



ISO 9001
REGISTERED

NEW-FLOW

MANUFACTURE OF THERMAL INSERTION MASS FLOW METER

TDF SERIES

AND CONTROL INSTRUMENTS

Instruction Manual



Approvals:



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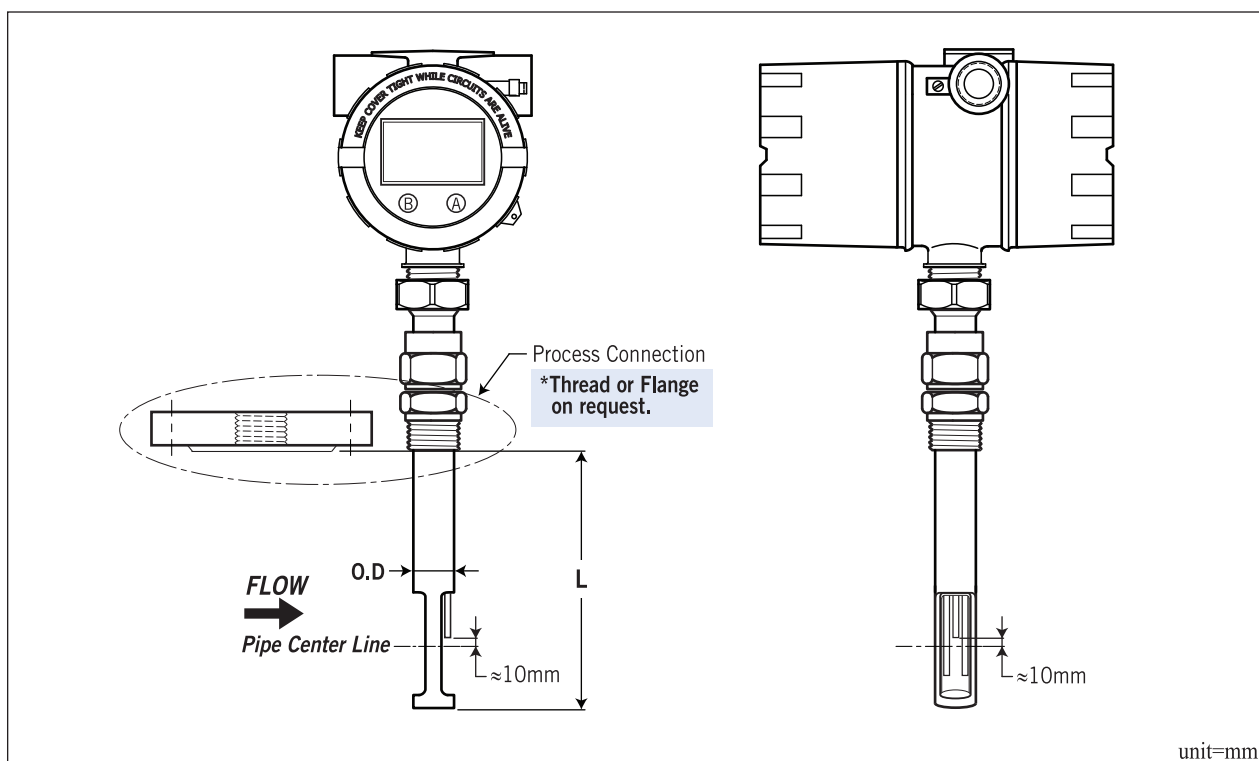
1. OVERVIEW

1.1 Application

TDF-Series is assembled with a thermal dispersion sensor. The sensors use three ratio: temperature detector, reference sensor, compensation sensor through a Wheatstone Bridge to provide a output signal 4~20mA, for measuring temperature when the sensor is immersed into process gases.

1.2 Style Types

- **TDF-IN** : Insertion Style
 - Application for the large diameter, duct and chimney.
 - Measuring the flow in pipe or air channel which inner diameter bigger than 2”.
 - Pipe/Line size compatibility is from 2” to 60” ; bigger than 60” is on request.
 - Measuring Range: 0.6 M/S to 60 M/S
 - Calibrated in mass flow range or mass flow rate.
 - Thread and Flange type available



Insertion Length / Flow Rate

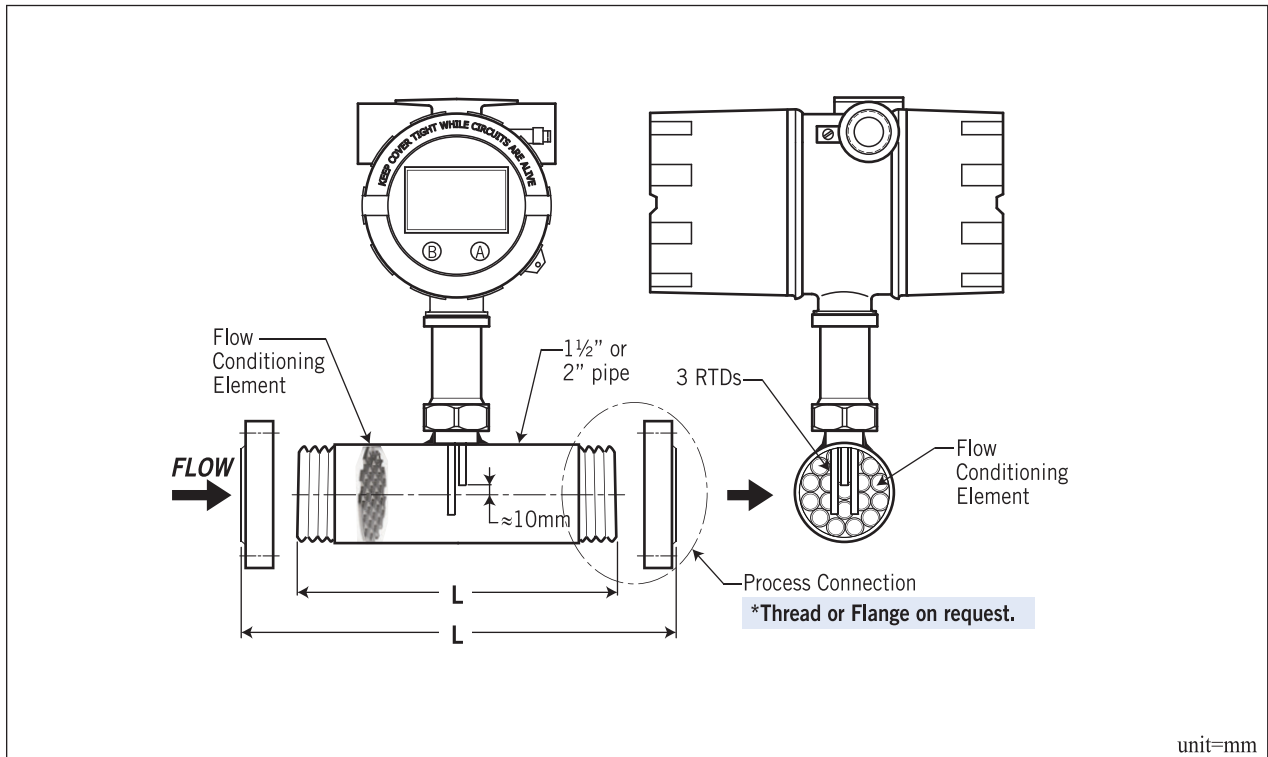
" O.D "	Length " L "	Max. Flow Rate	Pipe Size
ø20mm	Standard 1¾", option 2"~60"	600 Nm ³ /Hr	2"
		800 Nm ³ /Hr	2½"
		1200 Nm ³ /Hr	3"
		2000 Nm ³ /Hr	4"

*Other pipe size is on request.

1. OVERVIEW

- TDF-CP : Combine Pipe Style

- Application for the measuring pipe, and the pipe size is from 1/2" to 2".
- Measuring Range: Air / 0.6 SCFM (1 NCMH) ~ 410 SCFM (700 NCMH).
- Calibrated in mass flow range.



Insertion Length / Flow Rate

Process Connection	Connection Type	" L " Length	Max. Flow Rate
1/2"	NPT / BSP or Flange Type Available	13"	350 NLPM
3/4"		13"	1,500 NLPM
1"		13"	2,500 NLPM
1 1/4"		13"	4,000 NLPM
1 1/2"		13"	5,000 NLPM
2"		13"	11,500 NLPM

* L is standard length.
Other L length please consult with the factory.

1.3 Basic Function

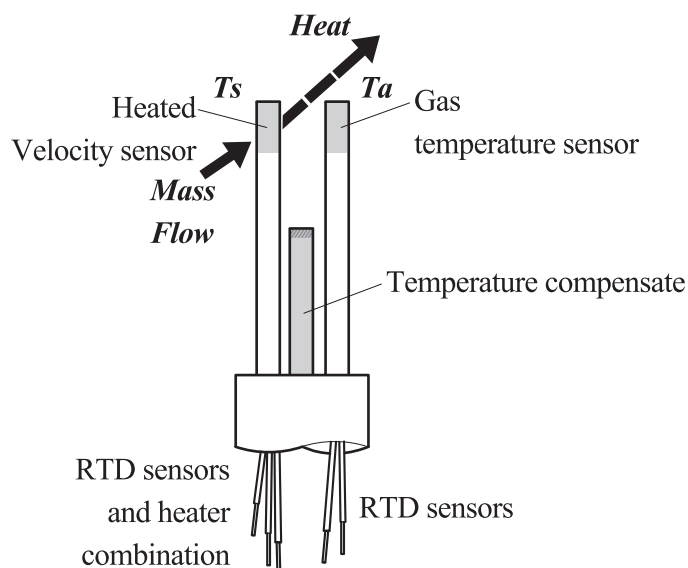
- Function Type : Flow rate with totalizer LCD display & blue back lighted
- Enclosure Material : Aluminum or SS316 available
- Wetted Parts Material : 316 stainless steel
- LCD Display : Totalizer 10 digital (top); Flow rate 8 digital (bottom)
- Output Signal : 0-5 VDC linear min. load 1000 Ω or 4-20mA linear, loop resistance 500 Ω
- Input Power : 24VDC or 110/220VAC
- Process Connection :
TDF-IN : $\frac{3}{4}$ " NPT, BSP male thread; or flange 1"~3" JIS, ANSI, DIN and clamp available
TDF-CP : $\frac{1}{2}$ " ~ 2" NPT, BSP male thread; or flange type available
- Conduit Connection : $\frac{1}{2}$ " or $\frac{3}{4}$ " NPT female, or M20xP1.5 (with adaptor); others option available
- Detection Length : Standard 1 $\frac{3}{4}$ "; and option 2" ~ 60"
- Working Temperature : 0~80 °C
- Working Pressure : Maximum 40 kg/cm²
- Housing : IP68
- Explosion Proof : Class I, Groups A, B, C, D; Class II, Groups E, F, G; NEMA 4X
- Response Time : 1 second
- Accuracy : $\pm 1\%$ of reading +0.5% of full scale
- Repeatability : $\pm 0.2\%$ of full scale
- Wide Turn down Ratio : 100 : 1
- Unit :
Flow unit : Kg , GAL , N , Nm³ , cc , ℓ , M³
Time uni : Day , Hr , Min , Sec

1.4 Flow Sensing Principle

TDF-Series's sensor probe is responsible for the unsurpassed accuracy, ruggedness and reliability of industrial flow meters. The immersible sensor consists of one temperature compensate and two sensing elements – a velocity sensor and a temperature sensor that automatically corrects for changes in gas temperature.

When power is applied to the flow meter, the transducer electronics heats the velocity sensor to a constant temperature differential above the gas temperature and measures the cooling effect of the gas flow. The electrical power required to maintain a constant temperature differential is directly proportional to the gas mass flow rate.

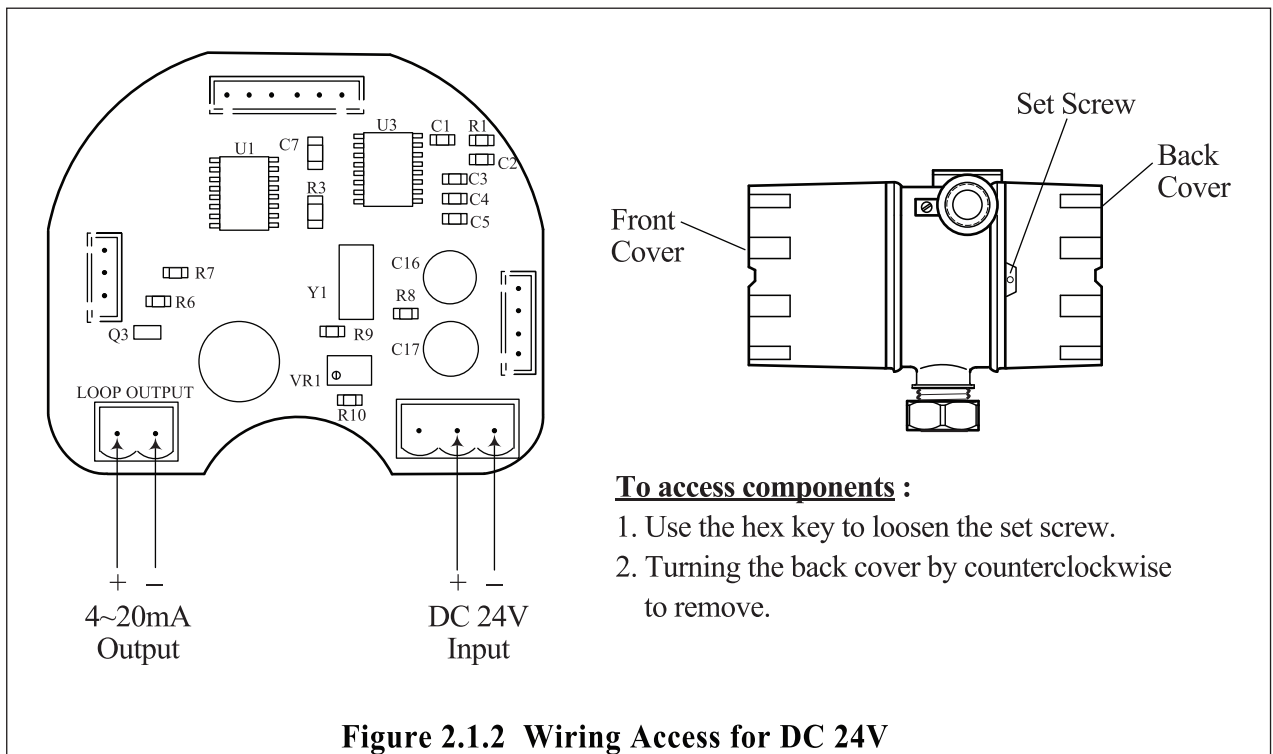
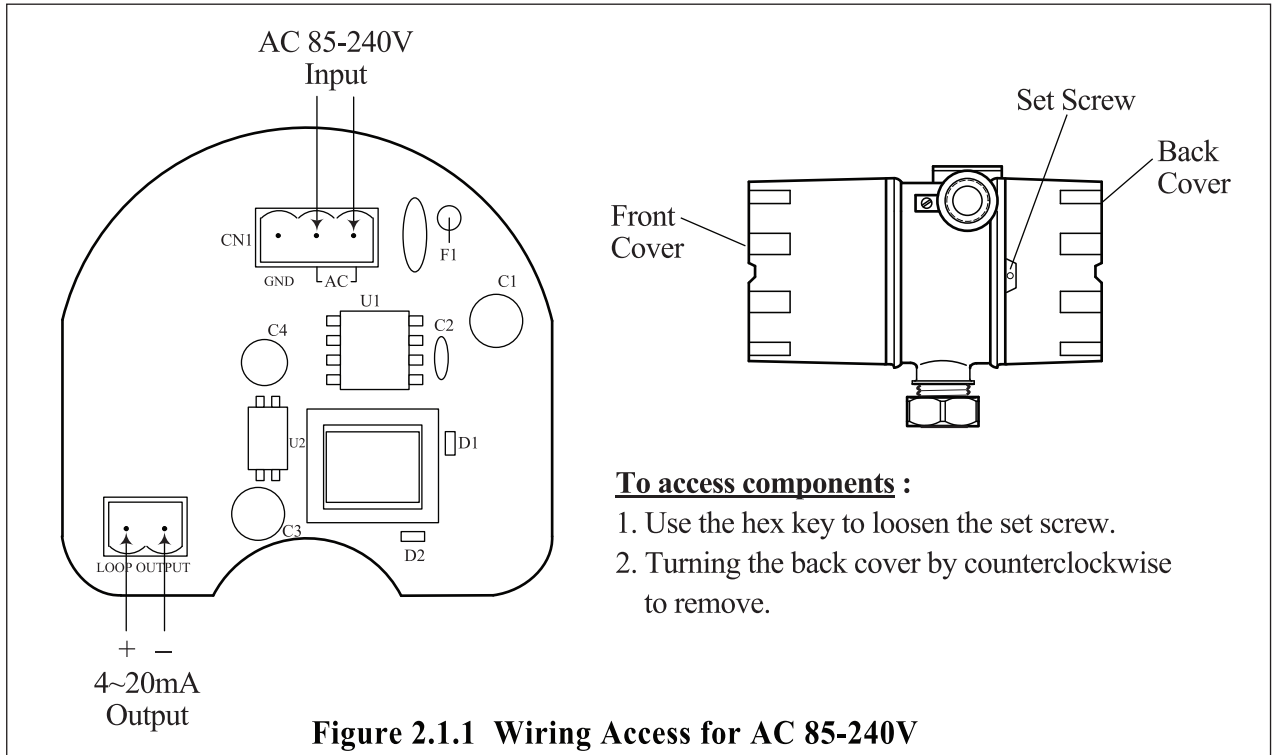
Both sensors are reference-grade platinum resistance temperature detectors (RTDs). The platinum RTD wire is wound on a rugged ceramic mandrel for strength and stability. TDF-Series's sensors are clad in a rugged, sealed 316 stainless steel encasement.



Flow Sensor Principle - Sensor Assembly

2. WIRING CONNECTION & OUTPUT

2.1 Wiring Terminal



2. WIRING CONNECTION & OUTPUT

2.2 Terminal Assignment

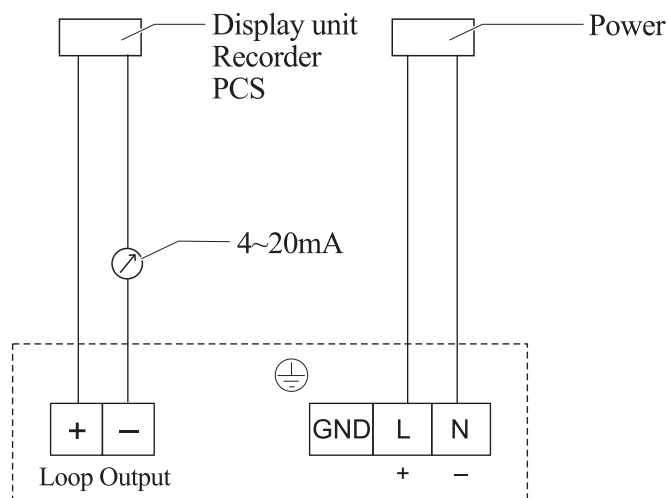


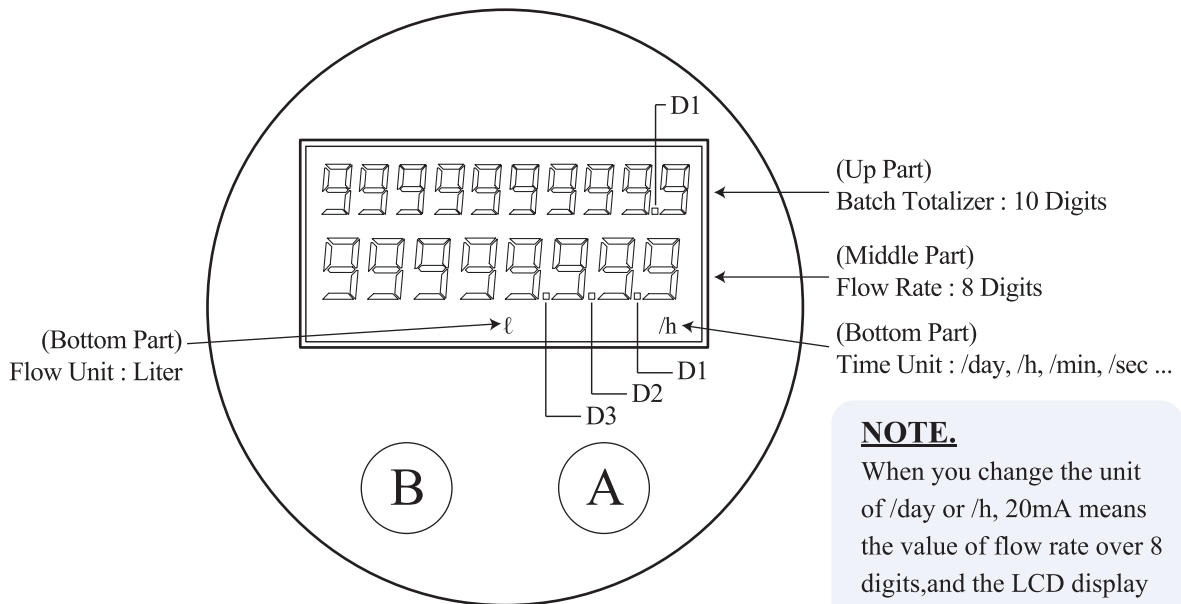
Figure 2.2.1 4-Wires Version (Active)

- Connect the connecting line to the screw terminals line cross-sections of 0.5 to 2.5 mm² (20 to 14 AWG) in the terminal compartment.
- Use 2-wire twisted pair cable with screen for the connection.
- Protective circuitry against reverse polarity, RFI and over-voltage peaks is built into the device.
- A standard installation cable is sufficient if only the analogue signal is used.

3. DISPLAY & KEYS OPERATION

3.1 Display Digital Decimal Point Function

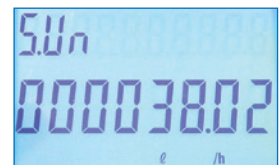
Flow Rate with Totalizer LCD Display :



Flow rate unit adjustable (S.UN) : ℓ / Min

Time Unit Adjustment : (Flow unit has set by the manufacturer, the client can adjust the time unit only.)

- Push “ A key ” and “ B key ” at the same time, LCD display
 - “ S.Un ” ——— (Up Part)
 - 000000.00 ——— (Middle Part)
 - ℓ / min ——— (Bottom Part)
- Push “ B key + A key ”, the time unit display
 - “ ℓ / min ” ——— (Bottom Part) – will *flashing*
- Push “ B key ” continuously, the time unit changed step by step from
 - “ ℓ / day , / h , / min , / sec ... ”
 adjust and set the time it as required.



- Then Push “ B key + A key ” to finish the time unit setting, LCD display

“ S.Un ” ——— (Up Part)
000000.00 ——— (Middle Part)
ℓ / h ——— (Bottom Part)

and push “ A key ” and “ B key ” at the same time, to back to the usage mode, LCD display

“ 0000xxxx.xx ” ——— (Up Part)
00xxxx.xx ——— (Middle Part) – will display *actual sensor input value*
ℓ / h ——— (Bottom Part) – according to the final adjusted *time unit*

3. DISPLAY & KEYS OPERATION

3.2 Batch Totalizer Flow Rate Zero Adjustable

- Push “ B key ”, LCD display

“ 0000xxxx.xx” ——— (Up Part) – will *flashing*
bAtch ——— (Middle Part)
ℓ ——— (Bottom Part)



- Push and Hold “ B key ” and “ A key ” at the same time, to make the batch flow rate to back to “ ZERO ”
- Release “ A key ” and “ B key ” at the same time, to back to the usage mode
“ 00000000.00” ——— (Up Part)
000000.x0 ——— (Middle Part) – will display *actual sensor input value*
kg/min ——— (Bottom Part) – according to the final adjusted *time unit*

3.3 Total Accumulation (NO RESET FUNCTION)

- Push and Hold “ A key ”, LCD display

“ 09876543.21” ——— (Up Part)
2 ——— (Middle Part)
ℓ ——— (Bottom Part)

- Release “ A key ”, to back to the mode of batch flow rate, and also back to the usage mode
“ 0000xxxx.xx” ——— (Up Part) – will display *original batch flow*
000000.x0 ——— (Middle Part) – will display *actual sensor input value*
ℓ / min ——— (Bottom Part) – according to the final adjusted *time unit*

NOTE.

Total accumulation displayed, the middle part of LCD display “ 2”, which means the value of total accumulation is exceeded two time 10 digits.

4. INSTALLATION

4.1 Mounting Procedure

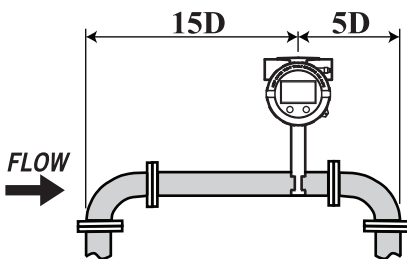
4.1.1 Unobstructed Flow Requirements

Select an installation site that will minimize possible distortion in the flow profile. Valves, elbows, control valves and other piping components may cause flow disturbances. Check your specific piping condition against the examples shown below. In order to achieve accurate and repeatable performance install the flow meter using the recommended number of straight run pipe diameters upstream and downstream of the sensor.

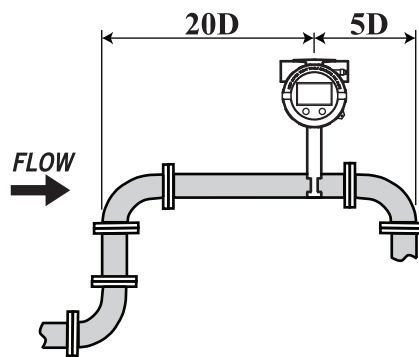
4.1.2 Required Pipe Length

D = Nominal bore size (diameter)

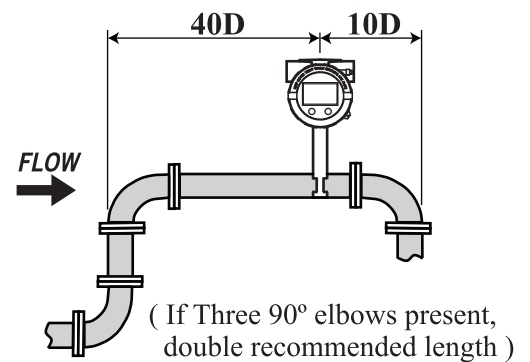
(1) One 90° Elbow



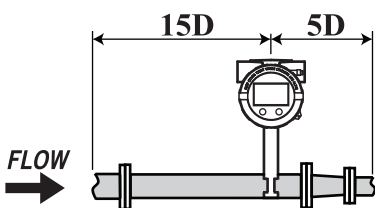
(2) Two 90° Elbow in one plane



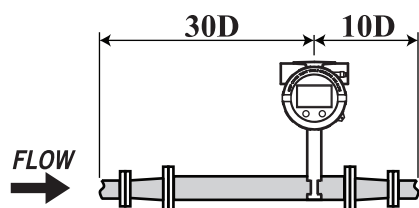
(3) Two 90° Elbow out of plane



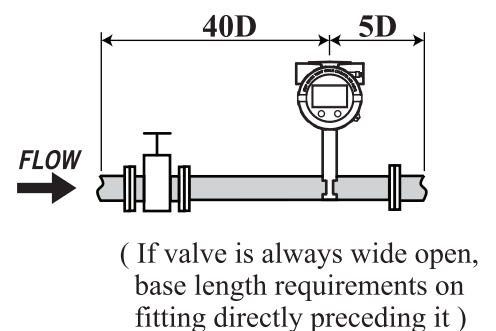
(4) Reduction



(5) Expansion



(6) Regulator or Valve

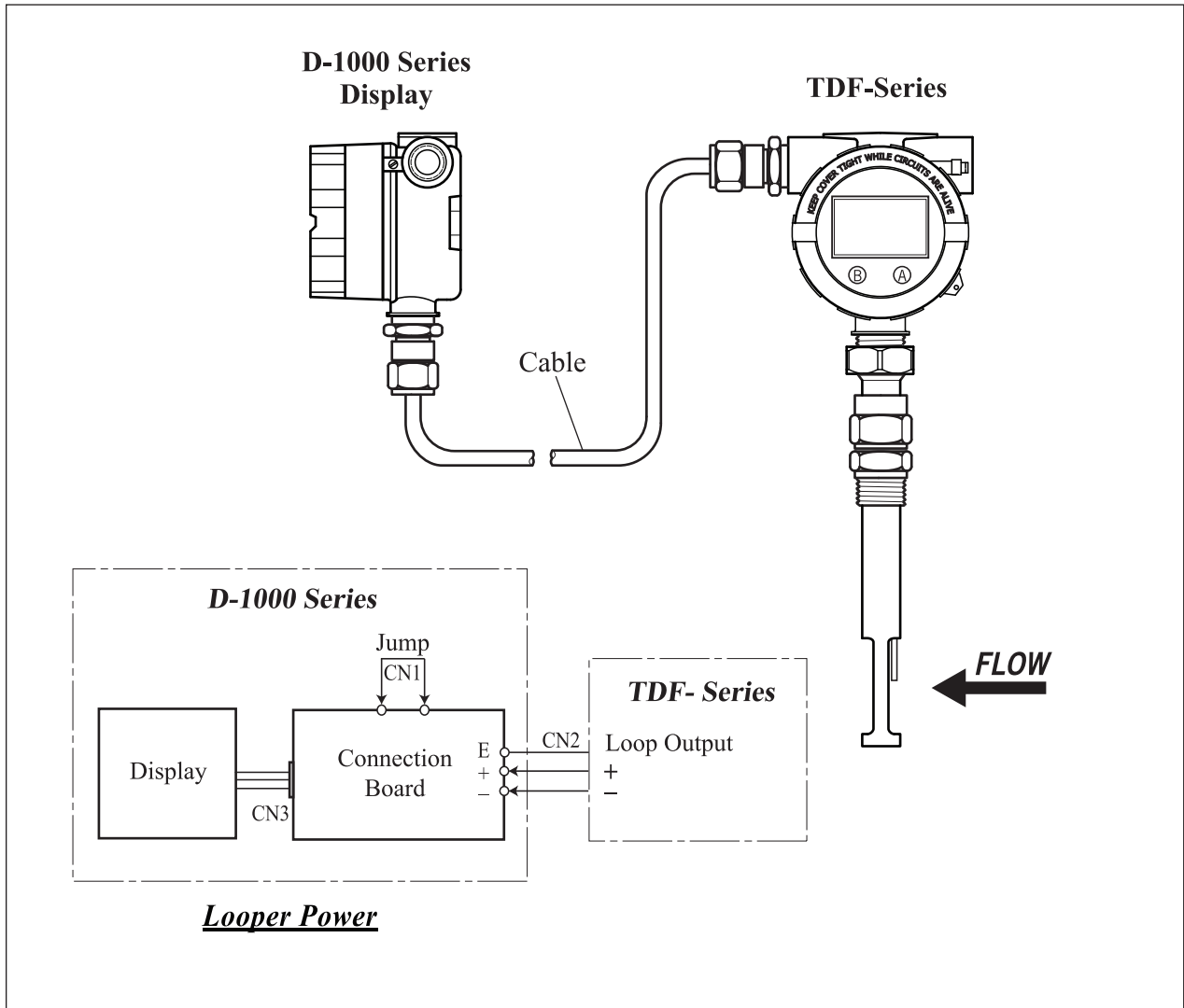


NOTE.

The length of a reducer, if connected, can be counted as a part of the straight pipe length. No straight pipe length is needed on the downstream side. If a butterfly valve is installed downstream of the detector, do not let the valve plate protrude into the pipe of the detector.

4. INSTALLATION

4.1.3 Wiring for Remote Mounting





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