

Operating Manual

DELTA CU3

Valve-Net Profibus Control Unit



Read and understand this manual prior to operating or servicing this product.

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1. Information

Symbols

The following symbols are used in the operating manual.



Attention: Indicates information which, if not followed, could result in danger to your health or to the functionality of the machine.



Note : Indicates important additional information, tips and recommendations.

2. Safety instructions

Important Information



Always read the manual BEFORE using the Control Unit.

2.1 General

To ensure that the device functions correctly and will have a long service life, please comply with the information given in this operating manual as well as with the operating conditions and permissible data specified in the data sheets of the control unit for process valves.

- When planning the application of the device, and during its operation, observe the general technical rules!
- Installation and maintenance work may only be carried out by specialist staff using the correct tools!
- Observe the relevant accident prevention and safety regulations applicable for electrical equipment while operating and maintaining the device!
- Always switch off the electrical power supply before carrying out any works on the system!
- Note that piping or valves must not be removed from a system that is under pressure!
- 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 ignored, liability will not be accepted from our side, and the guarantee on the device and its accessories will expire!

2. Safety instructions

2.2 Welding instructions

In general, it is recommended to avoid welding work in process plants if the control units are already installed and electrically connected.

If welding is absolutely necessary, switch off power in the complete network and always earth the devices in the welding area.

- always ground the welding torch close to the welding point
- remove the cable for the control unit from the welding point so that the magnetic field around the welding arc does not enter the cable and damage the electronics.

2.3 Connecting terminals

To connect cables with the terminals at the electronic module only use short wire end ferrules without plastic collar!

2.4 Guarantee

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

Attention !



This guarantee only applies to the Control Unit.
No liability will be accepted, however, for consequential damage of any kind that could arise from the failure or malfunction of the device.

3. General description

The control unit consists of an electronic part which scans the position of the valve and provides the information as signals which are compatible with Profibus DP protocol.

For further information pls. study the Programmers Guide for CU3 Valve-Net Profibus!

The solenoid valves are located in the control unit. The solenoid valve which is electrically activated, controls the compressed air. The solenoid valve is equipped with a throttling system for supply and exhaust air, which ensures to decrease the opening and closing speed of the valve.

The control unit for DELTA DE3 / DA3+ valves is available with 1 solenoid valve and with 3 solenoid valves.

The control unit has LEDs which ensure quick visual indication of the valve position, solenoid status and service messages. Pls. see chapter 6. LED indication!

Connections for air and power supply are installed at the control unit together with a valve which cuts off the air supply for removal of the control unit. The control unit can be removed by release of a quick-acting coupling. This permits fast servicing of the valve.

The whole control unit is encapsulated, and all the cable passages and air supplies are sealed so that the control unit complies with the requirements of IP 67.

Label
DELTA CU3 Valve-Net Profibus

3.1

Description of the electronic module Valve-Net Profibus

The solenoid valve and feedback signals are controlled by an electronic module.

The sensors for the upper and lower valve position consist of two Hall sensors or of two external proximity switches for DA3+ and DE3 valves.

See chapter 5. Connections with other Profibus Equipment

For the use of mixproof valves DA3+ with Seat Lifting Detection (SLD) 4 sensors can be installed to the electronic module. See chapter 5. Connections with other Profibus Equipment


The CU3 Valve-Net Profibus is made as Profibus DP slave, according to EN 50170.

Beside information to control the solenoids and to receive the feedback signals a comprehensive information package for diagnosis and service is implemented.

Pls. see the appropriated programmers guide for Profibus.

All the informations and valve settings can be observed via the PLC or via the service terminal with APV Toolbx Software or Handheldterminal.

Pls. see Programmers Guide for Toolbox.

DELTA CU3 Valve-Net Profibus 	
1	Profibus A (-)
2	Profibus B (+)
3	Shield
4	Power supply +
5	Power supply -
6	5V DC
7	Sensor 1
8	Sensor 3
9	Gnd
10	5V DC
11	Sensor 2
12	Sensor 4
13	Gnd

3. General description

3.1.1 Description of the electronic module

The CU3 Valve-Net Profibus is made as Profibus DP slave, according to EN 50170.

Beside information to control the solenoids and to receive the feedback signals a comprehensive information package for diagnosis and service is implemented.

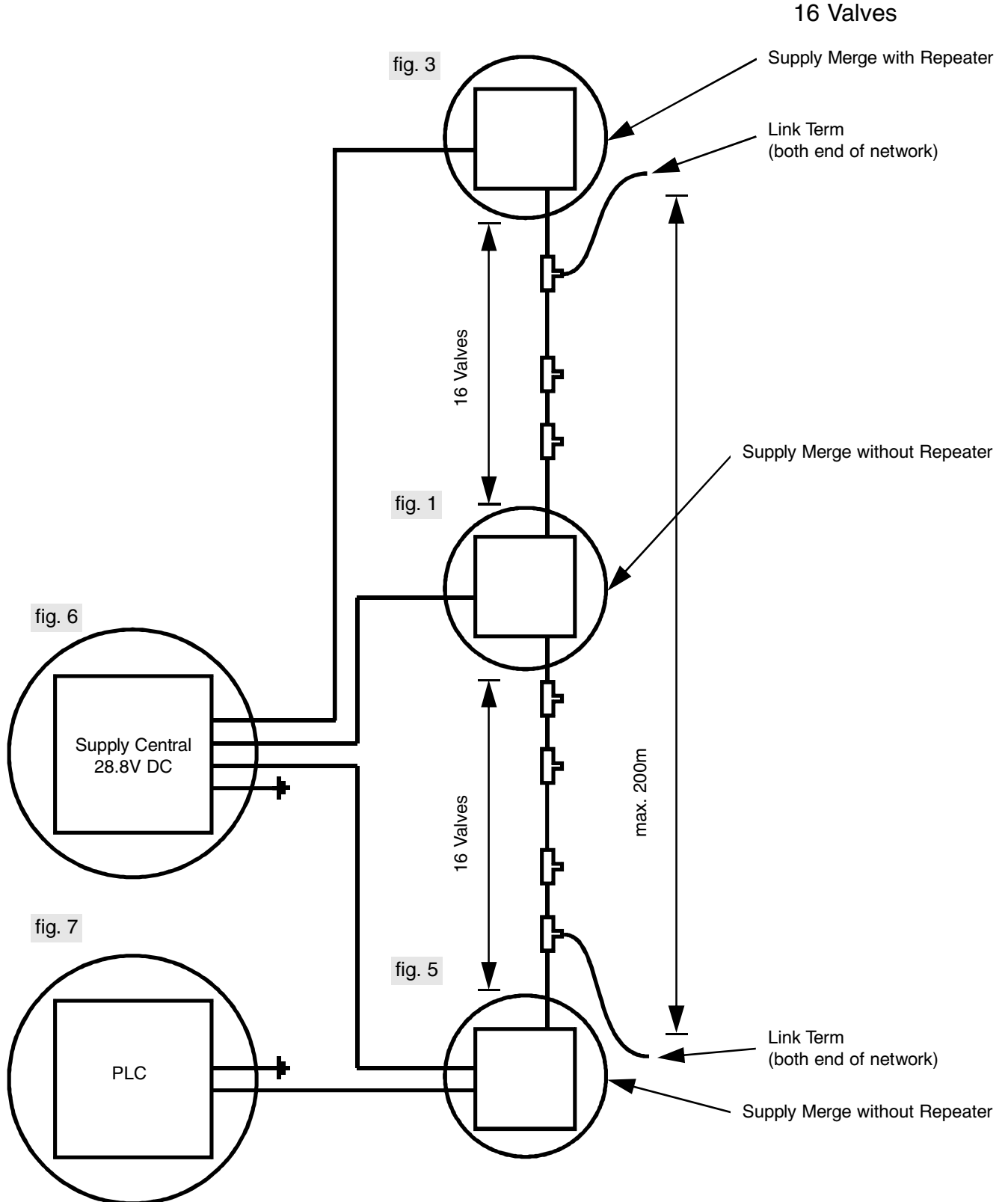
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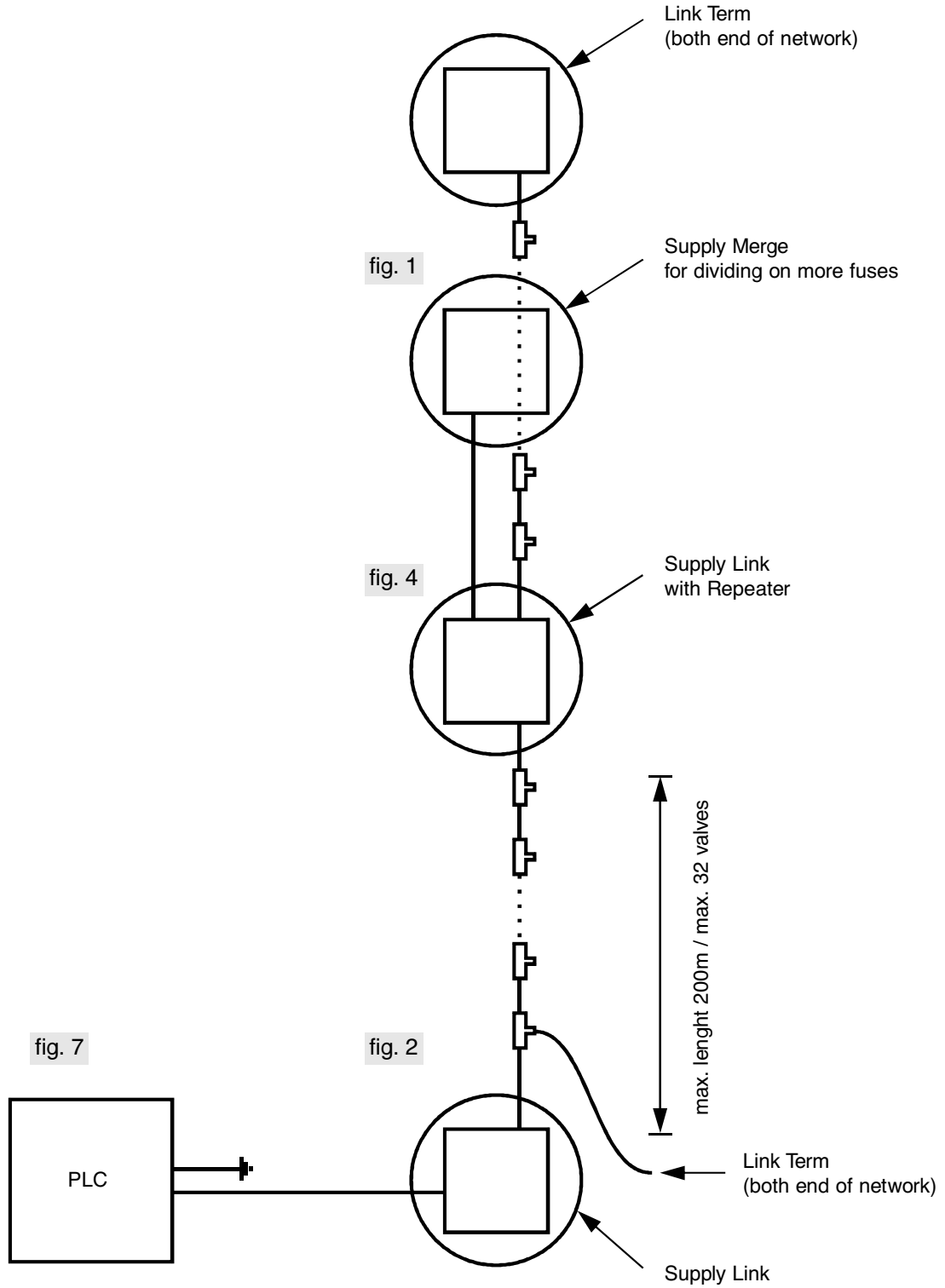
4. Cable and Power supply

4.1 Installation Example 1 Segment divided into 16 valves per fuse/power supply



4. Cable and Power supply

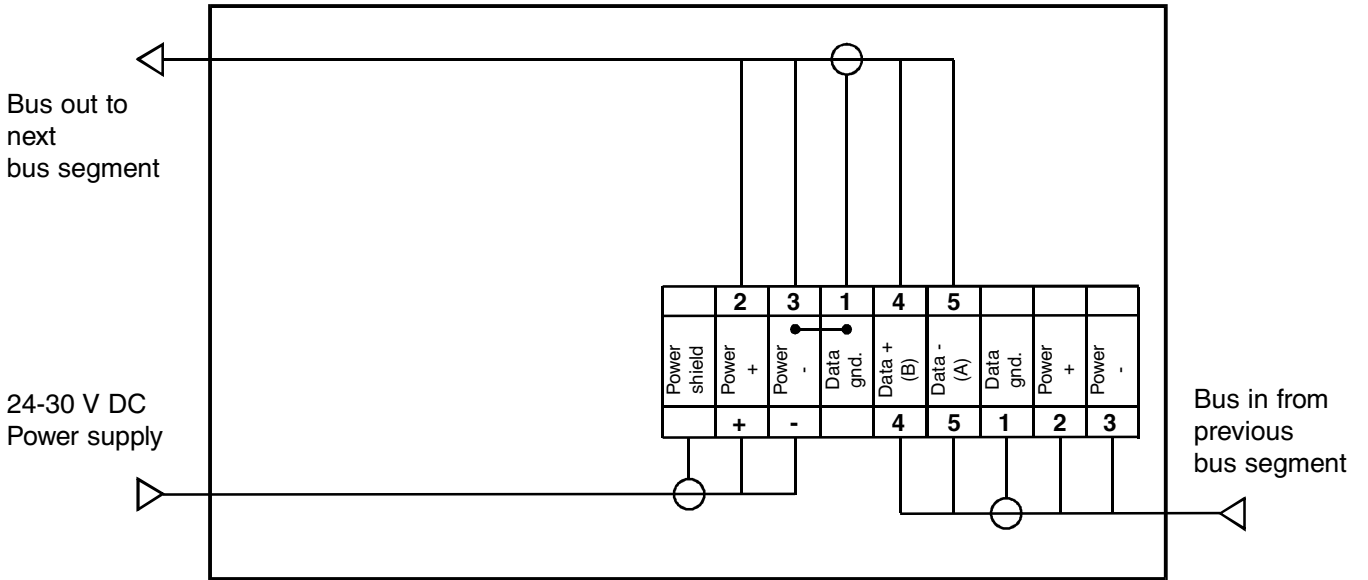
4.2 Installation Example 2 Segment with 32 valves on same supply/fuse



4. Cable and Power supply

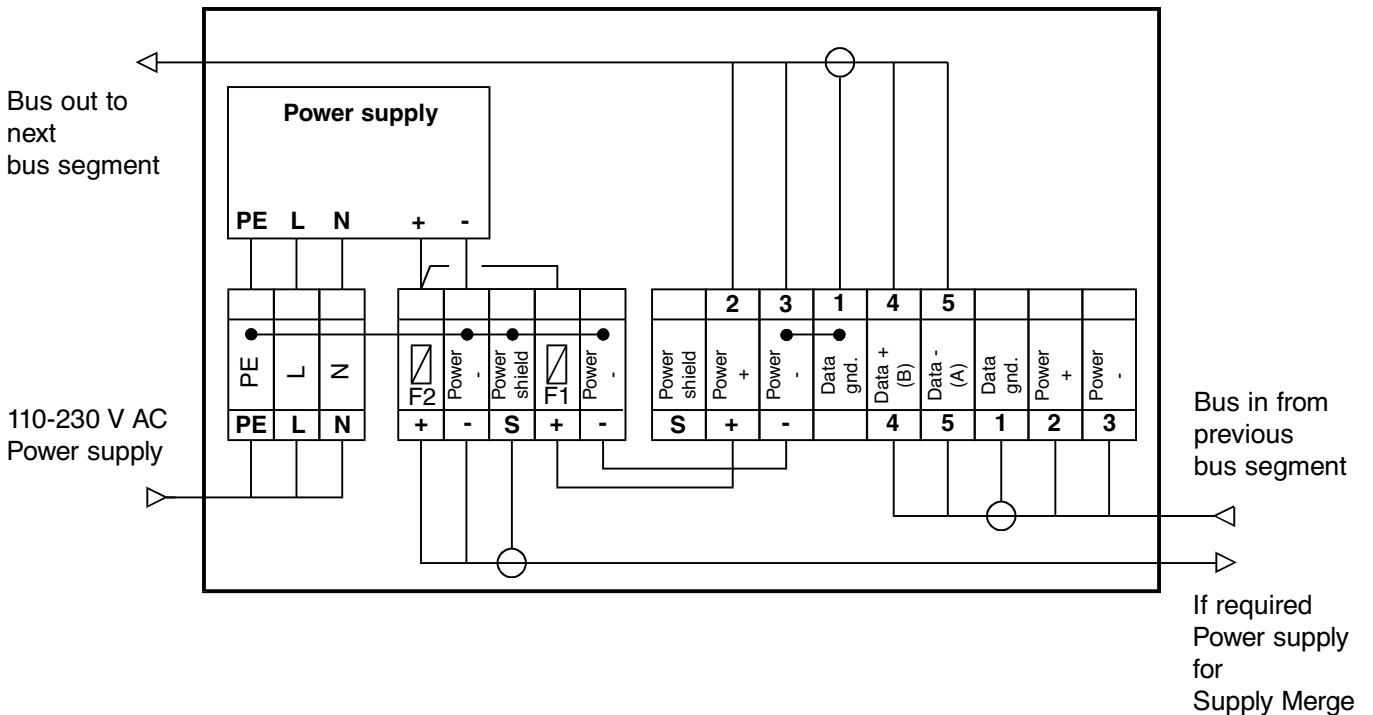
4.3 Supply Merge

fig. 1



4.4 Supply Link

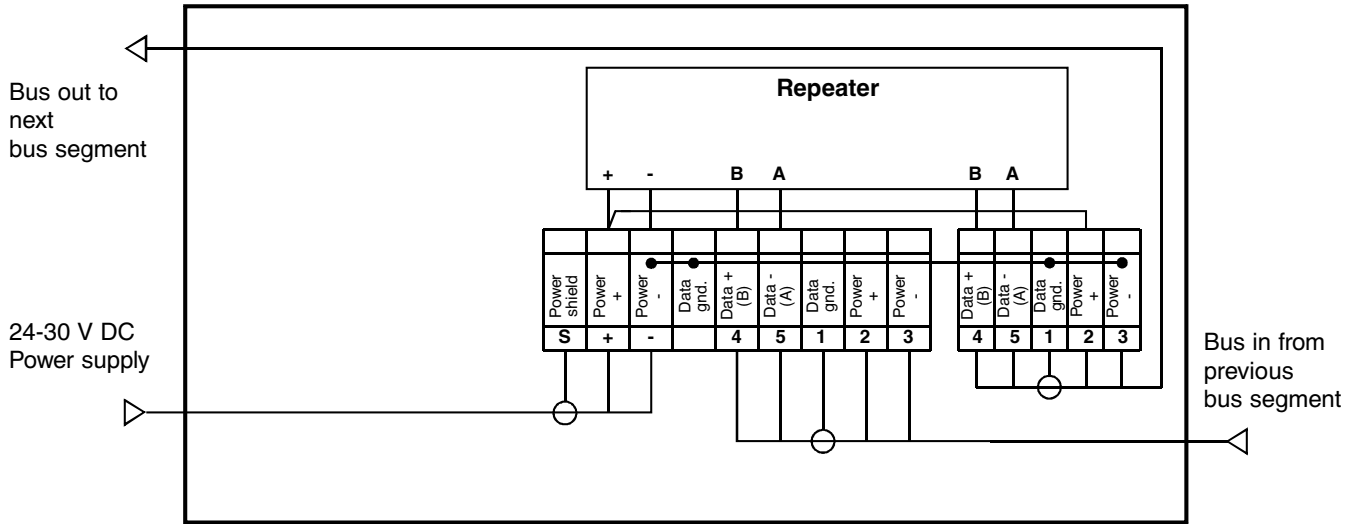
fig. 2



4. Cable and Power supply

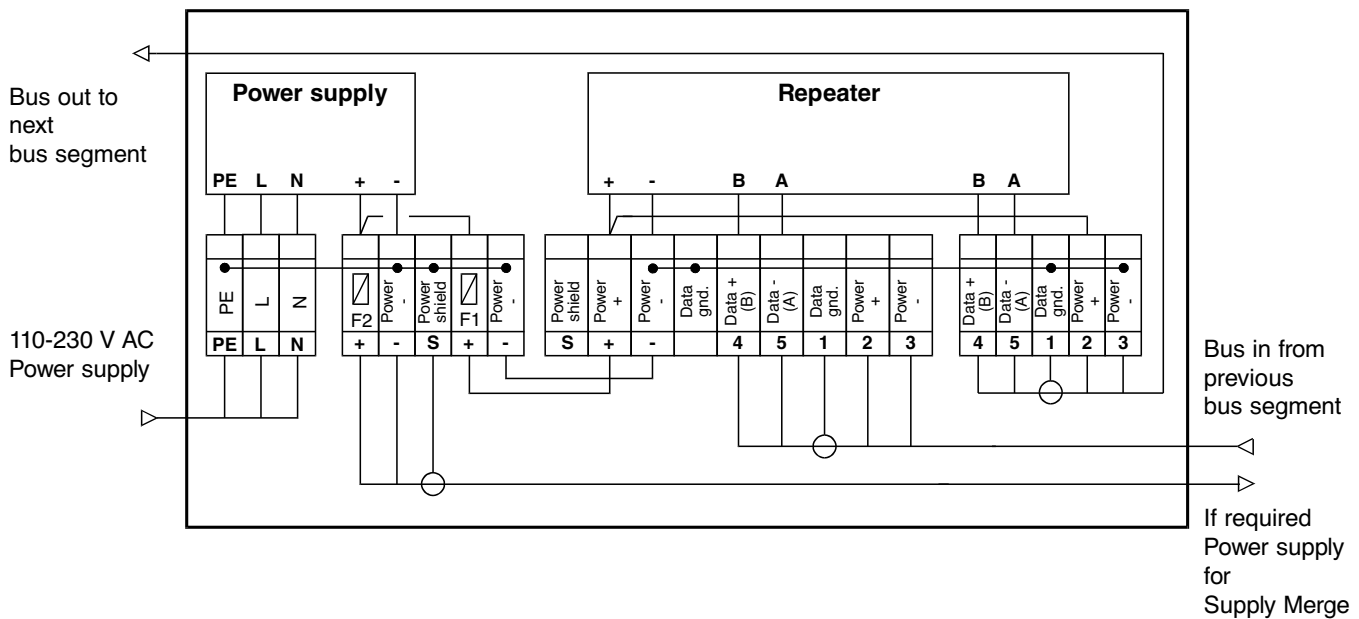
4.5 Supply Merge with repeater

fig. 3



4.6 Supply Link with repeater

fig. 4



4. Cable and Power supply

4.7 Calculation examples

The cable type used for CU3Valve-Net Profibus can have a maximum length of 200 metres per segment. A repeater can be inserted which amplifies the communication signal and thus starts a new segment which can again be 200 metres long, where yet another repeater can be placed, and so on. On each segment a maximum of 32 units can be connected. This means that a repeater must be used either after 200 metres of cable, or after 32 units.

The maximum distance between the different types of Supply Merge, Supply Merge Link and Supply Merge Link Term units is therefore 200 metres.

The following two examples calculate with power consumption for 16 and 32 CU3Valve-Net Profibus per segment respectively. On a segment one or more Supply Merges can be inserted either if the voltage becomes too low or if you want distribution over several fuses per segment.

Example 1 with 16 valves calculates with all 16 valves mounted at the outermost end of the cable.

Example 2 with 32 valves calculates with the first 16 valves after 100 metres and the last sixteen at the farthest end of the cable.

4.8 Calculation Example 1

The following shows the calculation basis for 200 metres and 16 valves.

Valve consumption:

1,56W (0,065A at 24V DC) with active solenoid valve.

0,96W (0,04A at 24V DC) with passive solenoid valve.

Total consumption for the 16 valves with a demand factor of 0,5:
 $(0,065 \times 16 \times 0,5)$ active + $(0,04 \times 16 \times 0,5)$ passive = 0,84A

Conduction resistance for the bus is:
 1,41 Ohms/100 metres for buses and
 328 Ohms/100 metres for the screen.

The return route for the current from one valve goes through the neutral conductor and screen. So the total resistance for the parallel resistance of the zero conductor and the screen for the 200 metres is 0,98 Ohms/100 metres.

The voltage drop over 200 metres is:
 $(1,41 \times 2) \times 0,84A + (0,98 \times 2) \times 0,84 = 4$ Volts

The minimum voltage for a valve is 20 Volts.

If the output voltage for the power supply module is : 28 Volts,
 - this means that the maximum permissible voltage drop between the power supply module and the SupplyMerge boxes with or without repeater is $28 - 4 - 20 = 4$ Volts.

Table 1 shows the conduction resistance for the different cable cross-sections.

In the power supply module each output is separately protected.
 Table 1

Cable cross section mm ²	Cables for fixed installation copper conductor Ohm/ km ved 20°C
1,5	12,1
2,5	7,41
4,0	4,61
6,0	3,08
10,0	1,83

4. Cable and Power supply

4.9 Calculation Example 2

The following shows the calculation basis for 200 metres and 32 valves.

Valve consumption:

1,56W (0,065A at 24VDC) with active solenoid valve.

0,96W (0,04A at 24VDC) with passive solenoid valve.

Total consumption for the 32 valves with a demand factor of 0,5:
(0,065 x 32 x 0,5) active + (0,04 x 32 x 0,5) passive = 1,68A

Conduction resistance for the bus is:

1,41 Ohms/100 metres for buses and

3,28 Ohms/100 metres for the screen.

The return route for the current from one valve goes through DC-GND and screen. So the total resistance for the parallel resistance of DC-GND and the screen is 0,98 Ohms/100 metres.

The voltage drop to the last valve will therefore be:

100 metres of cable with 1,68A followed by 100 metres of cable with 0,84A

The voltage drop over the 200 metres is:

$(1,41 \times 1,68) + (0,98 \times 1,68) + (1,41 \times 0,84) + (0,98 \times 0,84) = 6$ Volts

The minimum voltage for a valve is 20 Volts.

- If the voltage for the power supply module is 28 Volts, this means that the maximum permissible voltage drop between the power supply module and the SupplyMerge boxes with or without repeater is $28 - 6 - 20 = 2$ Volts.

It should be mentioned that the above calculation examples show a worst-case situation.

Normally the mounted valves are distributed over the whole bus. The demand factor may be different from 0,5, and the number of mounted valves may be different. These are all important factors for the cable length between the various boxes.

We recommend that the grounding for the PLC and power supply is taken from the same grounding system, so that the voltage potential at these two points is the same. The voltage difference between the valve frame and PLC frame must be no more than 4V. Similarly, none of the SupplyMerge boxes must be terminated to ground.

If the PLC or repeater has an isolated Profibus output, data-ground in the plug must be connected to ground.

5. Connection with other Profibus equipment

To get the best possible protection against noise the communication interface is not galvanically isolated from the power supply. This is because the supply and communications are carried by the same cable and from the same point.

However, this means that some factors should be investigated when linking CU3 Valve Net Profibus with other equipment.

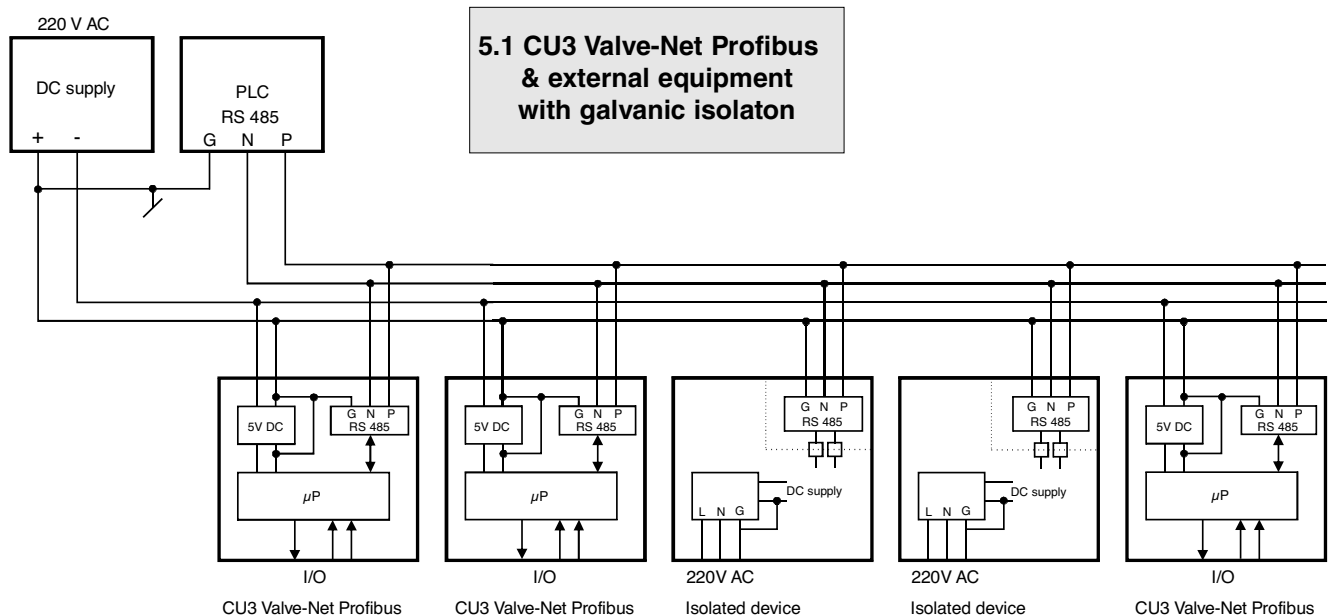
Profibus equipment normally has an external power supply, and thus often galvanic isolation.

If the other equipment has a separate power supply it will normally have galvanic isolation. This type of equipment can be connected directly to CU3 Valve Net Profibus.

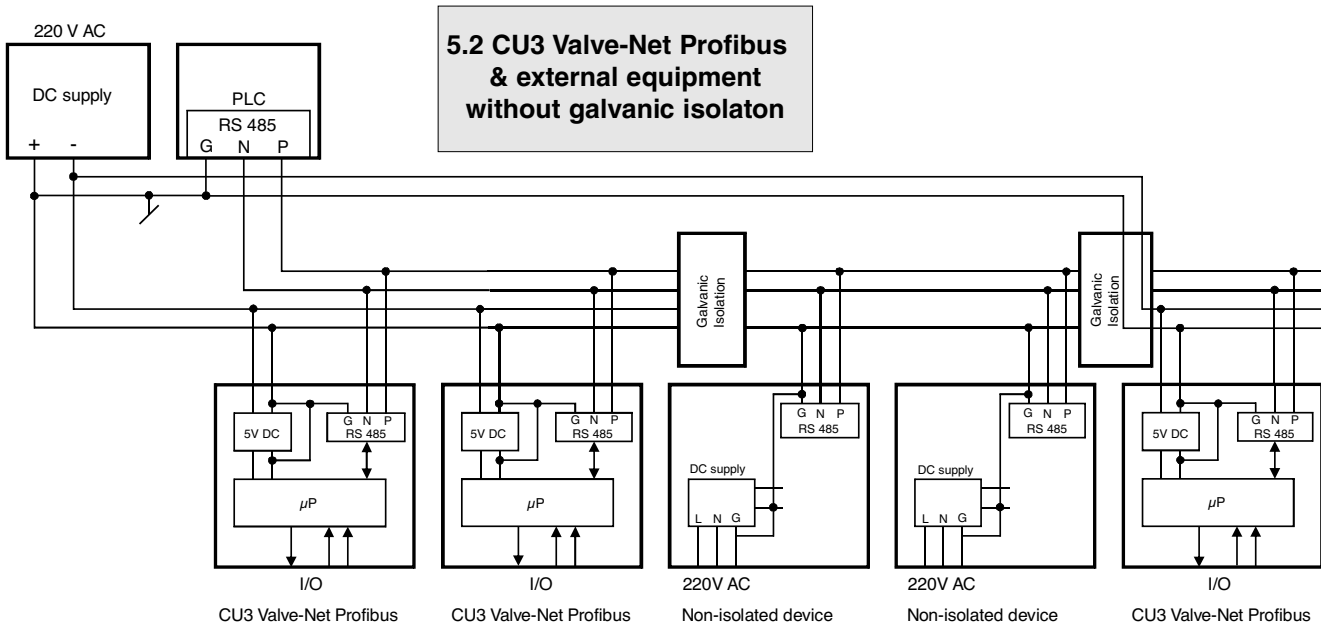
If the external equipment has no galvanic isolation, a repeater must be inserted between the external equipment and the CU3 Valve Net Profibus segments.

It is important that the screen and DC return can be connected to ground at one point.

If screen/DC return are connected to the plant, the communication cable will function as a potential compensation cable, which will on the one hand cause noise in the communications and may also destroy the cable and/or CU3 Valve Net Profibus units.



5. Connection with other Profibus equipment



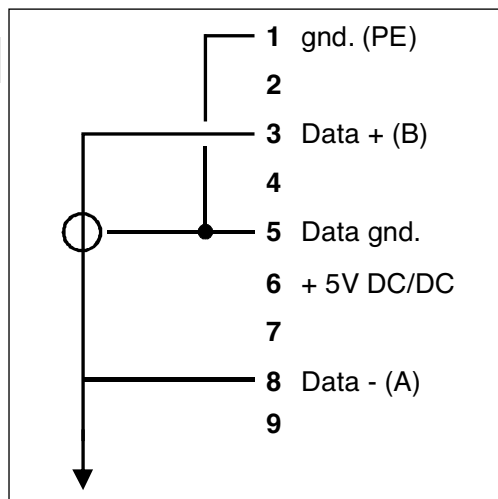
6. PLC Connection

Connection of standard Profibus plug. Connect data-ground to screen in the cable as to ground. The ground potential is used as a shared communications reference.

The Profibus standard plug is 9 pol D-sub.

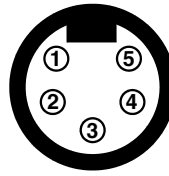
Normally Pin 1 is connected to PE internally - if not, the screen in the cable must be connected with an external PE.

fig. 7

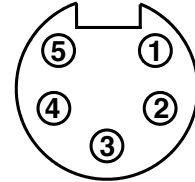


7. Cable and plugs

Male plug - front



Fermale plug - front













Pin	Colour	Function
1		Screen / Ground
2	Brown	Bus Power V+
3	Blue	Bus Power V-
4	Black	Communication + (B)
5	White	Communication - (A)

For a more easier installation of Profibus cable screwings we recommend to grease the stainless steel screw thread.

Pls. ensure, no grease till get in contact with the mating surface of the plugs!

We recommend the grease type Klüber UH1184-201, which can be used with stainless steel.

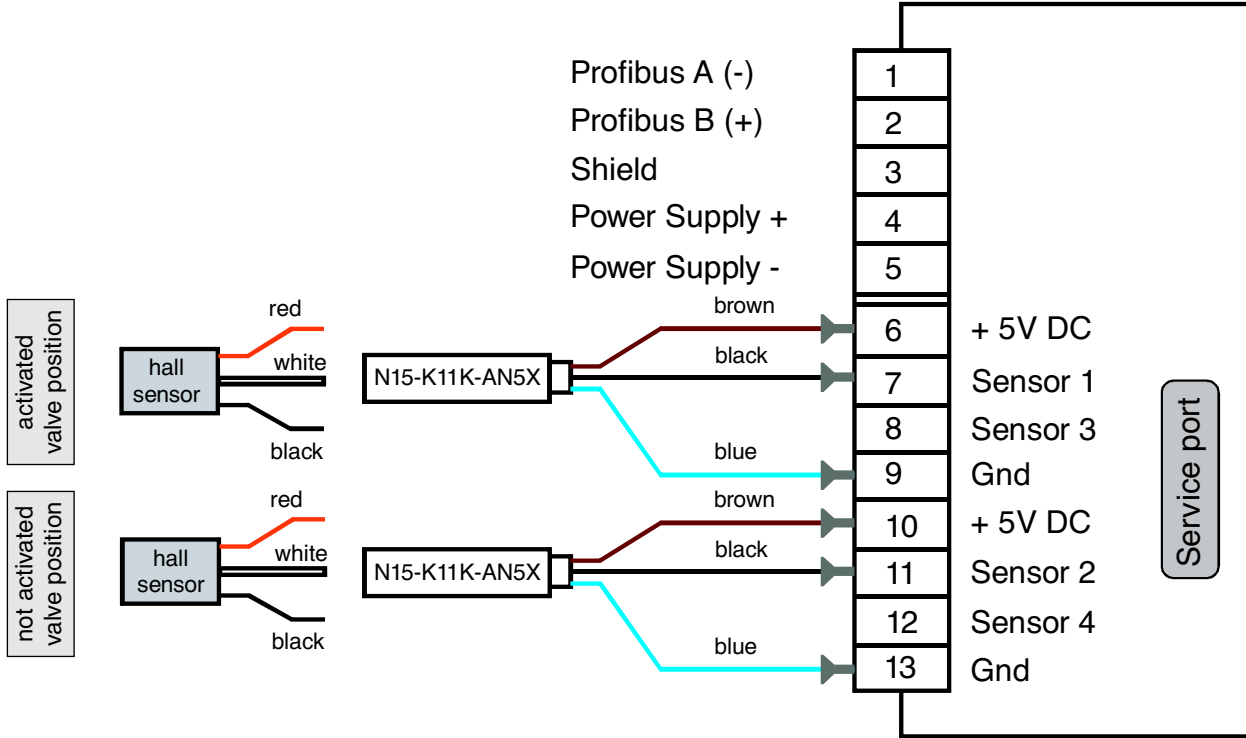
In case you need to take apart the cables you should always check the name of the standard which is printed on the cable.

Valve - Net Device Net Name	Valve - Net Profibus Name	SDS cable	Device Net cable	Mini Connector Round 5 pole connector
Shield	Shield	Shield 	Shield 	1
Power +	Power +	Brown 	Red 	2
Power gnd.	Power gnd.	Blue 	Black 	3
Device Net high	Profibus high / B	Black 	White 	4
Device Net low	Profibus low / A	White 	Blue 	5

8. Connection of Electronic Module

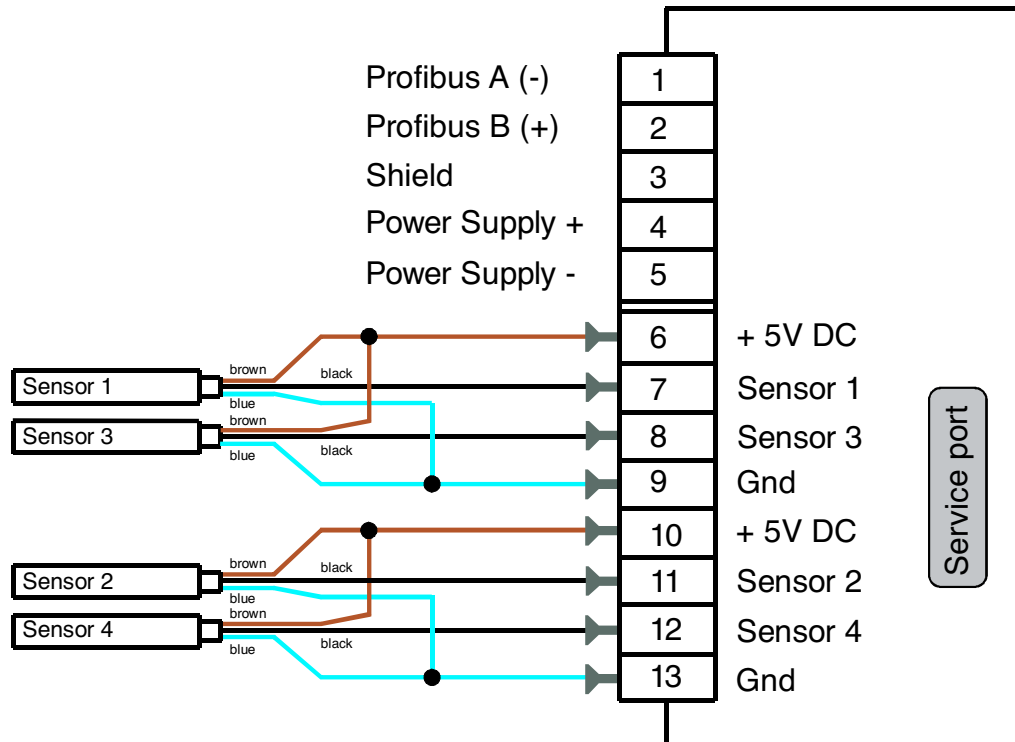
Standard valves

a) 2 sensors : for activated / not activated valve position



Mixproof valves with Seat Lift Detection (SLD)

b) 4 sensors : for activated / not activated valve position and additional seat lifting detection at mixproof valve DA3+



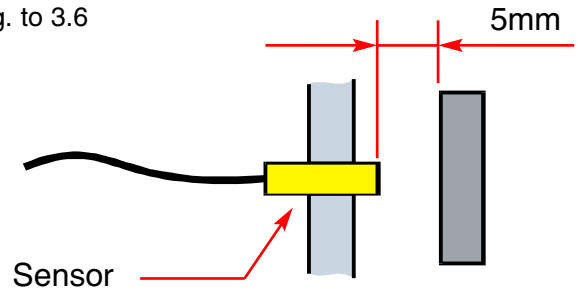
8. Connection of Electronic Module

8.1 Installation of internal and external sensors

External sensor

A 5V DC NPN sensor must be used.
Operating distance: 5 mm.

Fig. to 3.6

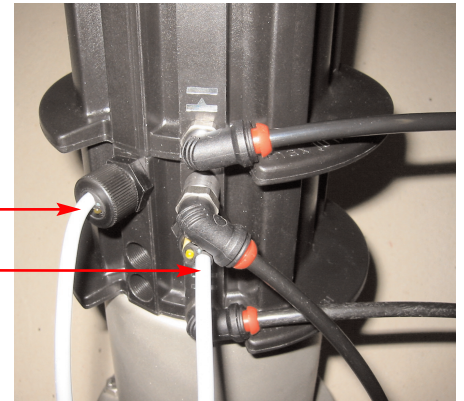


Sensor 2
(internal Hall Sensor)

Sensor 1
(internal Hall Sensor)

Sensor 3
(external Proximity Sensor)

Sensor 4
(external Proximity Sensor)



8. Connection of Electronic Module

8.2 Sensor signals to monitor valve status incl. Seat Lift Detection

feedback Sensor		sensor 1 internal hall sensor	sensor 2 internal hall sensor	sensor 3 external proximity sensor	sensor 4 external proximity sensor
valve position	LED indication				
closed	upper LED ON	0	1	1	1
open	lower LED ON	1	0	0	0
upper seat lift	upper LED 2 blink	0	1	1	0
lower seat lift	upper LED 1 blink	0	0	1	1

The open and closed position will be shown at LED's

Also the appropriate seat lift position will be indicated as follow:

- lower seat lift LED for closed valve position will blink with 1 short blink
- upper seat lift LED for closed valve position will blink with 2 short blink

The solenoid status is indicated as well:

- main valve LED continuous ON
- lower seat lift Solenoid LED 1 blink
- upper seat lift Solenoid LED 2 blink



**All signals will be communicated via Profibus DP "response byte"
PLS. SEE DELTA CU3 VALVENET PROGRAMMERS GUIDE**

9. LED Indication

Error / Service Request LED

<p>Constant Off</p> <div style="border: 1px solid black; width: 100%; height: 15px; background-color: white;"></div> <p>No Error</p>	<div style="border: 1px solid black; width: 100%; height: 15px; background-color: white;"></div>
<p>1 Long and 5 Short</p> <div style="border: 1px solid black; width: 100%; height: 15px; background-color: red; position: relative;"> </div> <p>Feedback Error</p>	<div style="border: 1px solid black; width: 100%; height: 15px; background-color: red; position: relative;"> </div>
<p>1 Short</p> <div style="border: 1px solid black; width: 100%; height: 15px; background-color: red; position: relative;"> </div> <p>Supply Voltage Error</p>	<div style="border: 1px solid black; width: 100%; height: 15px; background-color: red; position: relative;"> </div>
<p>3 Short Flash</p> <div style="border: 1px solid black; width: 100%; height: 15px; background-color: red; position: relative;"> </div> <p>No Master Found</p>	<div style="border: 1px solid black; width: 100%; height: 15px; background-color: red; position: relative;"> </div>
<p>Long</p> <div style="border: 1px solid black; width: 100%; height: 15px; background-color: green; position: relative;"> </div> <p>Service Request</p>	<div style="border: 1px solid black; width: 100%; height: 15px; background-color: green; position: relative;"> </div>

Solenoid LED

<p>Constant Off</p> <div style="border: 1px solid black; width: 100%; height: 15px; background-color: white;"></div> <p>No Solenoid Controlled</p>	<div style="border: 1px solid black; width: 100%; height: 15px; background-color: white;"></div>
<p>Constant On</p> <div style="border: 1px solid black; width: 100%; height: 15px; background-color: green;"></div> <p>Main Solenoid Activated</p>	<div style="border: 1px solid black; width: 100%; height: 15px; background-color: green;"></div>
<p>1 Short blink</p> <div style="border: 1px solid black; width: 100%; height: 15px; background-color: green; position: relative;"> </div> <p>Lower Seat Lift Activated</p>	<div style="border: 1px solid black; width: 100%; height: 15px; background-color: green; position: relative;"> </div>
<p>2 Short blink</p> <div style="border: 1px solid black; width: 100%; height: 15px; background-color: green; position: relative;"> </div> <p>Upper Seat Lift Activated</p>	<div style="border: 1px solid black; width: 100%; height: 15px; background-color: green; position: relative;"> </div>
<p>1 Short Pause</p> <div style="border: 1px solid black; width: 100%; height: 15px; background-color: green; position: relative;"> </div> <p>Solenoid Power Consumption to low</p>	<div style="border: 1px solid black; width: 100%; height: 15px; background-color: green; position: relative;"> </div>

9. LED Indication

Feedback LED (Standard valves - 2 sensors)

Constant Off



No Feedback Signal



Constant On



Position Sensor Signal OK



1 Short flash



No Position Sensor Signal



1 Short Pause



Position Sensor Signal Not Expected



Feedback LED (mixproof valves with Seat Lift Detection, SLD - 4 sensors)

upper Feedback LED

1 blink



lower seat lift activated



2 blink



upper seat lift activated



10. Functionality and Features

A CU3 Valve-Net Profibus unit is built up as a DP slave and can thus communicate using Profibus DP.

Maximum communication speed is 1,5Mbps.
Automatic detection of communication speed is built in.

The set-up for DP is:

ID number 08F9 for CU3

Output: 4 bytes with consistency (data to Valve-Net) = A3h = 163

Input: 4 bytes with consistency (data from Valve-Net) = 93H = 147

Layout of the 4 byte DP data			
Control	Command	Data 1	Data 2
Response	Command	Data 1	Data 2



All signals will be communicated via Profibus DP “response byte”

PLS. SEE DELTA CU3 VALVENET PROGRAMMERS GUIDE

10.1 Set-up of Profibus Communication

Id number for CU3 Profibus:

08F9, GSD file available via APV Intranet

Id number for CU2 Profibus:

6715, GSD file available via APV Intranet

For configuration of control units the best way is the use of the software APV Toolbox, available via APV Intranet.

10.2 Replace of old control units CU2 Profibus in existing installations

The control unit CU3 Valve-Net Profibus can be used to replace the old CU2 in existing installations (spare part).
The main functionality is similar between CU2 and CU3, response and control byte for DP communication consists of the same information.

For easy replacement of control units CU2 against CU3 without changing hardware configuration of the PLC the CU3 must be set into CU2 mode only ! To do this set-up into CU2 mode pls. use the APV Toolbox !

10. Functionality and Features

10.3 APV Toolbox – for easy and simple configuration

For quick configuration and set-up of the control unit APV provide the software Toolbox. All functions and features you'll find in the programmers guide APV Toolbox!

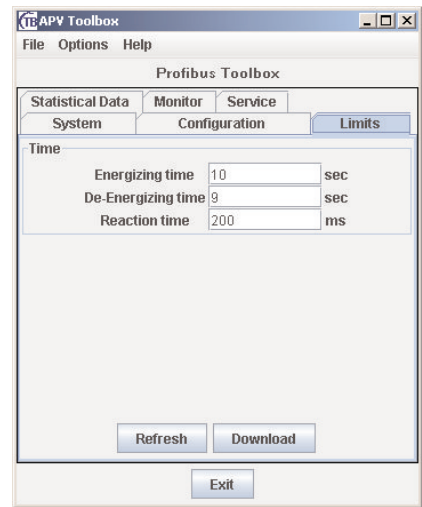
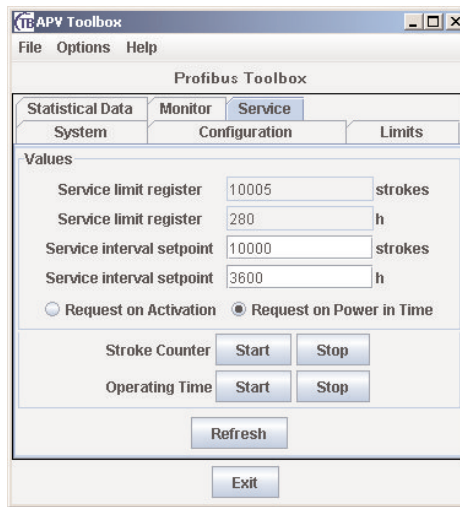
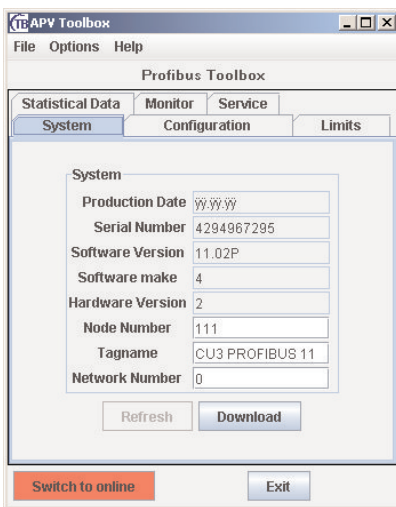
The pictures below the show the principle use and set-up.



CU must be powered with 24VDC



APV RS232 Toolbox Adapter (H207654)



Only 3 examples of the APV Toolbox (screen dump)

11. Set-up of slave address

The slave address is stored in the internal FLASH PROM in CU3 Valve-Net Profibus. To change the slave address the unit must be linked with a Profibus master station - this may be a PLC or a PC with configuration software APV Toolbox.

During production a CU3 Valve-Net Profibus is configured to the slave address 124. The units are connected individually to the bus, and each unit is assigned a future number. Then the next is linked up, and so on.

First the new slave number is sent to the unit, then a command is sent which transfers all the data to FLASH.

Command for new slave-number

Control	Command	Data 1	Data 2
XX	27	XX	new mode no.
Response	Command	Data 1	Data 2
XX	echo (27)	echo (XX)	echo (new mode no.)

Command for save data in FLASH (DP)

Control	Command	Data 1	Data 2
XX	1	XX	XX
Response	Command	Data 1	Data 2
XX	echo (1)	echo (XX)	echo (XX)



See also Command system.

PLS. SEE DELTA CU3 VALVENET PROGRAMMERS GUIDE

11. Set-up of slave address

11.1 Set up slave address

Profibus slave address can be set by a PC or hand held terminal connect to the service port on the CU.

Register for Valve-Net Profibus
to read address: "R12 <CR>"

to write address: W12 XX <CR>
Where XX is the new address

For easy and simple set up of slave address the APV Toolbox can be used !

11.2 Using the service port

Serial channel:

Default communication:

9600, 8bit, 1stop bit, No parity. No flowcontrol.

All received characters are echoed back.

RS232 communication adapter pinout on 9 pol D-sub female:

Pin 2 TX data

Pin 3 RX data

Pin 5 Ground

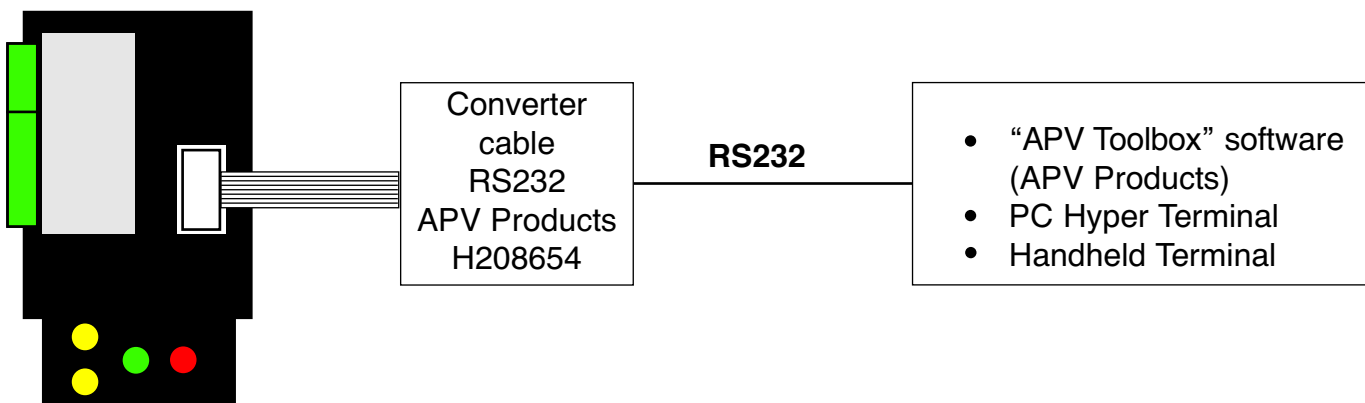
Pin 9 5V DC max 100 mA.

Connection to standard PC Comm-port:

Com Port Serial adapter

Pin:		Pin:
2	-	2
3	-	3
5	-	5

Normally the Serial Adapter is connected directly to the PC comport, and a flat ribbon cable connects the adapter to the Valve-Net Profibus unit.



12. Technical data

12.1 General technical data:

Ambient temperature: -20°C to + 70°C

Enclosure rating: IP 67

CE: EMC 89/336/EEC

Control air: instrumentation air acc.
DIN/ISO 8573-1

- **solid particel content:** quality class 3,
max. particel size 5 μ m
max. particel density 5 μ g/m³

- **water content:** quality class 3
max. dew point -20°C

- **oil content:** quality class 3
max. 1mg/m³

12.2 Power Supply

The complete unit is power supplied from the Valve-Net Profibus.
Supply voltage: 20-30 V DC, as specified for the
Valve-Net Profibus.

Supply current: Max. 45mA at 24V DC supply,
without active solenoid.
Max. 80mA at 24V DC supply,
with one solenoid active.

Electrical

connection: Direct cable PG

Dropcable: The unit is supplied with 0,5M dropcable.

BA CU3 VN0PB 02

ID-No.: H 317051

Translation of original manual



rev. 3



Your local contact:



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Zeichenstraße 49
D-59425 Unna

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For more information about our worldwide locations, approvals, certifications, and local representatives, please visit www.apv.com.

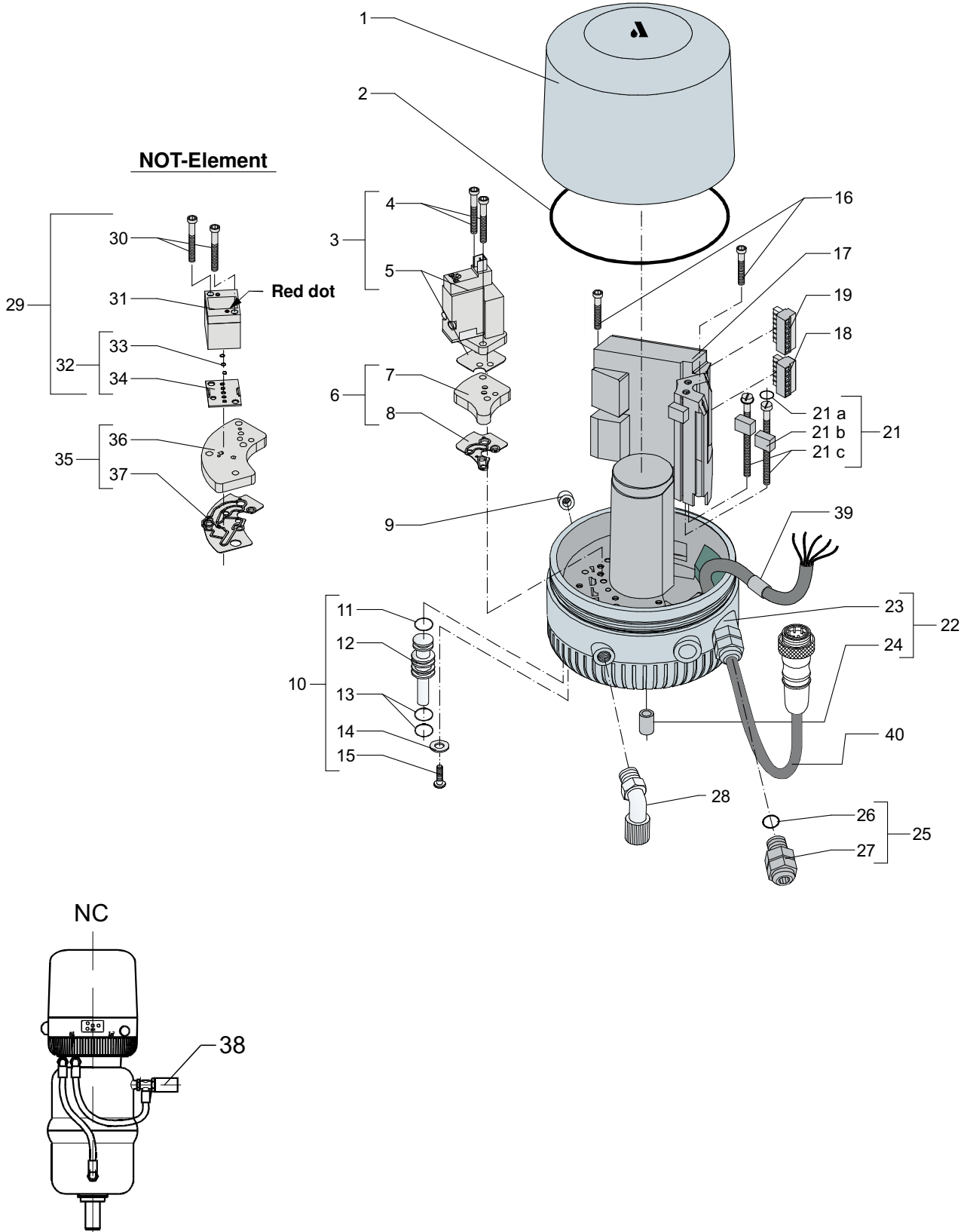
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13.1 Steuereinheit / Control unit

DELTA CU31 Valve-Net Profibus



13.1 Steuereinheit / Control unit

DELTA CU31 Valve-Net Profibus

Pos	Stk/Qty	Maße / Dim.	Benennung	Description	Ws.-Nr./Part No.
-	-		CU31-Profibus - Standard	CU31-Profibus - Standard	08-45-001/93
-	-		CU31N-Profibus mit NOT - Element	CU31N-Profibus with NOT-element	08-45-002/93
1	1		CU Haube	CU Cap	08-60-713/93
2	1	Ø105x2.5 /NBR	O-Ring	O-ring	-
3	1		Magnetventil CU3 komplett	Solenoid Valve CU3 complete	97-00-160/93
- 4	2		TORX - Schraube	TORX-screw	-
- 5	1		Magnetventil mit Dichtung	Solenoid Valve with seal	-
6	1		Luftverteilerplatte CU31 komplett	Air Distributing Plate CU31 cpl.	08-60-319/93
- 7	1		Luftverteilerplatte	Air Distributing Plate	-
- 8	1		Dichtung für Luftverteilerplatte	Gasket for Air Distributing Plate	-
9	1		Schalldämpfer	Sound Reducer	08-60-751/93
10	1		Druckluftabsperrkolben CU3 kpl.	Shut-off Piston Comp. Air CU3 cpl.	15-28-860/93
- 11	1	Ø7.65x1.78 /NBR	O-Ring	O-ring	-
- 12	1		Kolben	Piston	-
- 13	2	Ø9.25x1.78 /NBR	O-Ring	O-ring	-
- 14	1	Ø4.3 A2 /DIN 9021	Scheibe	Washer	-
- 15	1	40x12 /WN 1451	Schraube	Screw	-
16	2	40x45 /WN 1451	TORX - Schraube	TORX-screw	08-60-752/15
17	1		CU31 E-Box Profibus kpl.	CU31 E-Box Profibus cpl.	16-31-198/93
- 18*	1		Stecker 8-polig	connector 8-pole	08-60-776/93
- 19*	1		Stecker 5-polig	connector 5-pole	08-60-775/93
21	1		Hall Sensor komplett	Hall sensor complete	08-60-850/93
- 21a	2	Ø3x2 / NBR	O-Ring	O-ring	-
- 21b	2		Hall Sensor	Hall Sensor	-
- 21c	2	M4x80 /DIN 84A A2	Justierschraube	Adjusting screw	-
22	1		CU31 Sockel komplett	CU31 Base complete	08-51-016/93
- 23	1		Sockel	Base	-
- 24	1		Überströmventil	Pressure relief Valve	-
25	1		Kabelverschraubung komplett	Screwed Cable Gland complete	08-29-310/93
- 26	1	Ø12.42x1.78 /NBR	O-ring	O-Ring	-
- 27	1		PG9 Kabelverschraubung 5-10mm	PG9 Cable Inlet 5-10mm	-
28	1		Winkelverschraubung	Elbow Connector	08-60-750/93
29	1		NOT - Element CU3 komplett	NOT-element CU3 complete	08-60-290/93
- 30	2	40x50 /WN 1452	Schraube	TORX-screw	08-60-759/15
- 31	1		NOT - Element	NOT-element	-
- 32	1		Dichtungssatz NOT - Element	Seal kit NOT - element	58-34-300/13
- 33**	3	Ø3.68x1.78 /NBR	O-ring	O-Ring	-
- 34	1		Dichtung	Seal	-
35	1		Luftverteilerplatte CU31N kpl.	Air Distributing Plate CU31N cpl.	08-60-320/93
- 36	1		Luftverteilerplatte	Air Distributing Plate	-
- 37	1		Dichtung für Luftverteilerplatte	Seal for Air Distributing Plate	-
38***	1		Druckreduzierventil	Pressure reducer valve	08-60-766/93
39	1	16x9x28mm	Ferrithülse für CU3 Profibus	Ferrit bush for CU3 Profibus	08-46-155/99
40	1		Kabel für Device-NET	Drop cable for Device-NET	08-60-736/93

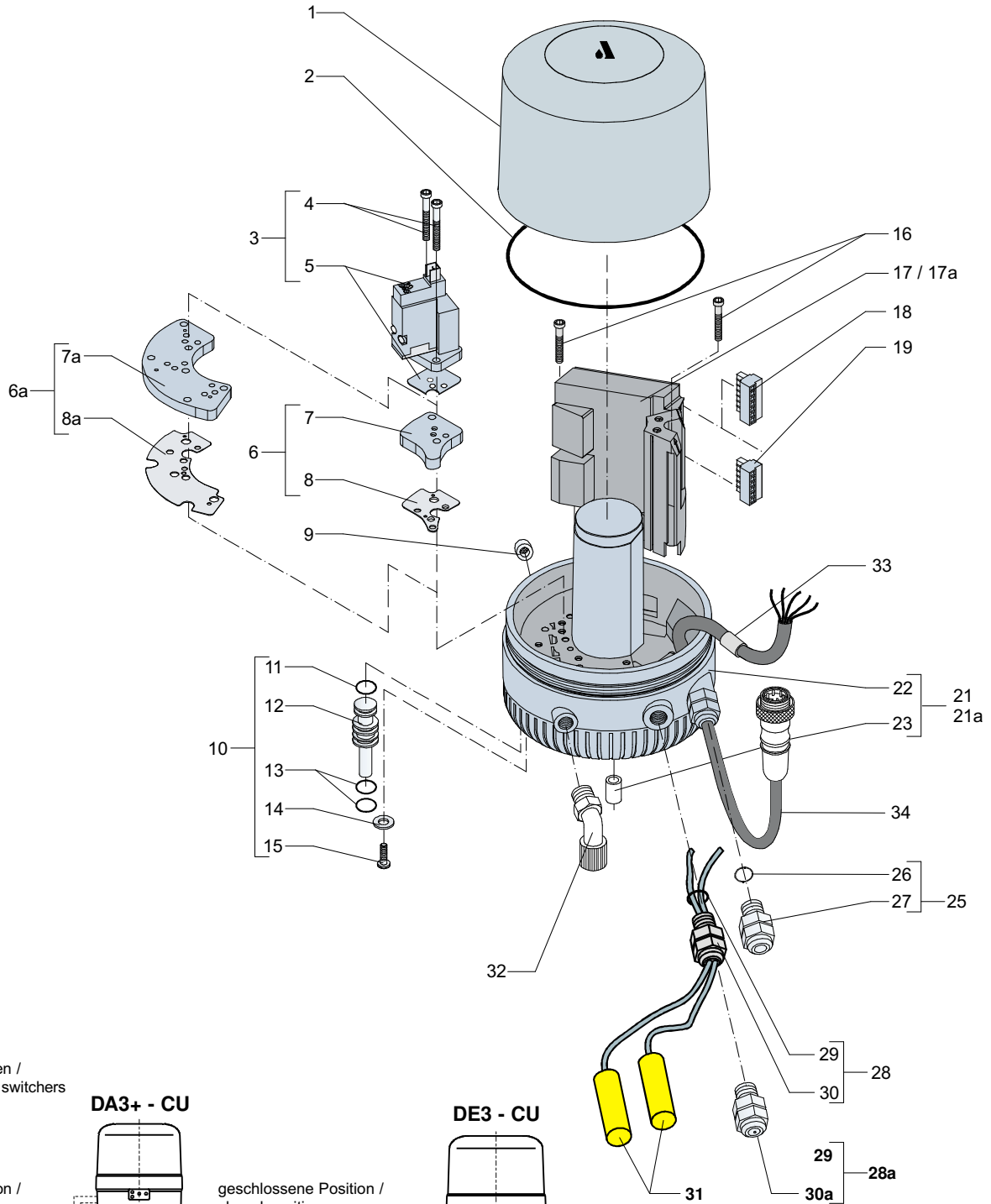
* Ersatzteile für Elektronikbox / Spare part for Electronic Box

** Ersatzteile für NOT - Element / Spare part for NOT - element

*** Das Druckreduzierventil wird nur bei der Control Unit mit NOT - Element eingesetzt.
Für die Montage in den Antrieb ist das Druckreduzierventil beigegefügt.
The pressure reducing valves is used only for the Control Unit with NOT - element.
For assembly in the actuator the pressure reducing valve forms part of the scope of supply.

13.2 Styreenhed / Control unit

DELTA CU3 Valve-Net for DA3+ / DE3



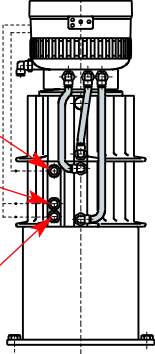
Position der Initiatoren /
Position of proximity switches

DA3+ - CU

geschlossene Position /
closed position

geöffnete Position
nur für DN 40, 1,5" /
open position
only for DN 40, 1,5"

geöffnete Position
nur für DN 50-100, 2"-4" /
open position
only for DN 50-100, 2"-4"

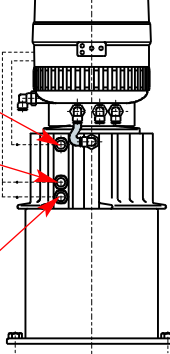


DE3 - CU

geschlossene Position /
closed position

geöffnete Position
nur für DN 40-50, 1,5"-2" /
open position
only for DN 40-50, 1,5"-2"

geöffnete Position
nur für DN 65-100, 2,5"-4" /
open position
only for DN 65-100, 2,5"-4"



13.2 Steuereinheit / Control unit

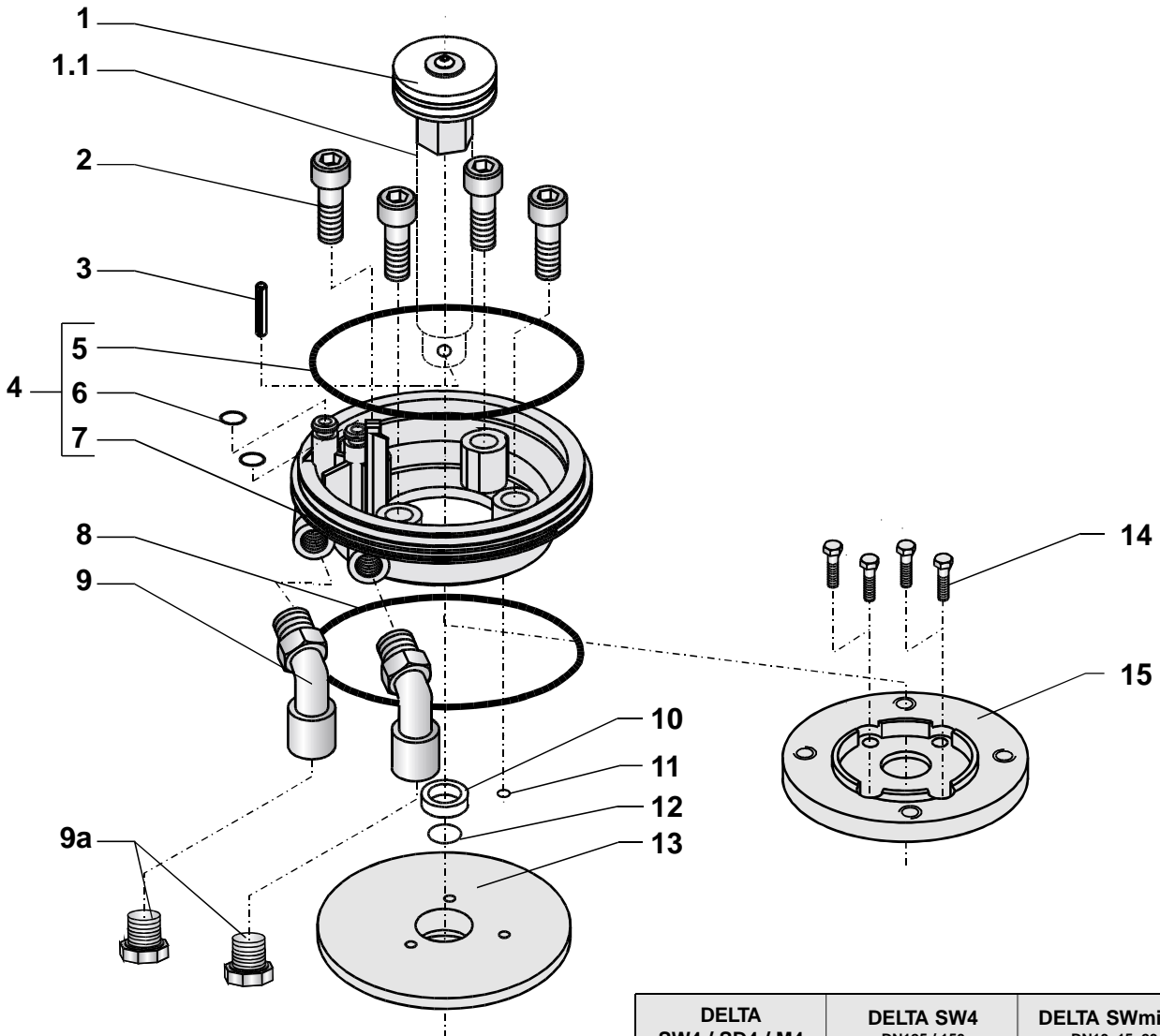
DELTA CU3Valve-Net for DA3+ / DE3

Pos.	Stk/Qty	Maße / Dim.	Benennung	Description	Ws.-Nr. / Part No.
-	-		CU31 DE3 Profibus 1EMV	CU31 DE3 Profibus 1 Solenoid Valve	08-45-003/93
-	-		CU33 DA3+ Profibus 3EMV	CU33 DA3+ Profibus 3 Sol. Valves	08-45-004/93
1	1		CU Haube	Cap	08-60-713/93
2	1	Ø105x2,5 /NBR	O-Ring	O-ring	-
3	1		Magnetventil CU3 komplett	Solenoid Valve CU3 complete	97-00-160/93
- 4	2	40x25 /WN 1451	TORX - Schraube	TORX-screw	-
- 5	1		Magnetventil	Solenoid Valve	-
6	1		Luftverteilerplatte CU31 komplett	Air Distributing Plate CU31 cpl.	08-60-319/93
- 7	1		Luftverteilerplatte	Air Distributing Plate	-
- 8	1		Dichtung für Luftverteilerplatte	Seal for Air Distributing Plate	-
6a	1		Luftverteilerplatte CU33 komplett	Air Distributing Plate CU33 cpl.	08-60-321/93
- 7a	1		Luftverteilerplatte	Air Distributing Plate	-
- 8a	1		Dichtung für Luftverteilerplatte	Seal for Air Distributing Plate	-
9	1		Schalldämpfer	Sound Reducer	08-60-751/93
10	1		Druckluftabsperkolben CU3 kpl.	Shut-off Piston Comp. Air CU3 cpl.	15-28-860/93
- 11	1	Ø7,65x1,78 /NBR	O-Ring	O-ring	-
- 12	1		Kolben	Piston	-
- 13	2	Ø9,25x1,78 /NBR	O-Ring	O-ring	-
- 14	1	Ø4,3 A2 /DIN 9021	Scheibe	Washer	-
- 15	1	40x12 /WN 1451	Schraube	Screw	-
16	2	40x45 /WN 1451	TORX - Schraube	TORX-screw	08-60-752/15
17	1		CU31 E-Box	CU31 E-Box	08-60-813/93
17a	1		CU33 E-Box	CU33 E-Box	08-60-814/93
- 18*	1		Stecker 8-polig	connector 8-pole	08-60-776/93
- 19*	1		Stecker 5-polig	connector 5-pole	08-60-775/93
21	1		CU31 - DE3 Sockel kpl. 1EMV	CU31 - DE3 Base cpl. - 1 SV	08-51-017/93
21a	1		CU33 - DA3+ Sockel kpl. 3EMV	CU33 - DA3+ Base cpl. - 3 SV	08-51-018/93
- 22	1		Sockel	Base	-
- 23	1		Übertrömventil	Pressure relief Valve	-
25	1	Ø12,42x1,78 /NBR	Kabelverschraubung 4-8mm kpl.	Screwed Cable Gland cpl. 4-8mm	08-29-310/93
- 26	1		O-Ring	O-ring	-
- 27	1		PG9 Kabelverschraubung	PG9 Cable Inlet	-
28	1	Ø18,77x1,78 NBR 70	Kabelverschraubung f. 2xInitiatoren kpl.	Screw. Cable Gland f. 2 Prox. switch	08-29-320/93
- 29	1		O-Ring	O-ring	-
- 30	1		Kabelverschraubung	Cable Inlet	-
28a	1	Ø18,77x1,78 NBR 70	Kabelverschraubung f. 1xInitiator kpl.	Screw. Cable Gland f. 1 Prox. switch	08-29-321/93
- 29	1		O-Ring	O-ring	-
- 30a	1		PG13.5 Kabelverschraubung	PG 13.5 Cable Inlet	-
31	2	16x9x28mm	Initiator für DA3+, DE3, D3	Proximity Switch for DA3+, DE3, D3	08-60-769/93
32	1		Winkelverschraubung	Elbow Connector	08-60-750/93
33	1		Ferrithülse für CU3 Profibus	Ferrit bush for CU3 Profibus	08-46-155/99
34	1		Kabel für Device-NET	Drop cable for Device-NET	08-60-736/93

* Ersatzteile für Elektronikbox / Spare part for Electronic Box

Adapter / adapter

DELTA CU3



Pos.	Stk./Qty.	Benennung	Description	DELTA	DELTA SW4	DELTA SWmini4
				SW4 / SD4 / M4	DN125 / 150	DN10, 15, 20
				Ws.-Nr. / Part No.		
-	-	CU Adapter kpl.	CU adapter complete	08-48-415/93	08-48-362/93	08-48-414/93
1	1	Schaltnocke	Actuator screw	08-60-700/93	08-60-700/93	08-60-700/93
1.1	1	Zugstangenverläng.	Extension rod	-	15-26-057/93	15-26-070/93
2	4	Schraube	Screw	M8x25/DIN 912	M8x25/DIN 912	M8x25/DIN 912
3	1	Spannstift	Split pin	-	-	-
4	1	CU Adapter Set	Adapter kit	08-60-331/93	08-60-331/93	08-60-331/93
- 5	1	O-Ring	O-ring	Ø88,62x1,78 /NBR	Ø88,62x1,78 /NBR	Ø88,62x1,78 /NBR
- 6	2	O-Ring	O-ring	Ø5,28x1,78 /NBR	Ø5,28x1,78 /NBR	Ø5,28x1,78 /NBR
- 7	1	Adapter	Adapter	-	-	-
8	1	O-Ring	O-ring	-	-	-
9	2	Winkelverschraub.	Elbow connector	08-60-750/93	08-60-750/93	08-60-750/93
9a	1	Stopfen	Plug	-	-	08-74-021/93
10	1	Dichtung	Gasket	-	-	-
11	1	O-Ring	O-ring	-	-	-
12	1	O-Ring	O-ring	-	-	-
13	1	Adapter	Adaptor	-	-	-
14	4	Schraube	Screw	-	-	M5x12/DIN 933
15	1	Adapter CU3 SW4-20	Adaptor CU3 SW4-20	-	-	08-48-355/93

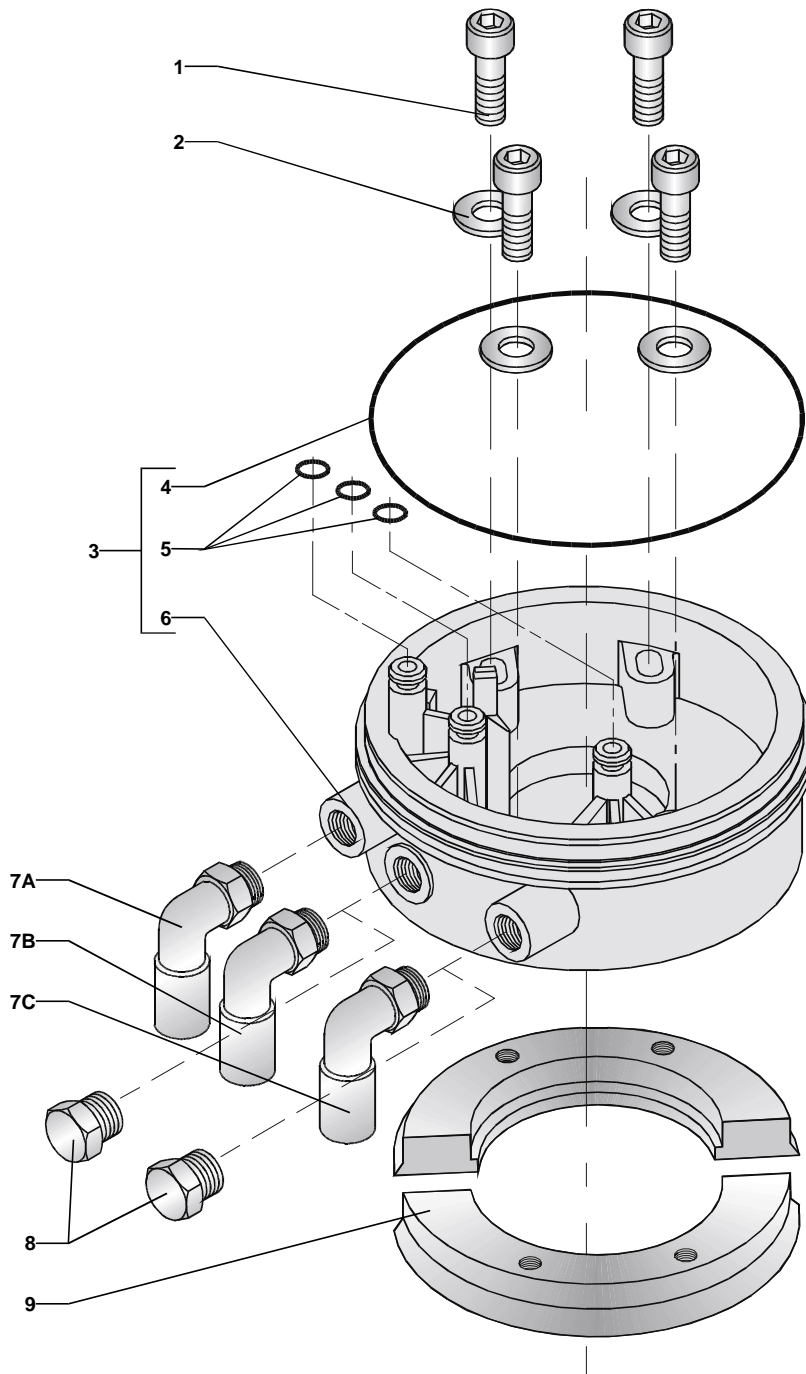
Adapter / adapter
DELTA CU3

				SV/SVS1F DN 25 - 100 and 1" - 4"	SVS1F DN 125 - 250		
				DKR 2 DN25 - 65 and 1" - 2,5"	DKR2 DN 80 - 125 and 3" - 4"	S2 / D2	S3
				DSV DN 50 - 65 and 2" - 3"	DSV DN 80 - 125 and 4"		
Pos.	Stk./Qty.	Benennung	Description	Ws.-Nr. / Part No.			
-	-	CU Adapter kompl.	CU adapter cpl.	08-48-416/93	08-48-417/93	08-48-418/93	08-48-419/93
1	1	Schaltnocke	Actuator screw	08-60-779/93	08-60-780/93	08-60-781/93	08-60-782/93
2	4	Schraube	Screw	-	-	-	M8x25/DIN 912
	4	Schraube	Screw	M5 x 18/ISO 1207	M5 x 18/ISO 1207	-	-
	4	Schraube	Screw	-	-	M8 x 22/DIN 912	-
3	1	Spannstift	Split pin	-	-	-	-
4	1	Adapter Set	Adapter kit	08-60-333/93	08-60-333/93	08-60-334/93	08-60-334/93
- 5	1	O-Ring	O-ring	Ø 88,62x1,78 /NBR	Ø 88,62x1,78 /NBR	Ø 88,62x1,78 /NBR	Ø 88,62x1,78 /NBR
- 6	2	O-Ring	O-ring	Ø 5,28x1,78 /NBR	Ø 5,28x1,78 /NBR	Ø 5,28x1,78 /NBR	Ø 5,28x1,78 /NBR
- 7	1	Adapter	Adapter	-	-	-	-
8	1	O-Ring	O-ring	Ø 90x2/ NBR	Ø 90x2/ NBR	-	-
9	2	Winkelverschraubung	Elbow connector	-	-	08-60-750/93	08-60-750/93
9a	2	Blindstopfen	Plug	08-60-740/93	08-60-740/93	-	-
10	1	Nutring	Gasket	-	08-60-738/93	-	-
11	1	O-Ring	O-ring	Ø 13 x 2 / NBR 70	Ø 13 x 2 / NBR 70	-	-
12	1	O-Ring	O-ring	-	Ø 11 x 3 / NBR	-	-
13	1	Adapter	Adapter	-	-	-	-

				VPS / VPL / VPB	VPS - 3A	VPS-3A Longstroke	VPM
Pos.	Stk./Qty.	Benennung	Description	Ws.-Nr. / Part No.			
-	-	CU Adapter kompl.	CU adaptor cpl.	08-48-420/93	08-48-421/93	08-48-422/93	08-48-423/93
1	1	Schaltnocke	Actuator screw	08-60-778/93	08-60-783/93	08-60-784/93	08-60-785/93
1.1	1	Zugstangenverläng.	Extension rod	-	-	-	-
2	4	Schraube	Screw	-	-	-	-
	4	Schraube	Screw	M5 x 18/ISO 1207	M5 x 18/ISO 1207	M5 x 18/ISO 1207	M5 x 18/ISO 1207
3	1	Spannhülse	Split pin	-	08-60-762/15	08-60-762/15	-
4	1	CU Adapter Set	Adaptor kit	08-60-332/93	08-60-332/93	08-60-332/93	08-60-332/93
- 5	1	O-ring	O-Ring	Ø 88,62x1,78 /NBR	Ø 88,62x1,78 /NBR	Ø 88,62x1,78 /NBR	Ø 88,62x1,78 /NBR
- 6	2	O-ring	O-Ring	Ø 5,28x1,78 /NBR	Ø 5,28x1,78 /NBR	Ø 5,28x1,78 /NBR	Ø 5,28x1,78 /NBR
- 7	1	Adapter	Adaptor	-	-	-	-
8	1	O-ring	O-Ring	Ø 88x1,5/ NBR	Ø 88x1,5/ NBR	Ø 88x1,5/ NBR	Ø 88x1,5/ NBR
9	2	Winkelverschraub.	Elbow connector	08-60-750/93	08-60-750/93	08-60-750/93	08-60-750/93
9a	2	Stopfen	Plug	-	-	-	-
10	1	Dichtung	Gasket	-	-	-	-
11	1	O-ring	O-Ring	-	-	-	-
12	1	O-ring	O-Ring	-	-	-	-
13	1	Adapter VPM	Adaptor VPM	-	-	-	08-20-125/12

Adapter / adapter

DELTA CU3 for DA3+ / DE3



Pos.	Benennung	Description
7A	Luftanschluss : Ventil öffnen	Air connection : Valve opening
7B	Luftanschluss : untere Sitzanlüftung	Air connection : lower seat lift
7C	Luftanschluss : obere Sitzanlüftung	Air connection : upper seat lift

Adapter / adapter
DELTA CU3 for DA3+ / DE3
**Adapter für DE3 / DA3+ - 1 Magnetventil (EMV) /
Adapter for DE3 / DA3+ - 1 Solenoid valve (SV)**

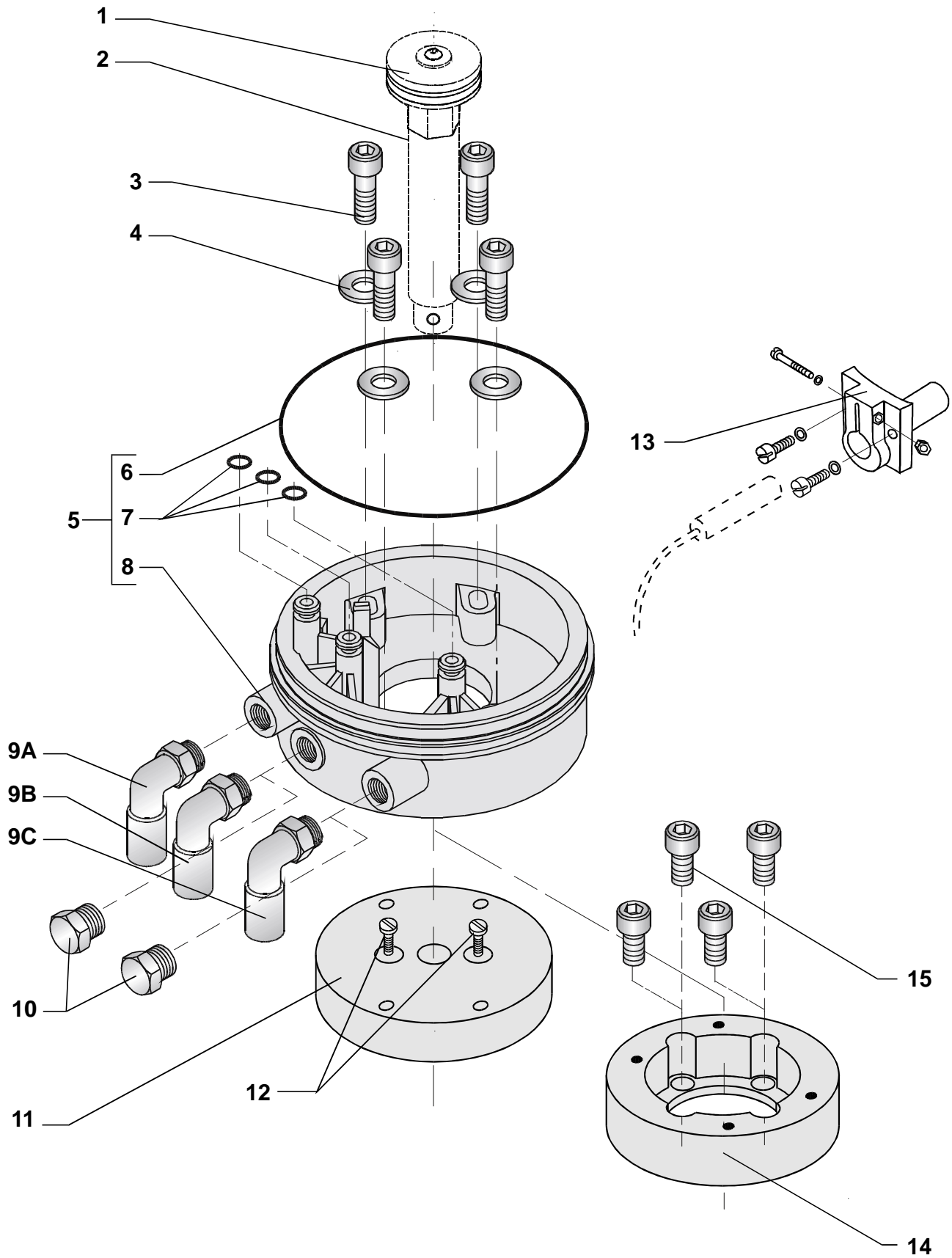
Pos	Stk/Qty	Benennung	Description	Ws.-Nr. / Part No.
-	-	CU21 Adapter DA3+, DE3 komplett -1 Elektromagnetventil	CU21 adapter DA3+, DE3 complete -1 solenoid Valve	08-48-424/93
1	4	Schraube	Screw	M5x25/ ISO4762
2	4	Scheibe	Washer	08-60-767/15
3	1	CU2 Adapter Set DA3+, DE3	CU2 adapter kit DA3+, DE3	08-60-330/93
- 4	1	O-ring	O-Ring	Ø88,62x1,78 /NBR
- 5	3	O-ring	O-Ring	Ø5,28x1,78 /NBR
- 6	1	Adapter	Adapter	-
7A	1	Winkelverschraubung	Elbow connector	08-60-750/93
8	2	Blindstopfen	Plug	08-60-740/93
9	2	Montagehälfte CU Adapter DA3+ / DE3	Assembly half CU adapter DA3+ / DE3	08-60-717/93

**Adapter für DA3+ - 3 Magnetventile (EMV) /
Adapter for DA3+ - 3 Solenoid valves (SV)**

Pos	Stk/Qty	Benennung	Description	Ws.-Nr. / Part No.
-	-	CU23 Adapter DA3+ komplett - 3 Elektromagnetventile	CU23 adapter DA3+ complete - 3 solenoid valves	08-48-425/93
1	4	Schraube	Screw	M5x25 ISO4762
2	4	Scheibe	Washer	08-60-767/15
3	1	CU2 Adapter Set DA3+, DE3	CU2 adapter kit DA3+, DE3	08-60-330/93
- 4	1	O-ring	O-Ring	Ø88,62x1,78 /NBR
- 5	3	O-ring	O-Ring	Ø5,28x1,78 /NBR
- 6	1	Adapter	Adapter	-
7A-B-C	3	Winkelverschraubung	Elbow connector	08-60-750/93
8	-	Blindstopfen	Plug	-
9	2	Montagehälfte CU Adapter DA3+ / DE3	Assembly half CU adapter DA3+ / DE3	08-60-717/93

Adapter / Adaptor

DELTA CU3 for PHB/ PSL, S2 - DN 10, 15, 20



Adapter / Adapter

DELTA CU3 for PHB/ PSL, S2 - DN 10, 15, 20

Adapter für Pneumatische Hubbegrenzung (PHB) SW4 / M4 / Adapter for Pneumatic Stroke Limitation (PSL) SW4 / M4

Pos	Stk/Qty	Benennung	Description	Ws.-Nr. / Part No.
-	-	CU32 Adapter SW4 / M4 - PHB kpl.	CU32 adapter SW4 / M4 - PSL cpl.	08-48-370/93
1	1	Schaltnocke	Actuator screw	08-60-700/93
2	1	Zugstangenverlängerung	Extension rod	15-26-057/93
3	4	Zyl. Schraube	Cyl. Screw	M5x25 ISO4762
4	4	Scheibe	Washer	08-60-767/15
5	1	CU2 Adapter Set DA3+, DE3	CU2 adapter kit DA3+, DE3	08-60-330/93
- 6	1	O-ring	O-Ring	Ø88,62x1,78 /NBR
- 7	3	O-ring	O-Ring	Ø5,28x1,78 /NBR
- 8	1	Adapter	Adapter	-
9A-B	2	Winkelverschraubung	Elbow connector	08-60-750/93
10	1	Blindstopfen	Plug	08-60-740/93
11	-			
12	-			
13	-			
14	1	CU3 Adapter SW4, M4, PHB	CU3 adapter SW4, M4, PSL	08-48-371/93
15	4	Schraube	Screw	M8x12 DIN912

Adapter für S2-DN 10, 15, 20 / Adapter for S2-DN 10, 15, 20

Pos	Stk/Qty	Benennung	Description	Ws.-Nr. / Part No.
-	-	CU31 Adapter S2 - DN10,15,20 kpl	CU31 adapter S2 - DN10,15,20 cpl.	16-00-174/93
1	-			
2	-			
3	4	Zyl. Schraube	Cyl. Screw	M5x25 ISO4762
4	4	Scheibe	Washer	08-60-767/15
5	1	CU2 Adapter Set DA3+, DE3	CU2 adapter kit DA3+, DE3	08-60-330/93
- 6	1	O-ring	O-Ring	Ø88,62x1,78 /NBR
- 7	3	O-ring	O-Ring	Ø5,28x1,78 /NBR
- 8	1	Adapter	Adaptor	-
9A	1	Winkelverschraubung	Elbow connector	08-60-750/93
10	2	Blindstopfen	Plug	08-60-740/93
11	1	Deckel Adapter CU31	Cover adapter CU31	16-00-174/93
12	2	Zyl. Schraube	Cyl. Screw	M5x10/ DIN912
13	2	Initiatorenhalter kpl.	Proximity switch support cpl.	15-33-921/83
14	-			

13.3 Auxiliary Equipment CU3 Valve Net

Description	Part No.-APV
Converter Cable RS232 for CU3 Toolbox Suitable for PC / Laptop	08-46-011/93
Software PC Toolbox for CU3 Valve-Net Profibus / Device Net APV utility software toolbox to use on PC or Laptop	08-46-510/00
Valve-Net Profibus Link Term	08-46-340/13
Valve-Net Profibus Link Guard	08-46-341/13
Valve-Net Toolbox cable sub-D 9pole / mini-T	08-46-334/13
Profibus extension cable 1,5m / 9pole sub-D	08-46-450/93
Valve-Net Supply Hub 1 230VAC/24VDC-10A Merger + Utility 1 Segment	08-46-300/13
Valve-Net Supply Hub 1 + OLM 230VAC/24VDC-10A Merger + optical Utility	08-46-301/13
Valve-Net Supply Hub 2 230VAC/24VDC-10A Merger + Utility 2 Segments	08-46-302/13
Valve-Net Supply Hub 2 + OLM	08-46-303/13
Valve-Net Supply Hub 2 + Repeater	08-46-304/13
Valve-Net Supply Hub 3 230VAC/24VDC-10A Merger + Utility 3 Segments	08-46-305/13
Valve-Net Supply Hub 3 + OLM 230VAC/24VDC-10A Merger + optical Utility	08-46-306/13
Valve-Net Supply Hub 3 + Repeater	08-46-307/13
Valve-Net Supply Hub 4 + Repeater	08-46-308/13
Valve-Net Supply Link with Optic	08-46-320/13
Valve-Net Supply Link with Optic + Repeater	08-46-321/13
Valve-Net Supply Link with Optic + 2 Repeater	08-46-322/13
Valve-Net Supply Merge	08-46-330/13
Valve-Net Supply + Repeater	08-46-331/13

13.3 Auxiliary Equipment CU3 Valve Net

Description Type / SDS	Part No.- Turck	Description Alternative Type / Device Net	Alternative Part No.- Turck
Mid-Cable 0,3M Type: RSV-RKV531-0,3M/S486	66 03 401	Mid-Cable 0,3M <i>Alternative Type :</i> RSV-RKV5711-0,3M/ROS	66 03 277
Mid-Cable 1,0M Type: RSV-RKV531-1M/S486	66 02 585	Mid-Cable 1,0M <i>Alternative Type :</i> RSV-RKV5711-1M/ROS	66 03 272
Mid-Cable 2,0M Type: RSV-RKV531-2M/S486	66 02 587	Mid-Cable 2,0M <i>Alternative Type :</i> RSV-RKV5711-2M/ROS	66 03 273
Mid-Cable 4,0M Type: RSV-RKV531-4M/S486	66 02 588	Mid-Cable 4,0M <i>Alternative Type :</i> RSV-RKV5711-4M/ROS	66 03 274
Mid-Cable 8,0M Type: RSV-RKV531-8M/S486	66 03 224	Mid-Cable 8,0M <i>Alternative Type :</i> RSV-RKV5711-8M/ROS	66 03 275
Mid-Cable 15,0M Type: RSV-RKV531-15M/S486	66 03 223	Mid-Cable 15,0M <i>Alternative Type :</i> RSV-RKV5711-15M/ROS	66 03 276
Mid Cable / M Type: SDS-BUSKABEL 531	66 02 305	Mid Cable / M <i>Alternative Type :</i> CABLE 5711	69 58 116
Mini Tee Type: RSV-2RKV50/ROS	66 02 429	Mini Tee <i>Alternative Type :</i> RSV-2RKV50/ROS	66 02 429

Cables and connectors to be purchased direct from Turck.