

Compression force transducers For level measuring with electrical output



Description

With this hydraulic/electric force transducer, forces (weights) are picked up in a simple, cheap manner and made available directly for further processing by means of an analogue output signal.

The force measuring unit works on the hydraulic principle. The force applied to the piston is converted into a hydraulic force depending on the piston area and transmitted to the integrated measuring cell.

The analogue signal output is 4 ... 20 mA.

The analogue signal can be processed and displayed in different units e.g. N, kN, kg, with a digital display that has a micro-processor.

The piston stroke is 0.5 mm max.

With this force transducer the piston is so designed that it is matched to the face of the force transmitting piston up to about $\pm 3^\circ$.

An exact force measurement requires a force that is concentric and at right angles to the piston. Moreover the piston must be free of side forces.

This force transducer is not suitable or only suitable under certain conditions for the measurement of impact energy or acceleration.

Providing the frequency is not too high, increasing and decreasing forces can also be measured with hydraulic force transducers. With a view to the life of the force measuring unit, a force measuring unit with a somewhat larger working range should be chosen.

Note

Hydraulic force measuring units are filled with pressure transmitting liquid under vacuum. For this reason a guarantee for satisfactory operation can only be given for complete assembled force measuring units. Sealing fastenings must not be loosened.

Features

- For compression forces
- For level measuring in tanks of heating, cooling or drinking water systems
- Nominal temperature range - 20 ... +85°C
- Cylinder and piston made of stainless steel
- Accuracy $\leq 1\%$ of end scale
- Piston stroke max. 0.5 mm
- Lateral forces within an angle of $\pm 3^\circ$ are equalized

Measuring ranges

- 50 kg ... 8.000 kg

Applications

- Process and chemical engineering
- Plant engineering

Specific information

- For measuring of fluid levels in tanks with three feet, a force measuring device is attached to one foot, the measurement is $\frac{1}{3}$ of the total mass.

Model: F1118

Technical Data

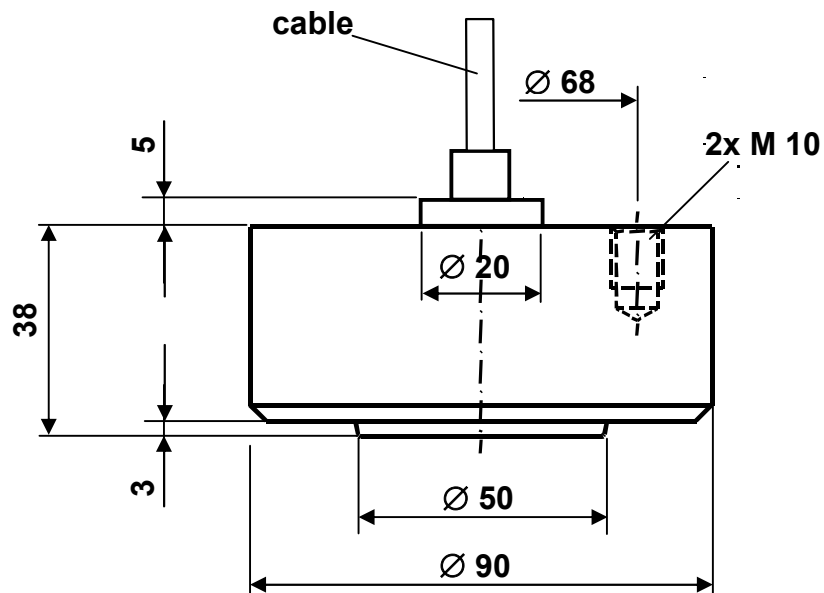
Model	F1118	Option
Nominal size	ND 20	
Accuracy	$\leq 1\%$ of F.S.	
Limit load	depending on measuring range	
Breaking load	depending on measuring range	
Combined error	$\leq \pm 1\%$ v. of F.S.	
Nominal deflection	< 0.5 mm	
Nominal temperature range	$-20 \dots +85^{\circ}\text{C}$	
Protection type	IP 67	
Cylinder housing	Stainless steel	
Piston	Stainless steel	
Mounting mode	Integrated pressure sensor	
Measuring device	Ceramic cell AL_2O_3 96% [$\leq 2.166,67$ kg, ≤ 100 bar] Thin-film cell [$\geq 2.233,33$ kg, > 100 bar]	
Overrange limit	Depending on measuring range	
Output signal	4 ... 20 mA – 2-wire	other on request
Power requirement	8 ... 30 V DC	
Temperature effect	zero span typ. $\leq \pm 0.2\%$ of F.S. /10K (max $\leq \pm 0.4\%$ of F.S. /10K) typ. $\leq \pm 0,15\%$ of F.S. /10K (max $\leq \pm 0.25\%$ of F.S. /10K)	
Electrical connection	Cable, 3 m	
Electrical protection	Reverse voltage, overvoltage and short circuit protection	
Hydraulic fluid	silicone oil, FFI.-No. 2	
Assembly	thread 2x M 10	
Dimensions	see dimensional drawing	
Weight	approx. 2 kg	

construction

hydraulic / electrical force transducer, composed of:

a force transducer Model F1118, ND 20 and
integrated sensor element (Ceramic- or Thin-film cell, depending on measuring range).

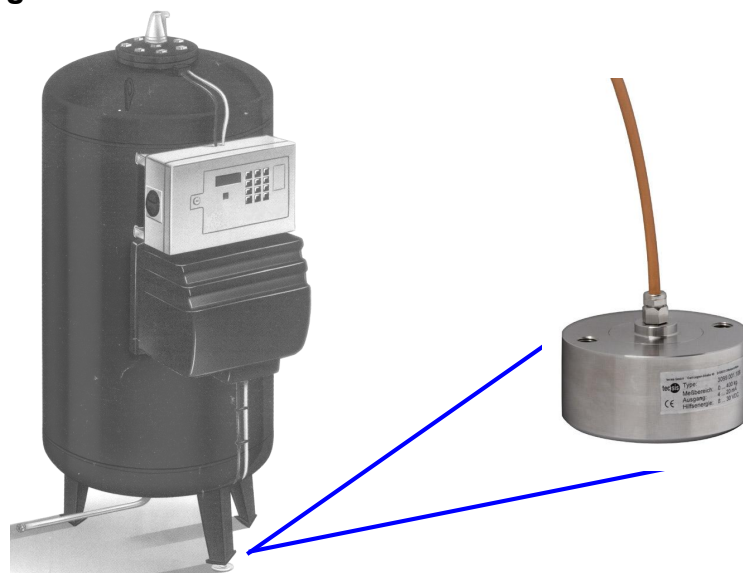
Dimensional drawing



Measuring ranges

Model F1118 – ND 20 – for level measurements			The load cell size indicates the surface area of the piston in cm ²
Tanks with three feet, measured attached to one foot 1 force measuring device, the measuring is 1/3 of the total mass.		pressure range on measuring device	
Weight loading = 100% [kg]	Weight loading = 1/3 [kg]	[bar]	
150	50.00	0 ... 2.50	special cablibration on request
200	66.67	0 ... 3.33	
250	83.33	0 ... 4.16	
300	100.00	0 ... 5.00	
350	116.67	0 ... 5.83	
400	133.33	0 ... 6.66	
420	140.00	0 ... 6.99	
450	150.00	0 ... 7.49	
500	166.67	0 ... 8.33	
600	200.00	0 ... 9.99	
700	233.33	0 ... 11.66	
800	266.67	0 ... 13.32	
850	283.33	0 ... 14.15	
900	300.00	0 ... 14.99	
1.000	333.33	0 ... 16.65	
1.200	400.00	0 ... 19.98	
1.600	533.33	0 ... 26.64	
2.000	666.67	0 ... 33.30	
2.100	700.00	0 ... 34.97	
2.400	800.00	0 ... 39.97	
2.800	933.33	0 ... 46.63	
3.000	1.000.00	0 ... 49.96	
3.500	1.166.67	0 ... 58.28	
4.000	1.333.33	0 ... 66.61	
4.200	1.400.00	0 ... 69.94	
5.200	1.733.33	0 ... 86.59	
6.500	2.166.67	0 ... 108.24	
6.700	2.233.33	0 ... 111.57	
8.000	2.666.67	0 ... 133.22	
9.000	3.000.00	0 ... 149.87	
10.000	3.333.33	0 ... 166.52	
12.500	4.166.67	0 ... 208.16	
24.000	8.000.00	0 ... 399.66	

Principle drawing



Measuring ranges

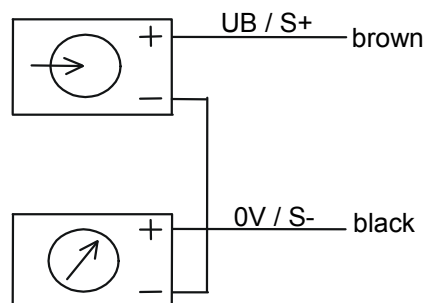
Model F1118 – ND 20 – for force measurement		
The force transducer loading 100% [kg]	pressure range on measuring device [bar]	The load cell size indicates the surface area of the piston in cm ²
50	0 ... 2,50	special cablibration on request
60	0 ... 3,00	
80	0 ... 4,00	
100	0 ... 5,00	
120	0 ... 5,99	
140	0 ... 6,99	
150	0 ... 7,49	
160	0 ... 7,99	
200	0 ... 9,99	
300	0 ... 14,99	
320	0 ... 15,99	
400	0 ... 19,98	
500	0 ... 24,98	
600	0 ... 29,97	
700	0 ... 34,97	
800	0 ... 39,97	
1.000	0 ... 49,96	
1.200	0 ... 59,95	
1.400	0 ... 69,94	
2.000	0 ... 99,91	
3.000	0 ... 149,87	
3.200	0 ... 159,86	
4.000	0 ... 199,83	
5.000	0 ... 249,79	
6.000	0 ... 299,74	
8.000	0 ... 399,66	

Principle drawing



Electrical connection

2-wire



Subject to technical changes