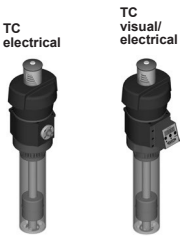
TankConditioner® TC
with Breather Filter, Float Switch and Temperature Monitoring System



1. TECHNICAL SPECIFICATIONS 1.1

UNIT CONSTRUCTION

The TankConditioner® TC is a multi-functional unit consisting of a fluid level and temperature monitoring system, an optional temperature display and a breather filter BF7 or BF 72.

1.2 FLUID LEVEL MONITORING

Values are measured using the float principle. For simple monitoring functions (e.g. pump protection or tank level monitoring) the fluid level monitoring device has two bistable switch contacts which can be turned through 180° for either N/O or N/C function. A resolution of 10 mm makes it easy to set the switch points to suit the requirements of the system. The switch points can also be displayed via 3 LEDs (green, yellow, red), if specially requested by the customer. Depending on the type of unit, the actual oil level can also be output as an analogue control signal for system control.

Oil level monitoring is maintenance-free for fluids which do not form a residue on the sensor tube during operation.

1.3 FLUID TEMPERATURE MONITORING

The thermal contact required for this is fitted to the end of the contact strip and therefore monitors the oil temperature in the lower part of the tank.

The normally closed contact responds at 70 °C and acts as an emergency cut-out. If switching functions are to be carried out in conjunction with temperature monitoring (to control an oil cooler, for example) then, depending on the model, up to 2 PNP switch outputs can either be programmed hysteresis-free from 0-100 °C, or can be output as an analogue control signal.

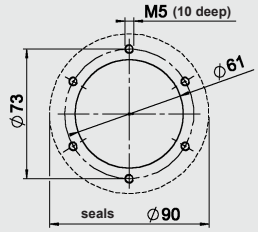
1.4 TANK BREATHER FILTER

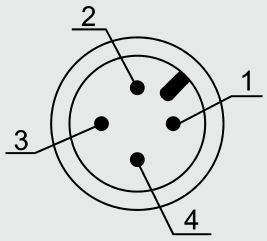
To meet the most likely customer requirements, the TankConditioner® TC is fitted with the BF 7 or BF 72 breather filter as standard.

The breather filter is designed in such a way that it is impossible to fill or top up the tank with hydraulic fluid via the filter housing (exception: version FABF). The TankConditioner® TC can be supplied without a port for a clogging indicator or with a visual-analogue clogging indicator. To make the breather filter even more maintenance-friendly, we recommend fitting a UBM type clogging indicator, which is easily visible and includes a memory function.The yellow reset button is used to reset the indicator after changing the element.

1.5 GENERAL TECHNICAL SPECIFICATIONS

Flange connection	DIN 24557/ Part 2: mounting hole Ø61
Installation position	vertical ±30°
Operating voltage	12V ... 30V DC
Electrical connection	Male: Series M12x1/ 4-pole IP67 For type S44 screened cables must be provided by the customer!
Filter element	3 µm
Air flow rate	BF 7: max. 900 l_N/min BF 72: max. 1200 l_N/min synthetic
Sensor tube / float / protective sleeve (option)	material / brass (optional stainless steel) max. 1 bar max. 100 °C
Nominal pressure	
Temperature of fluid	
Flange connection to DIN 24557 / Part 2	For pin assignment see Point 3. Dimensions





For further information, please see Point 3.

1.6 TANK FILLING OPTION

For simple applications the tank can be filled via the breather filter (see Supplementary Details code FABF). To protect the hydraulics a filler-strainer is built into the tank flange as a coarse filter. For high performance hydraulic systems we recommend the filling connection which allows the filling of filtered oil to be monitored (Supplementary Details FA34). The required quick release coupling is not supplied.

1.7 FILTER ELEMENTS

Contamination retention capacities in g

	Paper
BF 3 µm	
7 26.1	
72	52.2

1.8 SEALS

NBR (= Perbunan)
NBR and cork for version FA34

1.9 WAVE MOTION PROTECTION

Wave motion on the surface of the oil can affect the float and can therefore cause measurement errors, particularly in large tanks. A protective sleeve is therefore available in brass (type code 1.x) or stainless steel (type code 2.x) as an accessory for these applications.

1.10 FLOAT

To ensure compatibility with many standard hydraulic fluids, the TankConditioner® TC sensor tube and float are made from synthetic material and brass, with stainless steel as an option.

1.11 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

Brass version:

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743

Stainless steel version:

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids HFA, HFB, HFC and HFD

E 7.410.4/11.16

2. MODEL CODE (also order example)

TC P 7 F 3 UBM + D 1 . X /-S12-V250 -SSR

2.1 COMPLETE UNIT

Instrument type
TankConditioner® TC

Filter material
P Paper

Size of breather filter
7, 72

Connection
F flange (to DIN 24557 / Part 2)

Filtration rating in µm
3

Type of clogging indicator
W without port, no clogging indicator
UBM with visual vacuum indicator

Type of temperature monitoring
C electrical
D visual/electrical

Type code
1 material of float: polyurethane; material of sensor tube: brass
2 material of float and sensor tube: stainless steel

Modification number
X the latest version is always supplied

Supplementary details

Required: Switch assignment:

Switch	Fluid level	Temperature
S	1	2
S	4	4

1 = fluid level contact; normal setting: L1 = rising N/O, L2 = rising N/C
2 = N/C, 4 = measuring range 4–20mA

V250 Length of the sensor tube = 250 mm
V370 Length of the sensor tube = 370 mm
V520 Length of the sensor tube = 520 mm

Optional: SSR wave protection sleeve
(material, brass or stainless steel, is indicated by type code 1 or 2,
i.e. 1 = brass / 2 = stainless steel)
FA34 filling adapter with G ¾ connection (including wave protection sleeve)
FABF filling via breather filter (including wave protection sleeve)
LED optional LED display for fluid level (green = operating;
yellow = warning; red = critical)
(for this option, please contact HYDAC)

2.2 REPLACEMENT FILTER ELEMENT

0007 L 003 P

Size
0007, 0072

Type
L

Filtration rating in µm
003

Filter material
P Paper

2.3 PREFERRED MODELS

Out of all the different models of TankConditioner® TC, with all the options available to the customer, the following are designated "standard models":

- TC P 7 F 3 UBM+C 1.0 /-S12-Vxxx
- TC P 7 F 3 UBM+D 1.0 /-S12-Vxxx
- TC P 7 F 3 UBM+C 1.0 /-S12-Vxxx-FABF
- TC P 7 F 3 UBM+D 1.0 /-S12-Vxxx-FABF
- TC P 7 F 3 UBM+D 1.0 /-S12-Vxxx-FA34
- TC P 7 F 3 UBM+C 1.0 /-S44-Vxxx-FA34

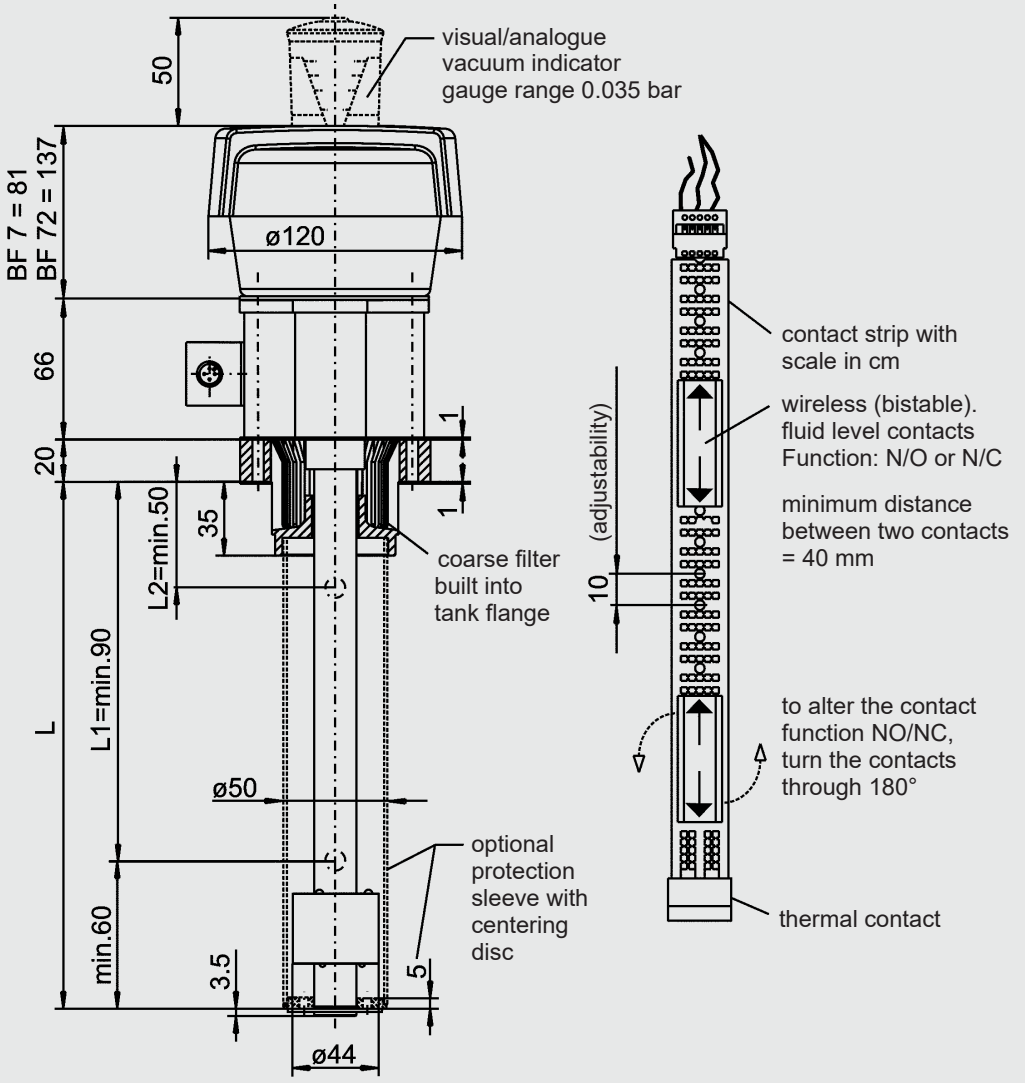
3. DIMENSIONS and TECHNICAL SPECIFICATIONS

Tank requirements

1. In the filter contact area, the tank flange should have a maximum flatness of 0.3 mm and RA 3.2 µm maximum roughness.
2. In addition, the contact area should be free of damage and scratches.
3. The fixing holes of the tank flange must be blind, or stud bolts with threadlocker must be used to fix the filter. As an alternative, the tank flange can be continuously welded from the inside.
4. Both the tank sheet metal and/or the filter mounting flange must be sufficiently robust so that neither deform when the seal is compressed during tightening.

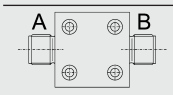
3.1 TANKCONDITIONER® TC WITH SUPPLEMENTARY CODE "S12"

Version TC...**C 1.x /-S12-Vxxx...(brass/synthetic material)**

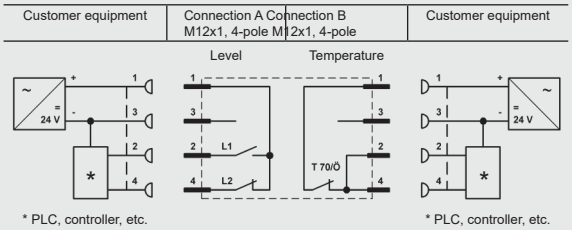


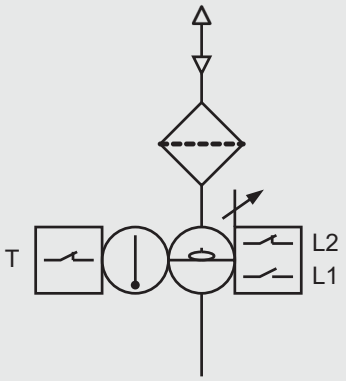
TECHNICAL SPECIFICATIONS

Level switch points	bistable N/O / N/C Max. 2 can be set
Resolution	10 mm
Hysteresis	4 mm
Thermal contact	T70 °C / N/C
Switching capacity	10W / VA max 30 V / DC max.
Switching current	1 A max.

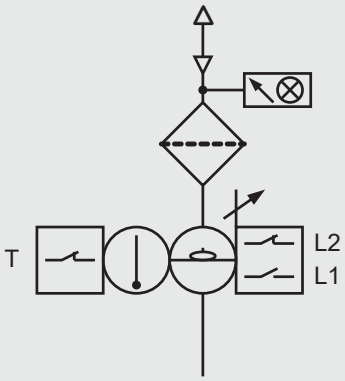


Male connections	
Connection A	Connection B
Level contact(s): 1 = 12V-30V DC 2 = level L1 (+UB) 3 = not connected 4 = level L2 (+UB)	Temp. contact(s): 1 = 12V-30V DC 2 + 4 = T70 / opens (+UB) 3 = not connected





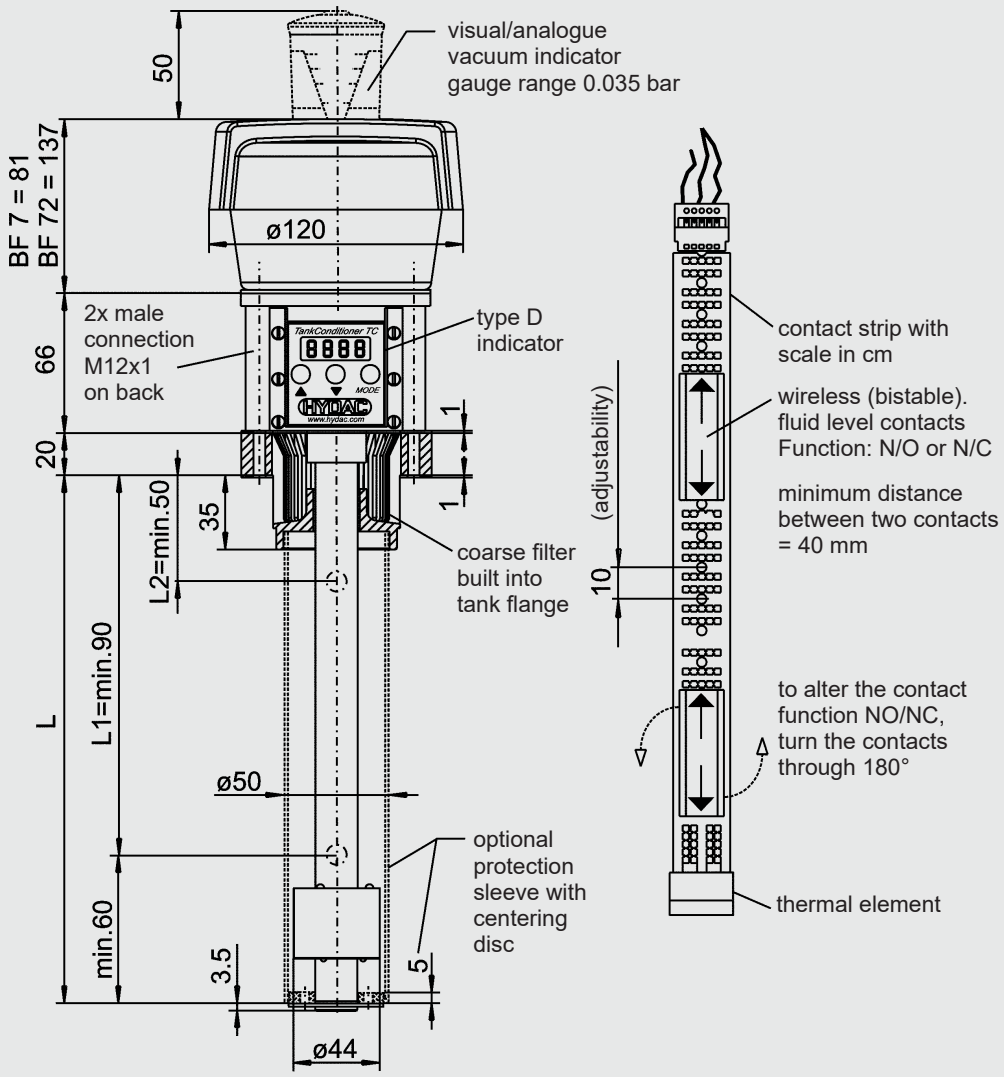
TC...W+C../-S12...



TC...UBM+C../-S12...

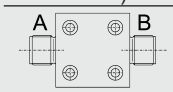
Factory normal setting for type S12: "pump protection monitoring"				
Switch points	Sensor tube length L		Contact function of fluid level contacts	Possible application
220	250	370 L2		
150	270		NC - rising N/C	Warning at "min. tank level"
	190	310 460	NO - rising N/O	Cut-out at "min. tank level"

Version TC...**D 1.x /-S12-Vxxx... (brass/synthetic material)**



TECHNICAL SPECIFICATIONS

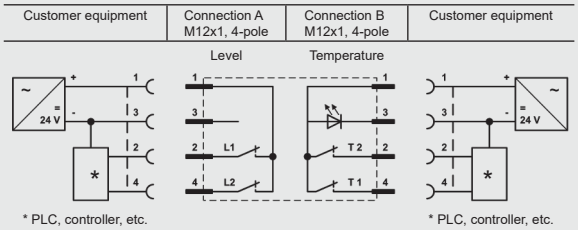
Level switch points	bistable N/O / N/C Max. 2 can be set
Resolution	10 mm
Hysteresis	4 mm
Thermal element	Pt100
Temp. switch points	Max. 2 can be set
Hysteresis	1 – 99 K can be set
Switching capacity	10W / VA max 30 V / DC max.
Switching current	1 A max.
Display for temperature monitoring	LED 3-digit (4-digit w/o unit of meas.)
Indication range	-20 °C to +120 °C (-4 ° to +248 °F)

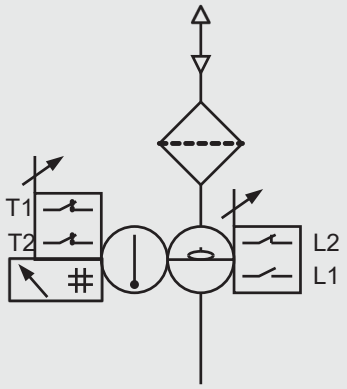


Male connections

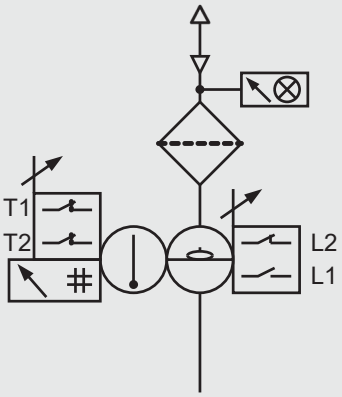
Connection A Connection B Level contacts:

Temperature contacts: 1 = 12V-30V DC 1 = 12V-30V DC 2 = level L1 (+UB) 2 = temp. 2 (+UB) 3 = not connected 3 = GND (0V) 4 = level L2 (+UB) 4 = temp. 1 (+UB)





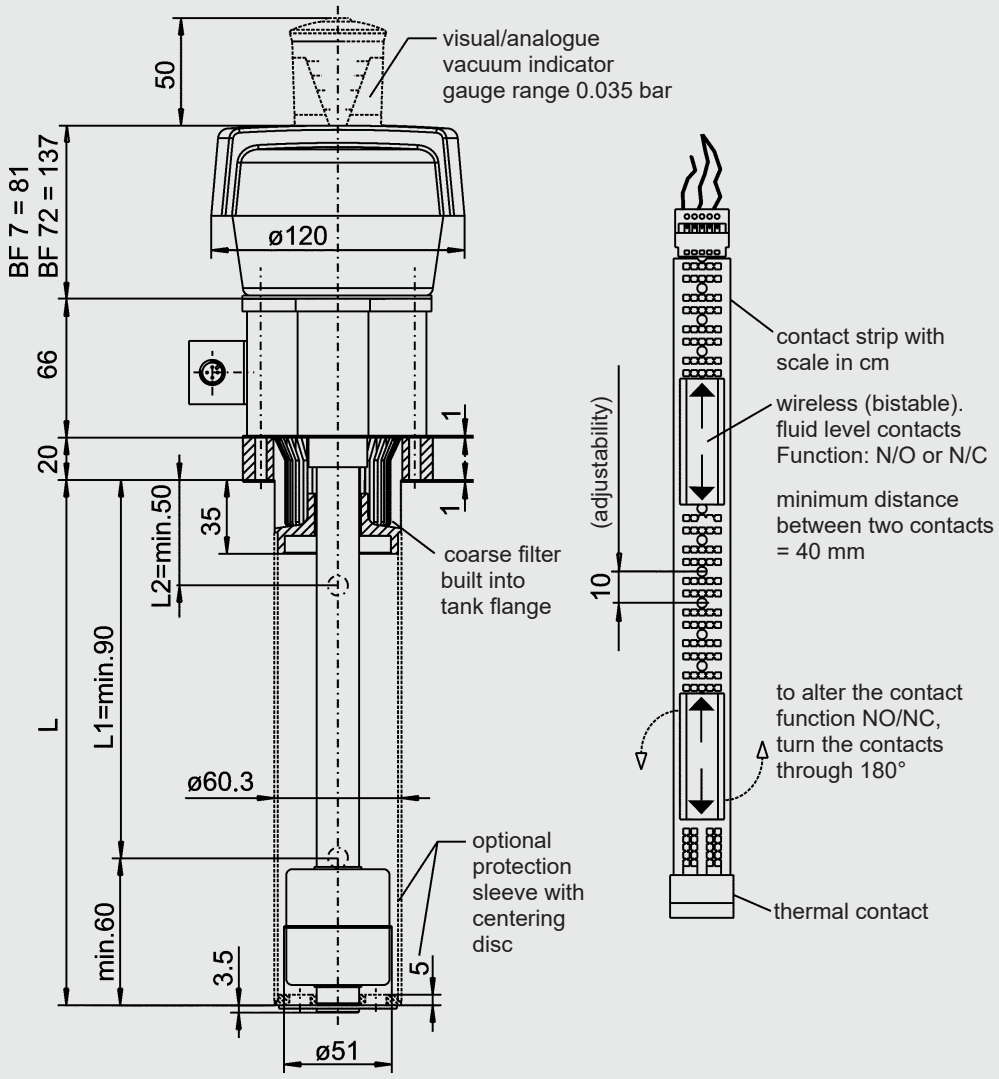
TC...W+D../-S12...



TC...UBM+D../-S12...

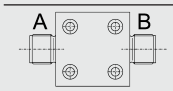
Factory normal setting for type S12: "pump protection monitoring"					
Switch points	Sensor tube length L 250	370	520	L2 150	Contact function of fluid level contacts	Possible application
270	420	L1 190	310	460	NC - rising N/C	Warning at "min. tank level"
					NO - rising N/O	Cut-out at "min. tank level"

Version TC...**C 2.x /-S12-Vxxx... (stainless steel)**



TECHNICAL SPECIFICATIONS

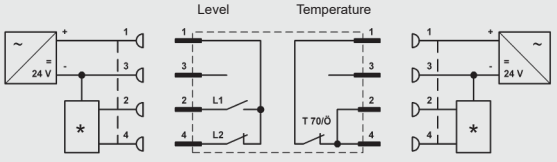
Level switch points	bistable N/O / N/C Max. 2 can be set
Resolution	10 mm
Hysteresis	4 mm
Thermal contact	T70 °C / N/C
Switching capacity	10W / VA max 30 V / DC max.
Switching current	1 A max.

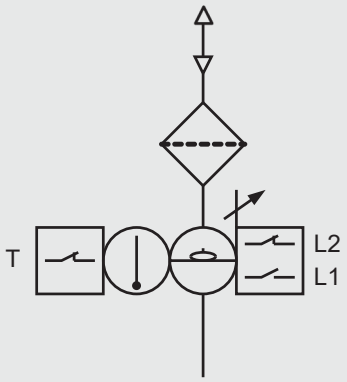


Male connections

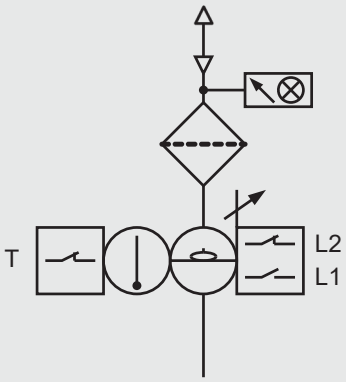
Connection A	Connection B
Level contact(s): 1 = 12V-30V DC 2 = level L1 (+UB) 3 = not connected 4 = level L2 (+UB)	Temp. contact(s): 1 = 12V-30V DC 2 + 4 = T70 / opens (+UB) 3 = not connected

Customer equipment	Connection A M12x1, 4-pole	Connection B M12x1, 4-pole	Customer equipment





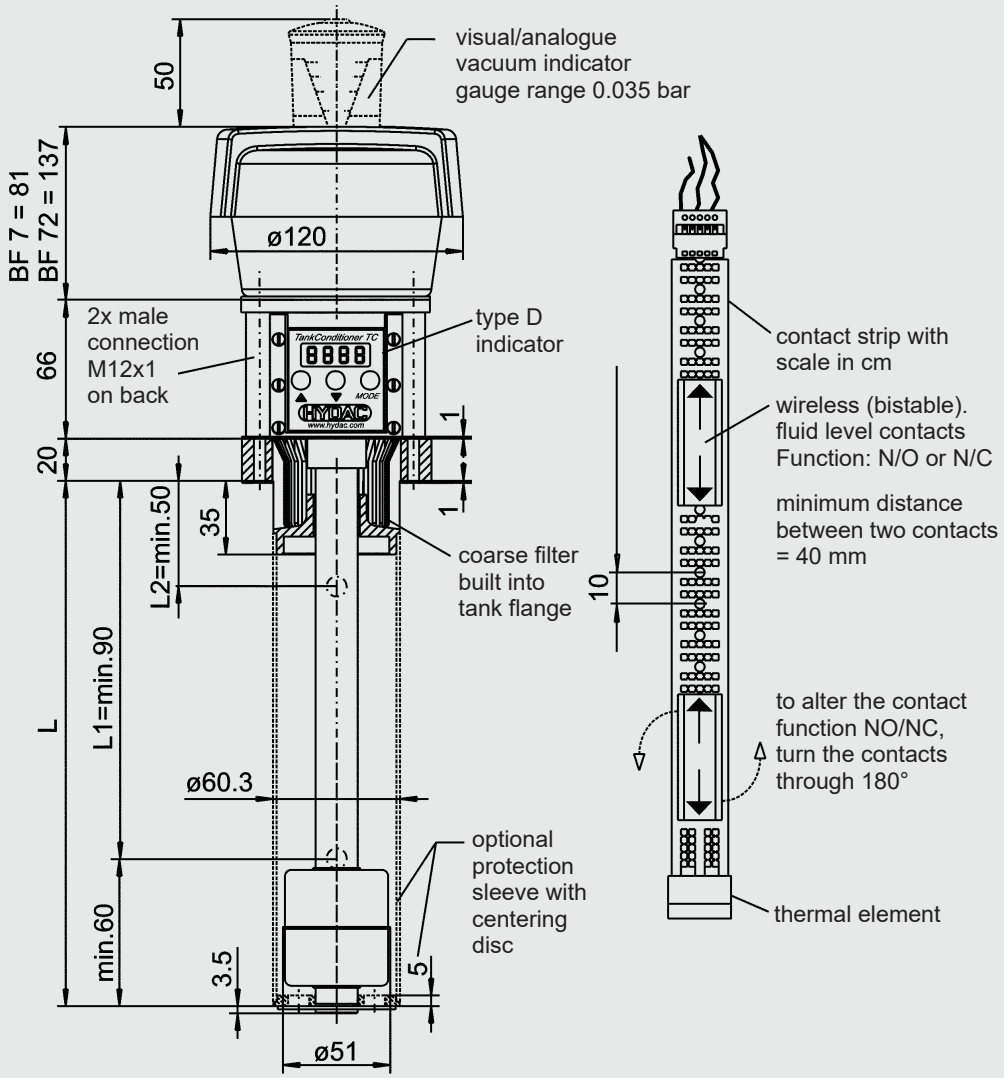
TC...W+C../-S12...



TC...UBM+C../-S12...

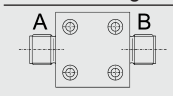
Factory normal setting for type S12: "pump protection monitoring"				
Switch points	Sensor tube length L		Contact function of fluid level contacts	Possible application
220	250	370 L2		
150 270			NC - rising N/C	Warning at "min. tank level"
	190 310	460	NO - rising N/O	Cut-out at "min. tank level"

Version TC...**D** 1.x /-**S12**-Vxxx... (stainless steel)



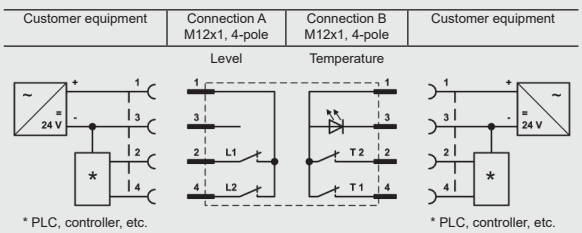
TECHNICAL SPECIFICATIONS

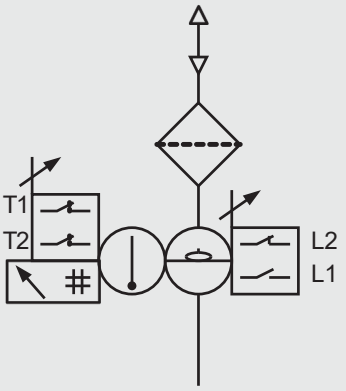
Level switch points	bistable N/O / N/C Max. 2 can be set
Resolution	10 mm
Hysteresis	4 mm
Thermal element	Pt100
Temp. switch points	Max. 2 can be set
Hysteresis	1 – 99 K can be set
Switching capacity	10W / VA max 30 V / DC max.
Switching current	1 A max.
Display for temperature monitoring	LED 3-digit (4-digit w/o unit of meas.)
Indication range	-20 °C to +120 °C (-4 ° to +248 °F)



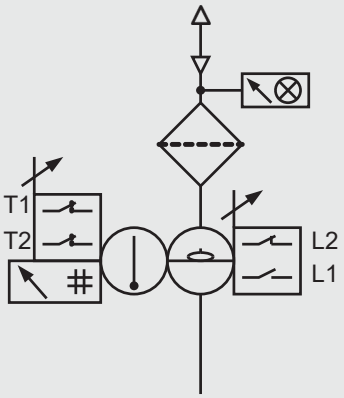
Male connections

Connection A	Connection B
Level contacts: 1 = 12V-30V DC 2 = level L1 (+UB) 3 = not connected 4 = level L2 (+UB)	Temperature contacts: 1 = 12V-30V DC 2 = temp. 2 (+UB) 3 = GND (0V) 4 = temp. 1 (+UB)





TC...W+D../-S12...

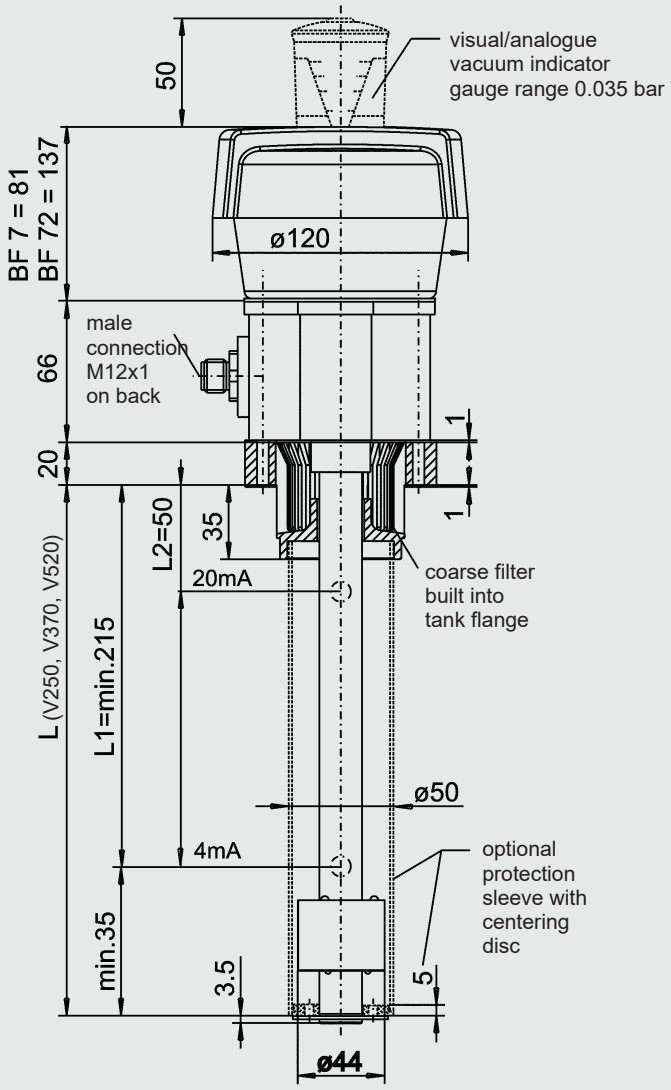


TC...UBM+D../-S12...

Factory normal setting for type S12: "pump protection monitoring"					
Switch points	Sensor tube length L			Contact function of fluid level contacts	Possible application
	250	370	520		
L2	150	270	420	NC - rising N/C	Warning at "min. tank level"
L1	190	310	460	NO - rising N/O	Cut-out at "min. tank level"

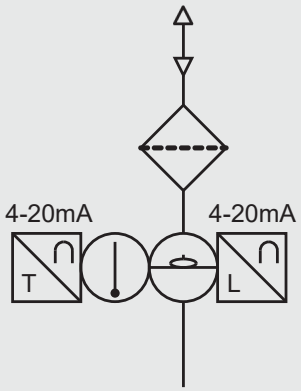
3.2 TANKCONDITIONER® TC WITH SUPPLEMENTARY CODE "S44"

Version TC...**C 1.x /-S44-Vxxx... (brass/synthetic material)**

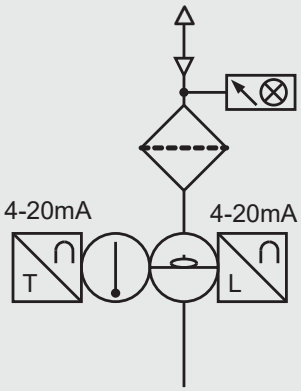


TECHNICAL SPECIFICATIONS

Fluid level monitoring	
Output signal	4 – 20 mA
Meas. range for V250	165 mm
Meas. range for V370	285 mm
Meas. range for V520	435 mm
Resolution	4 mm
Hysteresis	0 – 10%
Temperature monitoring	
Output signal	4 – 20 mA
Measuring range	0 – 100 °C
Hysteresis	0 – 1 K
Ohmic resistance	RB = U – 8 V / 20 mA
Data transfer	Shielded cable must be provided!



TC...W+C../-S44...

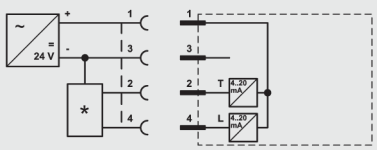


TC...UBM+C../-S44...

Male connections
Connection
Fluid level/Temperature signals 1 = 12V-30V DC 2 = temperature 4 – 20 mA 3 = not connected 4 = level 4 – 20 mA

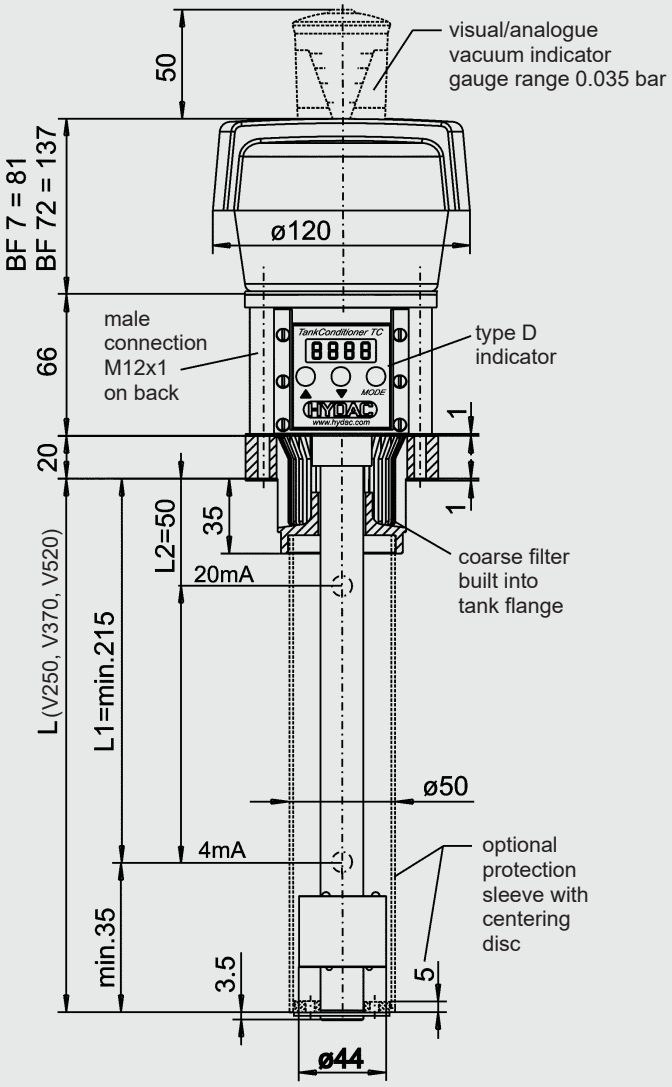
Customer equipment	Connection A M12x1, 4-pole	

Level and Temperature



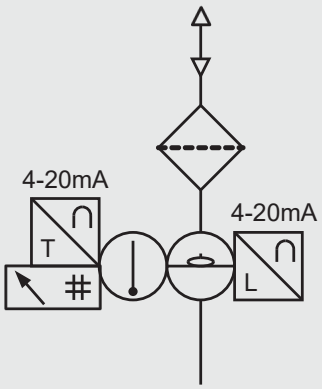
* PLC, controller, etc.

Version TC...**D 1.x /-S44-Vxxx... (brass/synthetic material)**

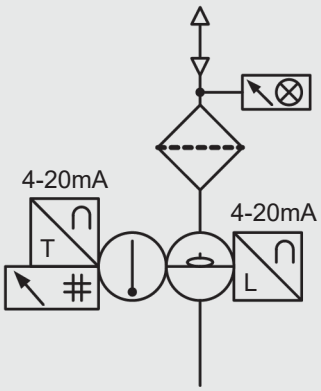


TECHNICAL SPECIFICATIONS

Fluid level monitoring	
Output signal	4 – 20 mA
Meas. range for V250	165 mm
Meas. range for V370	285 mm
Meas. range for V520	435 mm
Resolution	4 mm
Hysteresis	0 – 10%
Temperature monitoring	
Output signal	4 – 20 mA
Measuring range	0 – 100 °C
Hysteresis	0 – 1 K
Ohmic resistance	RB = U – 8 V / 20 mA
Data transfer	Screened cable must be provided!
Display for temperature monitoring	LED 3-digit (4-digit w/o unit of meas.) Indication range -20 °C to +120 °C (-4 ° to +248 °F)



TC...W+D../-S44...



TC...UBM+D../-S44...

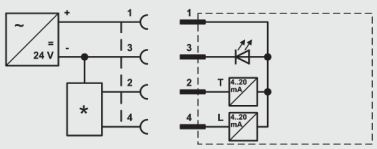
Male connections

Connection

Fluid level/Temperature signals

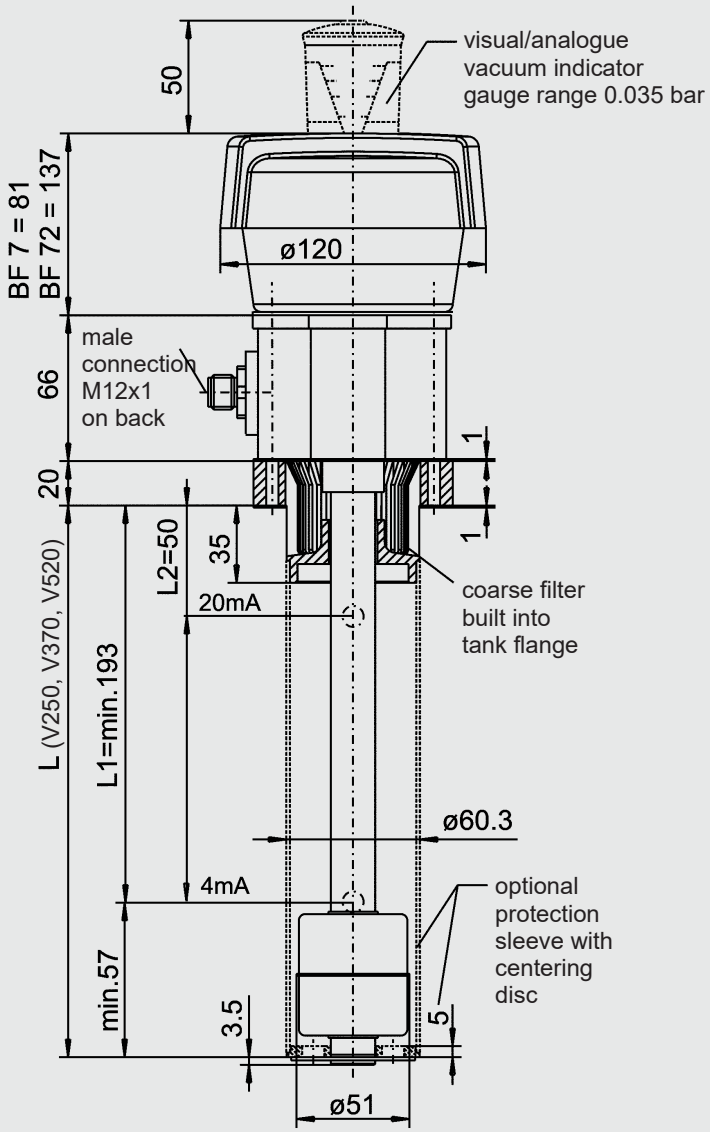
1 = 18V-30V DC
2 = temperature 4 – 20 mA
3 = GND (0V)
4 = level 4 – 20 mA

Customer equipment Connection A M12x1, 4-pole
Level and Temperature



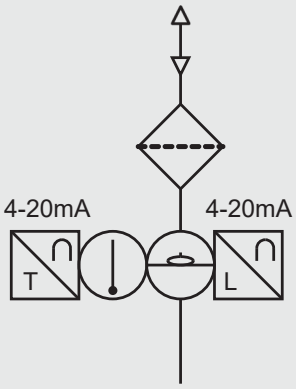
* PLC, controller, etc.

Version TC...**C 2.x /-S44-Vxxx-... (stainless steel)**

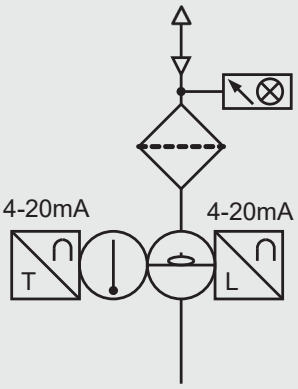


TECHNICAL SPECIFICATIONS

Fluid level monitoring	
Output signal	4 – 20 mA
Meas. range for V250	143 mm
Meas. range for V370	263 mm
Meas. range for V520	413 mm
Resolution	7.5 mm
Hysteresis	0 – 10%
Temperature monitoring	
Output signal	4 – 20 mA
Measuring range	0 – 100 °C
Hysteresis	0 – 1 K
Ohmic resistance	$\frac{RB = U - 8\ V}{20\ mA}$
Data transfer	Shielded cable must be provided!



TC...W+C../-S44...

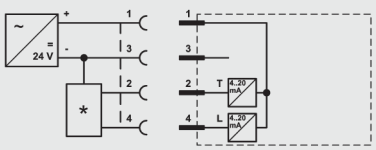


TC...UBM+C../-S44...

Male connections
Connection
Fluid level/Temperature signals 1 = 18 V-30V DC 2 = temperature 4 – 20 mA 3 = not connected 4 = level 4 – 20 mA

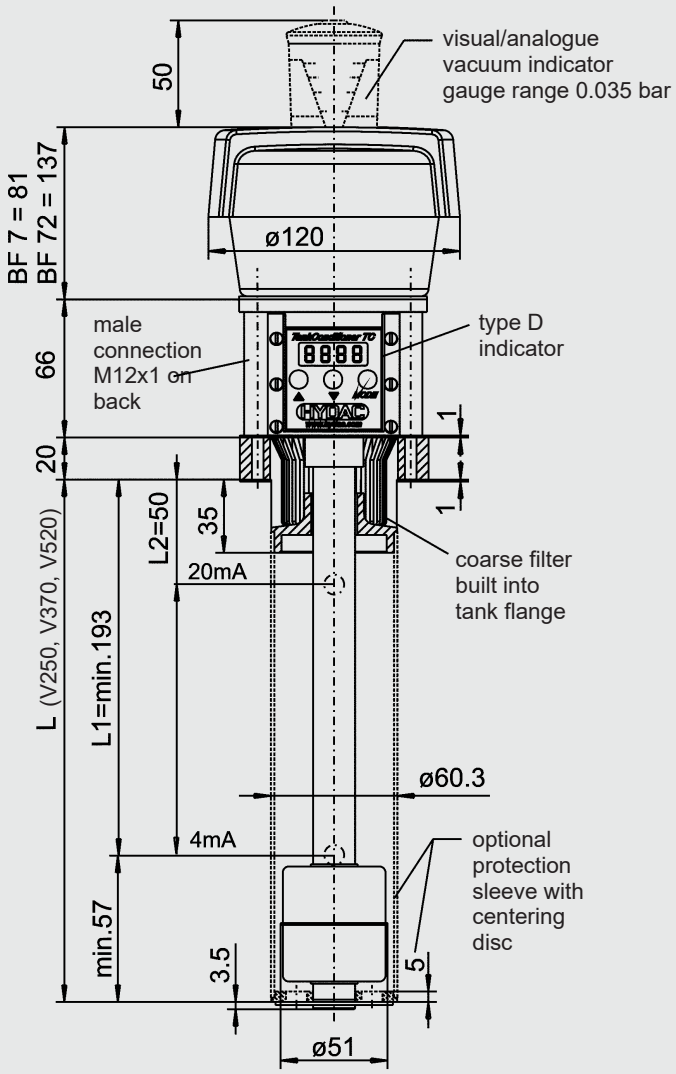
Customer equipment	Connection A M12x1, 4-pole	

Level and Temperature



* PLC, controller, etc.

Version TC...**D 2.x /-S44-Vxxx... (stainless steel)**



TECHNICAL SPECIFICATIONS

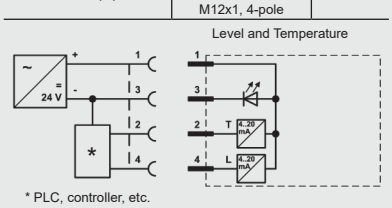
Fluid level monitoring	
Output signal	4 – 20 mA
Meas. range for V250	143 mm
Meas. range for V370	263 mm
Meas. range for V520	413 mm
Resolution	7.5 mm
Hysteresis	0 – 10%
Temperature monitoring	
Output signal	4 – 20 mA
Measuring range	0 – 100 °C
Hysteresis	0 – 1 K
Ohmic resistance	RB = U – 8 V / 20 mA
Data transfer	Screened cable must be provided!
Display for temperature monitoring	LED 3-digit (4-digit w/o unit of meas.) Indication range -20 °C to +120 °C (-4 ° to +248 °F)

Male connections

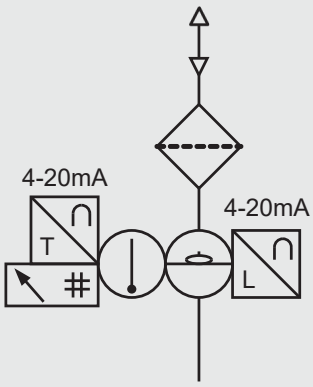
Connection

Fluid level/Temperature signals

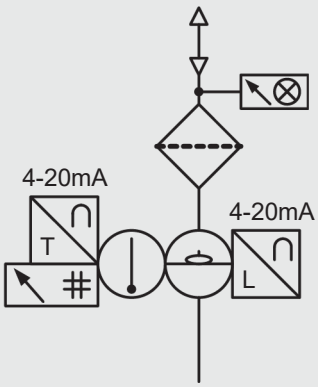
1 = 12V-30V DC
2 = temperature 4 – 20 mA
3 = GND (0V)
4 = level 4 – 20 mA



* PLC, controller, etc.



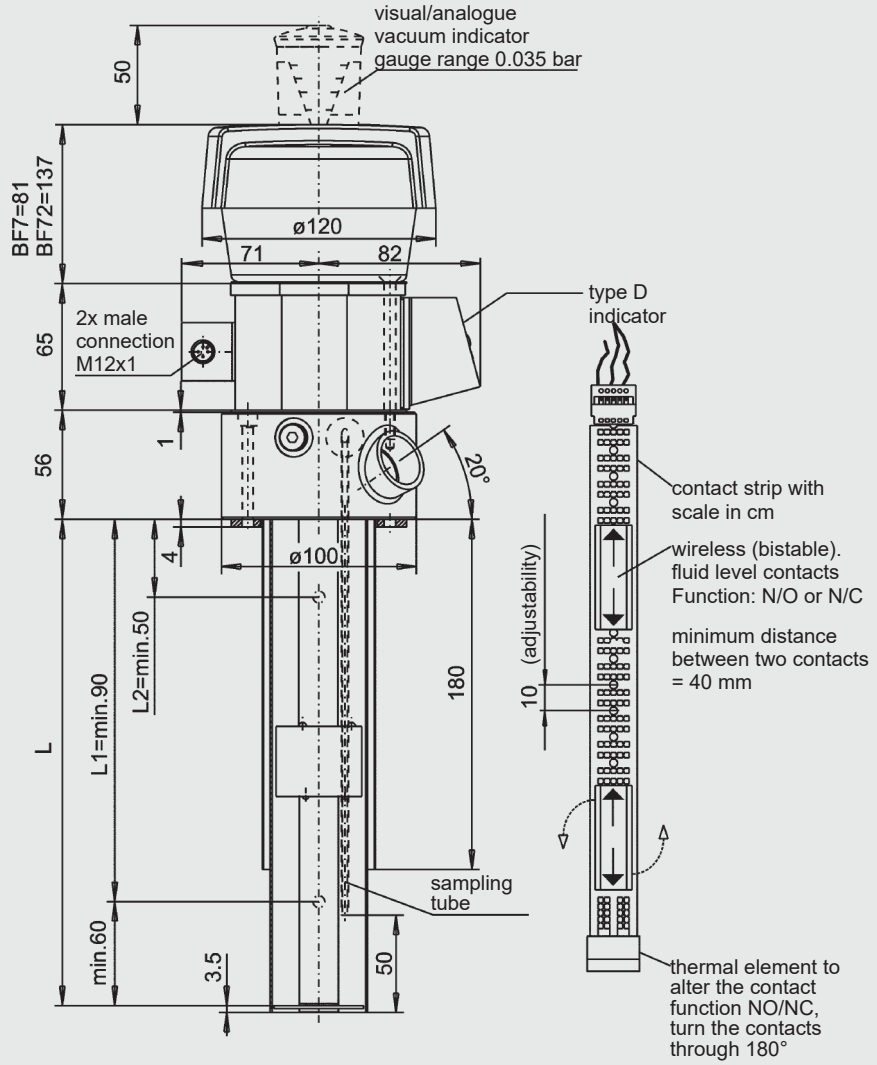
TC...W+D../-S44...

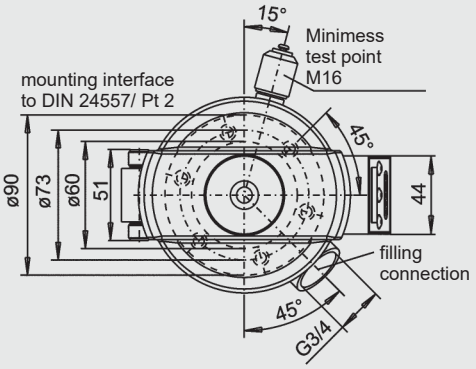


TC...UBM+D../-S44...

3.2 TANKCONDITIONER® TC WITH ADDITIONAL SUPPLEMENTARY CODE "FA34"

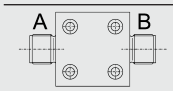
Version TC...**D 1.x /-S12-Vxxx-FA34 (FA34 with filling adapter)**





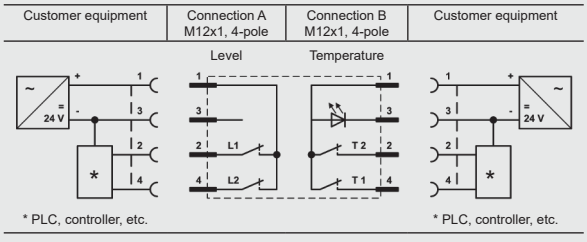
TECHNICAL SPECIFICATIONS

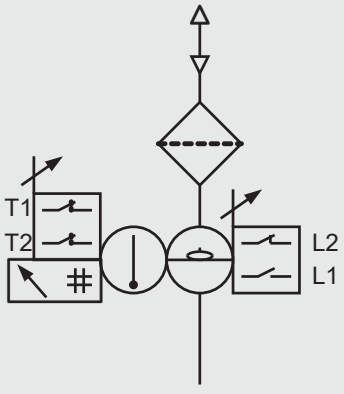
Level switch points	bistable N/O / N/C Max. 2 can be set
Resolution 10 mm	
Hysteresis 4 mm	
Thermal element	Pt100
Temp. switch points	Max. 2 can be set
Hysteresis 1 – 99 K can be set	
Switching capacity	10W / VA max 30 V / DC max.
Switching current	1 A max.
Display for LED 3-digit temperature monitoring (4-digit w/o unit of meas.)	
Indication range -20 °C to +120 °C (-4 ° to +248 °F)	



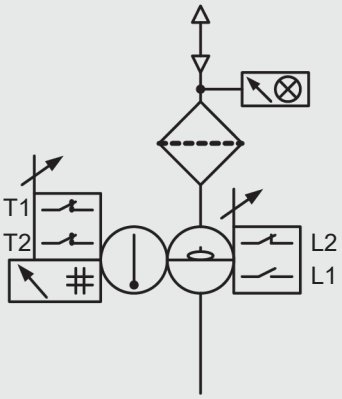
Male connections

Connection A	Connection B
Level contact(s): 1 = 12V-30V DC 2 = level L1 (+UB) 3 = not connected 4 = level L2 (+UB)	Temperature contacts: 1 = 12V-30V DC 2 = temp. 2 (+UB) 3 = GND (0V) 4 = temp. 1 (+UB)





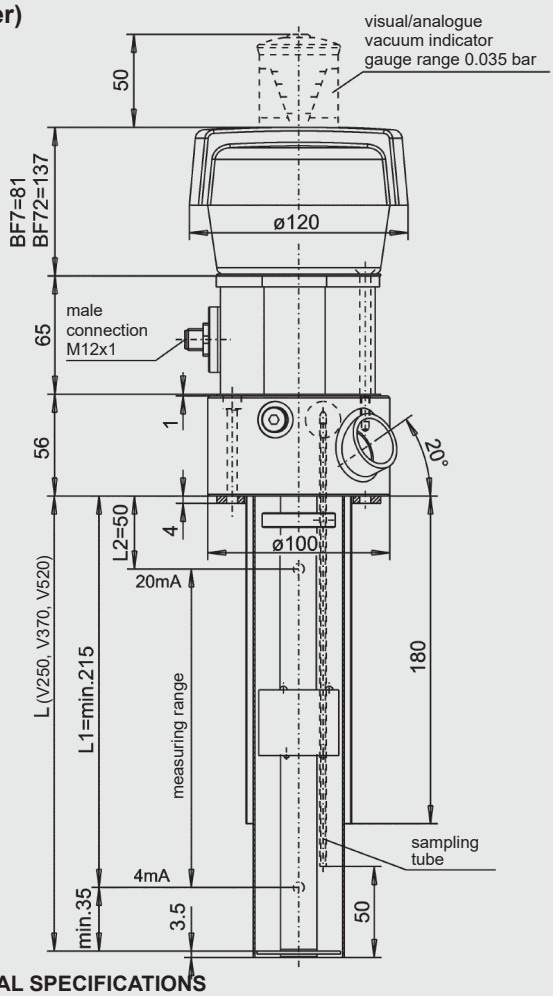
TC...W+D../-S12...

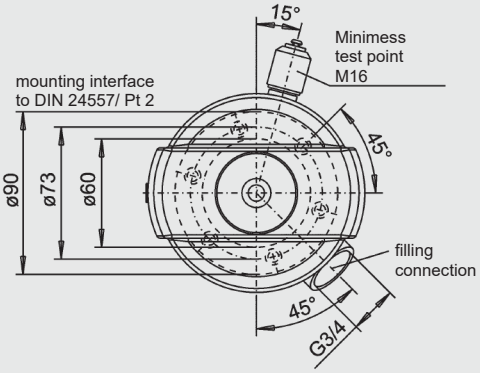


TC...UBM+D../-S12...

Factory normal setting for type S12: "pump protection monitoring"					
Switch points	Sensor tube length L			Contact function of fluid level contacts	Possible application
	250	370	520		
L2	150	270	420	NC - rising N/C	Warning at "min. tank level"
L1	190	310	460	NO - rising N/O	Cut-out at "min. tank level"

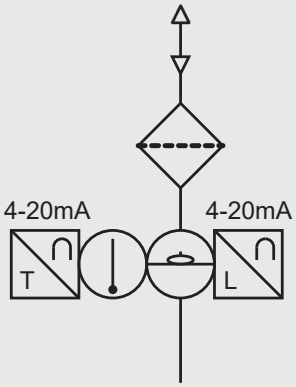
Version TC...**C 1.x /-S44-Vxxx-FA34 (FA34 with filling adapter)**



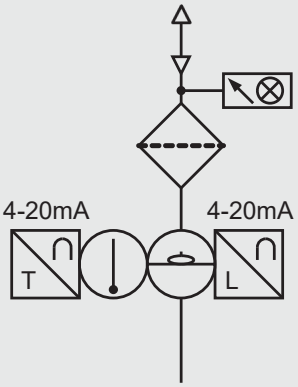


TECHNICAL SPECIFICATIONS

Fluid level monitoring	
Output signal 4 – 20 mA	
Meas. range for V250 165 mm	
Meas. range for V370 285 mm	
Meas. range for V520 435 mm	
Resolution 4 mm	
Hysteresis 0 – 10%	
Temperature monitoring	
Output signal 4 – 20 mA	
Measuring range 0 – 100 °C	
Hysteresis 0 – 1 K	
Ohmic resistance	RB = U – 8 V / 20 mA
Data transfer	Shielded cable must be provided!



TC...W+C../-S44...



TC...UBM+C../-S44...

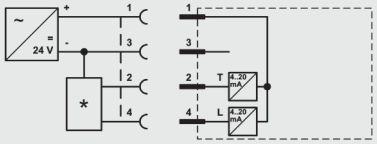
Male connections

Connection

Fluid level/Temperature
signals
1 = 18 V-30V DC
2 = temperature 4 – 20 mA
3 = not connected
4 = level 4 – 20 mA

Customer equipment	Connection A M12x1, 4-pole	

Level and Temperature



* PLC, controller, etc.

NOTE

The information in this brochure relates to the operating conditions and applications described.

For applications or operating conditions not described, please contact the relevant technical department.

Subject to technical modifications.