BARTEC

PETRO 3003 CHEM

Service manual

SA 210527

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Exclusion of liability	BARTEC BENKE GmbH and its vicarious agents only assume liability in the case of deliberate acts or gross negligence. The extent of liability in such a case is limited to the value of the order placed with BARTEC BENKE GmbH. BARTEC BENKE accepts no liability for any damage resulting from non-observance of the safety regulations or from non-compliance with the operating instructions or operating conditions. Secondary damage is excluded from the liability.
EU-Declaration of conformity	We, BARTEC BENKE GmbH, Schulstraße 30, D-94239 Gotteszell, hereby declare, that this product is in compliance with the essential requirements of the relevant EU-Directives The EU-Declaration of conformity for this product can be obtained from BARTEC BENKE GmbH, Schulstraße 30, D-94239 Gotteszell, gotteszell@bartec.com
Waste disposal	Make sure that the product described here is disposed of in an environmentally sound manner. Observe the national and local safety regulations.

1 About this manual

The illustrations in this manual are intended to illustrate the information and descriptions. They cannot always be transferred unchanged and may differ slightly from the actual design of the device.
BARTEC GmbH reserves the right to make technical changes at any time.
BARTEC GmbH is under no circumstances responsible or liable for any indirect or consequential damages resulting from the use, operation or application of this user manual.

Please read the operating instructions carefully before using the product.

Signs and symbols

The following characters and symbols are used in this manual to highlight passages that need special attention.

Notes
This arrow indicates special features to be observed during operation.

Warning
This symbol draws your attention to passages that, if not followed or followed inaccurately, may result in damage to or destruction of parts of the system or loss of data.

Danger!
This symbol marks passages that, if not followed, endanger the health or life of humans.

Special notes that appear within the text are marked with a frame.

2 Safety precautions

2.1 General Safety Regulations

The operator of the system is responsible for compliance with all the regulations that apply to the storage, transportation and transshipment of flammable liquids.

For safe installation and commissioning, the knowledge of the safety instructions and warnings in this service manual and their strict compliance are essential.

Careful handling and consistent adherence to instructions can help to prevent accidents, injuries and property damage.

Regulations and requirements lose none of their validity when the system is operated using PETRODAT units.

PETRODAT units were manufactured with due consideration to the regulations in force and left the factory in perfect condition. The equipment must be installed and maintained by qualified technical personnel.

- Make sure that the data and operating conditions specified by the manufacturer (BARTEC BENKE) are observed.
- Follow the instructions for operating and servicing the units.
- If you discover any signs of damage or destruction to any parts of the system or if safe operation of the equipment cannot be guaranteed for any other reason, do not start up the system or, if already in operation, shut it down immediately.
  Notify the local service centre.
- You should also contact our service specialists if you discover any faults or defects during operation or if you have cause to doubt whether the units are working properly.
- The PETRODAT units do not replace the safety facilities of the tanker or the customer (e.g. the overfill safety system).

2.2 Installation instructions

- Fit the units so that the specified climatic and temperature values are not exceeded. Protect them, if necessary, by covering, heating or cooling them.
- The installation location should be as free from vibration and shocks as possible. Protect all components from vibration through the use of sturdy mounts.
- The place where the printer is installed must provide continuous protection against dirt and moisture.
- When carrying out welding work on the vehicle, the power supply cable to the system must be disconnected (disconnect control gear).
- Protect the units, in particular the printer, against dirt during installation (metal chips, etc.).
- Seal cable glands that are not used with blanking plugs.
- Before installing, remove the fittings to protect the printer during transport.
- All solenoid valves fitted must be interference-suppressed (anti-surge diode).

2.3 Wiring instructions

- The wiring must be carried out by trained personnel.
- Installation must be in accordance with EN 60079-14 and ADR/GGVS as well as the relevant national regulations.
- The service instructions must be followed when wiring the unit.
- The connecting cable must be laid so that no individual sections of the cable sag.
  It is appropriate to fasten the cable every approx. 15 - 20 cm using cable clips or cable ties.

  Special care is required when laying the cable near the radiator, in the engine compartment, in the truck chassis members and in the delivery cabin.
  Under no circumstances should areas of weakness be created where the cable may be bent or chafed.
- Fit wire end connector sleeves to the ends of cables for terminals.
- Tighten unassigned clamping screws.
- Unused wires must be isolated individually.

2.4 Information on maintenance and repair

- Maintenance and repair must be carried out by trained personnel.
- Before carrying out maintenance and repair work, switch off the units and protect them from being switched on again for the duration of the maintenance work.

3 Compact Controller TIGER, type 6942-10

Attention:
„Fingers only" control

3.1 Technical data

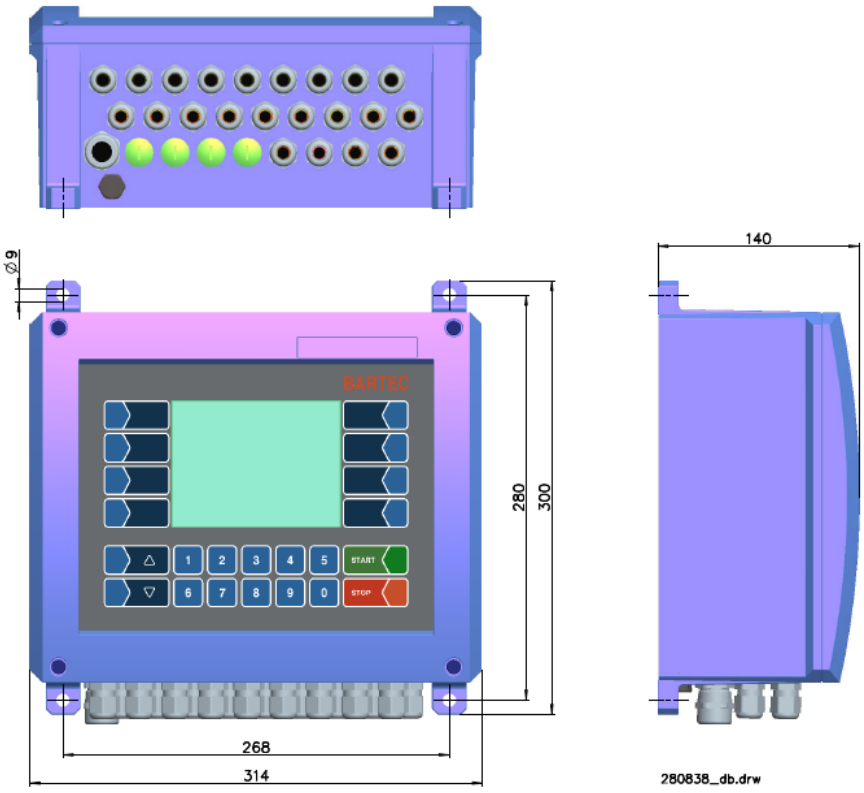
Device-specific data		
Nominal operating temperature	23 ± 2 °C	
Electrical data		
Operating voltage	DC 24 V (9 - 36V) on-board power supply (load-dump protection, stabilised)	
CPU		
Processor	Power PC™ MPC8270 (266 MHz)	
Built-in memory	FLASH: 256 MB FLASH (program memory) SDRAM: 128 MB SDRAM (working memory) SRAM: 4 MB (fail-safe data memory with battery backup)	
Removable memory	CompactFlash: all sizes	
Real-time clock	With battery backup	
Display/keypad		
Display	LC graphic display, 120 x 89 mm, monochrome, transflective 320x240-pixel resolution, adjustable LED backlighting	
Keypad	Resistive touch	
Measuring system interface		
Power inputs	3 x DC 24 V, 0/4 - 20 mA	
Voltage inputs	2 x DC 24 V, 0 - 4V	2 x DC 24 V, 0 - 4V
Temperature sensors	2 x Pt 100, 4-conductor	
Pulse transmitter input	24V, stabilised, max. 1kHz	
PWM output	24V, stabilised, max. 400Hz	
Analogue output (opt)	0/4 - 20 mA, R_B max. 500 Ω, 10-bit, isolated	
Outputs	16 x positive switching 1 A, 24 V, stabilised (3 A total)	
Digital inputs	8 x optoisolated, input resistance 2.6 kΩ, bipolar, solid state	
Pulse counter	3-channel max. 100Imp/s, input optoisolated 5 kΩ pull-up	

Interfaces	
Printer interface	RS 232, RxD, TxD, CTS, RTS 115 K, isolated
Fieldbus interface	P-NET RS485, 76800 baud, isolated
CAN interface (from series)	CAN 2.0A/B, 250 kbaud Communication profile: free protocol based on SAE J1939 CAN bus termination: activated or deactivated
Other interfaces	RS485, Ethernet 100 Mbit (on CPU), RS232 (excl. handshake)
Ambient conditions	
Operating temperature	- 20 … + 50 °C
Storage temperature	- 25 … + 60 °C
Climatic category	ISF in acc. with DIN 40050
Protection class	IP 65 in acc. with DIN 40040
Mechanical data	
Dimensions	See scale drawing
Material	Die-cast aluminium, blue coated
Front film	PES
Weight	65 N (6.5 kg)

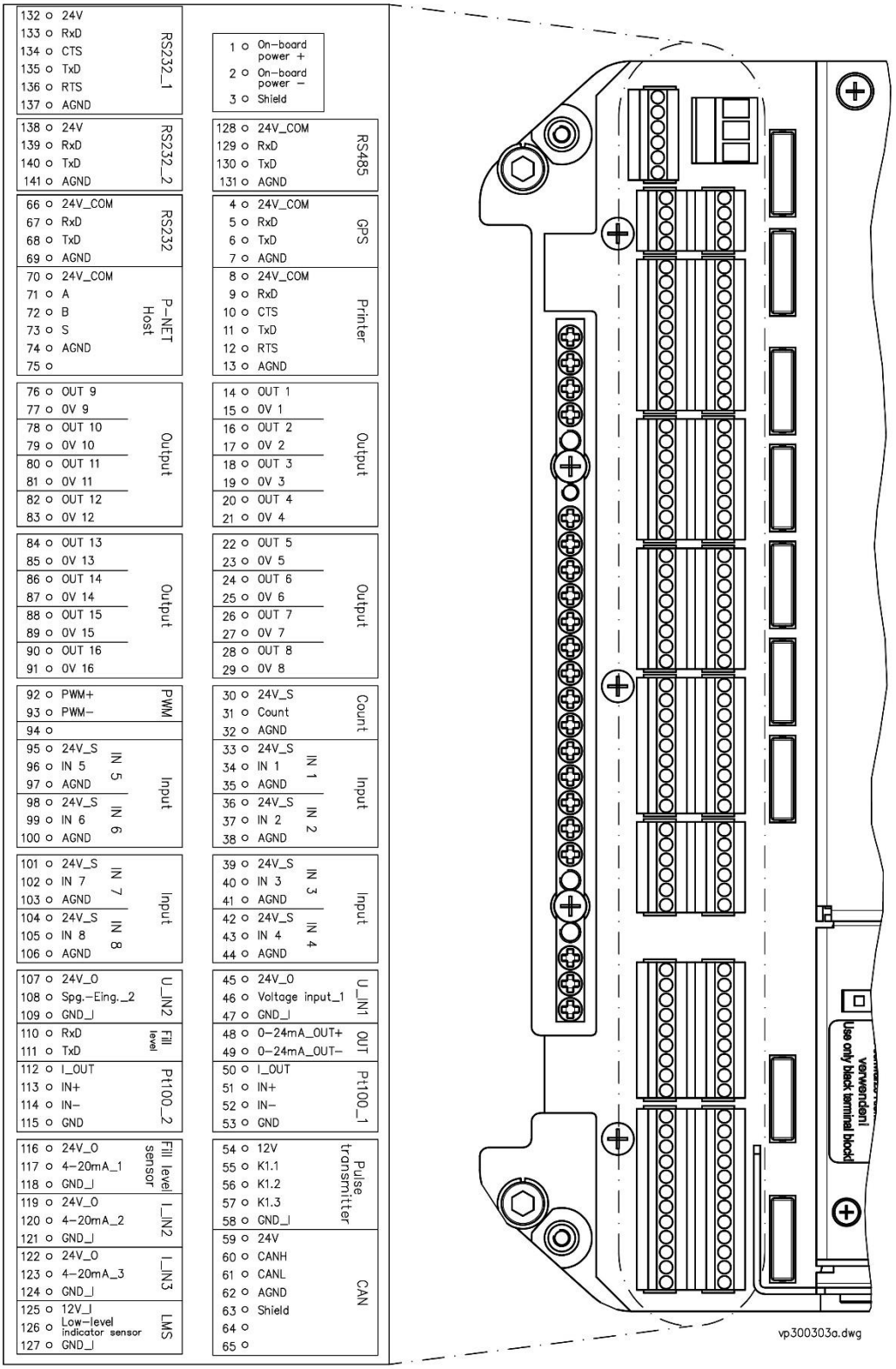
Ordering details

Designation	Order number
Compact Controller TIGER, type 6942-10, without CAN	280838
Compact Controller TIGER, type 6942-10, with CAN	386565
Motherboard without CAN-Bus, type 6942-111	U891176942111A
Motherboard with CAN-Bus, type 6942-112	U891176942112A

3.2 Dimensions



3.3 Terminal assignment



Attention:
Connection to external sources of voltage must be isolated.
Plus and minus connections are required at each output.
Relays must be shielded from interference (suppressor diode).
Shield bar must be conductively connected with vehicle chassis.
The shield must be placed on one side of the shield bar in the system 3003!

3.4 Power supply

Attention:
Shielded 2.5 mm² cable (16 A fuse, earth and positive branch) is required for the 24 V power supply, including corresponding switch.

The solenoid valves, all the measuring sensors and the ticket printer are supplied by the Controller.

A separate power supply is needed for the additive and the DIN A4 printer.

3.4.1 Inputs

The inputs are user-configurable. The recommended assignment is documented in the configuration manual.

3.4.2 Outputs

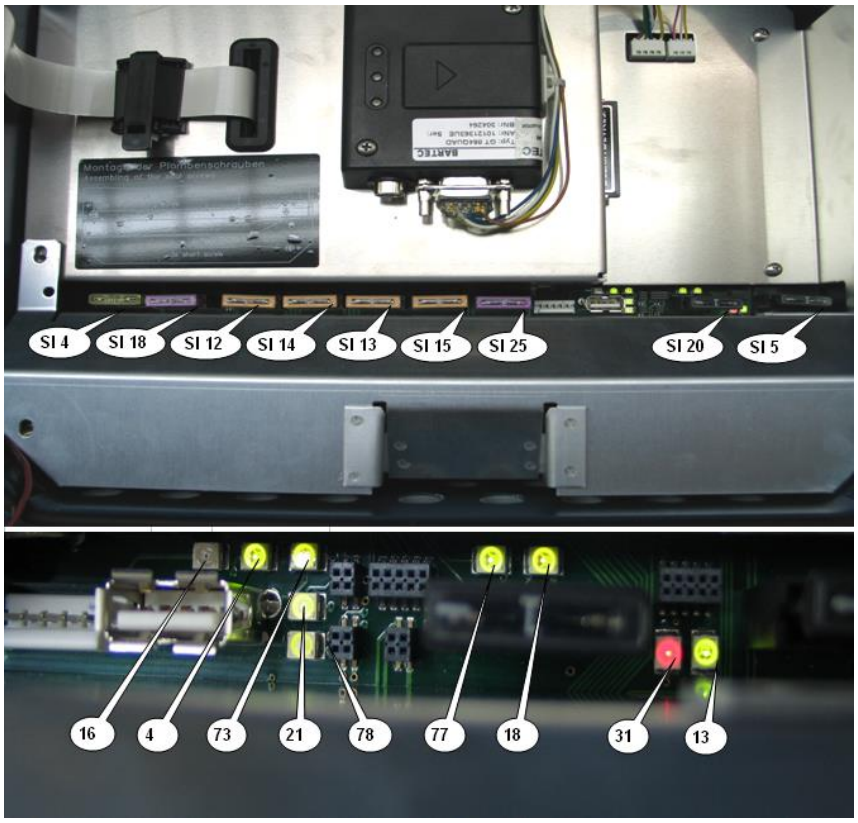
The outputs are user-configurable. The recommended assignment is documented in the configuration manual.

The solenoid valves are 24V with a power consumption of max. 200mA.

The output voltage is stabilized in terms of EMC protection from the on-board power supply in order to safeguard all control tasks. Therefore, galvanic isolation is always a requirement for connections to other voltages (e.g. chassis supply in the earth branch or reverse voltage links in the positive branch) (e.g. with additional relay if required).

3.6 Blade-type fuses and LED displays

3.6.1 Motherboard without CAN-Bus type 6942-111

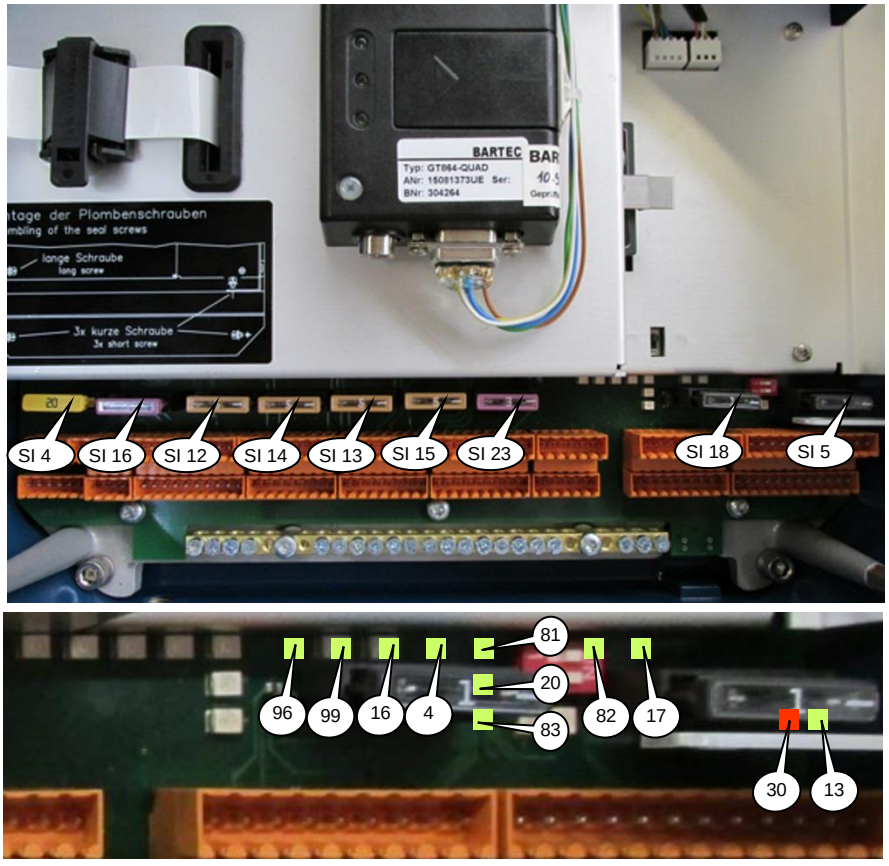


Standard blade-type motor vehicle fuses are fitted here with the following ratings:

Fuse no.	Rating	Voltage	Circuit/comments
SI 4	20 A	24V_S	Backup fuse for selective circuits SI18, SI12, SI13, SI14, SI15, SI25, SI5
SI 5	1 A	V24V_S	4-20mA inputs; voltage inputs
SI 12	5 A	+UB_1-4	Supply outputs 1-4; terminals 14-21
SI 13	5 A	+UB_5-8	Supply outputs 5-8; terminals 22-29
SI 14	5 A	+UB_9-12	Supply outputs 9-12; terminals 76-83
SI 15	5 A	+UB_13-16	Supply outputs 13-16; terminals 84-91
SI 18	3 A	24V_COM	RS 485, GPS, printer, P-net
SI 20	1 A	V24_GPRS	Supply for GPRS modem
SI 25	3 A	PWM out	Not in use

LED displays			Status
LED 4	5.5 supply for CPU, motherboard, electronic measuring equipment		Lights up
LED 13	Supply voltage 24 V_O/12 V_I analogue inputs		Lights up
LED 16	µ Controller power supply "busy"		Flashes
LED 18	USB communication, digital IN, analogue IO		Flashes
LED 21	µ Controller k_mif "busy" (PT100, 4-20 mA, U_IN,…)		Lights up
LED 31	µ Controller pulse counter "busy"		Lights up
LED 73	USB hub for GPRS, USB socket, P-net		Lights up
LED 77	USB communication, P-net, digital outputs		Flashes
LED 78	µ Controller k_pio "busy" (P-net, digital outputs)		Flashes
LED CPU	Top	Supply voltage	Lights up
LED CPU	Bottom	Busy	Flashes

3.6.2 Motherboard with CAN-Bus type 6942-112



Standard blade-type motor vehicle fuses are fitted here with the following ratings:

Fuse no.	Rating	Voltage	Circuit/comments
SI 4	20 A	24V_S	Backup fuse for selective circuits SI16, SI12, SI13, SI14, SI15, SI23, SI5
SI 5	1 A	V24V_S	4-20mA inputs; voltage inputs
SI 12	5 A	+UB_1-4	Supply outputs 1-4; terminals 14-21
SI 13	5 A	+UB_5-8	Supply outputs 5-8; terminals 22-29
SI 14	5 A	+UB_9-12	Supply outputs 9-12; terminals 76-83
SI 15	5 A	+UB_13-16	Supply outputs 13-16; terminals 84-91
SI 16	3 A	24V_COM	RS 485, GPS, printer, P-net, RS 232, CAN-Bus
SI 18	1 A	V24_GPRS	Supply for GPRS modem
SI 23	3 A	PWM out	Control of rotary pump, terminals 92-93

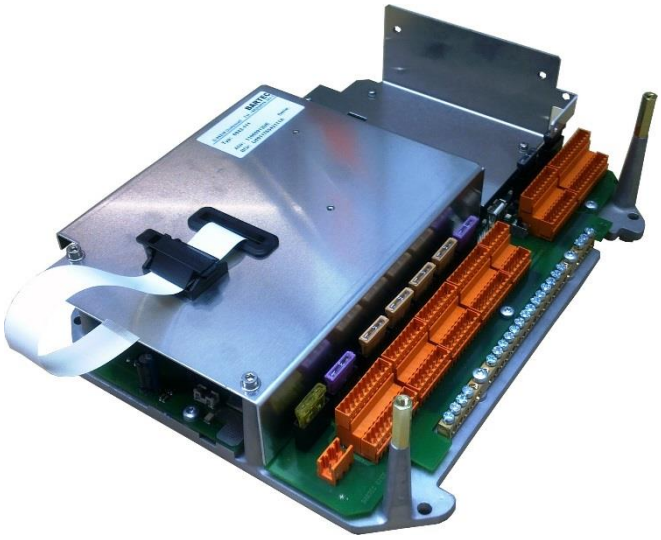
LED displays			Status
LED 4	5.5 supply for CPU, motherboard, electronic measuring equipment		Lights up
LED 13	Supply voltage 24 V_O/12 V_I analogue inputs		Lights up
LED 16	µ Controller power supply "busy"		Flashes
LED 17	USB communication, digital IN, analogue IO		Flashes
LED 20	µ Controller k_mif "busy" (PT100, 4-20 mA, U_IN,…)		Lights up
LED 30	µ Controller pulse counter "busy"		Lights up
LED 81	USB hub for GPRS, P-net, CAN, Display		Lights up
LED 82	USB communication, P-net, digital outputs		Flashes
LED 83	µ Controller k_pio "busy" (P-net, digital outputs)		Flashes
LED 96	USB-Communication CAN CAN/J1939 - inferface is configured CAN/J1939 - inferface is not configured		 Flashes Lights up
LED 99	µ Controller KCAN		Flashes
LED CPU	Top	Supply voltage	Lights up
LED CPU	Bottom	Busy	Flashes

3.7 CompactFlash card

Direction of CF

Attention:
Make sure the equipment is disconnected before changing the CompactFlash card!

3.8 Exchanging the motherboard/CPU board



The following points must be noted when replacing the motherboard:

- The configuration can be transferred with the CompactFlash card. The configuration must first be saved on the CompactFlash card via the Service menu, then the configuration can be loaded from the CompactFlash card onto the new motherboard. Only if the calibration switch is closed will the calibration parameters not be loaded and will then have to be adjusted.
- To change the motherboard, the display must be unplugged (flip strip at end of ribbon cable), the terminal blocks disconnected, and the wires disconnected from the shield bar. The entire motherboard can now be unscrewed at all four corners (M6x12) and taken out.
- Apply heat transfer compound supplied with new motherboard and fit.

Attention:
If it is necessary to remove the cover - in order, for example, to check that the ribbon cable is in the correct position for the display - it is essential to
remove the CompactFlash card first.

3.9 GPRS/UMTS data modem type CEP HT910G Global

- The modem housing (DGND) must not contact the chassis at any point. For this, the modem is fitted with the isolation set.
- Please also check the floating ground of the aerial adapter or the aerial.
- The shield bar must also not be in contact with the aerial adapter or the modem housing.
- The length of the modem cable is limited to 10m. Any measures to lengthen the cable must be avoided.
- The components may only be installed and operated in the non-hazardous area.

3.9.1 Technical data

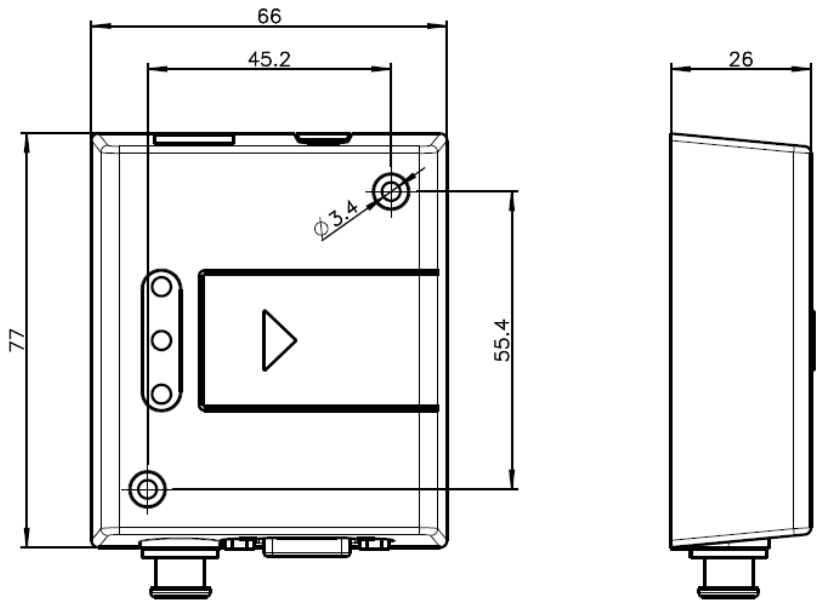
Operating voltage	5 - 36 V DC
Dimensions	77 mm x 67 mm x 26 mm
Weight	Approx. 100 g
Mounting	With two oval countersunk head screws M 3x8 mm
Operating temperature	-30 °C ... +75 °C
Storage temperature	-40 °C … +85 °C

Ordering details	
Designation	Order number
GPRS/ UMTS data modem type CEP HT910G Global	370919

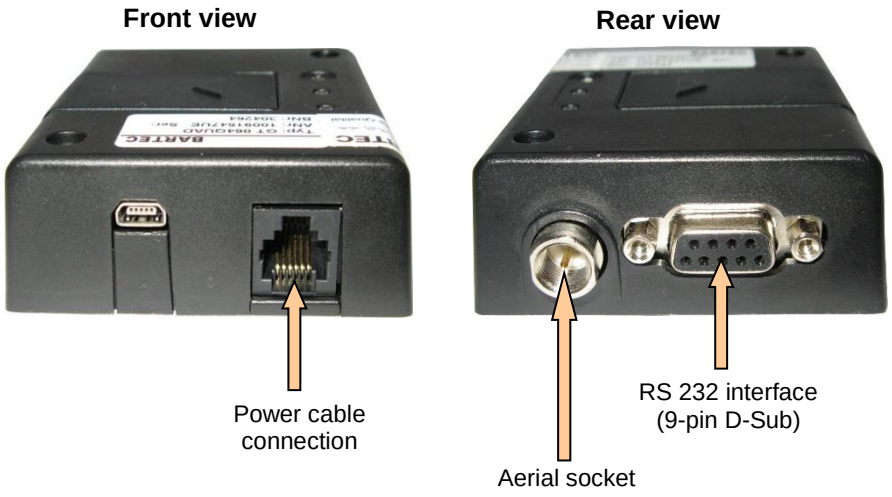
3.9.2 Dimensions and mounting

Fit the modem in a dry, dust-free and dirt-free area in a non-hazardous area where it is not exposed to much vibration.

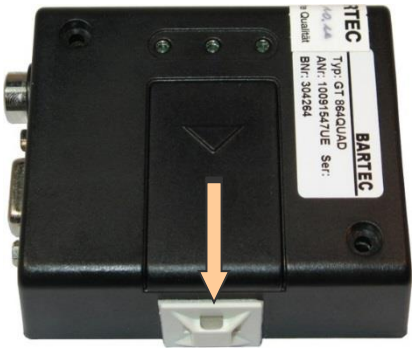
Dimensions and mounting holes



3.9.3 Connections and SIM-card



Inserting the SIM card



1. Open the cover.

2. Open the slot and insert the SIM card.

Attention:
Only change the SIM card with the power switched off!

3.9.4 Magnetic antenna

- Order no. 360422
- Ø 60mm / H: 13 mm
- Connection cable with FME connector, Length: 5 m
- Mount the aerial at a point where it will obtain good reception.
- It is not permitted to operate magnetic aerials in hazardous areas.
- Only change the SIM card with the power switched off.

Attention:
Fit the antenna in a location with good reception. The magnetic antenna may not be used in potentially explosive atmospheres.

First enter PIN in configuration then insert SIM card while the system is switched off.

3.9.5 SIM card specifications for the 3003 system

The following connections must be set up by the provider in order to guarantee efficient online support.

Service	Port	Description
SSH	22	Connection from 3003 system to office
SSH	22	Connection from office to 3003 system
HTTP	80	Connection from office to 3003 system
HTTPS	443	Connection from 3003 system to office
Ping		Connection from 3003 system to office

Additional options for office link-up via FTL and FTP (optional):

Service	Port	Description
FTP *1) (passive)	21 / all ports above 1023	Office link-up for Tiger MAK / PETRO and Petro 3003

Note:
The IMEI number of the modem must be activated and supported by the network operator/provider.

*1) FTP connections can also be protected by SSL. This is subject to the provider allowing FTP via SSL. Communications are then no longer in plain text but in SSL encryption form!

3.10 CAN bus termination (terminal resistor) (Series C)

The CAN bus line must be terminated at both ends. Using DIP switches (see picture below), the CAN bus termination/the terminating resistor on the compact controller can be switched on and switched off.

CAN bus termination deactivated or terminating resistors switched off.

CAN bus termination activated or terminating resistors switched on.

Attention:

CAN bus line:
It should be used a bus line which is isolated twisted and compliant to the CAN system (e.g. UNITRONIC BUS CAN 1x2x0.5 mm²).

CAN bus shielding:
The shield of the CAN bus line must be connected at one side.

CAN bus termination at FMS connection:
Via the DIP switch the CAN bus line must be terminated on the compact controller

3.11 Serial interfaces

3.11.1 Motherboard without CAN-Bus

Designation	Terminals	Interface on the system
GPRS	White plug	dev/usb/ttyUSB0
Bluetooth	Display connector	dev/usb/ttyUSB1
GPS	4-7	dev/ttyS3 (not changeable)
Printer	8-13	dev/ttySM0
RS485/RS232	66-69	dev/ttyS4

3.11.2 Motherboard with CAN-Bus

Designation	Terminals	Interface on the system
GPRS	White plug	dev/usb/ttyUSB0
Bluetooth	Display connector	dev/usb/ttyUSB1
GPS	4-7	dev/ttyS3 (not changeable)
Printer	8-13	dev/ttySM0
RS232	66-69	dev/ttyS4
RS485	128-131	dev/ttyS2
RS232_1	132-137	dev/ttySM1
RS232_2	138-141	dev/ttyS5

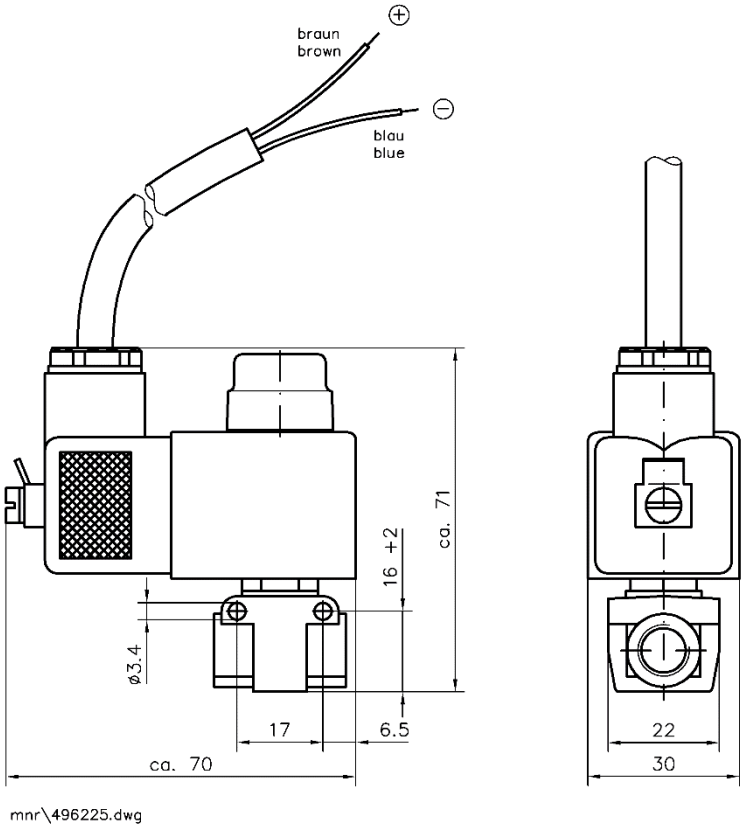
4 Periphery

4.1 Solenoid valve, 3/2-way, A1, 24V

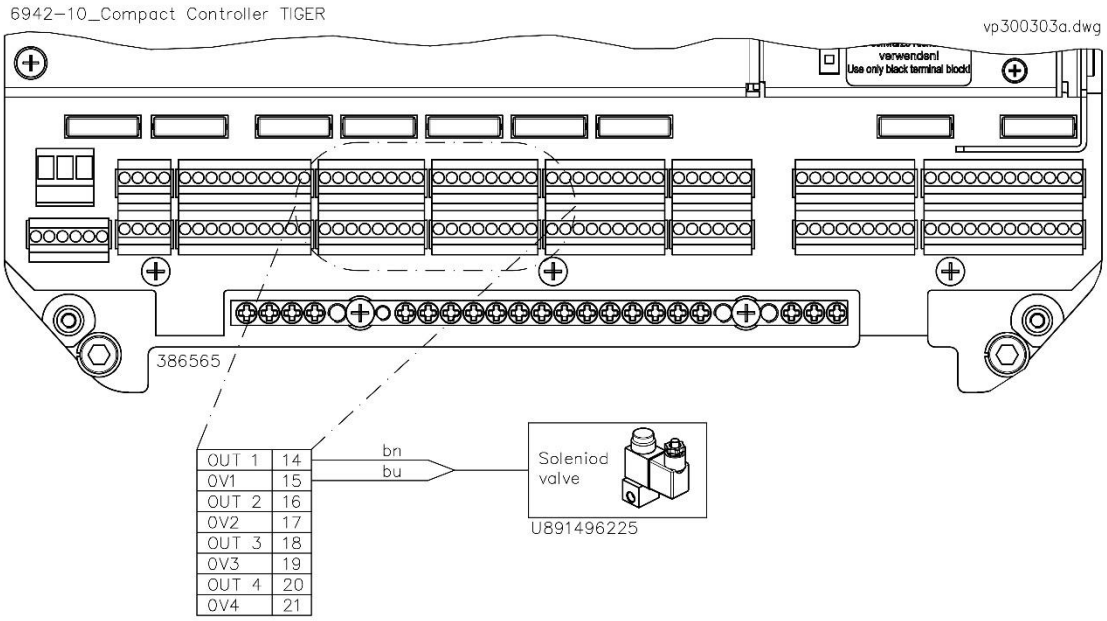
4.1.1 Technical data

Pressure	0 - 10 bar
Ambient temperature	-15…+50°C
Auxiliary power	DC 24 V ± 10 %, DC 0.14 A
Temperature of medium	Max. 50°C/h
Seal	FKM (Viton)
Equipment group / category / type of protection	II 2 G Ex mb II T5
Certificates	PTB 03 ATEX 2018 X IECEx PTB 04.0002 X
Norms	EN 60079-0, EN 60079-18 IEC 60079-0, IEC 60079-18
Protection class (EN 60529)	IP 65
Ordering details	
Designation	Order number
Solenoid valve, 3/2-way, A1, 24 V	U891496225

4.1.2 Dimensions and mounting



4.1.3 Electrical connection to Compact Controller TIGER, type 6942-10



Attention:
Connection to plus and minus in the Compact Controller required!

4.2 Printer, 24 V DC type 6881-30

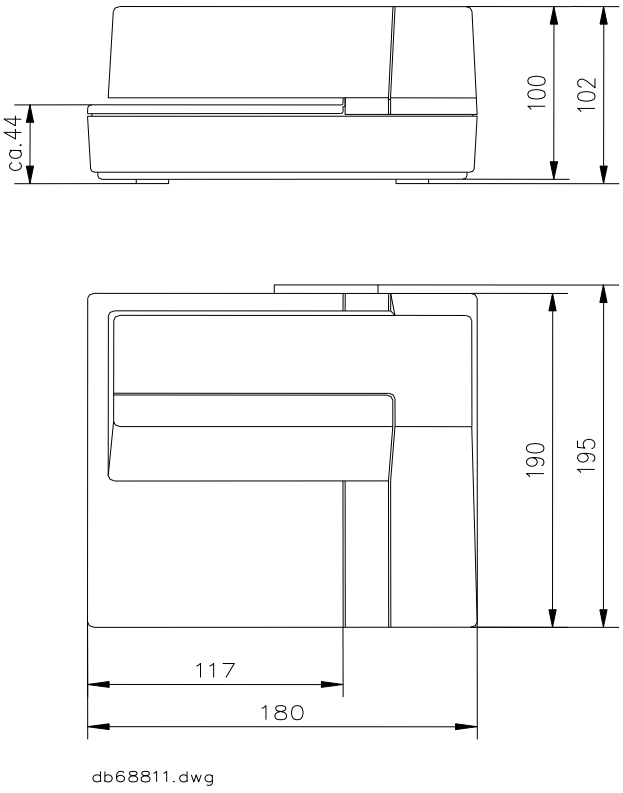
4.2.1 Technical data

Device-specific data	
Printing format	Alphanumerical character set with 96 ASCII characters (font 5 x 7 / 7 x7) 32 international characters and 128 x 3 graphical characters (font 6 x 7 / 10 x 7) 4 letter sizes: Standard, font 5 x 7 (35 characters per line) Normal, font 7 x 7 (42 characters per line) Wide, font 5 x 7 (17 characters per line) Wide, font 7 x 7 (21 characters per line) Line feed: 4.2 mm
Printing procedure	Needle printer 7 x 7 Unidirectional printing
Printing speed	1.9 ... 2.3 lines per second
Printing paper	Standard, carbon and self-copy paper Total thickness 0.09 ... 0.35 mm Paper width at least 80 mm Paper length at least 80 mm Printing width max. 60 mm Max. 4 copies with self-copy paper (25° C)
Colour ribbon	Colour ribbon cassette black Life expectancy approx. 1.5 x 10^6 characters
Data interface type 6961-100	Serial interface (RS 232) Cable length max. 10 m
Power supply	
Connection	25-pole socket (RS 232), 3-pole plugs (power supply DC 24 V)
Power supply	DC 24 V $\pm$ 10 %, max. 1.0 A, ripple $\leq$ 150 mV eff.
Ambient conditions	
Operating temperature	+5° C … +40 °C
Storage temperature	-10° C … +50 °C
Climatic class	KYF
Protective system	IP 40

Mechanical data	
Dimensions	180 x 102 x 195 mm (W x H x D)
Weight	Approx. 20 N (≅ 2 kg)
Housing	Plastic tabletop housing, grey

Ordering details	
Designation	Order number
Printer, type 6881-30	235934
Printer mount, type 6961-100	279562

4.2.2 Dimensions



4.2.3 Printer mount, type 6961-100

Attention:
The printer mount may only be installed and operated in the non-hazardous area.

4.2.3.1 Connections

Connection of printer mount without series:

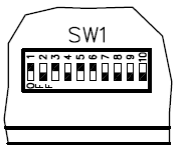
Designation	Terminal Connection Printer mount type 6961-100
24V	rd
RxD	ye
TxD	gn
GND	bu

Connection of printer mount from series A:

Designation	Terminal connection Printer mount type 6961-100
24V	rd + wh
RxD	ye
TxD	gn
GND	bu + bk

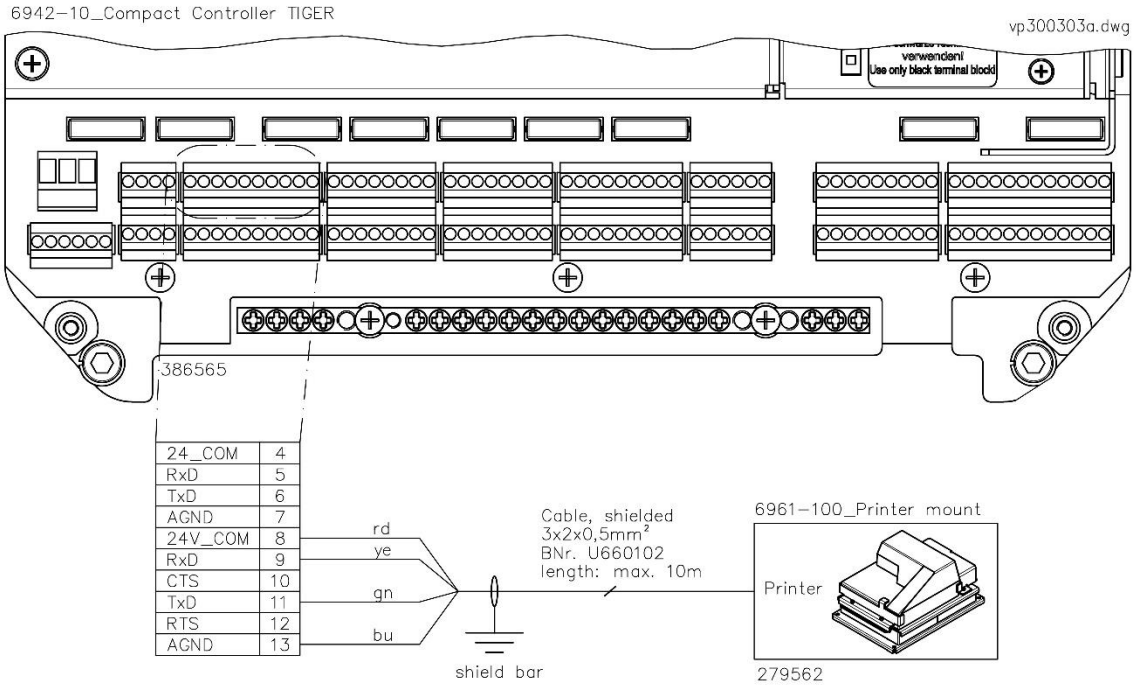
DIP switch setting (bottom):

Remove the adhesive label to change the DIP switch setting.

DIP switch no.	Printer mount type 6961-100
1	ON
2	OFF
3	ON
4	OFF
5	ON
6	ON
7	OFF
8	OFF
9	OFF
10	OFF
	

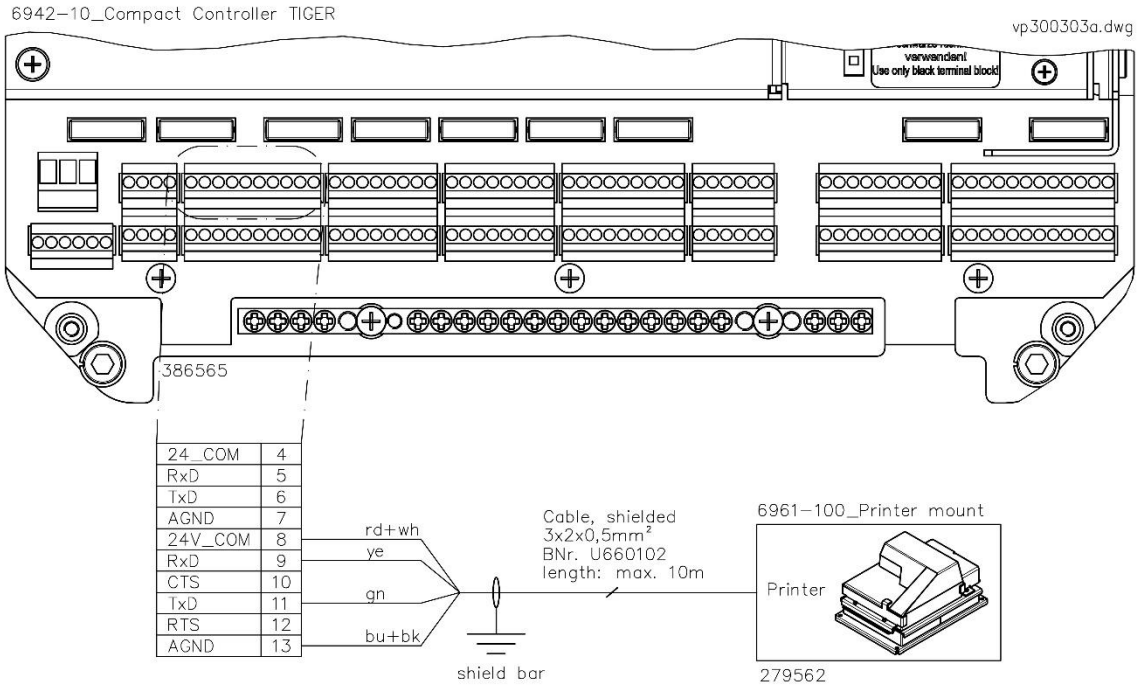
4.2.3.2 Electrical connection to Compact Controller, type 6942-10

Connection of printer mount before <u>series A:</u>



Terminal	Terminal connection Printer mount type 6961-100
8	24 V (rd)
9	RxD (ye)
10	
11	TxD (gn)
12	
13	GND (bu)

Connection of printer mount <u>from series A</u>:



Terminal	Terminal connection Printer mount type 6961-100
8	24 V (rd+wh)
9	RxD (ye)
10	
11	TxD (gn)
12	
13	GND (bu+bk)

4.3 W-AS, thermal type 6952-10

Order no.: 361458

The W-AS thermal requires a separate solenoid valve, which interrupts the compressed air for the solenoid valves "V" (D-valve fully open) and if necessary "U" (hose valve "unmeasured").
The + terminal of the AS-solenoid valve must be connected to the controller (input log. 5) to detect the switching status.
The W-AS components can be connected to the compact controller via the CAN interface.

See also operating instructions W-AS_BA_150626.

Attention:

CAN bus line:
It must be used a bus line which is isolated twisted and compliant to the CAN system (e.g. UNITRONIC BUS CAN FD P 1 x 2 x 0.5 mm²).

CAN bus shielding:
The shield of the CAN bus line must be connected at one side in the compact controller.

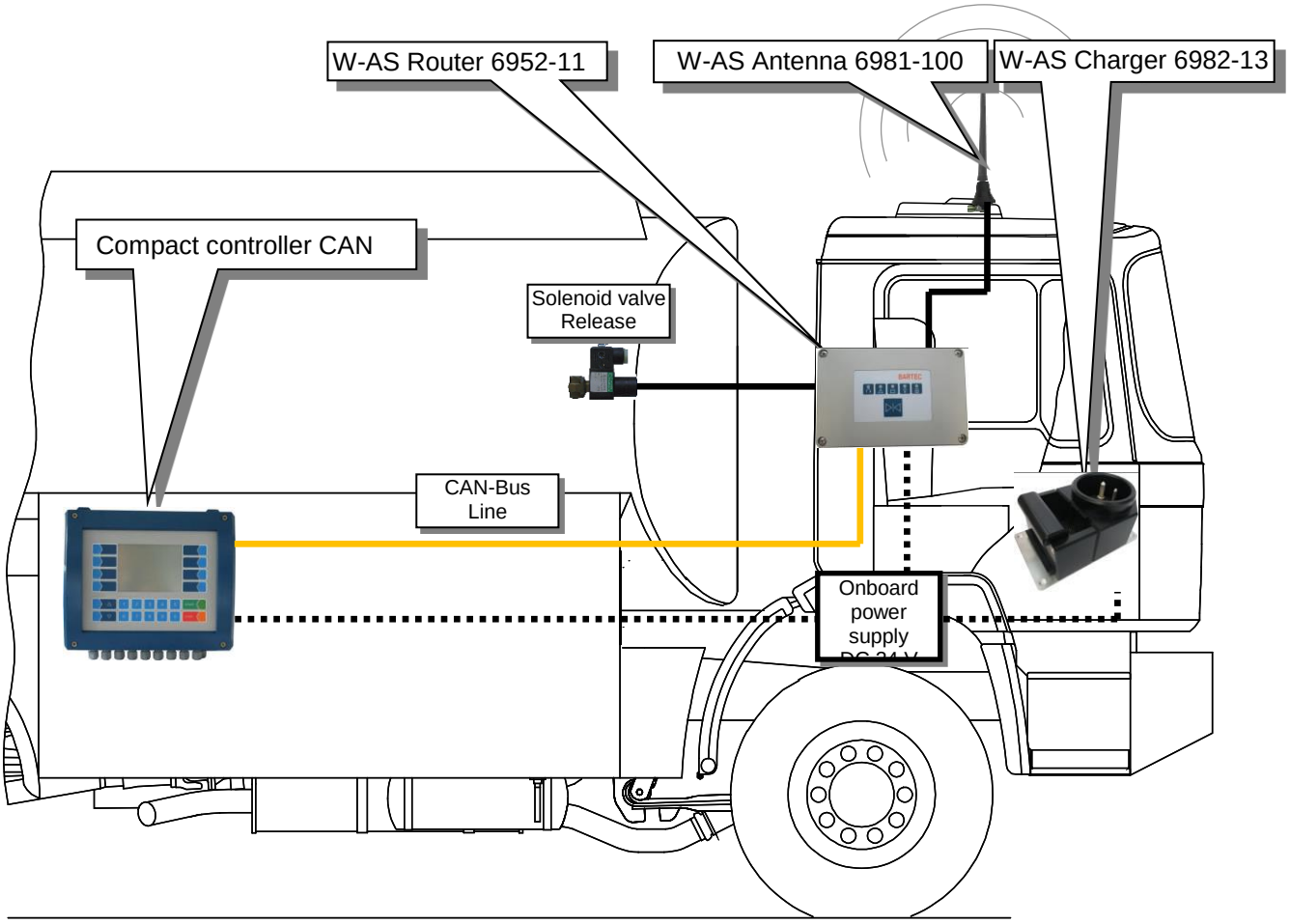
CAN bus termination:
Via the DIP switch, the CAN bus line at the compact controller can be terminated.

CAN bus termination deactivated or terminating resistors switched off.

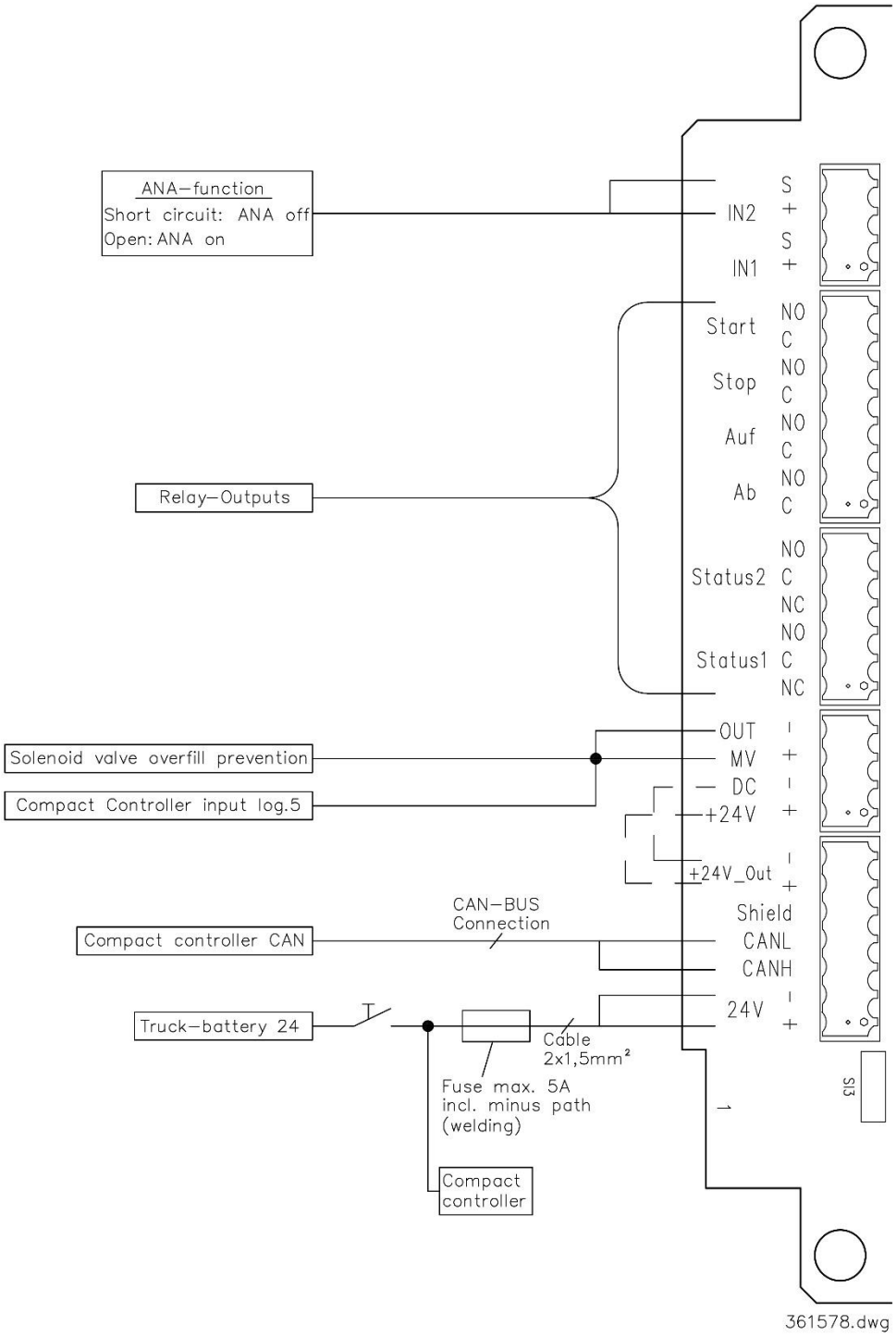
CAN bus termination activated or terminating resistors switched on.

Attention:
The W-AS Router must be supplied with voltage at the same time as the compact controller TIGER.

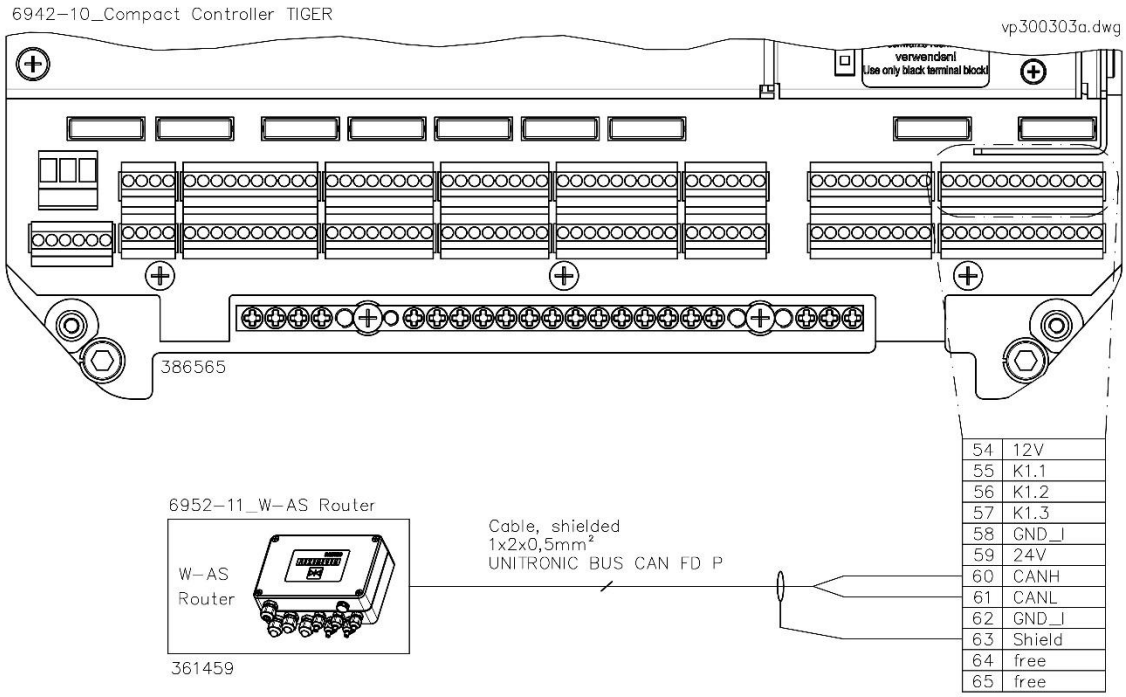
4.3.1 W-AS system components



4.3.2 Wiring



Terminals Compact Controller 6942-10 series: C	W-AS Router 6952-11
59 (24V)	
60 (CANH)	CANH
61 (CANL)	CANL
62 (GND_I)	
63 (shield)	
96 (IN 5)	MY +


6942-10_Compact Controller TIGER
vp300303a.dwg
verwenden!
Use only black terminal block!
386565
6952-11_W-AS Router
W-AS
Router
361459
Cable, shielded
1x2x0,5mm²
UNITRONIC BUS CAN FD P
54 12V
55 K1.1
56 K1.2
57 K1.3
58 GND_I
59 24V
60 CANH
61 CANL
62 GND_I
63 Shield
64 free
65 free

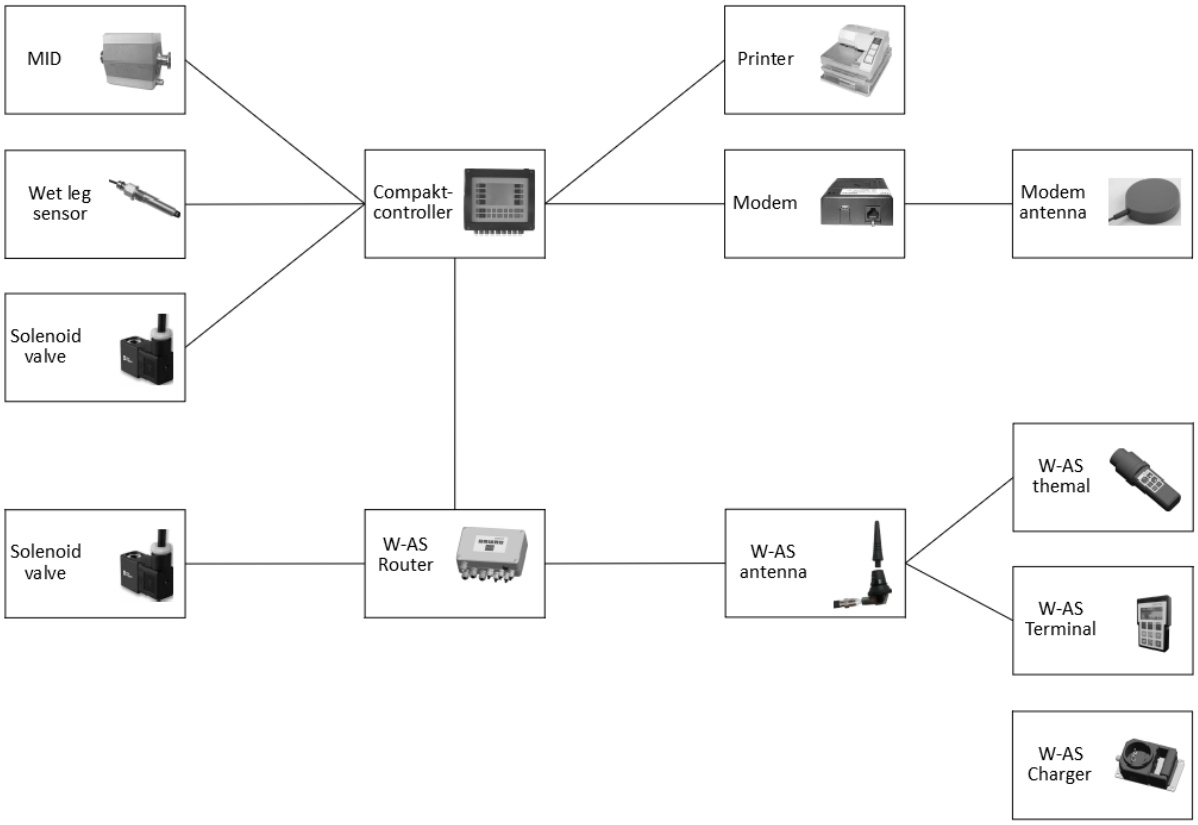
5 PETRO CHEM Measuring system

Attention:
The measuring system may only be operated under the nominal operating conditions specified in the EU type-examination certificate.

Legend:

BV1	Bottom valve compartment 1
BV2	Bottom valve compartment 2
KV1	Tilt valve compartment 1
KV2	Tilt valve compartment 2
SB1	Self-filling valve 1
SB2	Self-filling valve 2
EH	Vent valve of compensation tank
VH	Full hose valve
LH	Dry hose valve
HV	Trailer valve / trailer coupling
LMH	Wet leg sensor
K1	Compartment 1
K2	Compartment 2
DL	Throttle dry hose
BH	Bypass valve, bypass overfill prevention
SB3	Block valve during self-filling or external filling
P	Pump
ÜH	Overflow valve
TK-M	Dry coupling Trockenkupplung mother part
TK-V	Dry coupling father part
IBC	Intermediate Bulk Container
ESH	External start
UH	Valve for unmeasured delivery
MV	Solenoid valve

5.1 Block diagram PETRO CHEM



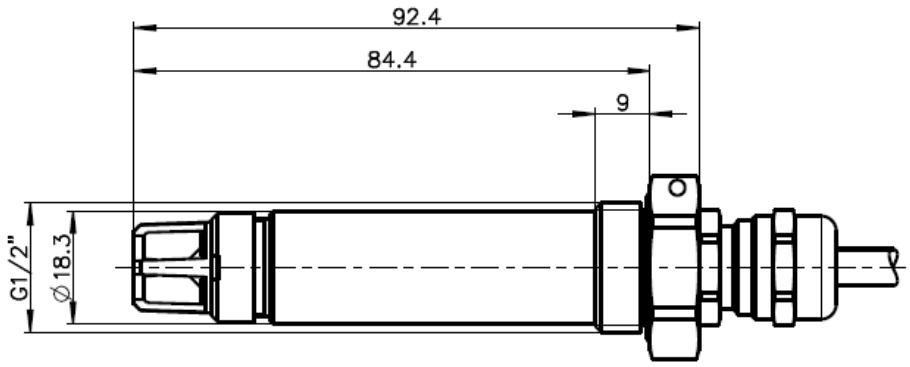
5.2 Wet leg sensor, optical Chem type 6729-26

5.2.1 Technical data

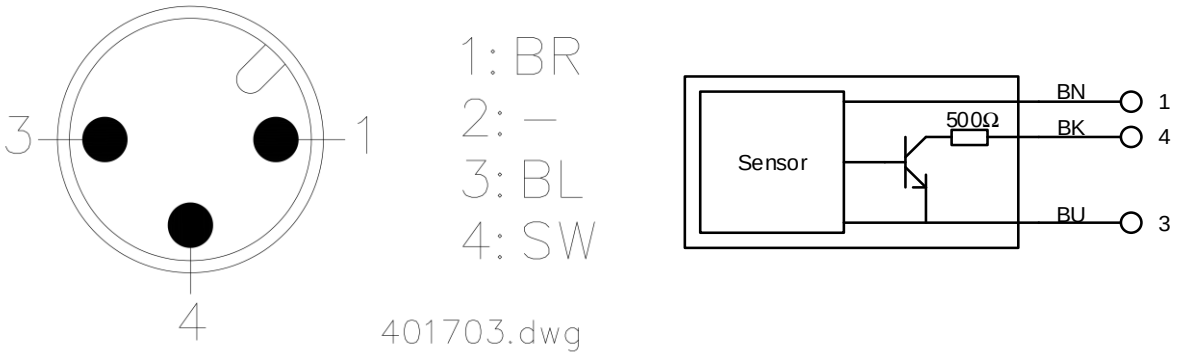
Electrical data	
Supply voltage	DC 10 V … 24 V
Nominal voltage	DC 24 V
Ripple	≤ 0,5%
Power consumption	<10mA
Current rating switching output	<20mA
Internal resistance switching output	<500Ω
Connection cable	0,80m with plug M12
Ambient conditions	
Permissible ambient temperature atmospheric conditions	- 20 °C…..+ 60 °C 0.8 bar ... 1.1 bar
Protection class (according to EN 60529)	IP 67
Permissible operating pressure pN	0,8 bar ... 20 bar
Mechanical Data	
Dimensions	See dimensional drawing
Housing material	Glass/ stainless steel
resistance	AdBlue, mineral oil

Ordering details	
Designation	Order number
Wet leg sensor, optical Chem type 6729-26	401703
O-ring 22,0 x 2,0	U220753
Protective cap	U05006748
Sensor cable with socket 5 m	292978
Sealing plug	303673
Constant current module, type 6753-302	U08001559

5.2.2 Dimensions

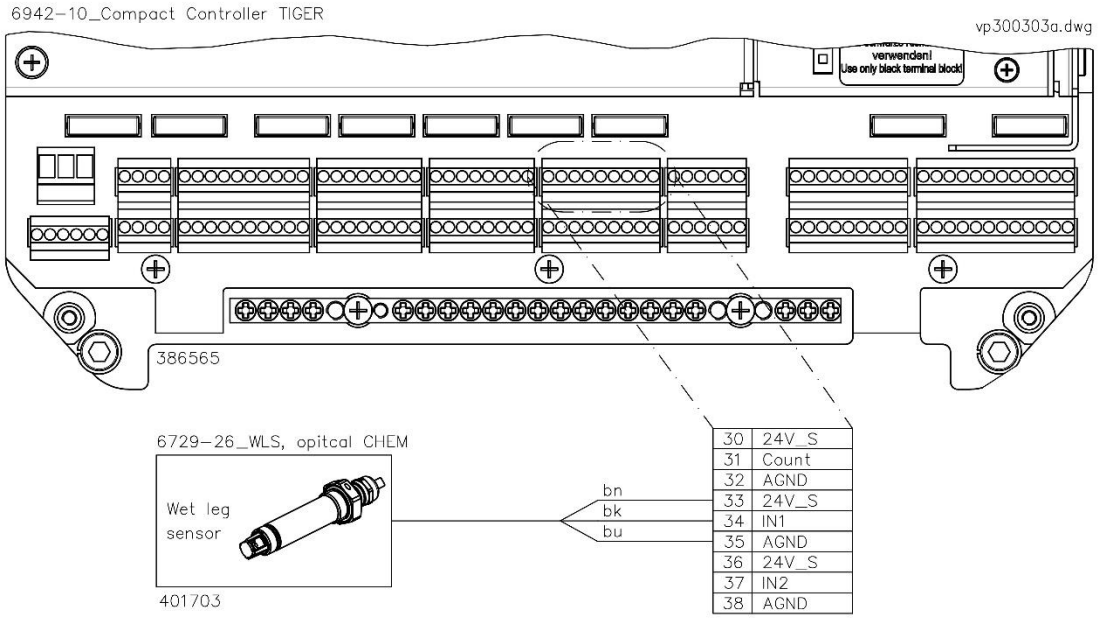


5.2.3 Terminal assignment



Pin	Color	Function
1	brown	+UN
2		NC
3	blue	GND
4	black	OUT

5.2.4 Electrical connection to Compact Controller TIGER, type 6942-10



5.3 MID NWx, PETRO type 6823-3x

5.3.1 Technical data

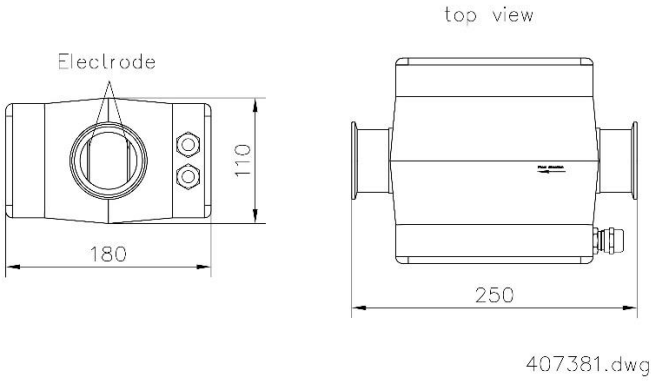
Device-specific data	
Measuring range MID NW25 PETRO, type 6823-30 MID NW40 PETRO, type 6823-33 MID NW50 PETRO, type 6823-31 MID NW63 PETRO, type 6823-32	 10 l/min to 100 l/min 30 l/min to 300 l/min 60 l/min to 600 l/min 100 l/min to 1000 l/min
Accuracy	≤ 0,3 % (in the above-mentioned measuring range)
Conductivity medium	> 5 µS/cm
Medium pressure	max. 10bar
Electrical data	
Supply voltage	24V DC ±15%
Power consumption	max. 6W
Outputs	PNET/3-channel (open collector)
Connection	Screw terminals
Ambient conditions	
Operating temperature	-10 … +50 °C
Storage temperature	-10 … +50 °C
Protection class	IP67
Mechanical data	
Dimensions	See scale drawing
Weight	ca. 5kg
Material	Teflon-coated stainless steel, steinless steel, PPO Noryle

Ordering details	
Designation	Order number
MID NW25 PETRO, type 6823-30	402069
MID NW40 PETRO, type 6823-33	422089
Clamp-bracket foldable DN 25/40	304623
Sealing ring clamp DN 25 NBR	304619
Clamp welding socket DN25	306985
MID NW50 PETRO, type 6823-31	407364
Clamp-bracket foldable DN 2“/50	U495080
Sealing ring clamp DN 2“ NBR	282387

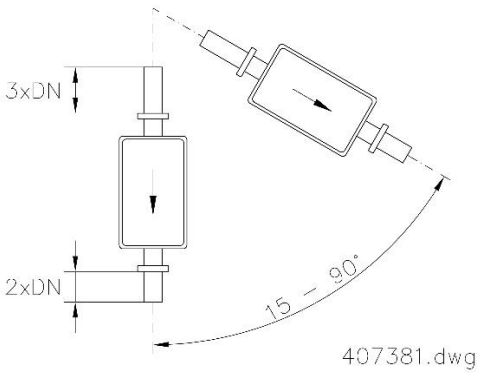
Clamp welding socket DN50	U495052
MID NW63, PETRO, type 6823-32	407381
Clamp-bracket foldable DN 2,5“	U495056
Sealing ring clamp DN 2,5“ NBR	U495059
Clamp welding socket DN 2,5“ kurz	U495053

5.3.2 Dimensions

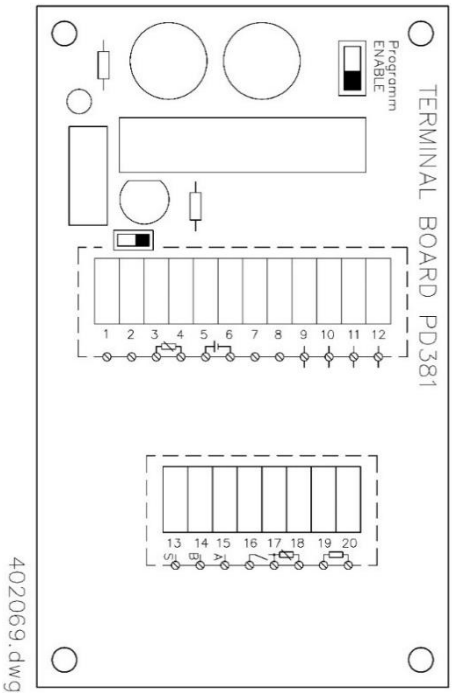
Dimensions



Mounting position

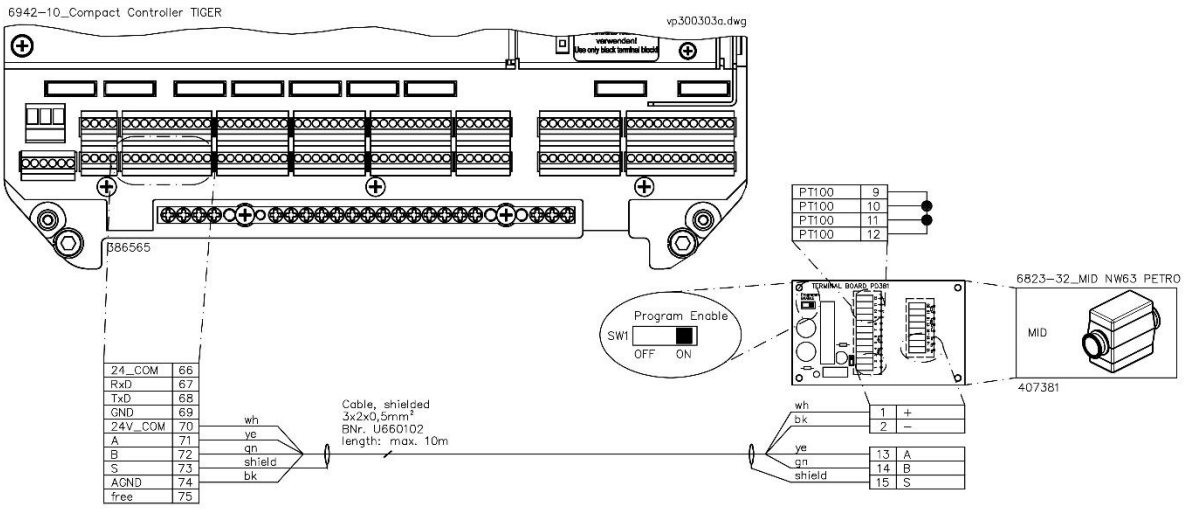


5.3.3 Terminal assignment

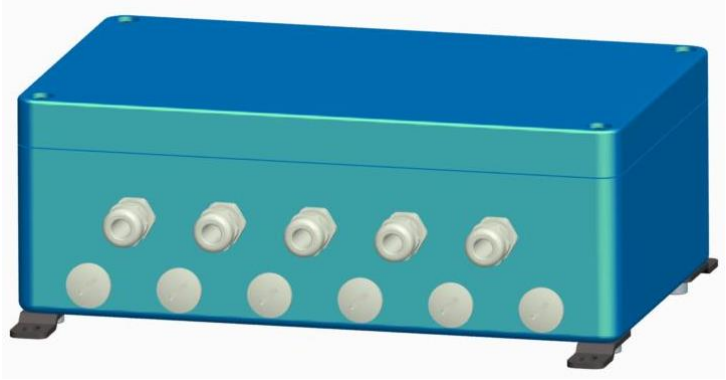


Clamp	Description
1	+24V
2	GND
3	Output 2 +
4	Output 2 -
5	Output 1 +
6	Output 1 -
7	Display +
8	Display -
9	PT100
10	PT100
11	PT100
12	PT100
13	PNET S
14	PNET B
15	PNET A
16	Output 3 +
17	Output 3 -
18	
19	Input 1 +
20	Input 1 -

5.3.4 Electrical connection to Compact Controller TIGER, type 6942-10



5.4 I/O-Box Vario PETRO type 6753-11

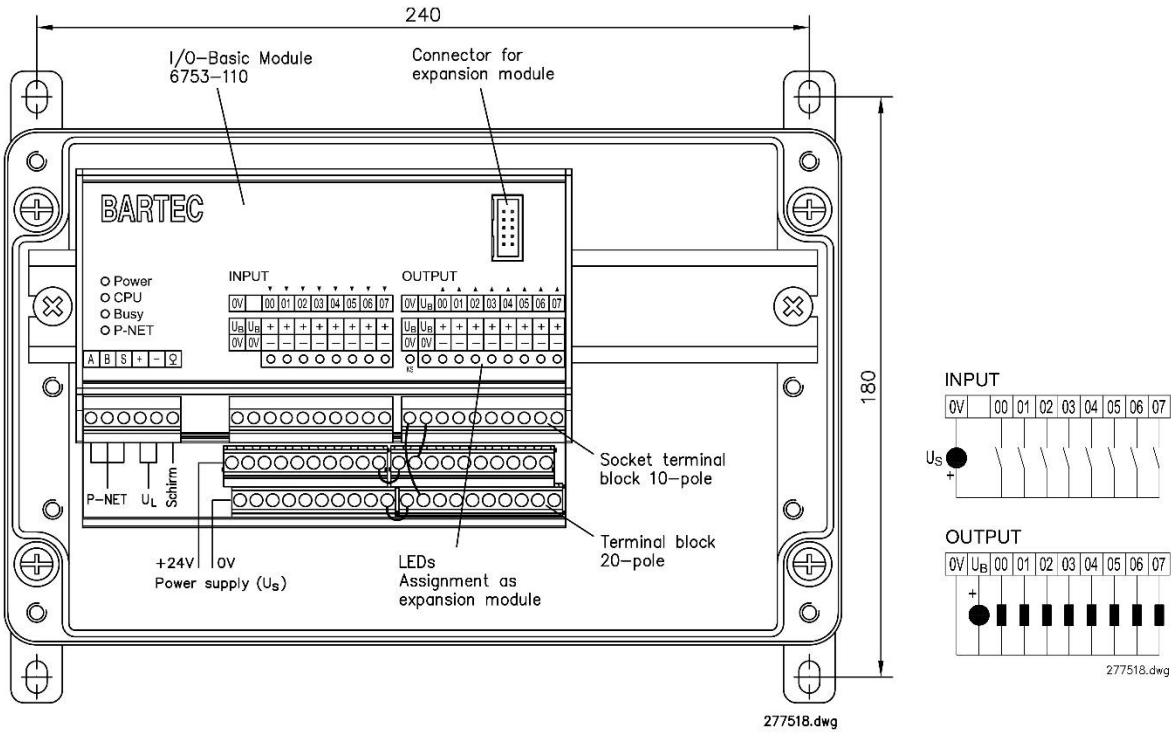


5.4.1 Technical data

Electrical data	
Auxiliary power	UL = DC 24 V/80 mA (I/O basic module), (ULimit = 16 … DC 36 V) 2 A fine-wire fuse
Connection type	Internal 5-pole screw terminals (P-NET and UL) Basic and extension modules, connected. Connection leads up to 1.5 mm². PG9 cable inlets.
Inputs	8 digital inputs, UIn = 0 … 24 V (ULimit = - 36 V … +36 V DC) Signal = 0: < DC + 5 V Signal = 1: > DC + 14 V (green LED on) Input resistance: 4 kΩ
Outputs	8 FET semiconductor outputs, positive. Electrical isolation of logic circuit and outputs via optocoupler. Min. switching current 100 µA. Max. current per output at signal 1: < 1 A (up to + 60 °C) Total load capability 8 A (-20 … + 60 °C). Voltage induced on circuit interruption limited by freewheeling diode. Supply voltage US: DC 24 V (18 - 36 V). Switching frequency ohmic load: 100 Hz. Switching frequency inductive load: 2 Hz. Max. output level at signal = 0: DC 2 V (no load)
Interfaces	P-Net fieldbus interface: serial, asynchronous. Baud rate 76,800 bit/s. Line length max. 1000 m P-Net ID number: 5922.
Ambient conditions	
Operating temperature	- 20 … 60 °C
Storage temperature	- 25 … 80 °C
Storage temperature	IUF according to DIN 40040
Protection class	IP 65
Mechanical data	
Dimensions	Casing: 160 x 260 x 90 mm Basic module: 155 x 85 x 58 mm
Weight	Casing: 2,01 kg Basic module: 0,4 kg

Ordering details	
Designation	Order number
I/O-Box Vario PETRO type 6753-11	277 518
I/O-Basic module, 8DI/8D0, type 6753-110	276 817
Input-Expansion module, 8DI, type 6753-111	276 819
Output-Expansion module, 8D0/2.0 A, type 6753-112	276 818
Output-Relay module 1x6,3 A/3 x 2,0 A, type 6753-106	899 17 6753106
Output-Relay module 1x6,3 A/1 x 2,0 A, type 6753-107	899 17 6753107
Socket terminal strip 5-pin	219 481
Socket terminal strip 10-pin	219 480
Socket terminal strip 20-pin	219 496
Cable gland PG 9 MS 4-8	U244128

5.4.2 Terminal assignment / Assembly

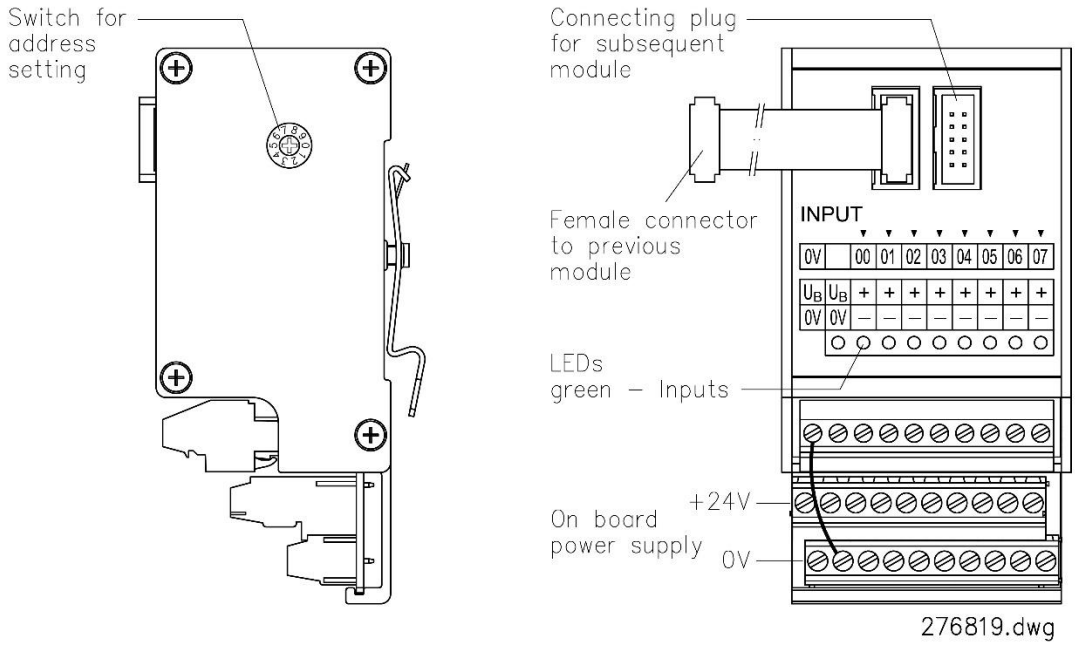


I / O-Box Vario Petro Optionally expandable with:

- • 1x input expansion module 8 DI, type 6753-111 or
- • 1xOutput extension module 8 DO / 1.0 A type 6753-112 or
- • 1x output relay module 1x 6.3 / 3 x 2.0 A, type 6753-106 or
- • 1x output relay module 1x 6.3 / 1 x 2.0 A, type 6753-107

5.4.3 Input-Expansion module 8DI type 6753-111

Input-Expansion module 8DI, type 6753-111

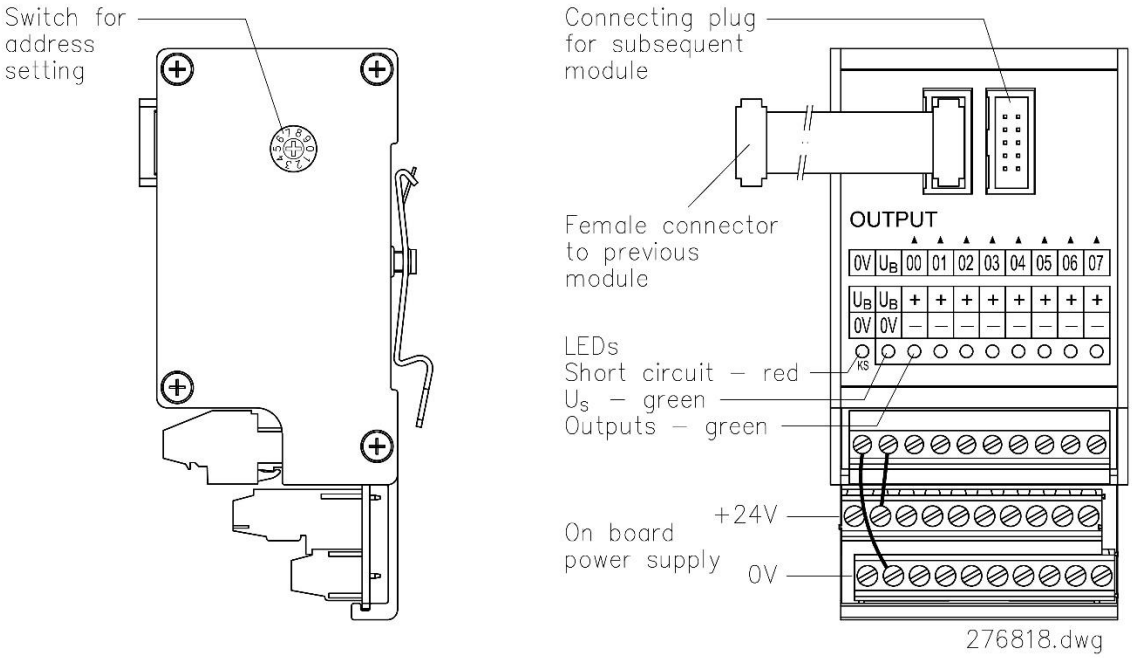


The address number 1 must be set to operate the input expansion module.

Dimensions	55 x 85 x 58 mm
Power consumption (logic)	0,29W
Weight	1,2N (= 0,12kg)

5.4.4 Output-Expansion module 8DO/2, 0A type 6753-112

Output-Expansion module 8D0/2, 0A, type 6753-112

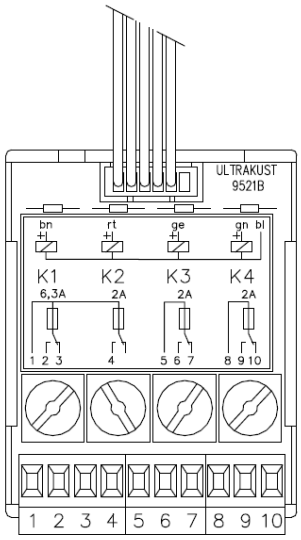


The address number 1 must be set to operate the input expansion module.

Dimensions	55 x 85 x 58 mm
Power consumption (logic)	0,325W
Weight	1,5N (= 0,15kg)
Max. current per output with signal 1	< 1A (to +60°C) Total load capacity 8A, (-20 … +60°C

5.4.5 Output-Relay module type 6753-106

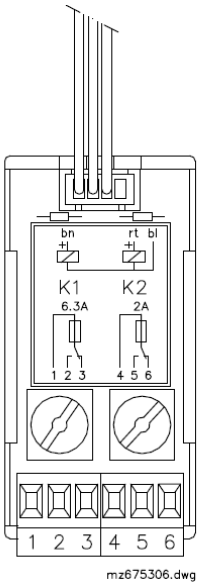
Output-Relay module, type 6753-106



Electrical connection	Bl = 0V Electrical system, bn, rt, ge, gn = Output. Connecting cable: 30 cm max.
Switching voltage (relay)	AC/DC 50 V
Dimension	55 x 74 x 65 mm
Fuses	1 x 6,3 A/3 x 2,0 A
Weight	1,5 N (= 150 g)

5.4.6 Output-Relaismodul Typ 6753-107

Output-Relay module, type 6753-107

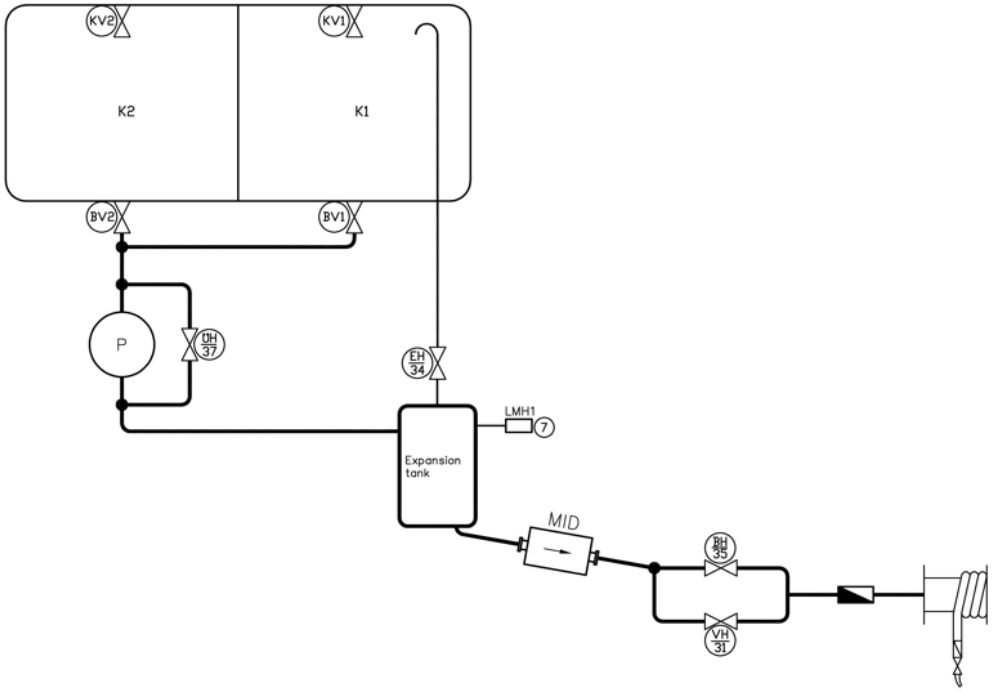


Electrical connection	bl = 0V Electrical system, bn, rt, ge, gn = Output. Connecting cable: 30 cm max.
Switching voltage (relay)	AC/DC 50 V
Dimension	35 x 74 x 65 mm
Fuses	1 x 6,3 A/1 x 2,0 A
Weight	0,75 N (= 75 g)

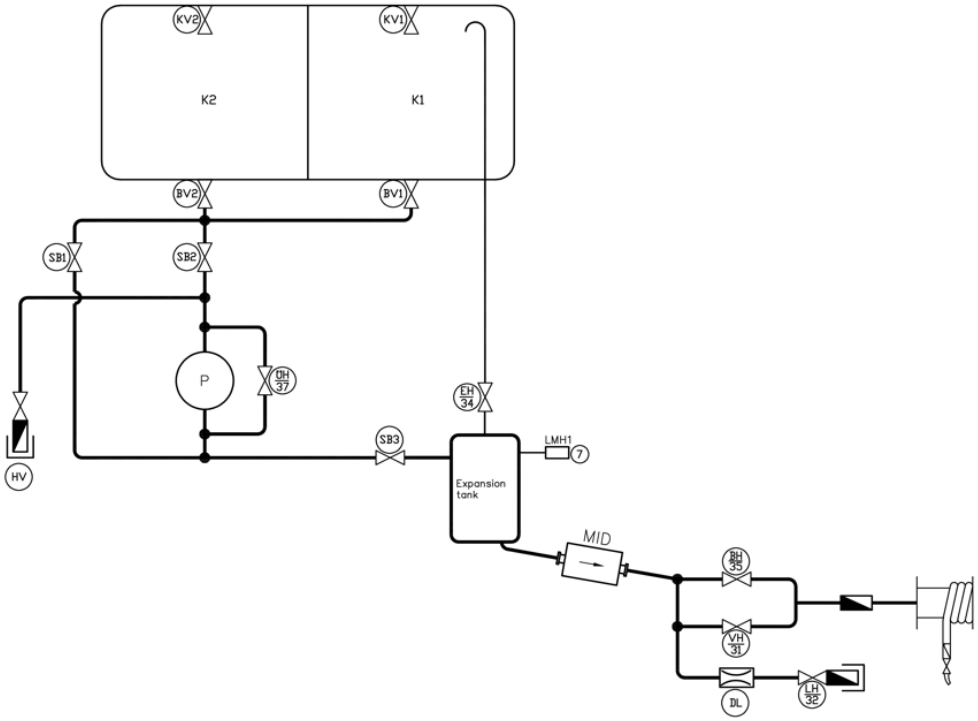
5.5 Variant – expansion tank

5.5.1 Piping scheme

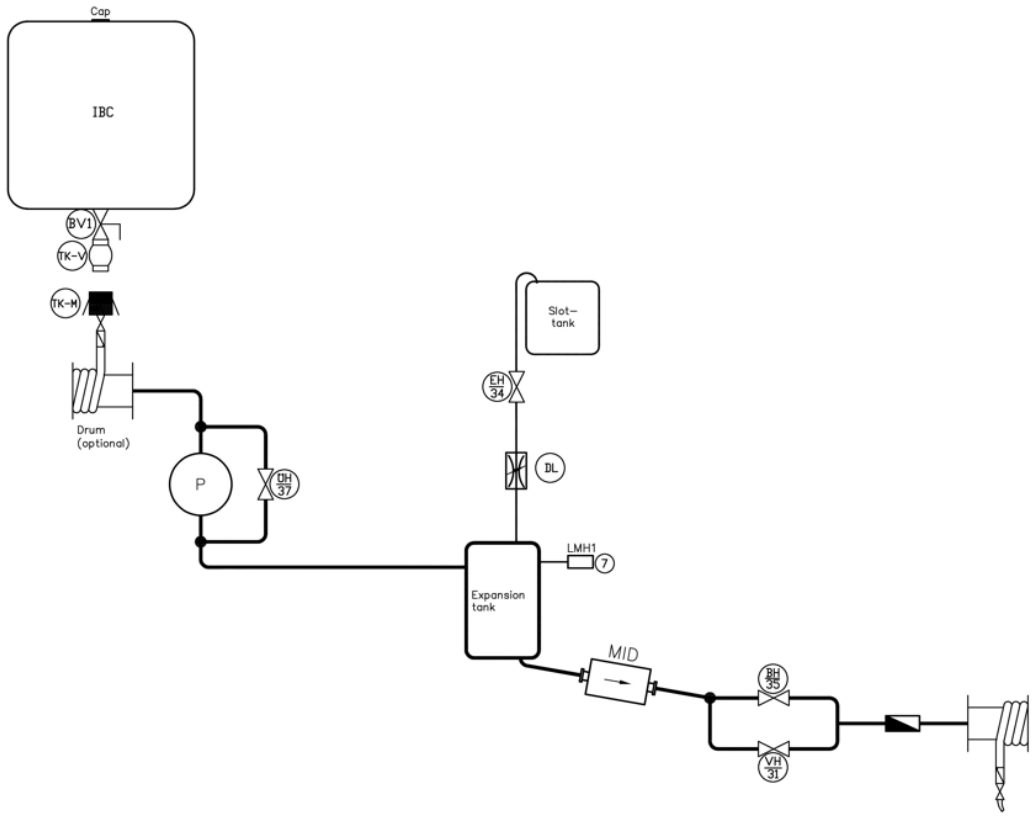
5.5.1.1 Basic system



5.5.1.2 Trailer



5.5.1.3 Mobile



5.5.2 Pump

A displacement pump (e.g. self-priming vane pump, rotary lobe pump ...) must be used as the pump.

The pump must have an adjustable overflow valve.

The pump must be installed at the lowest point.

The 3003 system also offers the option of changing the pump output in two stages. The system 3003 provides an output for this purpose. This output must be continued potential-free.

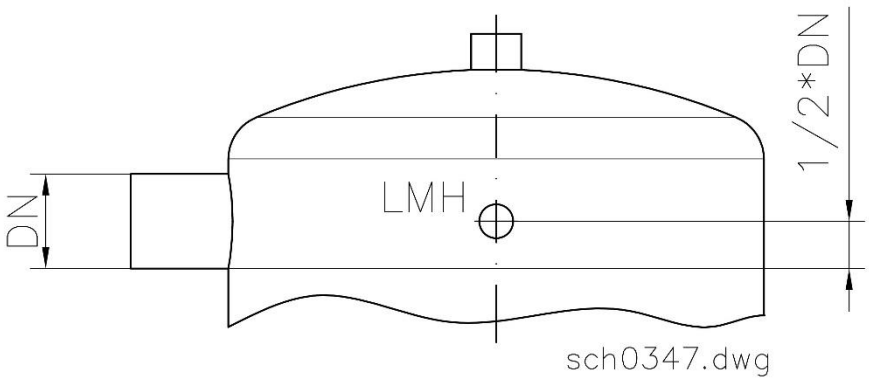
If the measured flow rate exceeds a preconfigured value, the pump output is increased by switching to the higher output level.

If the measured flow falls below a preconfigured value, the pump output is throttled by switching to the lower output level.

The type of pump output change, e.g. by means of an air pressure-controlled overflow valve or a speed-controlled pump, as well as the further wiring, is the responsibility of the installer.

5.5.3 Wet leg sensor, optically CHEM type 6729-26

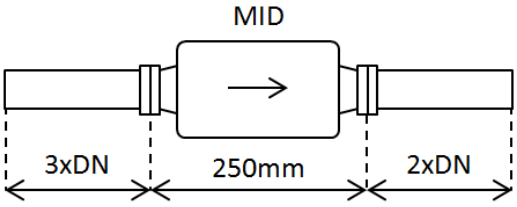
- The wet leg sensor is installed on the side of the expansion tank.
- The wet leg sensor must be positioned 90° offset to the supply line.
- The wet leg sensor must not be installed from above (droplet formation).
- The distance between the lower edge of the inlet and the wet leg sensor must be at least half the maximum pipe diameter.



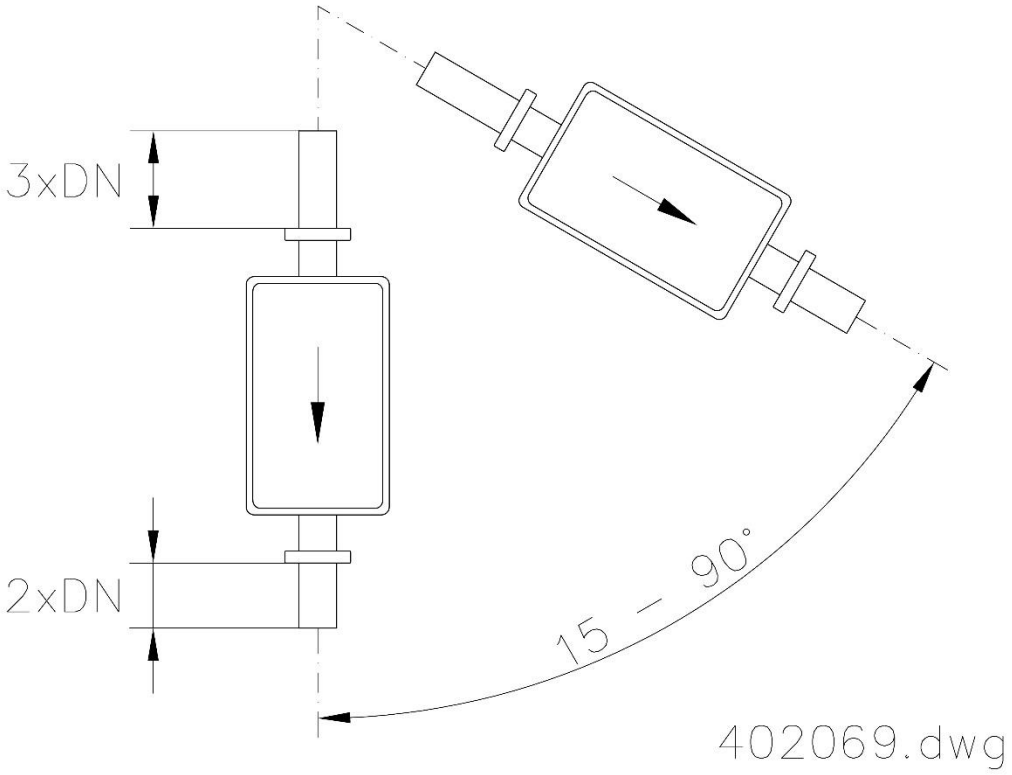
Attention:
To connect the wet leg sensor, type 6729-26, to the I / O-Box Vario, type 6753-11, the constant current module, type 6753-302 (item no. U08001559), is used as a "pull-up" between 24V_S and the corresponding input is required.

5.5.4 MID NWx, PETRO

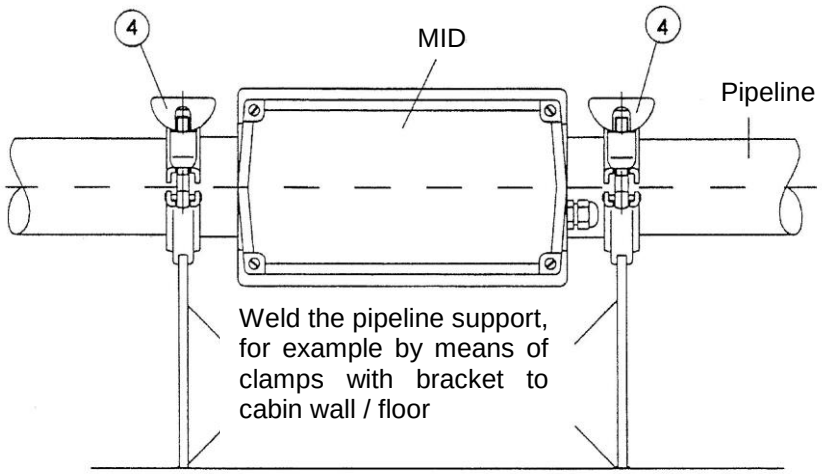
- A straight calming section of at least 3 times the pipe diameter must be installed in front of the flow meter. A straight calming section of at least twice the pipe diameter must be installed after the flow meter.



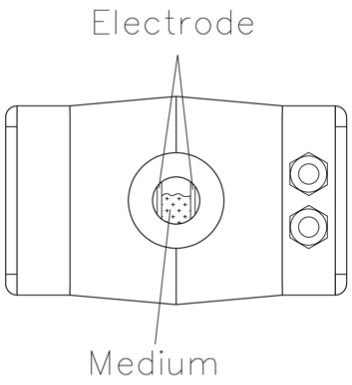
- So that gas inclusions can escape independently, the MID may only be installed at an angle of 15 ° to 90 ° to the horizontal. No air may be trapped in the measuring section.

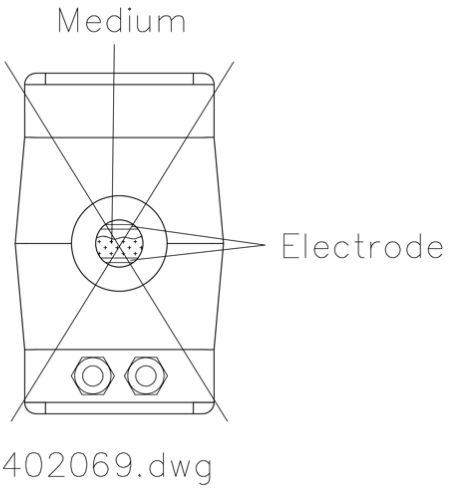

3xDN
2xDN
15 – 90°
402069.dwg

- No mechanical forces may act on the flow meter during assembly / disassembly or during operation. The pipes that are connected to the device on both sides must therefore be suitably supported.

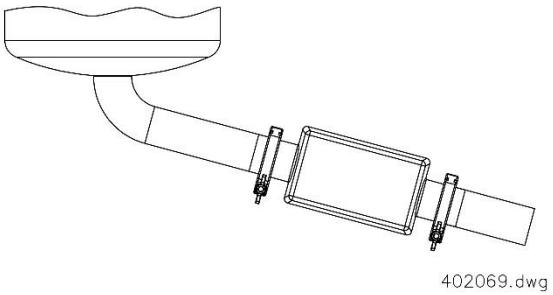


- If the installation position is less than 90°, the flow meter must be installed horizontally (flat) so that both measuring electrodes are to the side of the medium. The electrodes must not be located above or below the medium.

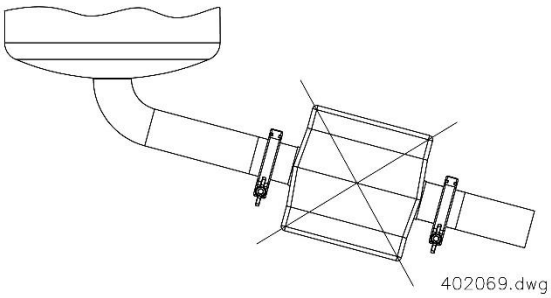




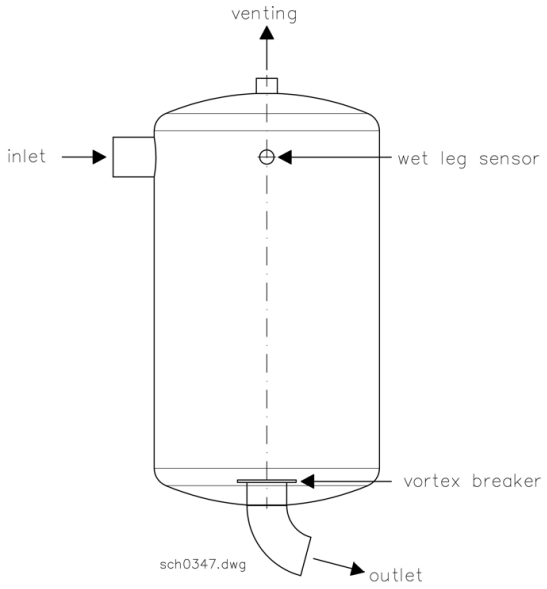
Flow meter installed horizontally

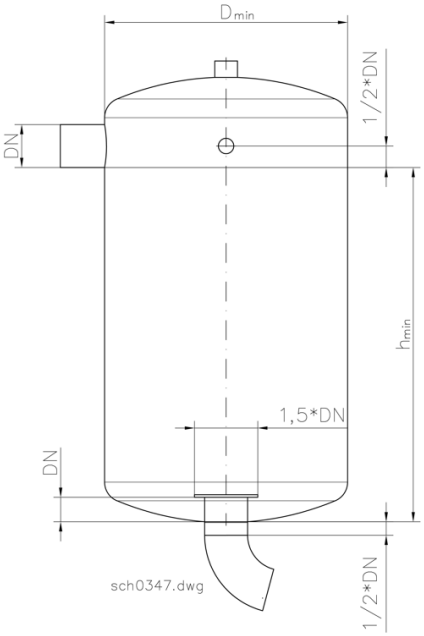


Flow meter installed upright

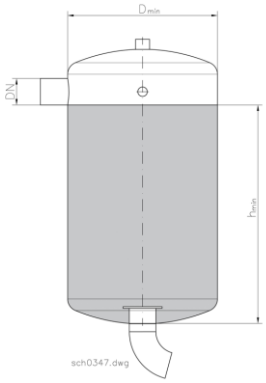


5.5.5 Expansion tank



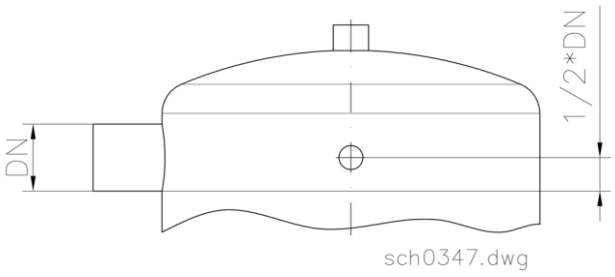


- The expansion tank must be dimensioned in such a way that no air can get into the measuring section when the wet leg sensor LMH is triggered.
- The expansion tank must be designed for the prevailing maximum pressures.
- The expansion tank must have a round shape.
- The minimum diameter D_{min} and the minimum height h_{min} of the expansion tank can be found in the following table. It must be ensured that the effective volume V_{min} and the height h_{min} are observed

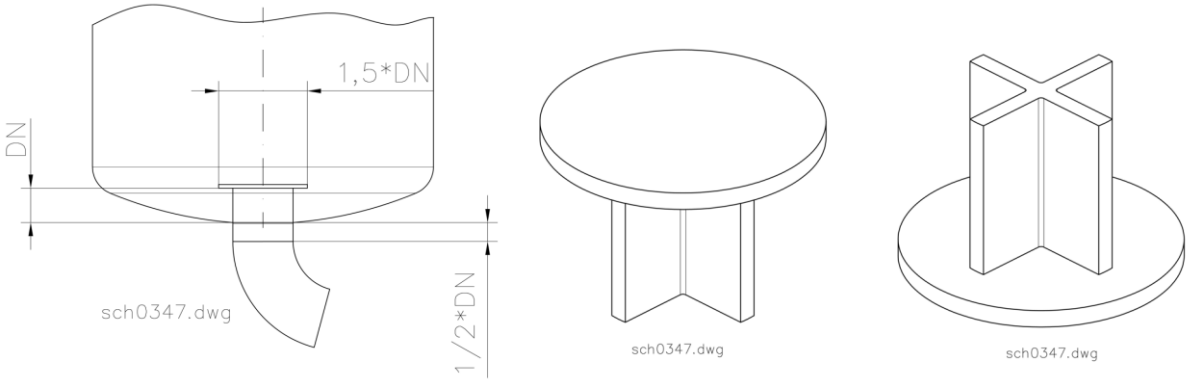


MID	DN	D_{min} [mm]	h_{min} [mm]	V [l]	V_{min} [l]
6823-30	25	200	300	ca. 9	≥ 7,5
6823-33	40	250	300	ca. 14	≥ 12,5
6823-31	50	300	400	ca. 28	≥ 25
6823-32	63	350	500	ca. 48	≥ 45

- The wet leg sensor is installed in the expansion tank. The distance between the lower edge of the inlet and the low-level sensor must be at least half the maximum pipe diameter. The wet leg sensor must be positioned 90° offset to the supply line.



- The switching times of the used valves must be less than 1s.
- The outlet of the expansion tank is to be provided with a vortex breaker.



5.5.6 Venting

In the case of the basic system and the trailer variant, the vent line must be fed back into the tank. All tilting valves must be open during delivery. If the tilting valves are closed, a delivery must not be possible or must be stopped.

In the mobile version, the vent line is provided with an adjustable throttle and fed back into a slot tank.

The ventilation line must have a minimum internal diameter of 15mm.

A pressure-compensated valve must be used as vent valve.

5.5.7 Bypass valve

In the case of a full hose delivery without overfill protection, the flow rate must be limited to a maximum of 200l/min. The bypass valve and the associated pipeline must be designed accordingly.

A pressure-compensated valve must be used as a bypass valve.

5.5.8 Full hose valve

The maximum permissible flow rate of the flow meter must not be exceeded during a full hose delivery.

The valves must be pressure-compensated valves.

5.5.9 Dry hose valve

The maximum permissible flow rate of the flow meter must not be exceeded during a dry hose delivery. If necessary, a suitable throttle device must be installed.

The valves must be pressure-compensated valves.

5.5.10 Slot tank

The slot tank must be dimensioned in such a way that no liquid can escape when the measuring section is vented.

5.5.11 Function

5.5.11.1 Delivery

When the delivery starts, the status of the wet leg sensor LMH is checked. If the sensor reports empty, the vent valve EH is opened first and then the pump is started. The trapped air thus escapes via the vent line. The pipes fill with the medium. As soon as the wet leg sensor reports full, a configurable time, the filling time, is pumped through the vent line.

If the wet leg sensor remains wetted during this filling time, the vent valve is then closed, the corresponding hose valve is opened and delivery begins.

If the wet leg sensor does not always remain wetted during this filling time, the time is reset. It is pumped through the vent line until the wet leg sensor reports full for the entire filling time.

If the wet leg sensor reports empty during a delivery, the pump is stopped, the corresponding hose valve is closed, the vent valve is opene and the pump is started again.

In the basic system and trailer variant, the tilt valves are controlled via the cabinet flap and the bottom valves are opened manually via a control block.

With the mobile version, the bottom valve and the ventilation of the IBC tank must be opened manually.

5.5.11.2 Draining

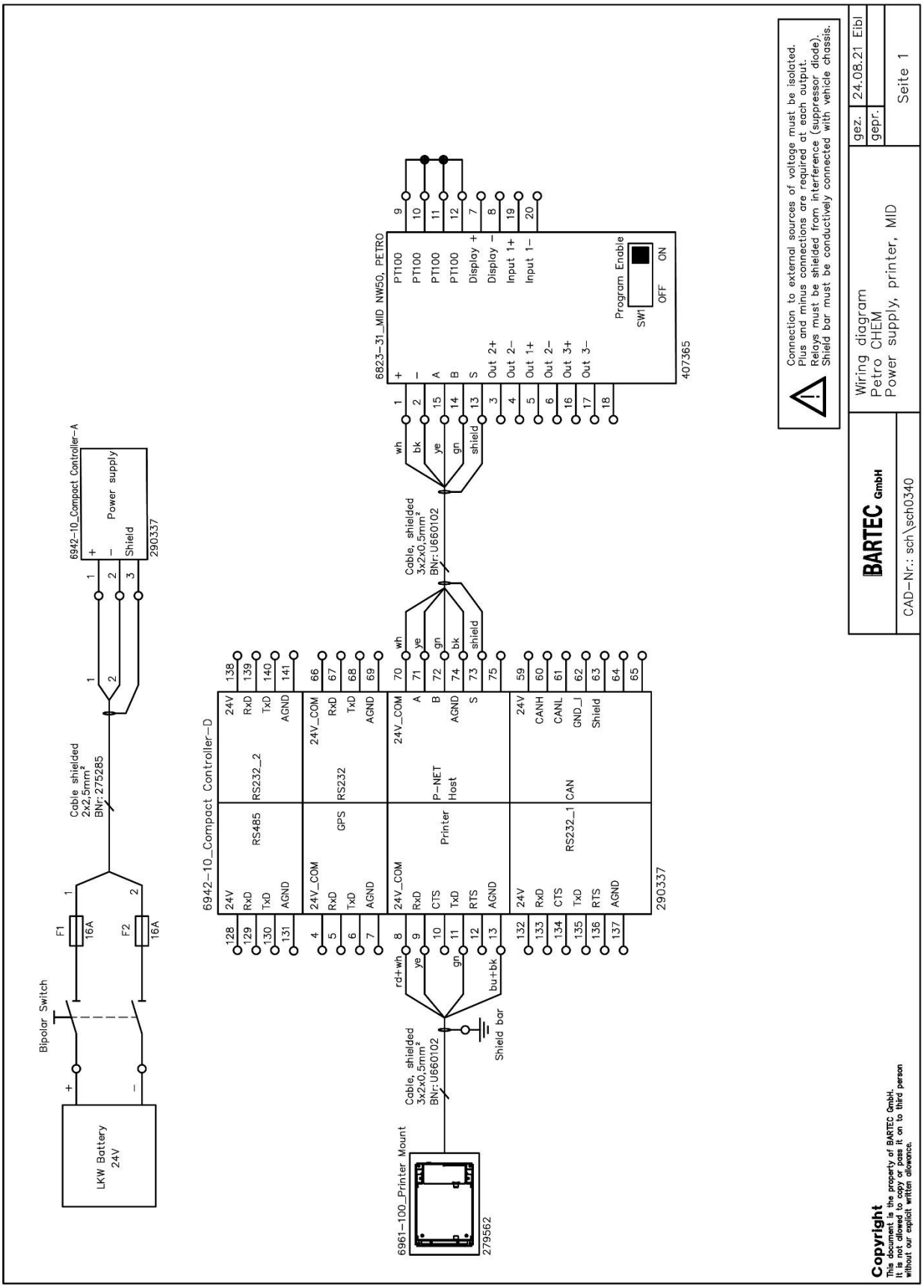
Draining is a special function for the measuring system. After the function has started, the pump is switched on and the hose valve is opened. If there is more than one hose, a hose is selected beforehand. A printout is not created because it cannot be measured here. The process is entered in the LOG file via event records but is not printed like a commercial delivery process. If draining with the wet hose has been carried out, a filling must be carried out before the next delivery. Emptying with the dry hose does not require filling.

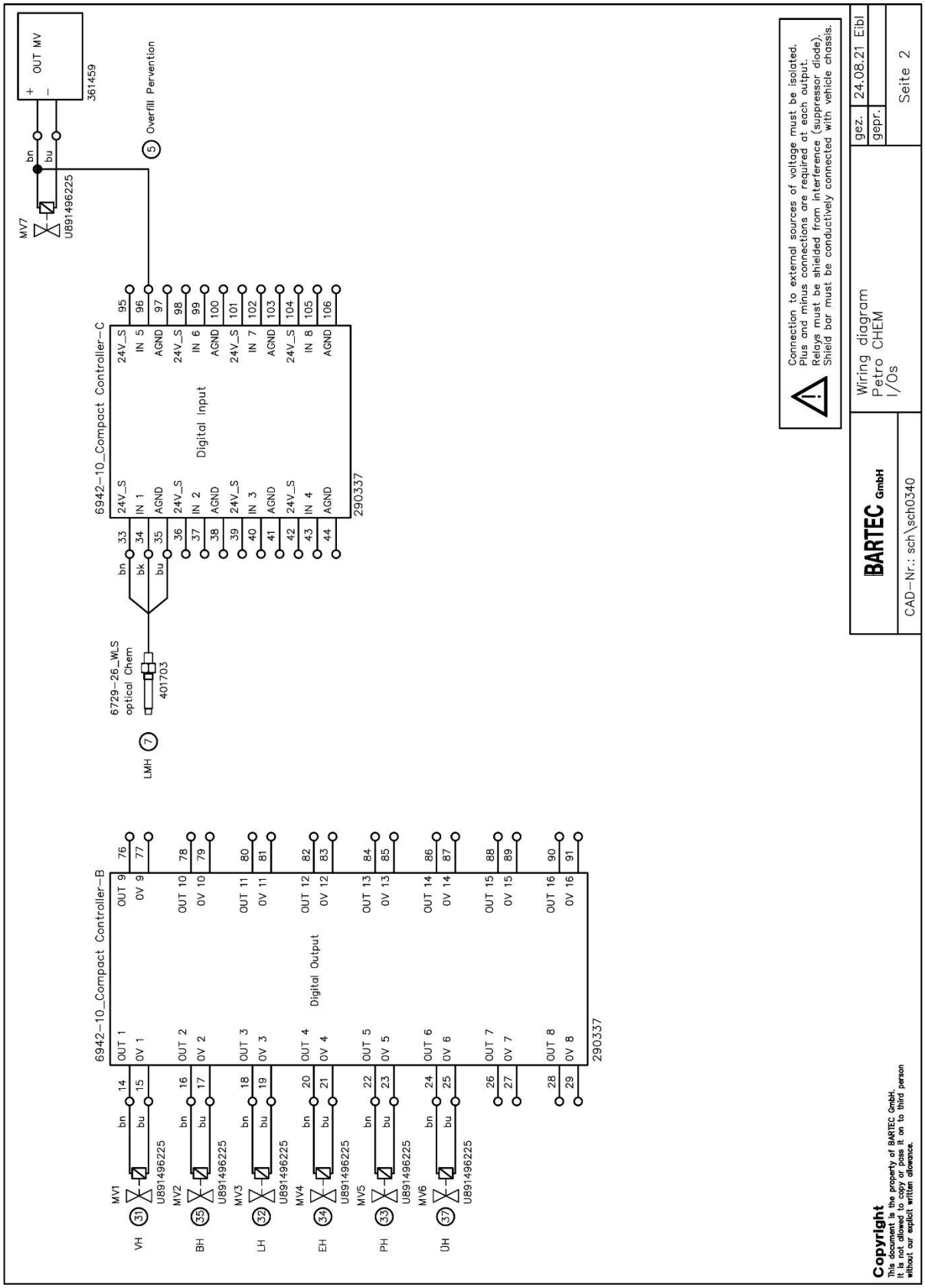
5.5.11.3 Filling

Filling is a special function that can always be selected. However, after emptying with a full hose, this must be carried out. When starting a normal process, the user receives a message that filling is required. A printout is not created. The system is considered as filled as soon as a preconfigured minimum delivery amount has been measured during filling. During the initial start-up, filling must be carried out once.

5.5.12 Wiring examples

5.5.12.1 PETRO CHEM




+ OUT MV –
361459
bn
bu
MV7
U891496225
5 Overfill Pervention
6942-10_Compact Controller-C
24V_S
IN 5
AGND
IN 6
IN 7
IN 8
Digital Input
290337
6729-26_WLS
optical Chem
401703
LMH 7
bn
bk
bu
6942-10_Compact Controller-B
OUT 1
0V 1
OUT 2
0V 2
OUT 3
0V 3
OUT 4
0V 4
OUT 5
0V 5
OUT 6
0V 6
OUT 7
0V 7
OUT 8
0V 8
OUT 9
0V 9
OUT 10
0V 10
OUT 11
0V 11
OUT 12
0V 12
OUT 13
0V 13
OUT 14
0V 14
OUT 15
0V 15
OUT 16
0V 16
Digital Output
MV1
MV2
MV3
MV4
MV5
MV6
VH
BH
LH
EH
PH
UH
Connection to external sources of voltage must be isolated.
Plus and minus connections are required at each output.
Relays must be shielded from interference (suppressor diode).
Shield bar must be conductively connected with vehicle chassis.
BARTEC GmbH
CAD-Nr.: sch\sch0340
Wiring diagram
Petro CHEM
I/Os
gez. 24.08.21 Eibl
gepr.
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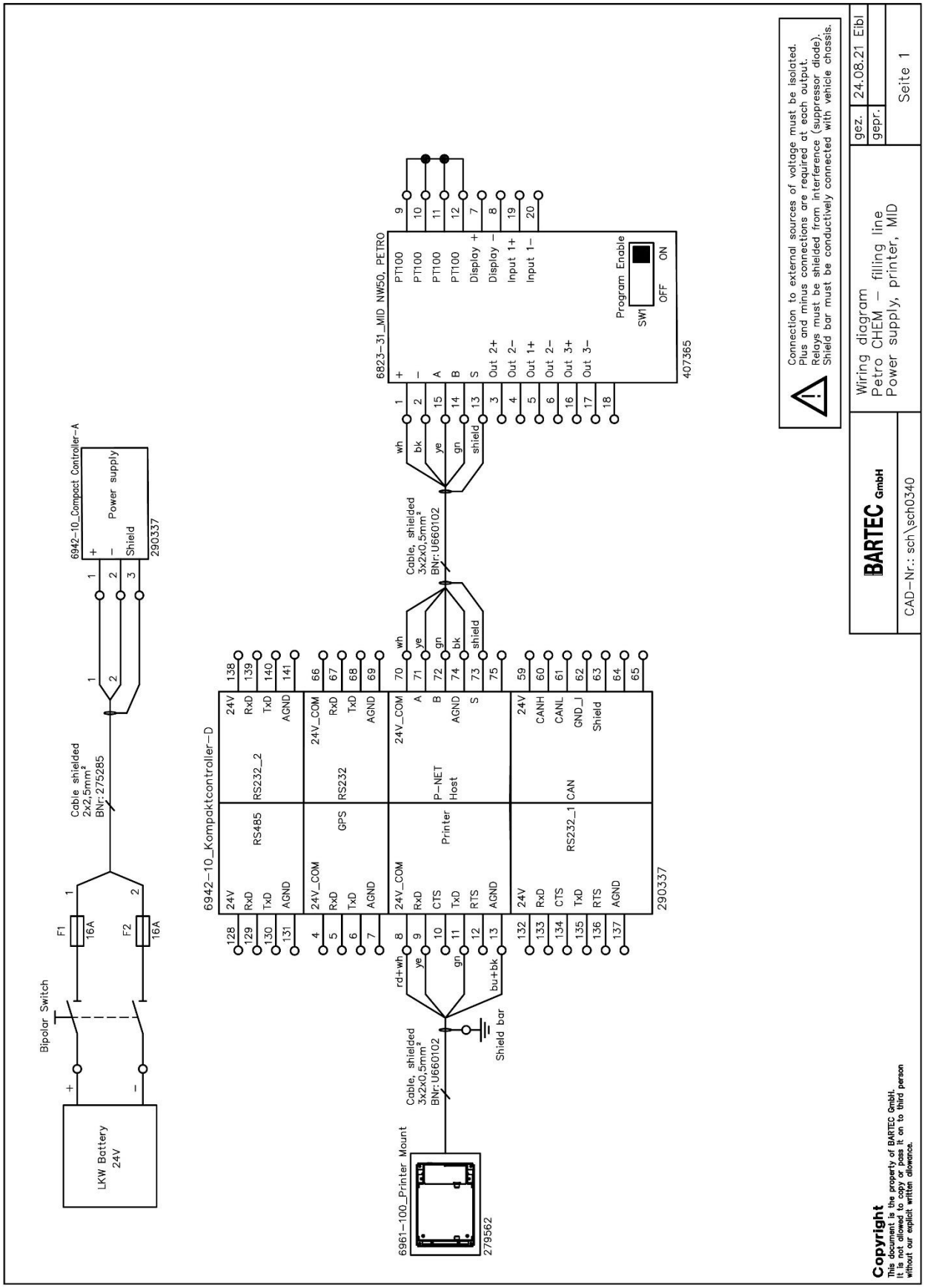
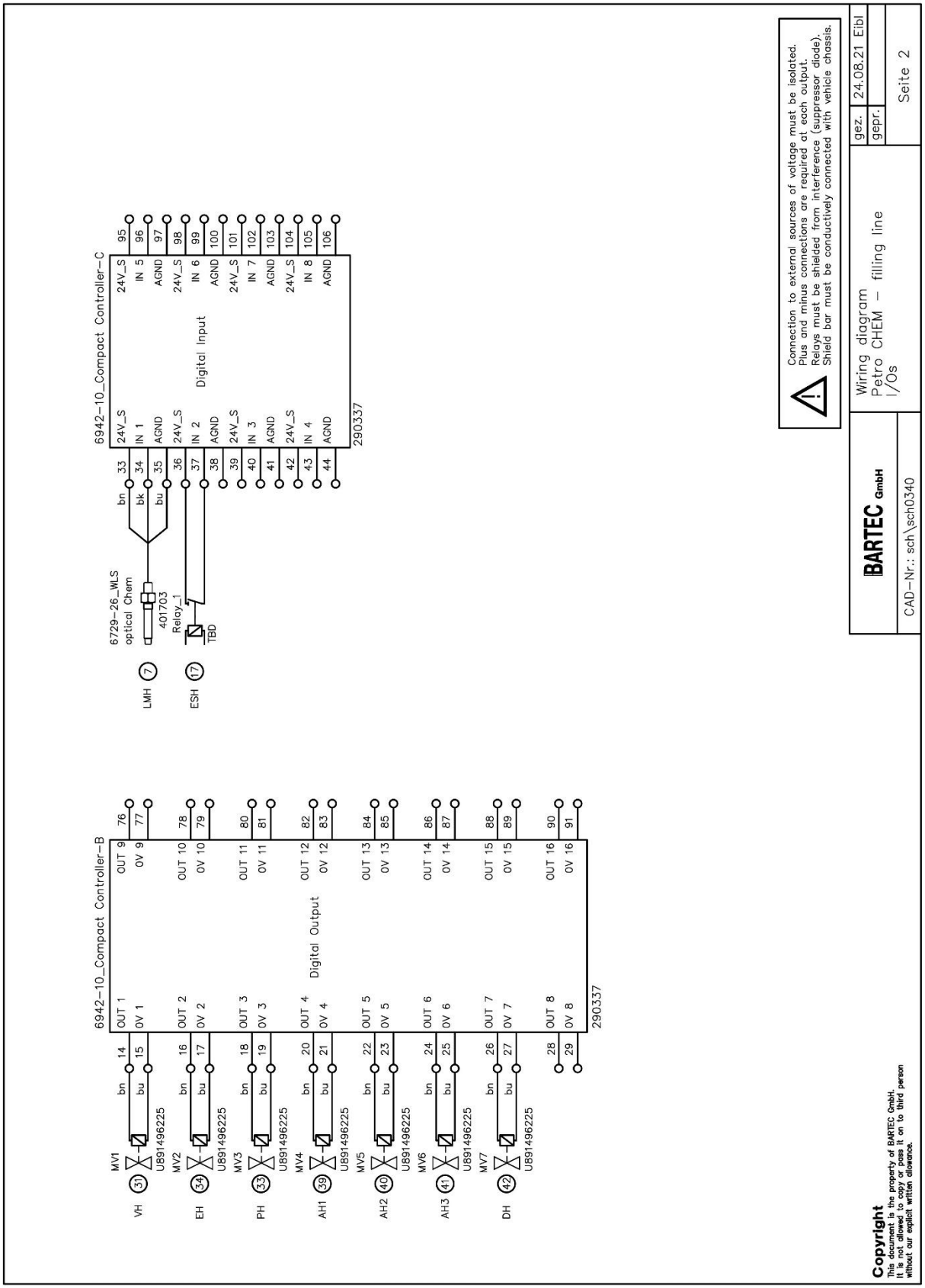
5.5.12.2 PETRO CHEM Filling line




6942-10_Compact Controller-C
Digital Input
290337
6729-26_WLS
optical Chem
401703
Relay_1
TBD
LMH
ESH
6942-10_Compact Controller-B
Digital Output
290337
MV1
MV2
MV3
MV4
MV5
MV6
MV7
U891496225
VH
EH
PH
AH1
AH2
AH3
DH
Connection to external sources of voltage must be isolated.
Plus and minus connections are required at each output.
Relays must be shielded from interference (suppressor diode).
Shield bar must be conductively connected with vehicle chassis.
BARTEC GmbH
Wiring diagram
Petro CHEM – filling line
I/Os
CAD-Nr.: sch\sch0340
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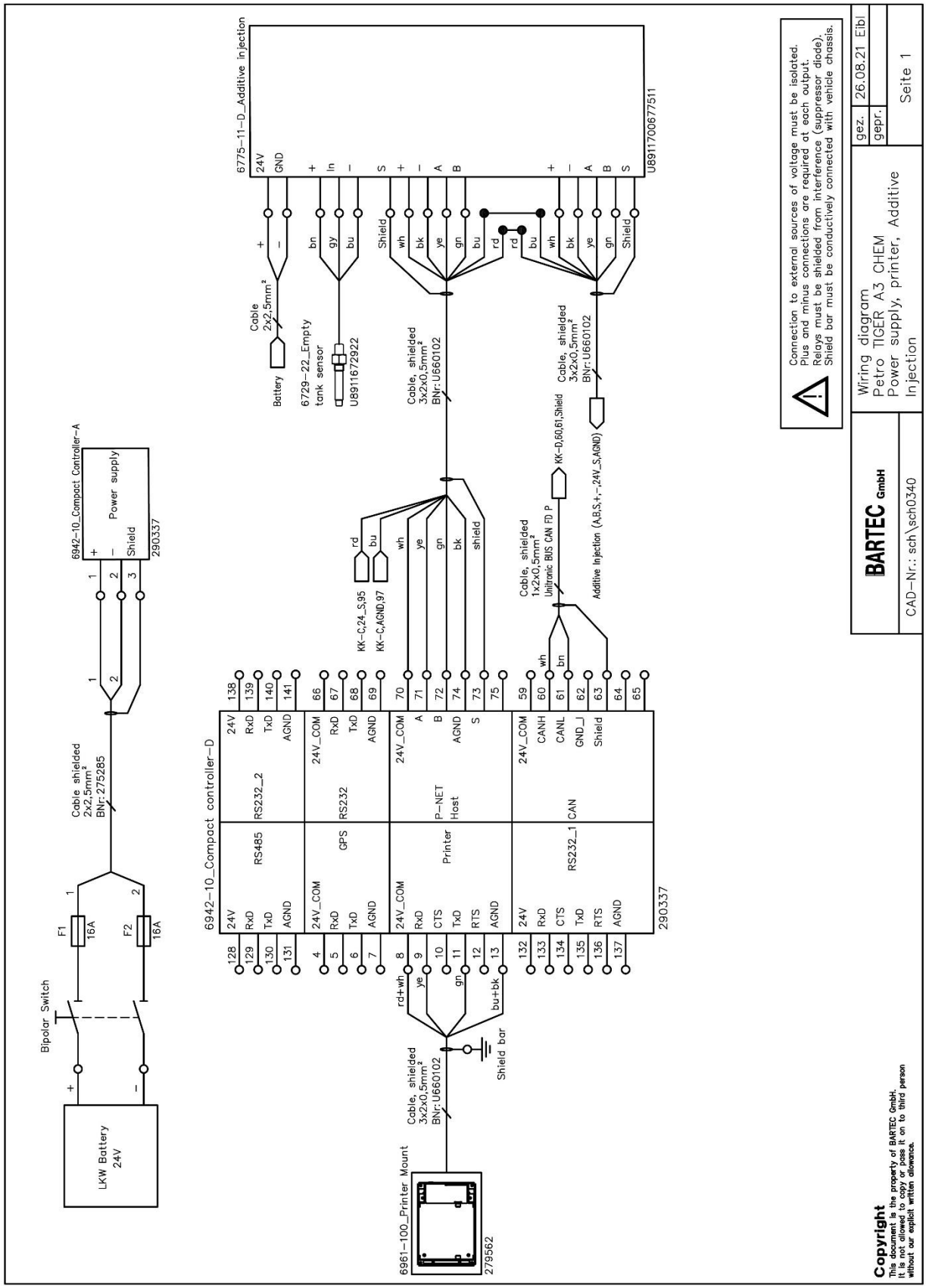
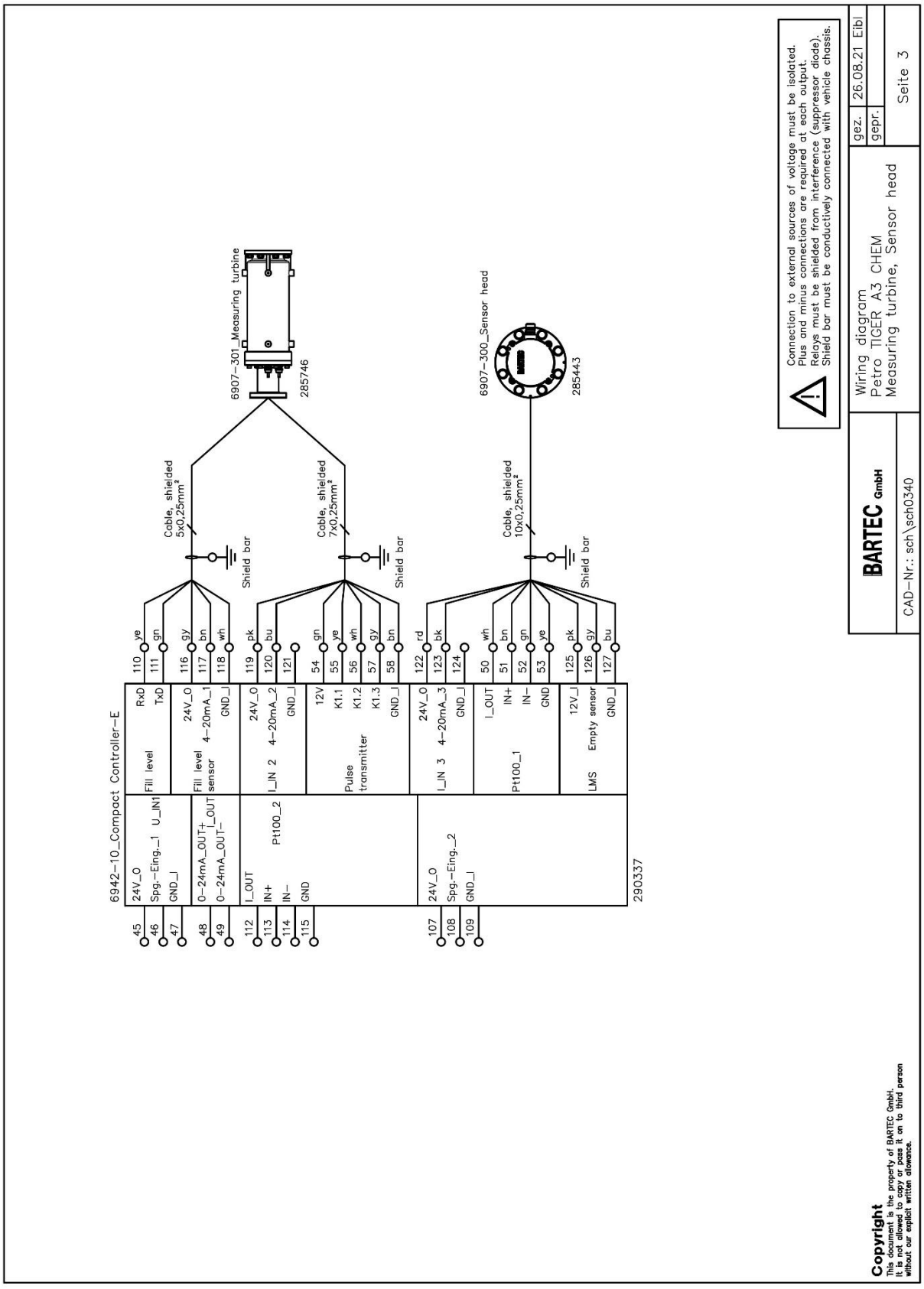
5.5.12.3 PETRO TIGER A3 CHEM




6942-10_Compact Controller-E
24V_0
Spg.-Eing._1
U_IN1
GND_I
Fill level
RxD
TxD
0-24mA_OUT+
I_OUT
0-24mA_OUT-
Fill level sensor
24V_0
4-20mA_1
GND_I
I_OUT
IN+
IN-
GND
Pt100_2
I_IN 2
24V_0
4-20mA_2
GND_I
Pulse transmitter
12V
K1.1
K1.2
K1.3
GND_I
24V_0
Spg.-Eing._2
GND_I
I_IN 3
24V_0
4-20mA_3
GND_I
Pt100_1
I_OUT
IN+
IN-
GND
LMS
12V_I
Empty sensor
GND_I
290337
6907-301_Measuring turbine
285746
6907-300_Sensor head
285443
Cable, shielded 5x0,25mm²
Cable, shielded 7x0,25mm²
Cable, shielded 10x0,25mm²
Shield bar
Shield bar
Shield bar
Connection to external sources of voltage must be isolated.
Plus and minus connections are required at each output.
Relays must be shielded from interference (suppressor diode).
Shield bar must be conductively connected with vehicle chassis.
BARTEC GmbH
Wiring diagram
Petro TIGER A3 CHEM
Measuring turbine, Sensor head
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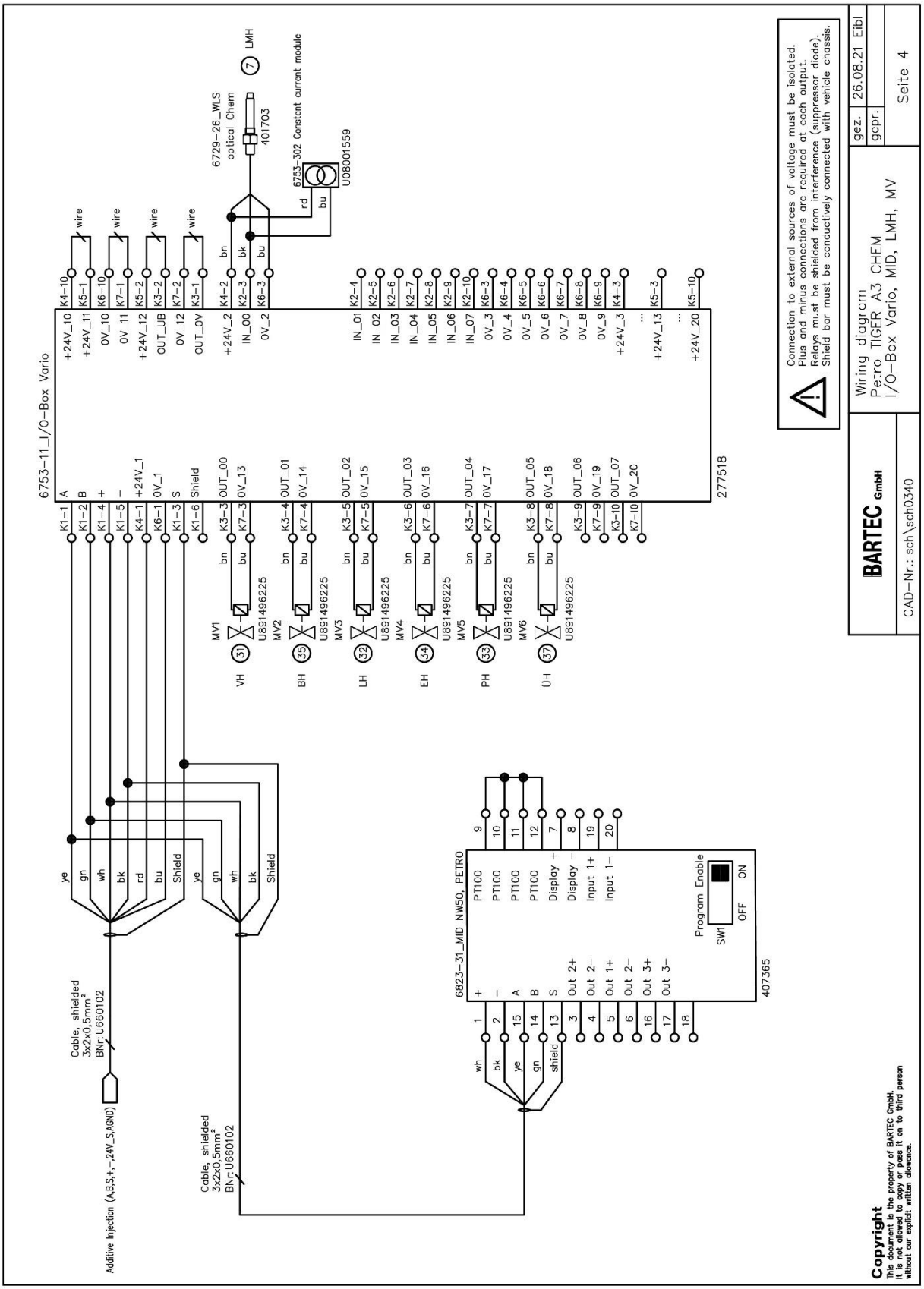
6753-11_I/O-Box Vario
277518
6729-26_WLS optical Chem
401703
7 LMH
6753-302 Constant current module
U08001559
MV1 VH 31
MV2 BH 35
MV3 LH 32
MV4 EH 34
MV5 PH 33
MV6 ÜH 37
U891496225
6823-31_MID NW50, PETRO
407365
Program Enable
SW1 OFF ON
Cable, shielded 3x2x0,5mm² BNr: U660102
Additive Injection (A,B,S,+,-,24V_S,AGND)
Cable, shielded 3x2x0,5mm² BNr: U660102
Connection to external sources of voltage must be isolated.
Plus and minus connections are required at each output.
Relays must be shielded from interference (suppressor diode).
Shield bar must be conductively connected with vehicle chassis.
BARTEC GmbH
Wiring diagram
Petro TIGER A3 CHEM
I/O-Box Vario, MID, LMH, MV
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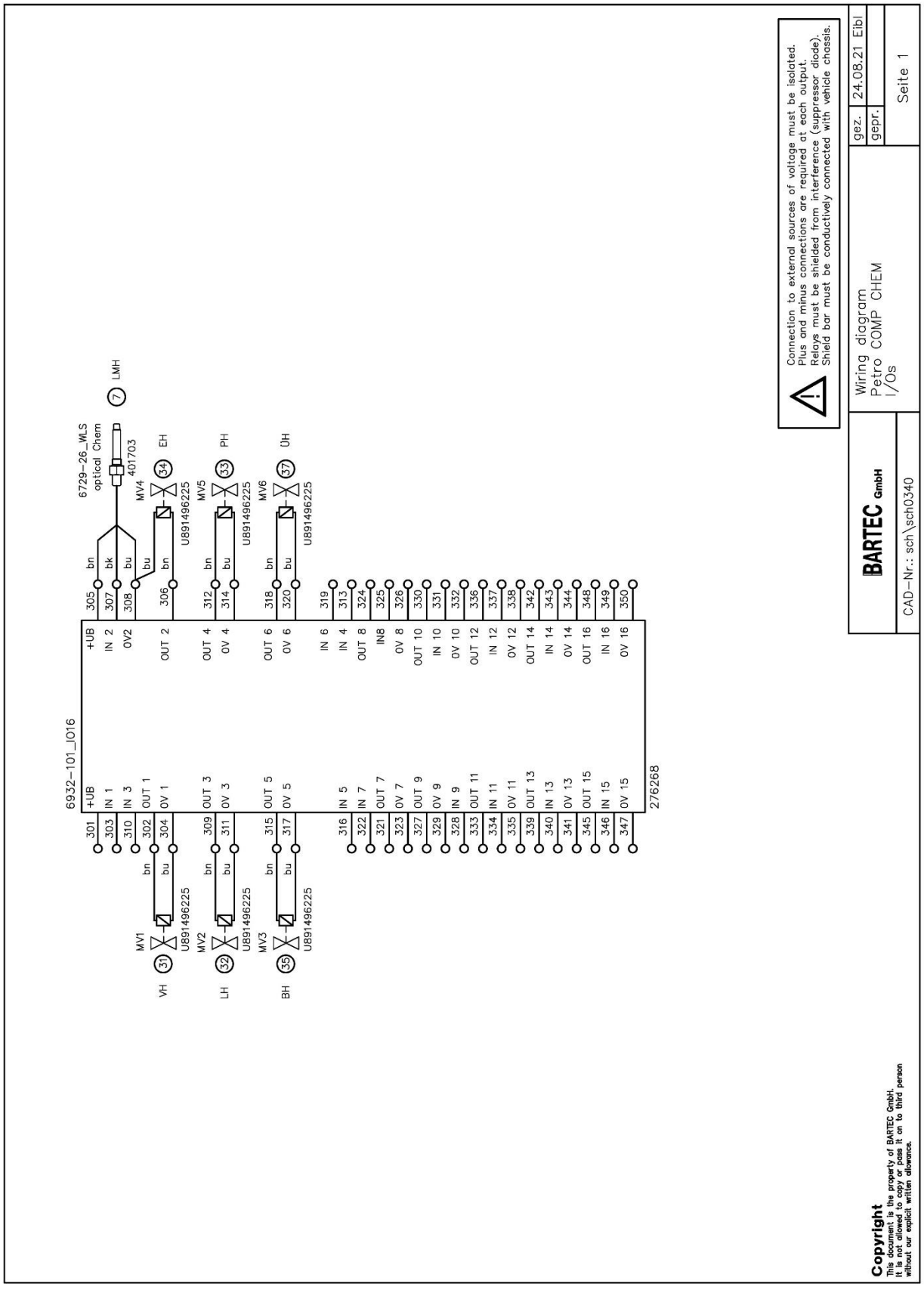
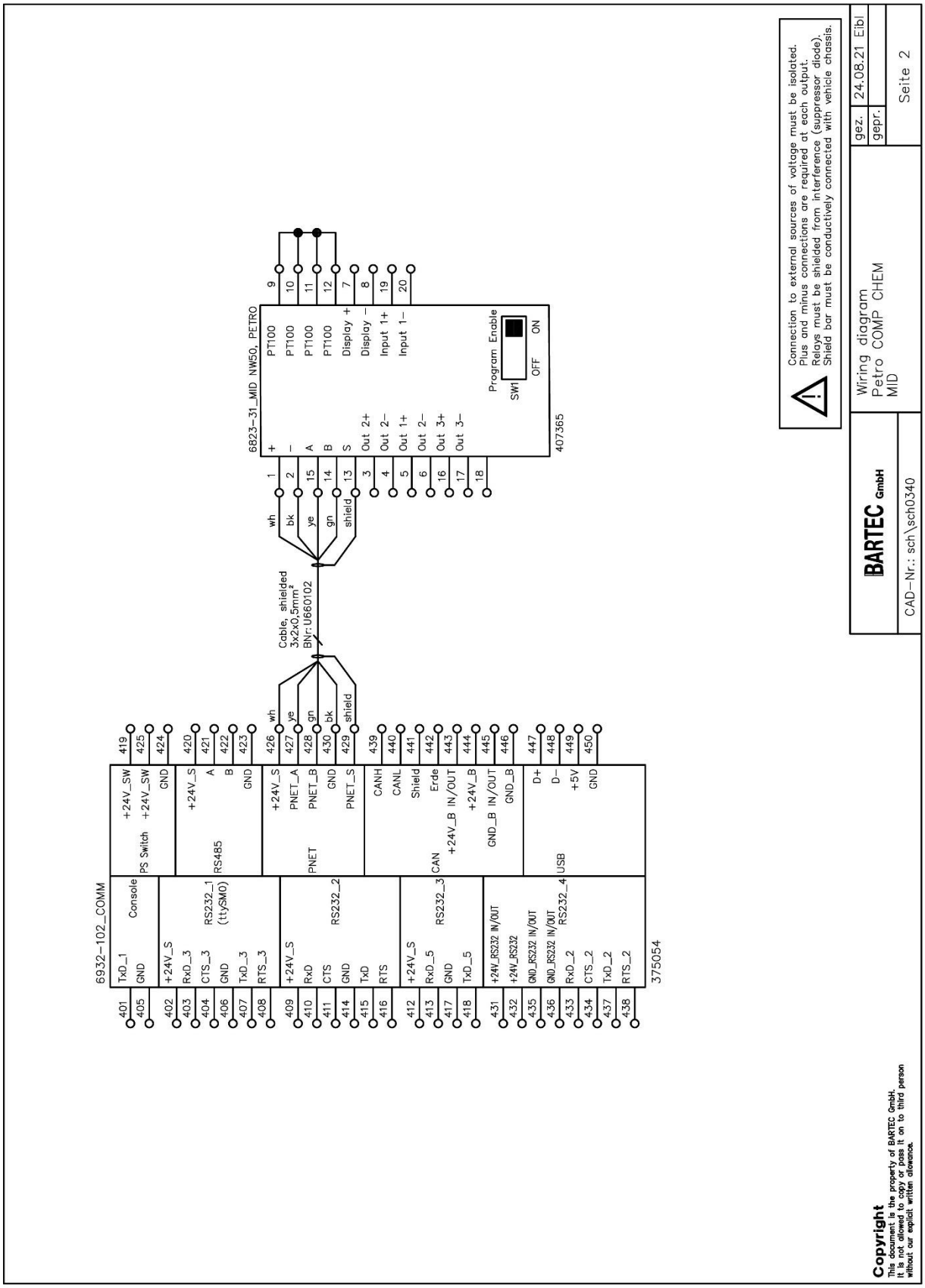
5.5.12.4 PETRO COMP CHEM




6823-31_MID NW50, PETRO
PT100
PT100
PT100
PT100
Display +
Display –
Input 1+
Input 1–
Out 2+
Out 2–
Out 1+
Out 2–
Out 3+
Out 3–
Program Enable
SW1
OFF
ON
407365
wh
bk
ye
gn
shield
Cable, shielded
3x2x0,5mm²
BNr.U660102
6932-102_COMM
Console
PS Switch
+24V_SW
+24V_SW
GND
RS485
RS232_1
(ttySMO)
PNET
RS232_2
CAN
RS232_3
USB
RS232_4
375054
Connection to external sources of voltage must be isolated.
Plus and minus connections are required at each output.
Relays must be shielded from interference (suppressor diode).
Shield bar must be conductively connected with vehicle chassis.
BARTEC GmbH
Wiring diagram
Petro COMP CHEM
MID
gez. 24.08.21 Eibl
gepr.
CAD–Nr.: sch\sch0340
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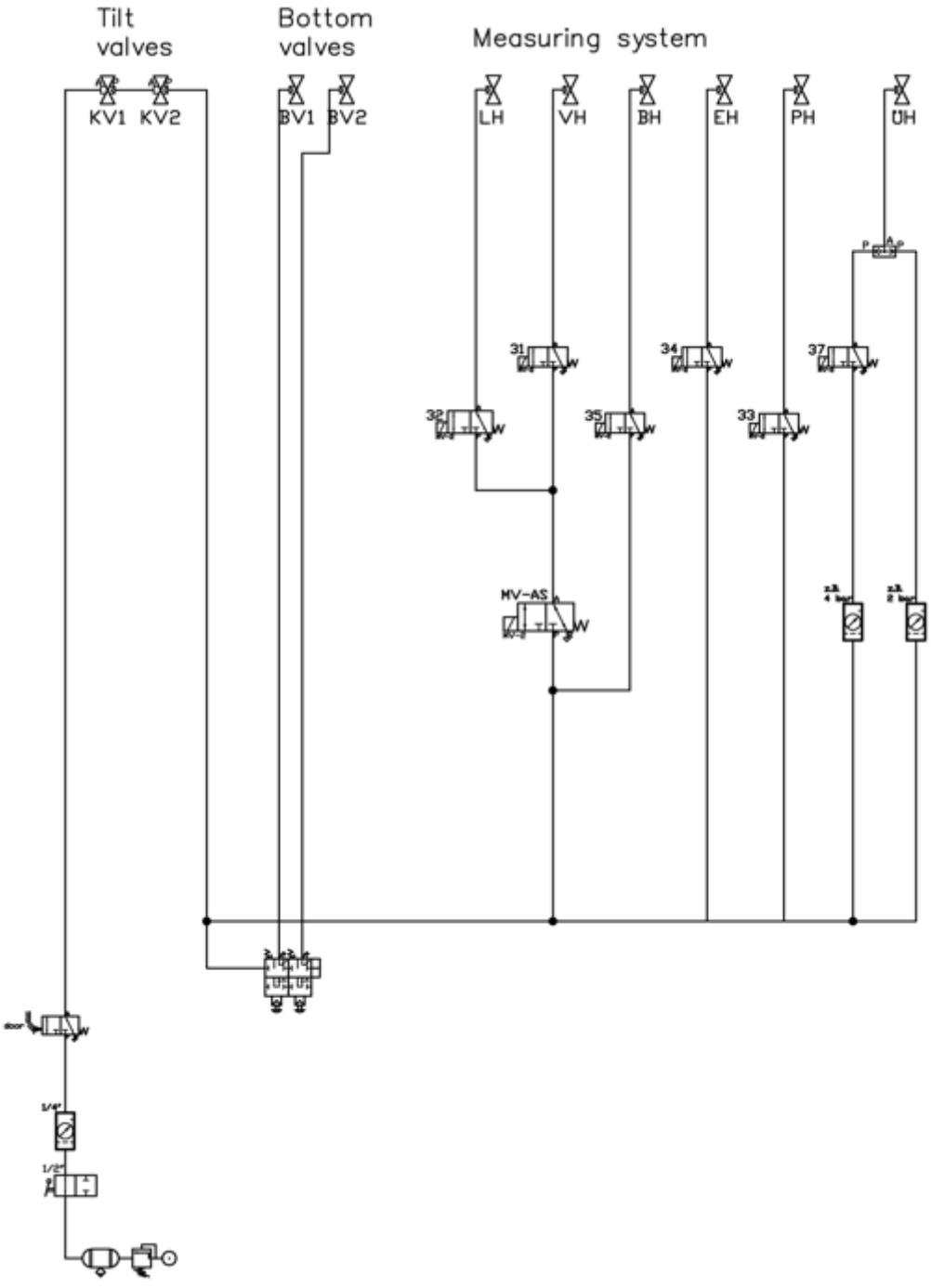
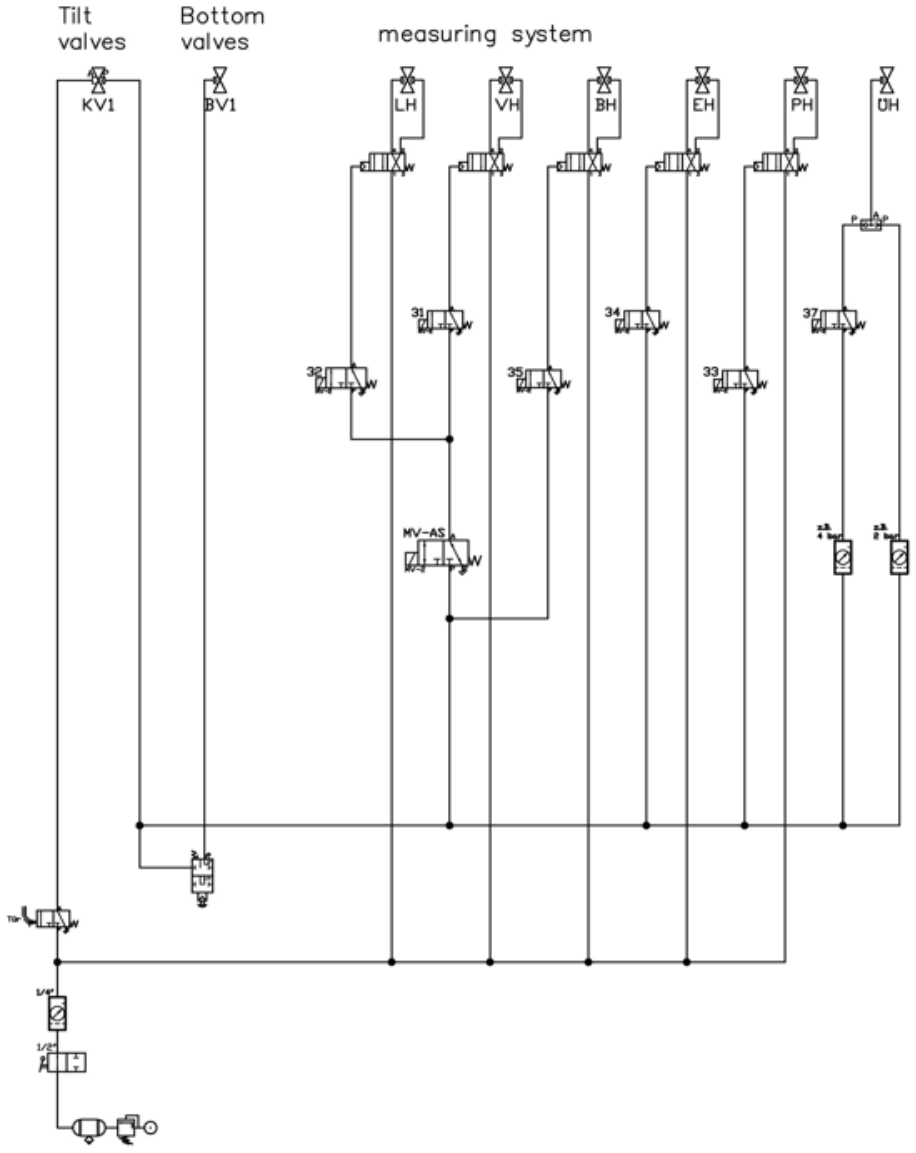
5.5.13 Pneumatics

5.5.13.1 Single-acting valves



5.5.13.2 Double-acting valves



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