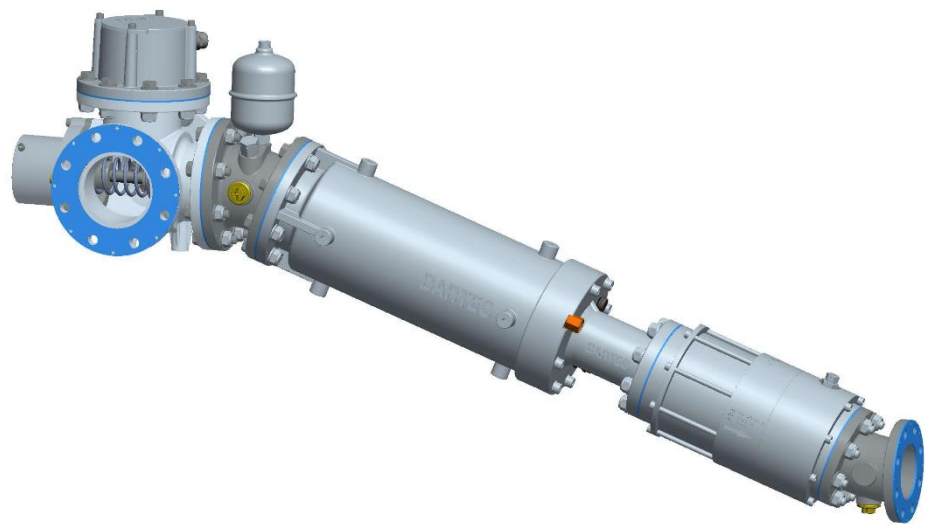


Measuring System TIGER 3003

Service manual

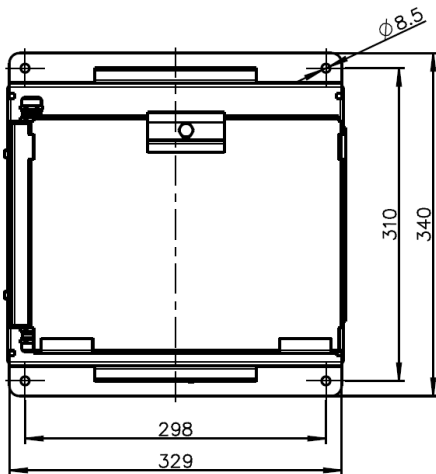
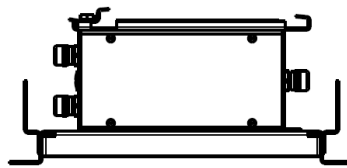
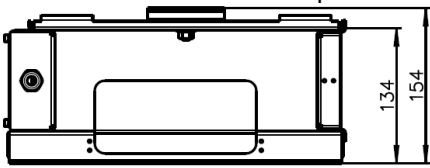


SA 130528

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1 Safety precautions

1.1 General safety regulations

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

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

PETRODAT units were manufactured with due consideration for 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).

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, info@bartec-benke.de

1.2 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).
- For sealing there must be used only the original sealing gaskets. After assembly the tightness has to be ensured by a pressure test at 20 bar.
- There could escape flammable mixtures from the vent of the sensor head type 6907-300 (Order no. 285443) or from the vent of the float air vent (Order no. 303798). Therefore the vent opening must be located in an area with no ignition and no hot surfaces or must be conducted through a pipe to a safe area.

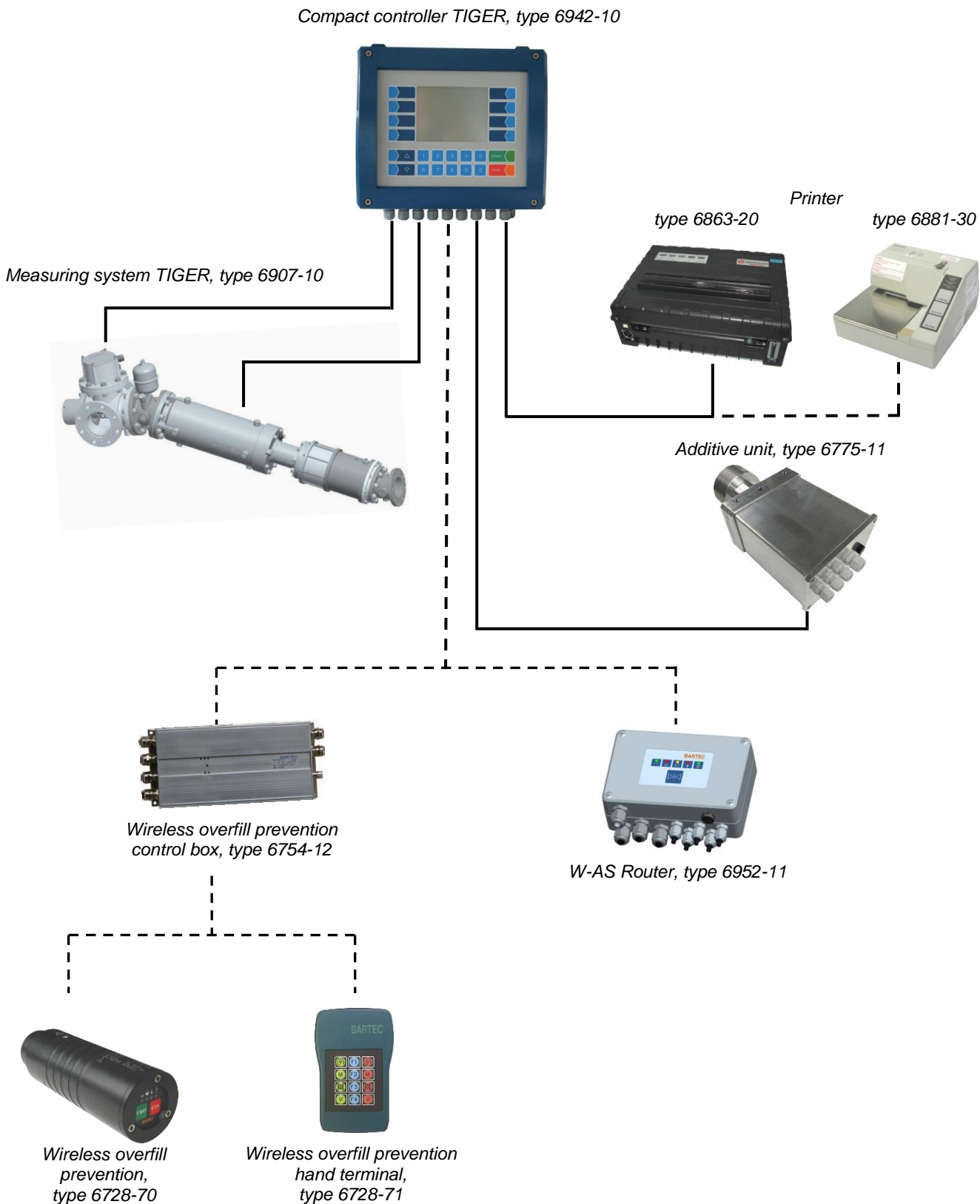
1.3 Wiring instructions

- 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 at intervals of 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.

1.4 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.

2 Block diagram of PETRODAT TIGER 3003 system



3 TIGER Compact Controller, type 6942-10

Order no.: 280838 (without CAN)

Order no.: 386565 (with CAN)



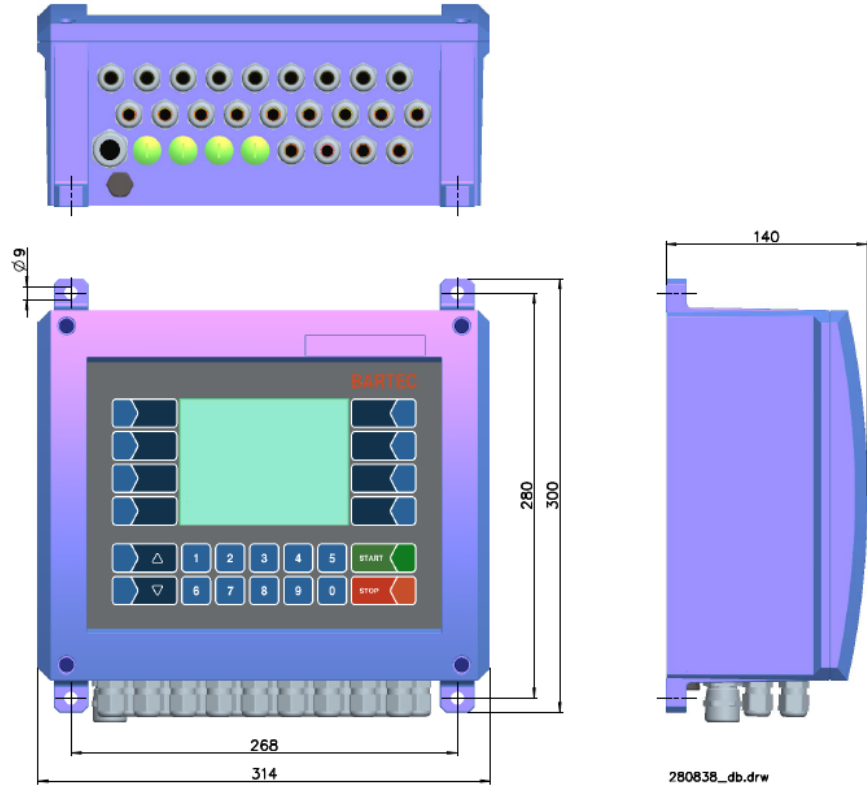
Attention:
"Fingers only" control

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, transfective 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)

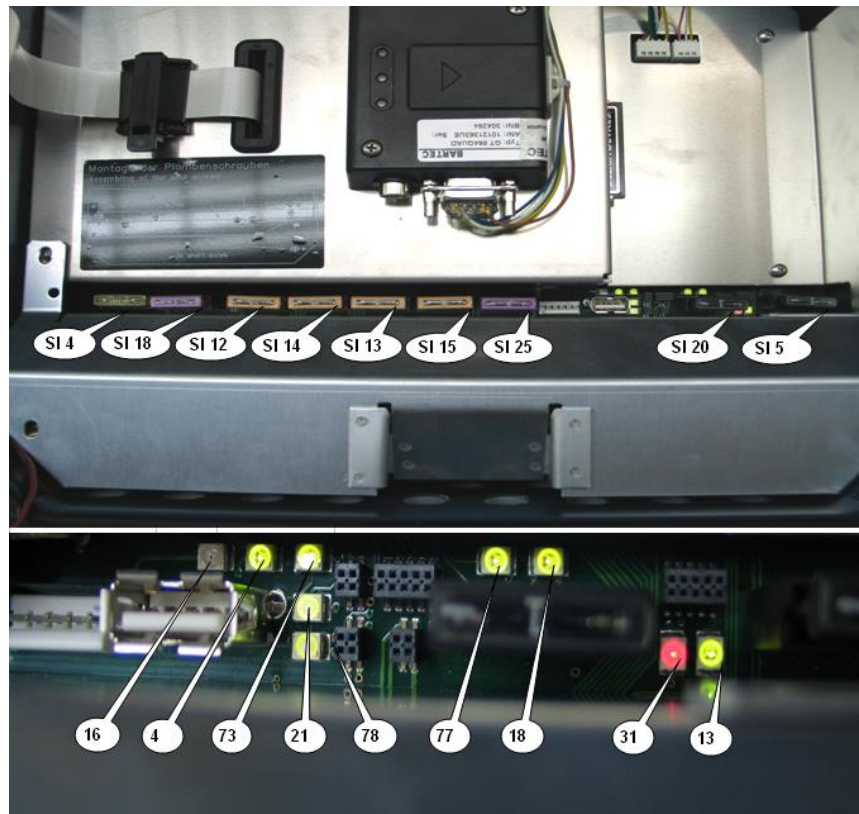
3.2 Compact Controller dimensions



3.3 Blade-type fuses and LED displays on TIGER 3003 (on motherboard)

3.3.1 Motherboard without CAN-Bus type 6942-111

Order no.: U891176942111A



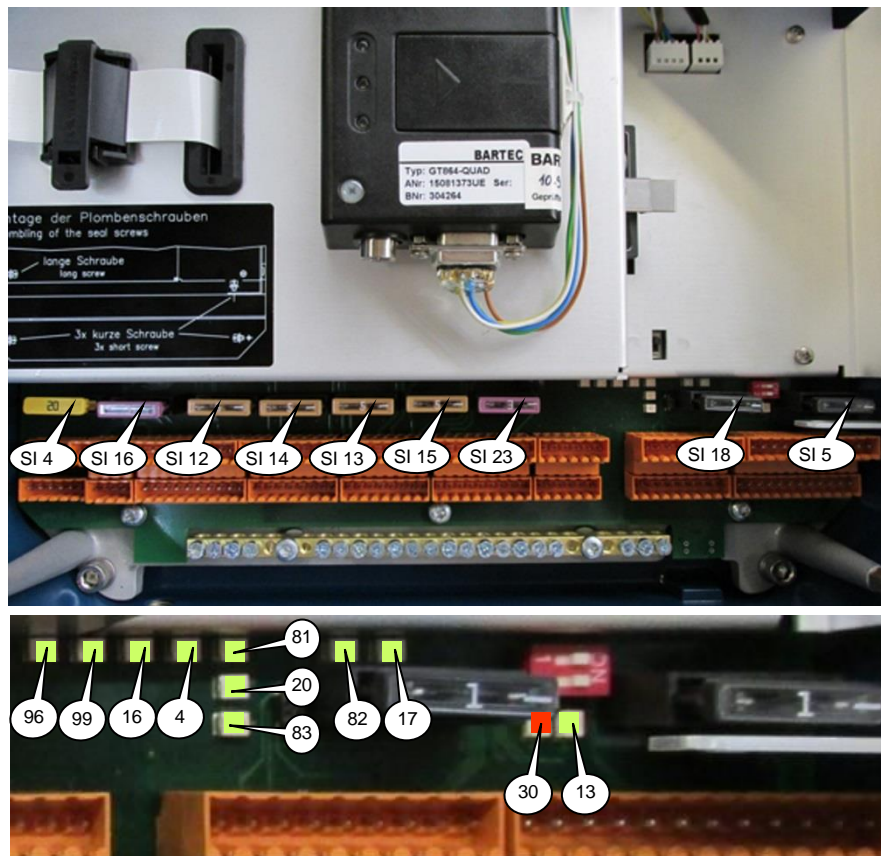
Standard blade-type motor vehicle fuses are fitted here with the following ratings:

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
LED CPU	Bottom	Busy

3.3.2 Motherboard with CAN-Bus type 6942-112

Order no.: U891176942112A



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 - interface is configured CAN/J1939 - interface is not configured		Flashes Lights up
LED 99	µ Controller KCAN		Flashes
LED CPU	Top	Supply voltage	Lights up
LED CPU	Bottom	Busy	Flashes

3.4 CompactFlash card



Direction of CF



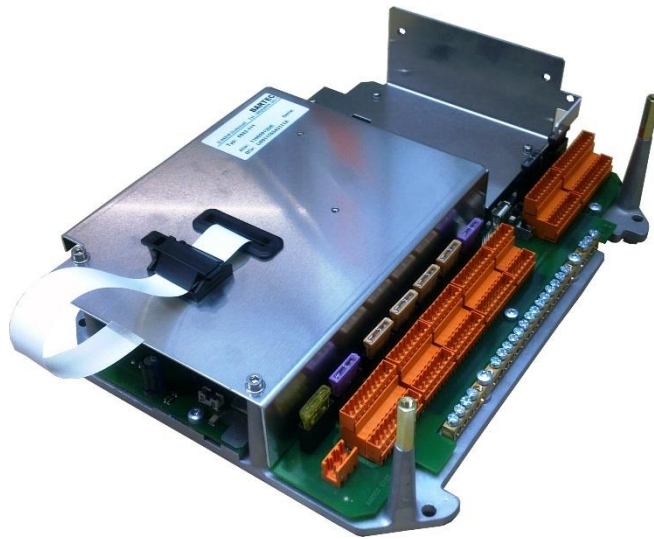
Attention:

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

3.5 Exchanging the motherboard/CPU board

Type 6942-111 (without CAN-Bus),
Order no.: U891176942111A

Type 6942-112 (with CAN-Bus),
Order no.: U891176942112A



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.

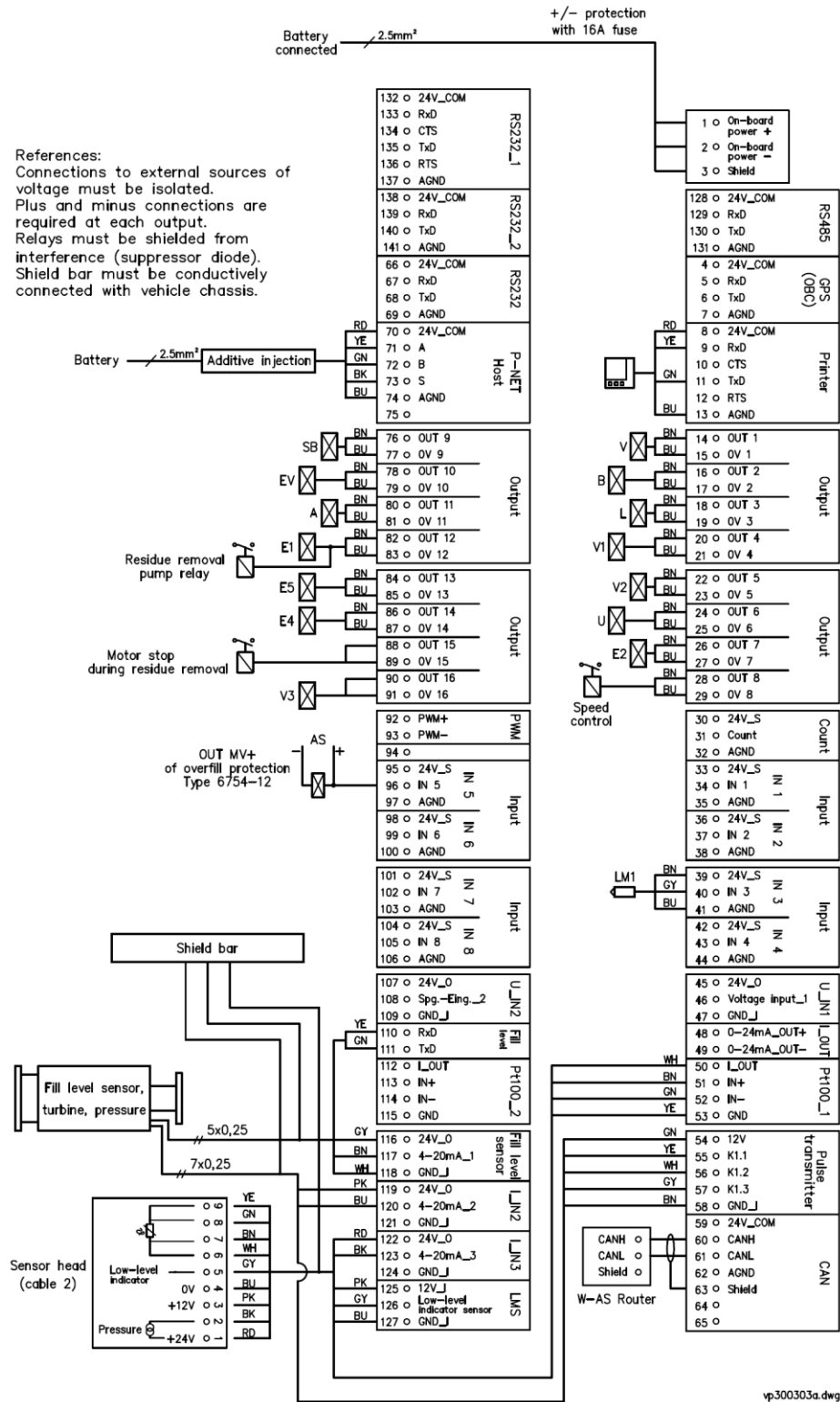


Attention:

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.

3.6 Compact Controller wiring

References:
Connections 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.



Attention:
The shield must be placed on one side of the shield bar in the system 3003!

3.6.1 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.

3.6.2 Inputs

The inputs are user-configurable.

The following assignment is recommended:

Explanatory notes:

3: Low-level indicator sensor in lower elbow
(only on design with residue removal function)

5: Overfill protection positive control pulse pickup on overfill protection system solenoid valve (Not necessary at W-AS.)

log.	inv.	Quiescent state	Valve designation	Function
1	n			Emergency stop
2	n			
3	j	H	LM1	Low-level indicator pinch valves
5	j	L		Overfill protection (system cable core 15)

3.6.3 Outputs

The outputs are user-configurable.

The following assignment is recommended:

Explanatory notes:

Outputs 9, 12, 14, 15, 20 and 21 are only needed if the residue removal function is installed.

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

The output voltage is stabilised 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).

log.	inv.	Valve designation	Function / explanation of logical outputs
1	n	V	D valve Opens the D valve fully via a 3/2-way solenoid valve
2	n	B	D valve (bypass) Controls the bypass function in the multifunctional valve via a 3/2-way solenoid valve
3	n	L	Empty hose Controls the empty hose valve via a 3/2-way solenoid valve.
4	n	V1	Full hose1 (front) Controls the full hose valve 1 via a 3/2-way solenoid valve
5	n	V2	Full hose2 (rear) Controls the full hose valve 2 via a 3/2-way solenoid valve
6	n	U	Unmeasured Controls the valve for unmeasured deliveries via a 3/2-way solenoid valve
7	n	E2	Vent - FILL Controls the straight-through valve to the vent surge tank via a 3/2-way solenoid valve
8	n		High pump output (system cable core 5) Positive-switching output to increase the motor rotation speed (This cuts in if a configurable flow rate is exceeded and cuts out if below a second flow rate configuration. This output is not active with a bypass)
9	n	SB	Vent control block Vents the control block via a 2/2-way solenoid valve, thereby closing foot valves
10	n	EV	Residue removal compressed air Supplies the compressed air for residue removal to the valve component via a straight-through solenoid valve
11	j	A	Measuring section intake Controls the valve A (measuring section intake) via a 3/2-way solenoid valve
12 12a	n n	E1	Residue removal stop valve Residue removal pump relay Controls the straight-through valve in the residue removal line between the pump sump and upper elbow via a 3/2-way solenoid valve; switches the residue removal pump on at the same time via a relay
14	n	E4	Header pipe compressed air Controls the straight-through valve in the residue removal line from the valve component to the header pipe via a 3/2-way solenoid valve
15	n		Motor off, 5 sec. high before start of residue removal process Positive-switching pulse output to switch motor off during residue removal
16	n	V3	Full hose3 Controls the full hose valve 3 via a 3/2-way solenoid valve
17	n		Speed control release Positive-switching output to switch off the motor speed adjustment. This cuts in at a flow rate of over 5 litres/min. (including with bypass)
18	n	B	Switches over to bypass before specified quantity is reached
19	n		On high for rest of residue removal process (e.g. hydraulic pump off)
20	n	E5	Vent measuring pipe Vents the measuring pipe if necessary during the residue removal process
21	n	E6	Residue removal full hose valve back into chamber

3.6.4 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 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:

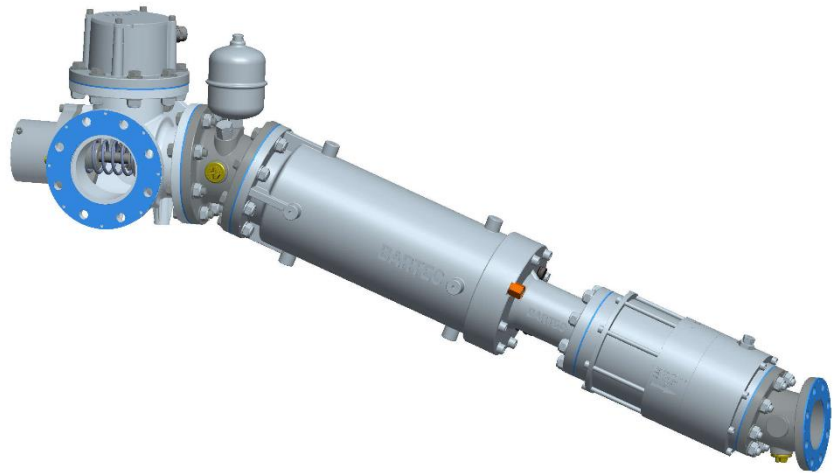
The shield of the CAN bus line must be connected at one side in the compact controller.



Attention:

All CAN bus participants connected to the compact controller TIGER, must be supplied with voltage at the same time as the compact controller.

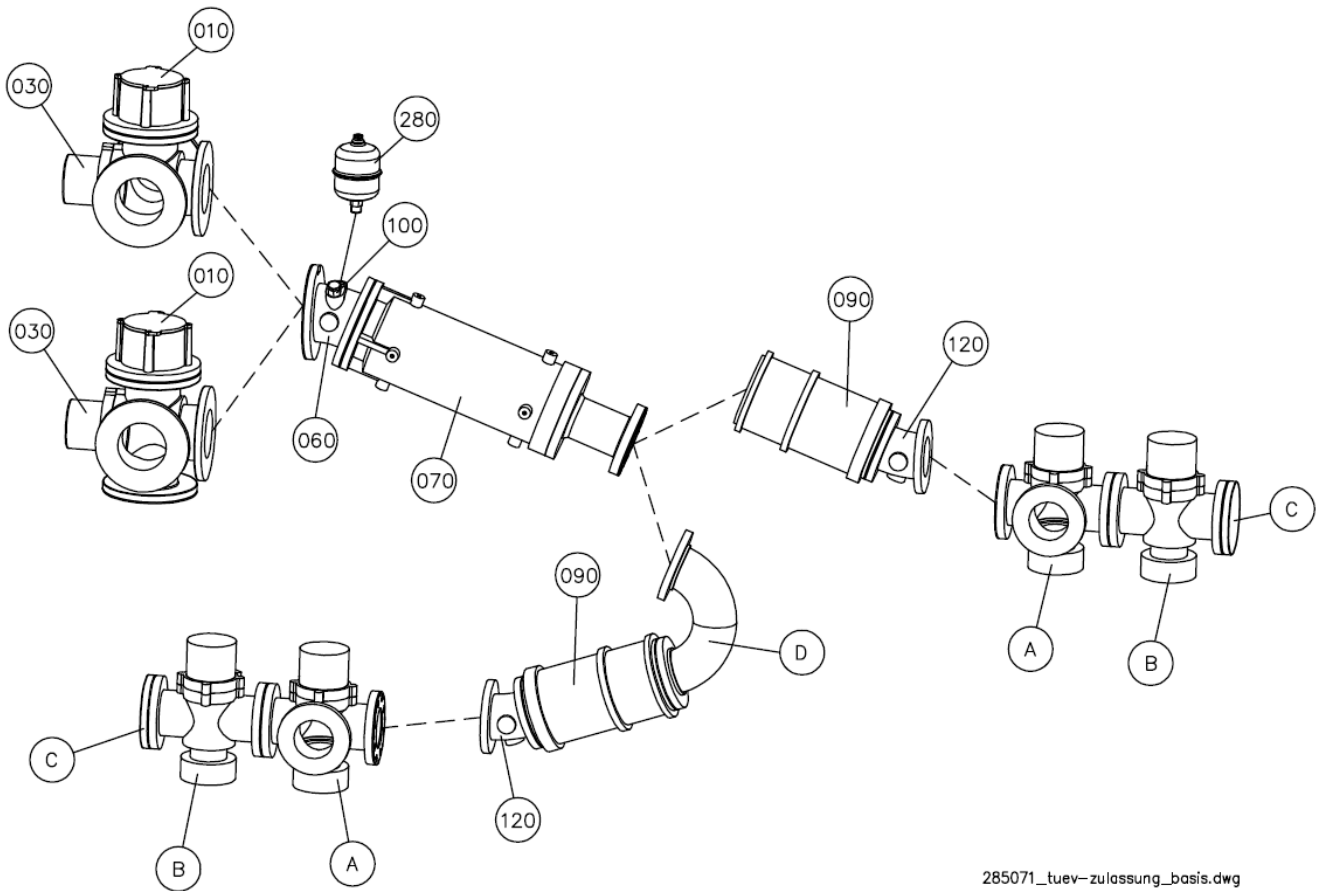
4 TIGER 3003 Measuring System



4.1 Technical data

Product data	
Full hose	Max. 800 l/min
Empty hose	Max. 800 l/min (setting requires synchronisation of power take-off and pump)
Viscosity range	< 20 mPa*s
Accuracy	≤ 0.5 %
Temperature	Pt 100 4 L
Pressure sensor	24 V DC / 4 - 20 mA 0 - 16 bar
Fill level sensor	24 V DC / 4 - 20 mA 0 - 100 FG
Counter	Three-channel turbine wheel
Wetting sensor	24 V DC transistor open-collector
Weight	Approx. 30 kg
Dimensions	See dimensional drawing
Products	Heating oil (EL), diesel
Electrical data	
Sensor head connection	9 terminals (max. 1.5 mm ²), cable fitting M16 x 1.5, cable specification: 10 x 0.25 mm ² shielded, cable diameter max. 10 mm
Measuring turbine connection	Cable 7 x 0.25 mm ² shielded (open end)
Fill level sensor connection	Cable 5 x 0.25 mm ² shielded (open end)
Ambient conditions	
Operating temperature	-20 ... +50 °C
Storage temperature	-20 ... +50 °C
Fluid pressure	700 ... 9000 hPa
Ambient pressure	950 ... 1050 hPa
Climatic category	JWF/IP 66

4.1.1 Measuring system parts

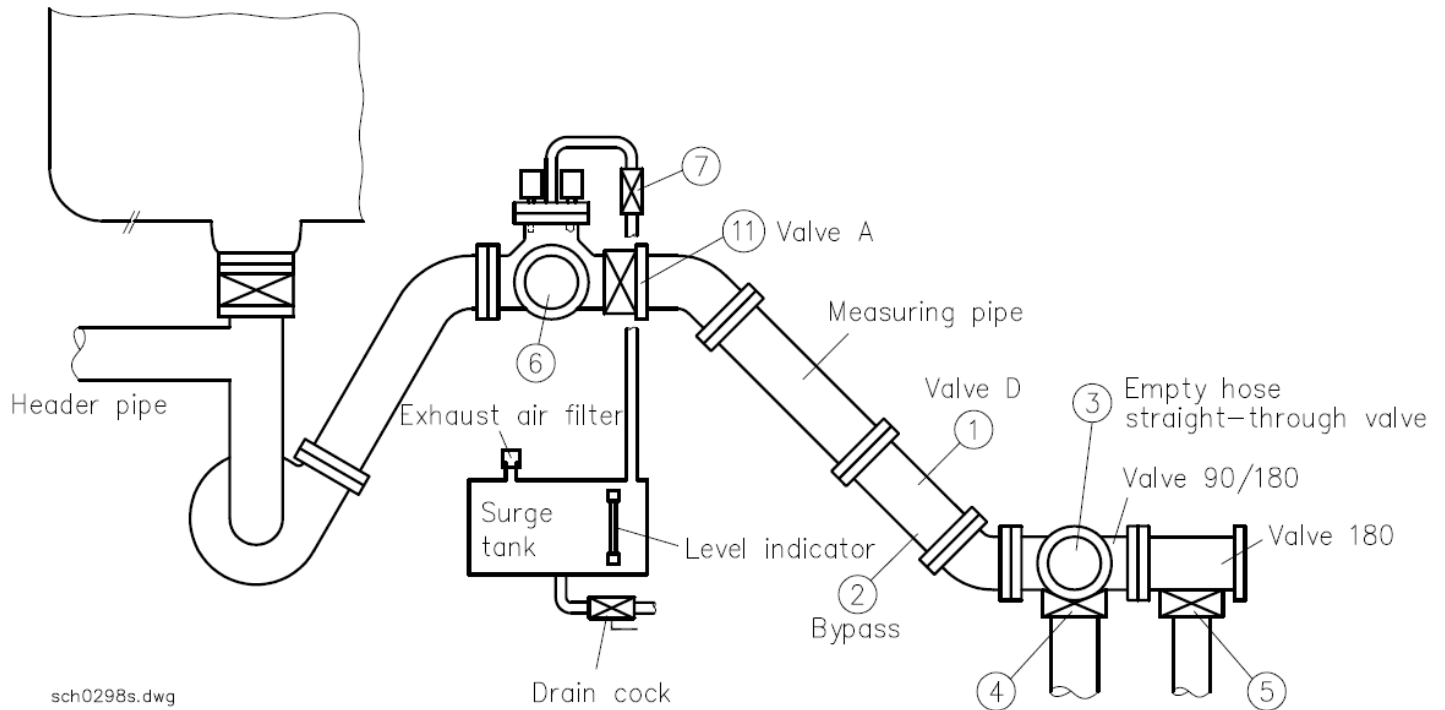


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Parts of the TIGER 3003 Measuring System			
Item	Designation	Type	Order no.
010	Sensor head, cpl.	6907-300	285443
030	Valve A, DN 80		285444
060	Elbow, DN 80	6907-00-002	285183
	Residue removal elbow, DN 80	6907-00-031	290245
070	Measuring pipe, cpl.	6907-301	285746
090	Valve D, DN 65		285550
100	Immersion sleeve	6907-00-013	285295
120	Elbow, DN 65	6907-00-003	285184
	Residue removal elbow, DN 65	6907-00-032	290246
280	Float air vent		303798
Accessories			
A	Valve B DN 65 90°/180°	6907-100	285388
B	Valve C DN 65 180°	6907-101	285389
C	Cover plate, DN 65	6907-00-004	285228
C	Cover plate, DN 80	6907-00-005	285229
D	Bend, DN 65 140°	6907-00-035	291453

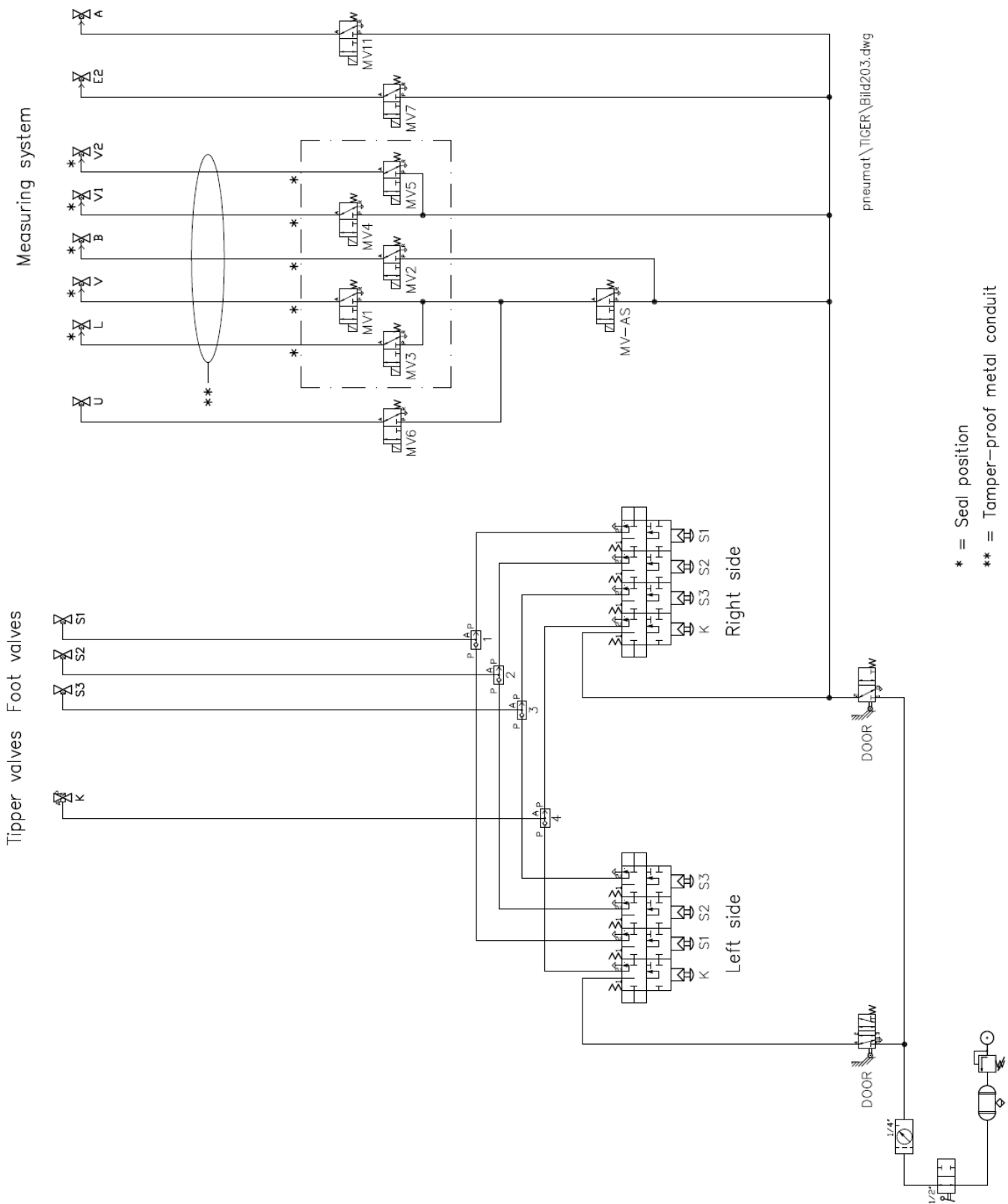
4.2 Measuring system without residue removal facility

4.2.1 Flow diagram



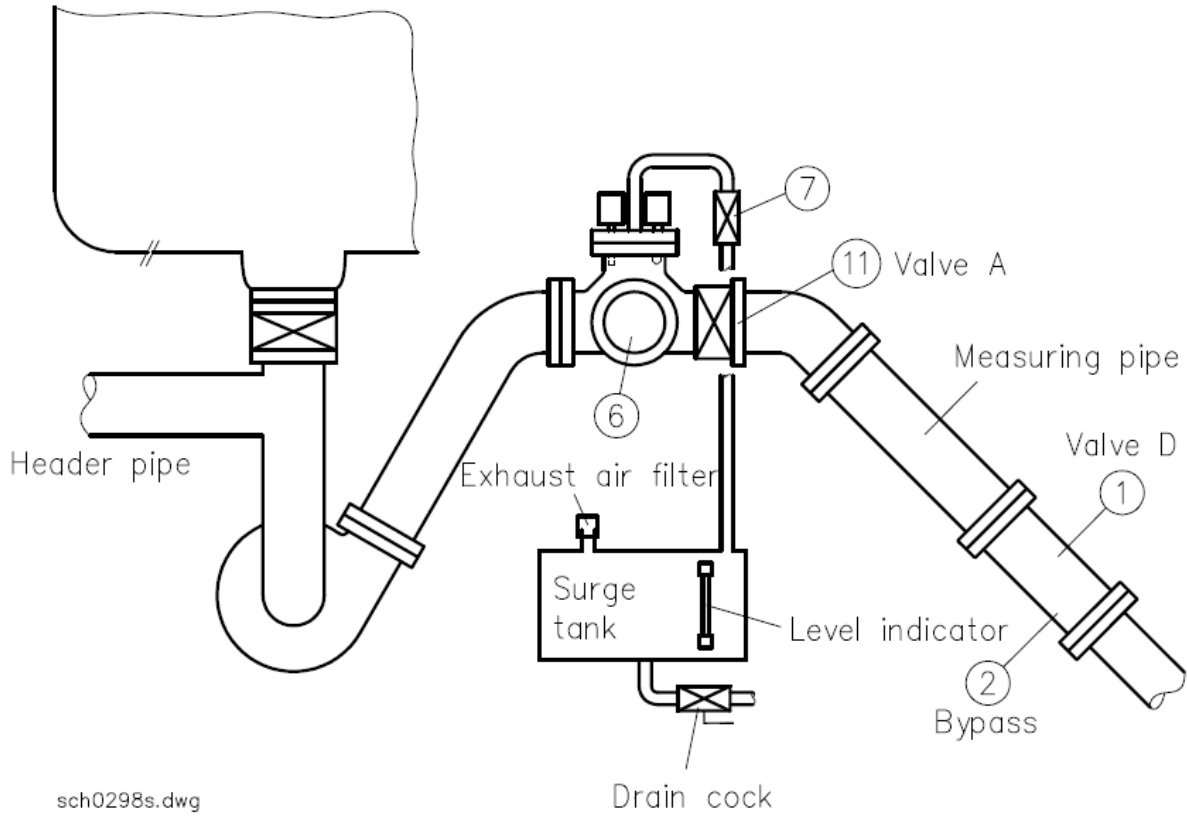
See section 3.6.3 for description of outputs

4.2.2 Pneumatic diagram



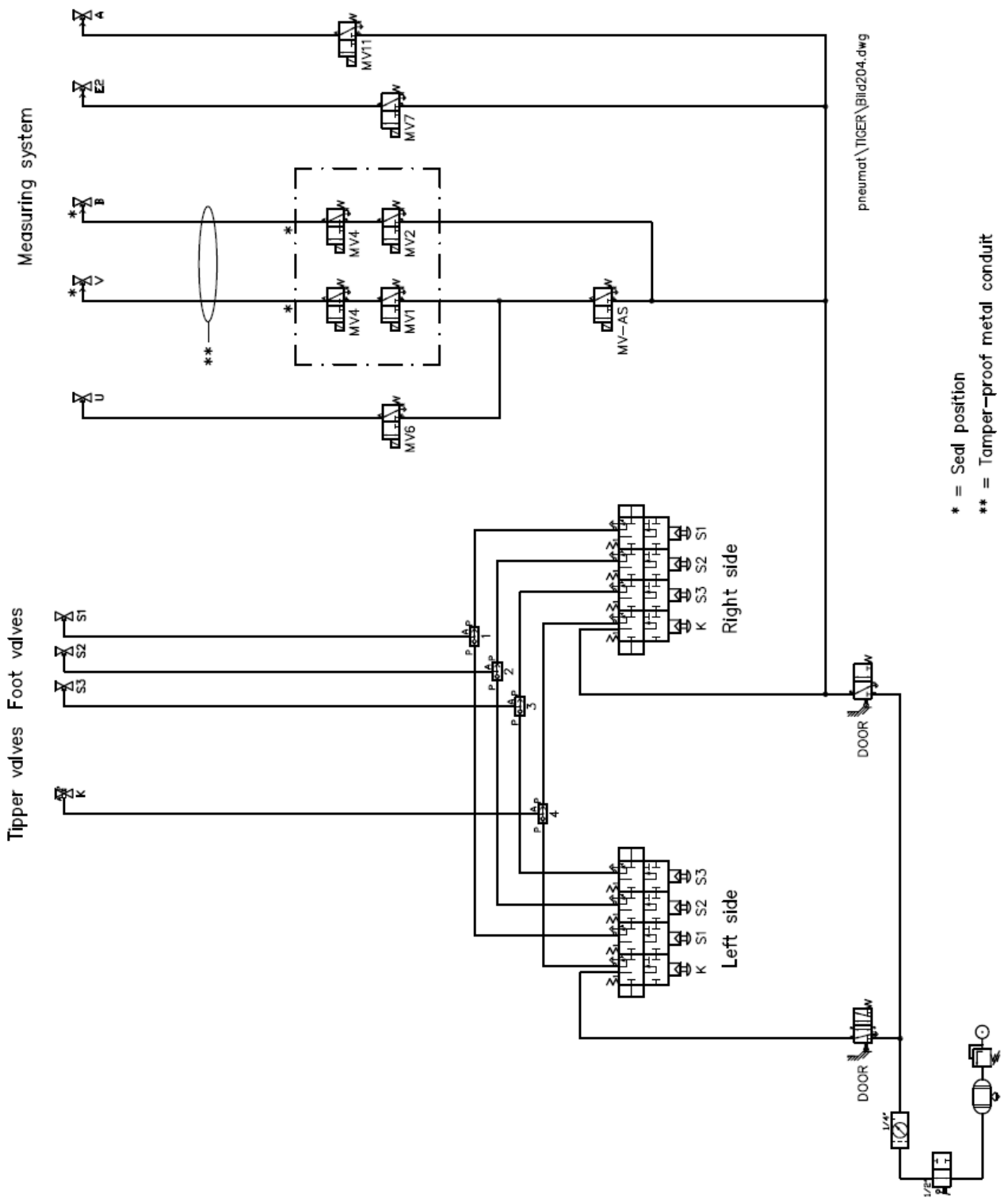
4.3 Measuring system without residue removal facility with full hose

4.3.1 Flow diagram



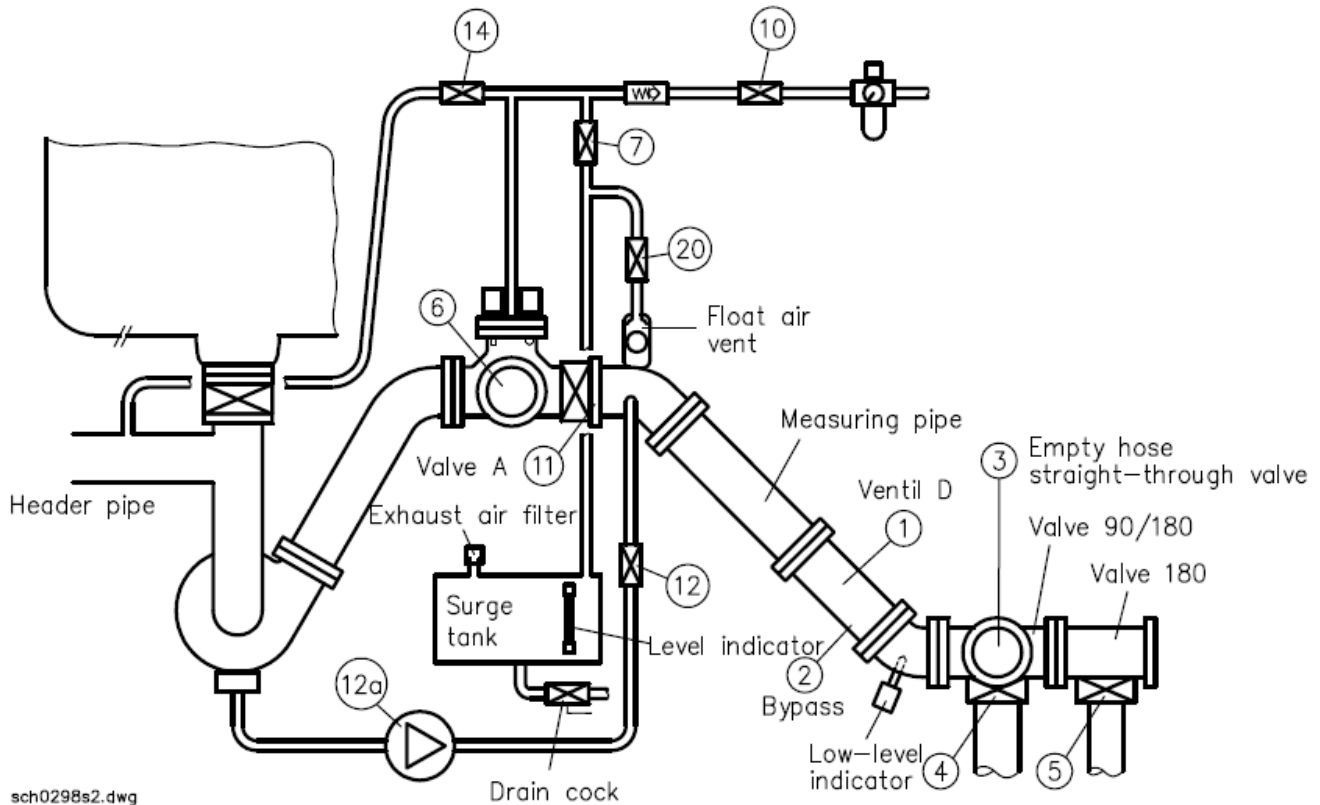
See section 3.6.3 for description of outputs

4.3.2 Pneumatic diagram



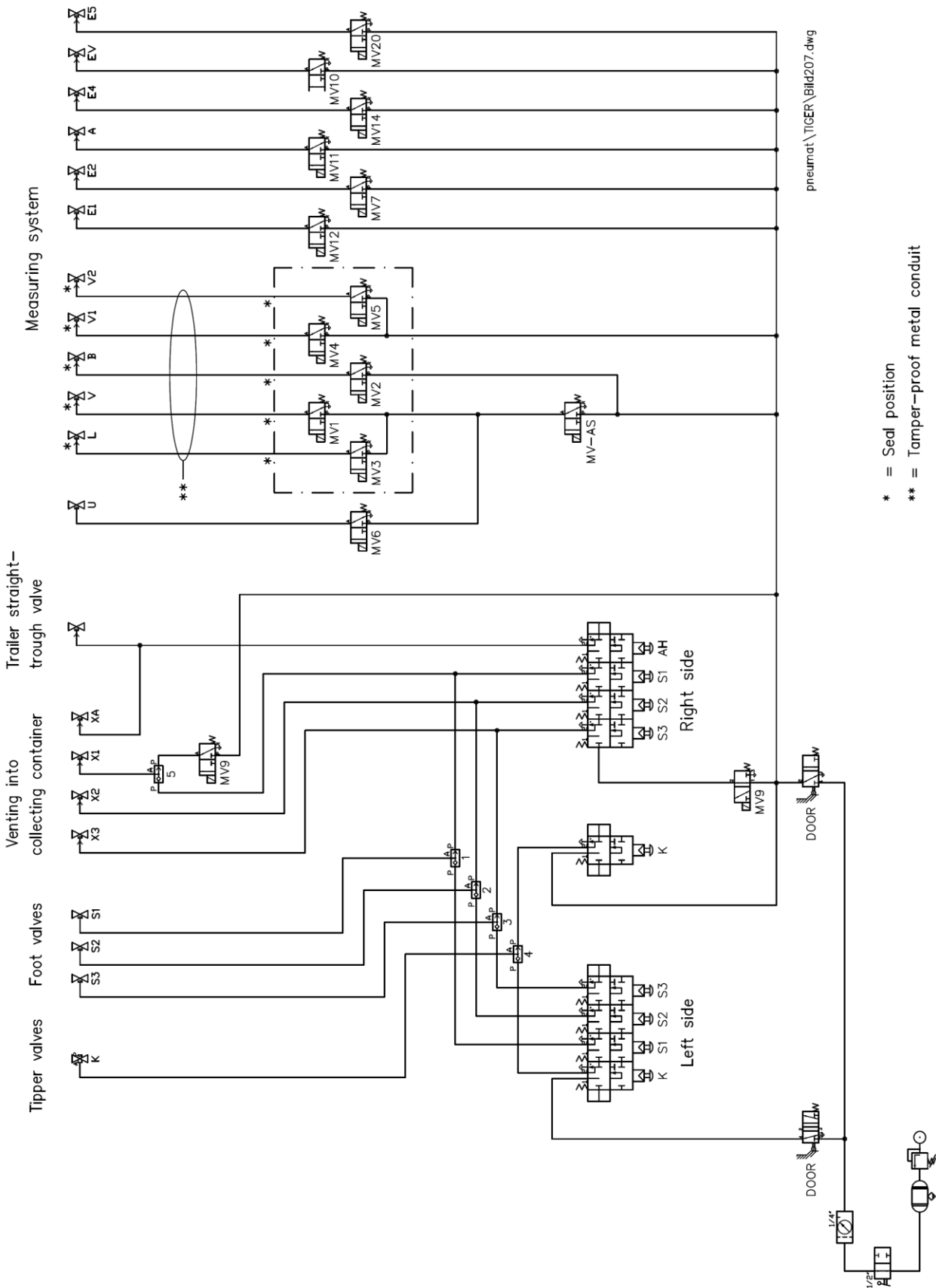
4.4 Measuring system with measured residue flow and venting into surge tank

4.4.1 Flow diagram

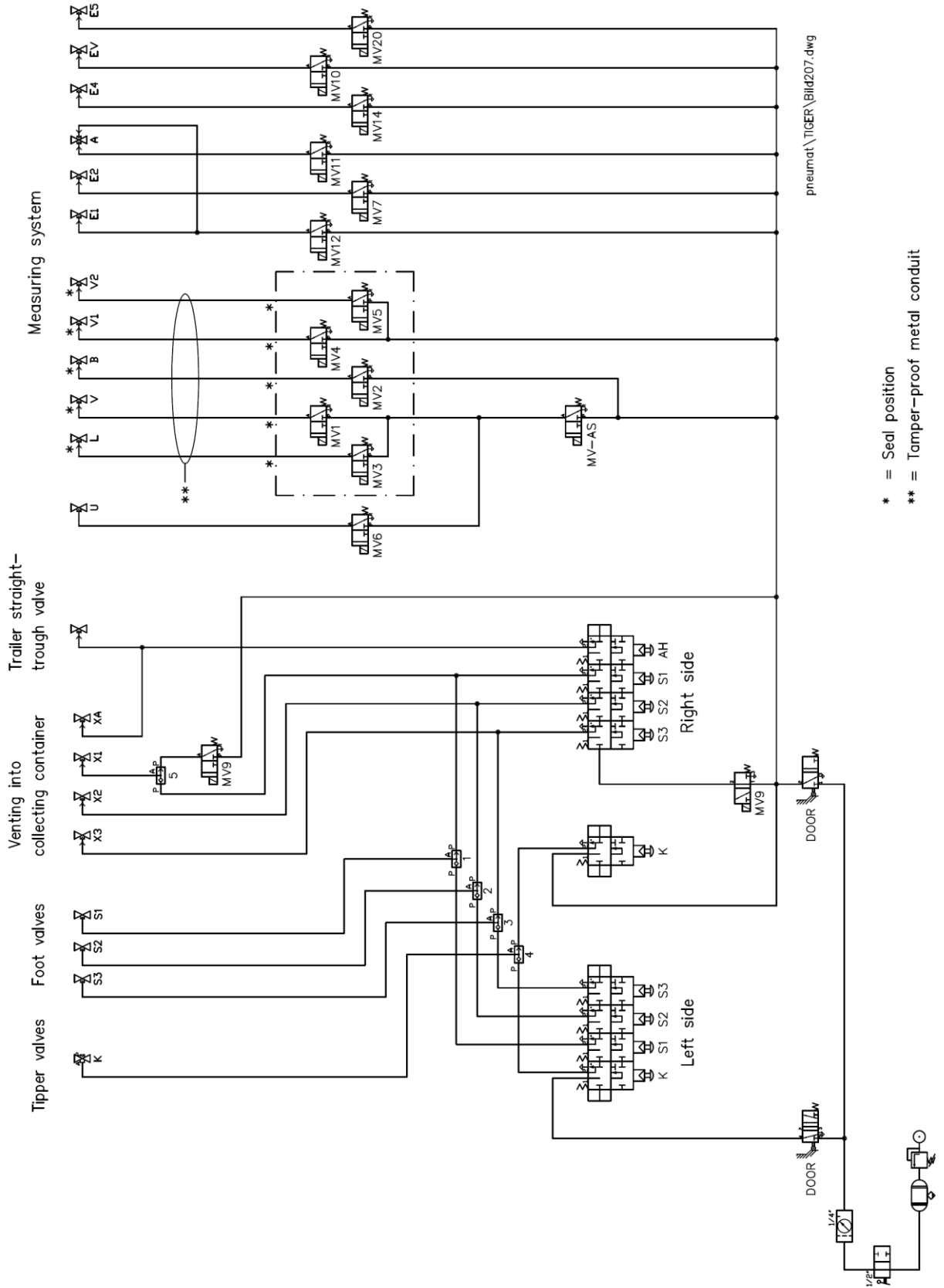


See section 3.6.3 for description of outputs

4.4.2 Pneumatic diagram A Valve without series

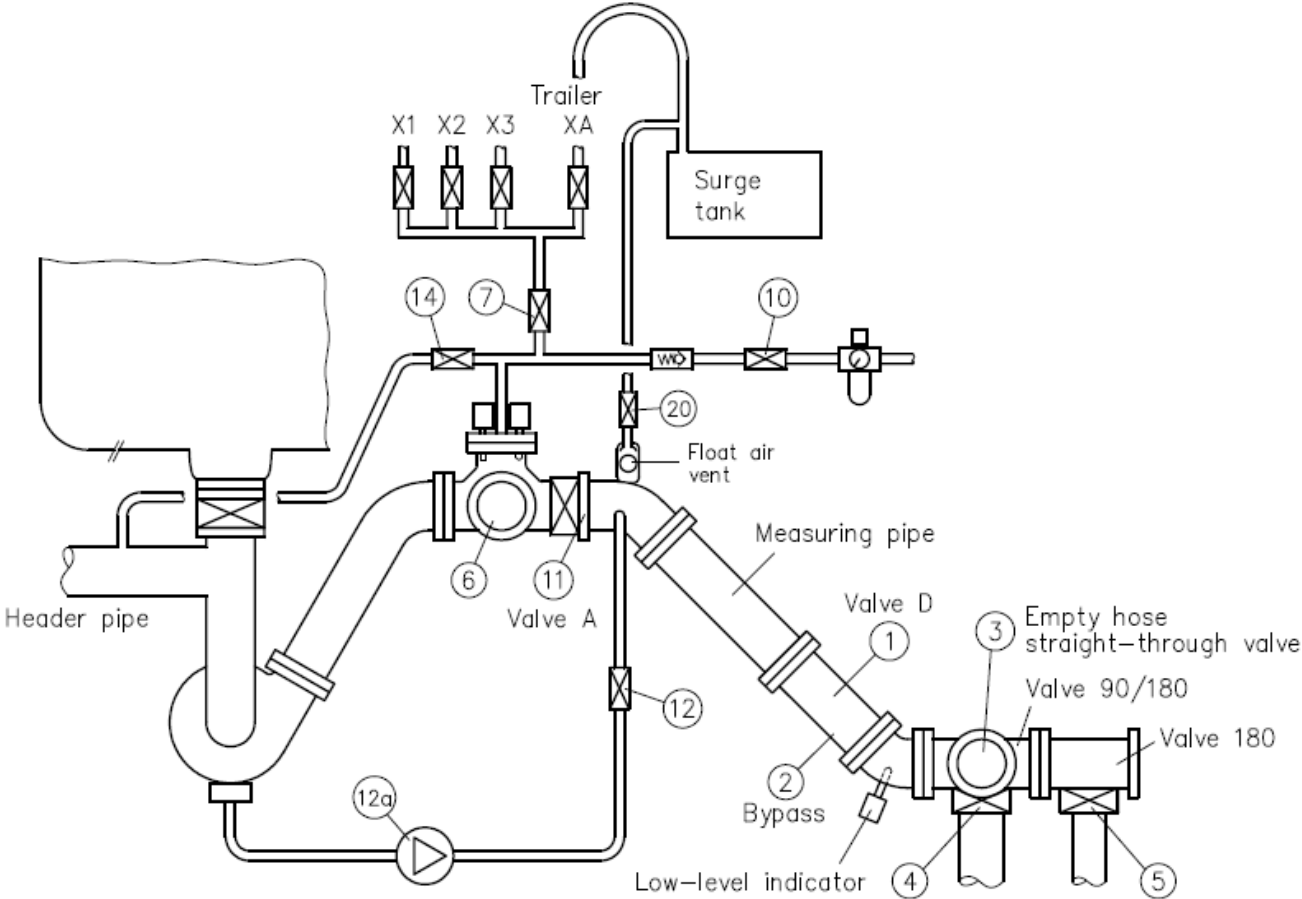


A Valve from series A



4.5 Measuring system with measured residue removal and venting back into chamber

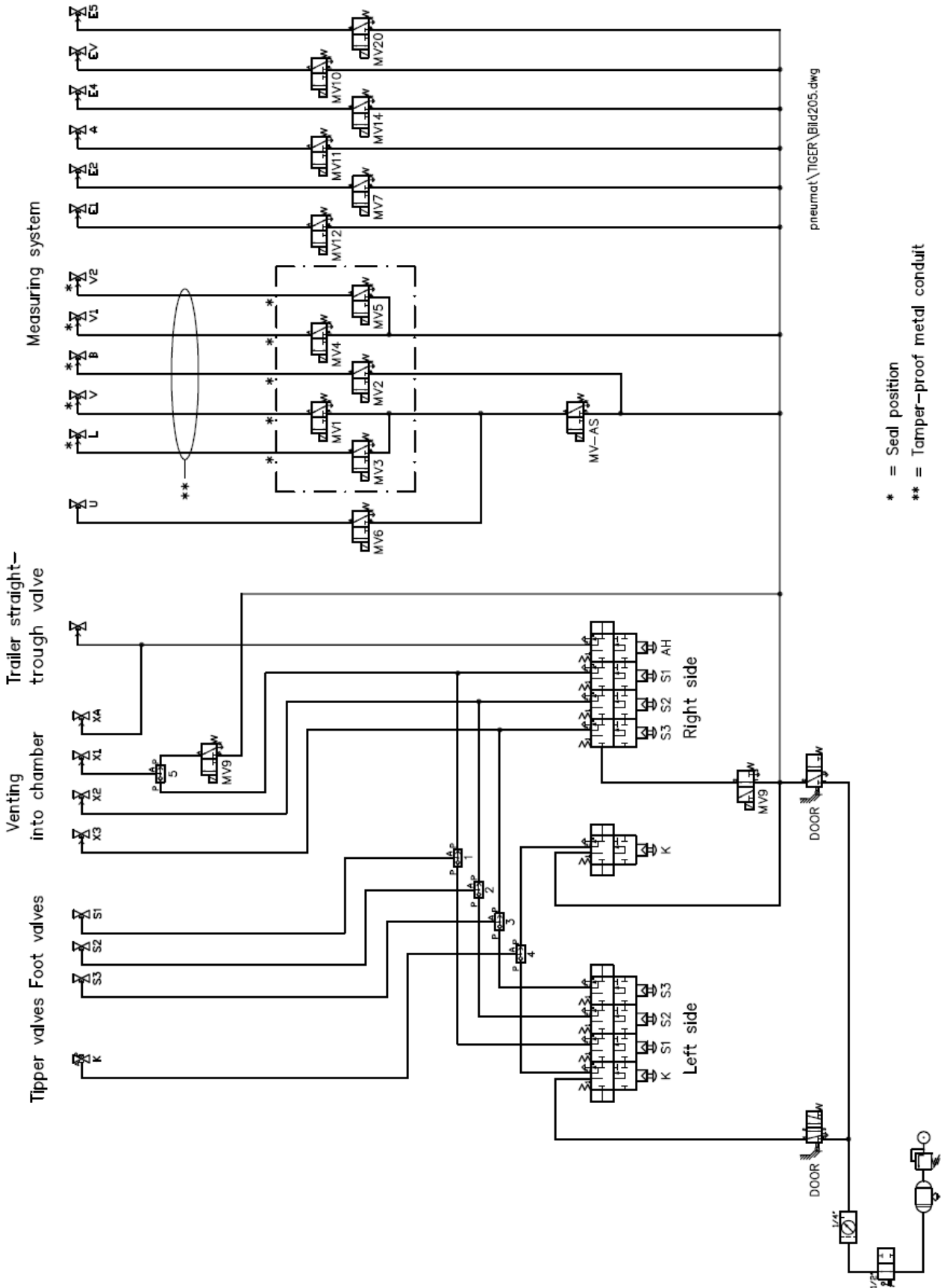
4.5.1 Flow diagram



sch0298t.dwg

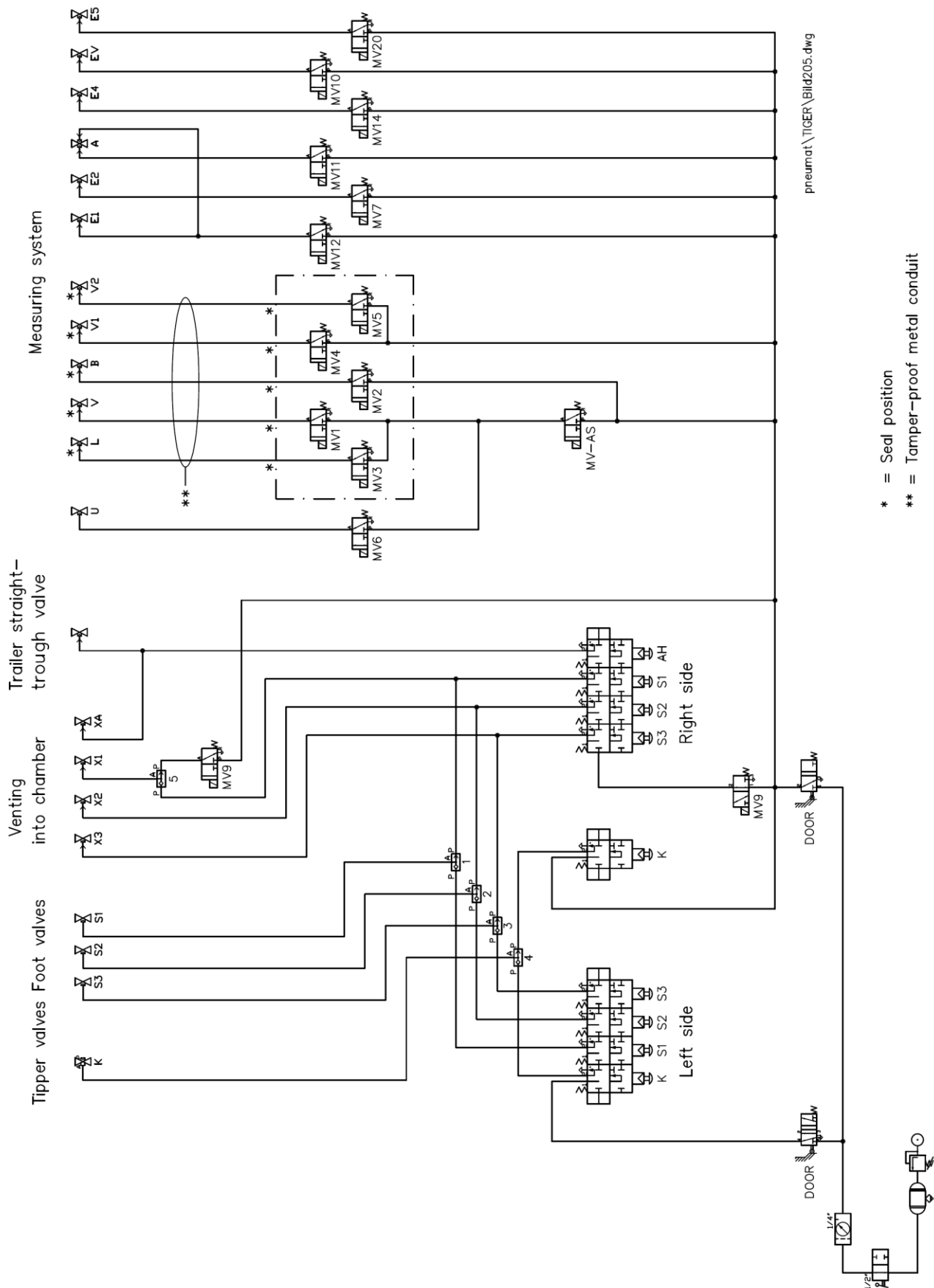
See section 3.6.3 for description of outputs

4.5.2 Pneumatic diagram A Valve without series



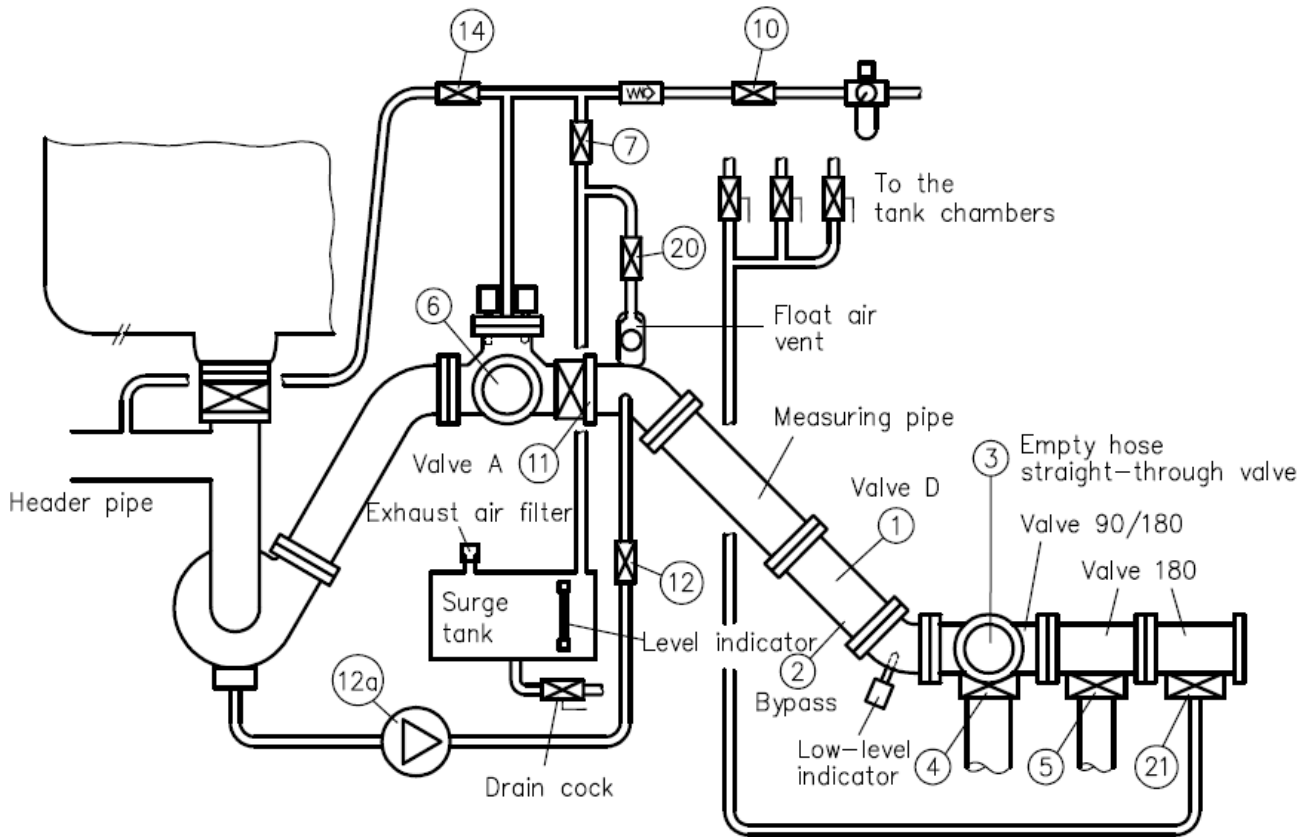
* = Seal position
** = Tamper-proof metal conduit

A Valve from series A



4.6 Measuring system with measured and unmeasured residue removal back into chamber

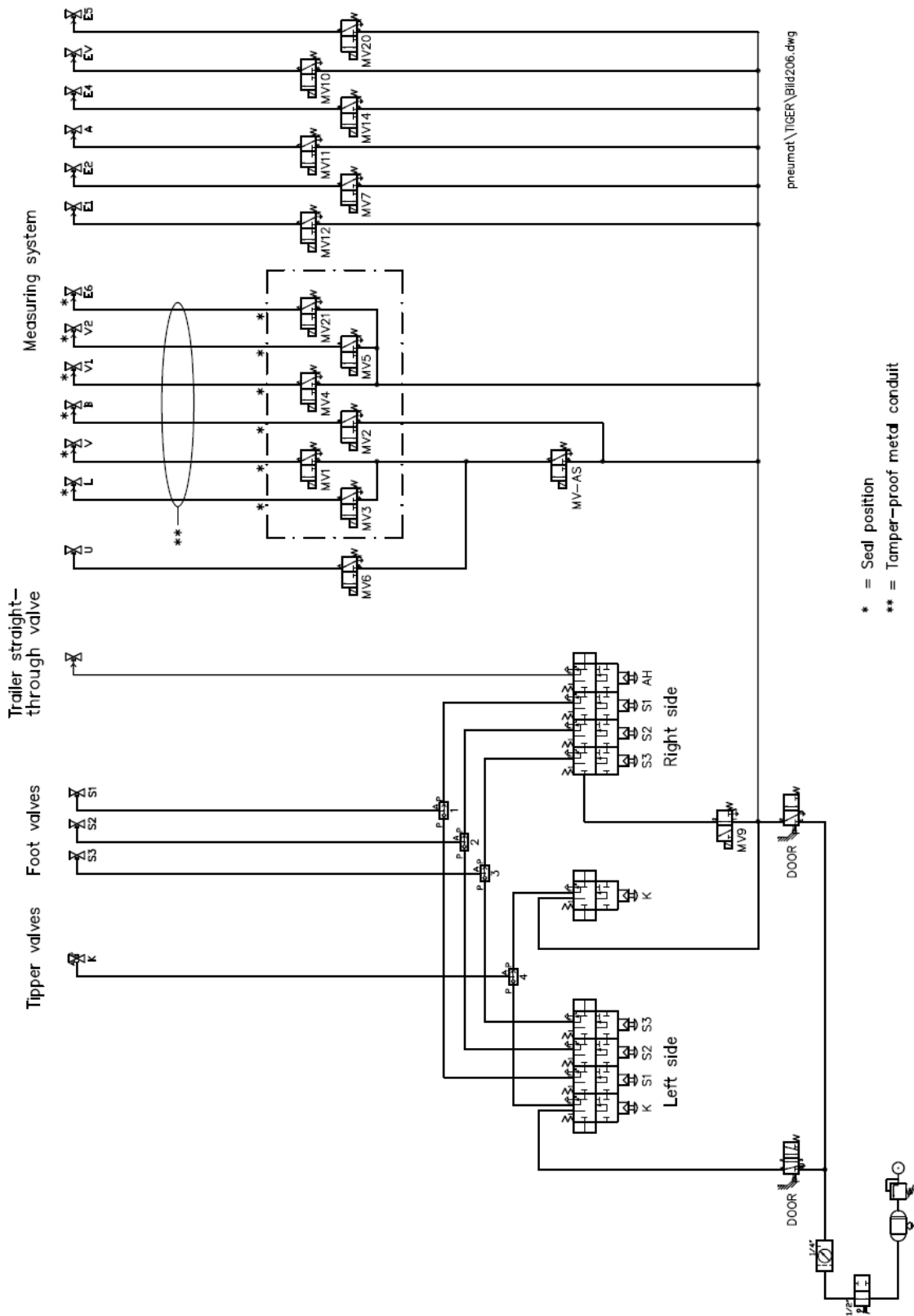
4.6.1 Flow diagram



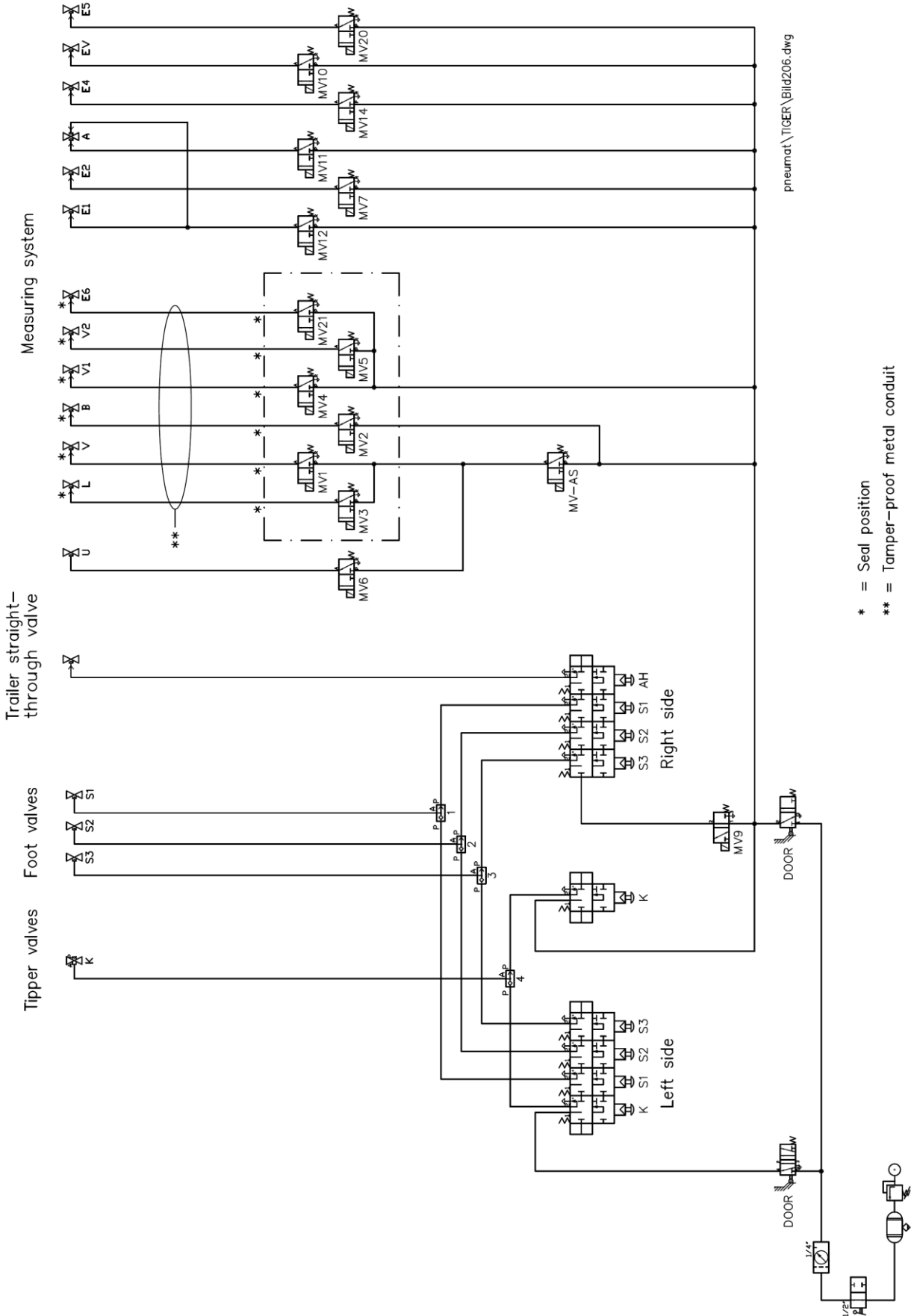
sch0298s1.dwg

See section 3.6.3 for description of outputs

4.6.2 Pneumatic diagram A Valve without series



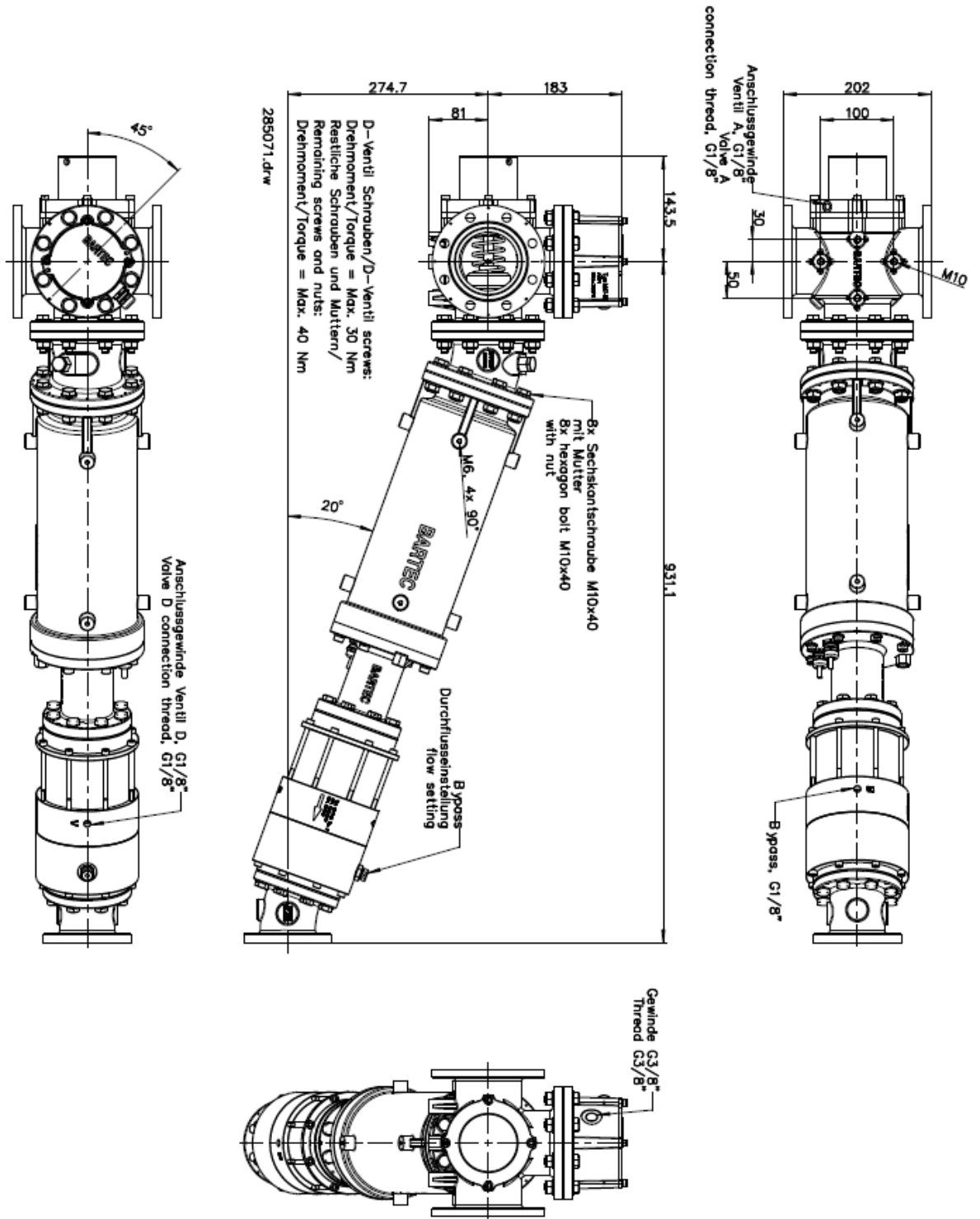
A Valve from series A



4.7

Dimensions of TIGER Measuring System

Type: 6907-10
 Order no.: 285071

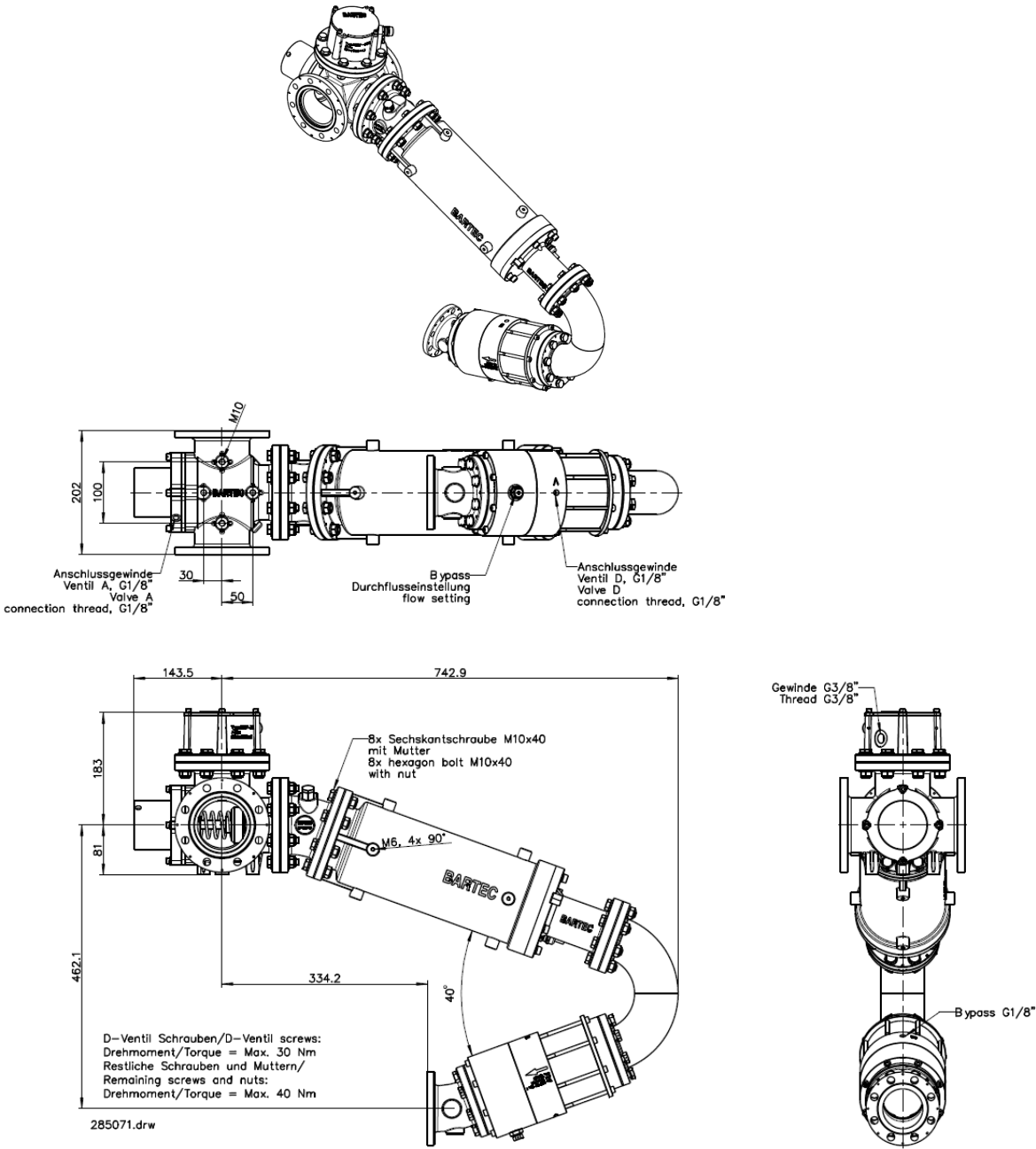


4.9 Dimensions of TIGER Measuring System with bend

Type: 6907-104
Order no.: 291543



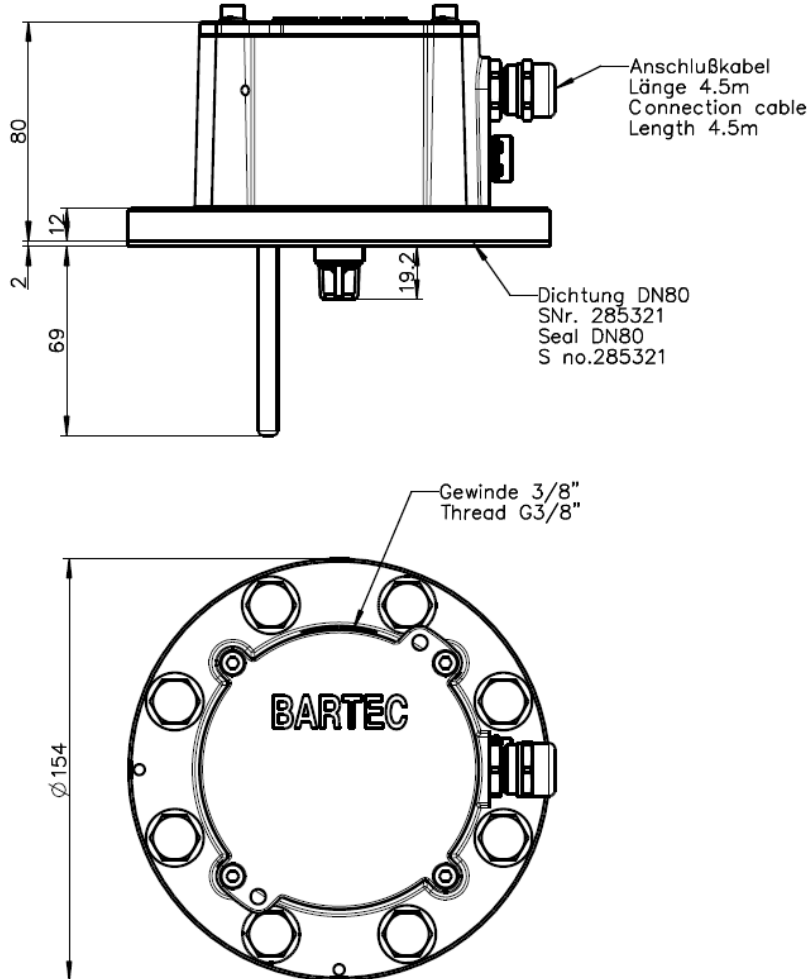
Attention:
The bend between the turbine and D valve can be moved forwards.
There is a mandatory minimum angle of incline of 20°.



4.10 Sensor head installation dimensions

Type: 6907-300

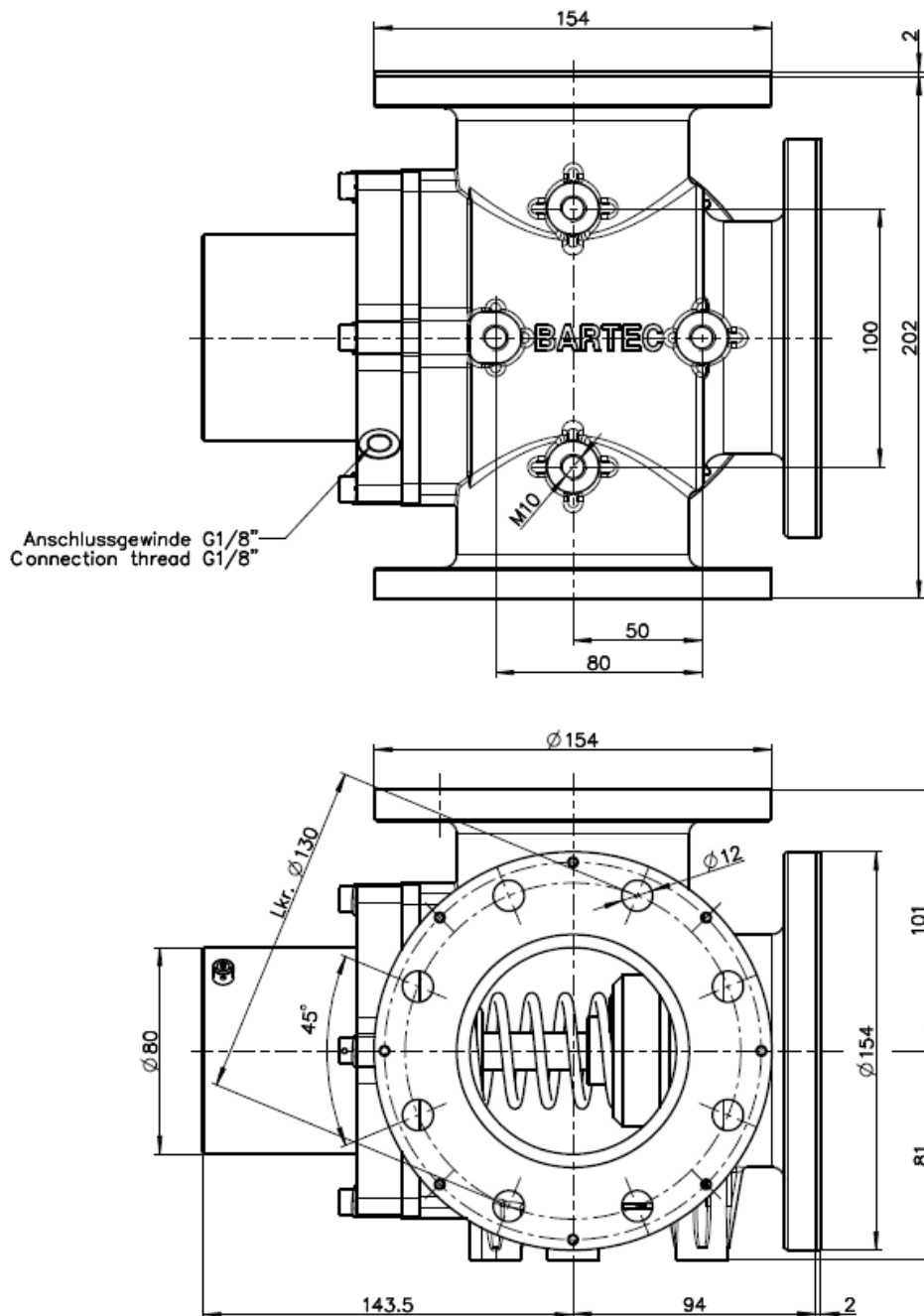
Order no.: 285443A



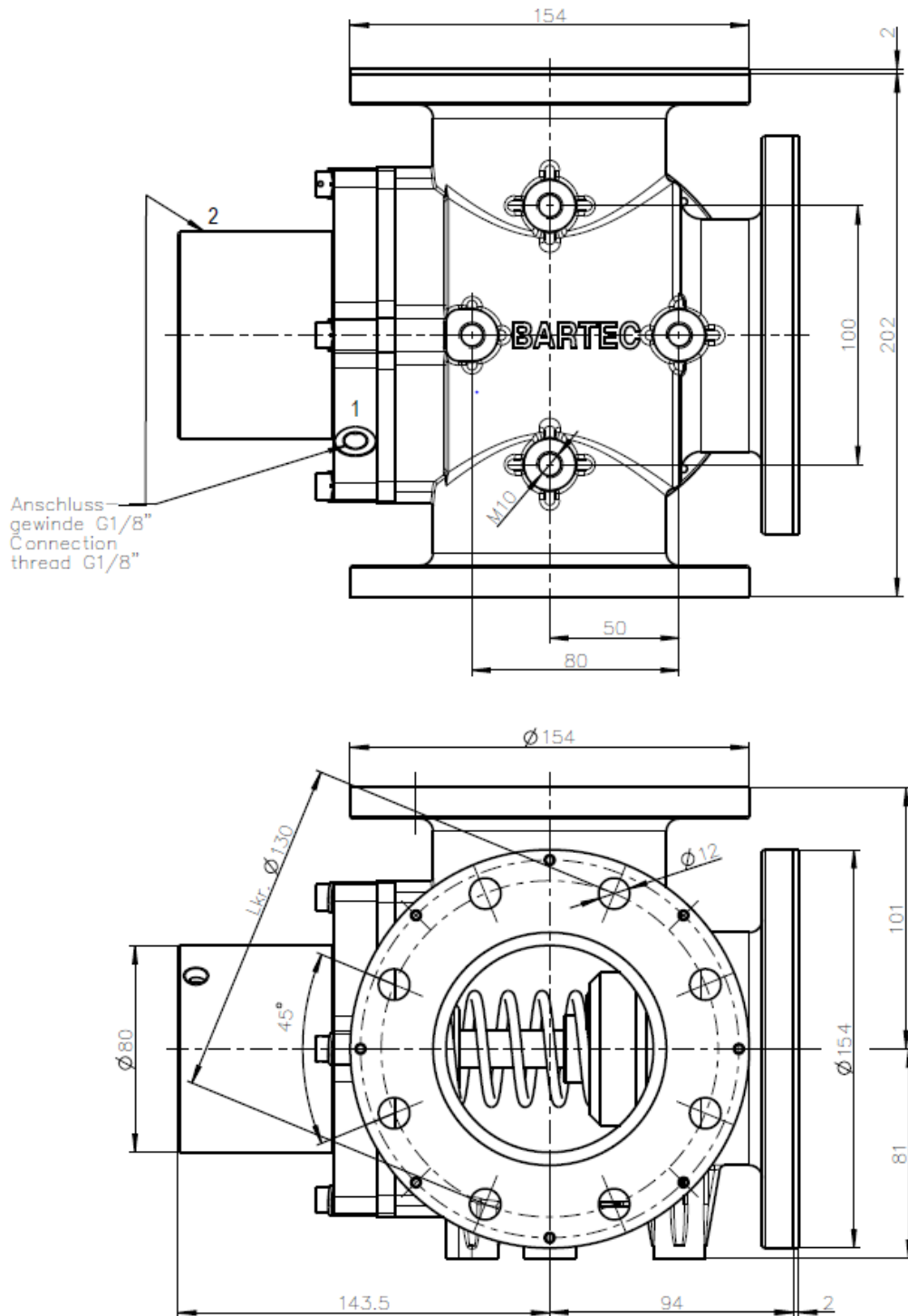
4.11 Installation dimensions of A valve, DN 80

Order no.: 285444

4.11.1 Installation dimensions without series



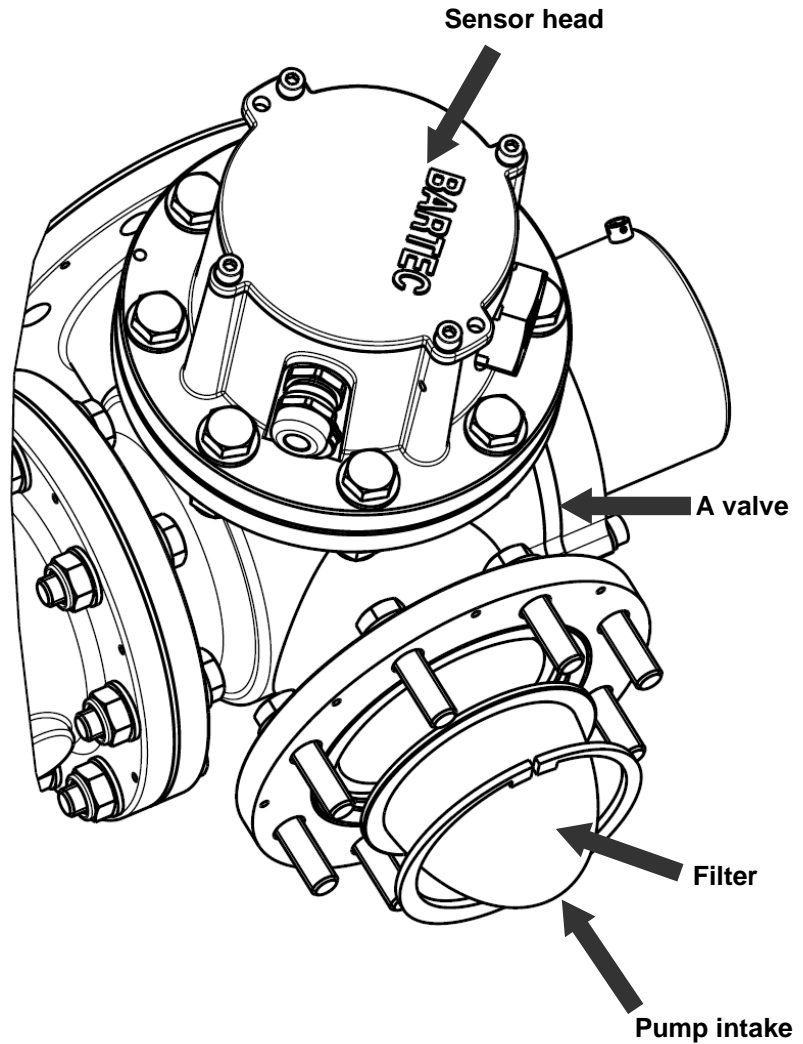
4.11.2 Installation dimensions series A



Attention:

At residue removal the air inlet 2 is controlled parallel to log. Function 12. See pneumatic diagram chapter 4.2.2. Without residue removal this connection must be protected with an exhaust air filter against pollution.

4.12 Filter installation (sensor head and A valve)

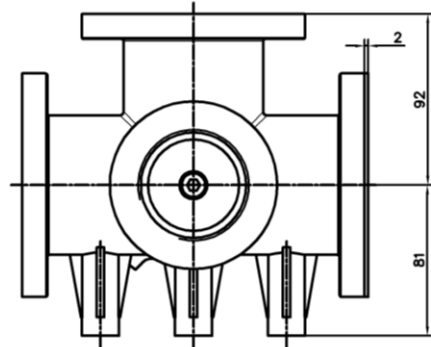
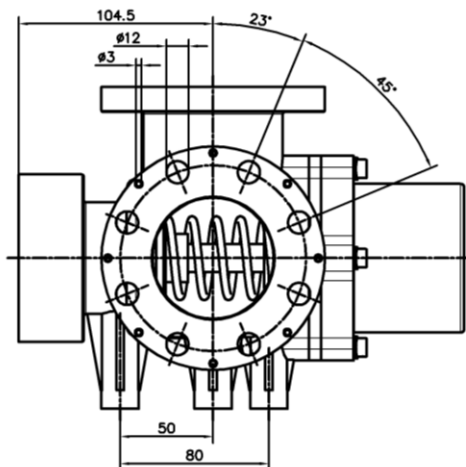
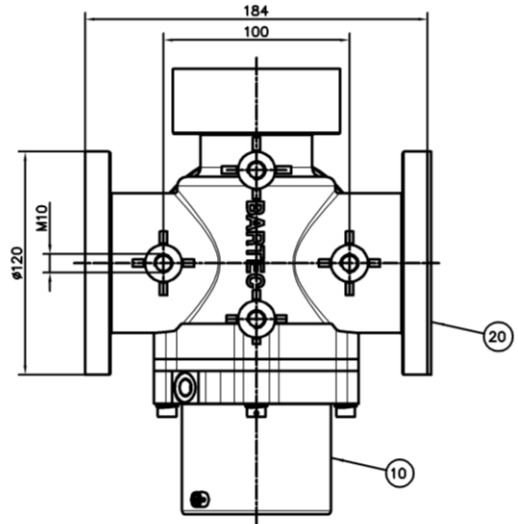
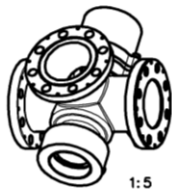
**Attention:**

The position of the sensor head on the A valve may not be changed!

Fit the filter as shown in the diagram above. Make sure that all the covers, protective caps and foreign objects have been removed before fitting.

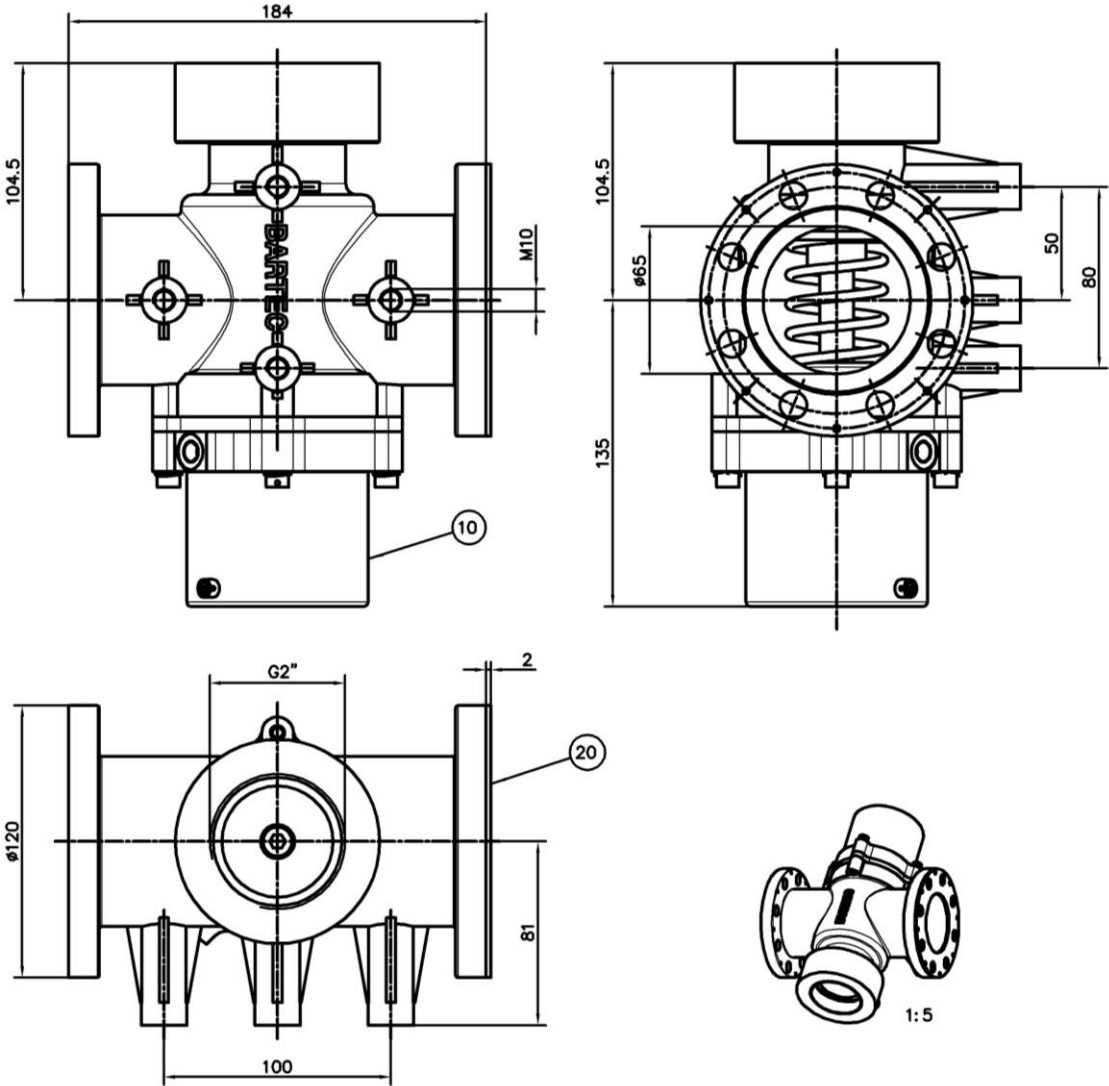
4.13 Installation dimensions of B valve 90°/180°, type 6907-100

Order no.: 285388



4.14 Installation dimensions of C valve 180°, type 6907-101

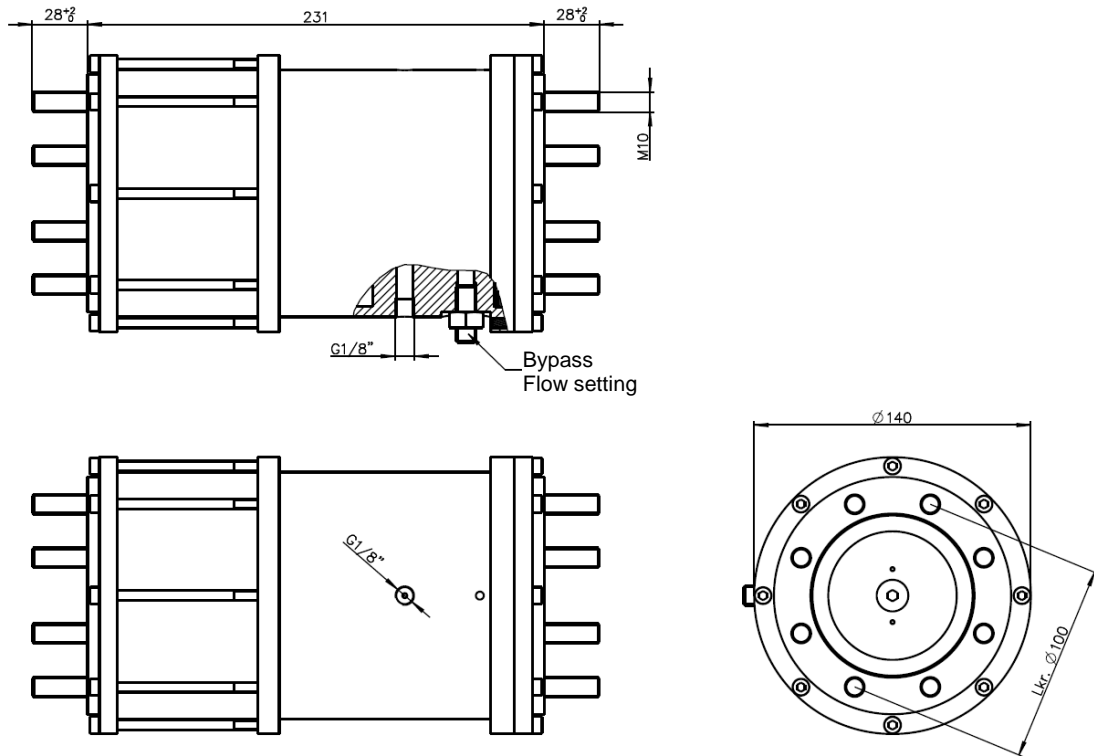
Order no.: 285389



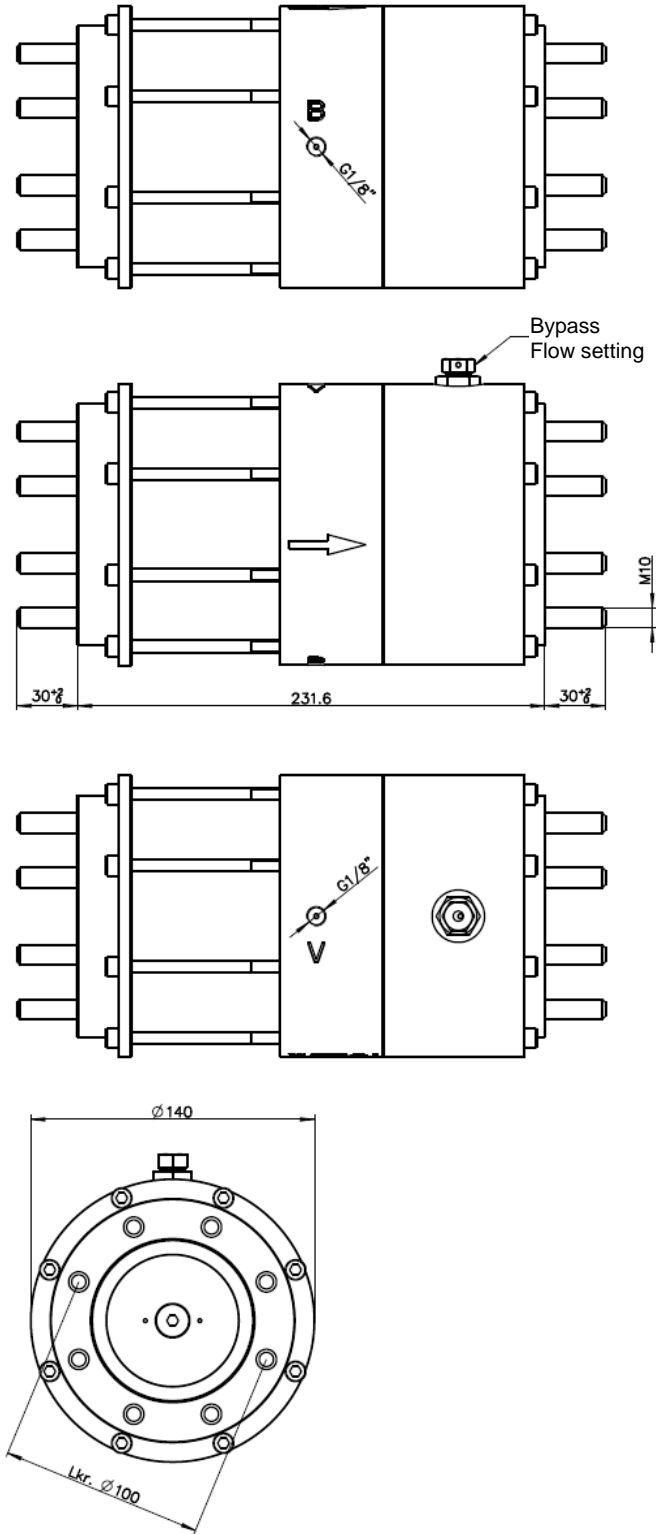
4.15 Installation dimensions of D valve, DN 65

Order no.: 285550

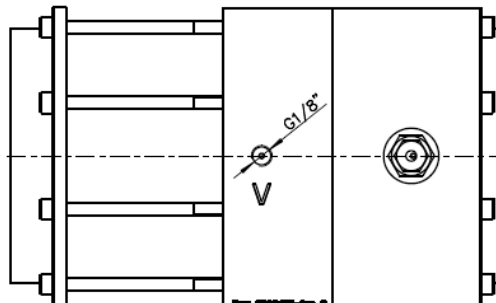
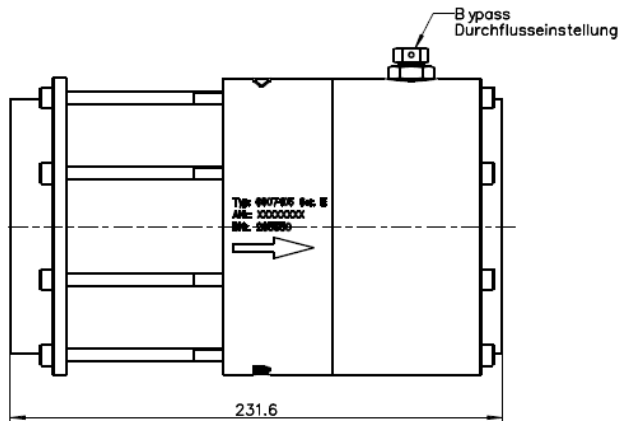
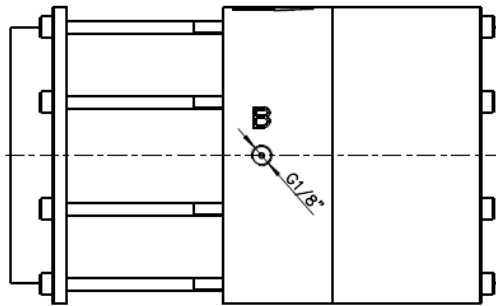
4.15.1 Installation dimensions without series



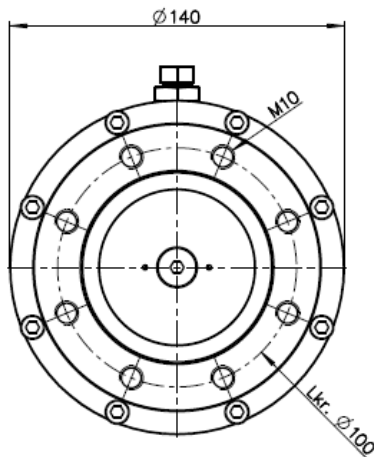
4.15.2 Installation dimensions from series B



4.15.3 Installation dimensions from series E



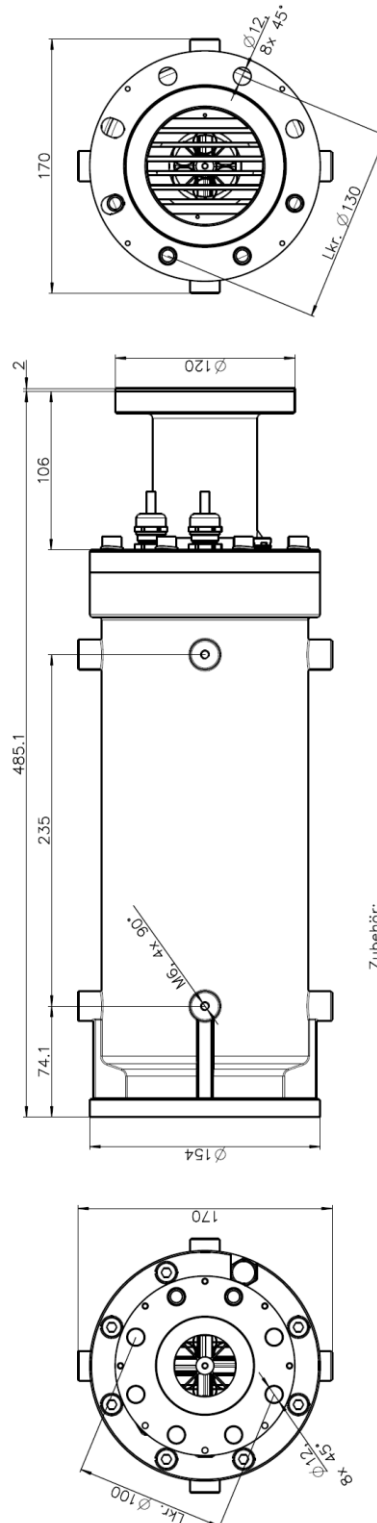
285550_ser-e.drw



4.16 Installation dimensions of measuring pipe

Type: 6907-301

Order no.: 285746A



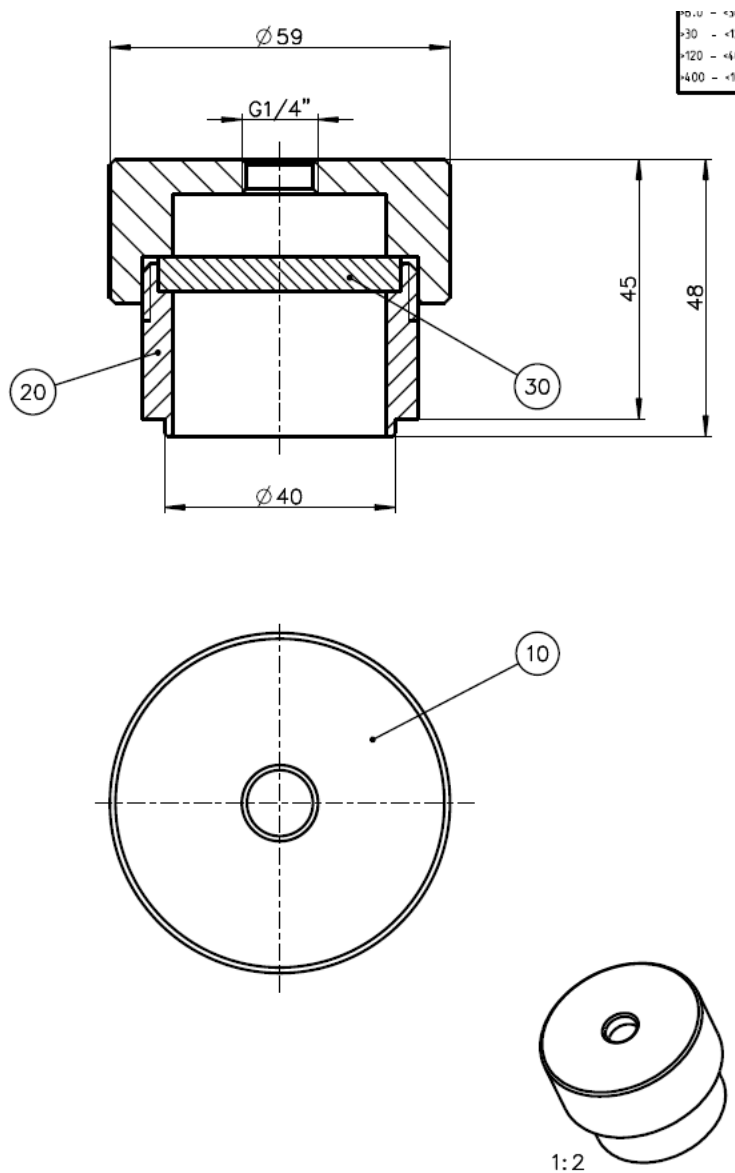
Zubehör:
 2x Dichtung DN 80, SNr. 285321
 1x Dichtung DN 65, SNr. 285304
 Accessories:
 2x seal DN80, S no. 285321
 1x seal DN65, S no. 285304

4.17 Residue removal exhaust air filter, type 6907-304

Order no.: 294300

Exhaust air filter for installation in surge tank

The housing has a welded flange at the bottom. The filter plate is screwed on to the connection at the top with the knurled screw where it acts as a vapour barrier. Another hose can be connected as an optional extra in order to be able to carry off the exhaust air.



4.18 Installing the measuring section

The following passages contain information and instructions on the installation of the TIGER 3003 heating oil metering system.

Failure to follow the instructions may render the system difficult or even impossible to operate.

The measuring section must be installed so that the measuring pipe is pointing downwards at an angle of 20°.

If the system is to be set up so that filling can proceed without the pump when the tank is low (gravitational force) then the air discharge port of the measuring section may not be above the minimum fluid level in the tank.

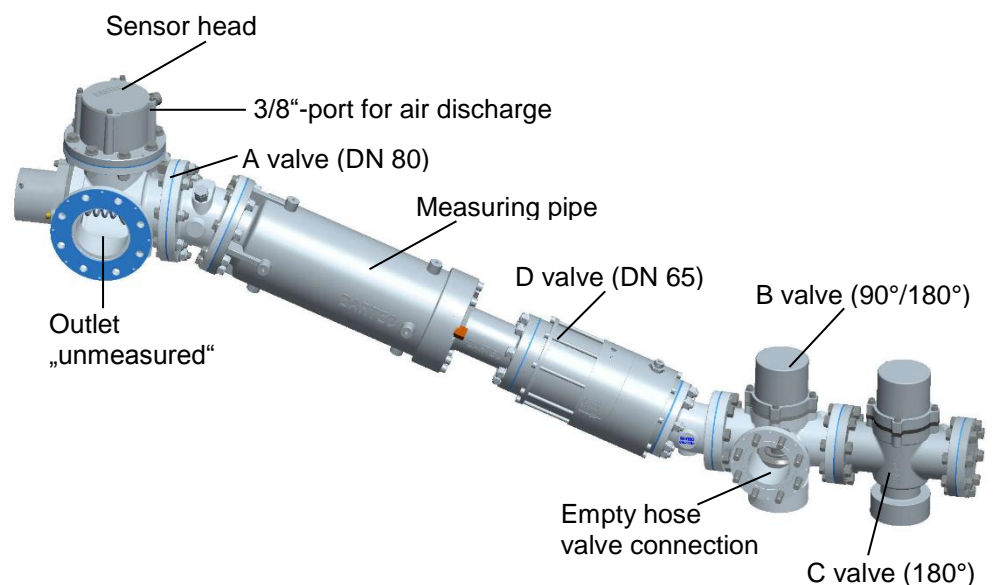
Correct filling is only possible if the air discharge port is above the pump discharge. This allows any air bubbles to rise up out of the pump into the measuring system and then escape through the air discharge port. The measuring section is designed to be downstream of the pump in the direction of flow.

Affix the low end of the measuring pipe (B valve 90°/180°) on the base or rear panel of the enclosure. M10 internal threads are provided for the fitting on the B valve and C valve.

There must not be any moment of force acting on the top intake. The pump and measuring pipe must be separated by a flexible connection.

The sensor head and measuring pipe are exchange parts. When installing the measuring section, take care to leave enough space on the rear of the measuring pipe to undo the screws and at least 6 cm above the sensor head to be able to remove the head. If there is no space above the sensor head, it may be necessary to remove the valve component entirely if the part is exchanged.

The pneumatic connections of the multifunctional valve (D valve) must be of a tamper-proof metal design.



4.19 Hose connections

A connection for unmeasured deliveries can be arranged on the valve component (at the top) via a pneumatically operated DN 80 straight-through valve (A valve).

The output for an empty hose can be arranged via a pneumatically operated straight-through valve on the 90° outlet of a 90°/180° valve (B valve, order no. 285388) or via an additional 180° valve (C valve, order no. 285389). A pressure-equalising valve with butterfly damper must be used for the empty hose valve.

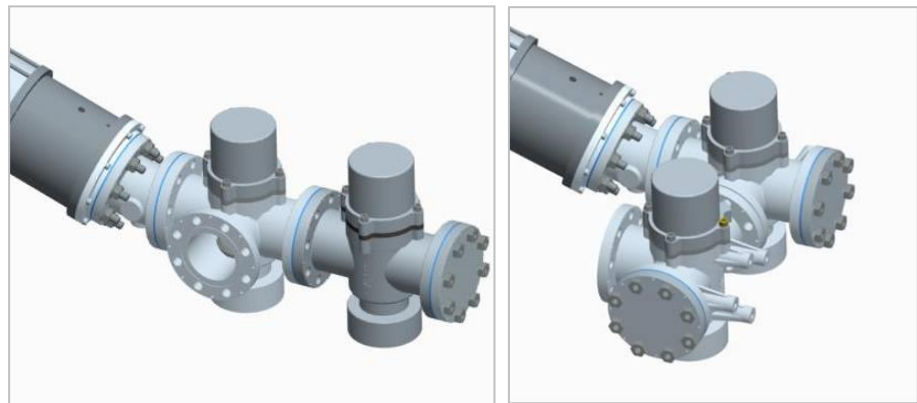
Full hose connections are possible on the valve outlets with the 2" thread.

Any combination of 90°/180° valves (B valves) and 180° valves (C valves) is possible depending on requirements (see examples).

The maximum possible set-up is three full hoses, one empty hose and a connection for unmeasured deliveries.

On vehicles without an empty hose and only one full hose, this full hose can be mounted directly on the lower manifold without an additional pinch valve. The D valve and the full hose valve must be pneumatically connected on this design (see pneumatic diagram).

The pneumatic connections of the pinch valves must be of a tamper-proof metal design.



Please note that, on systems with residue removal function, the full hose connections must be at the lowest point and running downwards.

4.20 Pump

The system is designed to be run on a rotary pump. Other types of pump have not been approved at present.

The product line must rise from the pump discharge towards the measuring system so that, with standard vehicle tilts, the air will be able to rise into the measuring section during the filling process and be carried out from there.

4.21 Air discharge

The filling process is carried out before every delivery and the measuring section is vented during this process.

The following equipment is required for the venting process:

- Approx. 5-litre surge tank with level indicator, top-mounted exhaust air filter and an outlet with shut-off valve.
- Connection with pneumatically controlled valve from the connection on the sensor head to the surge tank.
- Solenoid valve to control the pneumatic valve.

Hydraulic lines are recommended for the connections. The valve might be an axial valve type 4202, for example, supplied by Legris.

When the filling process is being carried out with the pump running, a flow reduction must be built in between the air discharge port and the bleed valve (e.g. with 6 x 1mm hydraulic line).

The bleed valve must be fitted near to the sensor head to minimise the amount of product delivered during the filling process.

Alternatively the air can be discharged into the tank. To do this, it is necessary to select the tank by means of additional valves controlled together with the relevant foot valves. Measures must be in place to ensure the necessary pressure equalisation!

A separate surge tank is recommended if you are running a trailer intake line in order to prevent the mixing of products during the filling process.

4.22 Residue removal

The residue removal facility is optional and need not be fitted if not required.

The following additional equipment is also required for the residue removal function:

- Separate pressure regulation unit, set to 1.5 bar
- Connection with non-return valve and solenoid valve from the pressure regulation unit to the air discharge port on the sensor head. T-fitting for connection to vent pipe
- Connection with pneumatically controlled valve from the air discharge port on the sensor head to the header pipe. Another T-fitting for connection to vent pipe
- Connection with residue removal pump and pneumatically controlled valve from the pump sump to the upper elbow of the measuring system. The residue removal pump must achieve a minimum flow rate of 40l/min during the residue removal process to meet the specification on the type examination certificate
- Suitable relay for actuation (e.g. 40 A switching current with suppressor diode)
- Separate power supply to residue removal pump
- 4 solenoid valves to control the pneumatic valves and to vent the control blocks
- Additional vent fitting to bleed the measuring pipe

Pipes with a nominal diameter of $\frac{3}{4}$ " are recommended for the residue removal line from the pump sump to the measuring section. The valves might be axial valves type 4202, for example, supplied by Legris.

There is a risk that oil products will get into the compressed air supply through the non-return valve when it is open, therefore the non-return valve should be above the supply point on the sensor head and should have an opening pressure of 0.5 bar in order to prevent this from happening. The air inlet should have an installed diameter of 8 mm.

The residue removal process is only possible with the pump upright and the foot valves closed. It is essential to use pressure-equalising foot valves. There are outputs on the Compact Controller which are used to switch off the motor and vent the control blocks of the foot valves.

4.23 Trailer intake line

If the vehicle has a trailer intake line, this must be shut off by a straight-through valve upstream of the pump during the residue removal process. Like the trailer itself, the residue is not removed from the trailer intake line.

The recommended way to supply the straight-through valve is by means of a control block which can be "discarded" (output 9) by the Compact Controller, together with the control blocks for the foot valves, before the residue removal process.

5 Printer, type 6881-30

Order no.: 235934



Attention:

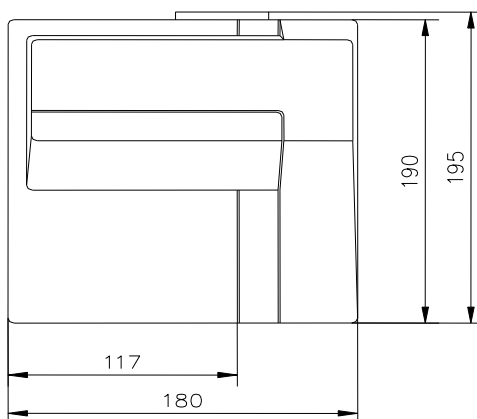
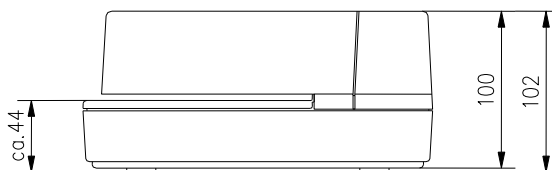
The printer and the printer holder must be protected from moisture!

5.1 Technical data

Device-specific data	
Printing format	Alphanumerical character set with 96 ASCII characters (font 5 x 7 / 7 x 7) 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

Electrical data	
Power supply	DC 24 V \pm 10 %, max. 1.0 A, ripple \leq 150 mV eff.
Connection	25-pole socket (RS 232), 3-pole plugs (power supply DC 24 V)
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 (\cong 2 kg)
Housing	Plastic tabletop housing, grey

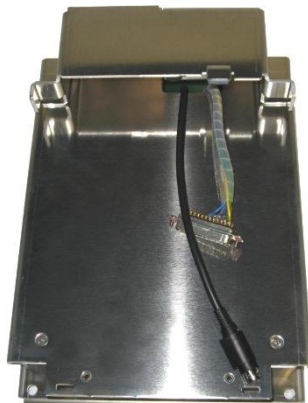
5.2 Dimensions of printer, type 6881-30



db68811.dwg

5.3 Printer mount, type 6961-100

Order no.: 279562



Attention:

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

5.3.1 Printer mount connection

Connection of printer mount without series

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

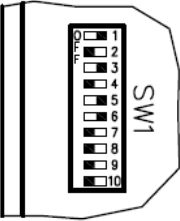
Connection of printer mount from series A

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)

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



6 Form printer, 24 V, 3003, type 6863-20

Order no.: 290938



Attention:

The printer must always be turned on separately with a button!

The printer and the printer holder must be protected from moisture!

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

The printer must be powered externally!

6.1 Technical data

Device-specific data	
Print format	Alphanumeric and graphical characters with 19 international character sets
Fonts	Roman, Sans Serif, Courier, Bold, Prestige, Script, Orator, Gothic, OCR-A, OCR-B; bar codes: UPC/A, UPS/E, EAN8, EAN13, Code 39, Code 128, Interleaved 2/5, Industrial 2/5
Resolution	180 x 120 dpi (draft), 180 x 360 dpi (LQ)
Pitch	10 cpi (80 characters per line) 12 cpi (96 characters per line) 15 cpi (120 characters per line) 17.1 cpi (136 characters per line) 20 cpi (160 characters per line) 24 cpi (192 characters per line) (depending on emulation)
Line spacing	3, 4, 5, 6, 8 lines per inch
Print head	24 pin; working life 250 million characters
Memory	64 kB
Standard printing language	IBM 2390+ (includes ProPrinter XL24E), Epson ESC/P2, Intermecc 6820
Printing method	Serial dot matrix
Printing speed	At 10 cpi: 400 characters per second (draft); At 12 cpi: 480 characters per second (draft); At 10 cpi: 133 characters per second (letter)

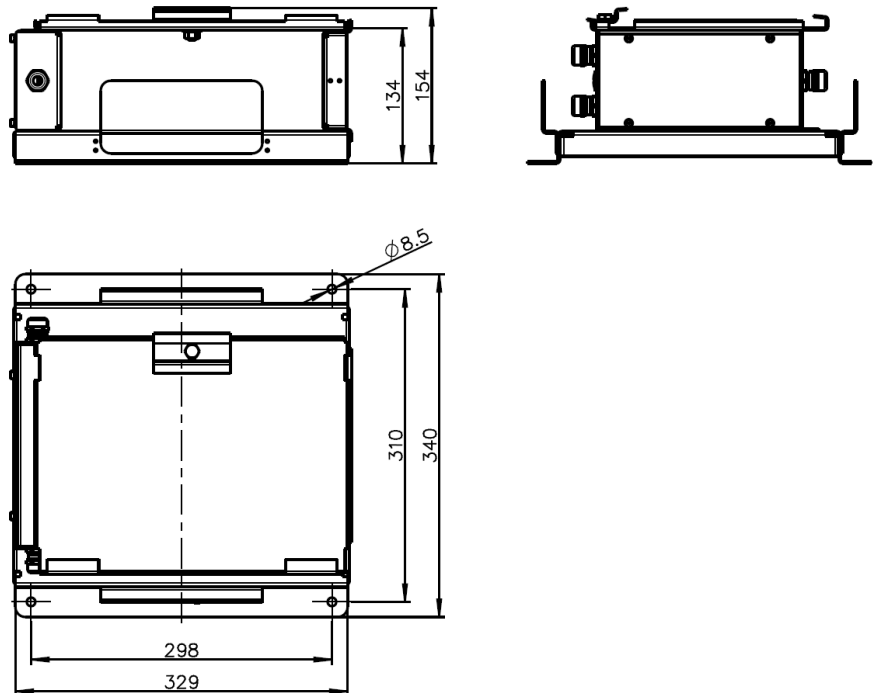
Paper	Plain and form sets Paper width: 102-167 mm Paper length: > 102 mm (fanfold); 76-364 mm (single sheet) Print width 216 mm max. Number of copies: 1 original + 3 duplicates
Paper weight	47 ... 81 g/m ² (single sheet) 40 ... 64 g/m ² (multi-copy forms)
Standard paper transport	Push tractor for fanfold paper, friction for single sheet, automatic advance to tear-off edge, parking position
Ink ribbon	Ribbon cartridge, black, 4 million characters
Interfaces	Serial interface (RS 232), USB 2.0 (full mode) Optional interfaces: Bluetooth (version 1.2), W-LAN (IEEE 802.11b/g)
Electrical data	
Input voltage	10.5 - 28 V DC, max. 10 A, connector for vehicle on-board supply; or AC adapter 100 - 240 V ± 10 %, 47-63 Hz, 3.2 A
Power consumption	Power Off mode: 0.3 W Sleep mode: 2.0 W Standby: 7.0 W Printing: max. 150 W
Printer driver	Windows 2000, XP (ESC/P2)
Ambient conditions	
Operating temperature	-20° C ... +60 °C
Storage temperature	-30° C ... +65 °C
Protection class	IP 22
Climate class	JUF as per DIN 40040
Mechanical data	
Dimensions	140 x 365 x 320 mm (H x W x D)
Weight	Approx. 65 N (= 6.5 kg)

6.2 Printer mount, type 6962-100

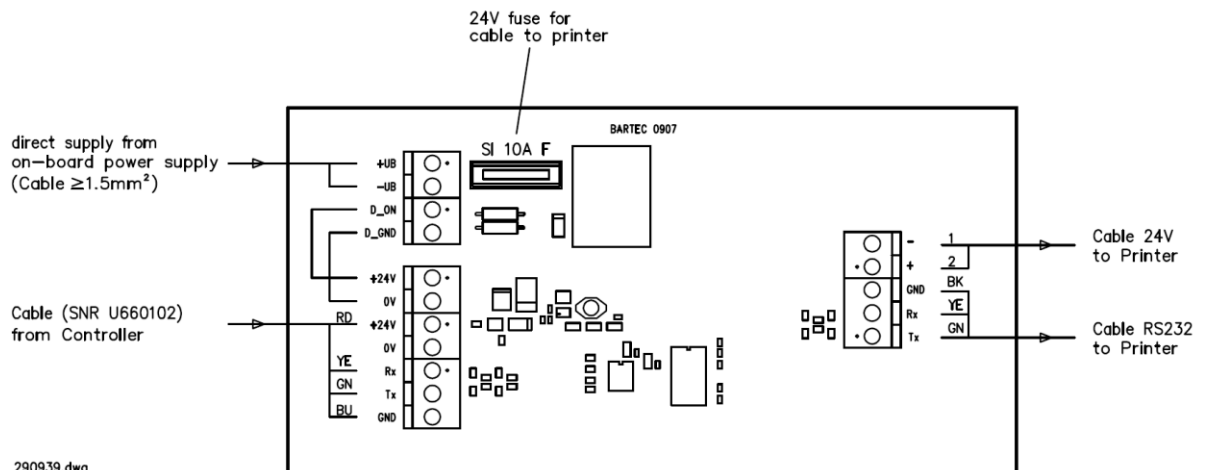
Order no.: 290939



6.2.1 Dimensions of printer mount



6.2.2 Connection of printer mount



290939.dwg

Controller
Terminal assignment:

Printer mount	Controller
Signal	Colour Terminal
+24V	red 8
Rx	yellow 9
Tx	green 11
GND	blue 12

Printer
Terminal assignment:

Signal	Colour
-	1
+	2
GND	black
Rx	yellow
Tx	green

7 Additive injection unit, type 6775-11

Order no.: U8911700677511

7.1 Additive injection unit series C



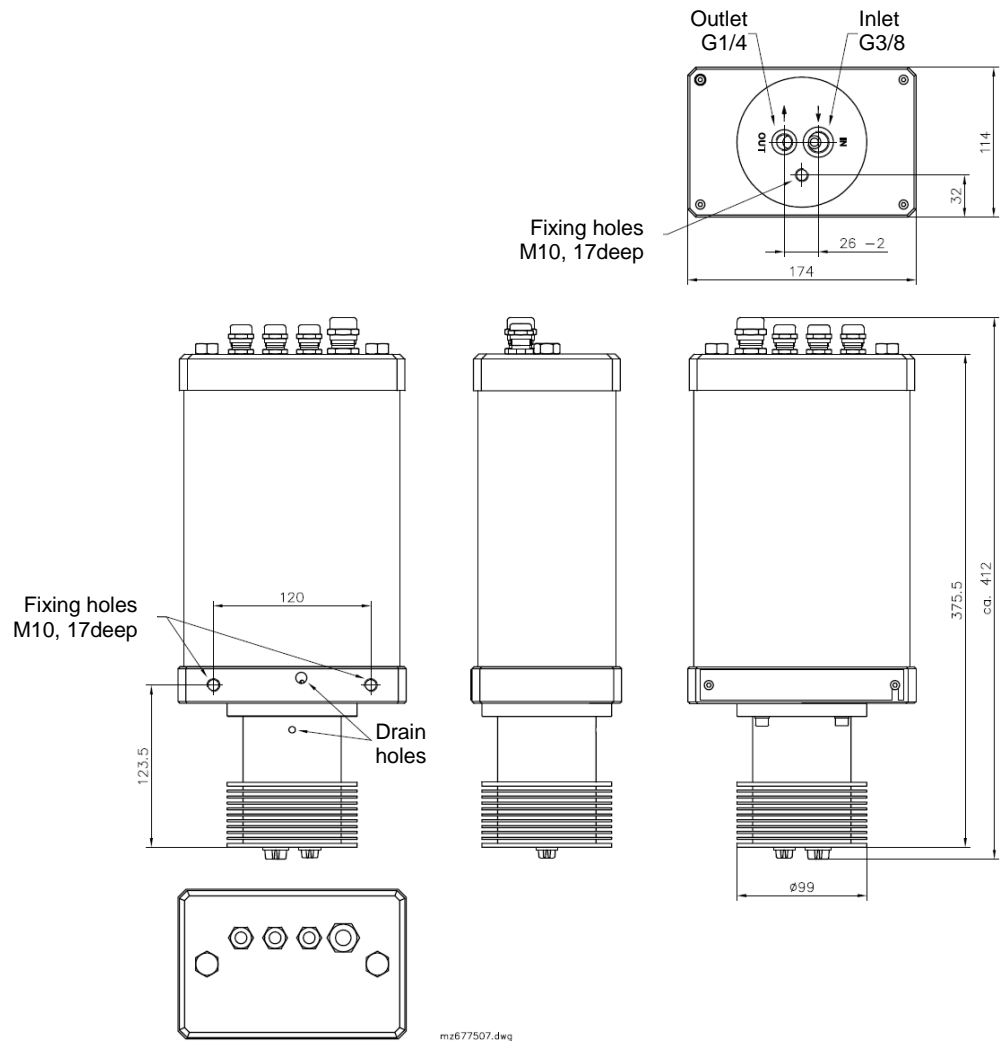
Attention:

The additive injection unit must have an external power supply!

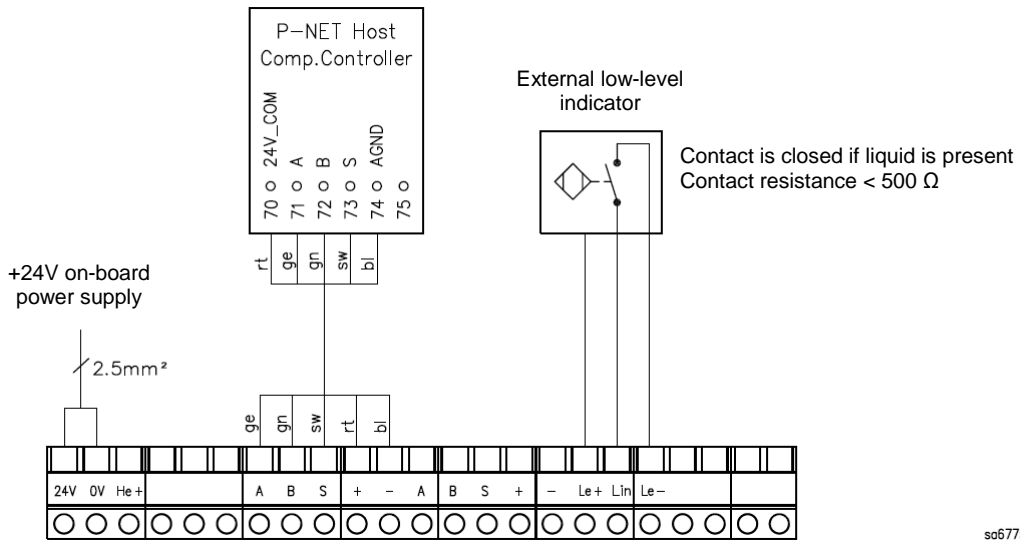
7.1.1 Technical data

Electrical data	
Pumping system	
Max. delivery rate	2 l/min
Max. delivery pressure	2 bar
Viscosity range	2 ... 30 mPa*s
Accuracy	± 5 % volumetric (up to max. 1 bar counter pressure)
Max. suction lift	1 m
Connections	
Inlet	3/8" threaded hole
Connecting pipe	Inside diameter ≥ 10 mm/in V2a
Outlet	1/4" threaded hole
Connecting pipe	Inside diameter ≥ 6 mm/in V2a
Electrical connection	Internal screw terminals, wire cross section ≤ 2.5 mm ² , cable inlet 3 x PG 9 and 1 x PG 13,5
Interfaces	Wire cross section ≤ for motor = 2.5 mm ² Fieldbus interface P-NET (P-NET ID no. 5929)
Product data	
Housing	Strong aluminium housing, uncoated, splashproof
Dimensions	174 x 114 x 398 mm
Protection type	IP 65
Fitting	Horizontal (3 x M10 threaded holes provided for possible fitting)
Ambient conditions	
Operating temperature	-20 ... +50 °C
Storage temperature	-25 ... +60 °C
Climatic category	JWF as per DIN 40040

7.1.2 Dimensions



7.1.3 Wiring



so677503.dwg

7.2 Additive injection unit series D



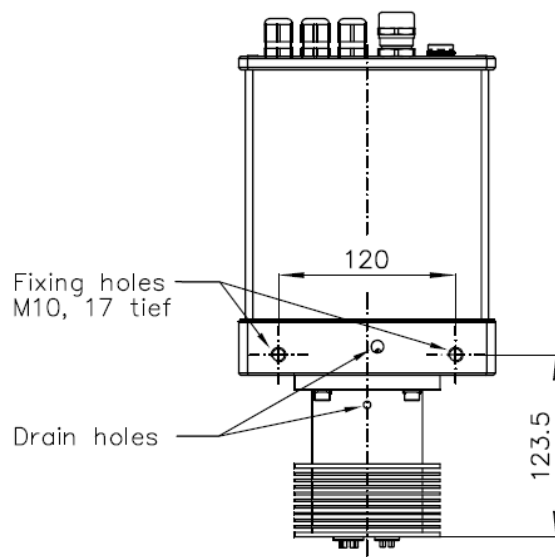
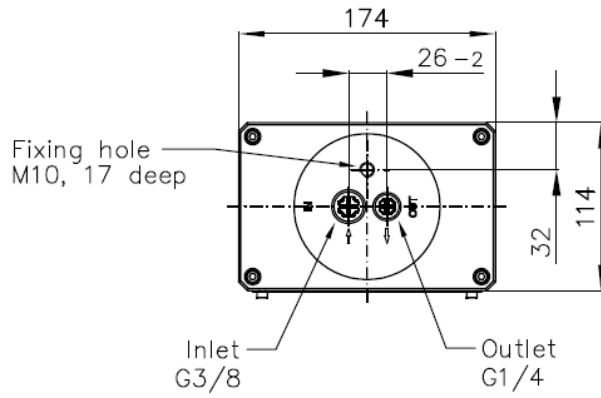
Attention:

The additive injection unit must have an external power supply!

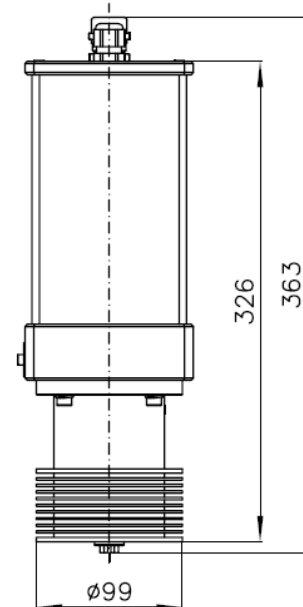
7.2.1 Technical data

Electrical data	
Pumping system	
Max. delivery rate	2 l/min
Max. delivery pressure	2 bar
Viscosity range	2 ... 30 mPa*s
Accuracy	± 5 % volumetric (up to max. 1 bar counter pressure)
Max. suction lift	1 m
Connections	
Inlet	3/8" threaded hole
Connecting pipe	Inside diameter ≥ 10 mm/in V2a
Outlet	1/4" threaded hole
Connecting pipe	Inside diameter ≥ 6 mm/in V2a
Electrical connection	Internal screw terminals, wire cross section ≤ 2.5 mm ² , cable inlet 3 x M16 and 1 x M20
Interfaces	Wire cross section ≤ for motor = 2.5 mm ² Fieldbus interface P-NET (P-NET ID no. 5929)
Product data	
Housing	Strong aluminium housing, uncoated, splashproof
Dimensions	See scale drawing
Protection type	IP 65
Fitting	Horizontal (3 x M10 threaded holes provided for possible fitting)
Ambient conditions	
Operating temperature	-20 ... +50 °C
Storage temperature	-25 ... +60 °C
Climatic category	JWF as per DIN 40040

7.2.2 Dimensions

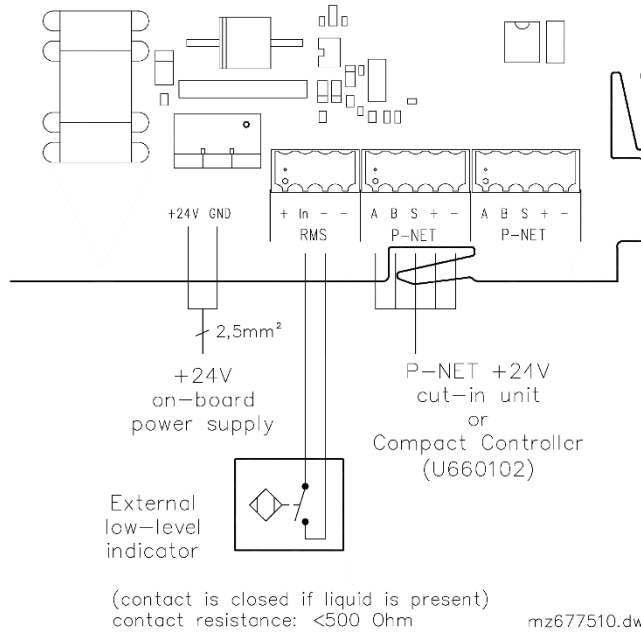


mz677510.dwg

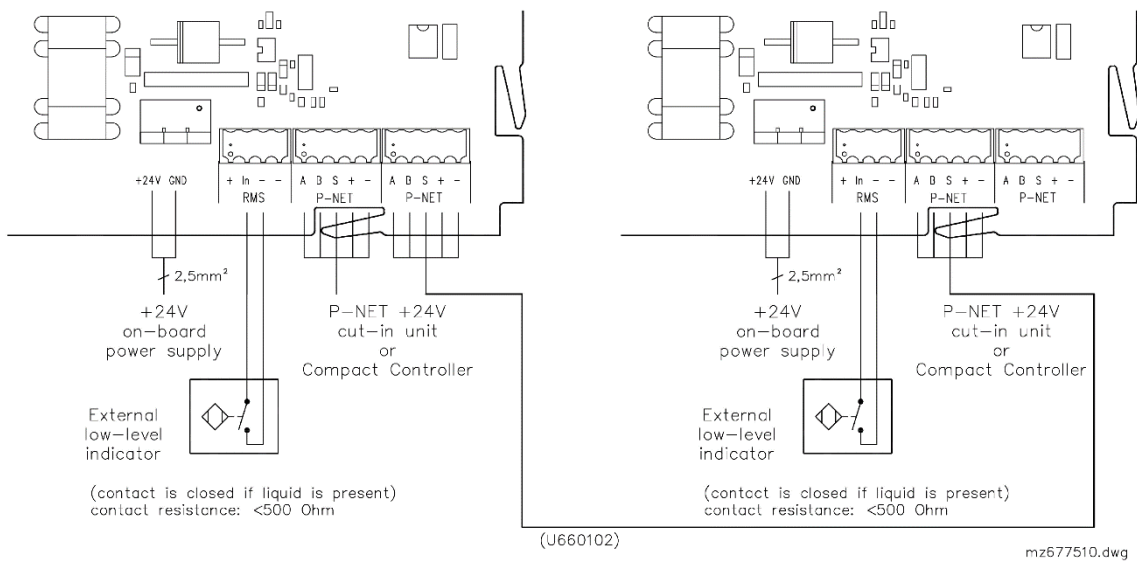


7.2.3 Wiring

7.2.3.1 Simple additive

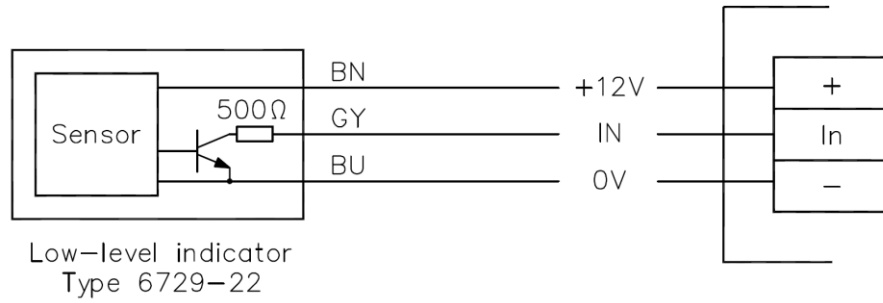


7.2.3.2 Multiple additive



7.2.3.3 Low-level indicator type 6729-22

BARTEC low-level indicator connection:



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8 Wireless overflow prevention, type 6728-70, series C

Order no.: 207820



The wireless or wired overflow prevention facility needs its own solenoid valve to interrupt the compressed air for the "V" solenoid valve (D valve fully open) and, where applicable, the "U" solenoid valve ("Unmeasured" hose valve).

The + terminal of the overflow protection solenoid valve must be connected to detect the switching status on the Controller (input 5).

To replace the battery pack (order no. 310722) the allen screws (see illustration) must be opened.

See also operating instructions AS-Funk_Serie C_BA_010226.

9 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.



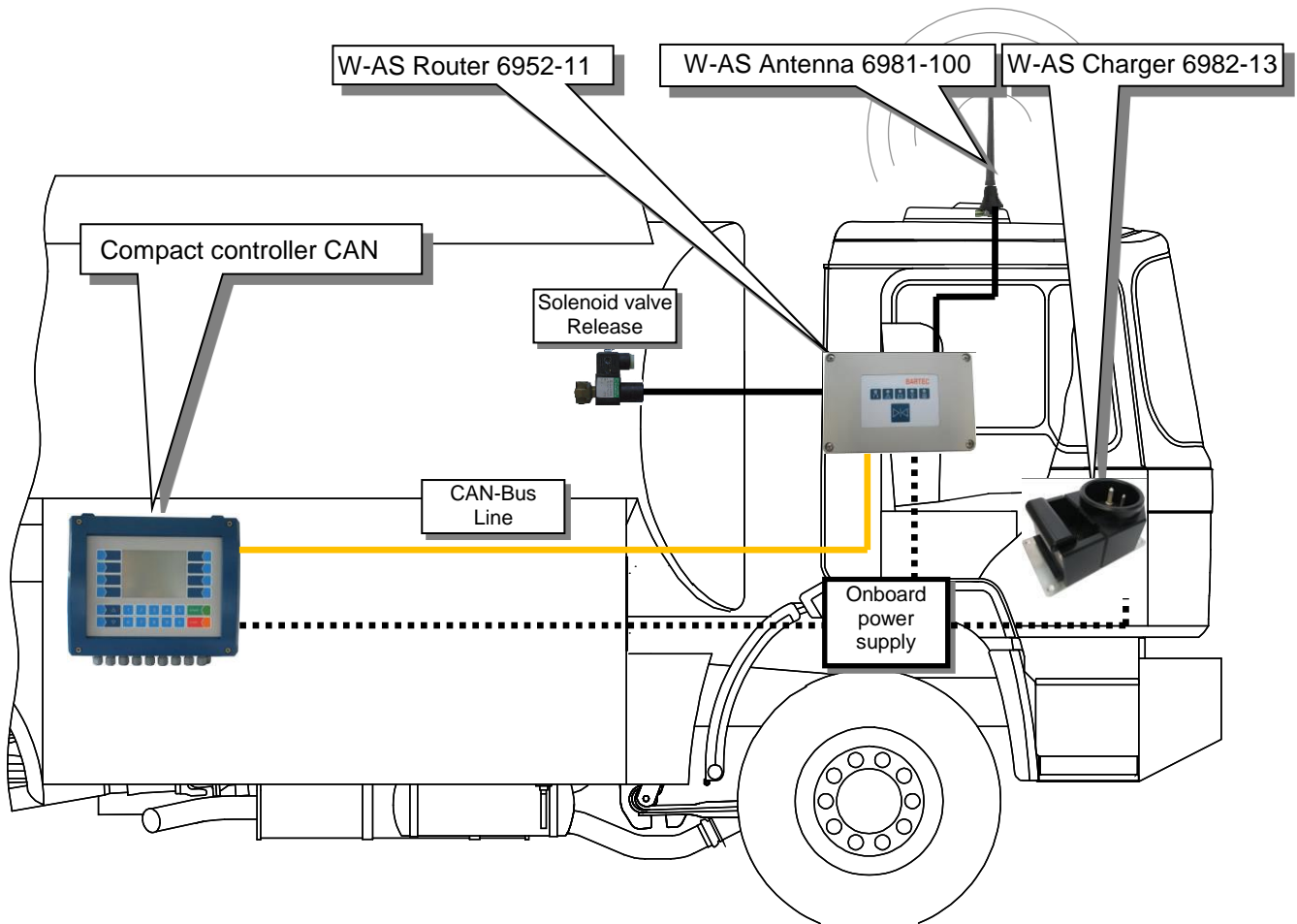
CAN bus termination activated or terminating resistors switched on.



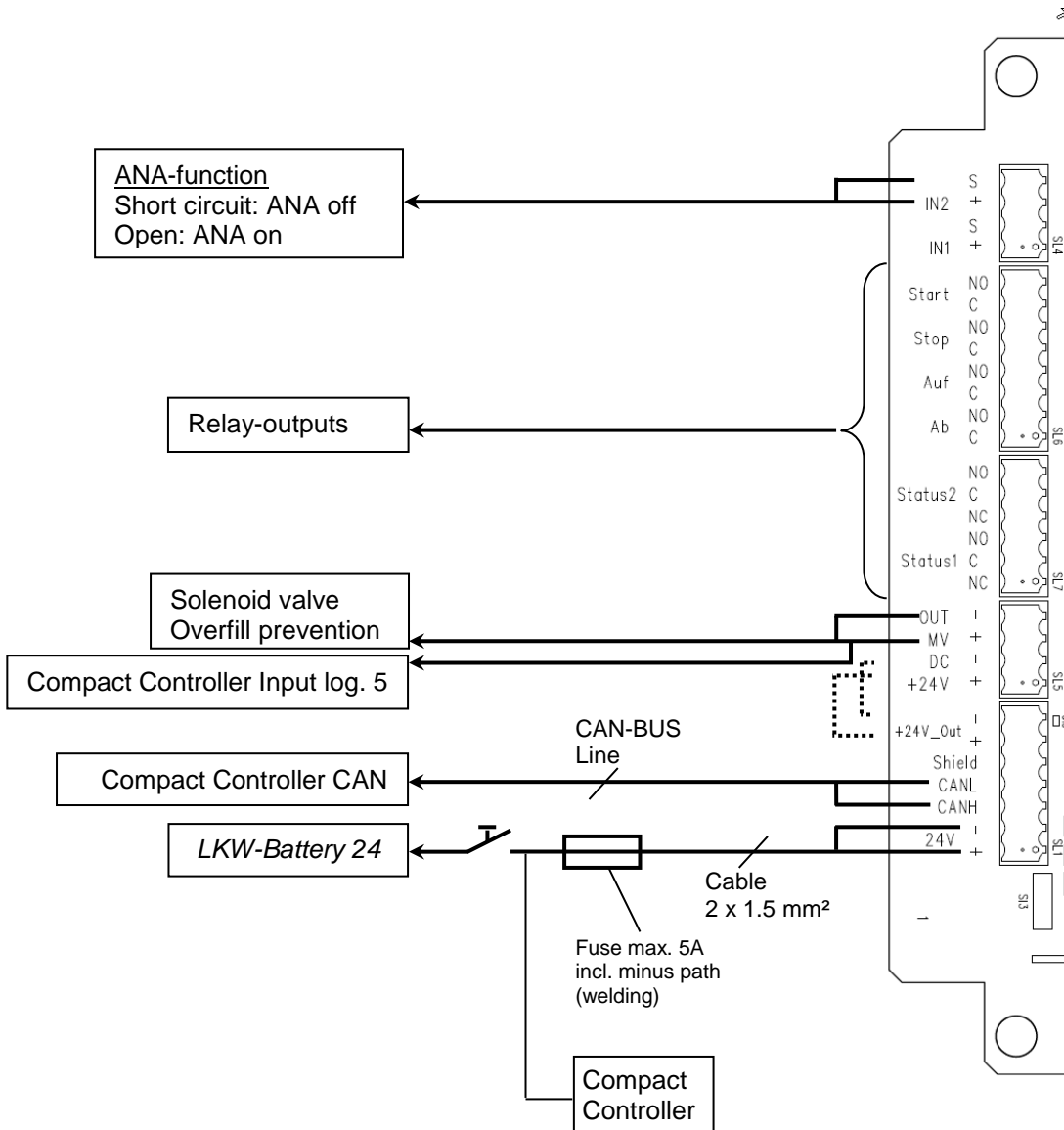
Attention:

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

9.1 W-AS system components



9.2 Wiring



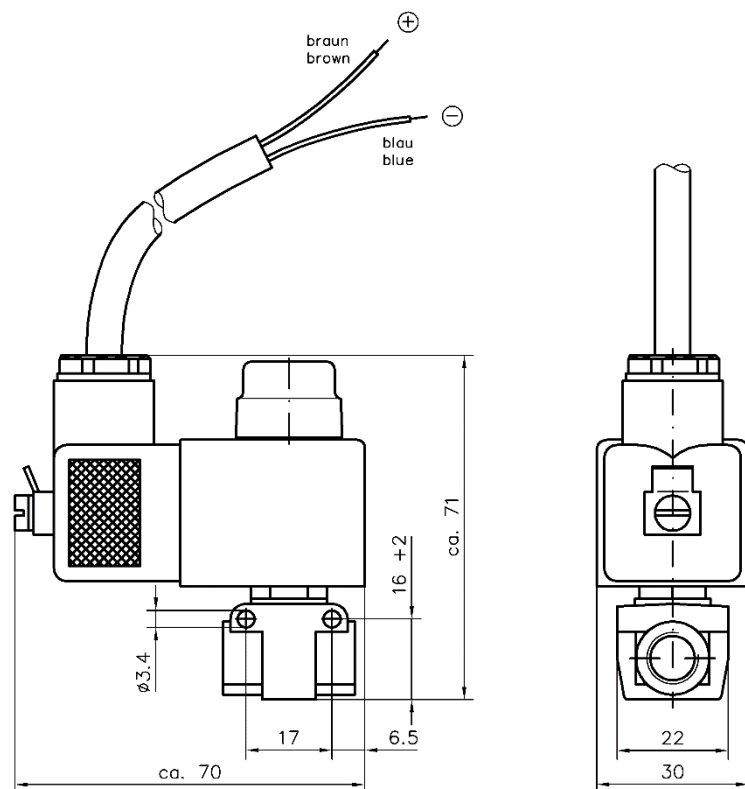
Terminals Compact Controller 6942-10 series: C	W-AS Router 6952-11
59 (24V)	
60 (CANH)	CANH
61 (CANL)	CANL
62 (GND_I)	
63 (shield)	
96 (IN 5)	MY +

10 3/2-way solenoid valve, A1, 24 V

Order no.: U891496225

10.1 Technical data

Pressure	0 - 10 bar
Ambient temperature	-15...+50°C
Auxiliary power	DC 24 V \pm 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



mnr\496225.dwg



Attention:

Connection to plus and minus in the Compact Controller required!

11 GPRS data modem type Telit GT864-Quad

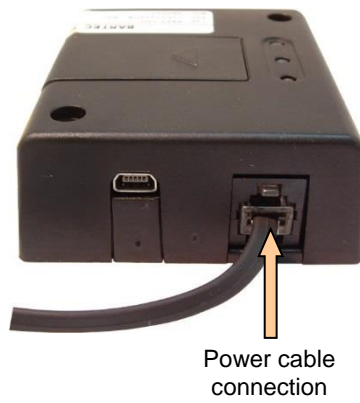
- The modem housing (DGND) must not contact the chassis at any point. For this, the modem is fitted with the isolation set.
- Please also check the floating ground of the aerial adapter or the aerial.
- The shield bar must also not be in contact with the aerial adapter or the modem housing.
- The length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

11.1 Technical data

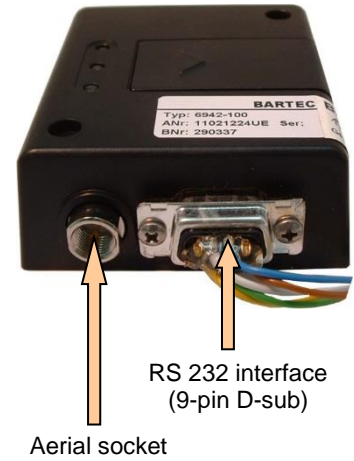
Operating voltage	5 - 36 V DC	
Dimensions	77 mm x 67 mm x 26 mm	
Weight	Approx. 100 g	
Mounting	With two oval countersunk head screws M 3x8 mm	
Operating temperature	-30 °C ... +75 °C	
Storage temperature	-40 °C ... +85 °C	
Ordering details		
Designation	Order number	
GPRS data modem type Telit GT864-Quad	304264	

11.2 Connections

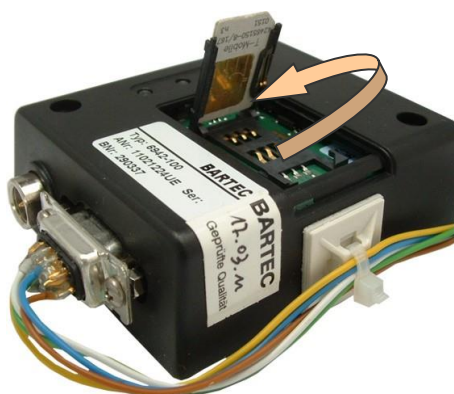
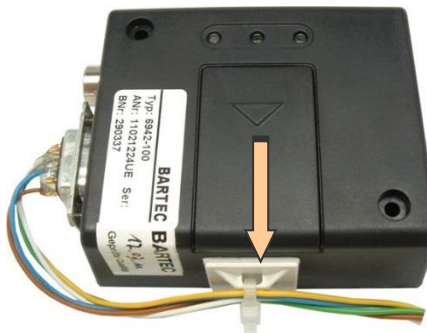
Front view



Rear view



Inserting the SIM card



11.4 Magnetic antenna

Order no.: 360422

Ø 60mm / H: 13 mm
Antenna length: 5 m



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.



11.5 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):

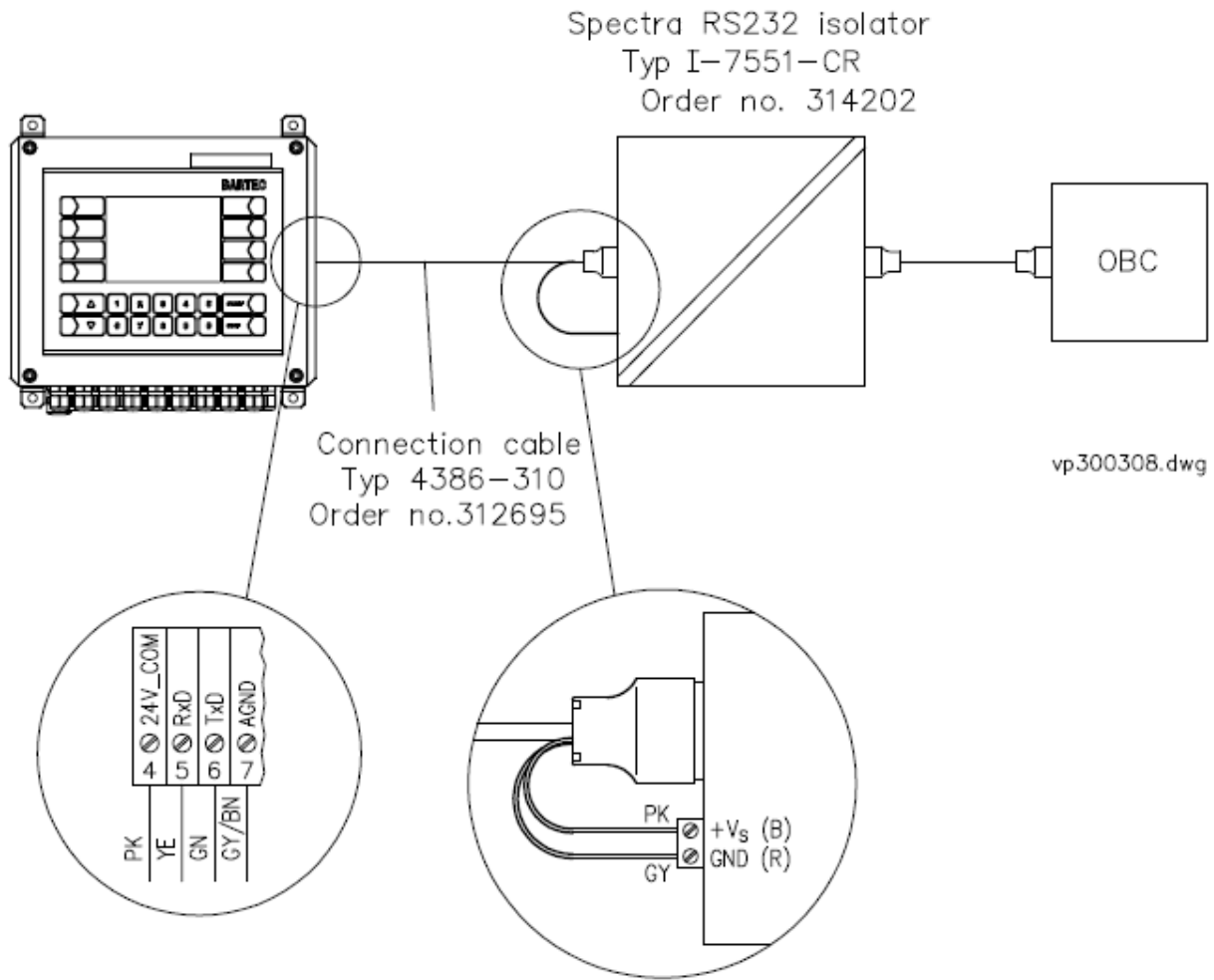
Service	Port	Description
FTP *1) (passive)	21 / all ports above 1023	Office link-up for Tiger MAK / PETRO and Petro 3003

Note:

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

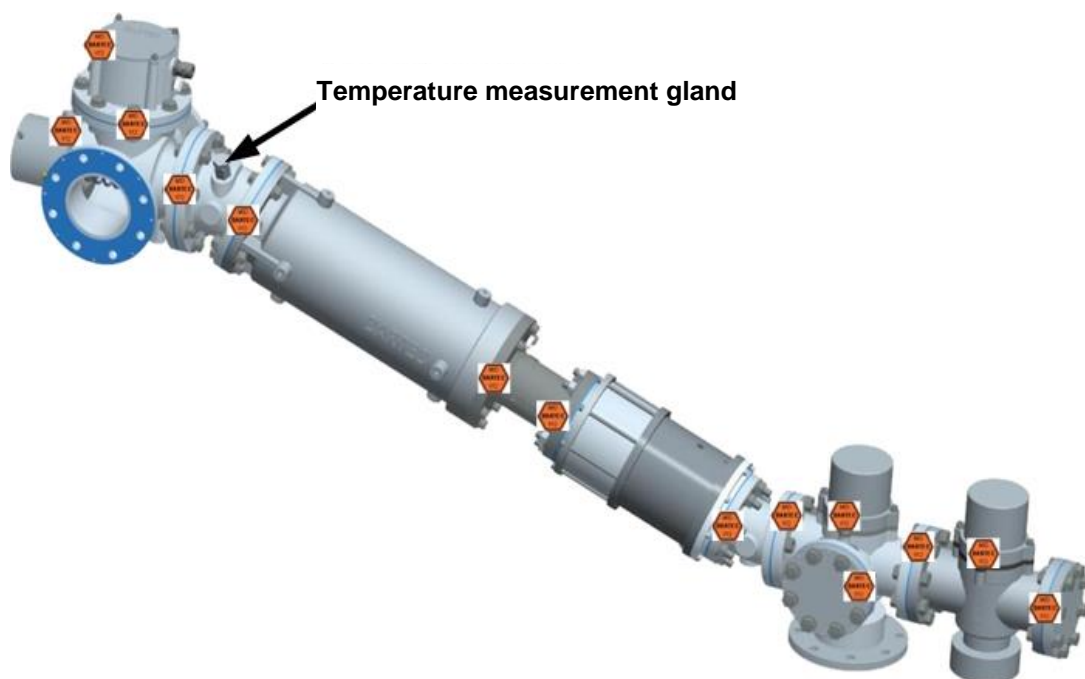
*1) FTP connections can also be protected by SSL. This is subject to the provider allowing FTP via SSL. Communications are then no longer in plain text but in SSL encryption form!

11.6 Wiring of 3003 FTL system



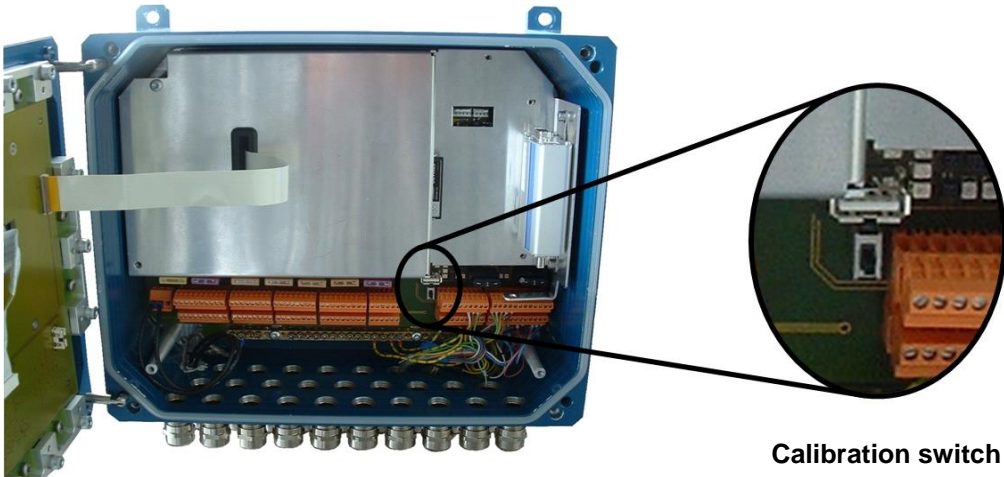
12 Seal diagram

12.1 TIGER 3003 measuring section seal diagram



12.2 TIGER 3003 Compact Controller seal diagram

12.2.1 Seal diagram Compact Controller type 6942-10 until series B



Calibration switch

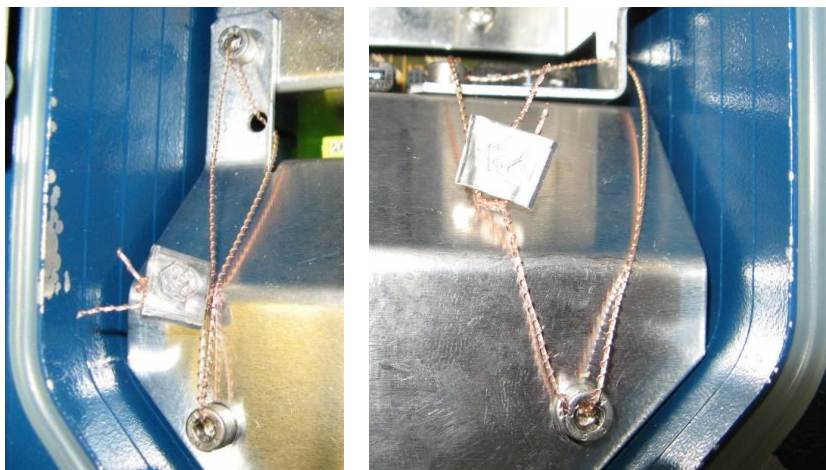


closed

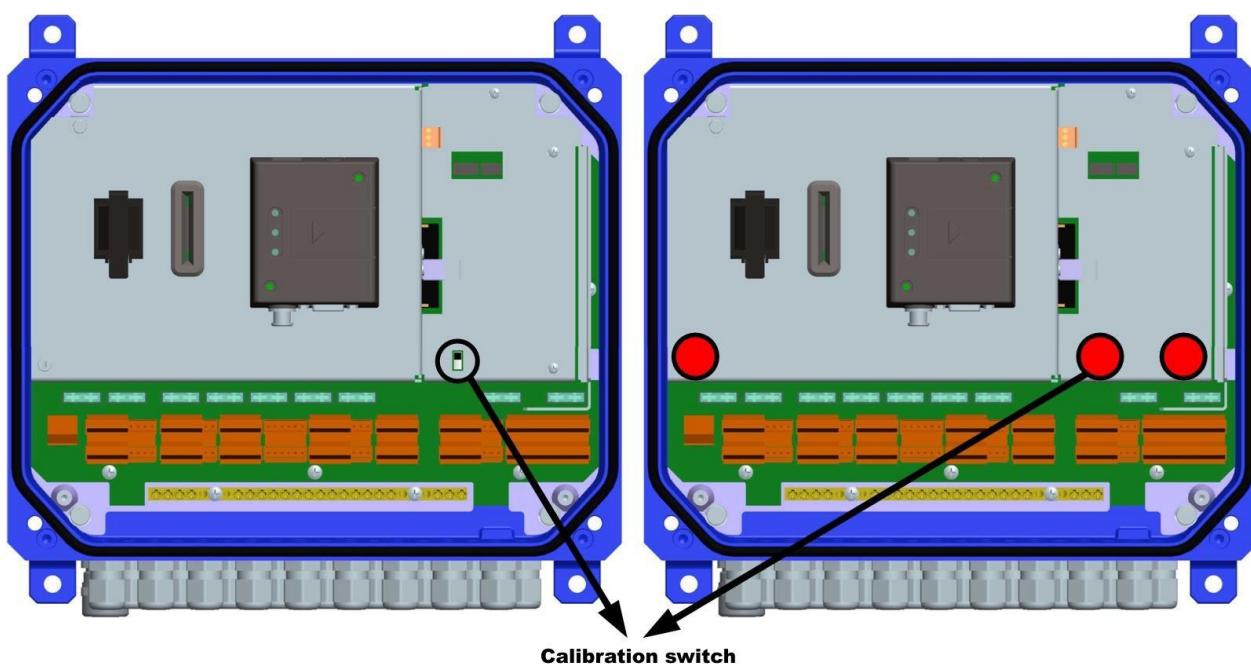



open





12.2.2 Seal diagram Compact Controller type 6942-10 from series C



Belay points - Compact Controller		
Calibration switch		
open Access to measurement parameter		closed No Access to measurement parameter
		Sealed with adhesive lable - calibration switch - cover
		