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Flow meter type M 335 and type M 350

Material	Measuring tube	PVC	PA (Trogamid)	PSU
	Union nut	• PVC-U	• PP[1)]	
	Insert, top and bottom	PVDF		
	Float	• PVDF[2)]		
Sealing material		• EPDM	• *)	
Working temperature		0 °C up to 40 °C	0 °C up to 60 °C	0 °C up to 100 °C
Nominal size		DN 25 / 32 / 40 / 50 / 65		
Pressure class		PN 10		
Measuring ranges		min. 50 l/h	max. 60000 l/h	
Accuracy		Accuracy class 4 as defined by VDI / VDE 3513, Page 2 (equates approximately ± 2% of scale value)		
Connection with pipe		• Cement socket / welding socket • Spigot SDR 11 / 17,6 / 21 • Threaded socket		
Length		Company standard		
Accessories		Limit value contact (float with solenoid required) Measuring sensor (float with solenoid required)		

*) Special version: FKM, CSM, NBR und FEP on request
1) with PP-end connector
2) Float PVDF - optionally: • without solenoid • with solenoid

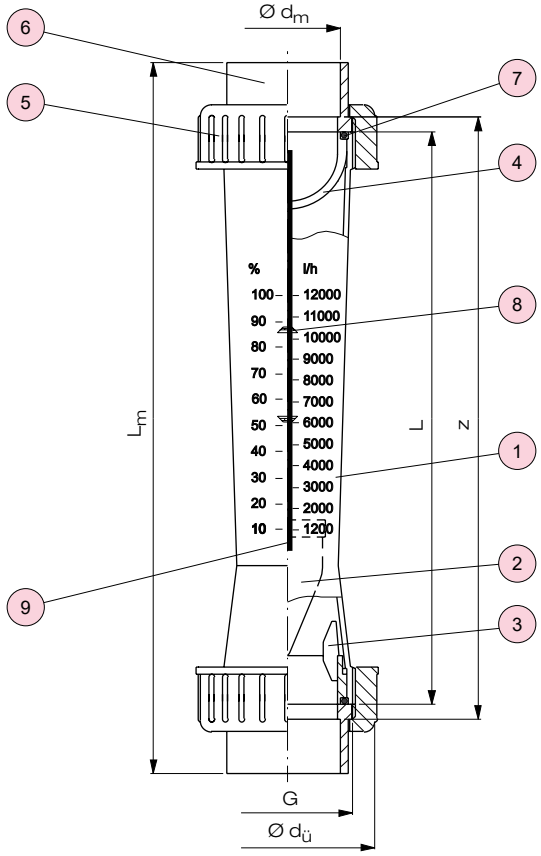
Example for an invitation to tender text:

Flow meter type M 335, DN 25, PN 10, measuring tube PVC, float PVDF with solenoid, sealing material EPDM, true union with socket PVC-U, measuring ranges 100 up to 1000 l/h H_2O

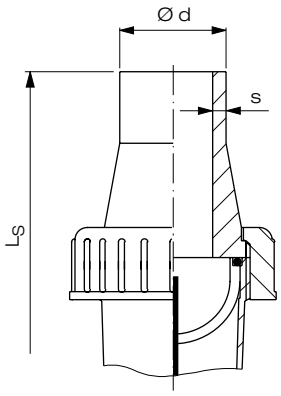
Document: *FRANK_DB_L6_Durchflussmesser Typ M 335 und Typ M 350_01-2024_EN*

Flow meter type M 335 and type M 350

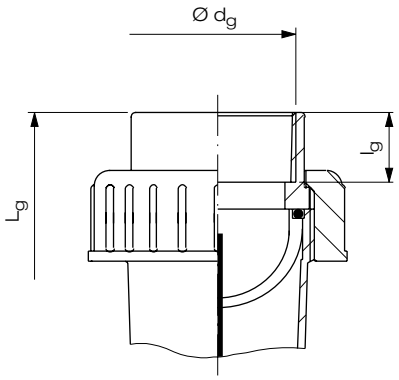
True union with socket



True union with spigot



True union with threaded socket



No.	Description	Number	Material
1	Measuring tube	1	PVC, PA, PSU,
2	Float*)	1	PVDF
3	Insert, bottom	1	PVDF
4	Insert, top	1	PVDF
5	Union nut	2	PVC, PP

No.	Description	Number	Material
6	Insertion part (socket, spigot)	2	PVC-U, PP, PVDF[1)]
7	O-ring*)	2	EPDM
8	Setpoint indicator	2	PS
9	Guide rod[2)]	1	1.4571 (SUS 316 Ti)
			PVDF-encapsulated

*) Wearing parts
1) other material on request
2) for DN 50

Description

- The flow meter type M 335 and type M 350 operates on the float principle and is used for flow rate measurements in pipelines. The medium flows through the vertically installed flow meter from bottom to top. This raises the float and shows the current flow rate on the scale on the measuring device. The read-off edge corresponds to the largest diameter of the float.
- Flow meters Typ M 335 and Typ M 350 come as standard with a water scale and a % scale, and two setpoint indicators.

Special features

- Break-proof and resistant against corrosion
- True union
- Special scales available for liquid and gaseous media
- Dovetail guide for mounting accessories (limit value contact, measuring sensor)
- Metering tube labeled with nominal diameter, measuring range and material
- Measuring ranges 50-60000 l/h

Flow meter type M 335 and type M 350

Dimensions and weights - M 335

Measuring range l/h H_2O	Dimensions in mm																		Weight in kg / pc
	DN	$d_ü$	G	L	Cement socket d_m	Cement socket z	Cement socket L_m	Welding socket d_m	Welding socket z	Welding socket L_m	Spigot PP or PE d	Spigot PP or PE L_s	Spigot PP or PE $s^{1)}$	Spigot PVDF d	Spigot PVDF L_s	Spigot PVDF $s^{2)}$	Threaded socket d_g	Threaded socket L_g	Threaded socket l_g	PVC, PA, PSU
50 - 500 100 - 1000	25	60	1 1/2“	335	32	341	385	32	341	381	32	455	2,9	32	455	2,4	1“	385	17	0,52
150 - 1500 250 - 2500	32	72	2“	335	40	341	393	40	341	385	40	461	3,7	40	461	2,4	1 1/4“	393	19	0,60
200 - 2000 300 - 3000 600 - 6000	40	83	2 1/4“	335	50	341	403	50	342	391	50	469	4,6	50	467	3,0	1 1/2“	403	23	1,22
600 - 6000 1000 - 10000 1500 - 15000	50	103	2 3/4“	335	63	341	417	63	341	399	63	473	5,8	63	473	3,0	2“	417	23	1,68
2000 - 20000 3000 - 30000 8000 - 60000	65	122	3 1/2“	335	75	341	429	75	345	407	75	430	6,9	75	430	3,6	2 1/2“	-	-	2,90

[1)] SDR 11 [2)] SDR 21

Dimensions and weights - M 350

Measuring range l/h H_2O	Dimensions in mm																		Weight in kg / pc
	DN	$d_ü$	G	L	Cement socket d_m	Cement socket z	Cement socket L_m	Welding socket d_m	Welding socket z	Welding socket L_m	Spigot PP or PE d	Spigot PP or PE L_s	Spigot PP or PE $s^{1)}$	Spigot PVDF d	Spigot PVDF L_s	Spigot PVDF $s^{2)}$	Threaded socket d_g	Threaded socket L_g	Threaded socket l_g	PVC, PA, PSU
50 - 500 100 - 1000	25	60	1 1/2“	350	32	356	400	32	360	396	32	470	2,9	32	470	2,4	1“	400	17	0,52
150 - 1500 250 - 2500	32	72	2“	350	40	356	408	40	360	400	40	476	3,7	40	476	2,4	1 1/4“	408	19	0,60
200 - 2000 300 - 3000 600 - 6000	40	83	2 1/4“	350	50	356	418	50	360	406	50	484	4,6	50	482	3,0	1 1/2“	418	23	1,22
600 - 6000 1000 - 10000 1500 - 15000	50	103	2 3/4“	350	63	356	432	63	360	414	63	488	5,8	63	488	3,0	2“	432	23	1,68
2000 - 20000 3000 - 30000 8000 - 60000	65	122	3 1/2“	350	75	356	444	75	360	422	75	445	6,9	75	445	3,6	2 1/2“	444	-	2,90

[1)] SDR 11 [2)] SDR 21

Pressure loss

Measuring ranges [l/h]	50-500	100-1000	150-1500	250-2500	200-2000	300-3000	600-6000	1000-10000	1500-15000	2000-20000	3000-30000	8000-60000
Pressure loss [mbar]	22,84	22,84	22,84	22,84	24,99	24,99	24,99	24,99	28,23	45,67	45,67	47,24

Flow meter type M 335 and type M 350

Available special scales

H_2O	Air (working pressure)								
[l/h]	0 bar Nm^3/h	1 bar Nm^3/h	2 bar Nm^3/h	3 bar Nm^3/h	4 bar Nm^3/h	5 bar Nm^3/h	6 bar Nm^3/h	7 bar Nm^3/h	8 bar Nm^3/h
50 - 500	2 - 15	3 - 20	3 - 24	3 - 28	4 - 31	4 - 34	5 - 37	5 - 39	4,5 - 42
100 - 1000	3,5 - 30	4 - 41	5 - 50	5 - 58	6 - 65	7 - 71	7 - 76	8 - 82	7,5 - 87
150 - 1500	5 - 45	6 - 63	7 - 77	8 - 90	9 - 100	10 - 110	11 - 119	12 - 127	12 - 135
250 - 2500	8 - 76	10 - 111	12 - 136	14 - 158	16 - 177	18 - 193	19 - 209	20 - 223	21 - 237
200 - 2000	7 - 60	9 - 82	11 - 100	12 - 116	14 - 130	15 - 142	16 - 153	17 - 164	18 - 174
300 - 3000	10 - 87	13 - 152	16 - 186	18 - 216	21 - 241	23 - 264	24 - 286	26 - 305	27 - 324
600 - 6000	20 - 170	24 - 246	30 - 301	34 - 348	39 - 389	42 - 426	45 - 461	49 - 492	51 - 522
600 - 6000	25 - 180	24 - 247	30 - 302	34 - 350	39 - 392	42 - 428	45 - 463	49 - 495	51 - 525
1000 - 10000	30 - 280	41 - 425	51 - 520	58 - 602	65 - 674	72 - 737	77 - 797	83 - 851	87 - 903
1500 - 15000	50 - 440	75 - 572	92 - 700	106 - 810	119 - 907	130 - 992	141 - 1073	150 - 1146	159 - 1215
2000 - 20000	70 - 580	78 - 770	96 - 942	110 - 1090	124 - 1220	135 - 1335	146 - 1444	156 - 1542	165 - 1635
3000 - 30000	100 - 900	113 - 1072	139 - 1311	160 - 1516	180 - 1697	197 - 1857	212 - 2008	227 - 2145	240 - 2274
8000 - 60000	230 - 1650	200 - 1150	250 - 1450	300 - 1650	300 - 1850	350 - 2000	350 - 2200	400 - 2300	400 - 2500

H_2O	NaOH		HCl
[l/h]	30 % l/h	50 % l/h	30 - 33 % l/h
50 - 500	30 - 320	10 - 62	40 - 430
100 - 1000	70 - 660	10 - 195	80 - 860
150 - 1500	100 - 900	20 - 350	150 - 1250
250 - 2500	100 - 1600	5 - 760	200 - 2150
200 - 2000	200 - 1400	5 - 540	200 - 1850
300 - 3000	300 - 1950	105 - 1200	300 - 2500
600 - 6000	500 - 3800	400 - 2350	600 - 4900
600 - 6000	500 - 4300	100 - 2200	600 - 5400
1000 - 10000	600 - 6600	100 - 4000	800 - 8400
1500 - 15000	750 - 9500	300 - 5000	1000 - 12750
2000 - 20000	1300 - 13000	200 - 7000	2000 - 17500
3000 - 30000	2600 - 20000	400 - 9800	3000 - 26500
8000 - 60000	6000 - 40000	2000 - 15000	6000 - 50000

Special scales H_2O with other units of measurement

Series M 335 / M 350				
DN	l/h	l/min	m^3/h	USGPM
25	50 - 500	0,8 - 8	0,05 - 0,5	0,22 - 2,2
25	100 - 1000	1,7 - 17	0,1 - 1	0,44 - 4,4
32	150 - 1500	2,5 - 25	0,15 - 1,5	0,66 - 6,6
32	250 - 2500	4 - 41	0,25 - 2,5	1,1 - 11
40	200 - 2000	3,3 - 33	0,2 - 2	0,66 - 6,6
40	300 - 3000	5 - 50	0,3 - 3	1,32 - 13,2
40	600 - 6000	10 - 100	0,6 - 6	2,64 - 26,4
50	600 - 6000	10 - 100	0,6 - 6	2,64 - 26,4
50	1000 - 10000	16 - 166	1 - 10	4,4 - 44,02
50	1500 - 15000	25 - 250	1,5 - 15	6,6 - 66,04
65	2000 - 20000	33 - 330	2 - 20	8,8 - 88
65	3000 - 30000	50 - 500	3 - 30	13,2 - 132
65	8000 - 60000	133 - 1000	8 - 60	35,2 - 264

Details required to design special scales

- Medium
- Specific gravity (g/cm^3)
- Viscosity (cP or mPas)
- Working temperature (°C)
- Working pressure (bar)
- Desired measuring range (l/h)

Application instructions for special scales

- When applying special scales later, ensure that the marking on the scale corresponds with the one on the measuring tube.

Flow meter type M 335 and type M 350

Pressure correction table for gases: Calibration pressure 0 bar

Working pressure [bar]	Factor n	Working pressure [bar]	Factor n
0	1	**3**	2
0,2	1,095	**4**	2,24
0,4	1,184	**5**	2,45
0,6	1,265	**6**	2,65
0,8	1,34	**7**	2,83
1	1,414	**8**	3
1,5	1,58	**9**	3,165
2	1,73	**10**	3,32

This table is used to correct values displayed for gases by the flow meter if the operating pressure deviates from the pressure used as a basis for the calibration.

The values displayed on the flow meter are simply multiplied by the factor corresponding to the operating pressure,

Worked sample:
M 335, DN 25
Special scales 0 bar air: 2,5-29 m^3/h
Working pressure: 0,8 bar
Display value: 20 m^3/h
Correction factor n according to table: 1,34
Flow rate value: Q = display value Q' x Correction factor n

Q = 20 m^3/h x 1,34 = 26,8 m^3/h

Notes for correct installation

- The flow meter must be installed stress-free in the pipe (plane parallelism, axial, overall length).
- Flow meters should not be installed before or behind pumps, valves and changes of directions (an inlet and outlet section must be provided. Inlet approx. Le > 10 X DN, outlet approx. La > 5 x DN).
- Socket and spigot type: Gluing and welding have to be carried out according to the relevant standards (e.g. DVS).

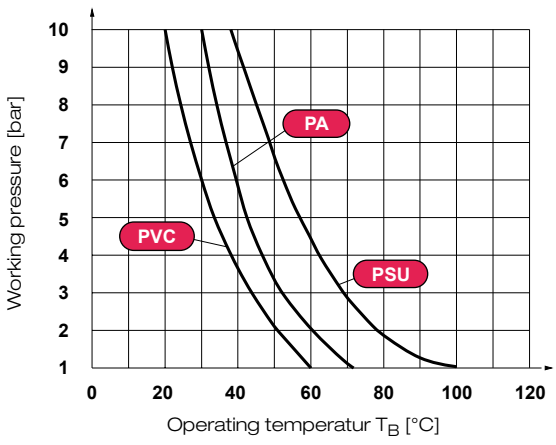
advice:

Probe must not get in contact with solvents.

Notes on operating

- Avoid pressure surges, as these can damage the unit.
- Exercise caution when installing. The measuring tube must not come into contact with solvent.
- Before start-up, make sure that the connected parts are sufficiently tightened.

Working pressure[1] p_B in bar



[1] Definition see chapter T2 / technical information

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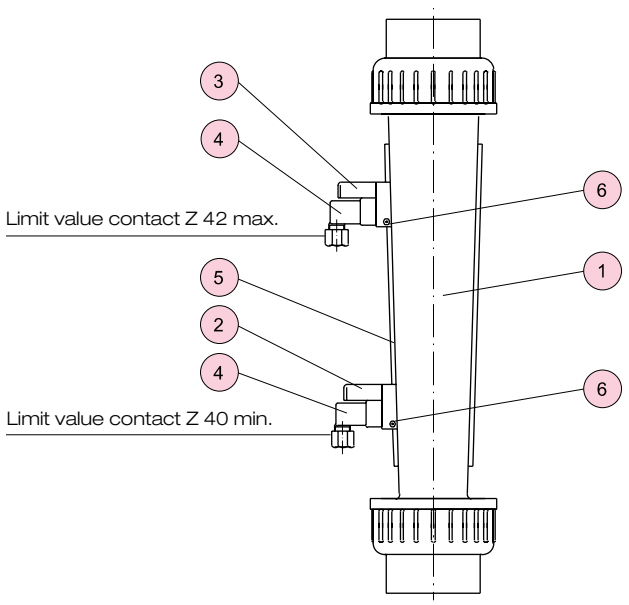
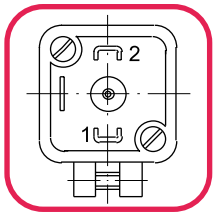
Limit value contact type Z 40 min. and type Z 42 max.
(Accessories for flow meter types M 335 / M 350, type M 123)

Functional component



No.	Description
1	Flow meter with solenoid-float
2	Limit value contact Z 40 min.
3	Limit value contact Z 42 max.
4	Angle plug for cable connection
5	Dovetail guide for mounting the Z 40 and Z 42
6	Clamping screw for fastening the limit value contact

Terminal connections



Description

Caution: *For using the limit value contacts Z 40 min. and Z 42 max. a flow meter M 335, M 350 or M 123 with solenoid-float is required.*

The limit value contacts Z 40 min. and Z 42 max. are used for external monitoring of limited flow values on our float-type flow meters. They are mounted onto the dovetail guide located on the flow measuring device and can be set to any desired value of the corresponding scale.
A solenoid installed in the float closes or opens a reed contact permanently cast in the limit value contact. The switching function is bistable. This means that the switching state is maintained even if the solenoid float moves away from the contact.

Advices

Caution: *Before starting please read the following using and mounting details.*

The limit value contacts Z 40 min. and Z 42 max. are not suitable for direct switching of larger consumers like pumps etc. In such cases you must use suitable switch components or SPS.
When retrofitting limit value contacts, ensure that the standard float is replaced with a solenoid float. The solenoid float is clearly identified by a „M“ on the top.

Installation instructions

- Put the limit value contact **2**/**3** on the dovetail guide **5**.
- Adjust the switch-point and fasten the clamping screw **6**.
- Demount the angle plug **4** and wire the cables. The seal must be insert when mounting.

Technical data

Switching voltage*):	max. 230 V
Switching rating*):	max. 10 W / 12 VA
Switching current*):	max. 0,5 A
Contact resistance:	< 200 mOhm
Leakage resistance:	> 10^{11} Ohm
Environmental temperature:	0 – 55 °C
Protection class:	in acc. with ISO 20653:2013-02 - IP 65
Switching hysteresis Z 40/42:	1 – 2 mm float travel

*) Even a brief overshoot is not permitted

Order numbers

Z 40 min.	517 100 686
Z 42 max.	517 100 687

Switching status

	Float	
	above	below
Z 40 min.	open	closed
Z 42 max.	closed	open

Dokument: *FRANK_DB_L6_Grenzwertkontakt Typen Z 40 min. + Z 42 max._01-2024_EN*

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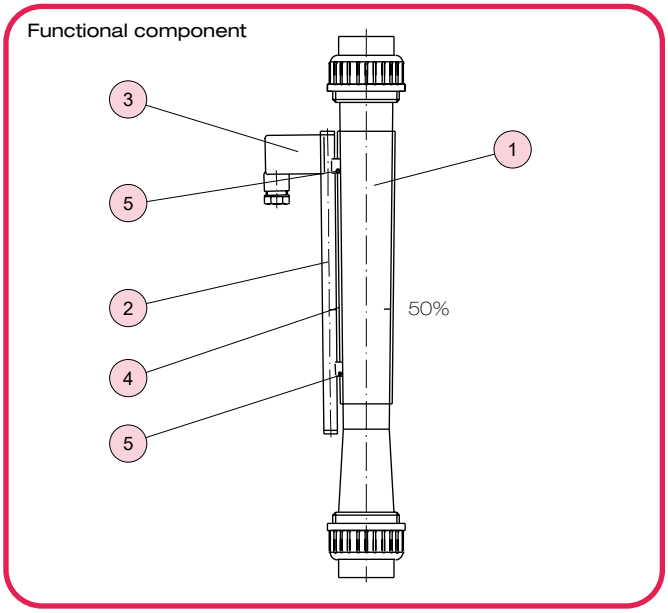
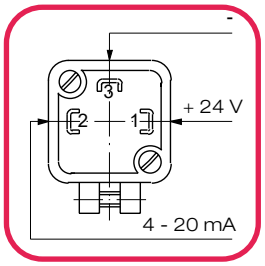
Measuring sensor type Z 60 (Accessories for flow meter type M 335 and type M 350)

Functional component



No.	Description
1	Flow meter type M 335 and type M 350 with solenoid float
2	Measuring sensor Z 60
3	Angle plug with cable connection
4	Dovetail guide to adjust the Z 60
5	Clamping screw to fix the Z 60 in the correct position

Terminal connections



Description

- The Z 60 measuring sensor has a new developed special electronic device with microprocessor and sensors. It supplies a analogue output signal 4 - 20 mA in accordance with the position of the float. This can be used with the PLC directly without any other de vices. By using the Z 60 monitoring and controlling of flows can be easily and cost efficient realized.
- If a magnetic float is mounted in the M 335 / M 350 the measuring sensor Z 60 can be added at any time during process.

Special features

- Easy assembling (even after installation of flowmeter mounting is always possible)
- 4 - 20 mA analoque signal

Accessories

- With encapsulated cable / sensor

Technical data

Supply voltage:	12-24 V ± 10%
Power consumption:	< 50 mA
Load resistance:	min. 0 Ohm, max. 500 Ohm
Current output:	4-20 mA (3 wire)
Measurement accuracy:	< 1%
Protection class:	acc. ISO 20653:2013-02 - IP 65
Temperature:	0 °C to +50 °C
Connection:	Angle plug acc. DIN EN 175301-803:2007-03
Electric protection:	Reverse voltage protection Integrated filter for supply voltage

Installation instructions

- Mount the flow transmitter onto the dovetil guide.
- Adjust the marking of the flow transmitter to the position as 50% mark of the scale.
- Fasten the clamping screw **5**.
- Demount the angle plug and wire the cables. The seal must be insert when mounting.