

Displacement flowmeter

Model: MDDS1

Introduction

MDDS1-Bi-Rotor Positive Displacement flowmeter features two precisely machined rotating members known as helical rotors which rotate and mesh within the meter's interior housing in order to form a measuring chamber of known volume which may be used to accurately determine volumetric flow rate as a function of the rotors' velocity. The helical rotors' motion is transmitted to the display via a sealed coupling & drive system that enables the display to provide accurate data for both flow rate and total accumulated flow. The unique helical rotor design provides a number of advantages over traditional gear-type PD meters including reduced pressure drop, the virtual elimination of down-stream pulsations, enhanced particle tolerance, and reduced maintenance. The advantages provided by the helical rotor make the MDDS1 an ideal choice for many applications including oil-in-water media and fluids with entrained solids.

Features

- Superior accuracy to 0.1% of reading over 30:1 turn-down
- Uniform rotation means low pressure loss
- No metal-to-metal contact provides for long service lifetime
- Self-lubricating Very low noise and vibration
- Reduced number of parts reduces maintenance requirements
- Rugged double case construction prevents loss of calibration
- Due to changes in pressure or temperature
- Size from 3/4" to 16"
- Complied with OMIL R120~1996

Principle

High accuracy is attained by two helical rotors which feature two finely balanced rotors (Refer to Figure 2). An adjuster, incorporated on the meter, is used to assure maximum accuracy within the meter's flow range.

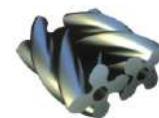
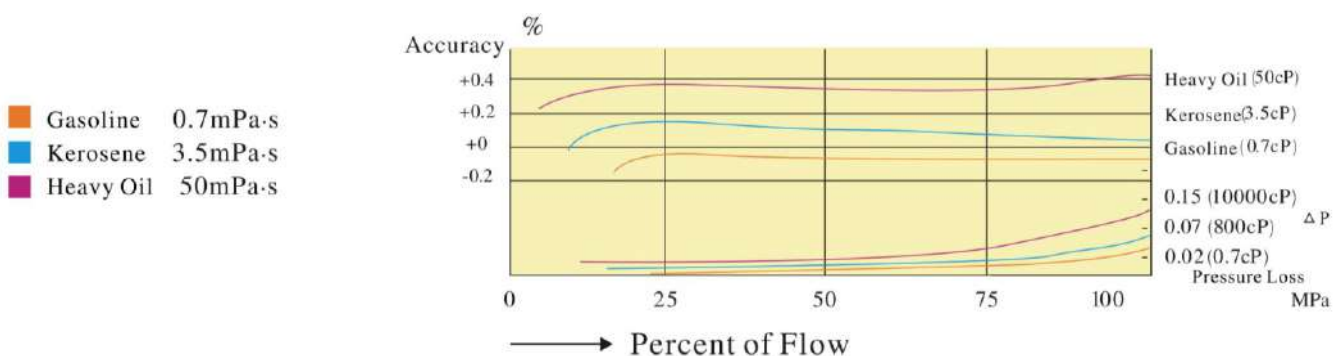


Figure 2, Bi-rotors inner measuring chamber.

Typical Pressure Drop Curve



Flow meter Registers options

Standard D type cheap solution of electronic register with explosion proof for options for instant and totalizer display with zero reset, 4-20mA, Pulse and Modbus RTU for communication



Standard dial type mechanical round indicator with non-resetable register, which is an ideal options for a non-resetable accumulative totalizer options.



MDIN 10 Electronic register with remote reading 4-20mA output/ Pulse output and data logging facilities ATEX, UL, CSA approved



N2 preset register select predetermined volume for precise batch control



N1 Mechanical register with pulser for volume indication 5 large digits numerical reset with 8 digital no reset totalizer. Liter, Cubic meter, Gallon units for options



TN ticket printer provides an imprinted ticket for delivery transactions, accumulative or zero start options available.



Technical Specification

- Accuracy: up to +/- 0.1%
- Line size: 1/4" to 16" (DN8mm to DN400mm)
- Repeatability: +/-0.02%
- Working pressure: up to ANSI 600Lb or customized
- Pulse output: (18 to 36V, VH=20V)
VL<1V and output load<200ohm
- Process temperature: -22 to 480°F (-30 to 250°C)
- Current output: 4-20mA, (two wires system w/600ohm max loop load 60mA)
- Viscosity: 0 to max.@ 20,000cp
- RS485 output: communication with modbus for D register only MODBUS RTU (powered by 18 to 36V
- Protection: IP65(IP67 for options)
- Display: Instantaneous/Total/Batch
- Ambient temperature: 104 to 176°F (40 to 80°C)
- Ambient humidity: 5% to 95% Rh @75°F
- User parameter: K factors, linear correction coefficient flowrate input signal section points,temperature and pressure compensation, set pulse output range, decimal adjustment, etc.

Materials of construction

Housing: welded steel construction combining steel castings and drawn steel plate
Rotators: Three/Four lobe rotators-cast steel as standard , SS304/SS316 for options
Measuring chamber: Cast case as standard(SS304 and SS316 for options)
Rotator shafts: E.T.D 150

Rotaror bearings: Stainless steel as standard , other materials for options
Body and end covers: cast steel, SS304 and SS316 for options
Couner base plate: cast steel
O-ring: Viton , PTFE
Drive shafts, Drive Gears and ball bearings:
Stainles steel

Dimension and Weight

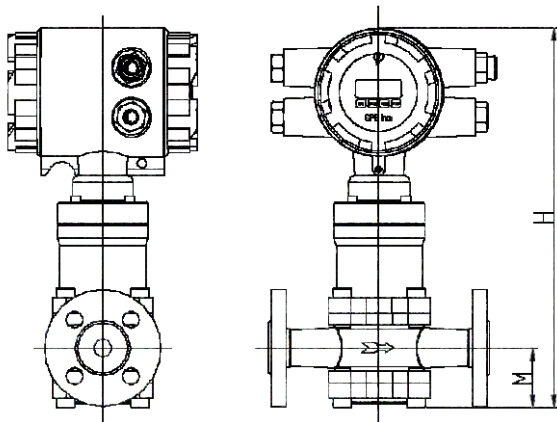


Figure 4,
Electronic D register flow meter size 3/8 to 1"

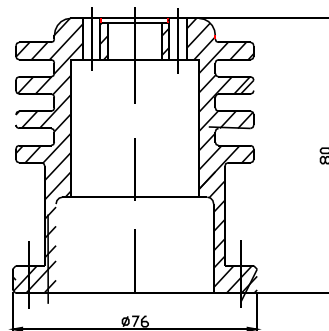


Figure 5, Cooling radiator

Table 1 Dimension for size 3/8" to 1" PD meter with D register figure 4

Size	FlangeDistant L, in mm	Total Height (H)	CentreHeight (M)	Weight Lb Kg
3/8" (Dn8mm)	5.91 150	11.02 280	1.87 47.5	5.43 71
1/2" (Dn15mm)	7.09 180	11.57 294	2.09 53	19.84 9
1" (Dn25mm)	7.87 200	13.58 345	2.95 75	33.07 15

Remarks

1. M may varies with expanded flange resulted from different flow range.
2. The cooling radiator should be added with the working temperature higher than 125°C(257° F) . See Fig 5

Table 1 Electric register D series DN8mm- DN25mm (3/8" to 1 inch) (check Fig.4 and Fig 5)

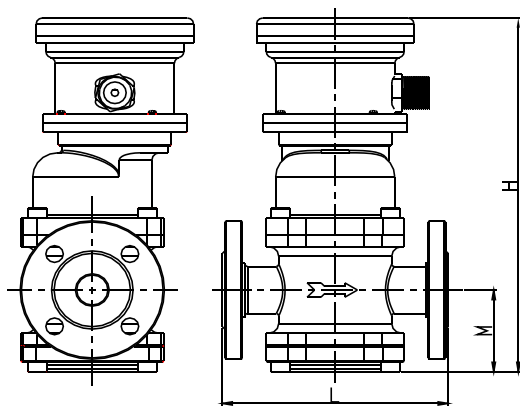


Fig. 6 Round mechanical register type meter

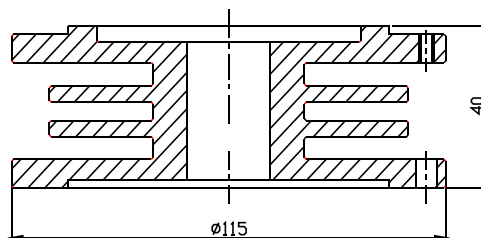


Fig. 7 Cooling radiator

Table 2 Round mechanic register DN15mm-DN25mm(1/2" to 1") (Fig. 6 and Fig. 7)※

Size in mm	FlangeDistant L, in mm	Total Height (H) in mm	CenterHeight (M) in mm	Weight lb (Kg)
1/2 " (Dn15mm)	180 7.09	270 10.63	53 2.09	8 17.64
1" (Dn25mm)	200 7.87	300 11.81	75 2.95	14 30.86

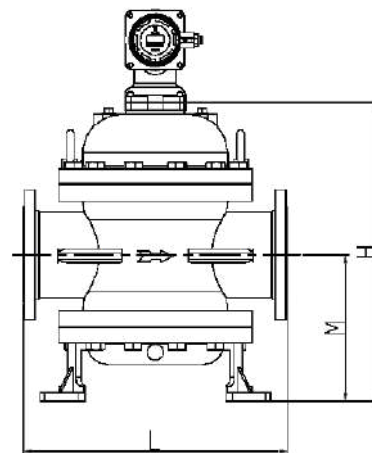
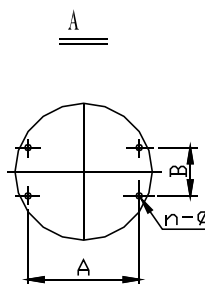
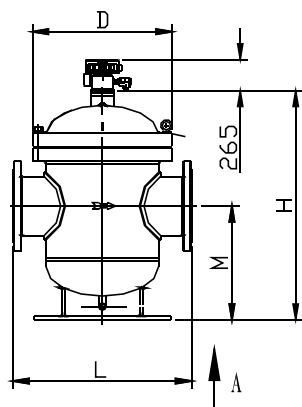


Fig.8 Vertical structure for PD flowmeter

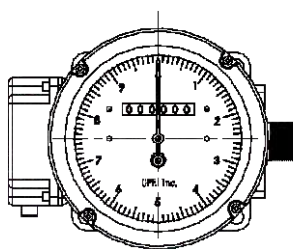


Fig.9 round register

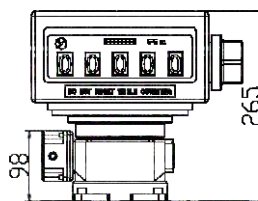


Fig.10 N1 register

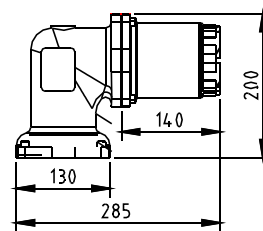


Fig.11 D electronic register

- 1) size 3/8" to 1" only support M type round register and electronic type register .
- 2) N1 square mechanical register support size 1 1/2" and bigger size.
- 3) Operator should install the flow meter as the arrow marks in the flow meter sensor body.
- 4) Factory result the right to change dimension without responsibility.

Table 3 Vertical installation size for size DN40mm to DN400mm(1-1/2" to 16") (Check Fig.8)

Size In Cm	Flange Distant L, in mm	Total Height (H) In mm	Center Height(M) In mm	Upper Dia(D) In mm	Install Dim. A × B In mm	Bolt hole size n-Φ	Weight, Kg lb
1 1/2 " (Dn40mm)	9.84 250	13.19 335	4.96 126	7.28 185			83.78 38
2" (Dn50mm)	14.17 360	16.14 410	5.91 150	9.25 235			123.46 56
3" (Dn80mm)	15.75 400	21.06 535	8.74 222	12.2 310			246.92 112
4" (Dn100mm)	17.72 450	22.83 580	10.63 270	12.2 310	235× 170 9.25*6.69	4-Φ 23	330.69 150
6" (Dn150)	22.05 560	26.57 675	12.52 318	16.34 415	190× 190 7.48*7.48	4-Φ 23	694.46 315
8" (Dn200mm)	27.56 700	37.2 945	17.72 450	20.87 530	445× 200 17.52*7.87	4-Φ 25	1213.54 550
10" (DN250mm)	39.37 1000	40.51 1029	19.69 500	24.41 620	524× 250 20.63*9.84	4-Φ 25	2182.58 990
12" Dn300mm	39.37 1000	50.98 1295	25.2 640	30.71 780	645× 300 25.39*11.81	4-Φ 25	3130.56 1420
14" Dn400mm	47.24 1200	62.36 1584	29.53 750	38.58 980	Φ 700 27.56	6-Φ 25	4409.25 2000

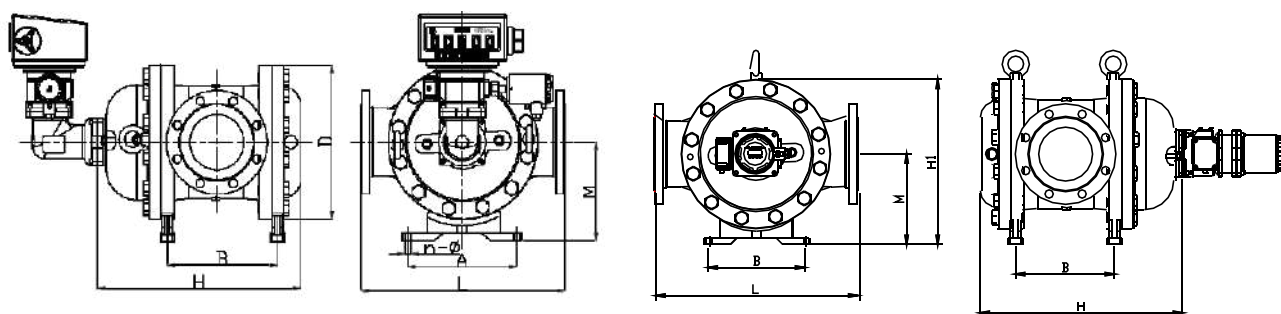


Fig.12 Hozirontalstructure for PD flow meter

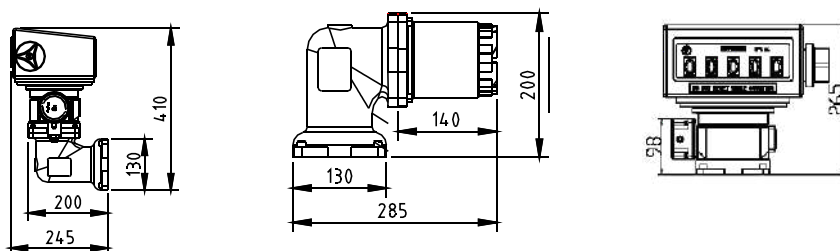


Fig.12 N1 register

Fig.13 D Electronicregister

Table 4 Horizontal structure for PD flowmeter size DN40 mm-DN150mm(1 1/2" to 6") (Fig. 12)※

Size In cm	Flange Distant L, in mm	Total Height (H) In mm	Height (H1) In mm	Center Height(M) In mm	Upper Dia (D) In mm	Install Dim. A × B	Bolt hole size n-Φ	Weight,lb Kg
1 1/2" (Dn40mm)	9.84 250	13.19 335	7.28 185	3.74 95	7.28 185			88.18 40
2" (Dn50mm)	14.17 360	16.14 410	9.25 235	4.72 120	9.25 235			132.28 60
3" (Dn80mm)	15.75 400	21.06 535	14.57 370	8.27 210	12.2 310			253.53 115
4" (Dn100mm)	17.72 450	20.28 515	14.57 370	8.27 210	12.8 325	250×220 9.84×8.6	4-φ20	330.69 150
6" (Dn150)	22.05 560	24.8 630	18.31 465	10.04 255	16.34 415	255×250 10.04×9.84	4-Φ20	694.56 315

Remarks: The radiator should be added with the working temperature of 80-150°C or higher without diverter. See Fig.14

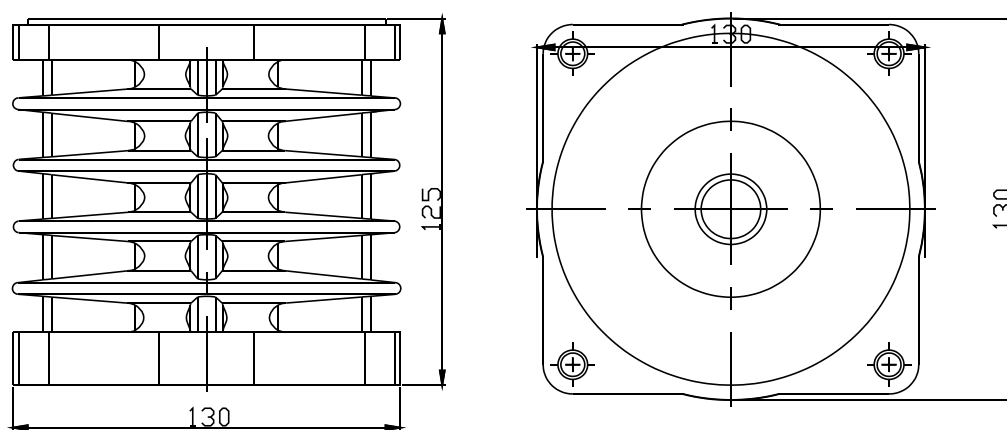


Fig. 14 cooling radiator

Flow Capacity in Metric units m3/hr

Size in (mm)	MDDS1 Flow range in m3/h							Pulse equivalent liter/pulse
	0.32-0.8mPa.s	0.8-2mPa.s	2-5mPa.s	5-50mPa.s	50-400mPa.s	400-2000mPa.s	2000-20000mPa.s	
	Gasoline/liquefied gas	Kerosene	Light diesel	Crude oil	heavy oil	Hi-viscosity Liquid	Liquid with high water content & super-high viscosity liquid	
Dn8mm	0.06-0.3	0.05-0.3	0.03-0.3	0.03-0.3	0.03-0.3	0.03-0.27	0.03-0.24	0.01
Dn15mm	0.6-3	0.4-4	0.4-4	0.4-4	0.4-4	0.3-2.4	0.3-2.4	0.001
Dn25mm	3-8	1.5-10	1-10	1-10	1-10	1-8	1-6	0.01
Dn40mm	4-20	2.7-22	2.5-25	2.5-25	2.5-25	2.5-18	1.5-12	
Dn50mm	7-28	4.5-36	4-40	4-40	4-40	2.8-24	2.2-18	
Dn80mm	14-56	10-80	9-90	9-90	9-90	6-56	5-40	0.1
Dn100mm	20-80	13-100	12-120	12-120	12-120	10-72	6-50	
Dn150mm	54-216	30-250	25-250	25-250	25-250	18-150	12-100	
Dn200mm	80-320	50-350	40-400	40-400	40-400	30-250	30-270	
DN250mm	130-520	100-600	60-600	60-600	60-600	40-360	60-300	
Dn300mm	200-800	180-900	100-1000	100-1000	100-1000	100-800	80-700	
Dn400mm	400-1600	360-1600	180-1800	180-1800	180-1800	130-1100	100-900	

Flow range in US units GPM
MDDS1 Flow range in GPM

Size in inch	viscosity (in cP)							Pulse (gallons per pulse)
	0.32-0.8	0.8-2	2-5	5-50	50-400	400-2k	2k-20k	
	Gasoline & liquefied gas	Kerosene	Light diesel	Crude oil,	heavy oil	Hi-viscosity Liquid	High water content & super-high viscosity	
1/4"	0.44 - 1.32	0.3 - 1.32	0.26 - 1.32	0.26 - 1.32	0.26 - 1.32	0.26 - 1.19	0.26 - 1.06	0.000264
1/2"	1.45 - 4.40	1.10 - 4.40	0.88 - 4.40	0.88 - 4.40	0.88 - 4.40	0.88 - 3.96	0.88 - 3.52	
1"	5.28 - 26.4	6.60 - 26.4	5.28 - 26.4	5.28 - 26.4	5.28 - 26.4	5.28 - 23.8	5.28 - 22	
1½"	48.4 - 96.9	39.6 - 96.9	33 - 96.9	33 - 96.9	33 - 96.9	17.6 - 96.9	14.5 - 44	0.00264
2"	79.3 - 158.5	63.4-158.5	52.8-158.5	52.8-158.5	52.8-158.5	33-96.9	26.4-123.3	
3"	176.1-352.2	140.9-352.2	117.6-352.2	117.6-352.2	117.6-440.3	70.4-211.3	66-198.1	0.0264
4"	220.1-440.3	176.1-440.3	149.7-440.3	149.7-440.3	149.7-440.3	105.7-317	88.1-264.2	
6"	506.3-968.6	396.3-968.6	321.4-968.6	321.4-968.6	321.4-968.6	176.1-528.3	132.1-396.3	
8"	792.5-1585	634-1585	528.3-1585	528.3-1585	528.3-1585	352.2-1057	220.1-660.4	
10"	1189-2378	951-2378	792.5-2378	792.5-2378	792.5-2378	440.3-1321	264.2-792.5	
12"	1981-3963	1585-3963	1321-3963	1321-3963	1321-3963	880.6-2642	660.4-1981	
16"	3522-7045	2819-7045	2334-7045	2334-7045	2334-7045	1761-5283	1321-3963	

Notes:

- 1) This is universal flow range for Bi rotor flow meter with all types of register(counter) , please refer to instruction manual for flow range difference with different type register, accuracy and body materials.
- 2) Size 1/4"(DN8mm) are only availbale in electronic register , not support mechanical reigster.
- 3) All flow meter calibrated in facotry by diesel oil as standard medium.

Ordering code

MDDS1 Displacement flowmeter

ORDERING CODE	Example:	MDDS1	6	S	E	2	CS	NX	D1	N
Line Size										
2 - 1/4"										
4 - 1/2"										
6 - 1"			6							
8 - 1 1/2"										
10 - 2"										
12 - 3"										
14 - 4"										
16 - 6"										
18 - 8"										
20 - 10"										
22 - 12"										
24 - 16"										
Meter body										
S - Standard structure				S						
T - Thermal Jacket (For high viscosity liquid , a thermal jacket is recommended)										
Process connection										
F - DIN PN16 1.6MPa										
B - DIN PN25 2.5MPa										
D - DIN PN40 4.0MPa										
E - DIN PN63 6.3MPa					E					
A - DIN PN100 10MPa										
C - ANSI B16.5 150#										
J - ANSI B16.5 300#										
T - ANSI B16.5 600#										
C - JIS 5K										
N - JIS 10K										
M - JIS 30K										
C - Customized connection										
Process Temperature										
1 - (-4°F to 176°F) - (-20 to 80°C)										
2 - (176°F to 302°F) (80°C to 150°C)						2				
3 - (302°F to 482°F) (150 to 250°C)										
Materials										
CS - Cast steel, standard options							CS			
S4 - Rotors in SS304, Housing in cast steel										
S6 - Rotors in SS316, Housing in cast steel										
A4 - Wetted parts in SS304										
A6 - Wetted parts in SS316										
SP - Special materials										
Explosion proof										
NX - Not for hazardous application								NX		
NE - Exd II CT6 , NEPSI approved										
AX - II2 G Ex d IIC T4 Gb, ATEX approved										
CS - Class I, Div. 1 Groups B, C and D, UL listed										
Register										
D - D 1 Digital electronic register , DC24V									D1	
R - Round dial mechanical register without zero reset										
N1 - square register with zero reset										
MDIN10 - Veeder root EMR4 electronic register , DC12 to 24V										
N2 - Present register predetermind volum for batch control										
TN - Ticket printer										
Signal output										
N - No remote signal output										N
I - 4 to 20mA + pulse (optional, Modbus RTU)										
P - Pulser (backed up with pulser),mounted with mechanical register										

Bi-Rotor Positive displacement flowmeter

	S	2	Note
Calibrator type			
S - Stepless calibrator for linearity adjustment, for mechanical register	S		
G - Gear ratio calibrator for linearity adjustment, for mechanical register			
N - Without Calibration (Electronic register)			
Accuracy			
1 - +/-0.1% of Reading			
2 - +/-0.2% of Reading		2	
3 - +/-0.5% of Reading			
Other			



Address: 7191 Yonge street, Toronto, Canada

Tel: +16472221281(5 line)

Web: www.madecotech.com

Email: Info@madecotech.com