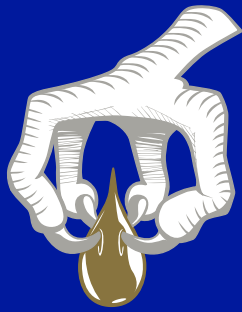


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PI-2020
BI ROTOR FLOW METER



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Description

PI-2020 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 PI-2020 an ideal choice for many applications including oil-in-water media and fluids with entrained solids.



Stainless steel flowmeter



Figure 1

High accuracy is attained by two unique helical rotators which features two finely balanced rotators (Refer to Figure 1). An adjustor, incorporated on the meter, is used to assure maximum accuracy within the meter's flow range.

Features

- ▶ Accuracy up to 0.1% over 10:1 turn-down ration
- ▶ Extremely long service life and easy maintenance
- ▶ Self-lubricating, low pressure drop, and low noise and vibration
- ▶ Two unique helical rotators with no touch, but synchronized by timing gears in the measuring chamber
- ▶ No oscillating, reciprocating or sliding parts or cranks to wear or disturb the balanced rotary action

Specifications

- ▶ Accuracy: $\pm 0.1\%$ of reading accuracy
- ▶ Line Size: 1/4" to 16" (8 to 400mm)
- ▶ Repeatability: $\pm 0.02\%$
- ▶ Working pressure: Customized
- ▶ Pulse Output: (18 to 36V, VH=20V)
CL<1V and output load <200 Ω
- ▶ Current Output: 4 to 20mA, (two wire system w/600 Ω max loop load)
- ▶ RS 485 Output: communication with Modbus
- ▶ Viscosity: 0 to 20,000 cP
- ▶ RTU (powered by 18 to 36V and <60mA)
- ▶ Protection: IP 65 (IP 67 for option)
- ▶ Display: Instantaneous/ Total/ Batch flow
- ▶ Ambient Temperature: 104°F to 176°F (40°C to 80°C)
- ▶ Ambient Humidity: 5% to 95% RH@ 75°F
- ▶ Used Parameters: K factors, linear correction coefficient flow rate input signal section points, temperature and pressure compensation, set pulse output range, decimal adjustment, etc.
- ▶ Communication Baud Rate: Optional (1200, 2400, 4800 or 9600)



ATEX, UL Approved



Materials of construction

Housing: Welded steel construction combining steel castings and drawn steel plate

Rotators: Three/ Four Lobe Rotator - Cast Iron/ 304SS/ 316SS/ 420SS

Measuring Chamber: Cast Iron /304SS/316SS

Rotator Shafts: E.T.D. 150

Rotator Bearings: Stainless Steel (Standard), other materials (optional)

Body and End covers: Cast Iron, Cast Steel, 304SS, 316SS

Counter Base Plate: Cast Steel

Body: Cast Iron, Cast Steel, 304SS, 316SS

O-Ring: Viton (Standard)

Drive Shafts, Drive Gears and Ball Bearings: Stainless Steel

Flowmeter Register options



Standard D1 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-resettable register, which is an ideal options for a non-resettable accumulative totalizer options.



Veeder-root EMR4 Electronic register with remote reading 4-20mA output/ Pulse output and data logging facilities
ATEX, UL, CSA approved



Veeder Root 7889 preset register select pre-determined volume for precise batch control



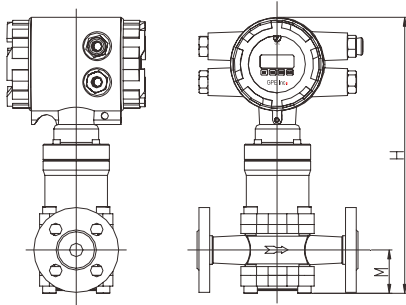
Veeder root 7887 Mechanical register with 7671 pulser for volume indication 5 large digits numerical reset with 8 digital no reset totalizer. Liter, Cubic meter, Gallon units for options



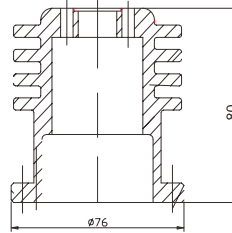
Veeder root ticket printer 7888 provides an in-printed ticket for delivery transactions, accumulative or zero start options available.

PI-2020 BI ROTOR FLOW METER

Dimension and Weight



Graph 1



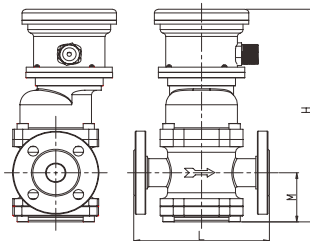
Graph 2

Remarks

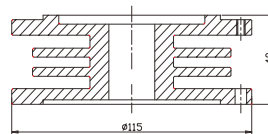
1. M may varies with expanded flange resulted from different flow range.
2. The radiator should be added with the working temperature beyond 125°C (257°F) See graph-2

Table 1 Electric register DN8mm- DN25mm ((3/8" to 1"), check graph 1 and graph 2

Size	Flange Distant (L)		Total Height (H)		Centre Height (M)		Weight lb
	inch	mm	inch	mm	inch	mm	Kg
3/8" (DN8mm)	5.91	150	11.02	280	1.87	47.5	11.97
							5.43
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



Graph 3



Graph 4

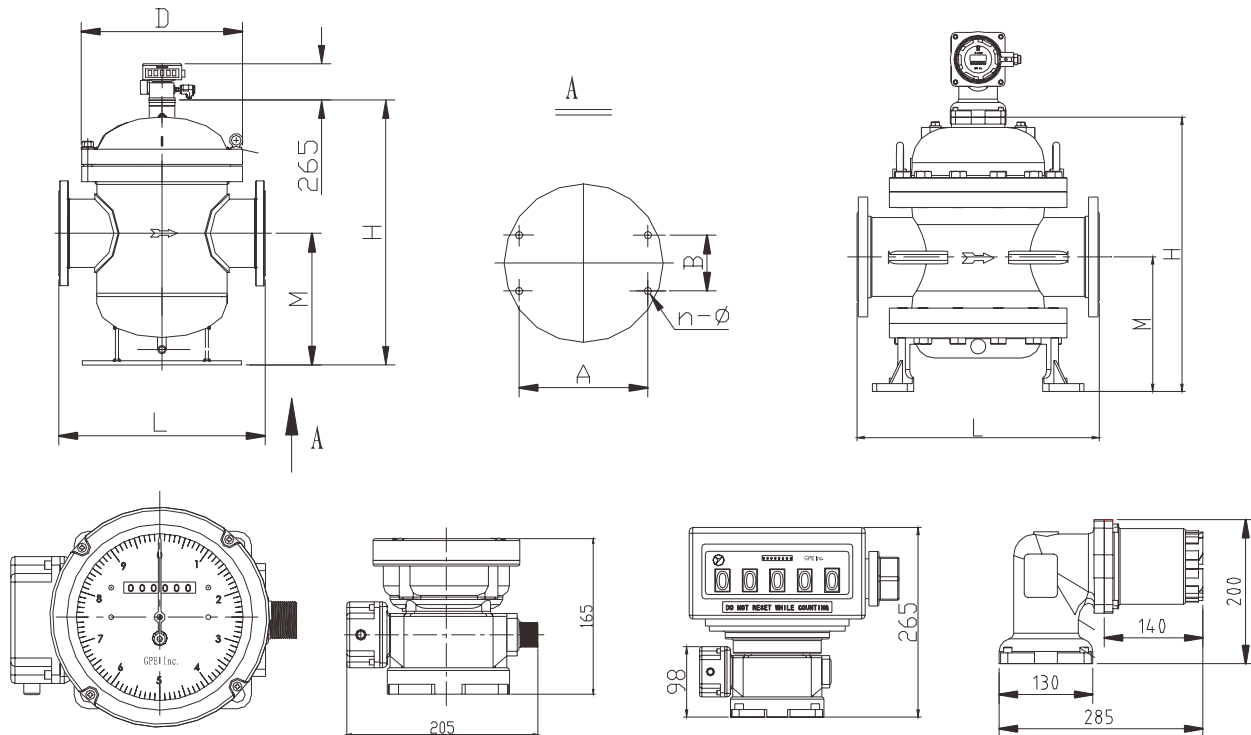
Table 2 Round mechanic register DN15mm-DN25mm (1/2" to 1") Check graph 3 and graph 4

Size	Flange Distant (L)		Total Height (H)		Center Height (M)		Weight lb
	inch	mm	inch	mm	inch	mm	kg
1/2"(DN15mm)	7.09	180	10.63	270	2.09	53	17.64
							8
1"(DN25mm)	7.87	200	11.81	300	2.95	75	30.86
							14

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Vertical installation size



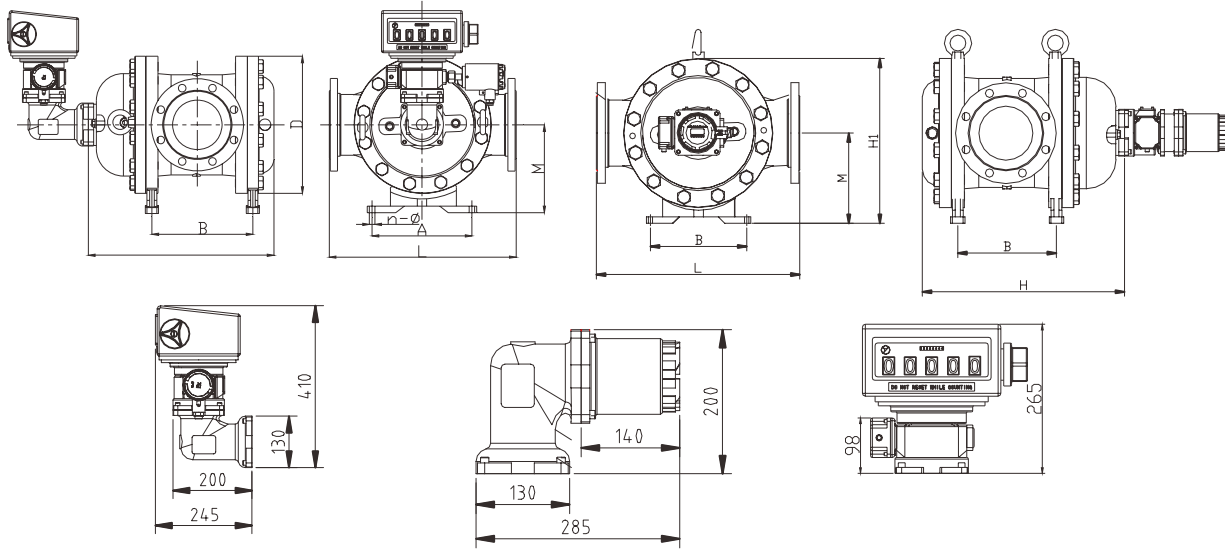
Graph 5

Table 3 Vertical installation size for size DN40mm to DN400mm (1-1/2" to 16"), Check graph 5

Size	Flange Distant (L)	Total Height(H)	Center Height (M)	Upper Dia (D)	Install Dim. AxB	Bolt hole size n-Φ	Weight lb
Inch	inch	inch	inch	inch	inch		kg
mm	mm	mm	mm	mm	mm		
1 1/2"	9.84	13.19	4.96	7.28			83.78
(DN40mm)	250	335	126	185			38
2"	14.17	16.14	5.91	9.25			123.46
(DN50mm)	360	410	150	235			56
3"	15.75	21.06	8.74	12.2			246.92
(DN80mm)	400	535	222	310			112
4"	17.72	22.83	10.63	12.2	235×170		330.69
(DN100mm)	450	580	270	310	9.25×6.69	4-Φ23	150
6"	22.05	26.57	12.52	16.34	190×190		694.46
(DN150)	560	675	318	415	7.48×7.48	4-Φ23	315
8"	27.56	37.2	17.72	20.87	445×200		1213.54
(DN200mm)	700	945	450	530	17.52×7.87	4-Φ25	550
10"	39.37	40.51	19.69	24.41	524×250		2182.58
(DN250mm)	1000	1029	500	620	20.63×9.84	4-Φ25	990
12"	39.37	50.98	25.2	30.71	645×300		3130.56
DN300mm	1000	1295	640	780	25.39×11.81	4-Φ25	1420
14"	47.24	62.36	29.53	38.58	Φ700		4409.25
DN400mm	1200	1584	750	980	27.56	6-Φ25	2000

PI-2020 BI ROTOR FLOW METER

Horizontal installation size

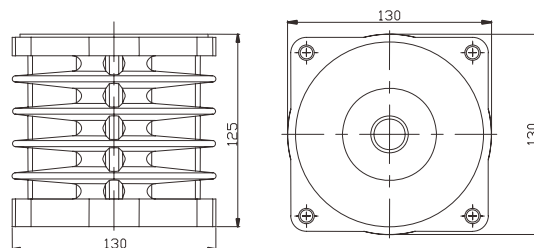


Graph 6

Table 4 Horizontal installation size for size DN40mm to DN400mm (1-1/2" to 16") Check graph 6

Size Inch mm	Flange Distant (L) inch mm	Total Height(H) inch mm	Center Height (M) inch mm	Upper Dia (D) inch mm	Install Dim. Ax B inch mm	Bolt hole size n-Φ	Weight lb kg
1 1/2" (Dn40mm)	9.84 250	13.19 335	3.74 95	7.28 185			88.18 40
2" (Dn50mm)	14.17 360	16.14 410	4.72 120	9.25 235			132.28 60
3" (Dn80mm)	15.75 400	21.06 535	8.27 210	12.2 310			253.53 115
4" (Dn100mm)	17.72 450	20.28 515	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	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 176°F to 302°F (80°C to 150°C) or higher without diverter. See graph 7



Graph 7

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FLOW RANGE

Flow Range in Metric units m3/hr								
Nominal Dia. (mm)	PI2020 Flow range in m3/h							Pulse (Liter per pulse)
	0.32-0.8mPa.s	0.8-2mPa.s	2-5mPa.s	5-50mPa.s	5-400mPa.s	400-2000mPa.s	2000-20000mPa.s	
	Gasoline/liquefied gas	Kerosene	Light Diesel	Crude Oil	Heavy Oil	High Viscosity Liquid	Liquid with high water content & super-high viscosity liquid	
1/4" (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
1/2" (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
1" (DN25mm)	3-8	1.5-10	1-10	1-10	1-10	1-8	1-6	0.01
1 1/2" (DN40mm)	8-20	2.7-22	2.5-25	2.5-25	2.5-25	2.1-18	1.5-12	
2" (DN50mm)	9-36	4.5-36	4-40	4-40	4-40	2.8-24	2.2-18	
3" (DN80mm)	20-80	10-80	9-90	9-90	9-90	6.5-56	5-40	
4" (DN100mm)	25-100	13-100	12-120	12-120	12-120	8.5-72	6.5-54	0.1
6" (DN150mm)	55-225	31-250	25-250	25-250	25-250	18-150	12-100	
8" (DN200mm)	90-360	50-400	40-400	40-400	40-400	28-240	20-160	
10" (DN250mm)	135-540	68-540	60-600	60-600	60-600	42-360	30-240	
12" (DN300mm)	220-900	112-900	100-1000	100-1000	100-1000	70-600	54-450	
16" (DN400mm)	400-1600	200-1600	180-1800	180-800	180-800	130-1100	90-750	

F2001 Flow range in GPM								
Nominal Dia. (mm)	Viscosity (in cP)							Pulse Gallons/Pulse
	0.32-0.8	0.8 to 2	2 to 5	5 to 50	500 to 400	400 to 2k	2k to 20k	
	Gasoline/liquefied gas	Kerosene	Light Diesel	Crude Oil	Heavy Oil	High Viscosity Liquid	Liquid with high water content & super-high viscosity liquid	
1/4" (DN8mm)	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" (DN15mm)	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" (DN25mm)	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	
1 1/2" (DN40mm)	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" (DN50mm)	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" (DN80mm)	176.1-352.2	140.9-352.2	117.6-352.2	117.6-352.2	117.6-352.2	70.4-211.3	66-198.1	0.0264
4" (DN100mm)	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" (DN150mm)	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" (DN200mm)	792.5-1585	634-1585	528.3-1585	528.3-1585	528.3-1585	352.2-1057	220.1-660.4	
10" (DN250mm)	1189-2378	951-2378	792.5-2378	792.5-2378	792.5-2378	440.3-1321	264.2-792.5	
12" (DN300mm)	1981-3963	1585-3963	1321-3963	1321-3963	1321-3963	880.6-2642	660.4-1981	
16" (DN400mm)	3522-7045	2819-7045	2334-7045	2334-7045	2334-7045	1761-5283	1321-3963	

Note:

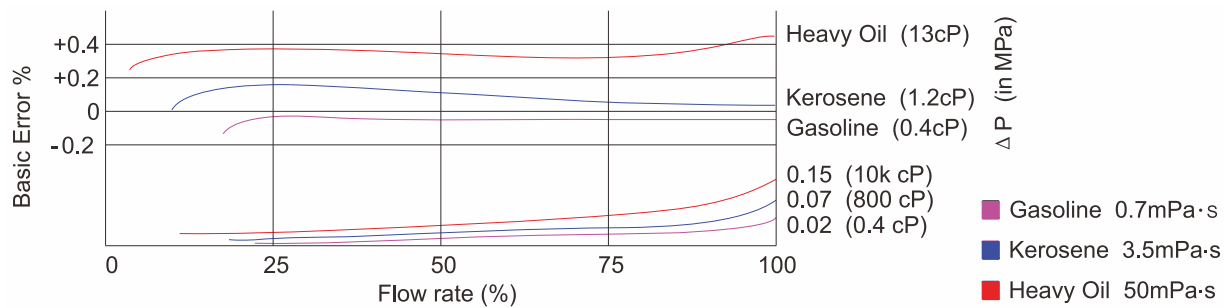
- 1) This is universal flow range for Bi rotor flow meter with all types of register (counter), please refer to instruction manual for flow range difference with different type register and flow meter body materials.
- 2) Size 1/4" (DN8mm) are only available in electronic register, not support mechanical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



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PI-2020 BI ROTOR FLOW METER

Pressure Drop Curve



The specifications contained herein are subject to change without notice and any user of said specifications should verify from the manufacturer that the specifications are currently in effect. Otherwise, the manufacturer assumes no responsibility for the use of specifications which may have been changed and are no longer in effect.

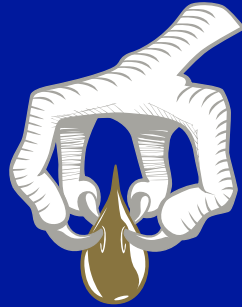
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PI-2020 BI ROTOR FLOW METER

Model Selection

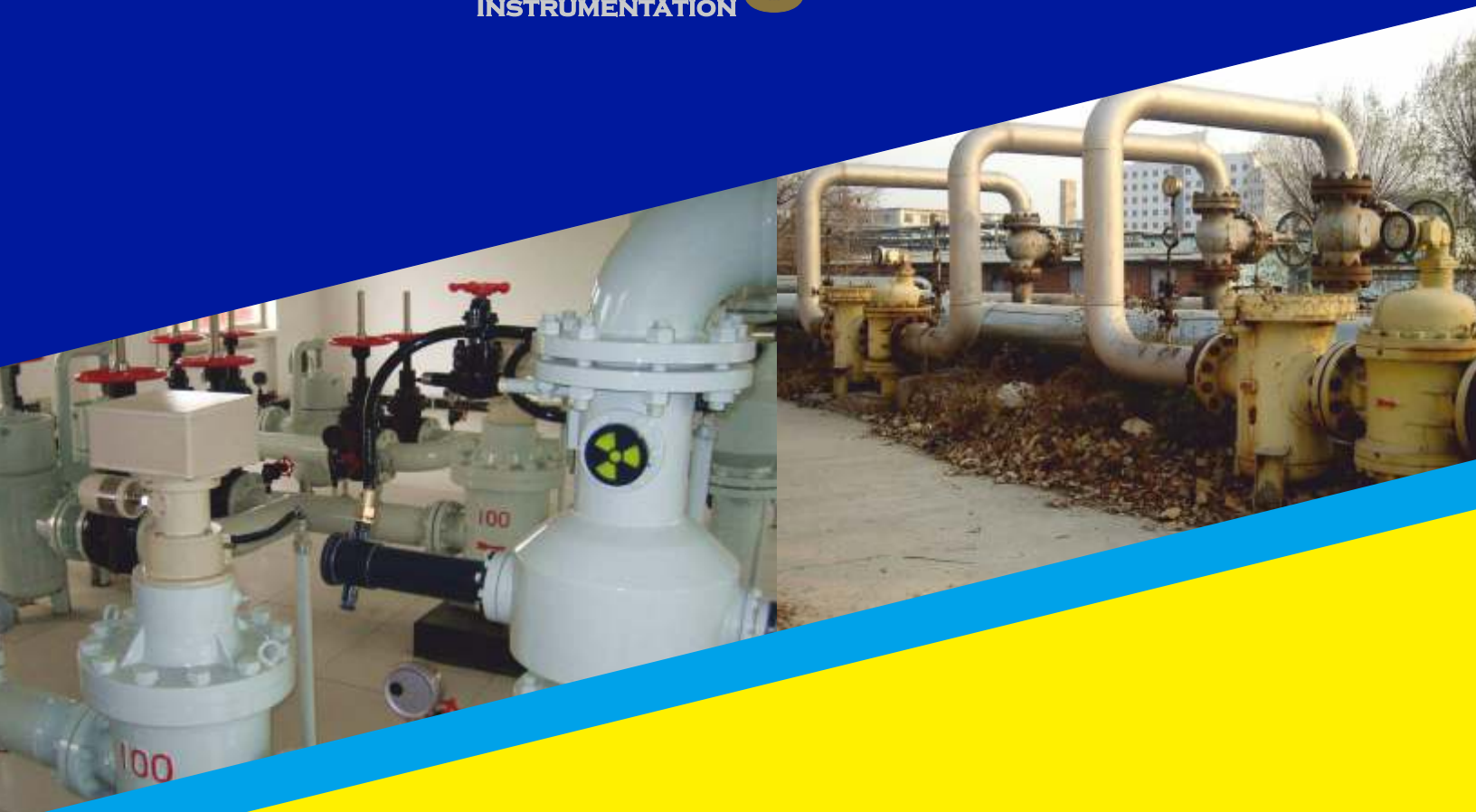
PI-2020 Series												
Example PI-2020-025SDI21CSEXD1RN3												
PI-2020	Size	**	**	**	**	**	**	**	**	**	**	Description
1/4"	008											Size
1/2"	015											
1"	025											
1 1/2"	040											
2"	050											
3"	080											
4"	100											
6"	150											
8"	200											
10"	250											
12"	300											
16"	400											
Standard	S											
Thermal Jacket	J											
ANSI		AN										Flange Standard
DIN		DI										
JIS		JS										
Others		OF										
-20 °C to +80 °C (-68°F to +176°F)			1									Working Temperature
+80 °C to +150 °C (+68°F to +176°F)			2									
+150 °C to +250 °C (+68°F to +482°F)			3									
1.6 MPa (232 psi)			1									Max. Working Pressure
2.5 MPa (363 psi)			2									
4.0 MPa (580 psi)			3									
6.4 Mpa (928 psi)			4									
Cast steel(Iron)				CS								Material
Rotator Material SS304				S4								
Rotator Material SS316				S6								
All materials SS304				A4								
All materials SS316				A6								
Special materials				SP								
Non-Explosion					NX							Approval
Explosion proof					EX							
Digital counter						DI						Counter
Round Mechanical counter						MI						
VR 7887 mechanical counter						VR						
No signal output (Local LCD display)							N					Signal output
4 to 20mA/Pulse							I					
Dual Pulse(Backed up with pulse generator)							F					
RS485+ 4 to 20mA+Pulse(For digital counter only)							R					
Stepless calibrator								S				Calibrator type
Gear Calibrator								G				
Without Calibrator								N				
±0.1%										1		Accuracy
±0.2%										2		
±0.5%										3		

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