
13	1	V-Dichtung V-sealing	NBR						
14	1	CU4 Schaltstange CU4 guide rod	1) PA6.6 2) 1.4301						
15	3	Zylinderschraube Cyl. Screw DIN EN ISO 4762 M5x16	A2-70						
16	4	Scheibe Washer DIN EN ISO 7092 9x5,48	A2	08-60-767/15 H208842					
17	4	Zylinderschraube Cyl. Screw DIN EN ISO 4762 M5x35	A2-70	65-06-056/13 H79028					
18	4	Zylinderschraube M8 Cyl. screw M8	A2-70			65-05-122/13 H79014	65-05-123/13 H173568		
19	1	D4 Zugstangen Adapter für CU4 D4 guide rod adapter for CU4	PA6.6			08-46-824/93 H336934			
20	1	D4 Magnet CU4plus kpl. D4 magnet CU4plus cpl.				08-46-924/93 H336935			
21	1	CU4plus V2 distanzring CU4plus V2 distance washer	NBR				08-46-941/93 H342644		
22		Balluff Adapter Balluff adapter	PA6.6					08-20-158/12 H342080	08-20-161/12 H343618
23		Zylinder Stift Parallel Pin DIN EN ISO 2338 4x16	A1					08-49-074/12 H343581	
24		Zylinder Schraube Cap screw DIN EN ISO 4762 M4x50	A2-70						65-05-051/13 H343617
25		Zylinder Schraube Cap screw DIN EN ISO 4762 M4x40	A2-70					65-05-040/13 H320360	

CU4plus Direct Connect Control Unit

FOR ATEX ZONE 2 GAS APPLICATIONS

SPXFLOW®

SPX FLOW

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