



Remote Meters with 4-20 Output Instruction and Operation Manual

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Series RM Rev. 4/7/2023

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I. SAFETY PRECAUTIONS

GENERAL: Be sure to follow all applicable and prudent safety precautions when working with chemical and electrical equipment.

ELECTRICAL: The circuit board and incoming A/C power line do include electrical shock risk. Take care to avoid electrical shocks and do not touch any part of the circuit board or A/C power line unless you are certain that A/C power has been disconnected from the system.

CHECK FOR DAMAGE: Before removing the product from the shipping packaging, carefully check the equipment for damage. If any product is found damaged, do not put it into operation or install it. Contact Hydro Instruments to discuss repair or replacement of the damaged sensor.

II. THEORY OF OPERATION

These remote meters work like a variable area flow meter, but with a slight twist. As with most variable area flow meters, as flow is increased/decreased it applies a certain amount of force to the float moving it up/down the tube, thus changing the surface area between the float and the glass wall until enough flow can go around the float and an equilibrium level is reached. The flow rate can then be determined based on calibrated markings on the tube. Hydro Instruments has taken this technology one step further by incorporating the use of magnetic fields. Implanted in the float is a magnet and behind the flow tube is a circuit board with Hall Effect sensors spaced out to the graduations on the tube. Thus as the magnet passes these sensors, a current is generated based on the float position which allows for remote monitoring of the flow rate.

III. SPECIFICATIONS

Gas Type: Chlorine and Sulfur Dioxide

Power requirements: 12-24 VDC

Outputs: (1) 4-20 mA output

Accuracy: 5% of full scale

Connections: 500 PPD (10 kg/h) – ½" FPT ports on the rear and side.
1,000 - 3,000 PPD (20 - 60 kg/h) – 1" NPT Sch.80 PVC unions.
4,000 - 10,000 PPD (80 - 160 kg/h) – 1.5" Sch.80 PVC unions.

All meters have a ¼" FPT (6.5mm) port for connecting a vacuum gauge and/or differential pressure regulator.

IV. INSTALLATION

1. Find a suitable location to mount the remote meter to a wall, panel or appropriate fixture. Four mounting holes are provided in the meter back panel.
2. Connect the red wire coming from the circuit board to the V+ terminal on a 12 to 24 VDC power supply board.
3. Connect the black wire coming from the circuit board to the V- terminal on the power supply board.
4. Connect the green wire coming from the circuit board to the positive terminal on the 4-20 mA receiver
5. Connect the white wire coming from the circuit board to the common/ground on the 4-20 mA receiver.
6. Install inlet and outlet chemical piping.

NOTE: Should the connector and cable included with the unit become broken or damaged or the operator has chosen not to use it, the four pin terminals on the circuit board (from left to right) correspond to V+, V-, AO+, AO-. (See diagram, page 11.)

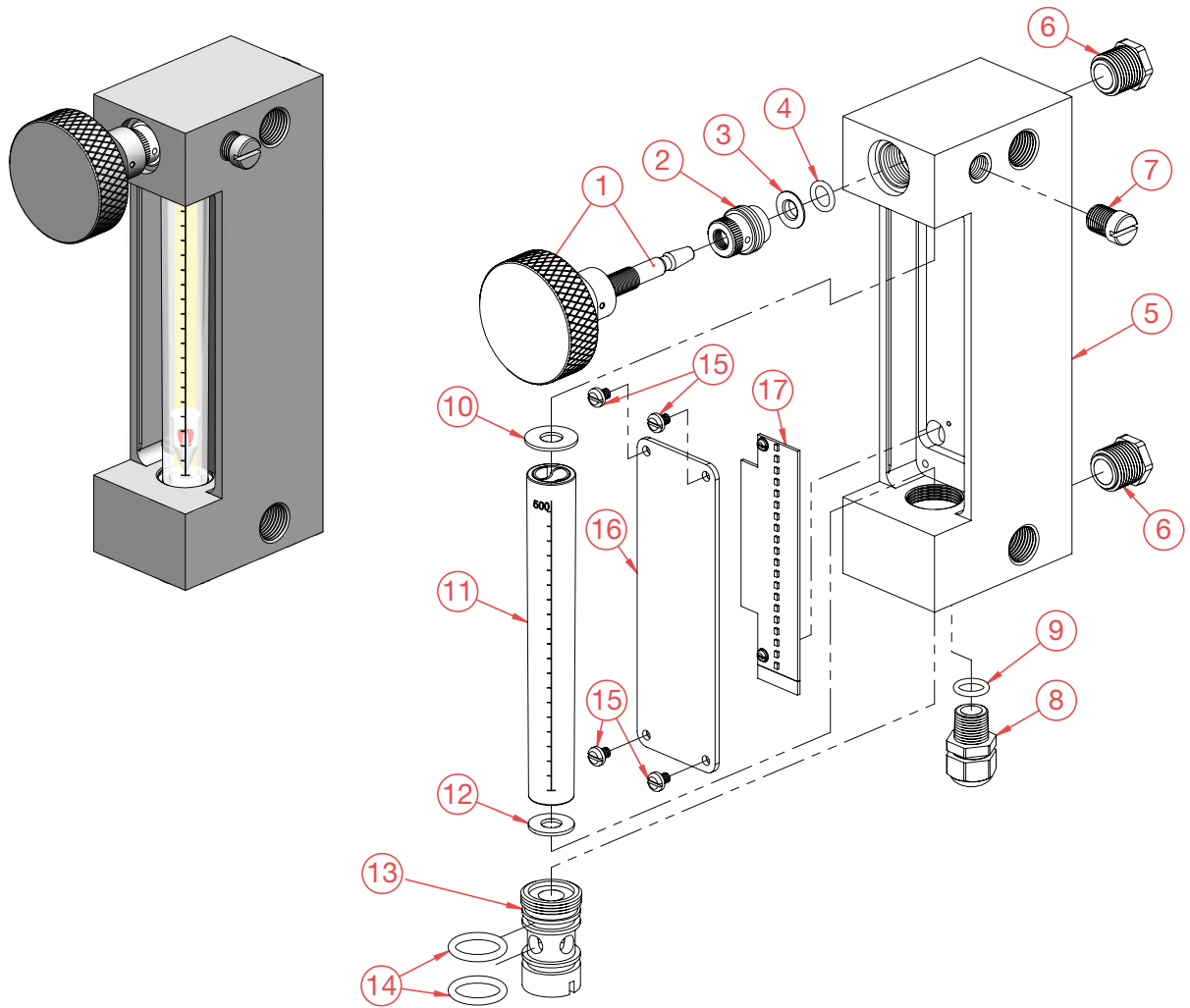
V. MAINTENANCE

Remote meters should be serviced at least once a year or sooner based on site conditions. Hydro Instruments provides parts and maintenance kits to ensure that the appropriate materials are used. Please reference the appropriate parts drawing when installing maintenance parts.

1. Using appropriate procedures evacuate all chemical from the feed line and isolate the remote meter from the system.
2. Unscrew the inlet plug and remove the flow tube and float.
3. Inspect and replace all gaskets and O-rings. Refer to the appropriate parts and maintenance kit and parts drawing for appropriate items and their locations.
4. Using warm water only, clean and rinse the flow meter tube and float.
5. Dry and re-install flow meter tube and float.

VI. TROUBLESHOOTING

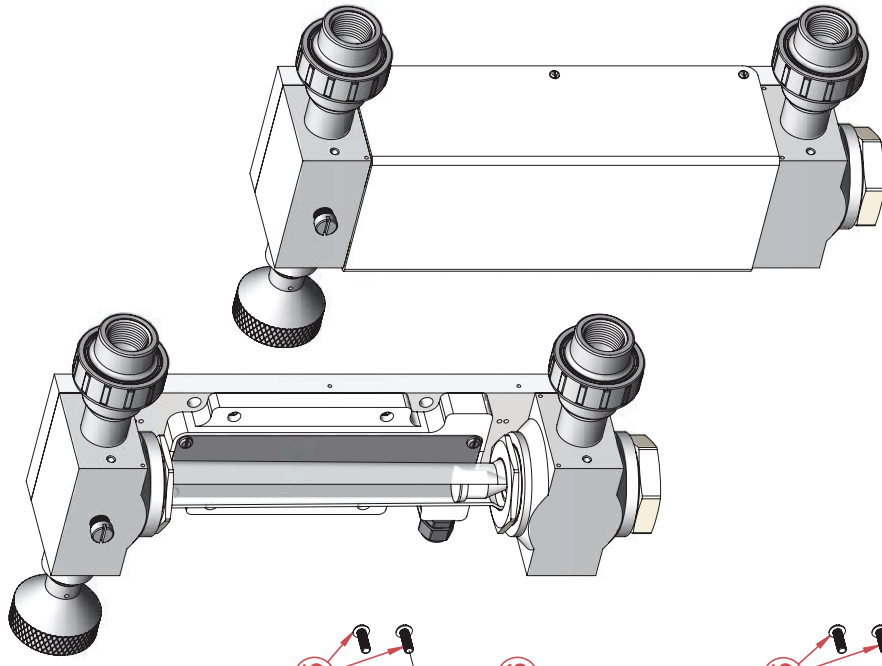
Problem	Probable Cause	Corrective Actions
No mA output	Improper wiring	Check wiring
	Power supply disconnected	Check wiring & Molex connector on circuit board
	Float/circuit board damage	Inspect float and circuit board, replace if necessary
No chemical feed	Rate valve closed	Rotate rate valve knob to ensure open
	Vacuum leak	Check and correct leaks
	Ejector	Ejector Ensure ejector is creating vacuum



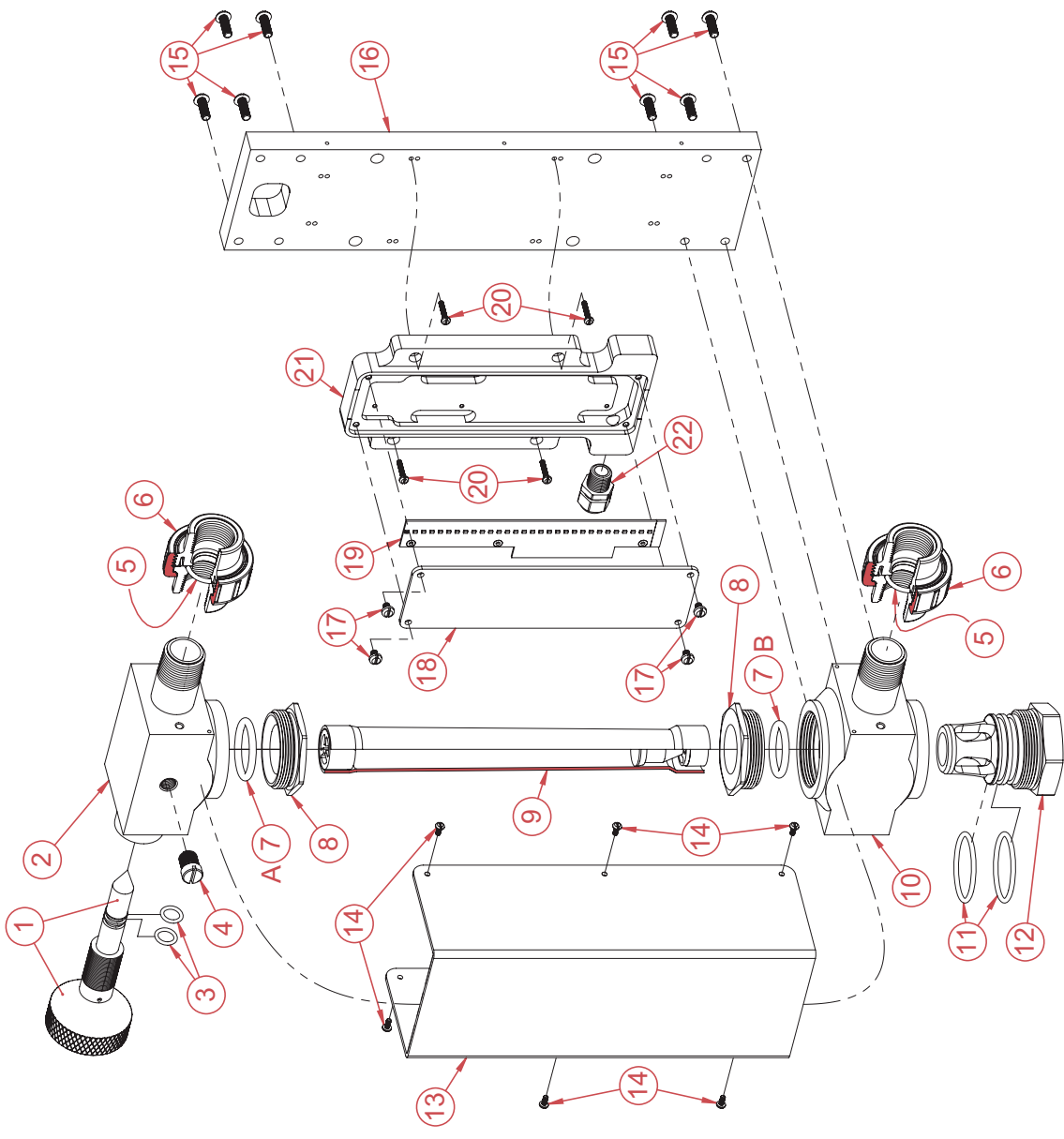
Item No.	Description	Quantity	Part No.	Item No.	Description	Quantity	Part No.
1	Rate Valve Stem & Large Knob	1	S-495-CAB-500	11	6" Meter Tube with Magnet Float (500 PPD)	1	MTH-420-500
2	Rate Valve Bonnet	1	S-493	12	^{PM} Bottom Meter Gasket	1	G-162
3	^{PM} Shaft Seal (Teflon)	1	SA-498	13	Meter Inlet	1	MIH-232-500
4	^{PM} O-Ring	1	OH-VIT-111	14	^{PM} O-Ring	2	OH-VIT-212
5	Meter Panel Body (4-20mA)	1	MPH-261-420-1	15	Screw	4	10-24 x 1/4"
6	1/2" NPT Plug	2	850-005	16	Circuit Board Cover	1	MPH-500-CBC
7	1/4" NPT Plug	1	PLH-108-250	17	Sensor Board	1	
8	Liquid Tight Fitting	1	BLT-199	*	Float with magnet (500 PPD)	1	MTH-420-500-FL
9	Required O-Ring for Liquid Tight Fitting	1	OH-VIT-112	*	Not shown. Float located inside meter tube.		
10	^{PM} Top Meter Gasket	1	G-161	^{PM}	Part & Maintenance Kit		KT5-702-RMP

hydro
INSTRUMENTS™
6" CABINET MOUNTED REMOTE METER
500 PPD (10 kg/hr)(Analog Output 4-20mA)


Date: 2023-04-07-v1
EXPLODED VIEW AND BOM
Dwg. No. MPH-500-CAB-420MA

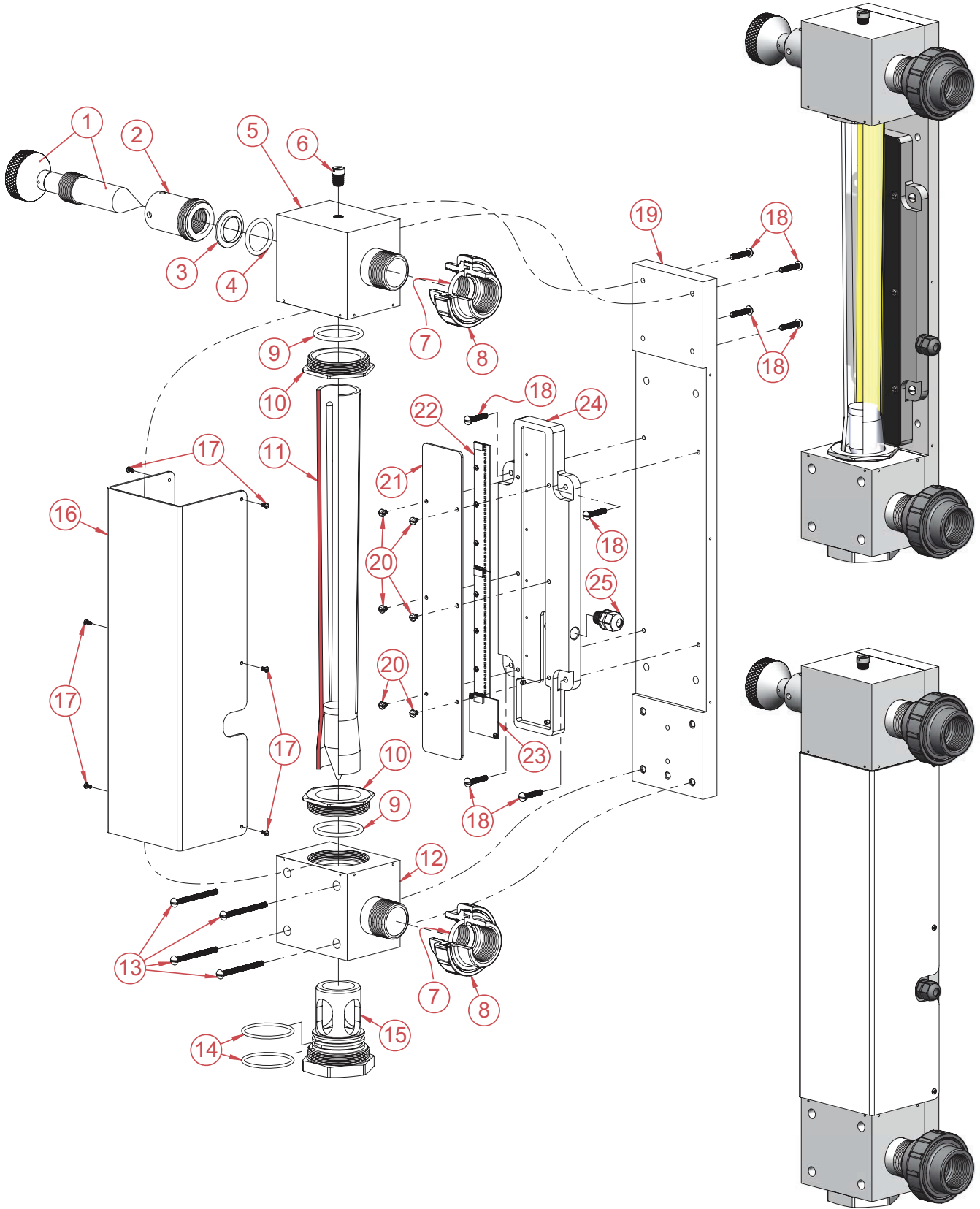


XXXX =
 1000
 2000
 3000



mpdro
 INSTRUMENTS™
 Date: 2021-11-17-v1
BILL OF MATERIALS
 12" HIGH CAPACITY REMOTE METER, 1,000-3,000 PPD (20-60 kg/h) Analog Output 4-20mA, EXP
 Dwg. No. RMH-XXXX-CL2-420MA, EXP

Item No.	Description	Quantity	Part No.	Item No.	Description	Quantity	Part No.
1	Rate Valve Stem w/ Knob & Pin	1	RVH-411-000	14	Meter Shield Screws	6	#6-32 x 5/16"
2	Top Meter Block	1	MBH-UB2-300	15	Meter Block Screws	8	BTH-STA-189
3	PM O-Ring	2	OH-VIT-112	16	Meter Base	1	MBU-12T-THN
4	1/4" NPT Plug	1	PLH-108-250	17	Screw	4	10-24 x 1/4"
5	PM O-Ring (for 1" PVC union)	2	OH-VIT-215	18	Circuit Board Cover	1	MPH-1000-CBC
6	1" PVC Union	2	U-4475	19	Sensor Board	1	
7A	PM O-Ring	1	OH-VIT-324	20	Screw	4	8-32 x 3/4" PHMS
7B	PM O-Ring	1	OH-VIT-322	21	Mounting Plate	1	MPH-1000-MP-THN
8	Meter Tube Hex Nut	2	MBH-THN-300	22	Liquid Tight Fitting	1	BLT-199
9A	12" Meter Tube (1,000 PPD / 20 Kg/h) with Magenat Float	1	MT-20-420MA	-	O-Ring for Liquid Tight Fitting	1	OH-VIT-212
9B	12" Meter Tube (2,000 PPD / 40 Kg/h) with Magenat Float	1	MT-40-420MA	-	Float with magnet (1,000 PPD)	1	MT-20-420MA-FL
9C	12" Meter Tube (3,000 PPD / 60 Kg/h) with Magenat Float	1	MT-60-420MA	-	Float with magnet (2,000 PPD)	1	MT-40-420MA-FL
				-	Float with magnet (3,000 PPD)	1	MT-60-420MA-FL
				-	Float located inside meter tube.		
10	Bottom Meter Block	1	MBH-LB3-300	PM	Parts & Maintenance Kit	1	KTH-3000-RMS
11	PM O-Ring	2	OH-VIT-224				
12	Meter Inlet Plug	1	MIH-300-000				
13	Meter Shield	1	MSU-12T-THN				
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> XXXX = 1000 2000 3000 </div>							
							
				Date: 2021-11-17-v1 BILL OF MATERIALS 12" HIGH CAPACITY REMOTE METER, 1,000-3,000 PPD (20-60 kg/h) Analog Output 4-20mA, EXP			




XXXXX =	4000
	6000
	8000
	10000


 Date: 2022-12-06-v1
BILL OF MATERIALS
 20" HIGH CAPACITY REMOTE METER,
 4,000-10,000 PPD (80-200 kg/hr) Analog Output 4-20mA
 Dwg. No. RMH-XXXXX-CL2-420MA, EXP

Item No.	Description	Quantity	Part No.
1	Rate Valve Stem & Knob	1	RVH-412-10000
2	Valve Bonnet	1	MBH-VB-10000
3	^{PM} Shaft Seal	1	RVH-852-SEAL
4	^{PM} O-Ring (for Rate Valve)	1	OH-VIT-324
5	Top Meter Block (Uses 1.5" PVC union)	1	MBH-UB2-10000
6	¼" NPT Plug	1	PLH-108-250
7	^{PM} O-Ring (for 1.5" PVC union)	2	OH-VIT-328
8	1.5" Union	2	U-4298
9	^{PM} O-Ring	2	OH-VIT-330
10	Meter Tube Hex Nut	2	MBH-THN-10000
11A	20" Meter Tube (4,000 PPD / 80 Kg/h) with Magnet Float	1	MTB-080KG-20-420MA
11B	20" Meter Tube (6,000 PPD / 120 Kg/h) with Magnet Float	1	MTB-120KG-20-420MA
11C	20" Meter Tube (8,000 PPD / 160 Kg/h) with Magnet Float	1	MTB-160KG-20-420MA
11D	20" Meter Tube (10,000 PPD / 200 Kg/h w/ Magnet Float	1	MTB-200KG-20-420MA
12	Bottom Meter Block (Uses 1.5" PVC Union)	1	MBH-LB3-10000
13	¼-20 x 3" Bolt	4	BTH-STA-279
14	^{PM} O-Ring	2	OH-VIT-229
15	Meter Inlet Plug	1	MIH-500-000
16	Meter Shield	1	MSU-20T-THN
17	Shield screw	6	#6-32 x 5/16"
18	¼-20 x 1 ¼" Bolt	4	BTH-STA-130
19	Meter Base	1	MBH-MB-10000-1
20	Screw	6	10-24 x ¼"
21	Circuit Board Cover	1	MPH-10000-CBC
22	Sensors Board	2	
23	Circuit Board	1	
24	Mounting Plate	1	MPH-10000-MP
25	Liquid Tight Fitting	1	BLT-199
-	O-Ring for Liquid Tight Fitting	1	OH-VIT-112
-	Float with magnet (4,000 PPD / 80 Kg/h)	1	MTB-080KG-20-420MA-FL
-	Float with magnet (6,000 PPD / 120 Kg/h)	1	MTB-120KG-20-420MA-FL
-	Float with magnet (8,000 PPD / 160 Kg/h)	1	MTB-160KG-20-420MA-FL
-	Float with magnet (10,000 PPD / 200 Kg/h)	1	MTB-200KG-20-420MA-FL
^{PM}	Part & Maintenance Kit	1	KTH-10000-MPS

XXXXX =	4000
	6000
	8000
	10000

 <small>20" HIGH CAPACITY REMOTE METER, 4,000-10,000 PPD (80-200 kg/hr) Analog Output 4-20mA</small>	Date: 2022-12-06-v1
	BILL OF MATERIALS Dwg. No. RMH-XXXXX-CL2-420MA, BOM

TITLE

Remote Meter with 4-20mA Output

DATE

6/21/2013

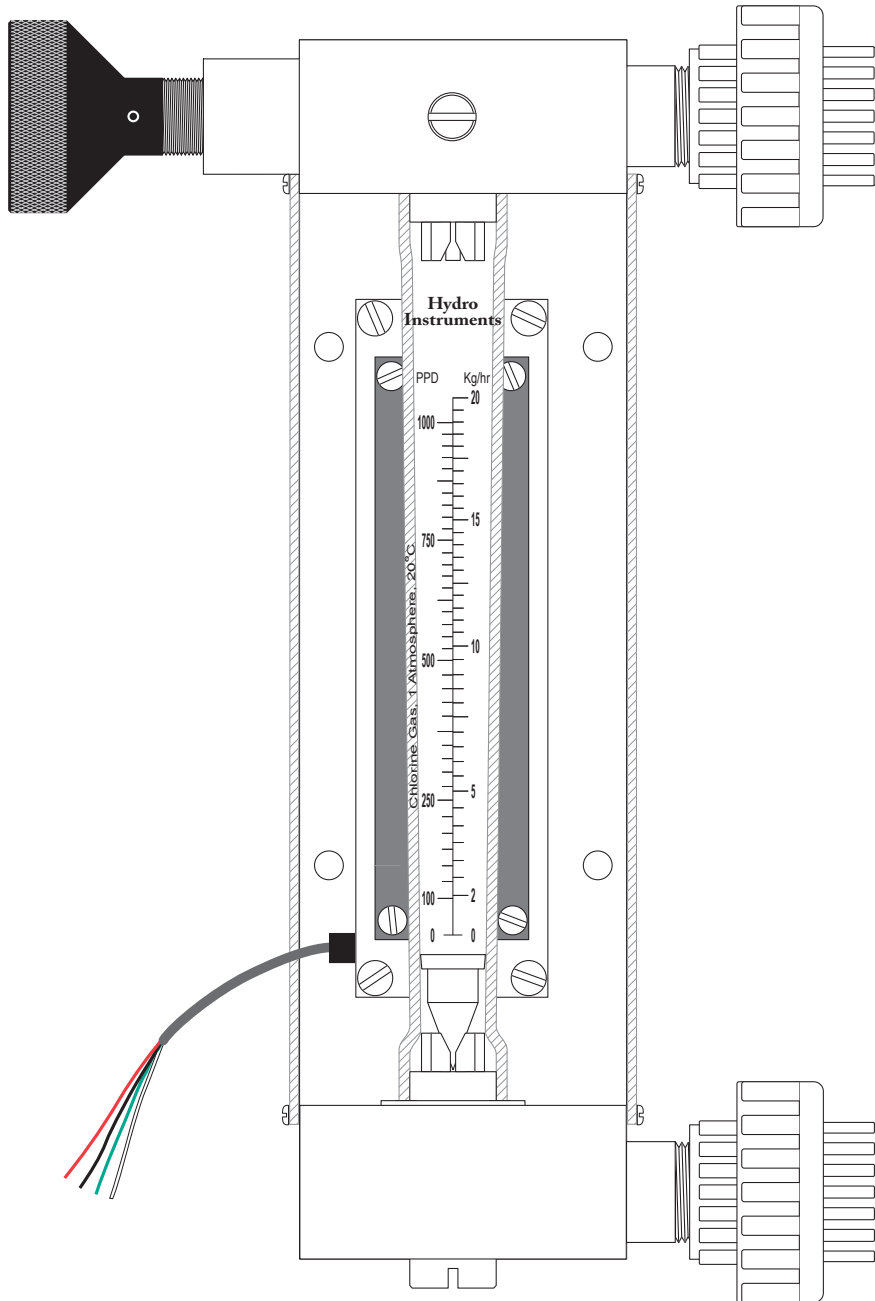
SCALE
40%

MEASUREMENTS

Inches
Millimeters

DWG. NO.

Wiring Diagram



Red	Black	Green	White
V+	V-	AO+	AO-