

OUTLINE

HDT1000 is a new series Oriflo meter combining orifice plate with multi-digital indicator.

HDT1000 detects differential pressure exerted by flow velocity on the orifice plate and displays it digitally as flow rate.

Available meter sizes range from 15mm to 300mm dia.

The principal applications are hot and cooling water, air flow measurement and so forth.



FEATURES

- ❑ Excellent cost performance
Flow rate measurement is possible at low cost for medium or large diameter pipes.
- ❑ Compact design
The indicator part is very small and saves mounting space.
- ❑ Easy installation
Available various process connections of "Screw", "Flange", and "Wafer" to meet all field possible requirements and for easy pipe installation.
- ❑ Applicable for both parallel and vertical pipes.
- ❑ Various functions of indicator
 - Any type can be chosen out of the following:
Battery type, Current output type (2-wire 4-20mA DC), Alarm output type, Temperature sensor input type and LonWorks type
 - Indicator part is interchangeable
- ❑ Easy to see because of large LCD display

MAIN APPLICATIONS

- ❑ Air conditioner water and air line
- ❑ Cooling water line
- ❑ General process line in medium and large diameters
- ❑ Sewage disposal process
- ❑ Pure water device
- ❑ Fire pump performance test
- ❑ Blower performance test

INDICATOR SPECIFICATION

Refer to the DT series TECHNICAL GUIDANCE [TG-EM125E](#) for the details of digital indicator.

STANDARD SPECIFICATION

- Measuring Fluid : Liquid (equivalent to water) or Gas
- Max. Pressure : 2MPa
- Allowable diff. press. : 200kPa (Bias pressure)
- Temperature and Relative Humidity
 - Fluid temperature : -10 to 70°C
 - Ambient Temp. : -10 to 50°C < 85%RH
 - Storage Temp. : -20 to 60°C < 85%RH
(Without icing, without condensation)
- Meter size : 15mm to 300mm
(350 to 500mm ; Consult factory for details)
- Flow range : Refer to [FLOW RANGE]
- Process connection
 - Screw connection : Rc (F) taper pipe thread
NPT(F)
[Meter size 15mm (1/2") to 100mm (4")]
 - Flange connection : JIS5K/10K/20K FF/RF
ANSI/JIP 150/300
[Meter size 15mm (1/2") to 300mm (12")]
 - Wafer connection : JIS10K/20K
ANSI/JIP 150/300
[Meter size 15mm (1/2") to 300mm (12")]
- Accuracy : ±3% F.S. (Std.)
(Accuracy guarantee fluid temp. range 7~60°C)
- Measuring range : Flow rate from 10 to 100% of full scale
- Low cutoff : Less than 7% (Selectable : 0, 7, and 15%)
- Protection class : IP65 (JIS C 0920)
(Except the air introduction port at the bottom of housing.)
- Material : Refer to [MATERIAL]
- Painting
 - Measuring tube : Polyurethane painting
(No painting in case of stainless steel)
 - Indicator housing : Melamine resin painting
- Painting color
 - Metering tube : Jade green (Munsell 7.5BG4/1.5)
 - Indicator housing
 - Front : Wine red (Munsell 10RP3/8)
 - Rear : Light gray (Munsell N7.5)
- Installation posture : Front vertical installation

● Required straight run

The upstream condition	Upstream	Downstream
90° elbow	≥10D	≥4D
Fully opened valve	≥12D	

D : Pipe inside diameter

Straight runs are calculated from orifice plate location.

● Indicator type function (All types with indicator)

Type	Function
Battery type	Battery drive, Indication only
Current output type	4-20mA DC (2-wire)
Alarm output A type	2 points + 4-20mA DC
Alarm output B type	2 points + Temp. input / indication
Temp. sensor input type	Temp. input / Indication, Battery drive
LonWorks Type	Applicable to Lon communication network

● Indication function

Flow rate indication	: 3-1/2 digits LCD (Height 18mm) : 0 to 1999 (FFF appears in case of out of range) 11 segment bar graph
Totalizer indication	: 7-1/2 digits LCD (Height 5mm) : 0 to 19999999
Indication interval	: 1s (Sampling 0.5 sec)
Filter	: 0.2, 4, 8, 16, 32s (Moving average)
LCD back light	: Continue 10s after operation (Except current output type)

● Specification and function of each type

1) Battery type

Battery	: Alkali battery (LR6) x 2 pcs.
Battery life	: Approx. 2 years at 23°C Auto power off mode selectable Low Battery monitor as standard

2) Current output type

Power supply	: 24V DC ± 10%
Output	: 4-20mA DC (2-wire)
Max. load	: 600Ω
Output accuracy	: ±0.5% F.S. at 23°C
Response	: Less than 2 s (At filter setting 0)

3) Alarm output A type

Power Supply	: 24V DC ± 10%
Power Consumption	: Less than 25mA
Alarm Output	: Open Collector x 2 (Independent)
Load	: Less than 30V DC / 80mA
Response	: Less than 2 s (At Filter setting 0)
Alarm setting	: Selectable (high / Low), Reset Span: Adjustable / Min. 1digit
Output	: 4-20mA DC
Max. load	: 600Ω
Output Accuracy	: ±0.5% F.S. at 23°C

4) Alarm output B type

Power Supply	: 24V DC ± 10%
Power Consumption	: Less than 25mA
Alarm Output	: Open Collector x 2 (Independent)
Load	: Less than 30V DC / 80mA
Response	: Less than 2 s (At Filter setting 0)
Alarm setting	: Selectable (high / Low), Reset Span: Adjustable / Min. 1digit
Connecting Temp. Sensor	: Pt100Ω (3-wire) (JIS C 1604)
Temp. Indication	: -10 to 80°C
Indication Interval	: 60 s
Temp. Ind. Accuracy	: ±2°C (Excluding sensor error)

5) Temperature sensor input type

Following function is added to battery type

Connecting temp. sensor : Pt100Ω (3-wire) (JIS C 1604)

Temp. Indication : -10 to 80°C

Indication interval : 60 s

Temp. indication accuracy: ±2°C (Excluding sensor error)

6) LonWorks type

Applicable to Lon communication network.

Communication with network devices by FTT-10A Transceiver.

Power Supply : 24V AC ± 10%

Power Consumption : Less than 80mA

Transmission Lon Value : Flow rate and differential pressure
(Convert the Indication value to Lon value)

Response : Less than 2 s (At Filter setting 0)

- The communication of each device is in accordance with definite procedure related to its Lon value. FTT-10A can be connected by free topology and multi drop connection. Refer to [Function Profile] for detailed information

● Cable entry

Type	Cable entry L	Cable entry R
Battery type	—	—
Current output type	○	—
Alarm output A type	○	—
Alarm output B type	○	○
Temperature sensor input type	—	○
LonWorks type	○	○
Acceptable cable outside diameter	Ø 3~8mm	

○ : Yes — : No

OPTION

● Totalizing indication

Selection of totalizer function

CODE : TLZ

● Selection of Temp. indication unit : °F (Export Model)

Temp. sensor input type only (Standard unit : °C)

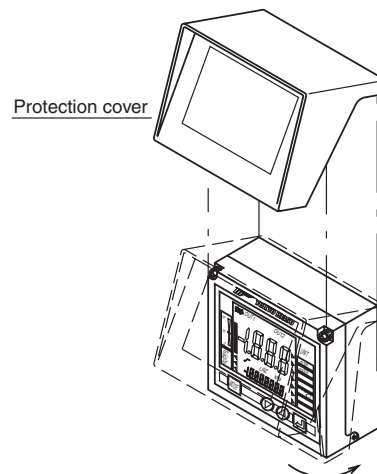
CODE : TPF

● Protection cover (For indicator protection)

CODE : HGC

CAUTIONS ON INSTALLATION

- Avoid direct rays and equip with a protection cover or install in the place which a direct rainstorm does not splash.
(If protection cover is used, it may be difficult to read the display.)



MATERIAL

Part Description			Material class 1		Material class 2		Material class3	
Wetted parts	Metering tube	Screw connection	15~25mm	SCS14	15~100mm	SCS14	15~100mm	SCS14
			32~100mm	FCD400				
		Flange connection	SGP • SS400		SUS304		SUS316	
		Wafer connection	25,40~150mm for JIS10K	SCS14	25,40~150mm for JIS10K	SCS14	25,40~150mm for JIS10K	SCS14
			Others	SS400	Others	SUS304	Others	SUS316
	Orifice plate		SUS304		SUS304		SUS316	
	Isolation valve	Body	SCS14		SCS14		SCS14	
		Shaft	SUS316		SUS316		SUS316	
		O ring	NBR or FPM		NBR or FPM		NBR or FPM	
	Indicator	Diaphragm	SUS316L					
		Body	SUS316					
		O ring	FPM					
Drain hole seal		Alumina ceramics						
Indicator body			Aluminum alloy					

FLOW RANGE

Meter size	Full scale range			
	Liquid m³/h		Gas m³/h (nor)	
	(Density 1.0g/cm³, Viscosity 1.0mPa • s)		(0°C • 1atm Air)	
	Min.	Max.	Min.	Max.
15mm	0.23	2.3	3.4	37
20mm	0.31	5.2	4.6	85
25mm	0.45	8.8	5.5	140
32mm	0.51	14.7	6.7	230
40mm	0.69	19	8.6	320
50mm	0.75	32	10	520
65mm	1.2	53	15	860
80mm	1.7	74	21	1200
100mm	2.9	127	35	2000
125mm	4.4	196	54	3200
150mm	6.2	276	80	4500
200mm	11	480	140	7800
250mm	17	740	210	12000
300mm	24	1060	300	17200

◆ Full scale ranges of upper table are for liquid application equivalent to water (Density 1.0g/cm³ and Viscosity 1.0mPa • s). If actual fluid condition has different values, conversion calculation is required per following formula:

$$Q_w = Q \sqrt{\gamma}$$

Q_w : Water converted flow rate

Q : Flow rate of actual fluid

γ : Density of actual fluid (g/cm³)

◆ The calculation of figures in the above flow range table has been made on the premises that SGP, a JIS code name for a carbon steel pipe for ordinary piping, is used for main pipes. In case of pipes other than SGP, multiply the above liquid quantity by (the inner diameter of a pipe used ÷ the inner diameter of a SGP pipe)².

◆ Full scale ranges for gas of upper table are shown by the flow rate of AIR, at 0°C, 1atm. If actual fluid condition has different value, conversion calculation is required per following formula.

Conversion calculation

$$Q_A = Q \times C_\gamma \times C_t \times C_p$$

Q_A : Converted Air flow

Q : Flow rate of Actual Gas

$$C_\gamma : C_\gamma = \sqrt{\gamma / 1.293}$$

[γ =Density of the Gas, kg/cm³(nor)]

$$C_t : C_t = \sqrt{(273+t)/273}$$

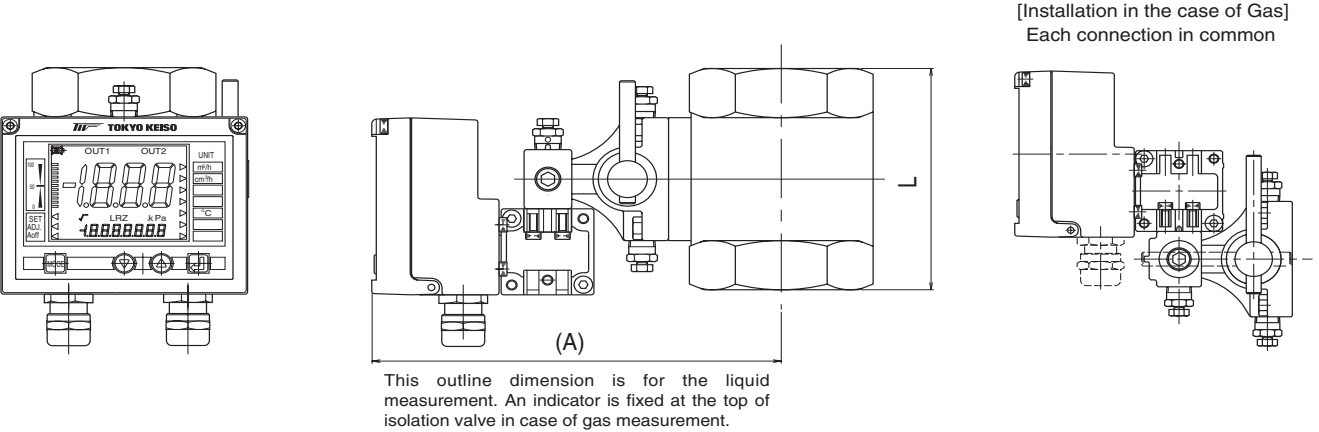
(t=operating temp., °C)

$$C_p : C_p = \sqrt{0.1013 / (0.1013+p)}$$

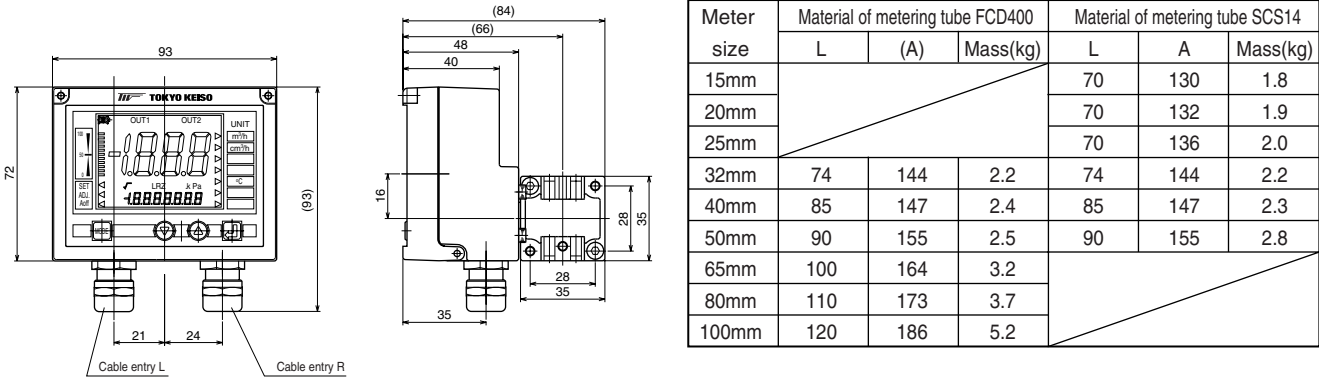
(p=Operating press, MPa)

OUTLINE DIMENSION

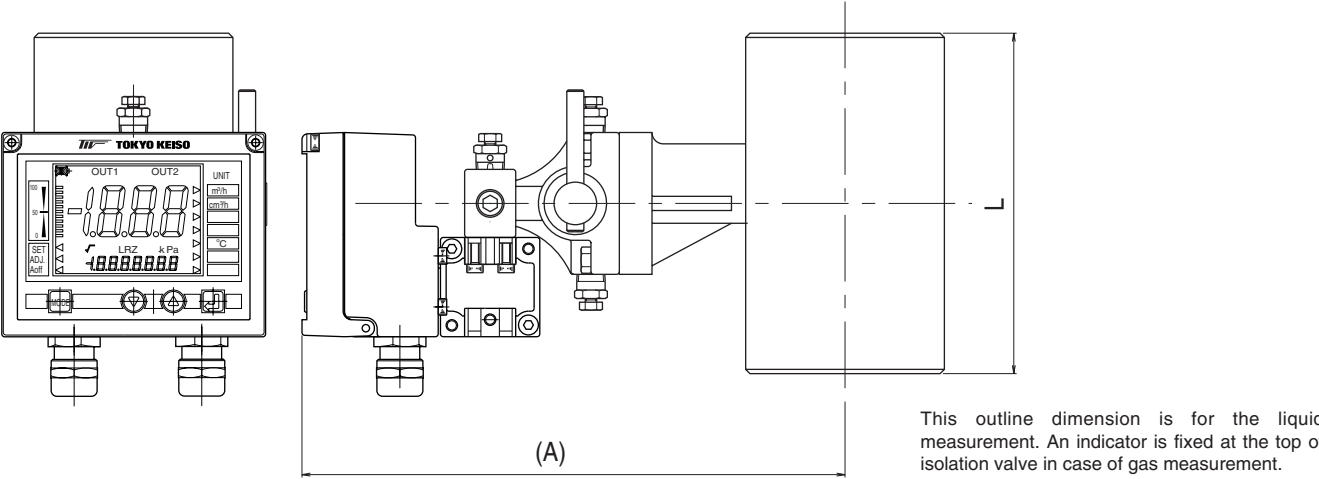
- Screw connection type
Material class 1 (Meter size 15~100mm)
Material class 2 / 3 (Meter size 15~50mm)



[Dimension of indicator]

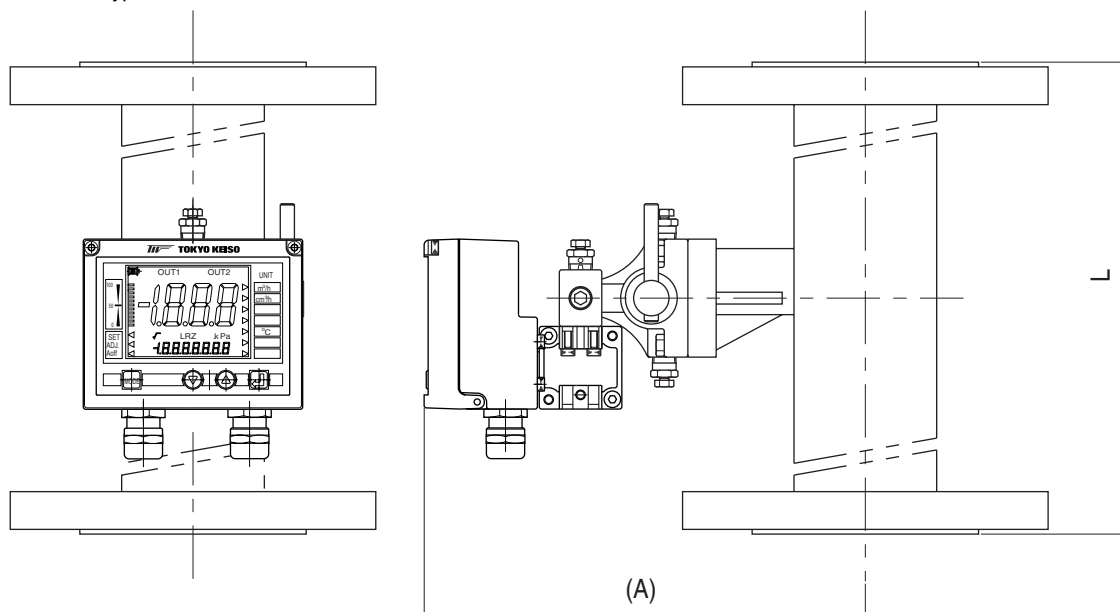


- Screw connection type
Material class 2 / 3 (Meter size 65~100mm)



Meter size	L	(A)	Mass (kg)
65mm	120	199	4.2
80mm	120	207	4.5
100mm	160	222	7.7

● Flange connection type

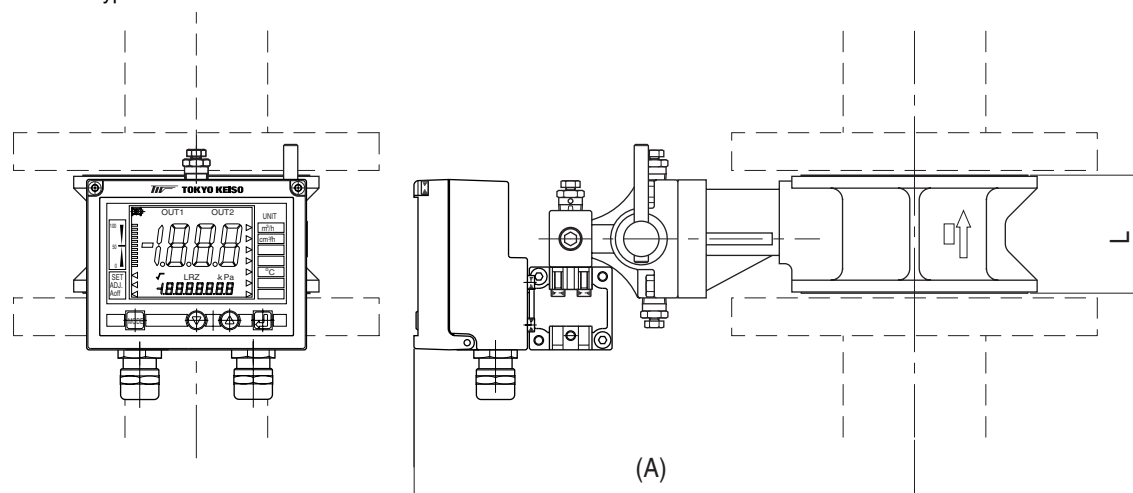


This outline dimension is for the liquid measurement. An indicator is fixed at the top of isolation valve in case of gas measurement.

Meter size	L	(A)	Mass (kg)*	Meter size	L	(A)	Mass (kg)*
15mm	540	167	3.8	80mm	540	201	12
20mm	540	170	4.4	100mm	540	214	16
25mm	540	174	5.6	125mm	540	226	20
32mm	540	178	6.9	150mm	540	239	27
40mm	540	181	7.3	200mm	540	265	35
50mm	540	187	8.7	250mm	540	290	50
65mm	540	195	11.6	300mm	540	316	61

*Mass is for case of JIS10K flange.

● Wafer connection type

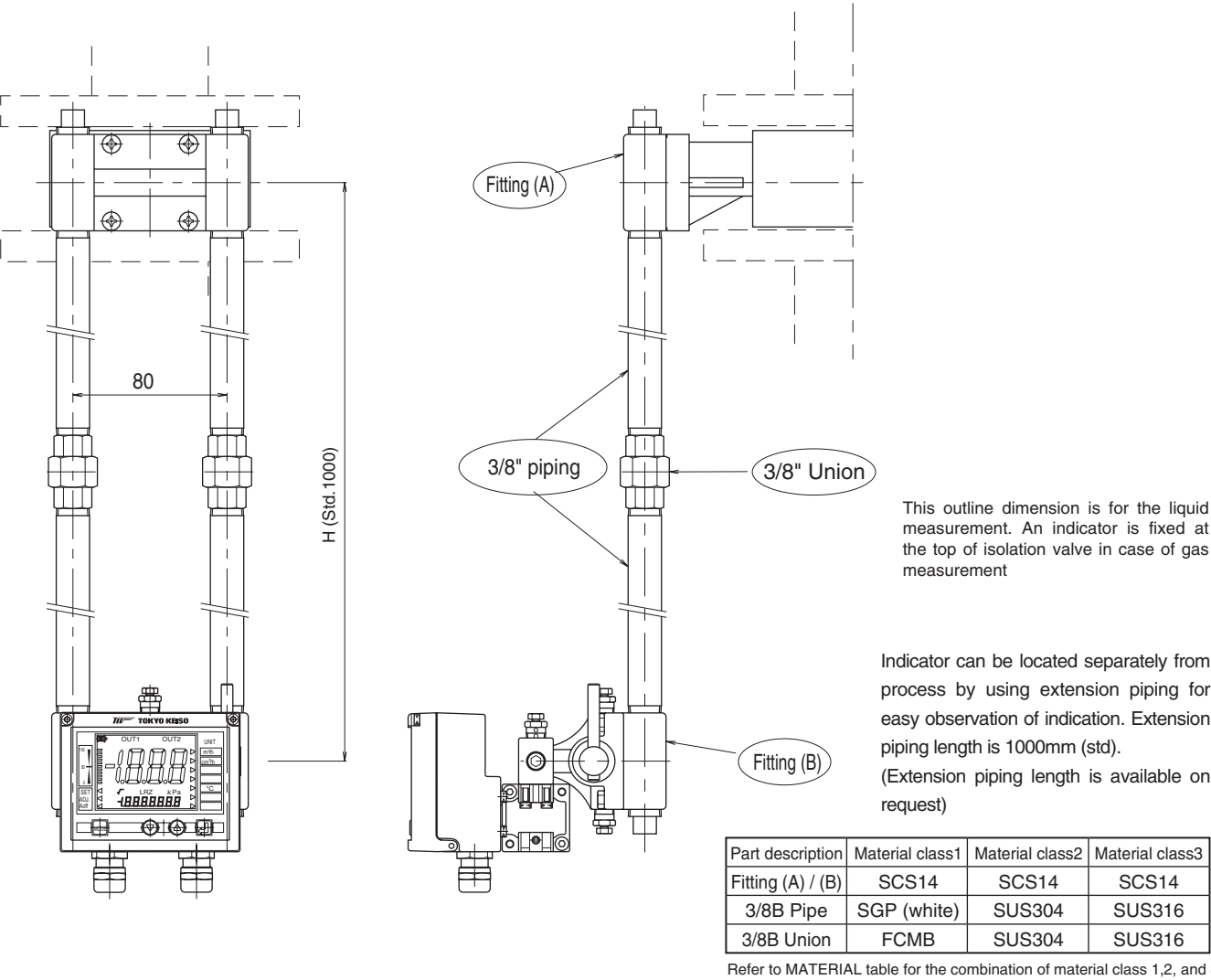


This outline dimension is for the liquid measurement. An indicator is fixed at the top of isolation valve in case of gas measurement.

Meter size	L	(A)*	Mass (kg)*	Meter size	L	(A)*	Mass (kg)*
15mm	50	186	2.9	80mm	50	227	3.5
20mm	50	188	3.0	100mm	50	239	4.0
25mm	50	197	3.4	125mm	50	255	5.0
32mm	50	199	3.8	150mm	50	270	6.0
40mm	50	204	2.7	200mm	50	292	13
50mm	50	212	3.0	250mm	50	323	18
65mm	50	222	3.3	300mm	50	346	20

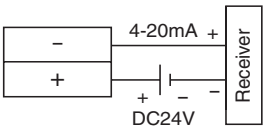
*A Length and Mass are for case of JIF10K flange.

● Indicator separation version



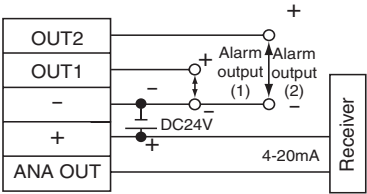
WIRING DIAGRAM

[Current output type]



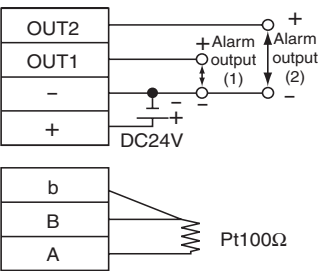
[Alarm output A type]

Alarm output (1)/(2) : Open collector
Max. 30V DC/80mA

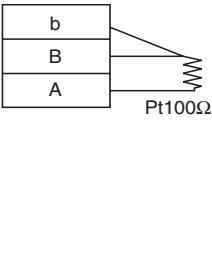


[Alarm output B type]

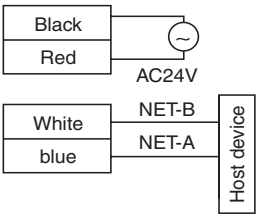
Alarm output (1)/(2) : Open collector
Max. 30V DC/80mA



[Temp. sensor input type]



[LonWorks Type]



MODEL CODE

Model code											Description	Note
HDT1	□□□	-□□□	□	-□	□	□	□	□	□	-A	/□□□	
Meter size	015										15mm	
	∅										∅	
	300										300mm	
		-SRC									Thread connection Rc	
		-SNP									Thread connection NPT	
		-J1F									JIS10K FF Flange	
		-J1R									JIS10K RF Flange	
		-J2F									JIS20K FF Flange	
		-J2R									JIS20K RF Flange	
		-J5F									JIS5K FF Flange	
		-J5R									JIS5K RF Flange	
		-A1R									ANSI 150 Flange	
		-A3R									ANSI 300 Flange	
		-P1R									JPI 150 Flange	
		-P3R									JPI 300 Flange	
		-WJ1									Wafer (JIS10K)	
		-WJ2									Wafer (JIS20K)	
		-WJ5									Wafer (JIS5K)	
		-WA1									Wafer (ANSI 150)	
		-WA3									Wafer (ANSI 300)	
		-WP1									Wafer (JPI 150)	
		-WP2									Wafer (JPI 300)	
		-ZZZ									Others	
Material		1									Material class 1	Refer to MATERIAL table
		2									Material class 2	
		3									Material class 3	
Indicator installation		-1									With isolation valve	
		-2									Indicator separation version	
O-ring for isolation valve		N									NBR	
		F									Viton	
Flow direction		1									Bottom to Top	
		6									Left to Right	
		7									Right to Left	
		8									Top to Bottom	
Flow range*1		***									Flow range code	Manufacturer choice
Indicator type		4									Battery type	Battery drive
		5									Current output type	4-20mA DC (2-wire)
		6									Alarm output A type	2 points + 4-20mA DC
		7									Alarm output B type	2 points + Temp input / indication
		8									Temp. sensor input type	Temp. input • Indication, Battery drive
		9									LonWorks type	LonWorks available
Application		L									For Liquid	
		G									For Gas	
Version		-A									Version code	
Option*2		/TLZ									Totalization indicator	
		/TPF									°F indication	Temp. indication type and in case of export are available.
		/HGC									With protection cover at display part	
Additional function		(Blank)									Not provided	Not necessary if above-mentioned code is available.
		/Z									Provided	

*1 Flow range code is selected by factory in accordance with the specified flow rate and diameter.

*2 Insert “ / ” between each code when the plural codes are selected.

Code example 1: [In case optional code is not selected.]

25mm diameter. Thread connection Rc. Material class 1. With isolation valve. NBR for O-ring for isolation valve.

Flow direction: Left to right. Battery operated type. For liquid application. “HDT1025-SRC-1N6***4L-A”

Code example 2: [In case all of the possible optional codes are selected.]

50mm diameter. JIS10K FF flange connection. Material class 2. With isolation valve. NBR for O-ring for isolation valve.

Flow direction: Top to bottom. Temperature sensing input type For liquid application. Integrating indication added.

Temperature indication in °F. With protection cover for indicator. “HDT1050-JIF2-1N8***8L-A/TLZ/TPF/HGC”

Code example 3: [In case the face to face dimension is specified.]

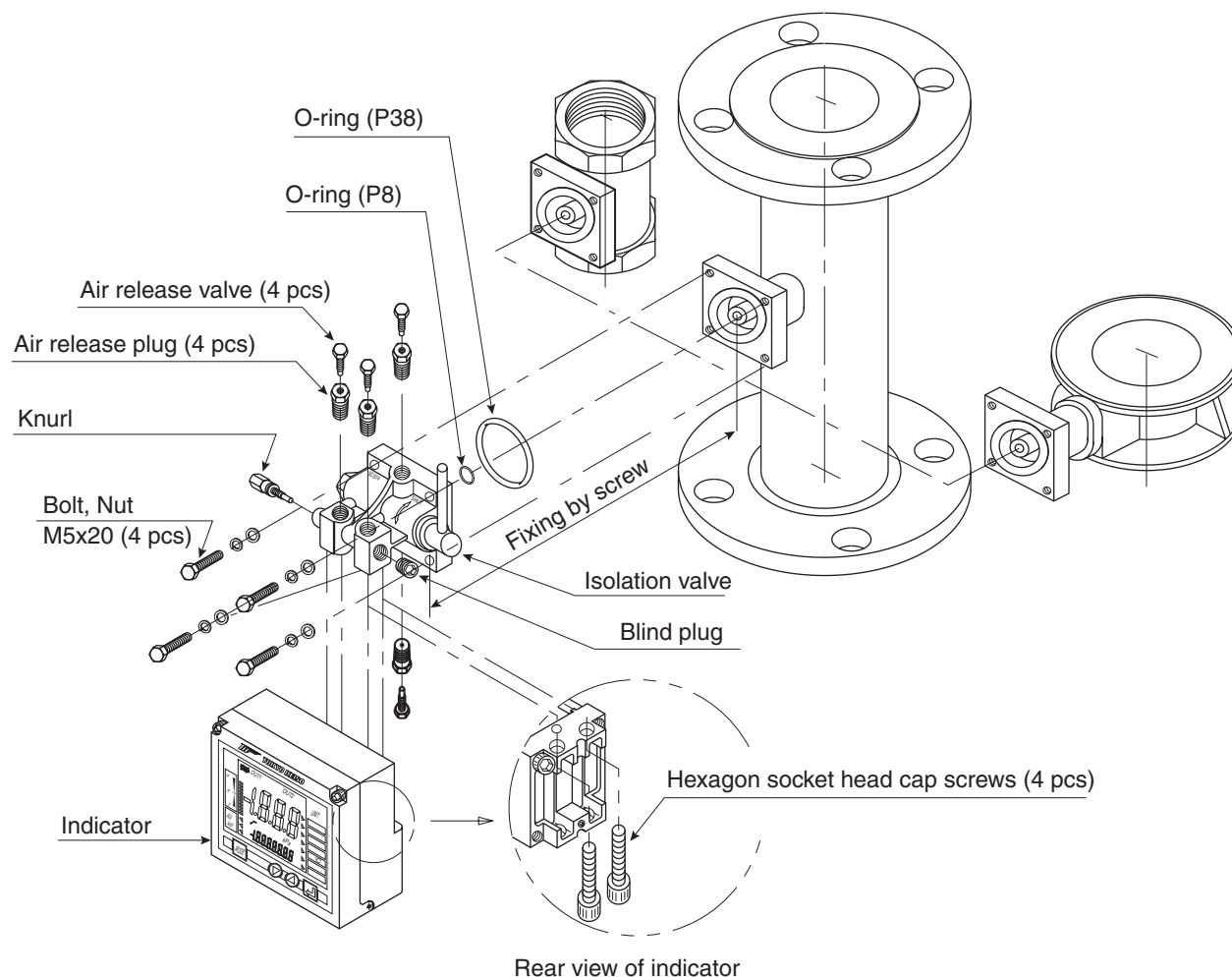
80mm diameter. JIS5K FF flange connection. Material class 3. With isolation valve. NBR for O-ring for isolation valve.

Flow direction: Right to left. Current output type. For liquid application. Integrating indication added. L=600 is specified instead of L=540.

“HDT1080-J5F3-1N7***5L-A/TLZ/Z” (L=600)

When the face to face dimension is specified as seen in the above Code Example 3, it will be “Special specification”, and the last letter of model code will be “Z” in case of such special specification as not mentioned in the above model code.

CONSTRUCTION



PREPARATION OF MEASUREMENT

- In case the fluid is liquid, eliminate the air, and for the gas application, eliminate the drain in according to the HDT1000 Instruction manual **[M-F972]**.

ORDERING INFORMATION

1. MODEL
2. FULL SCALE
3. FLUID NAME
4. TEMPERATURE (Nor. Max.)
5. PRESSURE (Nor. Max.)
6. DENSITY
7. VISCOSITY

* Specification is subject to change without notice.

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