

Magnetostrictive Liquid-Level Sensors with Temposonics® Technology

Product Accessories

Floats, Weights, Meters, Enclosures, Indicators, Interface Terminals and Programming



Document Part Number 551103 Revision F

FEATURES

- Variety of Styles and Sizes to Fit Most Applications
- Available in 316L Stainless Steel, Teflon[®], Hastelloy[®] C and Nitrophyl[®]
- Custom Weighting Available

APPLICATIONS

- Custody Transfer
- Inventory Control
- Bulk Storage
- Sanitary Process Control

MARKETS

- Petroleum and Petrochemical
- LPG Terminals
- Biotech and Pharmaceutical
- Food and Beverage
- Waste and Wastewater



MTS Offers a Variety of M-Series Liquid-Level Product Accessories

Accessories overview

MTS Sensors offers a variety of floats to meet your application needs. Our floats come in a variety of sizes from less than 38 mm (1.5 in.) up to 178 mm (7 in.) in diameter. Float materials are available in stainless steel, Teflon[®], Hastelloy[®] C and Nitrophyl[®].

Offset weighted floats are also available for applications requiring ATEX approval. Product viscosity, specific gravity, and temperature can vary widely in a process or tank gauging application. Because of these variables and others, such as tank pressure and corrosiveness, no one float can meet all requirements. Therefore, a variety of float styles are available and we will assist you in choosing the one that best meets your requirements.

When choosing a float for your application, MTS recommends you choose one that has a specific gravity of at least 0.05 less than that of the measured liquid. For interface measurement, a minimum of 0.05 specific gravity differential is recommended between upper and lower liquids.

MTS Sensors also offers a variety of meters, housings, and calibration equipment as accessories to our transmitter range. Meters are available for analog, DDA, and Modbus outputs.

For questions concerning the usage of different floats in a hazardous area, please consult our Brief Operating Manual for Safe Use.

For more information, please contact the MTS Sensors' applications department or go to www.mtssensors.com for more information.



All specifications are subject to change. Contact MTS for specifications and engineering drawings that are critical to your application. Drawings contained in this document are for reference only. Go to www.mtssensors.com for the latest support documentation.

Standard Float Options

- 1. Be sure that the float specific gravity is at least 0.05 less than that of the measured liquid as a safety margin at ambient temperature.
- 2. For interface measurement: A minimum of 0.05 specific gravity differential is required between the upper and lower liquids.
- 3. When the magnet is not shown, the magnet is positioned at the center line of float.
- 4. Offset weight option: A weight is installed in the float to bias, or tilt, the float installed on the transmitter tube so that the float remains in contact with the transmitter tube at all times. The offset option is required for installations that must conform to ATEX standards.
- 5. Drawings contained in this document are for reference only. Contact the factory for engineering drawings.
- 6. *Standard float that can be expedited.



STANDARD PRODUCT FLOATS Float and dimension reference		Pressure	Temp.	Magnet offset	Specific gravity	Material	Weight offset	Part number
	91 mm (3.57 in.)	29.3 bar	149 °C	No	0.43	SS	No	251469-1
M GASA BIOSTI Jacobio BIOSTI Jacobio BIOSTI Jacobio Altaria	89 mm (3.5 in.) dia.	(425 psi)	(300 °F)	NO	0.45	SS	Yes	251469-2

LOW-LIFTOFF FLOAT Float and dimension reference	Pressure	Temp.	Magnet offset	Specific gravity	Material	Weight offset	Part number
15 m (0.57 in.) Ret (1.52 ln.) (1.52 ln.) (1	8.6 bar (125 psi)	149 °C (300 °F)	Yes	0.65	SS	No	252228-3
STANDARD INTERFACE FLOATS Float and dimension reference	Pressure	Temp.	Magnet offset	Specific gravity	Material	Weight offset	Part number
→ ← 18 mm (0.7 in.) dia.						offset No	251982-1*
77 mm	20.2 har	140 °C		0.00 -	55	Yes	251982-2
	(425 psi)	(300 °F)	No	0.96		offset No Yes No	251982-3
47 mm (1.85 in.) dia.			No 0.96 0.96 Hastelloy C	Yes	251982-4		
					22	No	251983-1
77 mm (3.01 in.)	29.3 bar	149 °C	No	1.03 -	00	Yes	251983-2

$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	47 mm (1.85 in.) dia.					Hastelloy C	Yes
	27 mm (1.06 in.) 47 mm (1.83 in.) dia.	4 bar (60 psi)	149 °C (300 °F)	Yes	0.85 - 0.9	SS	Yes

149 °C (300 °F)

1.10

No

1

29.3 bar (425 psi)

251983-3

251983-4

201606-2*

No

General Notes (for sanitary applications):

- 1. Be sure that the float specific gravity is at least 0.05 less than that of the measured liquid as a safety margin at ambient temperature.
- 2. For interface measurement: A minimum of 0.05 specific gravity differential is required between the upper and lower liquids.
- 3. Sanitary polish is available for stainless-steel floats up to 200 Grit/Ra 25.
- 4. Electropolish is available for stainless-steel floats up to 240 Grit/Ra 15.
- 5. When the magnet is not shown, the magnet is positioned at the center line of float.
- 6. Offset weight option: A weight is installed in the float to bias, or tilt, the float installed on the transmitter tube so that the float remains in contact with the transmitter tube at all times. The offset option is required for installations that must conform to ATEX standards.
- 7. Drawings contained in this document are for reference only. Contact the factory for engineering drawings.
- 8. *Standard float that can be expedited.

Notes:

- 1. Float meets 3A Sanitary specifications.
- 2. Use this float with all Sanitary transmitter wells as other floats may enter the inactive zone when the tank is emptied.



Notes:

- 1. Float meets 3A Sanitary specifications.
- 2. Float may enter the inactive zone when used with 3A Sanitary transmitter wells.

Float and dimension reference	Pressure	Temp.	Magnet offset	Specific gravity	Material	Weight offset	Part number
					SS 200 Grit/ Ba 25 um	No	200931-1
	22.4 bar 149 °C	No	0.63	(0.625 μm)	Yes	200931-2	
	(325 psi)	(300 °F) NO 0.		SS 240 Grit/ Ba 15 um	No	200931-3	
18 mm (0.7 in.) dia.		(0.375 µm)	Yes	200931-4			
	22.4 bar					SS 200 Grit/ Ba 25 um	No
75 mm (2.95 in.) C 64 mm (2.5 in.) C 64 mm (2.5 in.)		149 °C			(0.625 μm)	Yes	200931-6
38 mm (1.5 in.)	(325 psi)	(300 °F)	Yes	0.63	SS 240 Grit/	No	200931-7
← 60 mm _→ (2.34 in.) dia.				Ra 15 (0.375 μm)	Yes	200931-8	



Notes:

- 1. Float meets clean-in-place and drain-in-place applications.
- 2. Float may enter the inactive zone. Consult factory about viability of usage.

Float and dimension reference	Pressure	Temp.	Magnet offset	Specific gravity	Material	Weight offset	Part number
51 mm (2 in.) 0.D. Over weld bead 50 mm (1.98 in.) 50 mm (1.96 in.)	22.4 bar	149 °C	No	0.74	SS 200 Grit/	No	251234-1
Magnet - 18 mm - Min ID	(325 psi)	(300 °F)	No	0.74	Ra 25 μm (0.625 μm)	Yes	251234-2

Notes:

- 1. Float meets 3A Sanitary specifications.
- 2. Float meets clean-in-place and drain-in-place applications.
- 3. Float may enter the inactive zone. Consult factory about viability of usage.

Float and dimension reference	Pressure	Temp.	Magnet offset	Specific gravity	Material	Weight offset	Part number
R.157 (4) Min. Magnet position 73 mm (2.21 in.) 23 mm (.9 in.) dia. 80 mm (3.15 in.) dia.	64 bar (900 psi)	149 °C (300 °F)	Yes	0.83 - 0.86	SS 240 Grit/ Ra 15 μm (0.375 μm)	Yes	560564-2

Teflon Float Options

- 1. Be sure that the float specific gravity is at least 0.05 less than that of the measured liquid as a safety margin at ambient temperature.
- 2. For interface measurement: A minimum of 0.05 specific gravity differential is required between the upper and lower liquids.
- 3. When the magnet is not shown, the magnet is positioned at the center line of float.
- 4. Offset weight option: A weight is installed in the float to bias, or tilt, the float installed on the transmitter tube so that the float remains in contact with the transmitter tube at all times. The offset option is required for installations that must conform to ATEX standards.
- 5. Drawings contained in this document are for reference only. Contact the factory for engineering drawings.
- 6. *Floats 251939, 251119, and 251120 should not be used in hazardous areas. Please consult Brief Operation Manual for Safe Use for further details.



- 1. Be sure that the float specific gravity is at least 0.05 less than that of the measured liquid as a safety margin at ambient temperature.
- 2. For interface measurement: A minimum of 0.05 specific gravity differential is required between the upper and lower liquids.
- 3. When the magnet is not shown, the magnet is positioned at the center line of float.
- 4. Offset weight option: A weight is installed in the float to bias, or tilt, the float installed on the transmitter tube so that the float remains in contact with the transmitter tube at all times. The offset option is required for installations that must conform to ATEX standards.
- 5. Drawings contained in this document are for reference only. Contact the factory for engineering drawings.

NITROPHYL FLOATS Float and dimension reference	Pressure	Temp.	Magnet offset	Specific gravity	Material	Weight offset	Part number
			0.40 Nitro	Nitrophyl	No	201643-1	
18 mm 18 mm (.07 in.) dia. 76 mm (3 in.)				0.45	-1-3	Yes	201643-2
	17.0 hor	104.90		0.80 -	Nitrophyl	No	201649-1
	(250 psi)	(220 °F)	Yes	0.86	мпгорпуг	Yes	201649-2
		0.91 - Nitrophyl	No	201650-1			
Added weight for interface floats 31 mm (1.2 in.) dia.				0.96	мпорпу	Yes	201650-2

Long-gauge Float Options

- 1. Be sure that the float specific gravity is at least 0.05 less than that of the measured liquid as a safety margin at ambient temperature.
- 2. For interface measurement: A minimum of 0.05 specific gravity differential is required between the upper and lower liquids.
- 3. When the magnet is not shown, the magnet is positioned at the center line of float.
- 4. Offset weight option: A weight is installed in the float to bias, or tilt, the float installed on the transmitter tube so that the float remains in contact with the transmitter tube at all times. The offset option is required for installations that must conform to ATEX standards.
- 5. Drawings contained in this document are for reference only. Contact the factory for engineering drawings.
- 6. *Standard float that can be expedited.

LONG-GAUGE FLOATS Float and dimension reference	Pressure	Temp.	Magnet offset	Specific gravity	Material	Weight offset	Part number
				0.54	SS	No	252961-1*
				0.04	00	Yes	252961-2
92 mm (3.6 in.) dia. 28 mm (1.1 in.) dia. 76 mm (3 in.) 88 mm (3.44 in.)				0.65	Hatellov-C	No	252961-3
						Yes	252961-4
		149 °C Vcc 0.90 -	SS	No	252962-1		
	29.3 bar			Yes	252962-2		
	(425 psi)	(300 °F)	163	0.90	Hatelloy-C	No	252962-3
					Yes	252962-4	
				SS	No	252963-1	
				1.03 -		Yes	252963-2
			1.03 - 1.1 Hatelloy-C	No	252963-3		
					naterioy o	Yes	252963-4
				0.44	66	No	201248-1*
				0.44	33	Yes	201248-2
III				0.50	Listellov C	No	201248-3
Ar Git 92				0.52	Hatelloy-C	Yes	201248-4
and the second se					00	No	252959-1
T & Magnet	37.9 bar	149 °C	V	0.90 -	55	Yes	252959-2
127 mm	(550 psi)	(300 °F)	Yes	0.96		No	252959-3
(4.98 in.) 116 mm					Hatelloy-C	Yes	252959-4
(4.55 in.) 28 mm (1.1 in.)						No	252960-1
				1 03 -	SS	telloy-C $ $	252960-2
				1.1		No	252960-3
→ 130 mm (5.11 in.)					Hatelloy-C	Yes	252960-4

LONG-GAUGE FLOATS (CONTINUED) Float and dimension reference	Pressure	Temp.	Magnet offset	Specific gravity	Material	Weight offset	Part number	
				0.44	22	No	251426-1	
				0.44		Yes	251426-2	
178 mm (7 in.)					0.47	Hastelloy	No	251426-3
48 mm (1.9 in.)				0.47	C-22*	Yes	251426-4	
178 mm (7 in.)	17.2 bar	149 °C	No		SS	No	251427-1	
	(250 psi)	(300 °F)	0.90 -	00	Yes	251427-2		
		0.96 Hastelloy	Hastelloy	No	251427-3			
					C-22*	Yes	251427-4	
				1.03 -	SS	SS No		
				1.10		Yes	251428-2	
			0.66	22	No	201232-1*		
MTS 20/12221 S ² GR.8) A ut (1.1 in.) dia.				0.00	33	Yes	201232-2	
127 mm (5.01 in.)	22.4 bar	149 °C	No	0.70	Hastellov C	No	201232-3	
70 mm (2.76 in.) max. dia.		(325 psi)	(300 °F)	140	NO 0.70 Hastelloy (Hastendy 6	Yes	201232-4
				0.92 -		No	201233-1	
				0.96	33	Yes	201233-2	

* Internal Diameter for these floats is 34.8 mm (1.37 in.).

ANALOG PROCESS METERS		Part number
600060 §	LED Display Universal Analog Process Meter* Precision Digital PD6000-6R0 6 Digit LED display Input: Analog 4-20 mA Output: None 110 VAC Input Power 32 point linearization Includes 24 Vdc transmitter supply Material: Standard 1/8 in. DIN, high impact plastic, NEMA Type 4X front panel	380071
600060 g	LED Display Universal Analog Process Meter (2 Relays)* Precision Digital PD6000-6R2 6 Digit LED display Input: Analog 4-20 mA Output: 2 relays 110 VAC Input Power 32 point linearization Includes 24 Vdc transmitter supply Material: Standard 1/8 in. DIN, high impact plastic, NEMA Type 4X front panel	380072
SCOBSO GRU-L2." - E	LED Display Universal Analog Process Meter (4 Relays)* Precision Digital PD6000-6R4 6 Digit LED display Input: Analog 4-20 mA Output: 4 relays 110 VAC Input Power 32 point linearization Includes 24 Vdc transmitter supply Material: Standard 1/8 in. DIN, high impact plastic, NEMA Type 4X front panel	380073
GRU-LZ-T	LED Display Universal Analog Process Meter (2 Relays, 4-20 mA)* Precision Digital PD6000-6R5 6 Digit LED display Input: Analog 4-20 mA Output: 4-20 mA and 2 relays 110 VAC Input Power 32 point linearization Includes 24 Vdc transmitter supply Material: Standard 1/8 in. DIN, high impact plastic, NEMA Type 4X front panel	380095
	XP Loop Powered Analog Meter Loop Powered on 4-20 mA output Displays in Percentage Only Embedded in XP Housing XP: Class I, II, III; Division 1; Groups B-G IS: Class I, II, III; Division 1; Groups A-G	380062
	Loop Powered Analog Meter F070-A-HG-PL-X1-ZB Loop Powered on 4-20 mA output Displays loop current, engineering units, and/or value Selectable on screen engineering units IP 67 / NEMA Type 4X Intrinsically Safe, backlight	380088

* Contact MTS for more options including explosion proof housings.

MODBUS PROCESS METERS		Part number
RET NORES 160 59.09.0 0 Q Part Part Nov Part Part	Multivariable Modbus Process MeterDisplay levels in feet, inches, and 16ths of an inchScrolling Display of Product, Interface, Temperature, or combinationInput:RS485 Modbus RTUOutput:2 Form A relays and 4-20 mA110 VAC Input Power16 point linearizationIncludes 24 Vdc transmitter supplyMaterial:Standard 1/8 in. DIN, high impact plastic, NEMA Type 4X front panel	380086
PRECISION DIGITAL + PRECISION DIGITAL + POID - HISTORIAL + POID - HIST	Single Variable Modbus Process Meter* Precision Digital PD865-6R5-16 6 Digit Display in Decimal Format Display 1 process variable without interrupting Master/Slave communication Input: RS485 Modbus RTU Output: 2 Form A relays and 4-20 mA 110 VAC Input Power 16 point linearization Includes 24 Vdc transmitter supply Material: Standard 1/8 in. DIN, high impact plastic, NEMA Type 4X front panel	380094

* Contact MTS for more options including explosion proof housings.

PROCESS METER ENCLOSUR	Part number	
15572 (1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.	NEMA Enclosures [†] Single NEMA 4X (PDA 2811) Dual NEMA 4X (PDA 2302) † NEMA Enclosures are available for most process meters, please contact factory for more information.	401150 401151
MODBUS TERMINALS		Part number
red lon 7 6 6 4 6 6 4 6 6 5 2 3 6 0 7 6 0 7 7 8 0 7 8 0 7 8 0 7 8 0 7 8 0 7 8 0 7 9 0 9 0 9 0 9 0 9 0 9 0 9 0 9 0 9 0 9 0	LCD Modbus Terminal Displays up to 4 tanks (2 levels, temp, volume) Displays up to 8 tanks (2 levels, temp) Displays levels in ft., in, and 16ths in. Input: Up to 8 Modbus transmitters Output: Modbus Mounted in NEMA 4 box Class 1 Div. 2 Includes Power Supply Calibrate from Screen	280494-X
red ton TANK1 TANK2 TANK1 TANK2 TANK1 TANK2 TANK1 TANK2 TANK2 TANK1 TANK2 TANK2 TANK1 TANK2 TANK2 TANK1 TANK2 TANK2 TANK2 TANK2 TANK2 TANK2 TANK2 TANK2 TANK2 TANK2 TANK2 TANK2 TANK2 TANK2 TANK2	Touchscreen Modbus Terminal Displays up to 16 tanks (2 levels, temp, volume) Displays levels in ft., in, and 16ths in. Input: up to 16 Modbus transmitters Output: Modbus Pictorial display of tanks Touchscreen Mounted in NEMA 4 box Class 1 Div. 2 Includes Power Supply Calibrate from Screen	280508-X

PROGRAMMING ACCESSORIES		Part number
	HT100 Hand Held Terminal M-Series Model MG Transmitter with DDA output Remote setup, troubleshooting, and maintenance	251259
SETUP SOFTWARE		Part number
	M-Series Model MG PC setup software on CD Includes RS-485 to RS-232 adapter, part no. 380077	625051
	M-Series Model MG PC setup software on CD	625052
	M-Series Model MR PC setup software on CD Includes HART adapter, part no. 380068	252273-1
	M-Series Model MR PC setup software on CD	252273-2
HARDWARE		Part number
	HART to RS-232 adapter (SMAR H1-311)	380068
	RS-485 to RS-232 adapter converter (B & B Electronics)	380077
	Hex Bushing 2 in. MNPT x 3/4 in. FNPT	561440
	Hex Bushing 2 in. FNPT x 4 in. MNPT	561441
	Hex Bushing 1 in. FNPT x 2 in. MNPT	561448

MAGNET AND WEIGHT ASSEMBLIES			Part number
	51 mm (2 in.) 76 mm (3 in.)	150 lb. Pull Magnet For LDF long transmitter and M-Series transmitters. (Top ring must be removed before installa- tion)	560604
	↓ 51 mm (2 in.) ↓ 127 mm (5 in.)	Standard 11 lb. Weight For M-Series transmitters	401059
	A 191 mm (7.5 in.) dia. 165 mm (6.5 in.) dia. 165 mm (6.5 in.) dia. 16 mm (.13 in.) 16 mm (.63 in.) 16 mm (.63 in.) Section A-A	Low Liftoff 11 lb. Weight Assembly Use with float, part no. 252999	402364
	89 mm (3.5 in.) dia. 32 mm (1.25 in.) dia. (2X) 1.3 X 45' Chamfer 1.3 X 45' Chamfer (1.44 in.) 4.5 in.) 1.3 X 45' Chamfer (1.44 in.) 64 mm (2.5 in.) 64 mm (2.5 in.)	Narrow 11 Ib. Weight Use with M-Series transmitters	402647

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MTS Systems Corporation Sensors Division

3001 Sheldon Drive Cary, North Carolina 27513, USA Tel.: +1-800-633-7609 Fax: +1-919-677-2343 +1-800-498-4442 e-mail: sensorsinfo@mts.com http://www.mtssensors.com

MTS Sensor Technologie GmbH & Co. KG

Auf dem Schüffel 9 D - 58513 Lüdenscheid, Germany Tel.: +49-2351-9587-0 Fax: +49-2351-56491 e-mail: info@mtssensor.de http://www.mtssensor.de

MTS Sensors Technology Corporation

737 Aihara-cho, Machida-shi Tokyo 194-0211, Japan Tel.: +81-42-775-3838 Fax: +81-42-775-5516 e-mail: info@mtssensor.co.jp http://www.mtssensor.co.jp