SPXFLOW®

INSTRUCTION MANUAL

CU4plus Direct Connect

CONTROL UNIT

FORM NO.: H343613 REVISION: GB-2

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

SPXFLOW®

CE Declaration of Conformity
UKCA Declaration of Conformity

We,

DESIGN CENTER:	**SPX Flow Technology Germany GmbH** **Gottlieb-Daimler-Str. 13, D-59439 Holzwickede**
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AUTHORIZED REPRESENTATIVE: **(for UKCA)**	**SPX Flow, Inc.** **Alexander House, 4 Station Road** **Cheadle Hulme, Cheadle SK3 5AE UK**

declare under our sole responsibility that the

SPX FLOW APV brand Control Units of the series
CU4 Direct Connect and AS-interface Control Unit
CU4plus Direct Connect, AS-interface and IO-Link Control Units
CU4 110V Module (*)

meet the requirements of the
Electromagnetic Compatibility Directive 2014/30/EU
& protection class IP 67 EN 60529, EN 61000-6-2, EN 61000-6-4, EN 60068-2-6
RoHS Directive 2011/65/EU
Low Voltage Directive 2014/35/EU (*only applicable for APV CU4 110V Module)

Holzwickede, December 2024

ppa. B. Ahlers

Dr.-Ing. Behdad Ariatabar, Design Center Lead - Valves

meet the requirements of the
Electromagnetic Compatibility Regulations 2016 No. 1091 & BS harmonized standards
Restriction of Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulation 2012 No. 3032
Electrical Equipment (Safety) Regulations 2016 No. 1101 (*only applicable for APV CU4 110V Module)

Manchester, December 2024

Mark Shanahan

Mark Shanahan, VP Finance N6H Solutions

Content

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!

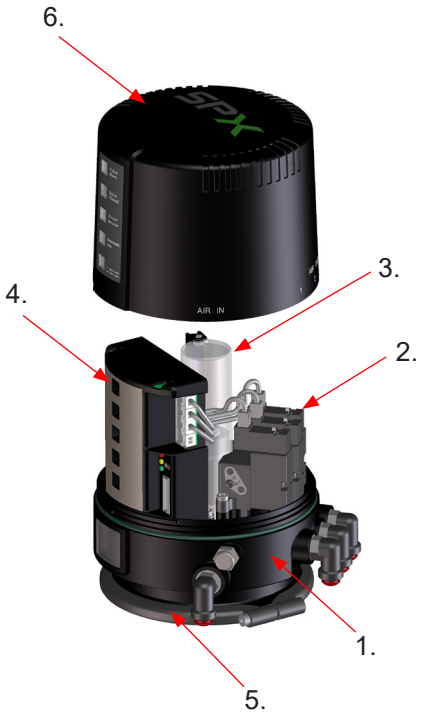
2.6. Warranty

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.

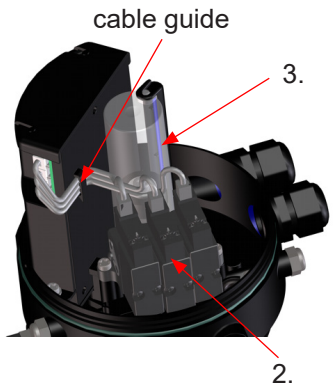
The pneumatic control of valves is undertaken via the solenoid valves. The control unit controls the valve positions, **open** and **closed**, via sensors. The electronic module undertakes the task to process the switching signal from the control and to control the corresponding solenoid valves. The 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 target 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 and AM1 valve generations two linear sensors are used to monitor the close, open and the upper and lower seat lift position.

For DA3+ double seat valves with active seat lift detection (SLD) additionally to the linear sensor 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, PLC communication)

3. General Terms

3.3. Function of the individual components

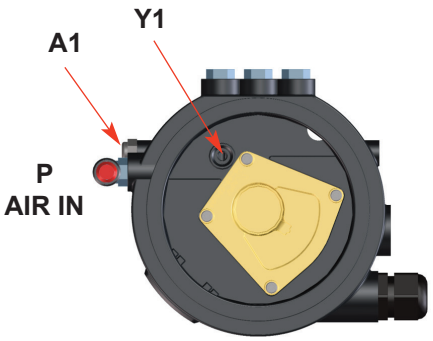
The luminous diodes are located on the front side of the electronic module. Their signals are visibly indicated to the outside by an optical window in the cover the control unit. Beside the open and closed valve position, the existence of the operating voltage as well as different diagnostic information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

Note! Wiring must be changed!

4. Mechanics and Pneumatics

4.1. Air connections for turning actuator

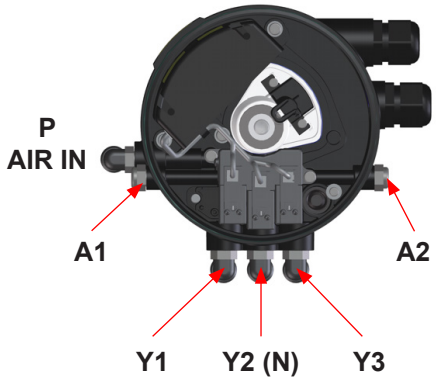


4.1.1. Function

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

CU41plus-M DC
design for DE3 double seat valves without seat lift function

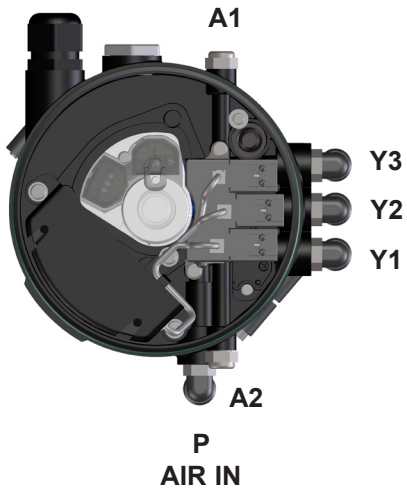
P air supply with integrated particle filter
Y1 pneumatic air connection for main actuator
A1 exhaust air with silencer

CU43plus-M DC
design for DA3+ 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

4.2.1. 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-V1-V2 / AM1
design for D4 SL, DT4 SL, D4 PMO, DA4 double seat mix proof and AM1 aseptic mixproof 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.

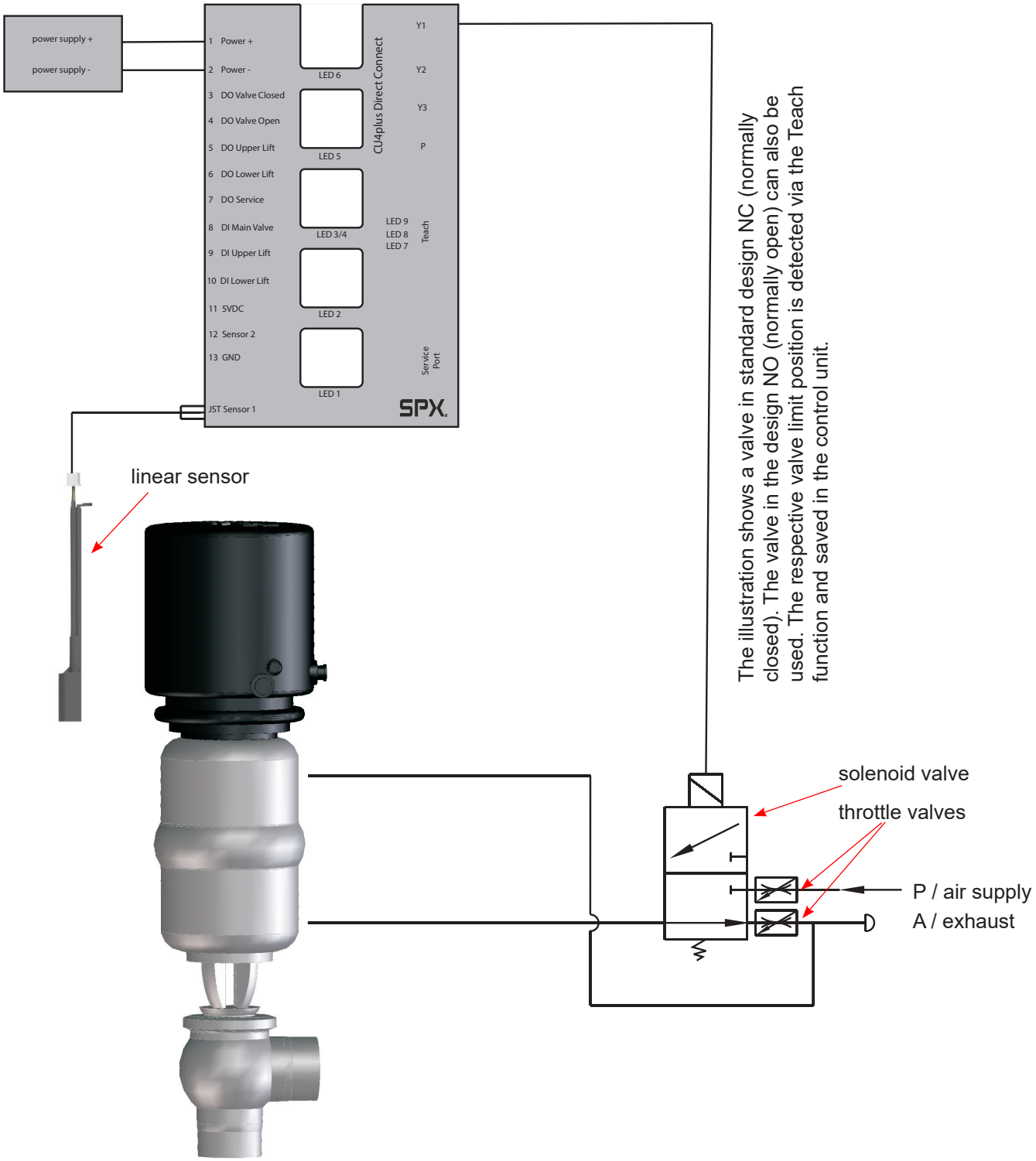
The pressure relief valve must not be mechanically blocked under any circumstances.

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

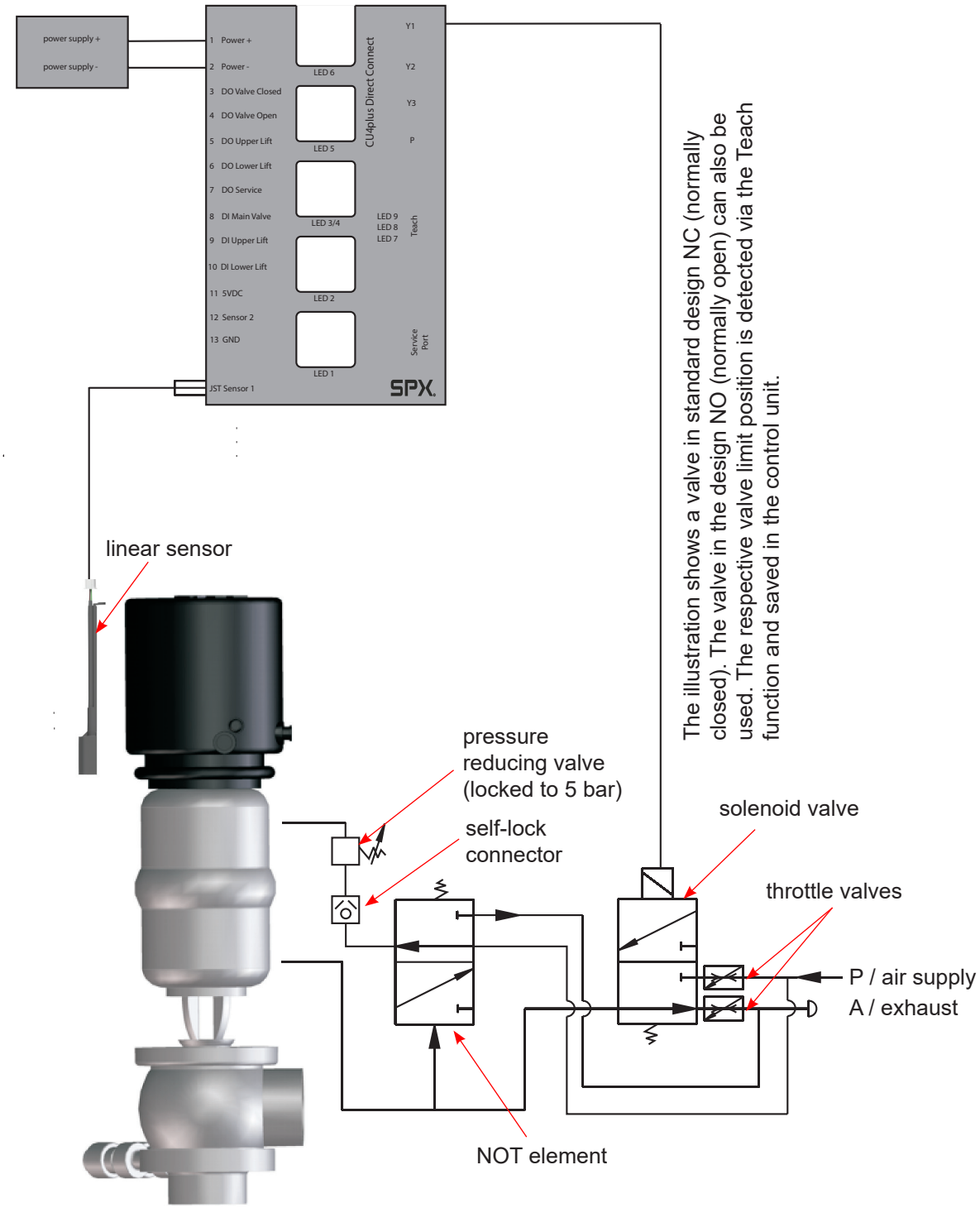


4. Mechanics and Pneumatics

4.4. Functional description - block diagrams

4.4.2. CU41Nplus Direct Connect
(internal position measuring system)

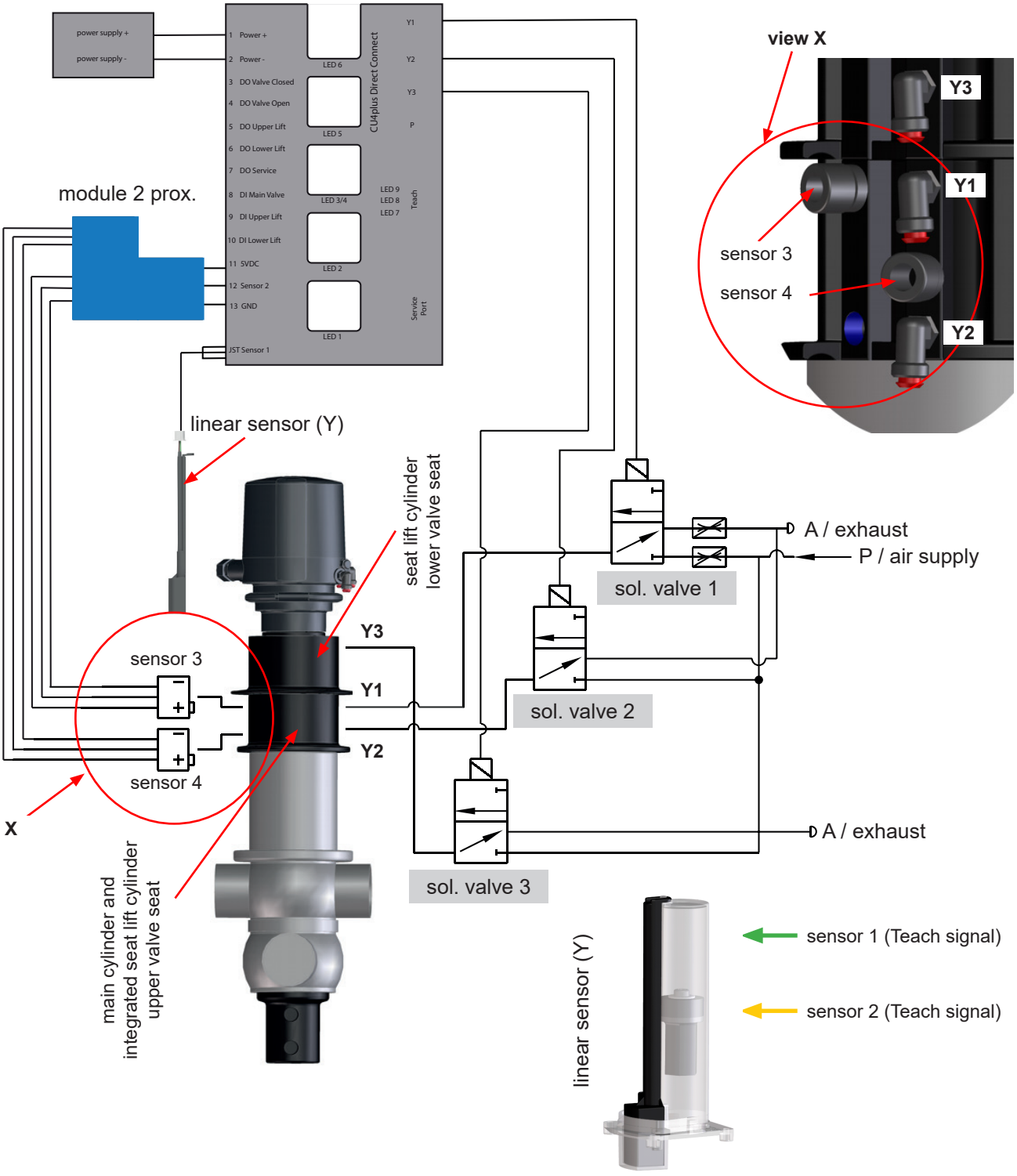
Valve type: SD4



4. Mechanics and Pneumatics

4.4. Functional description - block diagrams

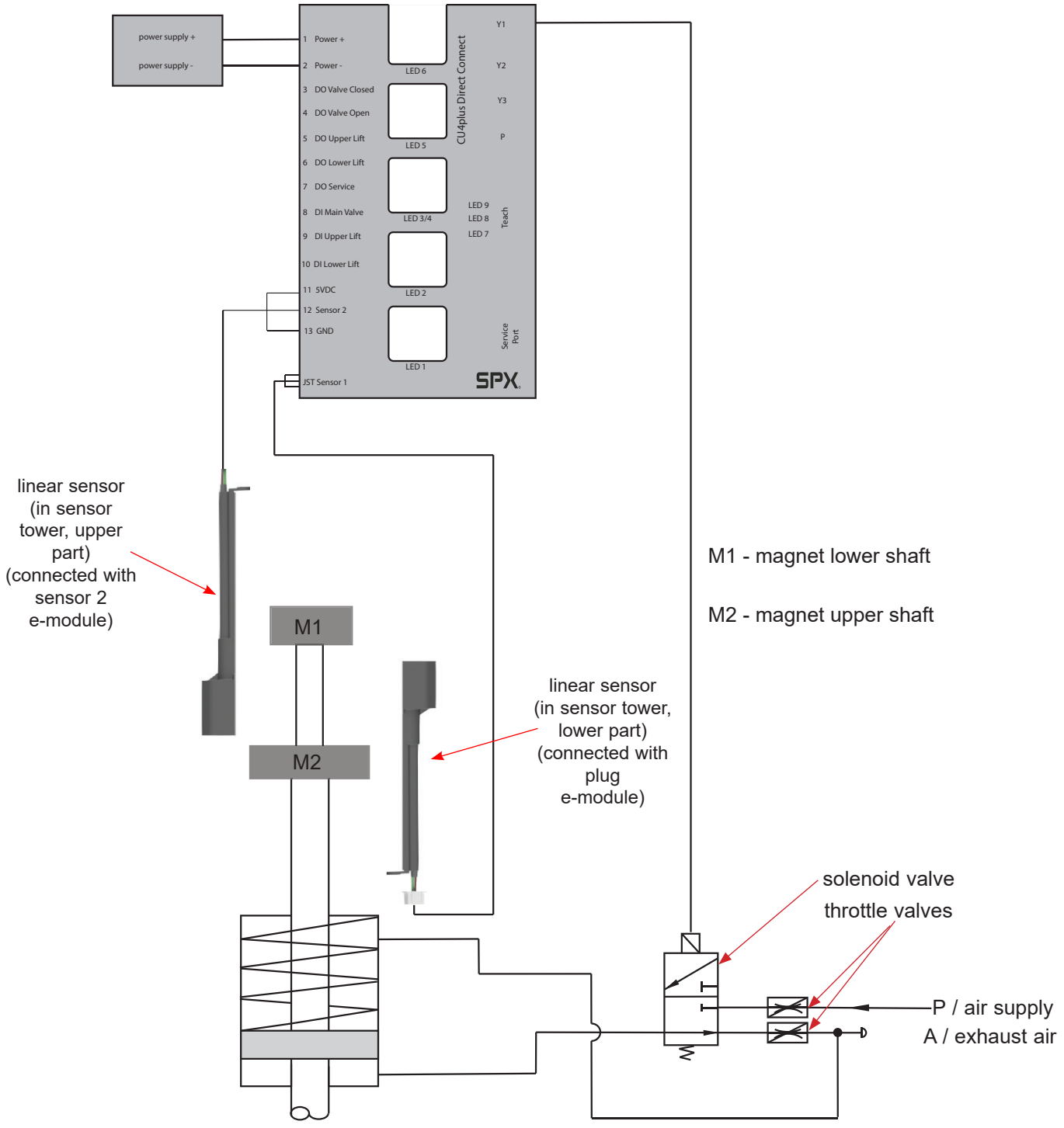
4.4.3. CU43plus Direct Connect for DA3+SLD double seat valve
(internal position measuring system and 2 external proximity switches)



4. Mechanics and Pneumatics

4.4. Functional description - block diagrams

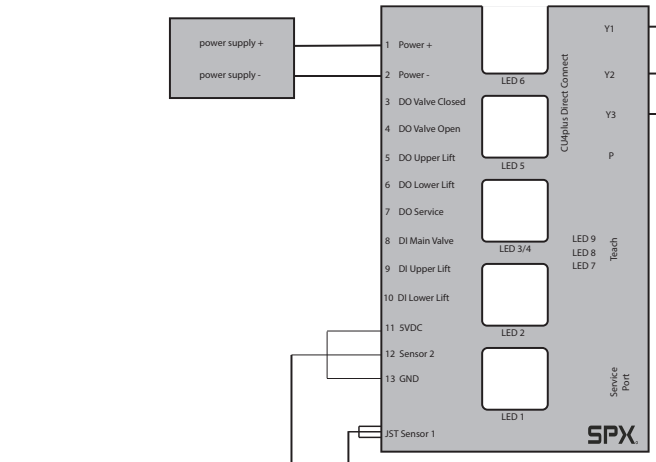
4.4.4. CU41plus-D4 for D4 double seat mix proof valves



4. Mechanics and Pneumatics

4.4. Functional description - block diagrams

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

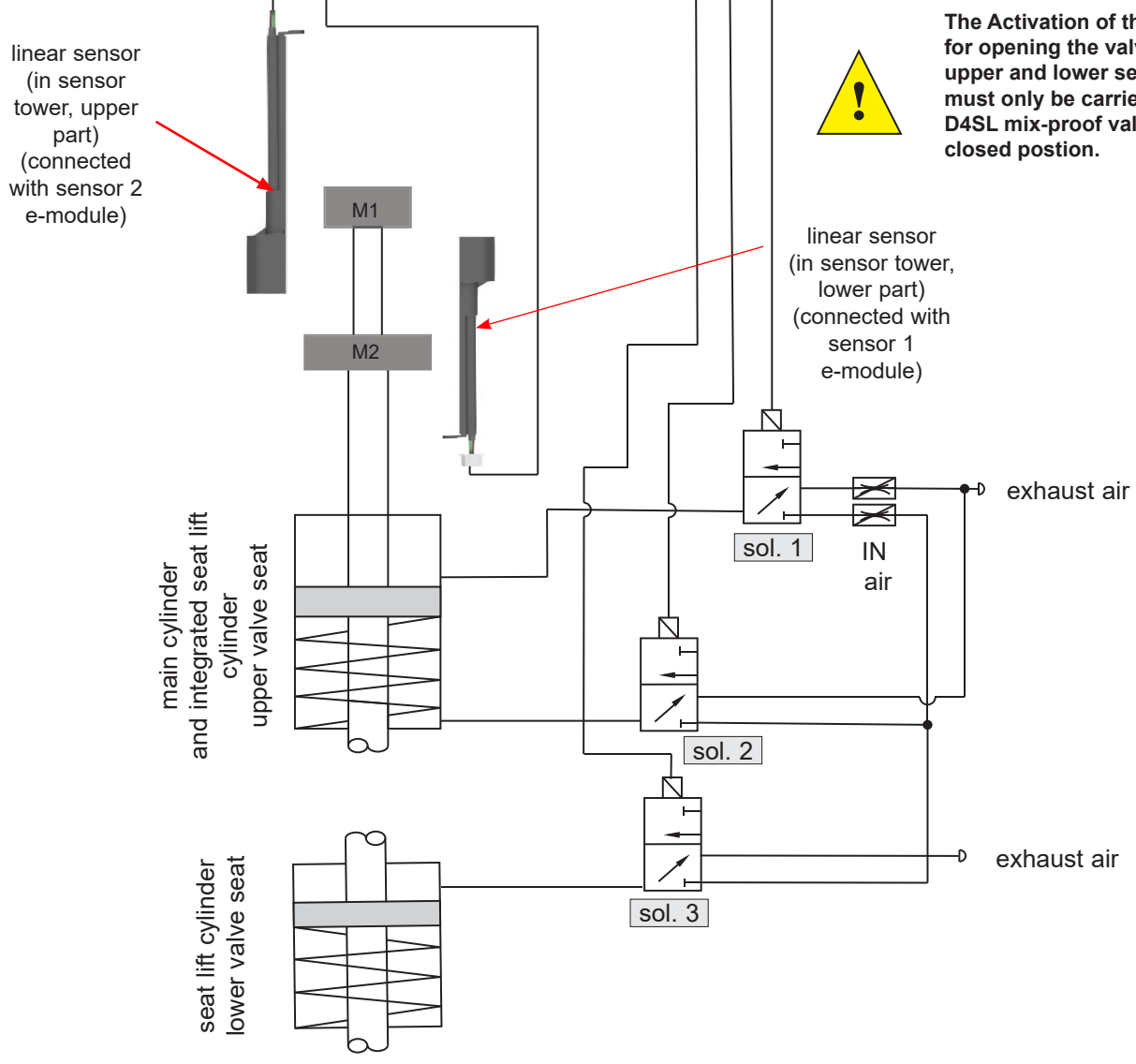


Operating directions of valve targets		
main stroke	down	M1 + M2
upper seat lift	up	M2
lower seat lift	down	M1

M1 - magnet lower shaft

M2 - magnet upper shaft

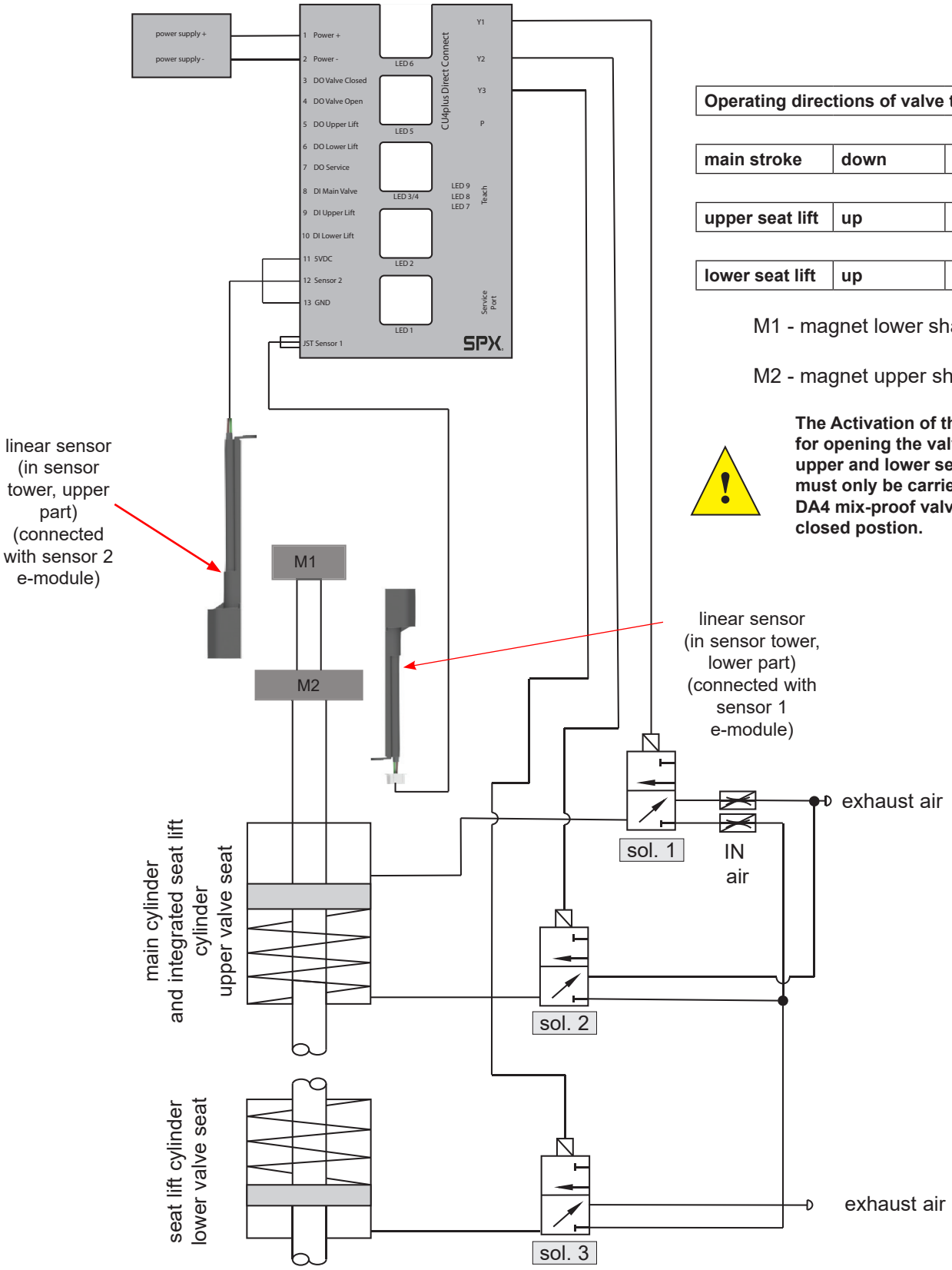
The Activation of the solenoid for opening the valve or for upper and lower seat lifting must only be carried out if the D4SL mix-proof valve is in the closed postion.



4. Mechanics and Pneumatics

4.4. Functional description - block diagrams

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



Operating directions of valve targets		
main stroke	down	M1 + M2
upper seat lift	up	M2
lower seat lift	up	M1

M1 - magnet lower shaft

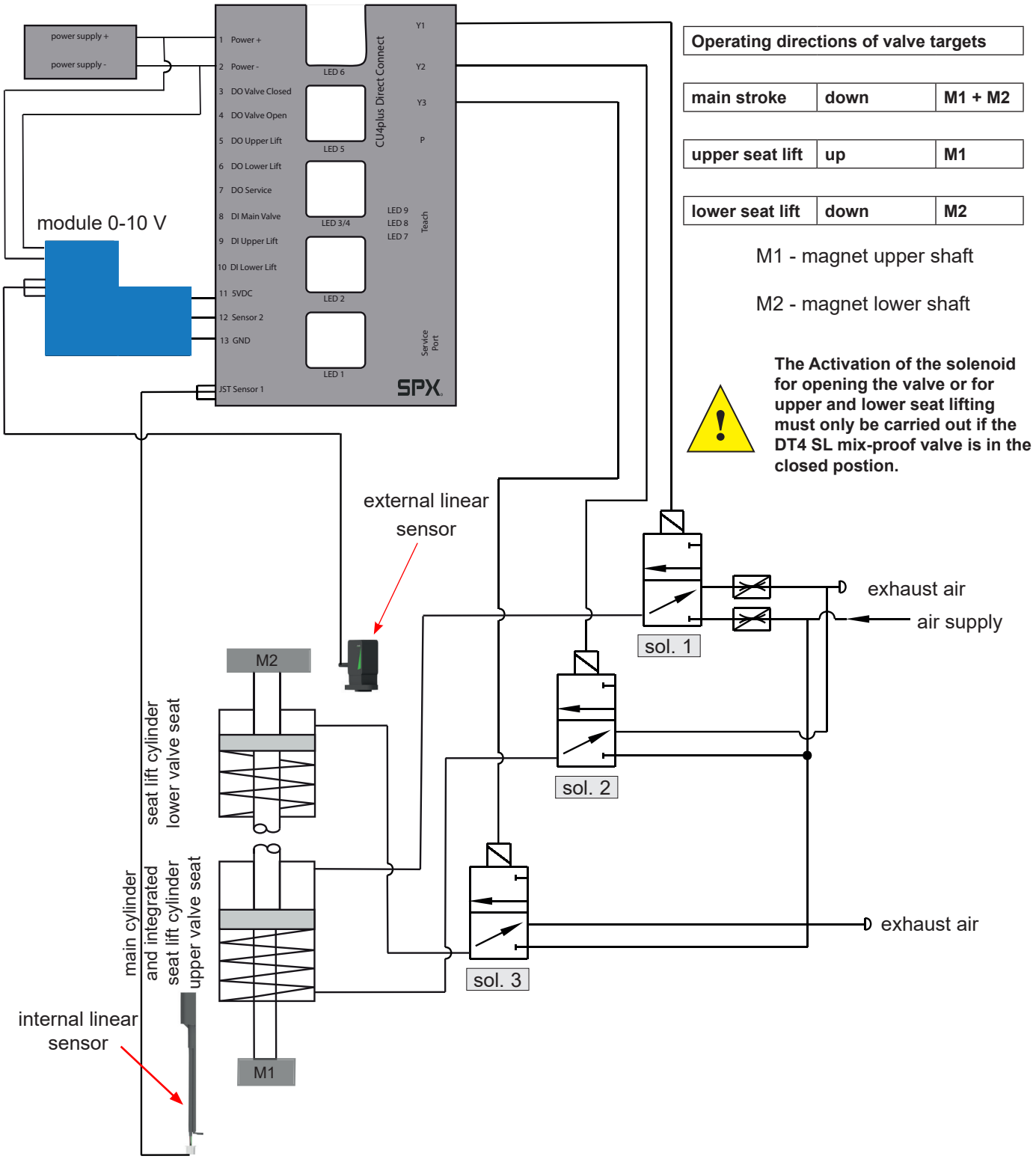
M2 - magnet upper shaft

The Activation of the solenoid for opening the valve or for upper and lower seat lifting must only be carried out if the DA4 mix-proof valve is in the closed postion.

4. Mechanics and Pneumatics

4.4. Functional description - block diagrams

4.4.7. CU43plus-D4 for DT4 SL double seat tank outlet valves



Operating directions of valve targets		
main stroke	down	M1 + M2
upper seat lift	up	M1
lower seat lift	down	M2

M1 - magnet upper shaft

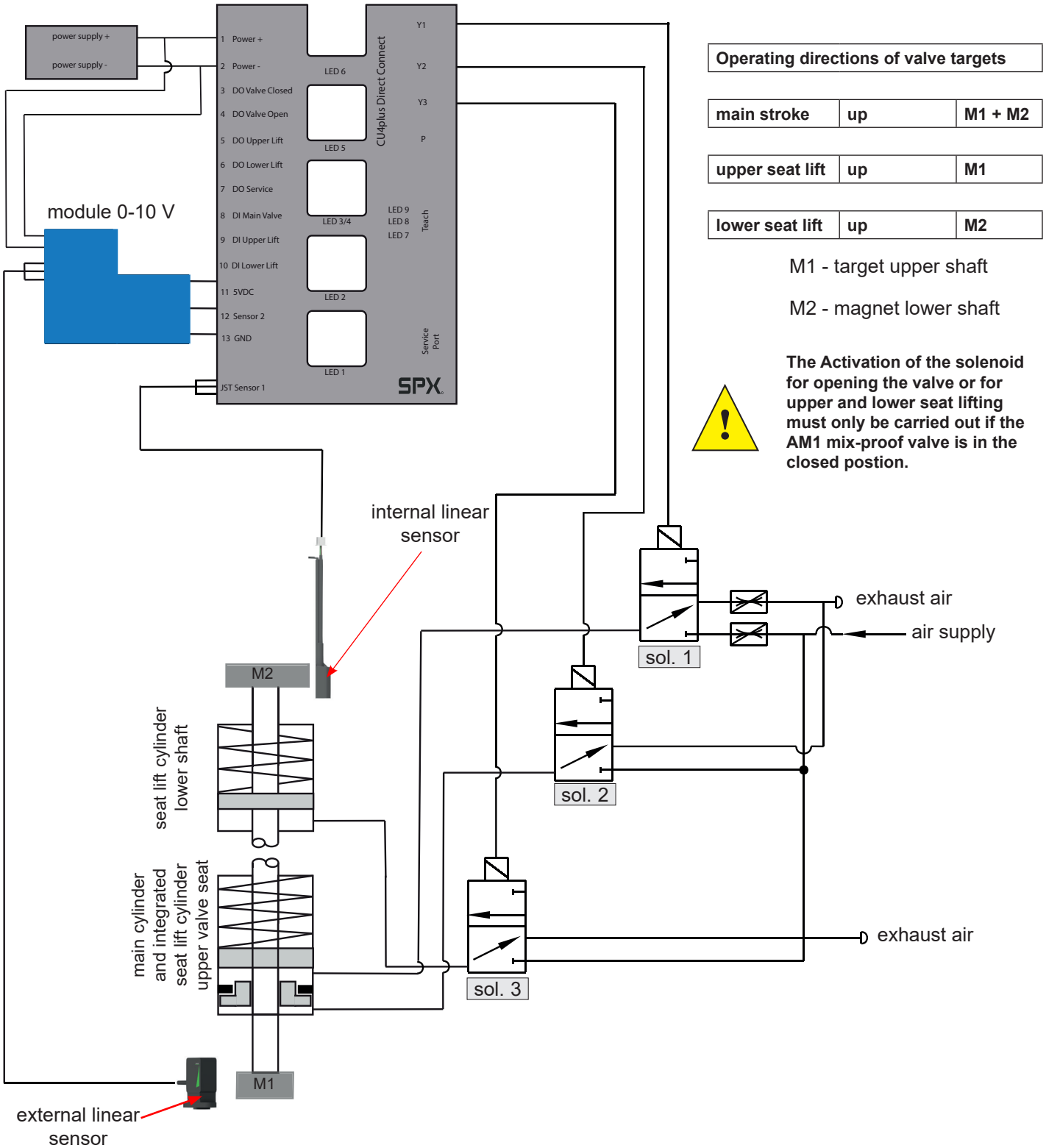
M2 - magnet lower shaft

The Activation of the solenoid for opening the valve or for upper and lower seat lifting must only be carried out if the DT4 SL mix-proof valve is in the closed postion.

4. Mechanics and Pneumatics

4.4. Functional description - block diagrams

4.4.8. CU43plus-D4 for AM1 aseptic mixproof valves



Operating directions of valve targets		
main stroke	up	M1 + M2
upper seat lift	up	M1
lower seat lift	up	M2

M1 - target upper shaft

M2 - magnet lower shaft

The Activation of the solenoid for opening the valve or for upper and lower seat lifting must only be carried out if the AM1 mix-proof valve is in the closed postion.

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
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

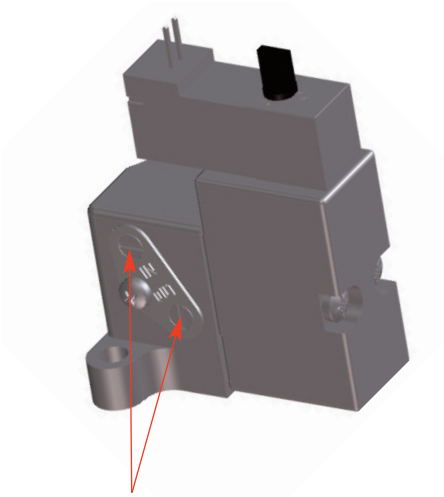
4.6. Solenoid valves

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

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.



throttle screws

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.

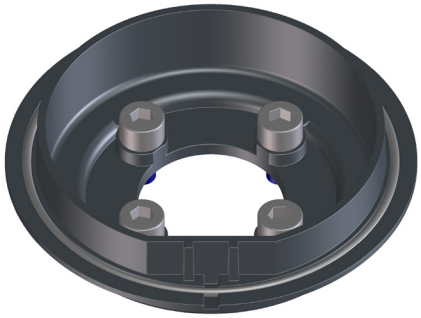
The NOT element is also used for air/air - actuators.

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 valve DE3, DA3+

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

5. Adapter

Adapter for different process valves

5.5. Double seat tank outlet valve DT4 SL and AM1 aseptic mixproof valve

5.5.1. DT4 - 62 adapter

5.5.2. DT4 - 92 adapter

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 and the AM1 aseptic mixproof valve range 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.

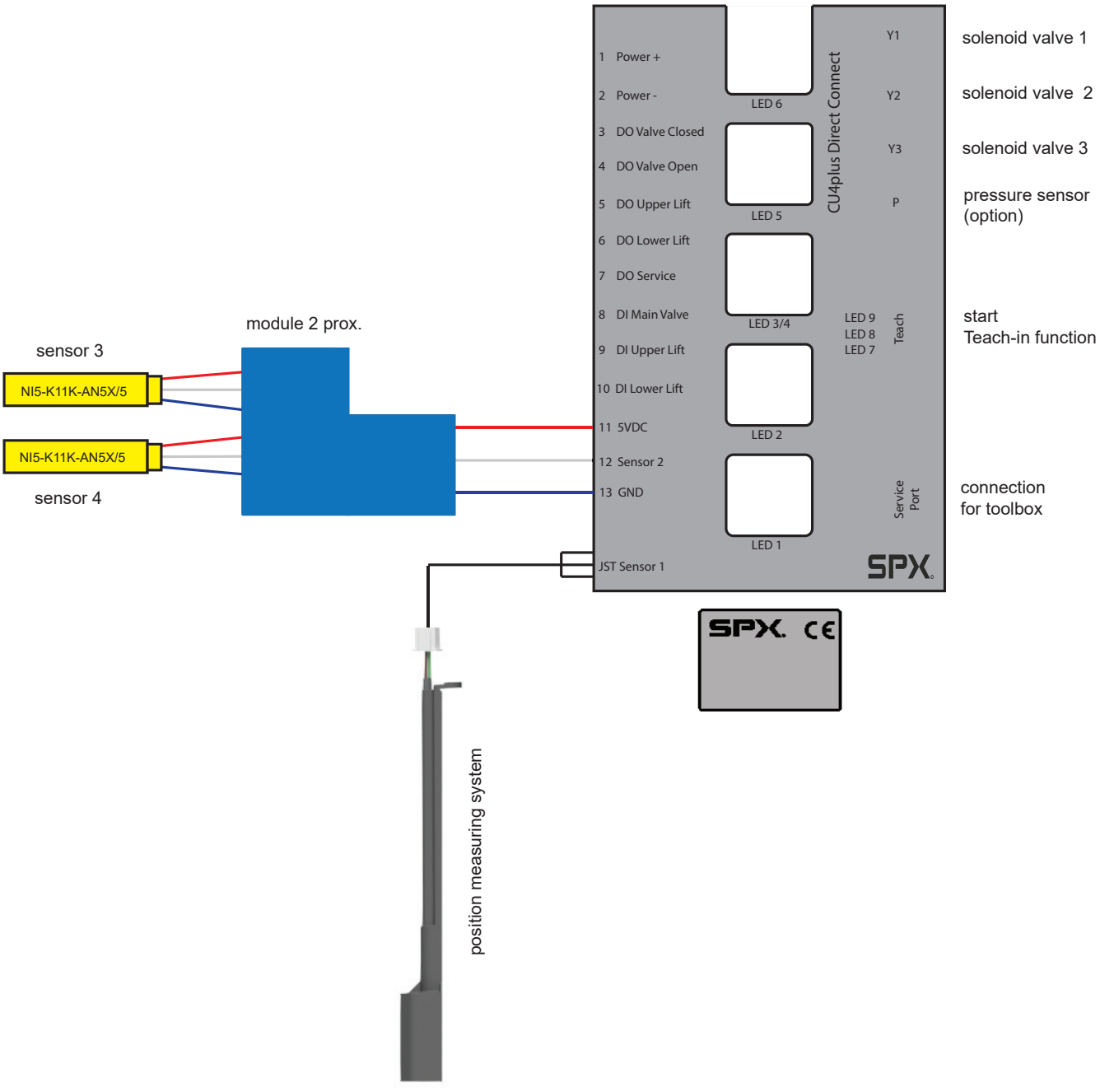
PNP/NPD polarity

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

6. Electronic Module

6.1. Function/block diagram

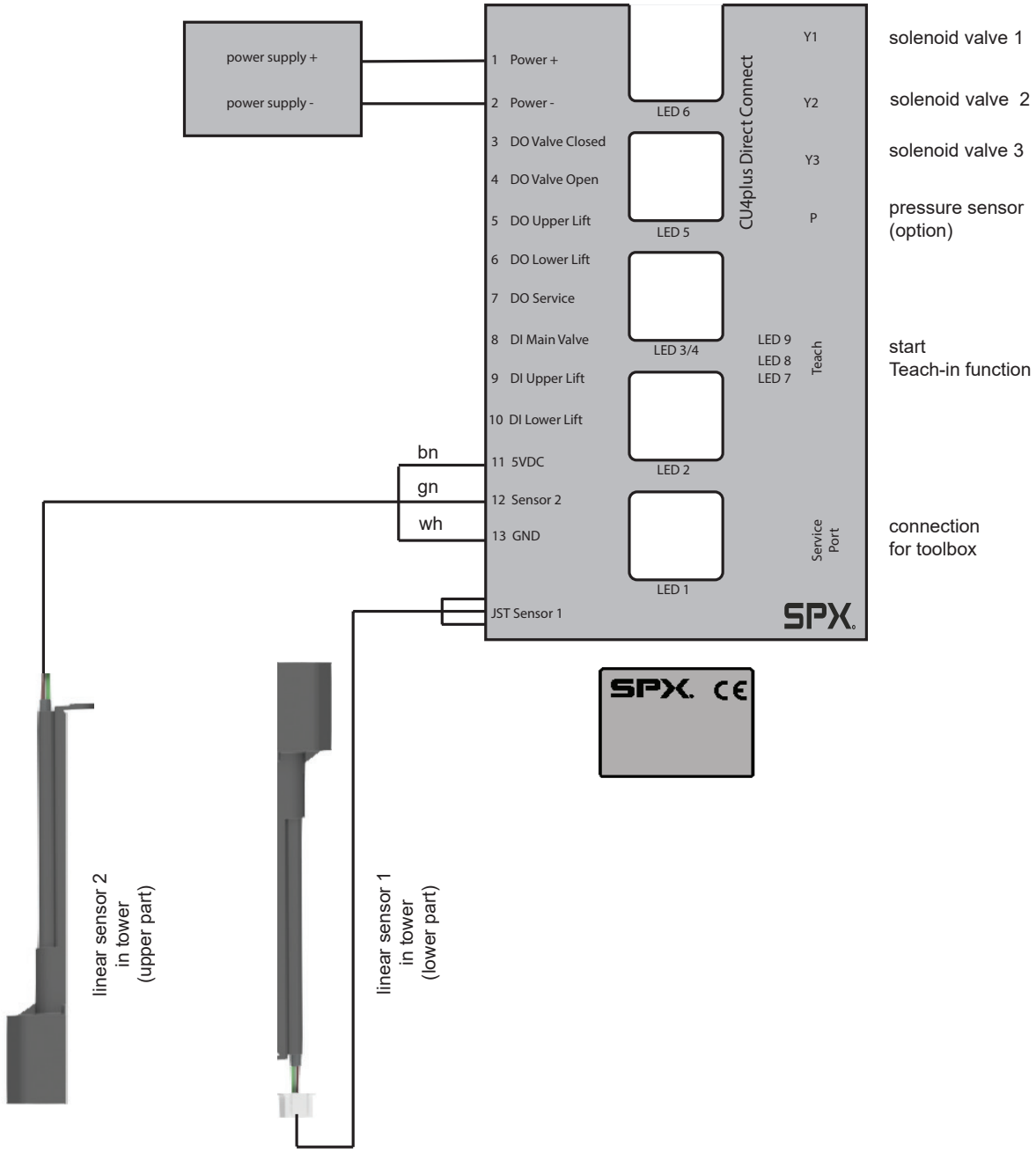
6.1.1. CU43plus Direct Conntect - DA3+



6. Electronic Module

6.1. Function/block diagram

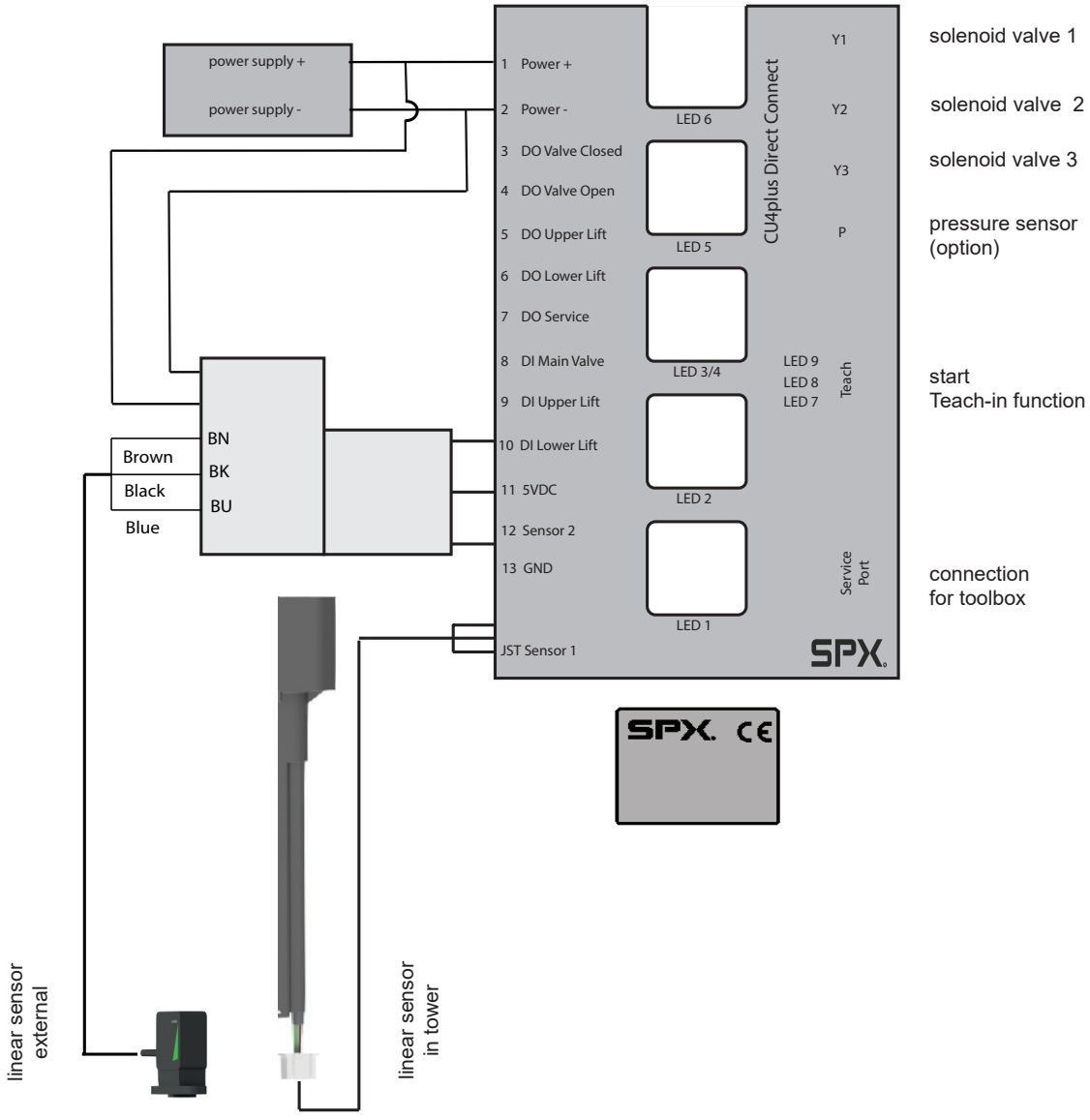
6.1.2. CU41plus-D4
CU43plus-D4



6. Electronic Module

6.1. Function/block diagram

6.1.3. CU43plus-DT4SL / AM1



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

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 1 solenoid active, 1 feedback active	 75 mA 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)

6. Electronic Module

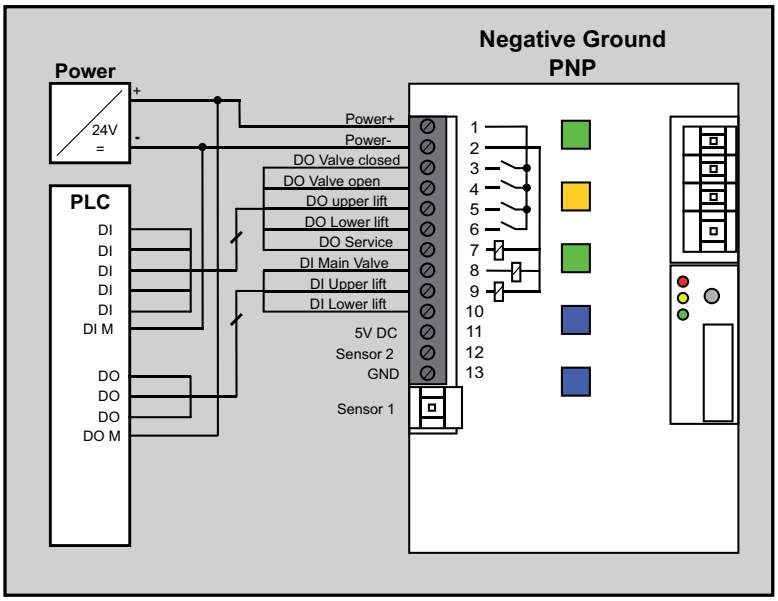
6.4. Connections

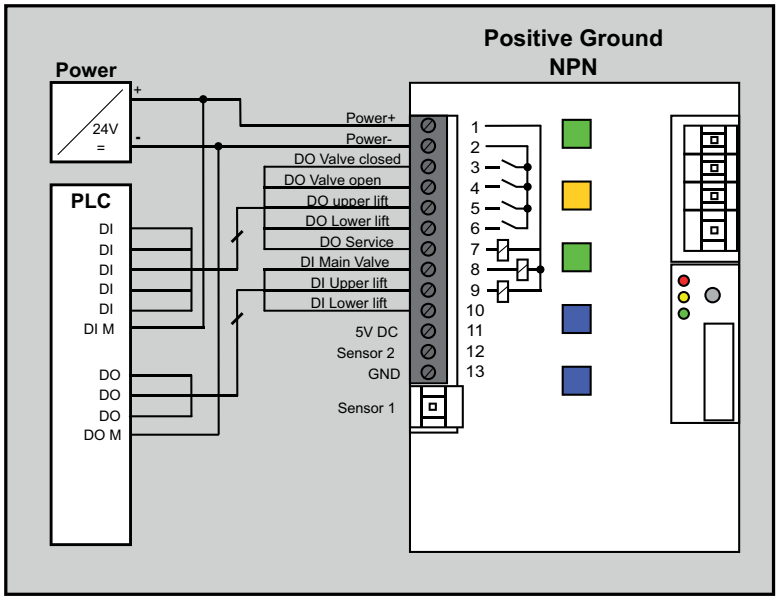
Sensors for valve position detection:

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
6	Mix proof valve with seat lift detection (SLD)	internal linear sensor and 2 external proximity switches	fixed +/- 1 mm	NC only	possible	always 3
7	Mix proof 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
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
A	Double seat tank outlet valve DT4 SL	1 internal linear sensor 1 external linear sensor	fixed +/- 1 mm	NC only	possible	always 3
B	Mix proof valve D4 PMO	2 internal linear sensors	fixed +/- 1 mm	NC only	possible	always 3
C	Aseptic mix-proof valve AM1	1internal linear sensor 1 external linear sensor	fixed	NC only	not possible	always 3
D	Mix proof valve D4SL and DA4	2 internal linear sensors	+/- 1 mm	NC only	possible	always 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, 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. 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)
DO0	closed	**1**	0
DO1	open	0	**1**
DO2	not occupied	**1**	**1**
DO3	not occupied	**1**	**1**
Input signals	**solenoid 1 Main**	**solenoid 2**	**solenoid 3**
DI0	**1**	0	0
DI1	0	**1**	0
DI2	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)
DO0	closed	0	**1**
DO1	open	**1**	0
DO2	not occupied	1	1
DO3	not occupied	1	1
Input signals	**solenoid 1 Main**	**solenoid 2**	**solenoid 3**
DI0	**1**	0	0
DI1	0	**1**	0
DI2	0	0	**1**

6. Electronic Module

6.7. Data signals

6.7.2. Mix proof valve with seat lift detection (DA3+ SLD)

NC - normally closed					
Application: Double seat mix proof valve with seat lift detection (SLD)					
Output signals	**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)
DO0	closed	1	1	0	1
DO1	open	0	0	1	0
DO2	upper seat lifting	0	1	0	1
DO3	lower seat lifting	1	1	0	0
The appropriate output signal for the required 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 output signals. Further ajdustments are not required!					

Input signals	**solenoid 1 main**	**solenoid 2 upper seat lift**	**solenoid 3 lower seat lift**
DI0	1	0	0
DI1	0	1	0
DI2	0	0	1

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

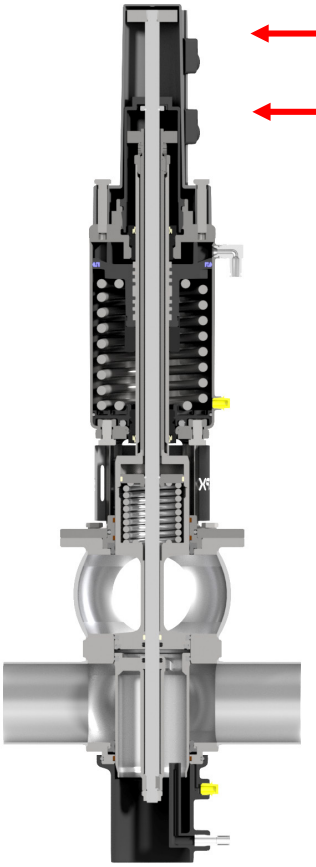
6. Electronic Module

6.7. Data signals

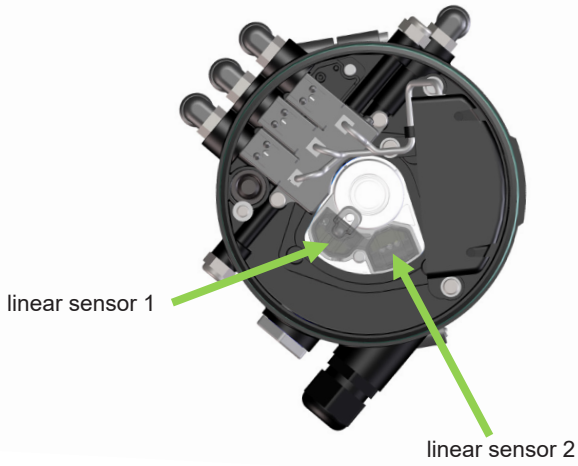
6.7.3. Mix proof valve D4, Valve profil type 1

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	
DO0	closed	1	0	not used	0	+1 mm, -1 mm
DO1	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
DI0	1	0	0
I1			
I2			

6. Electronic Module

6.7. Data signals

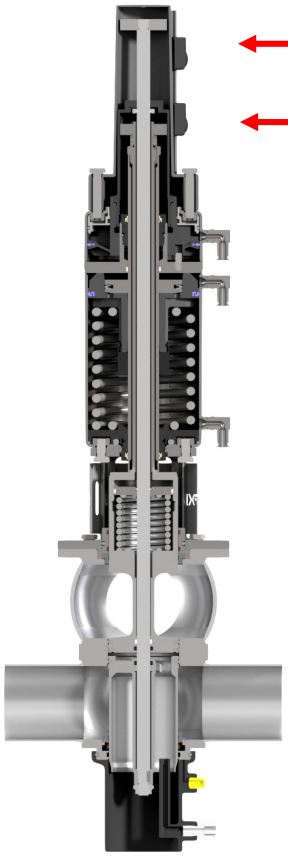
6.7.4. Mix proof valve D4 SL, Valve profile type 2

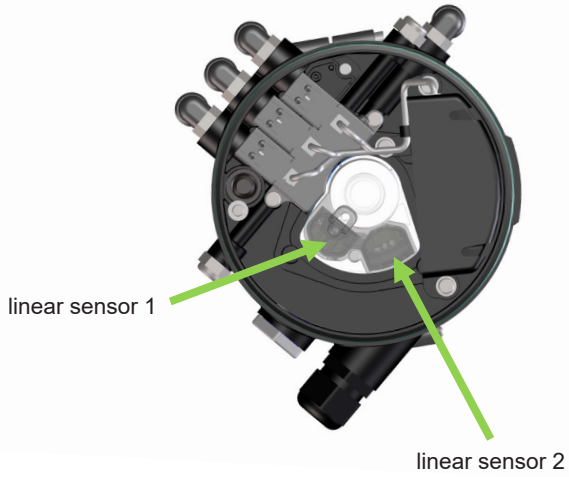
operating	main stroke downwards upper seat lift upwards lower seat lift downwards	

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	
DO0	closed	1	0	1	0	+1 mm, -1 mm
DO1	open	0	0	0	1	+1 mm, -1 mm
DO2	upper seat lift	0	1	1	0	+1 mm, -1 mm
DO3	lower seat lift	1	0	0	0	+1 mm, -1 mm

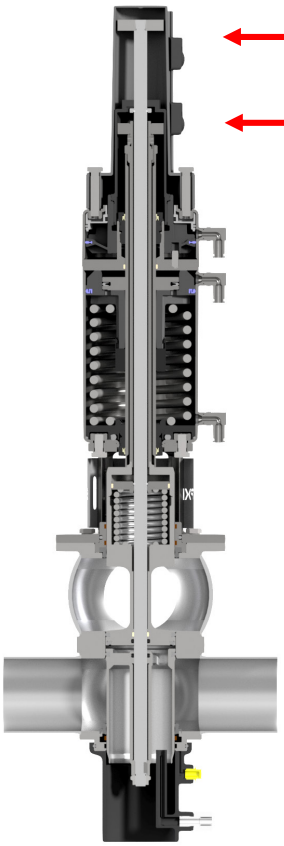
Input signal	solenoid 1 Main	solenoid 2 upper seat lift	solenoid 3 lower seat lift
DI0	1	0	0
DI1	0	1	0
DI2	0	0	1

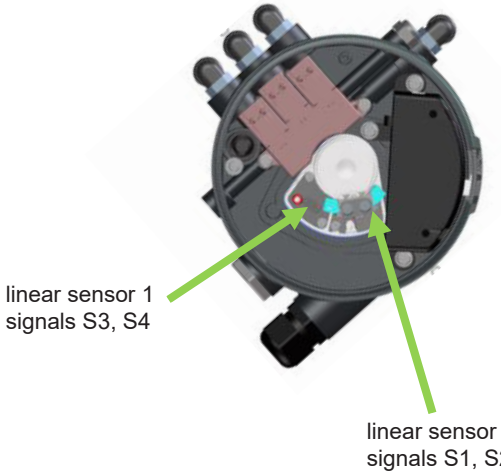
6. Electronic Module

6.7. Data signals

6.7.5. Mix proof valve D4 PMO Valve profile type B

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	electronic module terminal block 10,11,12
upper shaft	signal S2 signal S1	linear sensor 2	electronic module JST plug linear sensor





	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	
	closed	1	0	1	0	+1 mm, -1 mm
	open	0	0	0	1	+1 mm, -1 mm
	upper seat lift	0	1	1	0	+1 mm, -1 mm
	lower seat lift	1	0	0	0	+1 mm, -1 mm

Digital Output data	DO0	DO1	DO2	DO3
no logical combination of sensor signals, just raw data combination table has to be implemented in PLC software during seat lift - the opposite valve shaft stays in closed position, this can be monitored by watching the appropriate signal				

Digital Input data	solenoid 1 Main	solenoid 2 upper seat lift	solenoid 3 lower seat lift
DI0	1	0	0
DI1	0	1	0
DI2	0	0	1

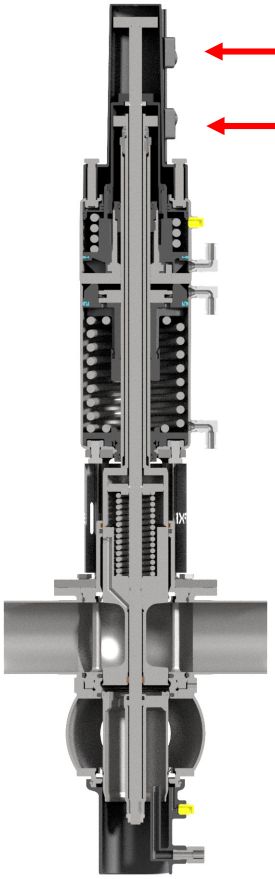
6. Electronic Module

6.7. Data signals

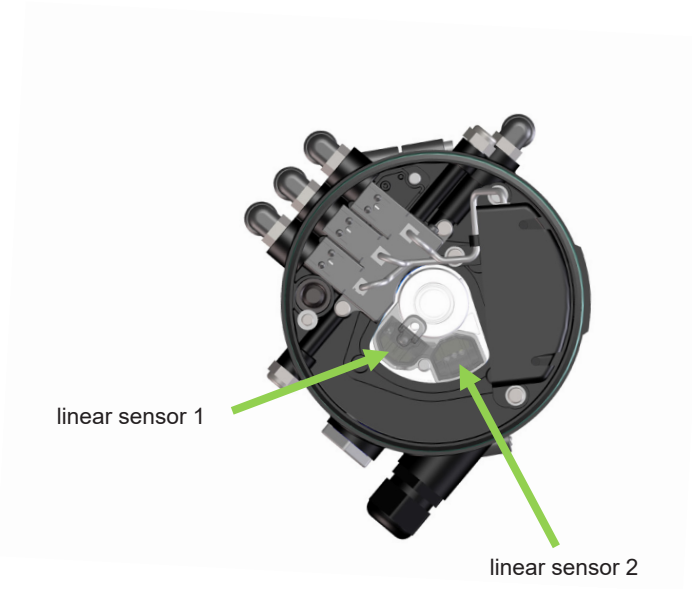
6.7.6. Mix proof valve DA4 Valve profile type 0

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	
DO0	closed	1	0	0	0	+1 mm, -1 mm
DO1	open	0	0	0	1	+1 mm, -1 mm
DO2	upper seat lift	0	1	0	0	+1 mm, -1 mm
DO3	lower seat lift	1	0	1	0	+1 mm, -1 mm

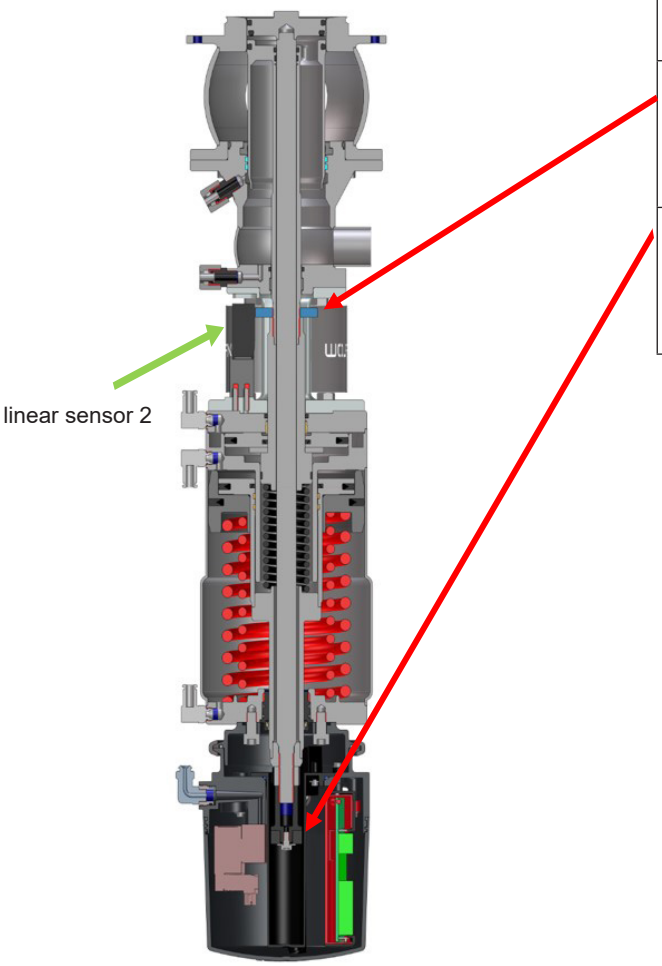
Input signals	solenoid 1 Main	solenoid 2 upper seat lift	solenoid 3 lower seat lift
DI0	1	0	0
DI1	0	1	0
DI2	0	0	1

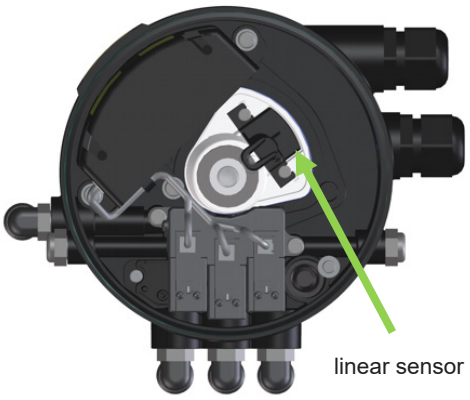
6. Electronic Module

6.7. Data signals

6.7.7. Double seat tank outlet valve DT4 SL, valve profile type A

operating	main stroke downwards upper seat lift upwards lower seat lift upwards		
main stroke	valve operating direction: downwards		
lower shaft target	signal S4	linear sensor 2 external additional converter module must be used	e-module terminal block 10,11,12
upper shaft target	signal S1 signal S2 signal S3	linear sensor 1	e-module terminal JST plug linear sensor





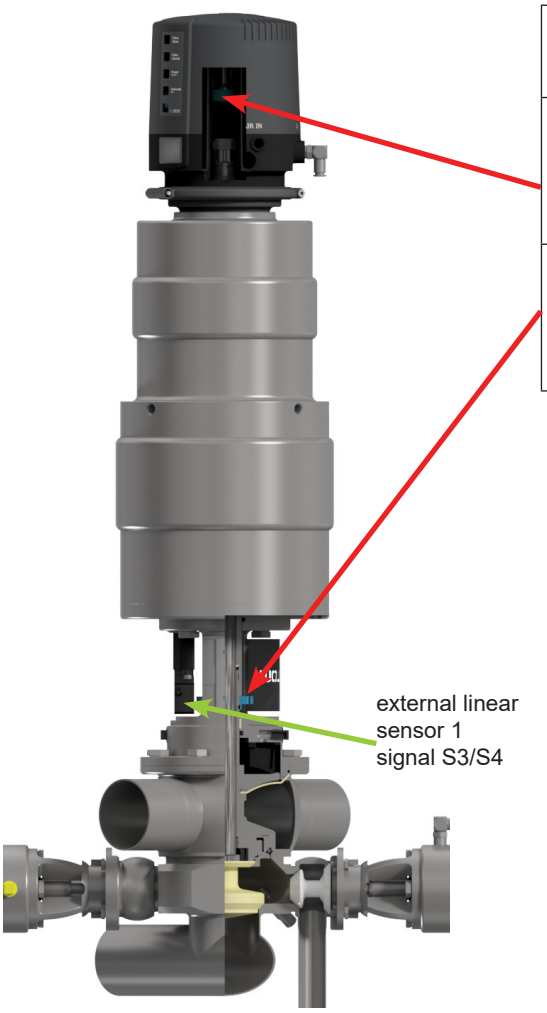
Input signals	valve status	linear sensor 2 / (Teach data)			linear sensor 1 / (Teach data)	tolerance band
		sensor signal S1	sensor signal S2	sensor signal lift	sensor signal S4	
DI0	closed	1	0	0	0	+1 mm, -1 mm
DI1	open	0	1	0	0	+1 mm, -1 mm
DI2	upper seat lift	0	0	1	0	+1 mm, -1 mm
DI3	lower seat lift	1	0	0	1	+1 mm, -1 mm

Output signals	solenoid 1 Main	solenoid 1 upper seat lift	solenoid 1 lower seat lift
DO0	1	0	0
DO1	0	1	0
DO2	0	0	1

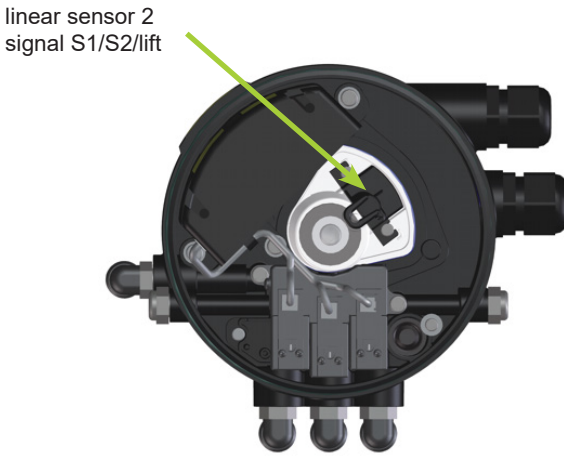
6. Electronic Module

6.7. Data signals

6.7.8. Aseptic mix proof valve AM1, valve profile type C



operating	main stroke upwards upper seat lift upwards lower seat lift upwards		
lower shaft target	signal S1 signal S2 signal lift	linear sensor 2	e-module terminal JST plug linear sensor
upper shaft target	signal S3 signal S4	linear sensor 1 external additional converter module must be used	e-module terminal block 10,11,12



input signlas	valve status	External linear sensor 1 (S) / (Teach data)		Internal linear sensor 2 (J) / (Teach data)			
		signal S3	signal S4	signal S1	signal S2	lift	Tolerance band
DI0	closed	0	1	1	0	0	fixed
DI1	open	0	0	0	1	0	+/- 1mm
DI2	upper seat lift	1	0	1	0	0	fixed
DI3	lower seat lift	0	1	0	0	1	fixed

output signals	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

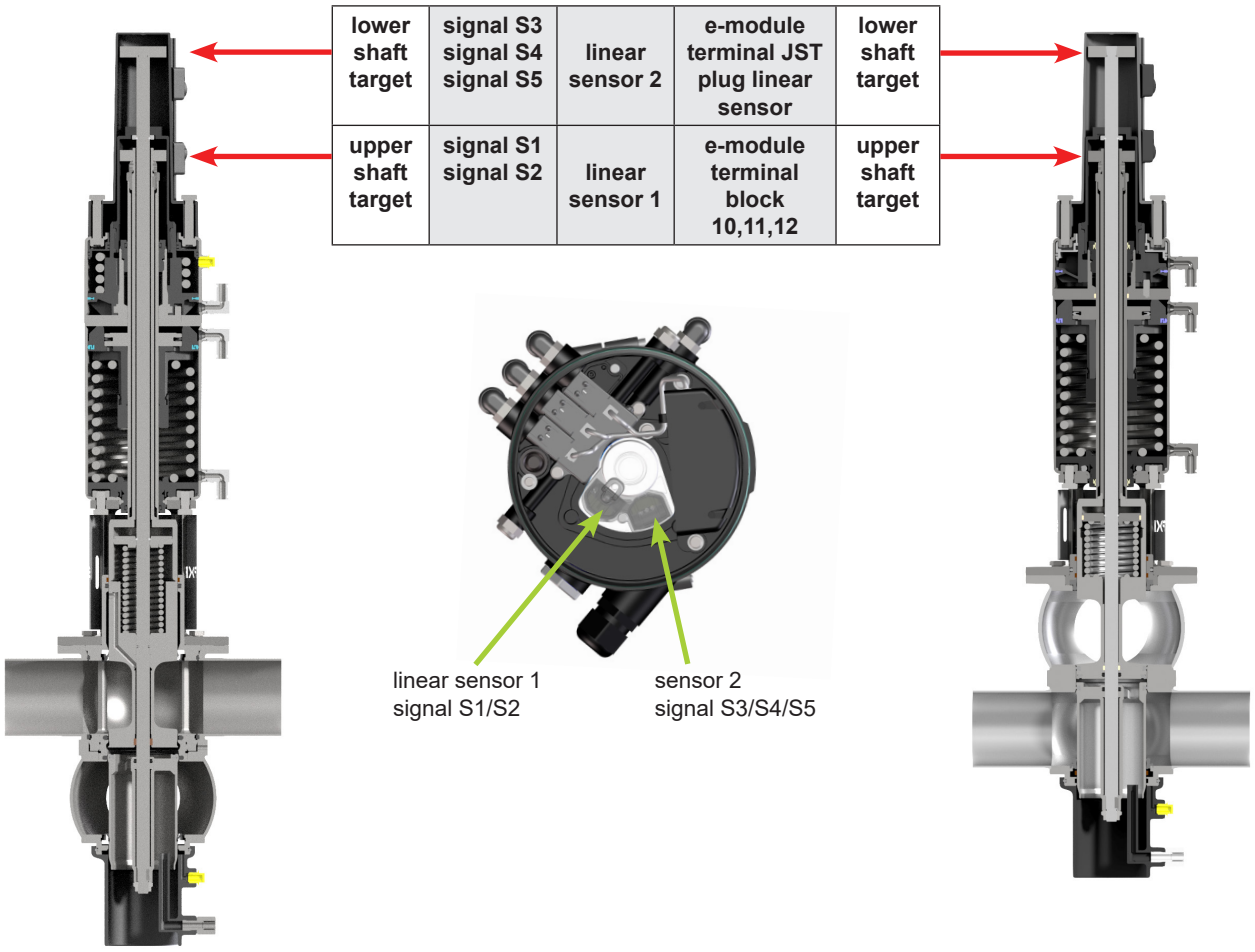
6. Electronic Module

6.7. Data signals

6.7.9. Valve profile type D

DA4 Mix proof valve	
operating	main stroke downwards upper seat lift upwards lower seat lift upwards

D4SL Mix proof valve	
operating	main stroke downwards upper seat lift upwards lower seat lift downwards



input signals				valve status	Internal linear sensor 1 (S) / Teach data for upper shaft		Internal linear sensor 2 (J) / Teach data for lower shaft			
DI0	DI1	DI2	DI3		signal S1	signal S2	signal S3	signal S4	signal S5	Tolerance band
1	0	0	0	closed	0	1	1	0	0	+/- 1mm
0	1	0	0	open	0	0	0	1	0	+/- 1mm
1	0	1	0	upper seat lift	1	0	1	0	0	+/- 1mm
1	0	0	1	lower seat lift	0	1	0	0	1	+/- 1mm

output signals	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

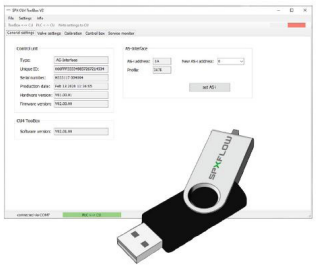
6. Electronic Module

6.7. Data signals

6.7.10. 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.

2 types of pulsation methods are available:

a) Time based pulsation:

The seat lifting is activated for a period of time = on time.
And the seat lifting is deactiviated for a period of time = off time.
For the time based pulsation, the on-time and off-time needs to be set via the CU4plus Toolbox.

b) Stroke based pulsation:

Once the seat lift postion has been reached the solenoid remains active for a defined time = on time.
Then the solenoid is deactivated, the shaft returns to close position, once the shaft passes a certain postion of the complete stroke = % of stroke, the solenoid is activated again and the seat lift cycle starts again.

For the stroke based pulsation, default parameters are set.
These can be adjusted within the CU4plus Toolbox.

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

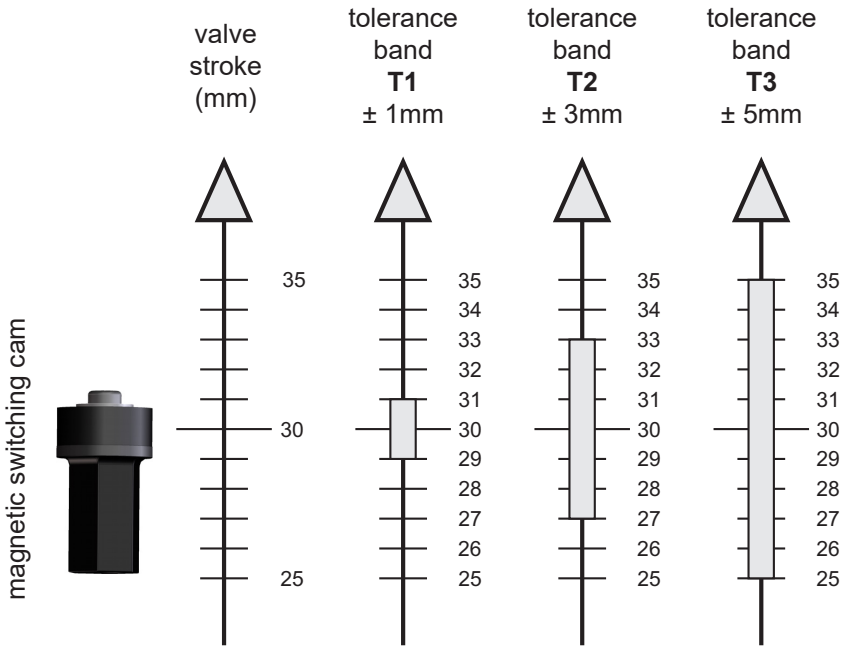
For the internal detection of the valve position indication, a contact-free operating linear sensor is used which is actuated via the magnetic switching cam installed at the valve rod. The nominal measuring range of the measuring system amounts to 0 - 72 mm, relative repetitive accuracy < 0.1 mm.
Within 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. DA3+, D4, D4 SL, D4 PMO, DA4, DT4 SL
T2	+/- 3 mm	e.g. SW4, MS4
T3	+/- 5 mm	e.g. SV, SVS, DKR

A fixed tolerance band is used for AM1 Valve

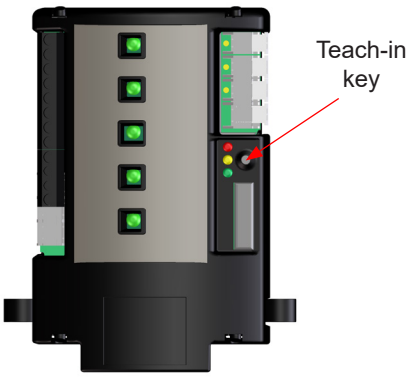


7. Valve Position Indication

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!

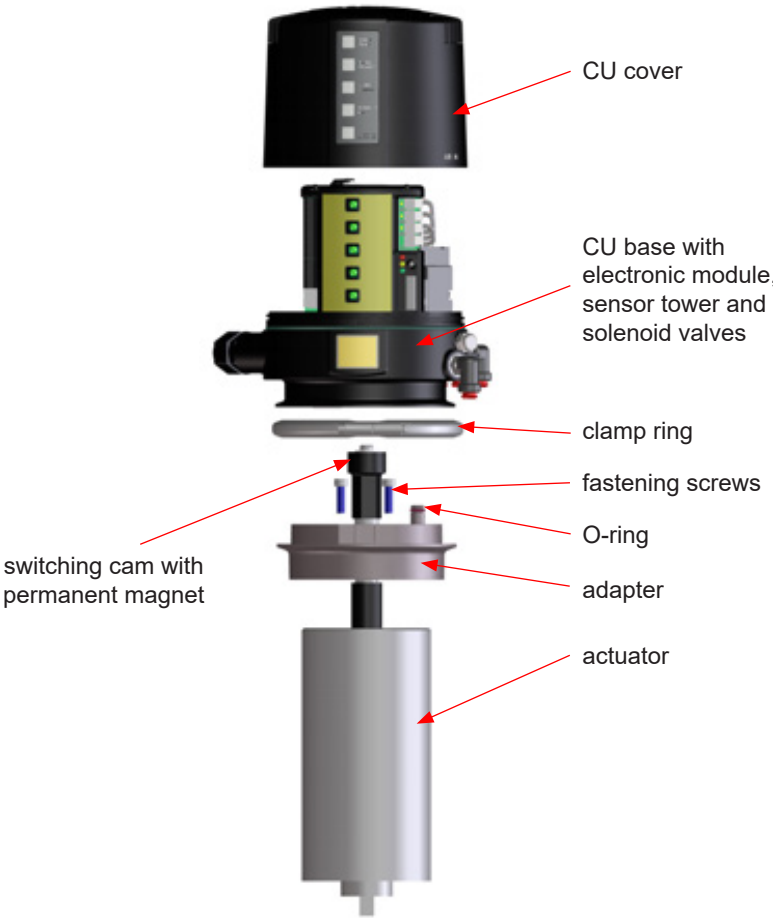
If these instructions are not observed, process failures, product loss or personal injury may occur!

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 Direct Connect.

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

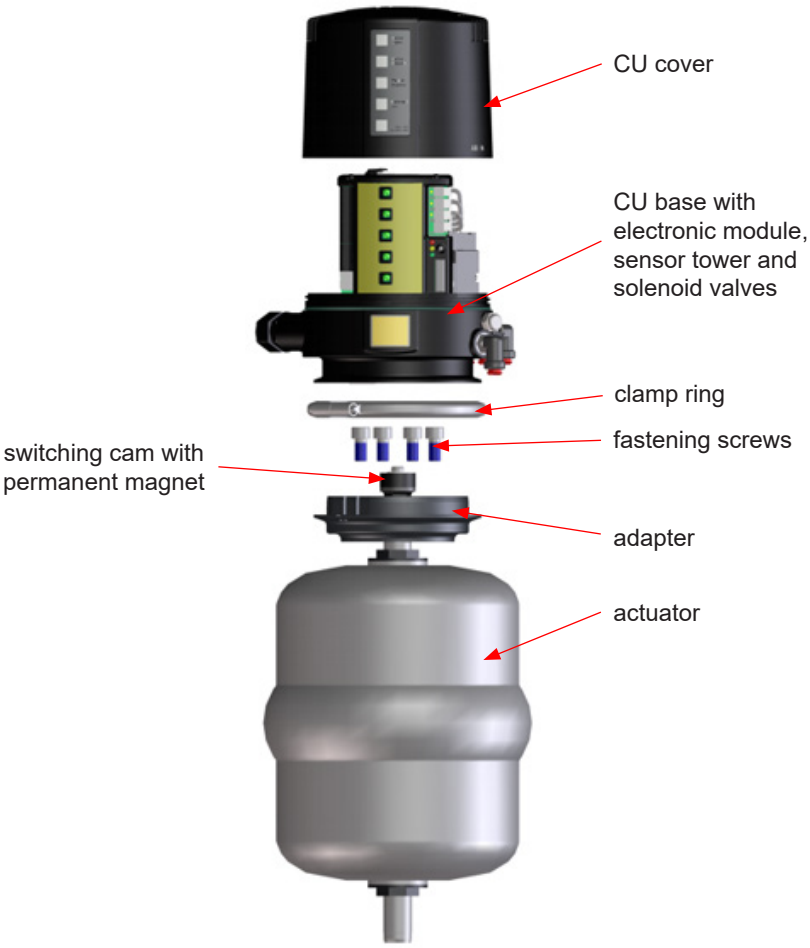
After proper assembly and installation of the control unit, startup can be undertaken as described below:

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.

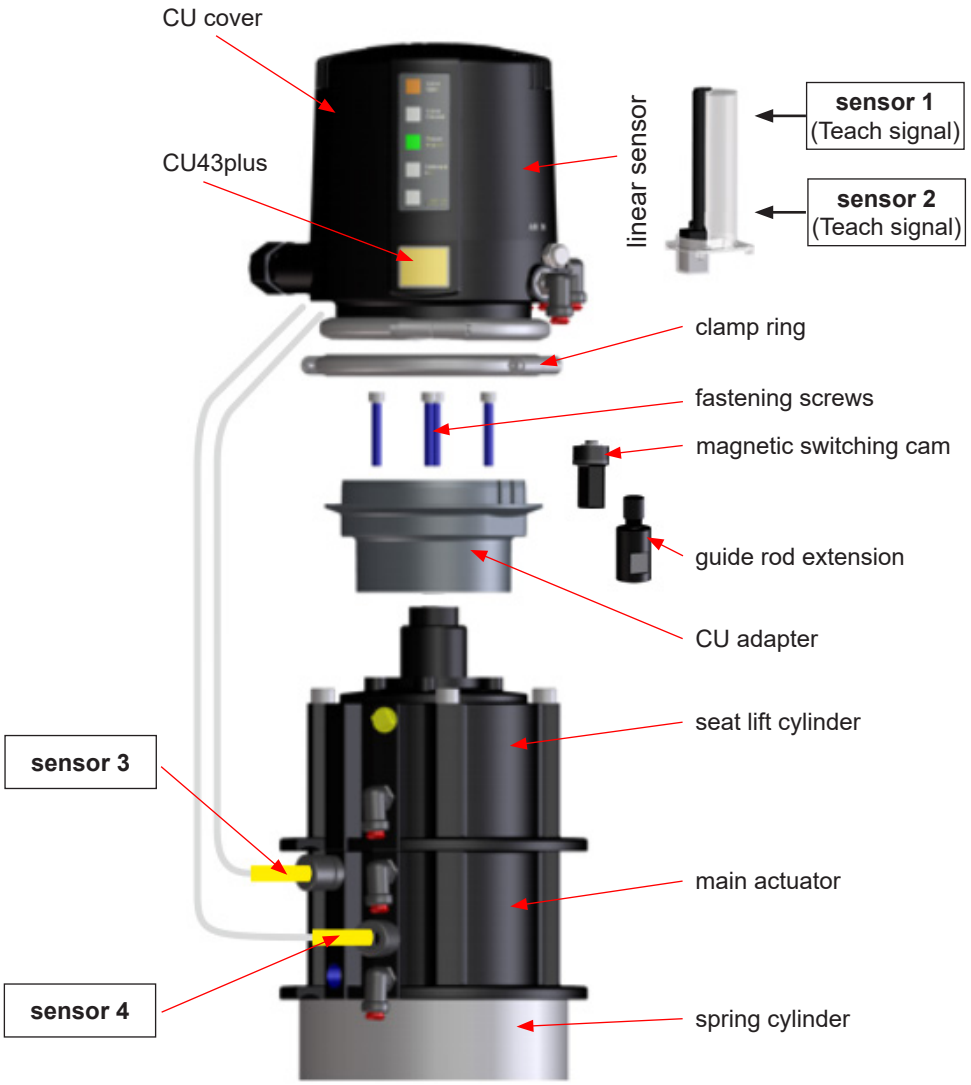
8.2.3. Startup

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 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 Startup

8.3.1 Pneumatic connection

Supply air:

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

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

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

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

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

Exhaust air:
As a standard, the exhaust air connections **A1** and **A2** are equipped with a silencer. If required, the silencer can be removed and the exhaust air can be 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.

8.3.3. 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.
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 Startup

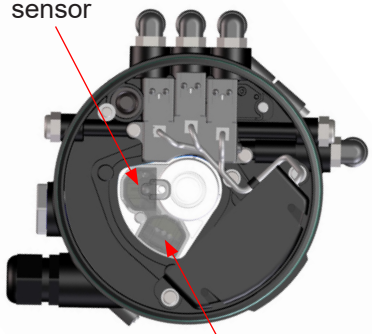
8.3.4. Startup

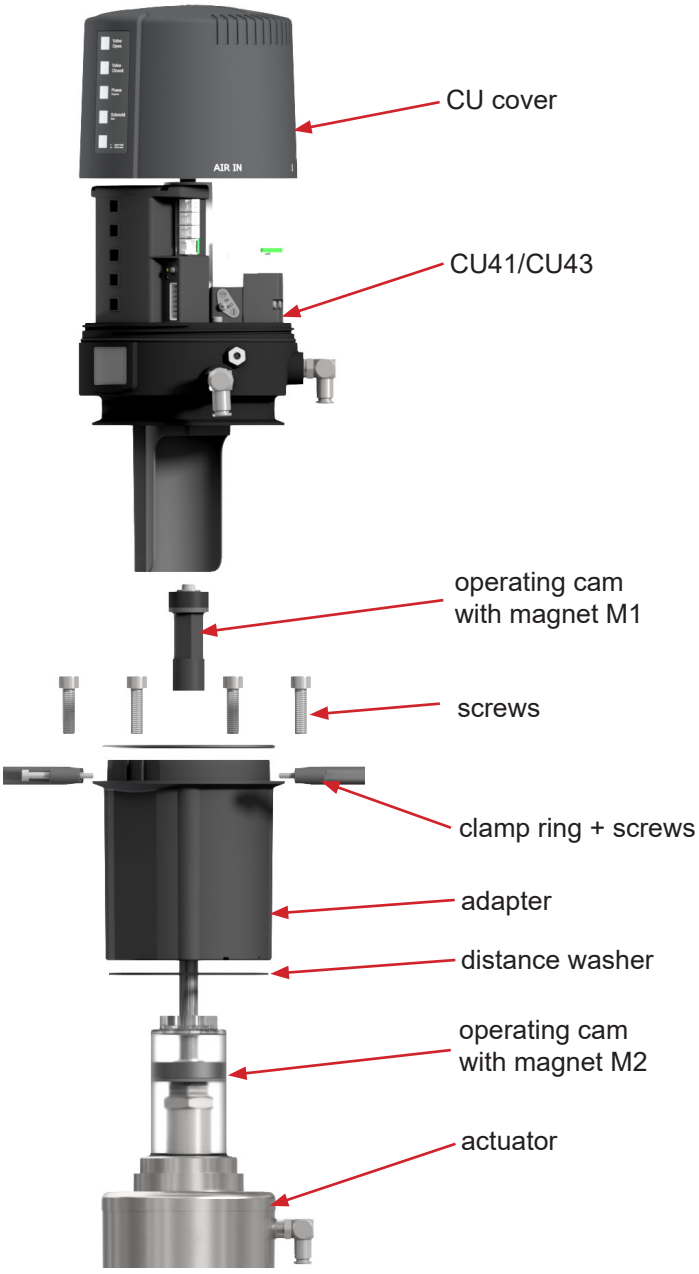
After proper assembly and installation of the control unit, startup can be undertaken as described below:

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

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





Assembly of the control unit on the valve

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

8. CU Assembly and Startup

8.4.1 Pneumatic connection

Supply air:

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

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

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

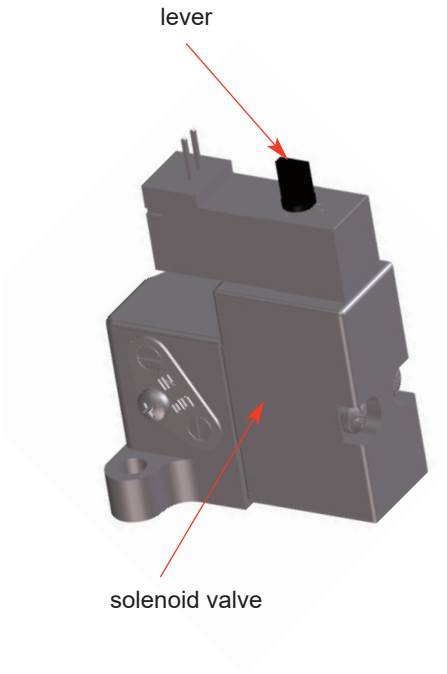
Exhaust air:
As a standard, the exhaust air connections **A1** and **A2** are equipped with a silencer. If required, the silencer can be removed and the exhaust air can be hosed separately when it must be led off to the exterior, for example.

8.4.2 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



8.4.3 Connection of external proximity switches

The electric connection of the proximity switches specified by SPX FLOW is undertaken according to the terminal layout described in chapter 6.
The mechanic assembly of the proximity switches is carried out at the actuator of the corresponding double seat valves.
Observance of the instruction manual for double seat valves is essential!

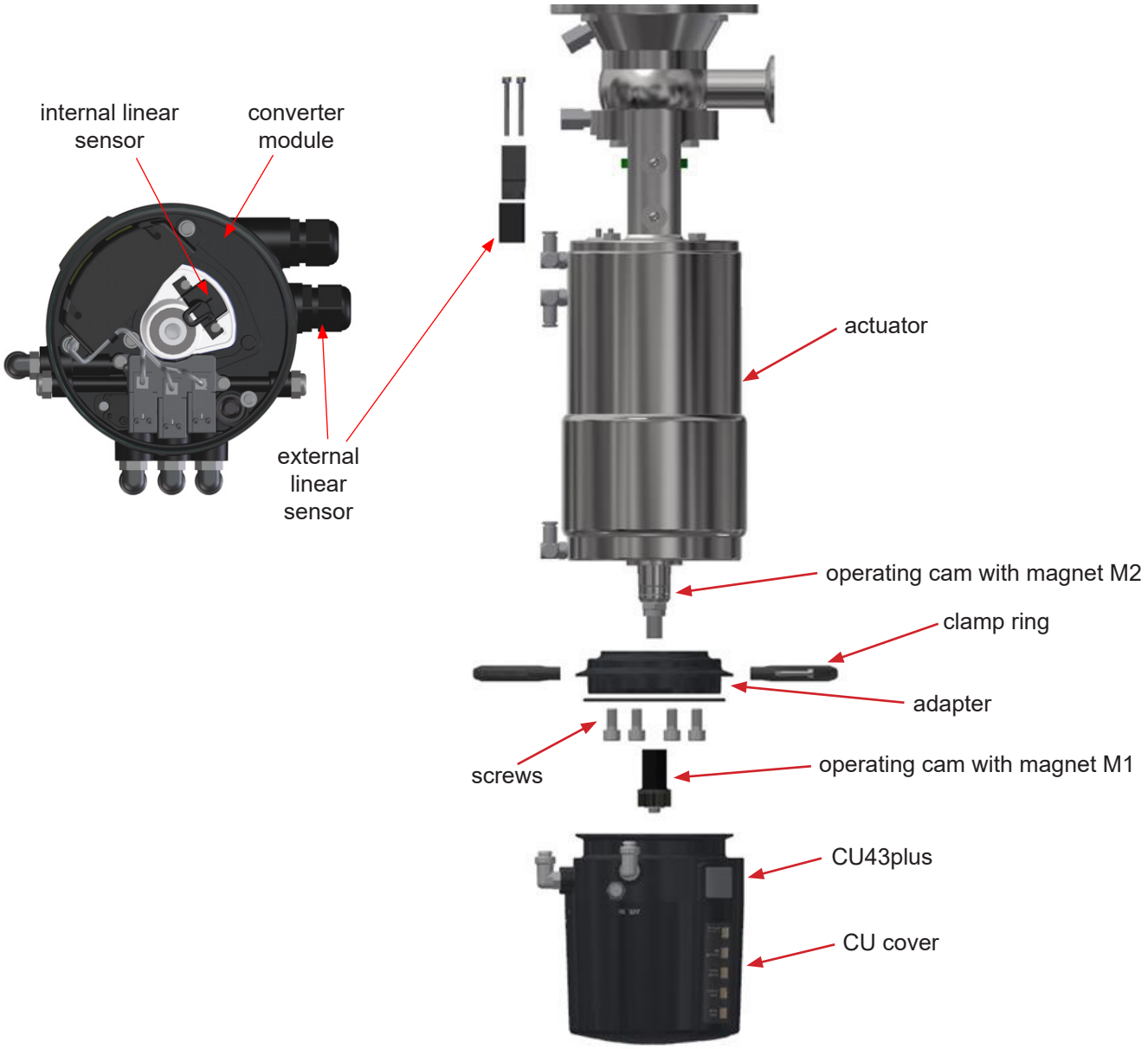
8.4.4 Startup

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

1. Switch on the air supply
2. Switch on the voltage supply.
3. Check the solenoid valves by turning the lever on the upper side by 90°.
4. For final adjustments of the feedback position switches please use the Teach function.

8. CU Assembly and Startup

8.5. Double seat tank outlet valve DT4 SL



Assembly of the control unit on the valve

1. Assemble the target M2 on the lower shaft, see oper. manual DT4 SL.
2. Assemble the external linear sensor with the adapter in the yoke area. Insert cable through cable grommet and cable gland then connect the cable to the E-modul.
3. Assemble the adapter with the 4 screws on the double seat valve.
4. Assemble the operating cam M1 on the guide rod.
5. Place the control unit onto the adapter. Observe alignment!
6. Attach the clamp rings and fasten them with the 2 screws.
7. Align air connections of the control unit to the valve actuator.

8. CU Assembly and Startup

8.5.1 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.

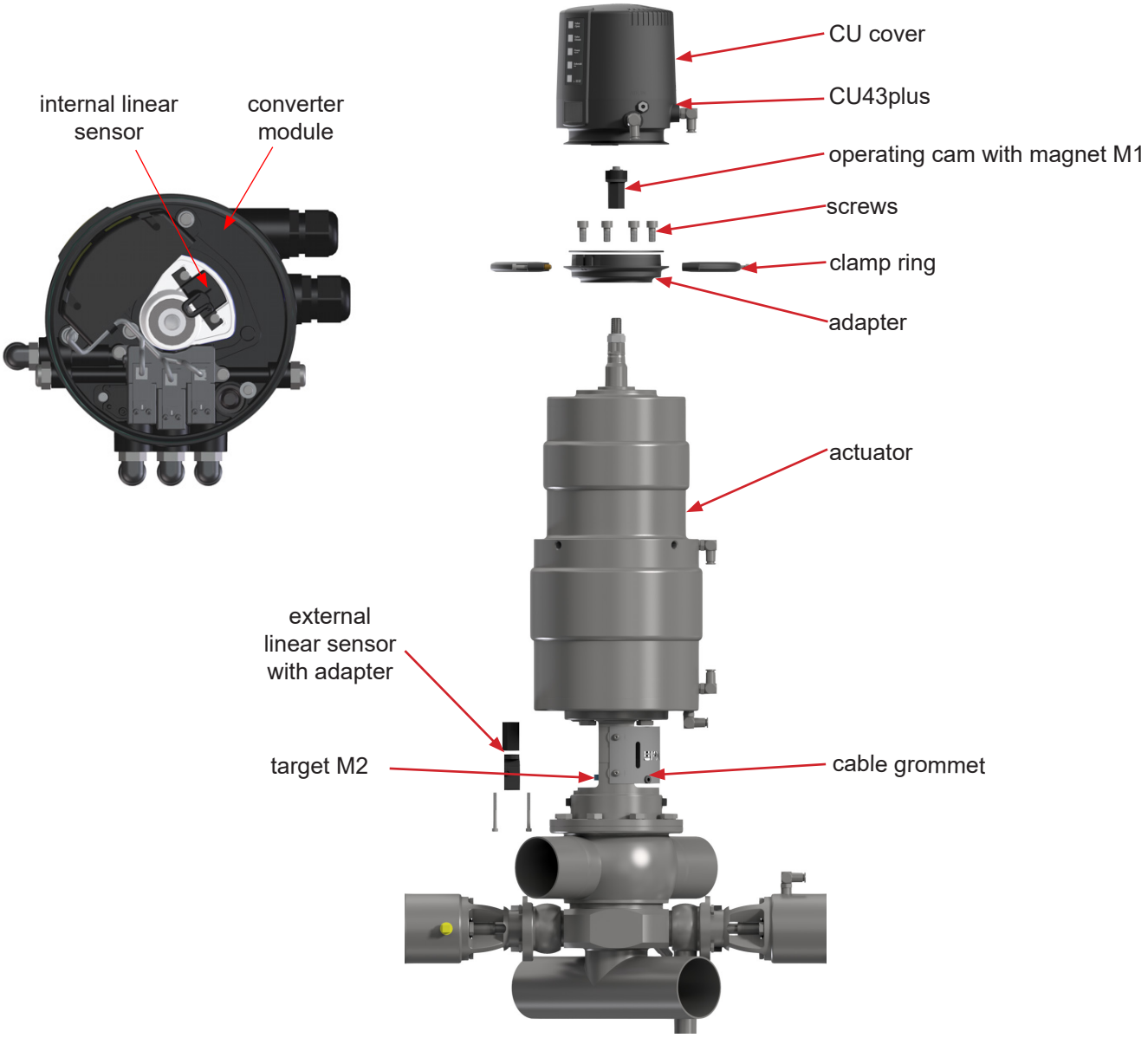
8.5.2 Electric connection

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

Observe the Safety Instructions specified in chapter 2.

8. CU Assembly and Startup

8.6. Aseptic Double seat mix proof valve AM1



Assembly of the control unit on the valve

1. Assemble the target M2 on the upper shaft, see oper. manual AM1.
2. Assemble the external linear sensor with the adapter in the yoke area. Insert cable through cable gland an connect to the E-modul.
3. Assemble the adapter with the 4 screws on the double seat valve.
4. Assemble the operating cam M1 on the guide rod.
5. Place the control unit onto the adapter. Observe alignment!
6. Attach the clamp rings and fasten them with the 2 screws.
7. Align air connections of the control unit to the valve actuator.

8. CU Assembly and Startup

8.6.1 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.

8.6.2 Electric connection

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

Observe the Safety Instructions specified in chapter 2.

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

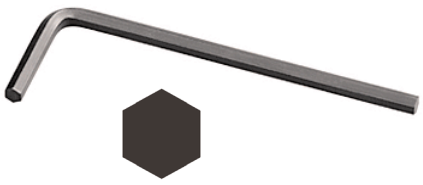
Loctite semi-solid

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 cables from the terminal strip.
+ 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-M 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-M DC CU43plus-D4-DC CU43plus DT4 SL CU43plus AM1
	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 DA3 / DA4 / D4 SL / D4 PMO / DT4 SL / AM1 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:

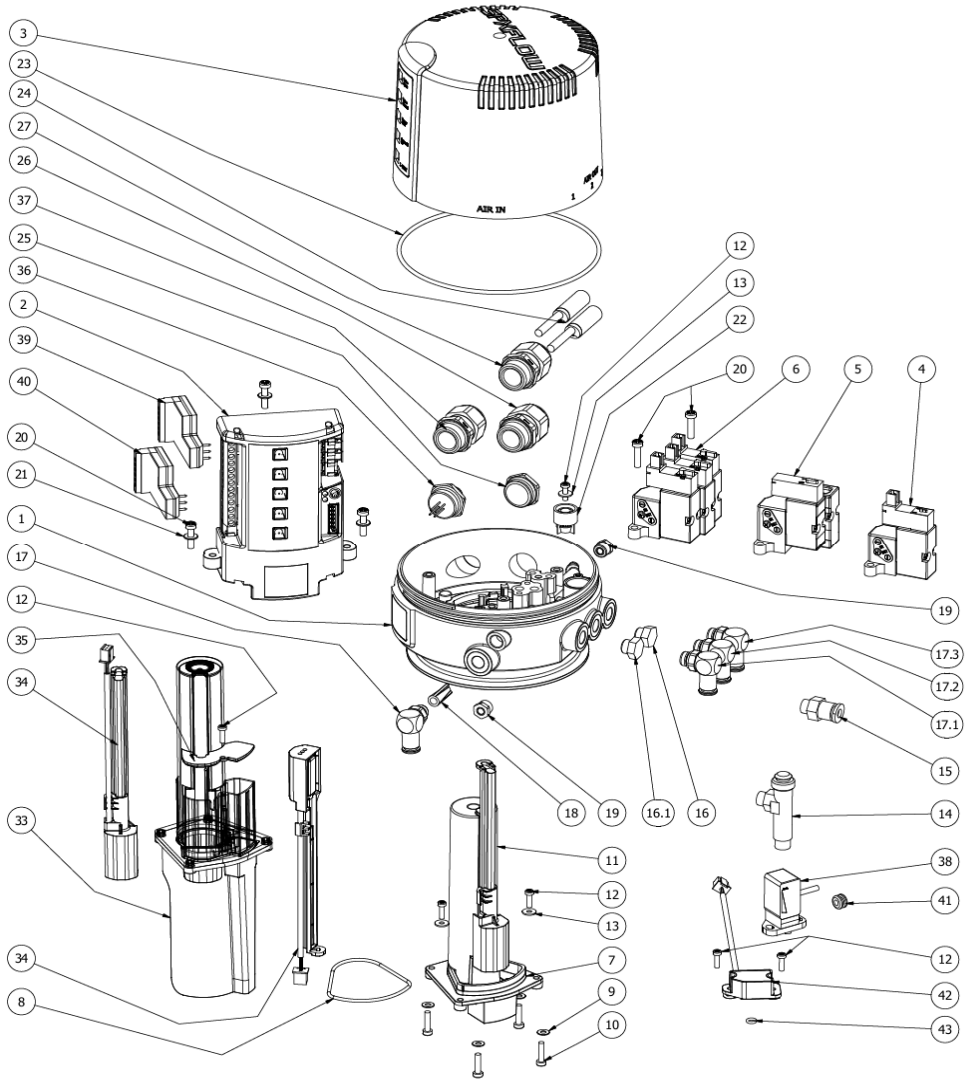
- number of parts required
- ID number
- reference number
- parts designation

Data are subject to change.

Spare Parts list

Control Unit CU4 plus Direct Connect

Date:	16.04.24				SPX FLOW
Name:	C.Keil				
Reviewed:	N.Spliethoff				
Date:					Page 1 of 9
Name:					RN 01.044.7
Reviewed:					



Spare parts list

Control Unit CU4 plus Direct Connect
CU4plus-S Direct Connect

Date:	16.04.24				SPX FLOW
Name:	C.Keil				
Reviewed:	N.Spliethoff				
Date:					Page 2 9
Name:					RN 01.044.7
Reviewed:					

pos. item	Quantity	Description	required in version	Material	Part no.
		CU41plus S DC. (6x1)		PA6.6 GF30	H342436
		CU41plus S DC cpl. (1/4")		PA6.6 GF30	H342437
		CU41plus S DC. (6x1) M12		PA6.6 GF30	H342456
		CU41plus S DC cpl. (1/4") M12		PA6.6 GF30	H342457
		CU43plus S DC. (6x1)		PA6.6 GF30	H342448
		CU43plus S DC cpl. (1/4")		PA6.6 GF30	H342449
		CU43plus S DC. (6x1) M12		PA6.6 GF30	H342468
		CU43plus S DC cpl. (1/4") M12		PA6.6 GF30	H342469
1	1	CU41-Base	CU41	PA6.6 GF30	H319853
	1	CU43-Base	CU43	PA6.6 GF30	H319857
2	1	CU4plus DC E-Modul	CU41+43	Zytel 70G33L	H343238
3	1	CU4 Cover	CU41+43	PA12 Black	H325602
4	1	Solenoid valve 1EMV	CU41	PPS	H319950
6	1	Solenoid valve 3 EMV	CU43	PPS	H319952
7	1	CU4plus Sensortower	CU41+43	Grilamid TR90	H321498
8	1	O-ring 47,29 x 2,62	CU41+43	NBR	H320401
9	4	Washer DIN125 A=3,7	CU41+43	A2	H323771
10	4	Ejot Delta PT screw 35 x 14	CU41+43	A2	H320364
11	1	CU4plus sensor cpl.	CU41+43	Noryl black	H324877
12	3	Ejot Delta PT screw 30 x 10	CU41+43	A2	H320363
13	3	Washer DIN9021 A=3,2	CU41+43	A2	H320404
16.1	1	Plug G1/8" with o-ring	CU41	Nickel-plated brass	H320482
17	1	Elbow connector G1/8" 6x1	CU41+43	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD	CU41+43	Nickel-plated brass	H312732
17.1	1	Elbow connector G1/8" 6x1	CU41+43	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD	CU41+43	Nickel-plated brass	H312732
17.2	1	Elbow connector G1/8" 6x1	CU43	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD	CU43	Nickel-plated brass	H312732
17.3	1	Elbow connector G1/8" 6x1	CU43	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD	CU43	Nickel-plated brass	H312732

pos. item	Quantity	Description, product contacted seals with reference number	required in version	Material	Part no.
18	1	CU4 air filter	CU41+43	PE	H320223
19	1	Sound reducer	CU41+43	Nickel-plated brass	H208826
20	5	Ejot Delta PT screw 40 x 16	CU41+43	A2	H320365
21	3	Washer DIN125 I=4,3	CU41+43	A2	H79576
22	1	CU4 overflow valve	CU41+43	PPS	H320352
23	1	O-ring 120,32 x 2,62	CU41+43	NBR	H320402
25	1	Plug V-NE-SD M20x1,5	CU43	PA black	H324895
26	1	Screwed cable gland M20x1,5 ø6-12	CU41	PA black	H323199
36	1	Female flange M12x1 with sld. con.5pin	CU41	1.4404	H341353
	1	Female flange M12x1 with sld. con.12pin	CU43	1.4404	H345456

CU4plus Adapter

Adapter Spareparts information to be found in document: RN01.044.3-1

Spare parts list

Control Unit CU4 plus Direct Connect
CU41Nplus-S Direct Connect

Date:	16.04.24				SPX FLOW
Name:	C.Keil				
Reviewed:	N.Spliethoff				
Date:					Page 3 9
Name:					RN 01.044.7
Reviewed:					

pos. item	Quantity	Description	required in version	Material	Part no.
		CU41Nplus S DC cpl. (6x1)		PA6.6 GF30	H342444
		CU41Nplus S DC cpl. (1/4")		PA6.6 GF30	H342445
		CU41Nplus S DC cpl. (6x1) M12		PA6.6 GF30	H342464
		CU41Nplus S DC cpl. (1/4") M12		PA6.6 GF30	H342465
1	1	CU41-Base	CU41	PA6.6 GF30	H319853
2	1	CU4plus DC E-Modul	CU41	Zytel 70G33L	H343238
3	1	CU4 Cover	CU41	PA12 Black	H325602
5	1	Solenoid valve 1 EMV+NOT-element		PPS	H319951
7	1	CU4plus Sensortower	CU41	Grilamid TR90	H321498
8	1	O-ring 47,29 x 2,62	CU41	NBR	H320401
9	4	Washer DIN125 A=3,7	CU41	A2	H323771
10	4	Ejot Delta PT screw 35 x 14	CU41	A2	H320364
11	1	CU4plus sensor cpl.	CU41	Noryl black	H324877
12	3	Ejot Delta PT screw 30 x 10	CU41	A2	H320363
13	3	Washer DIN9021 A=3,2	CU41	A2	H320404
14	1	Pressure reducer valve 5 bar	CU41	Nickel-plated brass	H208841
15	1	Connection direct automatic lock	CU41	Nickel-plated brass	H320551
17	1	Elbow connector G1/8" 6x1	CU41	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD	CU41 (1/4")	Nickel-plated brass	H312732
17.1	1	Elbow connector G1/8" 6x1	CU41	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD	CU41 (1/4")	Nickel-plated brass	H312732
18	1	CU4 air filter	CU41	PE	H320223
19	1	Sound reducer	CU41	Nickel-plated brass	H208826
20	5	Ejot Delta PT screw 40 x 16	CU41	A2	H320365
21	3	Washer DIN125 I=4,3	CU41	A2	H79576
22	1	CU4 overflow valve	CU41	PPS	H320352
23	1	O-ring 120,32 x 2,62	CU41	NBR	H320402
26	1	Screwed cable gland M20x1,5 ø6-12	CU41	PA black	H323199
36	1	Female flange M12x1 with sld.con.5pin	CU41	1.4404	H341353

pos. item	Quantity	Description, product contacted seals with reference number	required in version	Material	Part no.

CU4plus Adapter

Adapter Spareparts information to be found in document: RN01.044.3-1

Spare parts list

Control Unit CU4 plus Direct Connect
CU41plus-T Direct Connect

Date:	16.04.24				SPX FLOW
Name:	C.Keil				
Reviewed:	N.Spliethoff				
Date:					Page 4 9
Name:					RN 01.044.7
Reviewed:					

pos. item	Quantity	Description	required in version	Material	Part no.
		CU41plus T DC cpl. (6x1)		PA6.6 GF30	H342438
		CU41plus T DC cpl. (1/4")		PA6.6 GF30	H342439
		CU41plus T DC cpl. (6x1) M12		PA6.6 GF30	H342458
		CU41plus T DC cpl. (1/4") M12		PA6.6 GF30	H342459
1	1	CU41-Base	CU41	PA6.6 GF30	H319854
2	1	CU4plus DC E-Modul	CU41	Zytel 70G33L	H343238
3	1	CU4 Cover	CU41	PA12 Black	H325602
4	1	Solenoid valve 1EMV	CU41	PPS	H319950
7	1	CU4plus Sensortower	CU41	Grilamid TR90	H321498
8	1	O-ring 47,29 x 2,62	CU41	NBR	H320401
9	4	Washer DIN125 A=3,7	CU41	A2	H323771
10	4	Ejot Delta PT screw 35 x 14	CU41	A2	H320364
11	1	CU4plus sensor cpl.	CU41	Noryl black	H324877
12	3	Ejot Delta PT screw 30 x 10	CU41	A2	H320363
13	3	Washer DIN9021 A=3,2	CU41	A2	H320404
16	1	Plug G1/8" with o-ring	CU41	Nickel-plated brass	H320482
16.1	1	Plug G1/8" with o-ring	CU41	Nickel-plated brass	H320482
17	1	Elbow connector G1/8" 6x1	CU41	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD	CU41 (1/4")	Nickel-plated brass	H312732
18	1	CU4 air filter	CU41	PE	H320223
19	1	Sound reducer	CU41	Nickel-plated brass	H208826
20	5	Ejot Delta PT screw 40 x 16	CU41	A2	H320365
21	3	Washer DIN125 I=4,3	CU41	A2	H79576
22	1	CU4 overflow valve	CU41	PPS	H320352
23	1	O-ring 120,32 x 2,62	CU41	NBR	H320402
25	1	Plug V-NE-SD M20x1,5	CU41	PA black	H324895
36	1	Female flange M12x1 with sld.con.5pin	CU41	1.4404	H341353

pos. item	Quantity	Description, product contacted seals with reference number	required in version	Material	Part no.

CU4plus Adapter

Adapter Spareparts information to be found in document: RN01.044.3-1

Spare parts list

Control Unit CU4 plus Direct Connect
CU41Nplus-T Direct Connect

Date:	16.04.24				SPX FLOW
Name:	C.Keil				
Reviewed:	N.Spliethoff				
Date:					Page 5 9
Name:					RN 01.044.7
Reviewed:					

pos. item	Quantity	Description	required in version	Material	Part no.
		CU41Nplus T DC cpl. (6x1)		PA6.6 GF30	H342446
		CU41Nplus T DC cpl. (1/4")		PA6.6 GF30	H342447
		CU41Nplus T DC cpl. (6x1) M12		PA6.6 GF30	H342466
		CU41Nplus T DC cpl. (1/4") M12		PA6.6 GF30	H342467
1	1	CU41-Base	CU41	PA6.6 GF30	H319854
2	1	CU4plus DC E-Modul	CU41	Zytel 70G33L	H343238
3	1	CU4 Cover	CU41	PA12 Black	H325602
5	1	Solenoid valve 1 EMV+NOT-element		PPS	H319951
7	1	CU4plus Sensortower	CU41	Grilamid TR90	H321498
8	1	O-ring 47,29 x 2,62	CU41	NBR	H320401
9	4	Washer DIN125 A=3,7	CU41	A2	H323771
10	4	Ejot Delta PT screw 35 x 14	CU41	A2	H320364
11	1	CU4plus sensor cpl.	CU41		H324877
12	3	Ejot Delta PT screw 30 x 10	CU41	A2	H320363
13	3	Washer DIN9021 A=3,2	CU41	A2	H320404
14	1	Pressure reducer valve 5 bar		Nickel-plated brass	H208841
15	1	Connection direct automatic lock		Nickel-plated brass	H320551
16	1	Plug G1/8" with o-ring	CU41	Nickel-plated brass	H320482
17	1	Elbow connector G1/8" 6x1	CU41	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD	CU41 (1/4")	Nickel-plated brass	H312732
18	1	CU4 air filter	CU41	PE	H320223
19	1	Sound reducer	CU41	Nickel-plated brass	H208826
20	5	Ejot Delta PT screw 40 x 16	CU41	A2	H320365
21	3	Washer DIN125 I=4,3	CU41	A2	H79576
22	1	CU4 overflow valve	CU41	PPS	H320352
23	1	O-ring 120,32 x 2,62	CU41	NBR	H320402
26	1	Screwed cable gland M20x1,5 ø6-12	CU41	PA black	H323199
36	1	Female flange M12x1 with sld.con.5pin	CU41	1.4404	H341353

pos. item	Quantity	Description, product contacted seals with reference number	required in version	Material	Part no.

CU4plus Adapter

Adapter Spareparts information to be found in document: RN01.044.3-1

Spare parts list

Control Unit CU4 plus Direct Connect
CU4plus-M Direct Connect

Date:	16.04.24				SPX FLOW
Name:	C.Keil				
Reviewed:	N.Spliethoff				
Date:					Page 6 9
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Reviewed:					

pos. item	Quantity	Description	required in version	Material	Part no.
		CU41plus M DC cpl.(6x1)		PA6.6 GF30	H342440
		CU41plus M DC cpl.(1/4")		PA6.6 GF30	H342441
		CU41plus M DC cpl.(6x1) M12		PA6.6 GF30	H342460
		CU41plus M DC cpl.(1/4") M12		PA6.6 GF30	H342461
		CU43plus M DC cpl.(1/4")		PA6.6 GF30	H342451
		CU43plus M DC cpl.(6x1)		PA6.6 GF30	H342450
		CU43plus M DC cpl.(1/4") M12		PA6.6 GF30	H342471
		CU43plus M DC cpl.(6x1) M12		PA6.6 GF30	H342470
1	1	CU41-Base	CU41	PA6.6 GF30	H319855
	1	CU43-Base	CU43	PA6.6 GF30	H319857
2	1	CU4plus DC E-Modul	CU41+43	Zytel 70G33L	H343238
3	1	CU4 Cover	CU41+43	PA12 Black	H325602
4	1	Solenoid valve 1EMV	CU41	PPS	H319950
6	1	Solenoid valve 3 EMV	CU43	PPS	H319952
7	1	CU4plus Sensortower	CU41+43	Grilamid TR90	H321498
8	1	O-ring 47,29 x 2,62	CU41+43	NBR	H320401
9	4	Washer DIN125 A=3,7	CU41+43	A2	H323771
10	4	Ejot Delta PT screw 35 x 14	CU41+43	A2	H320364
11	1	CU4plus sensor cpl.	CU41+43	Noryl black	H324877
12	3	Ejot Delta PT screw 30 x 10	CU41+43	A2	H320363
13	3	Washer DIN9021 A=3,2	CU41+43	A2	H320404
16.1	1	Plug G1/8" with o-ring	CU41	Nickel-plated brass	H320482
17	1	Elbow connector G1/8" 6x1	CU41+43	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD	CU41+43	Nickel-plated brass	H312732
17.1	1	Elbow connector G1/8" 6x1	CU41+43	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD	CU41+43	Nickel-plated brass	H312732
17.2	1	Elbow connector G1/8" 6x1	CU43	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD	CU43	Nickel-plated brass	H312732
17.3	1	Elbow connector G1/8" 6x1	CU43	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD	CU43	Nickel-plated brass	H312732

pos. item	Quantity	Description, product contacted seals with reference number	required in version	Material	Part no.
18	1	CU4 air filter	CU41+43	PE	H320223
19	1	Sound reducer	CU41+43	Nickel-plated brass	H208826
20	5	Ejot Delta PT screw 40 x 16	CU41+43	A2	H320365
21	3	Washer DIN125 I=4,3	CU41+43	A2	H79576
22	1	CU4 overflow valve	CU41+43	PPS	H320352
23	1	O-ring 120,32 x 2,62	CU41+43	NBR	H320402
24	2	Proximity switch Ni5 K11K-AN 5X/5			H208844
26	1	Screwed cable gland M20x1,5 ø6-12	CU41+43	PA black	H323199
27	1	Screwed cable gland M20x1,5 ø2x5	CU43	PA black	H320371
36	1	Female flange M12x1 with sld. con.5pin	CU41	1.4404	H341353
	1	Female flange M12x1 with sld. con.8pin	CU43	1.4404	H341354
40	1	CU4plus ada. Sensor 2 prox. Switches	CU43	PA black	H342435

CU4plus Adapter

Adapter Spareparts information to be found in document: RN01.044.3-1

Spare parts list

Control Unit CU4 plus Direct Connect
CU4plus-D4 Direct Connect

Date:	16.04.24				SPX FLOW
Name:	C.Keil				
Reviewed:	N.Spliethoff				
Date:					Page 7 9
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Reviewed:					

pos. item	Quantity	Description		required in version	Material	Part no.
		CU41plus D4 DC (6x1)			PA6.6 GF30	H342442
		CU41plus D4 DC (1/4")			PA6.6 GF30	H342443
		CU41plus D4 DC (6x1) M12			PA6.6 GF30	H342462
		CU41plus D4 DC (1/4") M12			PA6.6 GF30	H342463
		CU43plus D4 DC (6x1)			PA6.6 GF30	H342452
		CU43plus D4 DC (1/4")			PA6.6 GF30	H342453
		CU43plus D4 DC (6x1) M12			PA6.6 GF30	H342472
		CU43plus D4 DC (1/4") M12			PA6.6 GF30	H342473
1	1	CU41-Base		CU41	PA6.6 GF30	H319855
	1	CU43-Base		CU43	PA6.6 GF30	H319857
2	1	CU4plus DC E-Modul		CU41+43	Zytel 70G33L	H343238
3	1	CU4 Cover		CU41+43	PA12 Black	H325602
4	1	Solenoid valve 1EMV		CU41	PPS	H319950
6	1	Solenoid valve 3 EMV		CU43	PPS	H319952
8	1	O-ring	47,29 x 2,62	CU41+43	NBR	H320401
9	4	Washer	DIN125 A=3,7	CU41+43	A2	H323771
10	4	Ejot Delta PT screw	35 x 14	CU41+43	A2	H320364
12	6	Ejot Delta PT screw	30 x 10	CU41+43	A2	H320363
13	3	Washer	DIN9021 A=3,2	CU41+43	A2	H320404
16	1	Plug G1/8" with o-ring		CU41	Nickel-plated brass	H320482
17	1	Elbow connector G1/8" 6x1		CU41+43	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD		CU41+43	Nickel-plated brass	H312732
17.1	1	Elbow connector G1/8" 6x1		CU41+43	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD		CU41+43	Nickel-plated brass	H312732
17.2	1	Elbow connector G1/8" 6x1		CU43	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD		CU43	Nickel-plated brass	H312732
17.3	1	Elbow connector G1/8" 6x1		CU43	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD		CU43	Nickel-plated brass	H312732
18	1	CU4 air filter		CU41+43	PE	H320223
19	1	Sound reducer		CU41+43	Nickel-plated brass	H208826

pos. item	Quantity	Description, product contacted seals with reference number		required in version	Material	Part no.
20	5	Ejot Delta PT screw	40 x 16	CU41+43	A2	H320365
21	3	Washer	DIN125 I=4,3	CU41+43	A2	H79576
22	1	CU4 overflow valve		CU41+43	PPS	H320352
23	1	O-ring	120,32 x 2,62	CU41+43	NBR	H320402
25	1	Plug V-NE-SD M20x1,5		CU41+43	PA black	H324895
26	1	Screwed cable gland M20x1,5 ø6-12		CU41+43	PA black	H323199
33	1	CU4plus sensortower D4 V2		CU41+43	PET	H339461
34	2	CU4plus Sensor V2		CU41+43	Noryl black	H339463
35	1	Cap CU4plus sensor tower		CU41+43	Noryl black	H339432
36	1	Female flange M12x1 with sld. Con. 5pi		CU41	1.4404	H341353
	1	Female flange M12x1 with sld. Con. 8pi		CU43	1.4404	H341354

CU4plus Adapter

Adapter Spareparts information to be found in document: RN01.044.3-1

Spare parts list

Control Unit CU4 plus Direct Connect
CU43plus-DT4 Direct Connect

Date:	16.04.24				SPX FLOW
Name:	C.Keil				
Reviewed:	N.Spliethoff				
Date:					Page 8 9
Name:					RN 01.044.7
Reviewed:					

pos. item	Quantity	Description		required in version	Material	Part no.
		CU43plus DT4 DC (6x1)			PA6.6 GF30	H342454
		CU43plus DT4 DC(1/4")			PA6.6 GF30	H342455
		CU43plus DT4 DC(6x1) M12			PA6.6 GF30	H342474
		CU43plus DT4 DC (1/4") M12			PA6.6 GF30	H342475
1	1	CU43-Base		CU43	PA6.6 GF30	H319857
2	1	CU4plus DC E-Modul		CU43	Zytel 70G33L	H343238
3	1	CU4 Cover		CU43	PA12 Black	H325602
6	1	Solenoid valve 3 EMV		CU43	PPS	H319952
7	1	CU4plus Sensortower		CU43	Grilamid TR90	H321498
8	1	O-ring	47,29 x 2,62	CU43	NBR	H320401
9	4	Washer	DIN125 A=3,7	CU43	A2	H323771
10	4	Ejot Delta PT screw	35 x 14	CU43	A2	H320364
11	1	CU4plus sensor cpl.		CU43	Noryl black	H324877
12	6	Ejot Delta PT screw	30 x 10	CU43	A2	H320363
13	3	Washer	DIN9021 A=3,2	CU43	A2	H320404
17	1	Elbow connector G1/8" 6x1		CU43	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD		CU43	Nickel-plated brass	H312732
17.1	1	Elbow connector G1/8" 6x1		CU43	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD		CU43	Nickel-plated brass	H312732
17.2	1	Elbow connector G1/8" 6x1		CU43	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD		CU43	Nickel-plated brass	H312732
17.3	1	Elbow connector G1/8" 6x1		CU43	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD		CU43	Nickel-plated brass	H312732
18	1	CU4 air filter		CU43	PE	H320223
19	1	Sound reducer		CU43	Nickel-plated brass	H208826
20	5	Ejot Delta PT screw	40 x 16	CU43	A2	H320365
21	3	Washer	DIN125 I=4,3	CU43	A2	H79576
22	1	CU4 overflow valve		CU43	PPS	H320352
23	1	O-ring	120,32 x 2,62	CU43	NBR	H320402
26	1	Screwed cable gland M20x1,5 ø5-9		CU43	PA black	H320372

pos. item	Quantity	Description, product contacted seals with reference number	required in version	Material	Part no.
36	1	Female fl. M12x1 with sld. con.12pin	CU43	1.4404	H345456
37	1	Screwed cable gland M20x1,5 ø6-12	CU43	PA black	H323199
38	1	Balluff linear sensor	CU43		H343141
39	1	CU4plus Adapter Sensor 0-10V	CU43		H342434
41	1	Cable grommet	CU43	PVC black	H344059

CU4plus Adapter

Adapter Spareparts information to be found in document: RN01.044.3-1

Spare parts list

Control Unit CU4 plus Direct Connect
CU43plus-AM1 Direct Connect

Date:	16.04.24	17.01.25		
Name:	C.Keil	C.Keil		
Reviewed:	N.Spl	N.Spl		

SPX FLOW

Date:				
Name:				
Reviewed:				

RN 01.044.7

pos. item	Quantity	Description		required in version	Material	Part no.
		CU43plus AM1 DC(6x1)			PA6.6 GF30	H348707
		CU43plus AM1 DC(1/4")			PA6.6 GF30	H348712
		CU43plus AM1 DC(6x1) M12			PA6.6 GF30	H348708
		CU43plus AM1 DC(1/4") M12			PA6.6 GF30	H348713
1	1	CU43-Base		CU43	PA6.6 GF30	H319857
2	1	CU4plus DC E-Modul		CU43	Zytel 70G33L	H343238
3	1	CU4 Cover		CU43	PA12 Black	H325602
6	1	Solenoid valve 3 EMV		CU43	PPS	H319952
7	1	CU4plus Sensortower		CU43	Grilamid TR90	H321498
8	1	O-ring	47,29 x 2,62	CU43	NBR	H320401
9	4	Washer	DIN125 A=3,7	CU43	A2	H323771
10	4	Ejot Delta PT screw	35 x 14	CU43	A2	H320364
11	1	CU4plus sensor cpl.		CU43	Noryl black	H324877
12	6	Ejot Delta PT screw	30 x 10	CU43	A2	H320363
13	3	Washer	DIN9021 A=3,2	CU43	A2	H320404
17	1	Elbow connector G1/8" 6x1		CU43	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD		CU43	Nickel-plated brass	H312732
17.1	1	Elbow connector G1/8" 6x1		CU43	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD		CU43	Nickel-plated brass	H312732
17.2	1	Elbow connector G1/8" 6x1		CU43	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD		CU43	Nickel-plated brass	H312732
17.3	1	Elbow connector G1/8" 6x1		CU43	Nickel-plated brass	H208825
	1	Elbow connector G1/8" 1/4" OD		CU43	Nickel-plated brass	H312732
18	1	CU4 air filter		CU43	PE	H320223
19	1	Sound reducer		CU43	Nickel-plated brass	H208826
20	5	Ejot Delta PT screw	40 x 16	CU43	A2	H320365
21	3	Washer	DIN125 I=4,3	CU43	A2	H79576
22	1	CU4 overflow valve		CU43	PPS	H320352
23	1	O-ring	120,32 x 2,62	CU43	NBR	H320402
26	1	Screwed cable gland M20x1,5 ø5-9		CU43	PA black	H320372

pos. item	Quantity	Description, product contacted seals with reference number		required in version	Material	Part no.
36	1	Female fl. M12x1 with sld. con.12pin		CU43-M12	1.4404	H345456
37	1	Screwed cable gland M20x1,5 ø6-12		CU43	PA black	H323199
38	1	Balluff linear sensor		CU43		H343141
39	1	CU4plus Adapter Sensor 0-10V		CU43		H342434
41	1	Cable grommet		CU43	PVC black	H344059
42	1	CU4plus pressure sensor cpl.		CU43		H336026
43	1	O-ring	4 x 1,5	CU43		H336024

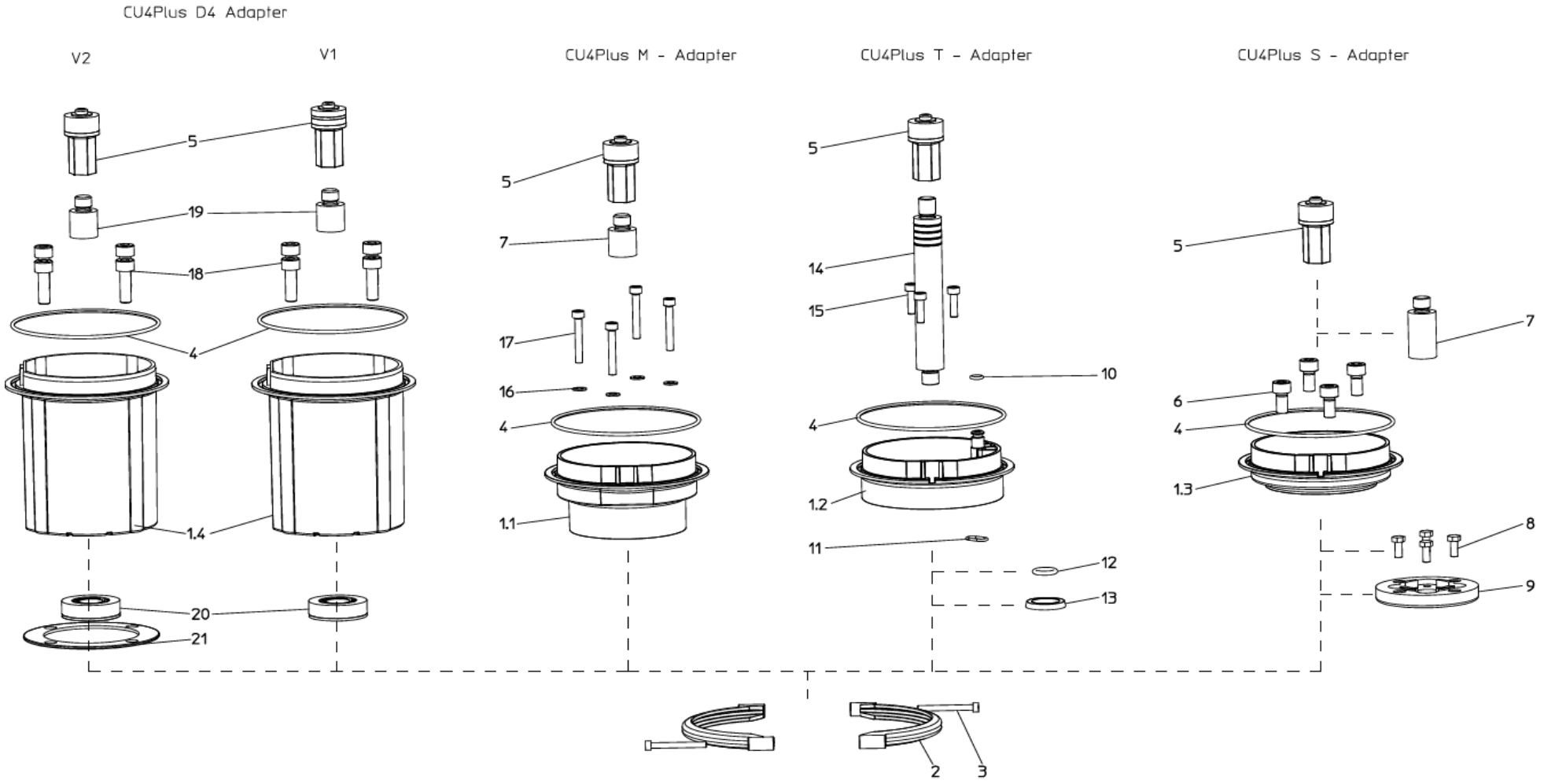
CU4plus Adapter

Adapter Spareparts information to be found in document: RN01.044.3-1

Spare Parts list

Control Unit CU4 plus Adapter

Date:	19.04.24	19.12.24			SPX FLOW
Name:	C.Keil	C.Keil			
Reviewed:	N.Spl	N.Spl			
Date:					Page 1 of 8
Name:					RN 01.044.3-1
Reviewed:					

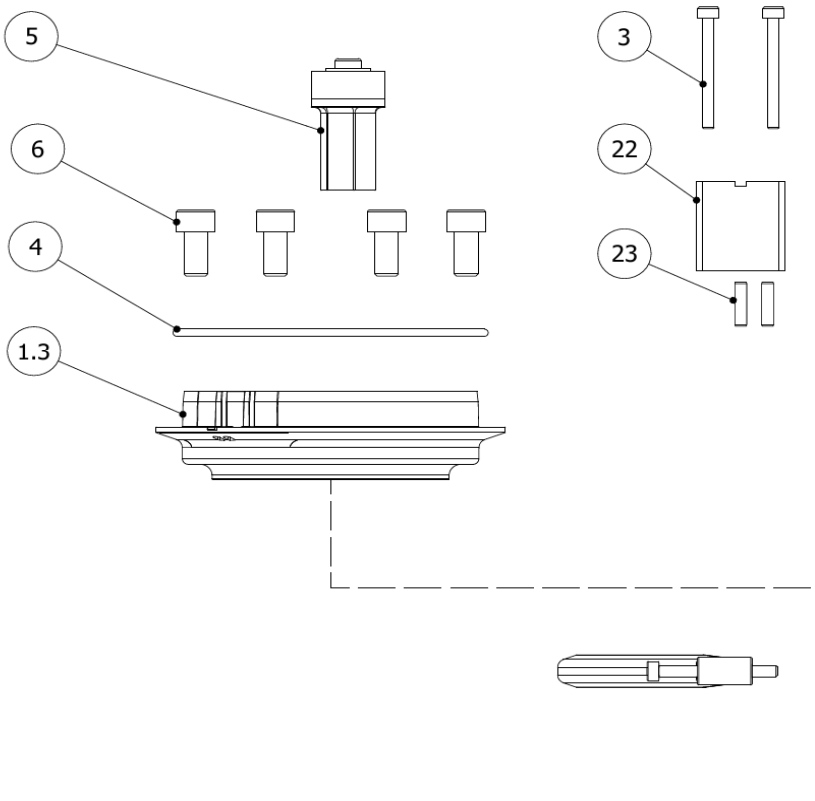


Spare Parts list

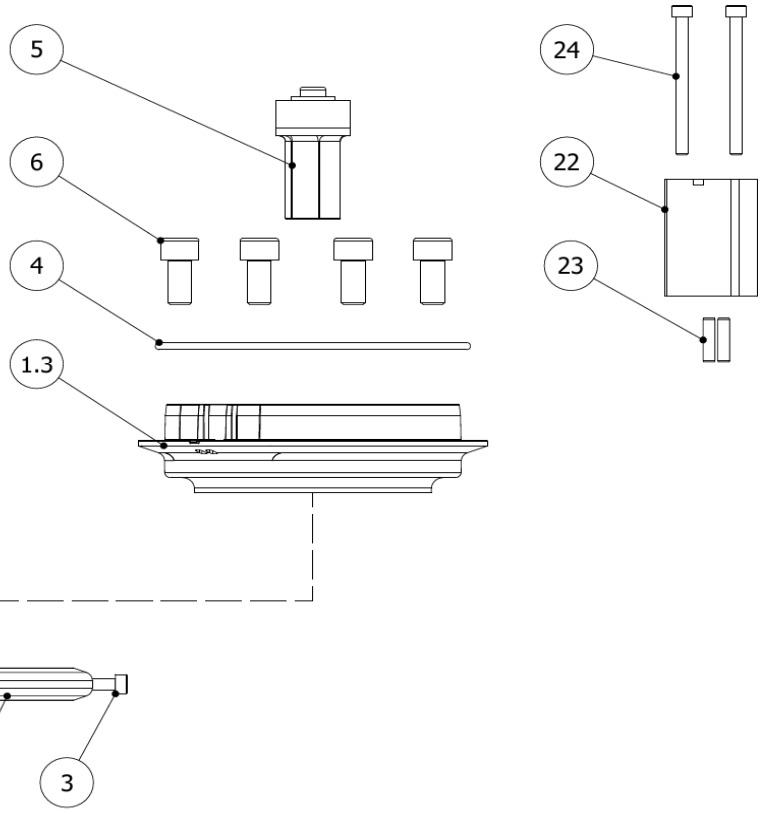
Control Unit CU4 plus Adapter

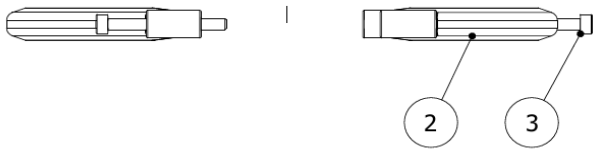
Date:	19.04.24				SPX FLOW
Name:	C.Keil				
Reviewed:	N.Spl				
Date:					Page 2 of 8
Name:					RN 01.044.3-1
Reviewed:					

CU4plus DT4-62 / AM1 Adapter



CU4plus DT4-92 Adapter





Spare parts list

Control Unit CU4 plus Adapter
CU4plus-S / CU4plus-S Longstroke

Date:	19.04.24				SPX FLOW
Name:	C.Keil				
Reviewed:	N.Spl				
Date:					Page 3 8
Name:					RN 01.044.3-1
Reviewed:					

pos. item	Quantity	Description	required in version	Material	Part no.
		CU4 S adapter cpl.	S		H333143
1.3	1	CU4 adapter S	S	Zytel 70G33L	H319874
2	2	CU4 clamp cpl.	S	Grivory	H319873
3	2	Cylinder Screw M4x40	S	A2-70	H320360
4	1	O-Ring 101,27x2,62	S	NBR	H148389
5	1	CU4 magnet cpl.	S	Zytel 70G33L	H333099
6	4	Cylinder Screw M8x16	S	A2-70	H79012

pos. item	Quantity	Description	required in version	Material	Part no.
		CU4 S Longstroke Ø165 adapter cpl.	S-Longstroke		H335312
1.3	1	CU4 adapter S	S-Longstroke	Zytel 70G33L	H319874
2	2	CU4 clamp cpl.	S-Longstroke	Grivory	H319873
3	2	Cylinder Screw M4x40	S-Longstroke	A2-70	H320360
4	1	O-Ring 101,27x2,62	S-Longstroke	NBR	H148389
5	1	CU4 magnet cpl.	S-Longstroke	Zytel 70G33L	H333099
6	4	Cylinder Screw M8x25	S-Longstroke	A2-70	H79014
9	1	CU adapter SW4	S-Longstroke	PA6	H330879

Spare parts list

Control Unit CU4 plus Adapter
CU4plus-S mini / CU4plus-S max

Date:	19.04.24				SPX FLOW
Name:	C.Keil				
Reviewed:	N.Spl				
Date:					Page 4 8
Name:					RN 01.044.3-1
Reviewed:					

pos. item	Quantity	Description		required in version	Material	Part no.
		CU4 S mini adapter cpl.		S mini		H333144
1.3	1	CU4 adapter S		S mini	Zytel 70G33L	H319874
2	2	CU4 clamp cpl.		S mini	Grivory	H319873
3	2	Cylinder Screw	M4x40	S mini	A2-70	H320360
4	1	O-Ring	101,27x2,62	S mini	NBR	H148389
5	1	CU4 magnet cpl.		S mini	Zytel 70G33L	H333099
6	4	Cylinder Screw	M8x16	S mini	A2-70	H79012
7	1	Guide rod extension		S mini	PA6	H207570
8	1	Hex. Screw	M5x12	S mini	A2-70	H78737
9	1	CU adapter SW4		S mini	PA6	H207570

pos. item	Quantity	Description		required in version	Material	Part no.
		CU4 S max adapter cpl.		S max		H333145
1.3	1	CU4 adapter S		S max	Zytel 70G33L	H319874
2	2	CU4 clamp cpl.		S max	Grivory	H319873
3	2	Cylinder Screw	M4x40	S max	A2-70	H320360
4	1	O-Ring	101,27x2,62	S max	NBR	H148389
5	1	CU4 magnet cpl.		S max	Zytel 70G33L	H333099
6	4	Cylinder Screw	M8x60	S max	A2-70	H315760
7	1	Guide rod extension		S max	PA6	H327149
9	1	CU adapter SW4		S max	PA6	H330879

Spare parts list

Control Unit CU4 plus Adapter CU4plus-T / CU4plus-T max

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pos. item	Quantity	Description		required in version	Material	Part no.
		CU4 T adapter cpl.		T		H333146
1.2	1	CU4 adapter T		T	Zytel 70G33L	H319875
2	2	CU4 clamp cpl.		T	Grivory	H319873
3	2	Cylinder Screw	M4x40	T	A2-70	H320360
4	1	O-Ring	101,27x2,62	T	NBR	H148389
5	1	CU4 magnet cpl.		T	Zytel 70G33L	H333099
10	1	O-ring	6x2	T	NBR	H320505
11	1	O-ring	11x2	T	NBR	H321897
14	1	CU4 guide rod		T	PA6.6	H320480
15	1	Cylinder screw	M5x16	T	A2-70	H79000

pos. item	Quantity	Description		required in version	Material	Part no.
		CU4 T max adapter cpl.		T max		H333147
1.2	1	CU4 adapter T		T max	Zytel 70G33L	H319875
2	2	CU4 clamp cpl.		T max	Grivory	H319873
3	2	Cylinder Screw	M4x40	T max	A2-70	H320360
4	1	O-Ring	101,27x2,62	T max	NBR	H148389
5	1	CU4 magnet cpl.		T max	Zytel 70G33L	H333099
10	1	O-ring	6x2	T max	NBR	H320505
11	1	O-ring	11x2	T max	NBR	H321897
12	1	O-ring	11x3	T max	NBR	H208632
13	1	V-seal		T max	NBR	H171060
14	1	CU4 guide rod		T max	1.4301	H321990
15	3	Cylinder Screw	M5x16	T max	A2-70	H79000

Spare parts list

Control Unit CU4 plus Adapter
CU41plus-M / CU43plus-M

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pos. item	Quantity	Description		required in version	Material	Part no.
		CU41 M adapter cpl.		41 M		H320476
1.1	1	CU4 adapter M		41 M	Zytel 70G33L	H319876
2	2	CU4 clamp cpl.		41 M	Grivory	H319873
3	2	Cylinder Screw	M4x40	41 M	A2-70	H320360
4	1	O-Ring	101,27x2,62	41 M	NBR	H148389
16	4	Washer	9x5,48	41 M	A2-70	H208842
17	4	Cylinder Screw	M5x35	41 M	A2-70	H79028

pos. item	Quantity	Description		required in version	Material	Part no.
		CU43 M adapter cpl.		43 M		H333148
1.1	1	CU4 adapter M		43 M	Zytel 70G33L	H319876
2	2	CU4 clamp cpl.		43 M	Grivory	H319873
3	2	Cylinder Screw	M4x40	43 M	A2-70	H320360
4	1	O-Ring	101,27x2,62	43 M	NBR	H148389
5	1	CU4 magnet switch cam cpl.		43 M	Zytel 70G33L	H333099
7	1	Guide rod extension		43 M	PA6	H333136
16	4	Washer	9x5,48	43 M	A2-70	H208842
17	4	Cylinder Screw	M5x35	43 M	A2-70	H79028

Spare parts list

Control Unit CU4 plus Adapter
CU4plus-D4 V2 / CU4plus-D4 V2

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pos. item	Quantity	Description		required in version	Material	Part no.
		CU4 D4 V1 adapter cpl.		D4 V1		H336441
1.4	1	CU4 adapter D4		D4 V1	Zytel 70G33L	H336038
2	2	CU4 clamp cpl.		D4 V1	Grivory	H319873
3	2	Cylinder Screw	M4x40	D4 V1	A2-70	H320360
4	1	O-Ring	101,27x2,62	D4 V1	NBR	H148389
5	1	CU4 magnet switch cam cpl.		D4 V1	Zytel	H320479
18	4	Cylinder screw		D4 V1	A2-70	H79014
19	1	D4 guide rod adapter for CU4		D4 V1	PA6.6	H336934
20	1	D4 magnet CU4plus cpl.		D4 V1		H348519

pos. item	Quantity	Description		required in version	Material	Part no.
		CU4 D4 V2 adapter cpl.		D4 V2		H341891
1.4	1	CU4 adapter D4		D4 V2	Zytel 70G33L	H336038
2	2	CU4 clamp cpl.		D4 V2	Grivory	H319873
3	2	Cylinder Screw	M4x40	D4 V2	A2-70	H320360
4	1	O-Ring	101,27x2,62	D4 V2	NBR	H148389
5	1	CU4plus magnet switch cam cpl.		D4 V2	Zytel	H333099
18	4	Cylinder screw		D4 V2	A2-70	H173568
19	1	D4 guide rod adapter for CU4		D4 V2	PA6.6	H336934
20	1	D4 magnet CU4plus cpl.		D4 V2		H348519
21	1	CU4plus V2 distance washer		D4 V2	NBR	H342644

Spare parts list

Control Unit CU4 plus Adapter
CU4plus-DT4 62 / CU4plus-DT 92 / CU4plus AM1

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pos. item	Quantity	Description		required in version	Material	Part no.
		CU4 DT4-62 adapter cpl.		DT4 62 / AM1		H343619
1.3	1	CU4 adapter S		DT4 62 / AM1	Zytel 70G33L	H319874
2	2	CU4 clamp cpl.		DT4 62 / AM1	Grivory	H319873
3	4	Cylinder Screw	M4x40	DT4 62 / AM1	A2-70	H320360
4	1	O-Ring	101,27x2,62	DT4 62 / AM1	NBR	H148389
5	1	CU4 magnet switch cam cpl.		DT4 62 / AM1	Zytel	H333099
6	1	Cylinder screw	M8x16	DT4 62 / AM1	A2-70	H79012
22	1	Balluf adapter-62		DT4 62 / AM1	PA6.6	H342080
23	2	Parallel pin	4x16	DT4 62 / AM1	A1	H343581

pos. item	Quantity	Description		required in version	Material	Part no.
		CU4 DT4-92 adapter cpl.		DT4 92		H343620
1.3	1	CU4 adapter S		DT4 92	Zytel 70G33L	H319874
2	2	CU4 clamp cpl.		DT4 92	Grivory	H319873
3	2	Cylinder Screw	M4x40	DT4 92	A2-70	H320360
4	1	O-Ring	101,27x2,62	DT4 92	NBR	H148389
5	1	CU4plus magnet switch cam cpl.		DT4 92	Zytel	H333099
6	1	Cylinder screw	M8x16	DT4 92	A2-70	H79012
22	1	Balluf adapter-92		DT4 62	PA6.6	H343618
23	2	Parallel pin	4x16	DT4 62	A2-70	H343581
24	2	Cylinder screw	M4x50	DT4 62	A2-70	H343617

CU4plus Direct Connect

CONTROL UNIT

SPXFLOW®

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