TECHNICAL GUIDANCE

CDT1000 Series

Multi-Digital Flowmeter

OUTLINE

CDT1000 is a new series of flowmeter which combines a multi-digital indicator with a pitot tube.
CDT1000 detects the differential pressure exerted by flow velocity in the pitot tube inserted in the pipe and outputs flow rate with digital indication.
Applicable sizes range from 20mm to 450mm dia.
The principal applications are for hot and cooling water lines for air conditioning in apartment and office buildings and other facilities.

FEATURES

- ❏ Easy installation
- ❏ Installation simply by making a 35mm dia. hole and welding 20mm (3/4") socket at measuring point of existing pipes. This is most convenient for renewal use when additional flow sensor is required on the line.
- ❏ Low pressure drop
- ❏ Wide measuring range
  Measuring range selectable depending on application
- ❏ Applicable for both horizontal and vertical pipes.
- ❏ Various indicator functions selectable from the following:
  Battery type, Current Output type (2-wire 4 to 20mA) and Alarm Output type
- ❏ Indicator parts are interchangeable.
- ❏ Easy to see because of large LCD display
- ❏ Compact size and lightweight
- ❏ Quick delivery

STANDARD SPECIFICATION

- Measuring Fluid : Water, Cold water, Hot water
- Max. Pressure : 2MPa
- Max. Allowable Differential Pressure
  : 700kPa (Bias pressure)
  Not applicable for vacuum service
- Temperature and Relative Humidity
  Fluid temperature : -10 to 70°C
  Use PVC lining and resin tubes within respective allowable temperature ranges.
  Ambient Temp. : -10 to 50°C < 85%RH
  Storage Temp. : -20 to 60°C < 85%RH
  (Without icing, without condensation)
- Process pipe size : 20mm(3/4") to 450mm(18")
- Adaptation pipe : Carbon steel pipe for piping (JIS G 3452) [1MPa class]
  Carbon steel pipe for pressure piping (JIS G 3454 Sch40) [2MPa class]
  Note : If pipe other than above is required, special calibration may be necessary.
  Consult factory for details.
- Accuracy : std. ±5% F.S., (±10% F.S. for a flow rate of less than 30%)
- Measuring range : Flow rate from 10 to 100% of full scale
- Low cutoff : Less than 7%
- Protection class : IP65 (JIS C 0920)
  (Except for the air introduction port at the bottom of housing.)

- Mass : Approx. 2kg
- 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 type	2 points + 4-20mA DC
	Alarm 1-point +totalized pulse + 4 to 20 mA

- 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)
- Material of Pitot tube parts :
  Refer to [OUTLINE DIMENSION] and [MATERIAL]
- Material of wetted parts of indicator
  Diaphragm : 316L SS
  Body : 316SS
  O-ring : Fluorine rubber (JIS Class4-D)
  Drain hole sealing : Alumina ceramics
- Material of indicator body: Aluminium alloy
- Painting : Melamine resin painting (Indicator housing)
- Painting color
  Front : Wine red (Munsell 10RP3/8)
  Rear : Light gray (Munsell N7.5)
- Process connection : R3/4" (M)
- Installation posture : Front vertical installation

TOKYO KEISO CO.,LTD.

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TG-F976-6E SEP. 2013K

● Standard full scale range [SGP,STPG(40~450mm)pipe]

Process pipe size		Full scale range [L/min]			Inside dia. (mm)	
mm	inch	Code			1MPa	2MPa
		05	10	20		
20	3/4	50	70	100	(26)	Refer to following table
25	1	70	100	150	(34)	
32	1-1/4	120	160	250	(43)	
40	1-1/2	130	200	300	41.6	41.2
50	2	200	300	450	52.9	52.7
65	2-1/2	400	500	700	67.9	65.9
80	3	500	700	1000	80.7	78.1
100	4	900	1300	1800	105.3	102.3
125	5	1300	2000	2800	130.8	126.6
150	6	2000	3000	4000	155.2	151.0
200	8	3500	5000	7000	204.7	199.9
250	10	5000	7000	10000	254.2	248.8
300	12	8000	10000	16000	304.7	297.9
350	14	10000	13000	20000	339.8	333.4
400	16	13000	18000	25000	390.6	381.0
450	18	16000	20000	30000	441.4	428.6

● Standard full scale range [2MPa version = 20~32mm]

Process pipe size		Full scale range [L/min]			Inside dia. (mm)
mm	inch	Code			
		10	20	50	
20	3/4	50	70	100	21.4
25	1	70	100	150	27.2
32	1-1/4	120	160	250	35.5

● Standard full scale range [PVC lined pipe]

Process pipe size		Full scale range [L/min]			Inside dia. (mm)
mm	inch	Code			
		05	10	20	
32	1-1/4	75	100	150	29.5
40	1-1/2	100	130	200	34.7
50	2	170	250	350	46.2
65	2-1/2	300	400	600	59.7
80	3	450	650	900	70.9
100	4	800	1000	1600	95.2
125	5	1200	1800	2500	119.7
150	6	1700	2500	3500	142

Note

1) The inside diameter of pipe size 20 to 32mm in 1MPa is based on three-way socket (JIS B 2301).
   (It is possible to attach three-way socket as option.)
2) The inside diameter of pipe size 20 to 32mm in 2MPa is based on three-way socket (Sch.40). (Supplied by customer.)
3) 40mm or more, the inside diameter of in 1MPa specification is based on Carbon steel tube for ordinary piping SGP (JIS G3452), and the inside diameter of in 2MPa specification is based on Carbon steel pipes for pressure piping STPG (JIS G 3454 Sch40).
4) Full-scale flow rates for the PVC lining pipe are calculated based on the inner diameter of ESLON ESLOCOAT LX tee fittings (Sekisui Chemical Co., Ltd). If you use other fittings, additional calibration is needed. Please determine the values of “D” and “L” in the figure at the end of this document and the kind of pipe and then contact us.

● 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 type
   Power Supply : 24V DC ±10%
   Power Consumption : Less than 25mA
   Alarm Output : Open Collector x 2 (Independent)
   (When the totalized pulse output option is added, the alarm output can be set only at either a high or low limit.)
   Totalized pulse output : Pulse width : 200 to 300ms
   Frequency : Less than 1Hz
   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

● Cable entry

Type	Cable entry
Battery type	–
Current output type	○
Alarm output type	○
Acceptable cable outside diameter	Ø3~8mm

○ : Yes – : No

OPTION (Factory set)

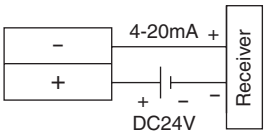
● Totalizing indication
  Selection of totalizer function CODE : /TLZ
● Totalized indication + Pulse output CODE : /PUL

OPTION (Others)

● Refer to “MODEL CODE”

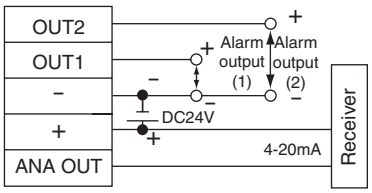
WIRING DIAGRAM

[Current output type]



[Alarm output type]

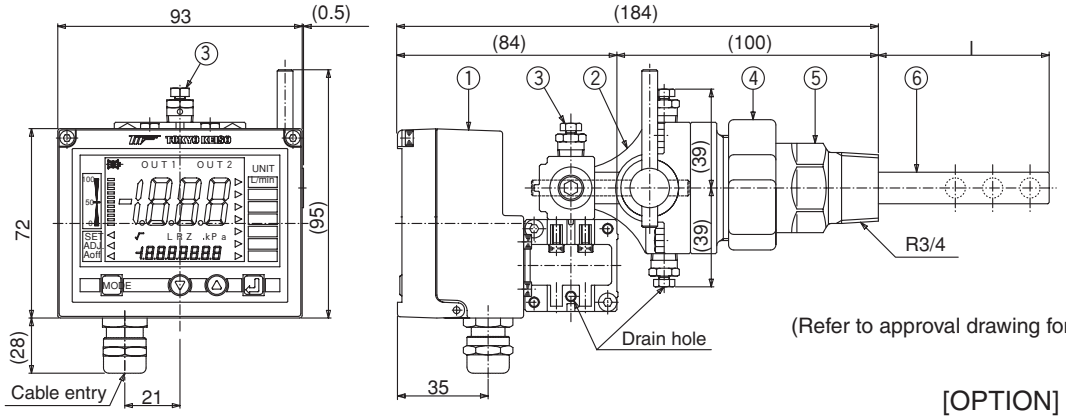
Alarm output (1)/(2) : Open collector
Load: Less than 30V DC/80mA (each)



(OUT1 is used for the pulse output when the totalized pulse output option is added.)

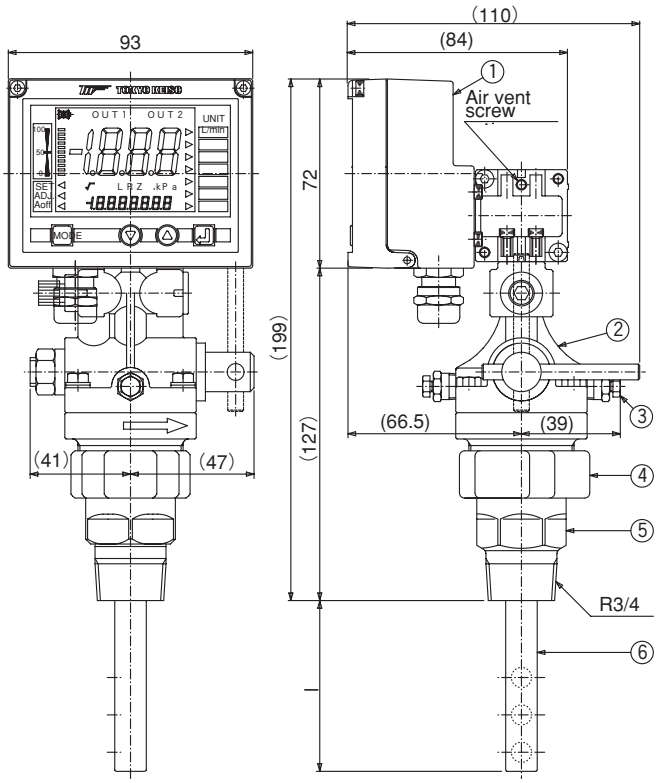
MATERIAL and OUTLINE DIMENSION

CDT12 □□



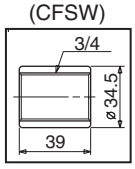
(Refer to approval drawing for the dimension l.)

CDT14 □□

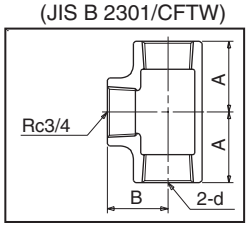


[OPTION]

⑦ Socket (CFSW)



⑧ SGP three-way socket (JIS B 2301/CFTW)



Dimension of three-way socket

Size	d	A	B
20mm	Rc3/4	33	33
25mm	Rc1	35	36
32mm	Rc11/4	36	41

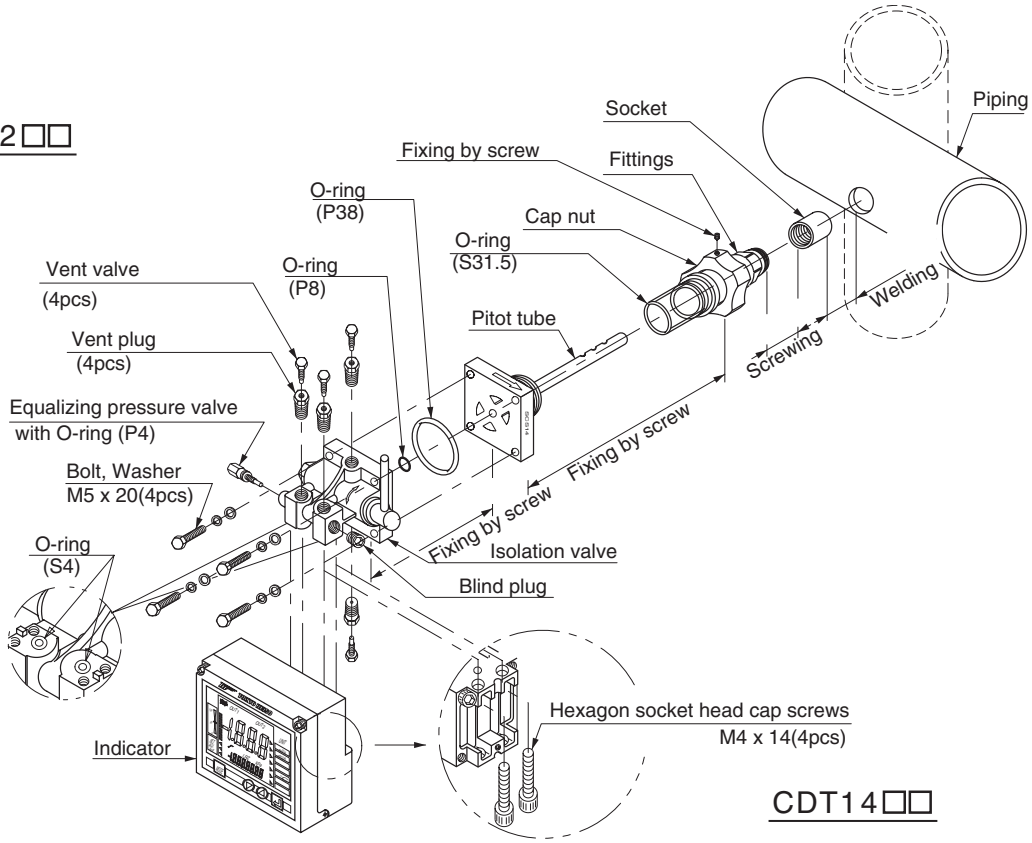
No.	Part Description	Material
①	Indicator body	Aluminum alloy
②	Isolation valve	SCS 14
	Valve Shaft	SUS 316
	O-ring	NBR
③	Vent valve	SUS 316
④	Cap nut	SCS13
⑤	Fittings	SCS 14
⑥	Pitot tube	SUS 316
⑦	Socket	SS 400*1
⑧	Three-way socket	FCMB*1,2

*1 It is possible to attach standard material for socket (SS400 or FCMB) if requested, but material besides these materials shall be provided by customer when needed.

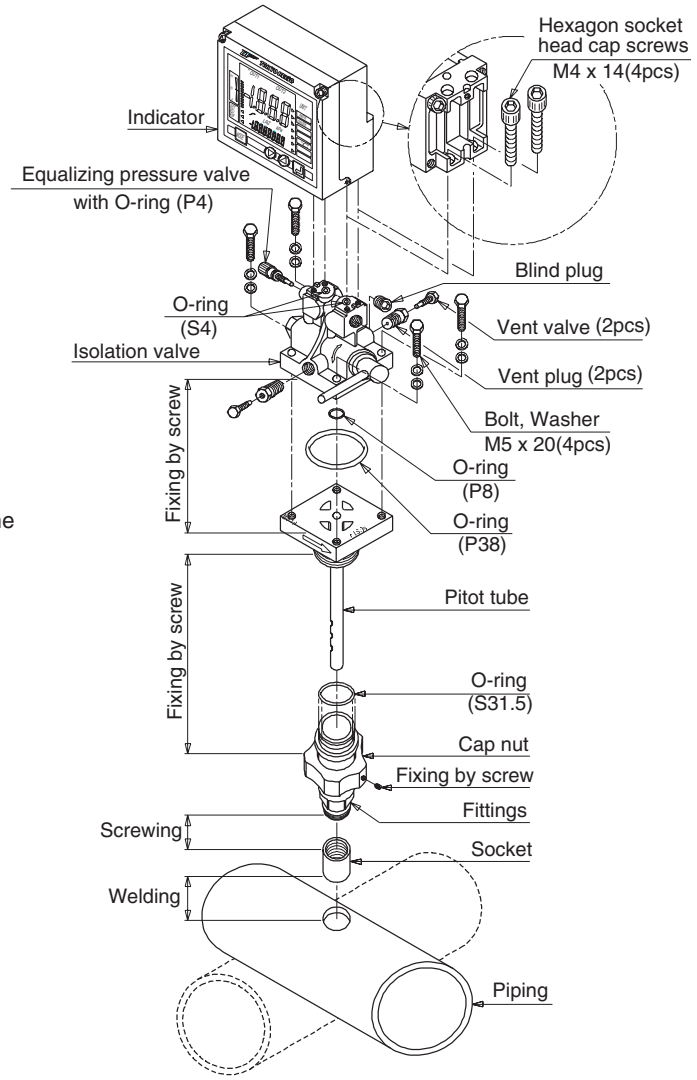
*1,2 For the 2 MPa rating, the parts made of proper material such as S25C be selected and provided by customers considering pipe sch40.

CONSTURUCTION

CDT12□□

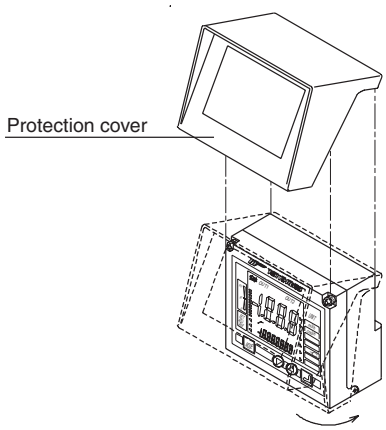


CDT14□□



[Option]

- 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.)

MODEL CODE

CDT1	☐	☐0	-☐☐☐	-☐☐	☐	L	-A	/☐☐☐		Description	Note
Installation type	2									Horizontal type	Standard type
	4									Perpendicular type	Vertical type
Pressure rating		10								1MPa class	Carbon steel pipe for piping (JIS G 3452)
		20								2MPa class	Carbon steel pipe for pressure piping (JIS G 3454 Sch40)
Main pipe size			-020							20mm	Nominal diameter for installation pipe
			-025							25mm	
			-032							32mm	
			-040							40mm	
			-050							50mm	
			-065							65mm	
			-080							80mm	
			-100							100mm	
			-125							125mm	
			-150							150mm	
			-200							200mm	
			-250							250mm	
			-300							300mm	
			-350							350mm	
			-400							400mm	
			-450							450mm	
Full scale range				-05						Flow rate range	Select for the code of Standard full scale range
				-10							
				-20							
				-50							
Indicator type					4					Battery type	Battery drive
					5					Current output type	4-20mA DC (2-wire)
					6					Alarm output type	2 points + 4-20mA DC
Application						L				For liquid	
Version							-A			Version code	
Option*								/TLZ		Totalization indicator	
								/PUL		Totalized indication + Pulse output	Applicable for alarm output type only.
								/HGC		With protection cover at display part	
								/CFT		Three-way socket for piping (CFTW)	Attachment is possible in case of the quality of the material FCMB and 1MPa specification (20 to 32 mm)
								/CFS		Welding sockt (CFSW)	Available only for SS400 (More than 40 mm)
								/PL		PVC lined pipe specification	Inform us L and D dimension of figure in page 6.
Additional function									Blank	Not provided	Not necessary if above-mentioned code is available.
									/Z	Provided	Consult about the details of the pipe material or Pitot-tube length.

*Note) Insert "/ " between each code when the plural codes are selected.

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

Horizontal installation, Connection size 50mm, 1MPa class, Full scale flow rate code[10], Battery drive type

Model code: CDT1210-050-104L-A

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

Vertical installation, Connection size 100mm, 1MPa class, Full scale flow rate code[05], Current output type, Totalization indicator, indication, With protection cover at display part, With welding socket

Model code: CDT1410-100-055L-A/TLZ/HGC/CFS

Code example 3: [In case piping type specification]

Horizontal installation, Connection size 80mm, Pipe material SUS304TPD, 1MPa class, Full scale flow rate code[20], Current output type, Totalization indicator, With welding socket

Model code: CDT1210-080-205L-A/TLZ/CFS/Z

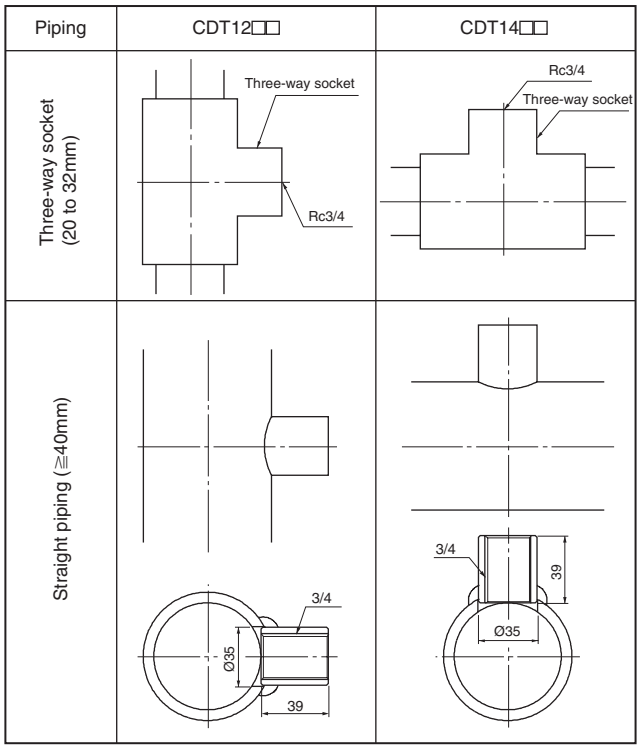
When the piping type is specified as seen in the above Code example 3, it will be additional function.

Moreover, in case socket and three-way socket are prepared by customer, Pitot tube length may be changed by installation dimension. This will be an additional function.

Accordingly the last letter of model code will be "/Z" in case of such special specification as not mentioned in the above model code.

INSTALLATION

1) Keep the upstream and downstream straight runs as required.
2) To install the flowmeters,
   Drill a hole of 35mm diameter into the pipe having more than or equal to 40mm diameter.
   Use the three-way socket for the pipe having less than or equal to 32 mm diameter.
3) Select and drill the hole at right place so that the final fixed posture of indicator should be horizontal.
4) Weld the socket to the drilled hole. The centerline of the socket must be in line with the one of the pipe.
5) Screw the CDT1000 into the welded socket to complete the installation.



SUGGESTIONS

- The model CDT 12(4) 10 flowmeter is calibrated based on the inside diameter of JIS G3452 SGP. For the model CDT 12(4) 20, calibrated JIS G3454 Sch.40.
  Consult TOKYO KEISO if pipes are different from above.
  Specific calibration is required.
- Straight length for upstream and downstream is required for accurate measurement as shown in the following table,

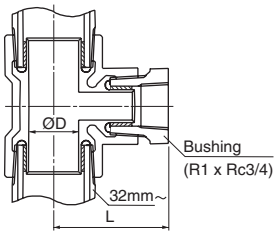
Size	Upstream	Downstream
≦32mm	≧10D	≧5D
≧40mm	≧5D	≧3D

Note) D : Inside diameter of main pipe.

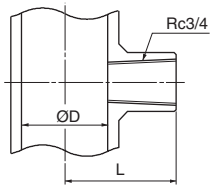
- Run the fluid fully in the pipe. Otherwise it could not be measured.
- Vent the air before measurement.
  See CDT1000 Instruction Manual for further details.

LINING AND OTHER PIPING

- The full scale flow rates are based on when the flow runs through the inside diameter of the pipe lined with PVC which consists of a tee joint of the Eslo coat LX made by Sekisui Chemical Co.'s Eslon®.
  If you use the tee joints with the different inside diameter from above, the extra calibration is required.
  For further consultation inform us of the dimension "D" in the following drawing.
- When the main pipe size is between 32 mm and 150 mm, provide either one of the following tee joint and bushing assembly to make the connection size 20 mm:
  — tee joint with 25 mm in branch line + A bushing with 25 mm x 20 mm
  — tee joint with larger than 25 mm in branch line + One or more bushings in series to make the final connection size 20 mm
  For further consultation inform us of the dimension "L" in the following drawing.
- Piping can be customized.
- Please determine the values of "D" and "L" in the figure below and the kind of pipe and then contact us.



Lining piping (PVC)



Other piping

ORDERING INFORMATION

Indicator
1. Model code
2. Quantity

* Specification is subject to change without notice.

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