General Specifications

digitalYEWFLO

GS 1F6A0-01E-H

Vortex flowmeter

- **Vortex Flowmeter for Liquids, Gases and Steam**
- **New converter concept provides diagnostic data based on the unique SSP Technology**
- **Line Size from DN 15 (1/2”) – DN 300 (12”)**
- **Pressure rates up to ANSI 1500 / PN250**
- **Temperature range -200 °C up to +450 °C**
- **Integrated flow measurement for precise results even under difficult installation conditions**
- **Dual piezo system ensuring high vibration immunity and shock resistance**

YOKOGAWA

GS 1F6A0-01E-H
2st Edition

Model DY-D,DY-E
Integral Type

Model DYA
Remote Type Converter

Model DY-N
Remote Type Detector

Based on field proven design

digital YEWFLO combines the field proven sensor and body assembly used in more than 200,000 units installed worldwide, with a unique digital electronic including Yokogawa's SSP technology. digitalYEWFLO provides high accuracy and stability, even in harsh process conditions. Combined with high reliability and robust design, it delivers improvements in plant efficiency and reduced operating costs.

Digital YEWFLO with SSP technology

Yokogawa's **SSP (Spectral Signal Processing) technology** is built into the powerful electronics of digitalYEWFLO. SSP analyses the fluid conditions inside digitalYEWFLO and uses the data to automatically select the optimal settings for the application*, providing features never seen before in a vortex flow meter*:

- The signals from the patented YEWFLO dual sensors, inside the shedder bar are monitored constantly. Intelligent noise functions eliminate noise providing vibration immunity and high stability, even at low flows.
- **SSP technology** gives the user valuable information about the fluid conditions inside the pipe, providing assistance in analysing the process and assessing the installation conditions or application.
- The user interface is a two line LCD display giving flow rate and totalized value simultaneously as well as functional data and diagnostic information.

FEATURES

- Unique digital electronics with **SSP technology**
- Dual piezo system with no wetted parts is most robust in class
- Completely averaged flow profile measurement ensures performance under real installation conditions
- No moving parts, no maintenance, no Zero drift.
- Removable Shedder Bar and sensor assembly means reduced downtime
- Precise measurement of Liquid, Gas or Steam with same instrument
- Compact design
- Quick and easy setup reduces commissioning time
- Dual output for 4-20mA and pulse. Two outputs simultaniously
- High Accuracy ±0.75% Liquids, 1.0% Gas, Steam
- High and Low temperature version from –200 deg.C up to 450 deg.C brings precise measurement to the toughest applications
- Intrinsically safe and Explosion proof versions comply with ATEX
- IP67 immersion and dust proof (equivalent to NEMA4X)
- Electrical outputs compliant with NAMUR NE21 and NE43
- Remote type available with up to 30 m connection distance
- HART or BRAIN communications, key switches for local adjustment
- Dual sensor design

Contents

STANDARD SPECIFICATIONS

Performance Specifications

Fluid to be Measured :
Liquid, Gas, Steam (Avoid Multiphase Flow and Sticky Fluids)

Measuring Flow Rates :
Refer to item “Table 5”

Accuracy : ± 0.75% of reading (Liquid)
± 1% of reading (Gas, Steam)
refer to “Table 8”

Repeatability : ± 0.2% of reading

Calibration :
The flowmeter is factory-calibrated using water.

Normal Operating Condition

Process Temperature Range :
–40 to 260 °C (general)
–200 to 100 °C (Cryogenic Version: option LT)
–40 to 450 °C (High Process Temperature Version: option HT)
Refer to “Figure 1” for integral converter type

Process Pressure Limit :
~ 0 bar to flange rating
Low pressure limit is a function of cavitation and density: Refer to item “Sizing”

Ambient Temperature Range (Integral Type) :
General : –40 to 85 °C
With Indicator : –30 to 80 °C (See Figure 1)
Flame Proof: –40 to 75°C
Intrinsic Safe: –40 to 60°C
Type n Approval: –40 to 60°C
Remote type: –40 to 85 °C (80 °C with indicator)
Refer to Figure 1 for integral converter type

Ambient Humidity : 5 to 100 RH (at 40 °C)
Outside installation without weather protection possible.

Power Supply Voltage : 10.5 to 42 V DC
(Refer to Figure 2 ; Relationship Between Power Supply Voltage and Load Resistance)

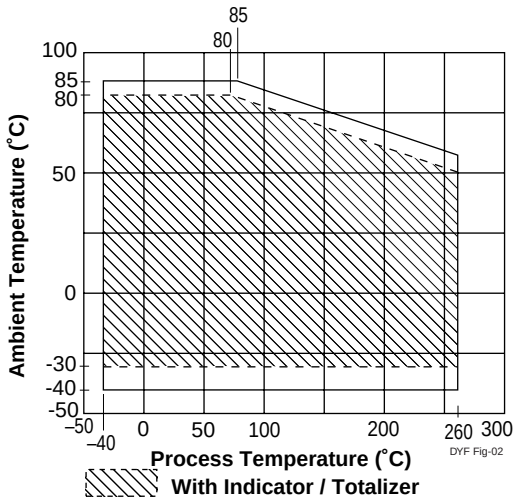

Figure 1. Ambient Temperature limit (Integral Type)

Mechanical Construction

Material :
- Body : Stainless Steel 1.4552 or Carbon Steel ASTM A216WCB CF8M
- Plug :
  - General, HT : Stainless Steel 1.4462
  - LT : Stainless Steel 1.4401 (equiv. AISI316L)
- Gasket
  - General, LT : SUS316 PTFE coated (equiv. AISI316) (YF101 to YF105: HC PTFE coated on special request)
  - HT : SUS316 silver coated
- Shedder bar : Duplex stainless steel
  - General : YF101: 1.4301 YF102-120: 1.4517
  - HT : YF102-120: DCS1 (Note: DCS1 is a registered trademark of Daido Tokushu Steel Co.)
  - LT : YF101: AISI 316 YF102 to 110: SCS14 (equiv. CF8M)
- Plate
  - General, HT : YF101 to YF104: 1.4308 YF105 to YF110: 1.4549 YF115 to YF120: no plate is used
  - LT : YF101 to YF104: 1.4308 YF105 to YF110: 1.4301
- Fixing bolts
  - General, HT : YF101 to YF104: SUS660 (equiv. AISI660) YF105 to YF120: SUS630 (equiv. AISI630)
  - LT : YF101 to YF110: SUS660 (equiv. AISI660)
- Housing and covers : Aluminium alloy

Refer to “Table 1”

Coating Color:
Converter case, cover : Deep sea moss green (Munsell 0.6GY 3.1/2.0) (Polyurethane corrosion-resistant coating)

Protection:
IP67 immersion proof and dust proof. (Equivalent to NEMA 4X).

Hazardous Area Classifications:
Refer to item “Option Specifications”

Electrical Classifications:
Refer to item “Option Specifications”

Electrical Connection:
ANSI 1/2 female,
ISO M20 × 1.5 female

Signal Cable:
Model DYC cable, used for remote detector and converter.
Max. length : 30 m.
Outer Sheath Material: Heat resistant polyethlene
Durable Temperature : –40 to 150 °C

Weight:
Refer to the external dimension.

Mounting:

Flowmeter : Vertically, horizontally or at any other angle. For liquid service, the flow line must be filled with liquid.

Detector : Flange or wafer mounting by flanges of adjacent pipeline.

Converter (remote) : 50 mm (2 in) pipe mounting

Electrical Specification

Note*: Pulse output, alarm output and status output use the common terminal, therefore these functions are not used simultaneously.

Output signal: Dual Output (Both Analog and Transistor contact output can be obtained simultaneously). In this case refer to the item "Remarks on installation" for power supply and pulse output wiring.

Analog: 4 to 20 mA DC, 2-wire system.

Transistor Contact Output:

Open collector, 3-wire system.
Pulse, alarm, status output are selected by parameter setting.
Contact rating: 30 V DC, 120 mA DC
Low level: 0 to 2 V DC. (refer to Figure3)

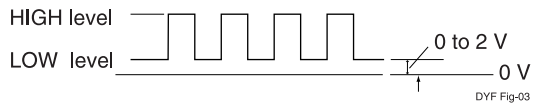

Figure 3. High and low level (Pulse output)

Communication Requirement :

Communication signal :

HART or BRAIN communication signal (superimposed on a 4 to 20 mA DC signal)

Conditions of Communication Line :

Load resistance :

250 to 600 Ω (including cable resistance), refer to figure 2.

Supply Voltage :

16.4 to 42 V DC for digital communications BRAIN and HART protocols (16.4 to 30 V DC for intrinsically safe type, refer to figure 2).

Distance from other Power Line: 15 cm or more (Parallel wiring should be avoided.)

BRAIN:

Communication Distance :

Up to 2 km (when polyethylene insulated PVC-sheathed cables (CEV cables) are used.Communication distance varies depending on type of cable used.)

Load Capacitance: 0.22 μF or less

Load Inductance: 3.3 mH or less

Input Impedance of Receiver Connected to the Receiving Resistance:

10 kΩ or more at 2.4 kHz.

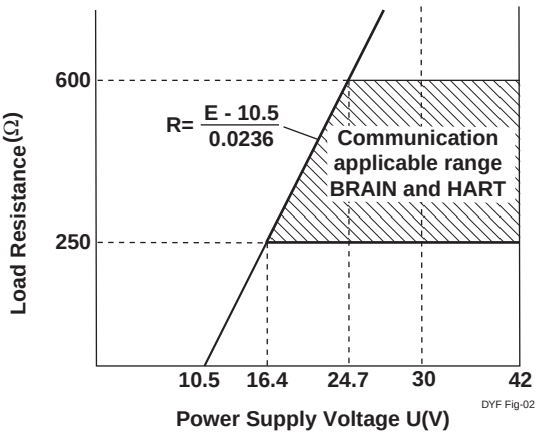

Figure 2. Relationship Between Power Supply and Load Resistance

HART:

Communication Distance:

Up to 1.5km (when using multiple twisted pair cables. Comminication distance varies depending on type of cable used.)

Cable Length for Specific Applications:

Use the following formula to determine cable length for specific applications.

$$L = \frac{65\times10^6}{(R\times C)} - \frac{(C_f+10{,}000\times C)}{C}$$

where:
L=length in meters.
R=resistance in Ω (including barrier resistance)
C=cable capacitance in pF/m.
Cf= maximum shunt capacitance of receiving devices in pF/m.

Functions:

Damping time constant:

Settable from 0 to 99 Sec (63% response time)

Note: Delay time is 0.5 Sec.

Analog output circuit time constant is 0.3 Sec.

Pulse output function:

Pulse output is selected from scaled pulse, unscaled pulse, frequency (Number of pulses per second at 100% of output).
Pulse frequency : Max 10 kHz
Duty cycles : Approx. 50% (1:2 to 2:1)

Self -diagnostics and Alarm Output:

In case an alarm (over range output signal, EEPROM error, vibration noise, abnormal flow such as clogging, bubble) occurs, an alarm signal is output and indicated.
The alarm signal output goes from close (ON) to open (OFF) during alarming.

Status output function *:

Flow Switch:

In case flow rate decrease under the flow set value, a status signal is output.
Status signal output mode can reverse (ON/ OFF).

Data Security During Power Failure:

Data (parameter, totalizer value, etc) storage by EEPROM. No back-up battery required.

Adjustment :

Instrument Application Adjustment :

Digital Yewflo errors can be corrected by segment approximations (using 5 correction factors).

Reynolds Number Correction:

Output error at Reynolds number 40000 or less is corrected using five-break-point line-segment approximation.

Down-scale burn out.

In case a CPU or EEPROM failure occurs, the flowmeter outputs a signal to 3.6 mA or less.
Up-scale (21.6 mA or more) or down-scale (3.6 mA or less) is user-selectable through the fail mode alarm jumper.

Indicator/Totalizer:

Flow rate (% or engineering units) and totalizer can be indicated simultaneously.
Short messages for self diagnostics are indicated.
Totalizer value is protected by an EEPROM at the time of a power failure.
The indicator can be rotated in 90 degree Intervals.

EMC Conformity Standards:

EMI (Emission) : EN55011 ClassA Group1, AS/NZS 2064 1/2
EMS(Immunity) : EN61326

***Note:**
For remote converter type the signal cable should be used with metal conduit

Model and Suffix Codes

DY Vortex Flowmeters (Integral Type, Remote type detector)

Model	Suffix Codes	Description
DY015	.....	Size 15 mm (1/2 inch)
DY025	.....	Size 25 mm (1 inch)
DY040	.....	Size 40 mm (1-1/2 inch)
DY050	.....	Size 50 mm (2 inch)
DY080	.....	Size 80 mm (3 inch)
DY100	.....	Size 100 mm (4 inch)
DY150	.....	Size 150 mm (6 inch)
DY200	.....	Size 200 mm (8 inch)
Output Signal /Commu-nication *1	-D	4 to 20 mA DC, Pulse, BRAIN Communication
	-E	4 to 20 mA DC, Pulse, HART Communication
	-N	Remote type detector
Body Material	B	CF8M
	C	DIN 1. 4552
	W	WCB
	X	Others
Shedder bar Material *2	L	1.4517, Only for 15mm is DSD1- H *1 (General)
	X	Others
Process Connection *3	AA1	ANSI Class 150 Wafer
	AA2	ANSI Class 300 Wafer
	AA4	ANSI Class 600 Wafer
	AD2	DIN PN10/16 Wafer
	AD4	DIN PN25/40 Wafer
	BA1	ANSI Class 150 Flange(Raised Face)
	BA2	ANSI Class 300 Flange(Raised Face)
	BA4	ANSI Class 600 Flange(Raised Face)
	BA5	ANSI Class 900 Flange(Raised Face)
	BD1	DIN PN10 Flange(Raised Face)
	BD2	DIN PN16 Flange(Raised Face)
	BD3	DIN PN25 Flange(Raised Face)
	BD4	DIN PN40 Flange(Raised Face)
	BD5	DIN PN64 Flange(Raised Face)
	BD6	DIN PN100 Flange(Raised Face)
	BD7	DIN PN160 Flange(Raised Face)
	CA4	ANSI Class 600 Flange(Ring Joint)
	CA5	ANSI Class 900 Flange(Ring Joint)
Electrical Connection	-2.....	ANSI 1/2 NPT Female *4
	-4.....	ISO M20×1.5 Female
Indicator/Totalizer *5	D	With Indicator/Totalizer
	N	None Indicator, Remote type detector
Options	/□	Refer to Option Specifications

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* 1: Duplex stainless steel
DCS1-H are registered trademarks of Daido Tokusyu Steel Co.

DYA Vortex Flow Converter (Remote Type)

Model	Suffix Code	Description
DYA	.....	Vortex Flow Converter (Remote Type)
Output Signal /Commu-nication *1	-D.....	4 to 20 mA DC, Pulse BRAIN Communication
	-E.....	4 to 20 mA DC, Pulse HART Communication
Electrical	2.....	ANSI 1/2 NPT Female *2
	4.....	ISO M20 ×1.5 female
Indicator/Totalizer	D	With Indicator/Totalizer
	N	None Indicator/Totalizer
Options	/□	Refer to Option Specifications

* 1: Nominal size, Fluid (Liquid, Gas, Steam), Density, Viscosity, Pressure, Temperature, Flow range, Parameters are set at the factory before shipment.
* 2 : Refer to Table 1.
* 3 : Refer to Table 2.
* 4 : In the case /KF1, gauge depth limit is +0.5 to +3.5 turns deeper than ANSI standards.
* 5 : Indicator/Totalizer is not available for remote type detector.

DYC Signal Cable

Model	Suffix Code	Description
DYC	·····	Signal Cable
Cable End	-0·····	Without End finish *6
	-1·····	With End finish
Cable Length	-05·····	5 m
	-10·····	10 m
	-15·····	15 m
	-20·····	20 m
	-25·····	25 m
	-30·····	30 m
	-□□·····	□□ m *7
Options	/□·····	Cable End Finish Part *8

* 6 : One set of end finish part is attached.
* 7 : Fill in two digit figure per 5m unit (for example, 40m, 50m etc).
The cable can be cut at required length within 30m at customer side.
In this case, select Cable End Code [-0].
* 8 : An entered digit figure shows required set quantity. (only for DYA).

Table.1 Body, Shedder bar, Gasket Material

Option Item (Note 1)	Option Code (Note 1)	Material			Process Connection	
		Body	Shedder bar	Gasket	Wafer Nominal Size	Flange Nominal Size
General (REFERENCE)	___	DIN 1.4552 WCB	DIN 1.4517	(Note2)	15 mm up to 100 mm	15 mm up to 200 mm
Compliance with NACE (Note 4)	NC	CF8M	Hastelloy C	(Note2)	15 mm up to 100 mm	15 mm up to 200 mm
Anti-corrosion Version II	HY	DIN 1.4552 WCB	Hastelloy C	(Note2)	15 mm up to 100 mm	15 mm up to 100 mm
High Process Temperature Version	HT	CF8M DIN 1.4552 WCB	DCS 1	JIS SUS316 stainless steel plated with silver	25 mm up to 100 mm	25 mm up to 200 mm
Cryogenic Version	LT	CF8M DIN1.4552	DY015 : AISI 316 SCS14	(Note2)	15 mm up to 100 mm	15 mm up to 100 mm

(Note 1) Refer to item "Option Specifications"
(Note 2) JIS SUS316 stainless steel with polytetrafluoroethylene(Teflon) coating
(Note 4) On request (NACE : National Association of Corrosion Engineers)

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Table.2 Flowmeter Selection Guide

Process Connection	Wafer		Flange(Raised Face)		Flange(Ring Joint)	
	Suffix Code	Nominal Size	Suffix Code	Nominal Size	Suffix Code	Nominal Size
ANSI Class 150	AA1	15 mm up to 100 mm	BA1	15 mm up to 300 mm	—	—
ANSI Class 300	AA2	15 mm up to 100 mm	BA2	15 mm up to 300 mm	—	—
ANSI Class 600	AA4	15 mm up to 100 mm	BA4	15 mm up to 200 mm	CA4	15 mm up to 200 mm
ANSI Class 900	—	—	BA5	15 mm up to 200 mm	CA5	15 mm up to 200 mm
DIN PN 10	AD1	15 mm up to 100 mm	BD1	15 mm up to 200 mm	—	—
DIN PN 16	AD2	15 mm up to 100 mm	BD2	15 mm up to 200 mm	—	—
DIN PN 25	AD3	15 mm up to 100 mm	BD3	15 mm up to 200 mm	—	—
DIN PN 40	AD4	15 mm up to 100 mm	BD4	15 mm up to 200 mm	—	—
DIN PN 64	—	—	BD5	15 mm up to 150 mm	—	—
DIN PN 100	—	—	BD6	15 mm up to 150 mm	—	—
DIN PN 160	—	—	BD7	15 mm up to 100 mm	—	—

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OPTION SPECIFICATIONS (ELECTRICAL CLASSIFICATIONS)

ITEM	Specifications	Code
ATEX Directive (certified KEMA (CENELEC)) (Note 3)	ATEX Directive (certified KEMA (CENELEC)) Flame proof Approval EExd IIC T6...T1 Tamb :-40 to +60°C :-30 to +60°C(For integral type with indicator) Process temp.: T6;85°C, T5;100°C, T4;135°C, T3;200°C, T2;300°C, T1;450°C Use /HT version above 260°C Electrical connection: ANSI 1/2NPT female, ISO M20 × 1.5 female	KF1
	ATEX Directive (certified KEMA (CENELEC)) Intrinsically safe Approval (Note 2) EEx ia IIC T4...T1 Tamb(Integral Type Flowmeter and Remote Type Converter) : -40 to +60°C Tamb(Remote Type Flowmeter) : -40 to +80°C Process temp.: T4;135°C, T3;200°C, T2;300°C, T1;450°C Use /HT version above 260°C For connection to certified Intrinsically Safe circuit with Signal/Supply and Pulse circuit of Integral Type Flowmeter and Remote Type Converter Ui=30 V, Ii=165 mA, Pi=0.9 W, Ci=6 nF, Li=0.15 mH Connect sensor circuit of Remote Type Converter to Remote Type Flowmeter Maximum cable capacitance : 160nF Electrical connection: ANSI 1/2NPT female, ISO M20 × 1.5 female	KS1

(Note 3) Now preparing. The specification for explosion proof and instrinsically safe is fixed when the certification publishes.

T020401.eps

Item	Specification	Applicable Model	Code
Stainless steel tag plate	Stainless steel tag plate, wired on converter case.	DY / DYA	/SCT
Stainless steel bolt & nut assembly	1.4301 bolt/nut assembly. Used when a wafer type is installed.	DY Wafer Type	/BL
Degrease Treatment (Note 1)	All wetted parts are assembled after body decreasing. After calibration, the body is cleaned by alcanic cleaner.	DY	/DEG
Epoxy Coating	Epoxy coating for meter cover and case.	DY / DYA	/X1
High Process Temperature Version (Note 2)	This specification temperature is from -40 to +450 °C, size 25 to 200 mm In case of other sizes, please ask. Refer to Table 1 , Figure 4 and Table 5.	DY***-N	/HT
Cryogenic Version (Note 3)	This specification temperature is from -200 to +100°C, size 15 to 100 mm In case of other sizes, please ask. Refer to Table 1 , Figure 6.	DY***-N	/LT
Lightning Protector	There is an arrester inside converter for power line.	DY***-D,E / DYA	/A
Compliance with NACE (Note 4)	Compliance with NACE	DY	/NC
Anti-corrosion Version 2 (Note 4)	Anti-corrosion Version 2	DY	/HY
Bolt fixing plate	With fixing plates for sensor bolts	DY	/BFP
Flange facing DIN 2526 Type C	Flange facing acc. DIN 2526 type C, roughness of flange: RZ = 40 –160μm	DY	/DFC
Flange facing DIN 2526 Type E	Flange facing acc. DIN 2526 type E, roughness of flange: RZ = 16μm	DY	/DFE
DIN flange facing with nut	Both flanges with groove acc. DIN 2512, type N	DY	/DSN
No parameter setting (Note 5)	No parameters are set in the instrument	DY/DYA	/NP
Parameter setting	Paramter will be set according the parameter sheet	DY/DYA	/PS

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(Note 1) There is a case that calibration water should stay between the body and the shedder bar. So this is not degrease treatment in the strict sense.
(Note 2) High Process Temperature Version is not available for Hastelloy C.
Refer to figure 4 about fluid temperature condition, and Table 5 about minimum measurable flow velocity.
Gasket material: JIS SUS316 stainless steel plated with silver.
(Note 3) Cryogenic Version is not available for Hastelloy C.
Refer to figure 5 about fluid tempreature condition.
Shedder bar material: JIS SUS14 stainless steel (equivalent to CF8M), JIS SUS316 stainless steel (equivalent to ANSI 316) only for 15mm.
(Note 4) On request (NACE : National Association of Corrosion Engineers)
(Note 5) Only size and K-factor are setted.

SIZING

For sizing please use the Yokogawa Sizing Software.

Table 3. Pressure Test Value

Flange Rating	Pressure
DIN PN 10	15,0 bar
DIN PN 16	24,0 bar
DIN PN 25	37,5 bar
DIN PN 40	60,0 bar
DIN PN 64	96,0 bar
DIN PN 100	150,0 bar
DIN PN 160	240,0 bar
ANSI Class 150	29,0 bar
ANSI Class 300	75,0 bar
ANSI Class 600	149,0 bar
ANSI Class 900	240,0 bar

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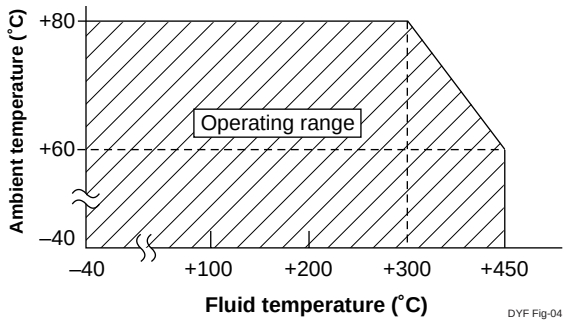


Figure 4. Fluid temperature range of high process temperature version

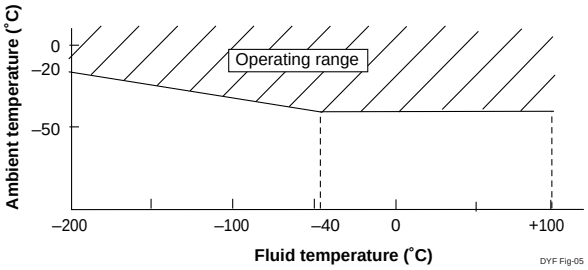


Figure 5. Fluid temperature range of cryogenic version

■ Measurable minimum flow velocity

Table.4 Relationship between Minimum Velocity and Density (Use the Larger of the two Values)

Nominal size in mm	Liquid		GAS, Steam	
	General Type, Cryogenic Type (unit: m/s)	High Process Temperature Version (unit: m/s)	General Type, Cryogenic Type (unit: m/s)	High Process Temperature version (unit: m/s)
15	$\sqrt{250/\rho}$ or 0.2	—	$\sqrt{80/\rho}$ or 3	—
25	$\sqrt{122.5/\rho}$ or 0.2	$\sqrt{490/\rho}$ or 0.2	$\sqrt{45/\rho}$ or 2	$\sqrt{125/\rho}$ or 2
40	$\sqrt{90/\rho}$ or 0.2	$\sqrt{490/\rho}$ or 0.2	$\sqrt{31.3/\rho}$ or 2	$\sqrt{125/\rho}$ or 2
50	$\sqrt{90/\rho}$ or 0.2	$\sqrt{160/\rho}$ or 0.2	$\sqrt{31.3/\rho}$ or 2	$\sqrt{61.3/\rho}$ or 2
80	$\sqrt{90/\rho}$ or 0.2	$\sqrt{160/\rho}$ or 0.2	$\sqrt{31.3/\rho}$ or 2	$\sqrt{61.3/\rho}$ or 2
100	$\sqrt{90/\rho}$ or 0.2	$\sqrt{160/\rho}$ or 0.2	$\sqrt{31.3/\rho}$ or 2	$\sqrt{61.3/\rho}$ or 2
150	$\sqrt{90/\rho}$ or 0.2	$\sqrt{160/\rho}$ or 0.2	$\sqrt{31.3/\rho}$ or 3	$\sqrt{61.3/\rho}$ or 3
200	$\sqrt{122.5/\rho}$ or 0.2	$\sqrt{202.5/\rho}$ or 0.2	$\sqrt{45/\rho}$ or 3	$\sqrt{80/\rho}$ or 3

ρ : Density at operating conditions (kg/m^3)

Table.5 Range of Measurable flow velocity

Fluid	Nominal Size	Minimum flow velocity	Maximum flow velocity
Liquid	15mm up to 200 mm	Larger value of flow velocities obtained from Table.4 or “at the velocity of Reynolds number of 5000,” whichever is higher. For liquid Reynolds number of 5000 : Use figure.6	10 m/s
Gas, Steam	15mm up to 200 mm	Larger value of flow velocities obtained from Table.4 or “at the velocity of Reynolds number of 5000”, whichever is higher. For Gas and steam Reynolds number of 5000 : Use of a calculation formula	80 m/s

When the flow velocity is lower than minimum either the analog output or the pulse output is displayed as zero “0”.

■ Flow Velocity at Reynolds Number of 5,000 (Liquid)

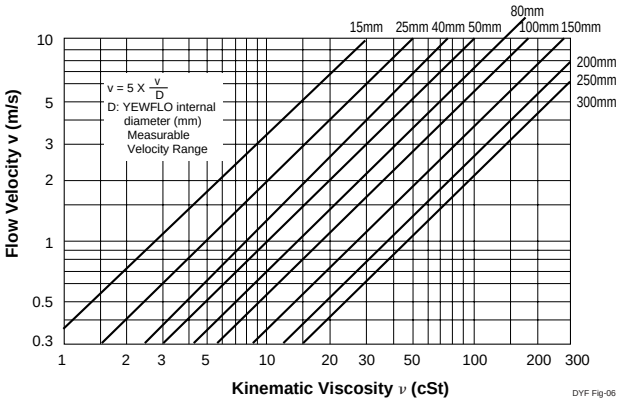


Figure.6 Relationship between Velocity and Kinematic Viscosity

Attention: Please take into account the relationship between process temperature and maximum allowed process pressure.

■ Guaranteed accuracy at minimum flow velocity

Table.7 Range of Accuracy Flow Velocity

Fluid	Nominal Size	Minimum flow velocity	Maximum flow velocity
Liquid	15 mm up to 100 mm	Larger value of flow velocity obtained from Table.4 or "at the velocity of Reynolds number of 20000", whichever is higher. For liquid Reynolds number of 20000 : The value is four times velocity value in Figure.6	10 m/s
	150 mm up to 200 mm	Larger value of flow velocity obtained from Table.4 or "at the velocity of Reynolds number of 40000", whichever is higher. For liquid Reynolds number of 40000 : The value is eight times velocity value in Figure.6	
Gas, Steam	15 mm up to 100 mm	Larger value of flow velocity obtained from Table.4 or "at the velocity of Reynplds number of 20000", whichever is higher. For gas and steam Reynolds number of 20000 : Use of a calcuration formula	80 m/s
	150 mm up to 200 mm	Larger value of flow velocity obtained from Table.4 or "at the velocity of Reynolds number of 40000 or more, whichever is higher. For gas and steam Reynolds number of 40000 : Use of a calculation formula	

Table.8 Detailed Accuracy (for range of guaranteed accuracy)

Fluid	Nominal Size	Accracy
Liquid	15mm	± 1.0% of Reading (20000 ≤ Re)
	25 mm up to 100 mm	± 1.0% of Reading (20000 ≤ Re < D/mm×10^3)
		± 0.75% of Reading (D/mm × 10^3 ≤ Re)
	150 mm up to 200 mm	± 1.0% of Reading (40000 ≤ Re)
Gas, Steam	15 mm up to 200 mm	± 1.0% of Reading (Velocity 35 m/s or less)
		± 1.5% of Reading (Velocity 35 m/s up to 80 m/s)

D : Inner diameter of digital YEWFLO (mm), refer to "Table 8"
Re: Reynols number (non unit)
Note: This table shows the accuracy of pulse output. In case of analog output, add up ± 0.1% of full scale to the values mentioned above.

■ Calculation formula

■ How to calculate volume flow rate at operating conditions.

- $Qv = \frac{v \times D^2}{354}$ or $Qv = 3600 \times v \times A$

■ How to calculate the velocity of a specific Reynolds number of 5000.

- $v = 5 \times \frac{\upsilon}{D}$ (Reynolds number of 5000)
- $v = 20 \times \frac{\upsilon}{D}$ (Reynolds number of 20000)
- $v = 40 \times \frac{\upsilon}{D}$ (Reynolds number of 40000)
- $Re = \frac{354 \times 10^3 \times Qv}{\upsilon \times D}$
- $v = \frac{\upsilon}{\rho} \times 10^3$

Qv : Volume flow rate at operating conditions (m^3/h)
D : Inner diameter of YEWFLO (mm)
v : Flow velocity (m/s)
A : Sectional area of YEWFLO (m^2)
Re : Reynolds number (no unit)
ρ : Density at operating conditions (kg/m^3)
n : Viscosity at operating conditions (cp)
υ : Kinematic viscosity at operating conditions (cSt)

Table.9 Nominal Pulse Rate and K-Factor

Nominal Size		Internal Diameter mm	Nominal K-Factor Pulse/L	Nominal Pluse Rate	
mm	inch			Hz/m/s	Hz/m^3/h
15	1/2	14.6	376	62.7	104
25	1	25.7	65.6	35.5	19.1
40	1-1/2	39.7	18.7	23.1	5.19
50	2	51.1	8.95	18.3	2.49
80	3	71.0	3.33	13.2	0.925
100	4	93.8	1.43	9.88	0.397
150	6	138.8	0.441	6.67	0.123
200	8	185.6	0.185	5.00	0.0514

Table.10 Water Flow Rate
(At standard conditions of 15°C, ρ = 1000 kg/m^3)

Nominal Size		Measurable Flow Rate in m^3/h	Normal Operating Flow Rate in m^3/h
mm	inch		
15	1/2	0.30 up to 6	0.94 up to 6
25	1	0.65 up to 18	1.7 up to 18
40	1-1/2	1.3 up to 44	2.6 up to 44
50	2	2.2 up to 73	3.3 up to 73
80	3	4.3 up to 140	4.6 up to 140
100	4	7.5 up to 245	7.5 up to 245
150	6	17 up to 540	18 up to 540
200	8	34 up to 970	34 up to 970

Table 10. Air Flow Rate at Selected Process Pressures

Nominal Size	Flow Rate Limits	Minimum and Maximum Measurable Flow Rate in Nm^3/h									
		0 MPa	0.1 MPa	0.2 MPa	0.4 MPa	0.6 MPa	0.8 MPa	1 MPa	1.5 MPa	2 MPa	2.5 MPa
15 mm	min.	4.8(11.1)	6.7(11.1)	8.2(11.1)	10.5(11.1)	12.5	16.1	19.7	28.6	37.5	46.4
	max.	48.2	95.8	143	239	334	429	524	762	1000	1238
25 mm	min.	11.0(19.5)	15.5(19.5)	19.0(19.5)	24.5	29.0	33.3	40.6	59.0	77.5	95.9
	max.	149	297	444	739	1034	1329	1624	2361	3098	3836
40 mm	min.	21.8(30.0)	30.8	39.3	59	77.2	94.3	111	149	186	229
	max.	367	708	1060	1764	2468	3171	3875	5634	7394	9153
50 mm	min.	36.2(38.7)	51	62.4	80.5	102	131	161	233	306	379
	max.	591	1174	1757	2922	4088	5254	6420	9335	12249	15164
80 mm	min.	69.8	98.4	120	155	197	254	310	451	591	732
	max.	1140	2266	3391	5642	7892	10143	12394	18021	23648	29274
100 mm	min.	122	172	219	329	431	526	618	833	1036	1277
	max.	1990	3954	5919	9847	13775	17703	21632	31453	41274	51095
150 mm	min.	267	440	607	912	1193	1458	1776	2583	3389	4196
	max.	4358	8659	12960	21561	30163	38765	47367	68871	90375	111880
200 mm	min.	575	1009	1393	2094	2739	3347	3929	5301	6589	7815
	max.	7792	15482	23172	38552	53933	69313	84693	123144	161595	200046

(1) At standard conditions STP (0˚C. 1atm).
(2) Pressure listed is at process temperature of 0˚C.
(3) Maximum flow rate is the lower of 80 m/s.
(4) Minimum values are determined from Table 4. The values in parenthesis show the minimum linear flow rates (Re = 20.000 or 40.000) when they are higher than the minimum measurable flow rate.

Table 11. Saturated Steam Flow Rate at Selected Process Pressures

Nominal Size	Flow Rate Limits	Minimum and Maximum Measurable Flow Rate in kg/h									
		0.1 MPa	0.2 MPa	0.4 MPa	0.6 MPa	0.8 MPa	1 MPa	1.5 MPa	2 MPa	2.5 MPa	3 MPa
15 mm	min.	5.9(10.7)	7.0(11.1)	8.8(11.6)	10.4(12.1)	11.6(12.3)	12.8	15.3	19.1	23.6	28.1
	max.	55.8	80	129	177	225	272	390	508	628	748
25 mm	min.	13.4(18.9)	16.2(20.0)	20.5	24.1	27.1	30	36	41	49	58
	max.	169.7	247.7	400	548	696	843	1209	1575	1945	2318
40 mm	min.	26.5(29.2)	32	40.6	49.0	59.2	69	92	114	135	155
	max.	405	591	954	1310	1662	2012	2884	3759	4640	5532
50 mm	min.	43.9	53	67.3	79	89	98	120	156	192	229
	max.	671	979	1580	2170	2753	3333	4778	6228	7668	9166
80 mm	min.	84.6	103	130	152	171	189	231	301	371	442
	max.	1295	1891	3050	4188	5314	6434	9224	12024	14842	17694
100 mm	min.	148	179	227	273	330	385	514	635	751	865
	max.	2261	3300	5324	7310	9276	11230	16099	20986	25904	30883
150 mm	min.	324	401	587	757	915	1067	1423	1759	2127	2536
	max.	4951	7226	11658	16007	20310	24589	35250	45953	56720	67624
200 mm	min.	697	920	1348	1737	2101	2448	3266	4038	4778	5500
	max.	8853	12920	20845	28620	36315	43966	63029	82165	101418	120913

(1) Maximum flow rate is lower 80 m/s.
(3) Minimum values are determined from Figure 4. The values in parenthesis show the minimum linear flow rates (Re = 20.000 or 40.000) when they are higher than the minimum measurable flow rate.

■ Pressure Loss

At velocity of 10 m/s by water, $\Delta p = 108$ kPa
At velocity of 80 m/s by atmospheric air,
$\Delta p = 9$ kPa
obtained from the following equations.

$$\Delta p = 108 \times 10^{-5} \times \rho_f \times \upsilon^2$$

or

$$\Delta p = 135 \times \rho_f \times \frac{Q_v^2}{D^4}$$

where,

Δp : Pressure loss (kPa)
ρ_f : Density at operating condition (kg/m^3)
v : Flow velocity (m/s)
Q_v : Actual flow rate (m^3/h)
D : Internal Diameter (mm)

Figure 7 shows pressure loss versus actual flow rate. When nominal size 15 to 50mm and adjacent pipeline is Sch. 40, and nominal size 80 to 300 mm and adjacent pipeline is Sch 80, the pressure loss will be approximately 10% smaller than calculated value.

(Example) Calculation of pressure loss

Calculate the pressure loss when the nominal size is 50 mm and the flow rate of water at operating temperature 80 °C is 30 m^3/h.

1. Since the density of water at 80 °C is 972 kg/m^3, substitute this value in equation (2):

$$\Delta p = 135 \times 972 \times \frac{30^2}{51.1^4}$$

$$= 17.3 \text{ kPa}$$

2. Obtain the pressure loss using equation (1). The flow velocity when the flow rate is 30 m^3/h is given by:

$$v = \frac{354 \times Q_v}{D^2} = \frac{354 \times 30}{51.1^2} = 4.07 \text{ m/s}$$

Therefore, subtitute this value in equation (1):

$$\Delta p = 108 \times 10^{-5} \times 972 \times 4.07^2$$
$$= 17.3 \text{ kPa}$$

3. Obtain the pressure loss using Figure 7. Since the liquid pressure loss factor can be read as 18.5, then:

$$\Delta p = 98.1 \times 18.5 \times 972 \times 10^{-5}$$
$$= 17.6 \text{ kPa}$$

■ Cavitation

(Minimum Back Pressure, Liquid service only):

Cavitation occurs when the flow line pressure is low and flow velocity is high during fluid measurement, preventing correct measurement of flow rate. The optimum line pressure can be obtained from the following equation.

$$p = 2.7 \times \Delta p + 1.3 \times po \quad \text{..... (3)}$$

Where,

p : Line pressure, 2 to 7 times as large as internal diameter on downstream of flowmeter body surface. (kPa absolute).
Δp : Pressure loss (kPa). Refer to the item above.
po : Saturation liquid vapor pressure at operating temperature (kPa absolute).

(Example) Confirmation of cavitation presence

Suppose that the line pressure is 120 kPa abs and the flow rate scale is 0 to 30 m^3/h. It is only necessary to confirm the pressure at the maximum flow rate ; therefore, the saturated steam pressure of water at 80°C is as follows from the table of saturated steam pressures:

po = 47.4 kPa abs

Therefore, substitute this value in equation (3):

$$p = 2.7 \times 17.3 + 1.3 \times 47.4$$
$$= 108.3 \text{ kPa abs}$$

Since the operating pressure of 120 kPa abs is higher than 108.3 kPa abs, no cavitation occurs.

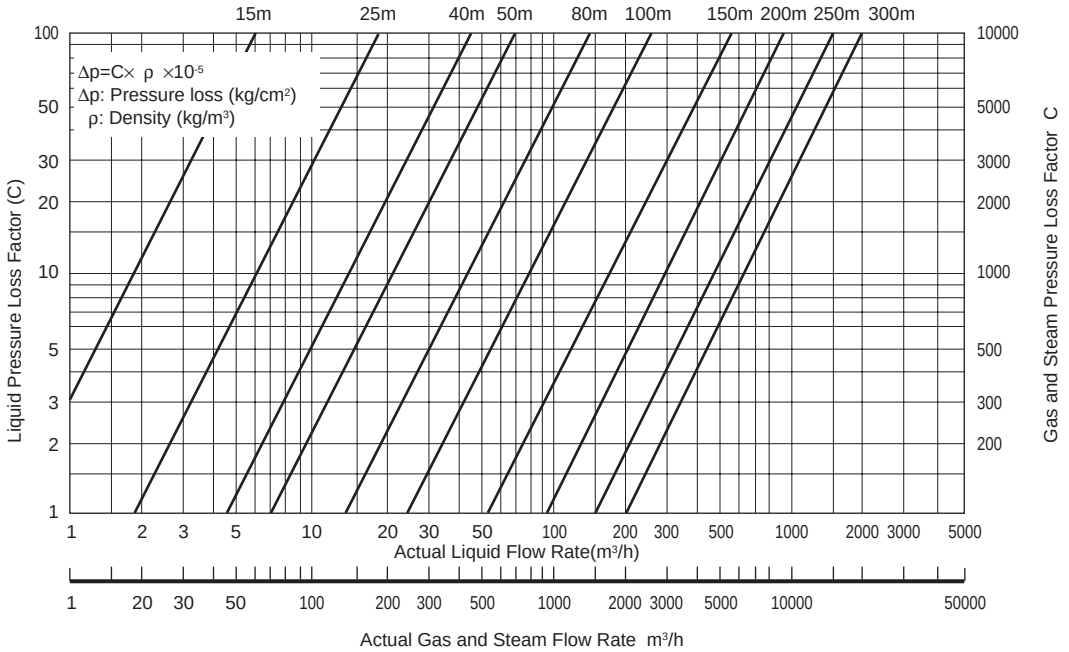
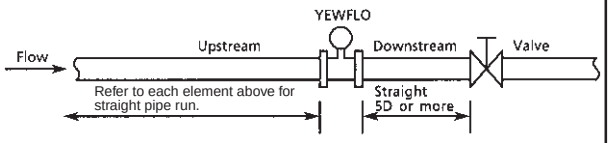
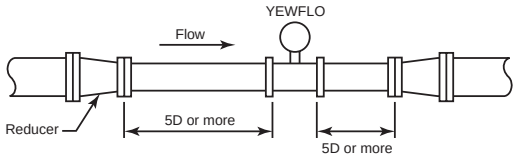
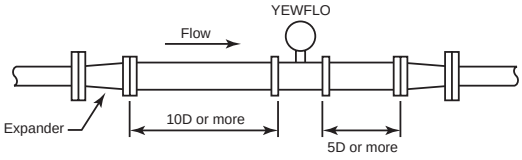
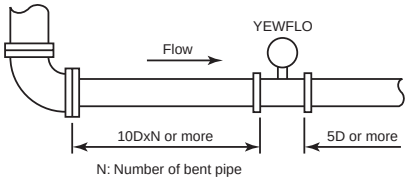
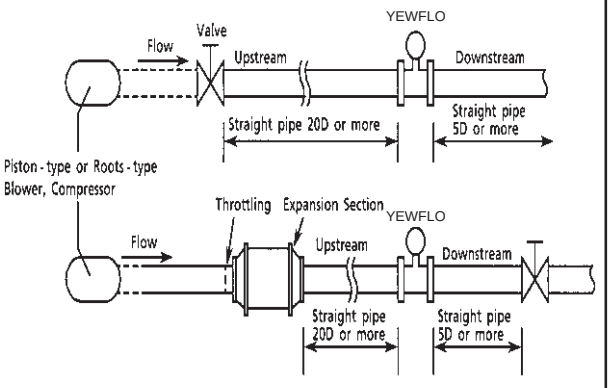
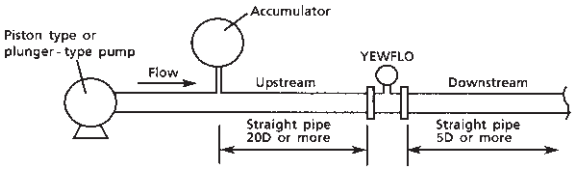


Figure 7. Pressure Loss

INSTALLATION

Description	Figure
Piping support: Typical vibration immunity level is 1G for normal piping condition. Piping support shoud be fixed in case of over 1G vibration level.	
Installation direction: If a pipe is always filled with liquids, the pipe can be installed vertically or at inclined angle.	
Adjacent pipes: The process pipline inner diameter should be larger than the YEWFLO inner diameter. Use the following adjacent pipe. Norminal size 15 mm up to 50 mm : Sch. 40 or less. Norminal size 80 mm up to 300 mm : Sch. 80 or less.	
Valve position and straight pipe length Install the digitalYEWFLO to the upstream side of valve.	
Reducer pipe: Ensure the upstream straight pipe length to be 5D or more, and the downstream straight pipe length to be 5D or more for per reducer pipe.	
Expander pipe: Ensure the upstream straight pipe length to be 10D or more, and the downstream straight pipe length to be 5D or more for per expander pipe.	
Bent pipe and straight pipe length: Ensure the upstream straight pipe length to be 10D or more, and the downstream straight pipe length to be 5D or more for per bent pipe.	
Fluid vibration: For a gas line which uses a position-type or roots-type blower compressor or a high-pressure liquid line(about 10 kg/cm^2 or more) which uses piston-type or plunger-type pump, fluid vibrations may be produced. In these cases, install valve on the upstream side of digitalYEWFLO. For inevitable reason from installation point of view, put a fluid vibration damping device such as throttling plate or expansion section in the upstream side of digitalYEWFLO.	
Piston-type or plunger pump: Install the accumulator to the upstream side of digitalYEWFLO to reduce fluid vibrations.	

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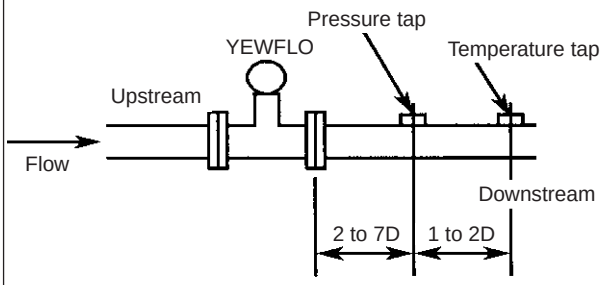
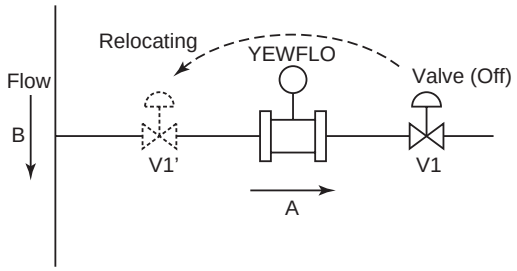
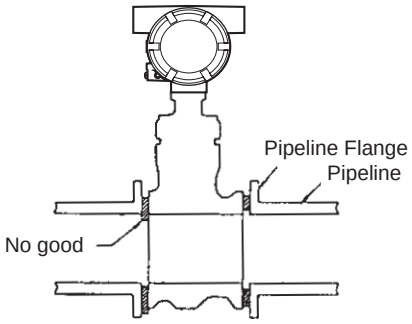
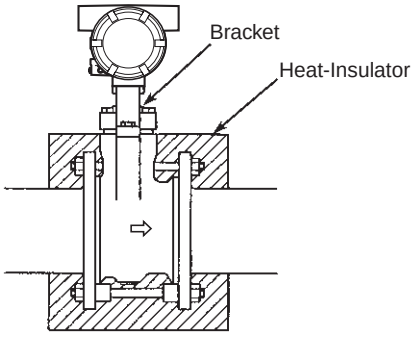
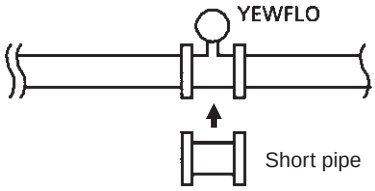
Description	Figure
Pressure and Temperature Taps (Gas Flow): For pressure measurements (when required), locate the pressure tap 3.5 to 7.5 inner pipe diameters downstream of the digital Yewflo. For temperature measurements (when required), the temperature tap should be located on 1 to 2 inner pipe diameter downstream of the pressure tap.	
T-type Pipe: When pulsation exists caused by a T-type piping, install the valve on the upstream of the flowmeter. Example:As shown in the figure, when the valve V1 is turned off, the fluid flows through B as to meter A the flow is zero. But due to the pulsating pressure is detected, the meter is zero point become fluctuating. To avoid this, change the valve V1 location to V1'.	
Mounting Gaskets: Avoid mounting gaskets which protrude into the pipe line. This way causes inaccurate readings. Use the gaskets with bolt holes, even if a wafer type is used. When using spiral gaskets (without bolt holes), confirm the size with the gasket -manufacturer, as standard items may not be used for certain flange ratings.	
Heat-Insulation: When an integral-type flowmeter is installed and the pipe carrying high-temperature fluids is heat-insulated, do not wrap insulating materials around the installation bracket of the converter.	
Flushing of the pipe line: Flush and clean, incrustation and sludge on the inside of pipe for newly installed pipe line and repaired pipe line before the operation. When flushing, the flow should flow through bypass-piping to avoid damaging the flowmeter. If there is no bypass pipe, replace the flowmeter by a short pipe during the proceedings. If the fluid is crystallized and forms a hard mass, clean up flow tube and shedder bar.	

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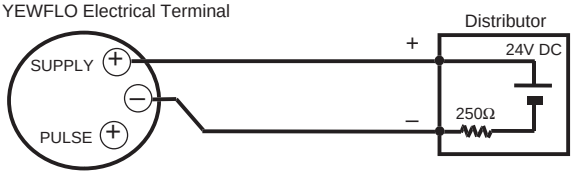
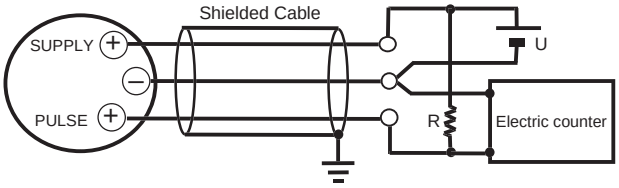
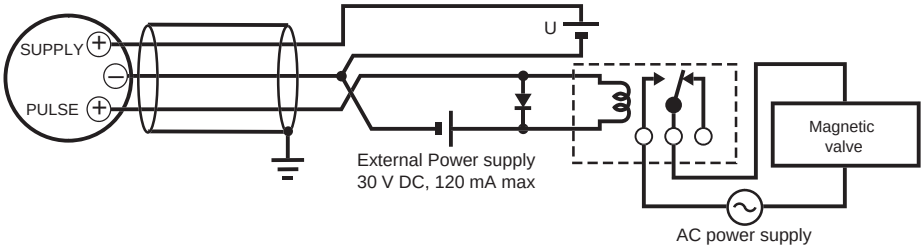
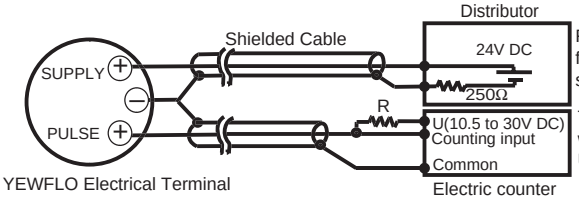
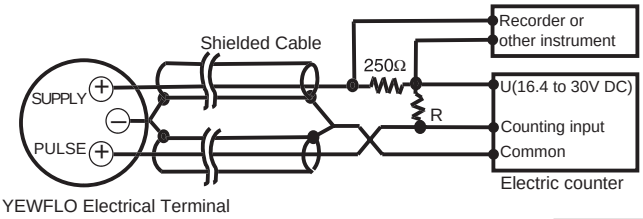
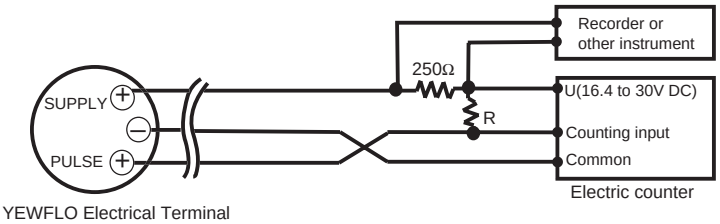
The wiring example for simultaneous analog and pulse (alarm, status) output.

Connection	Description
Analog Output	YEWFLO Electrical Terminal 
Pulse Output	YEWFLO Electrical Terminal Use the Three-wire shielded cable. 
Status Output Alarm Output	YEWFLO Electrical Terminal 
Simultaneous Analog -Pulse Output Example 1 In this case, Communica -tion is possible(up to a distance of 2km when a CEV cable is used).	When analog and pulse output are used, the length of communication line is subjected to wiring conditions. Refer to examples 1 to 3. If the communication carries out from amplifier, no need to consider wiring conditions.  For the shielded cables in this example of flowmeter installation, use two-wire separately shielded cables. This supply voltage requires a power sourse with a maximum output current of no less than U/R.
Example 2 In this case, Communica -tion is possible (up to a distance of 200m when a CEV cable is used and R = 1kΩ).	 For the shielded cables in this example of flowmeter installation, use two-wire separately shielded cables. This supply voltage requires a power sourse with a maximum output current of no less than U/R+25mA. The supply voltage requires output impedance no more than 1/1000 of R (load resistance).
Example 3 In this case, No communi -cation is possible (when shielded cable is not used).	 This supply voltage requires a power sourse with a maximum output current of no less than U/R+25mA.
The range of load resistance R for the pulse output.	The load resistance of pulse output should be used to 1kΩ, 2W. If no translation of the pulse output possible by the cable length or the frequency of the pulse output, the load resistance should be selected by calculation as shown below. $\frac{U\ (V)}{120} \leqq R\ (k\Omega) \leqq \frac{0.1}{C\ (\mu F) \times f\ (kHz)}$ Example of CEV cable capacitance ≒ 0.1μF/km $P\ (mW) = \frac{U^2\ (V^2)}{R\ (k\Omega)}$ Where U = Supply voltage (V) f = Frequency of pulse output (kHz) R = Value of load resistance (kΩ) C = Cable capacitance (μF) P = Power ratio of the load resistance (mW)

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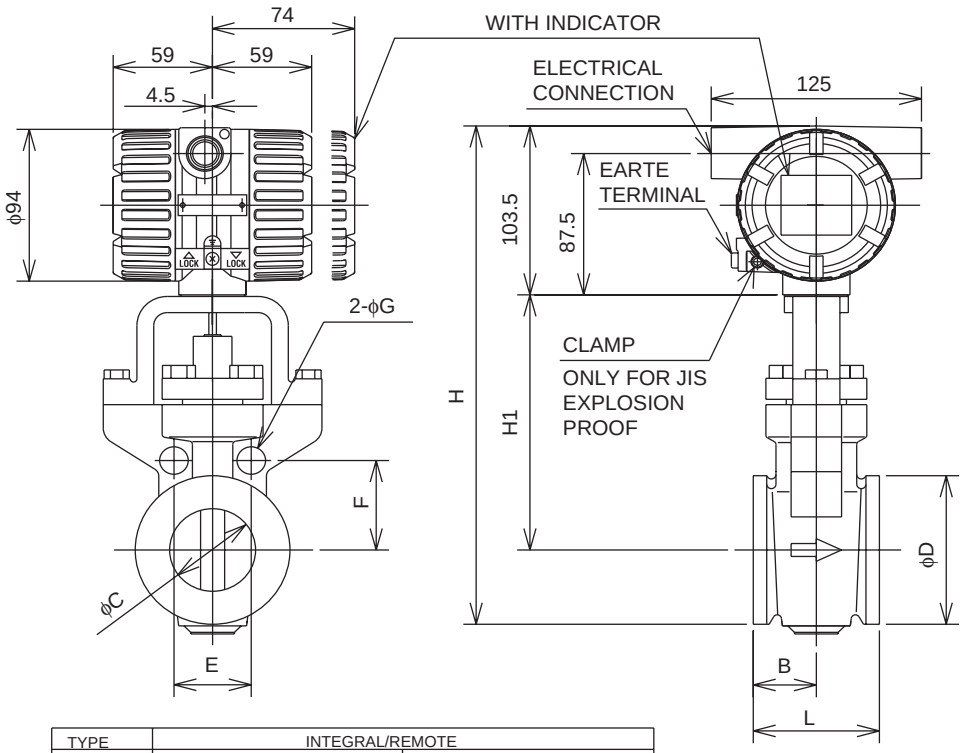
EXTERNAL DIMENSIONS

■ **Wafer type (15A - 100A)**

Unit: mm



TYPE	INTEGRAL/REMOTE							
CODE	DY015(15A)				DY025(25A)			
PROCESS CONNECTION	AA1	AA2	AA3	AD1 - AD4	AA1	AA2	AA3	AD1 - AD4
L	70				70			
B								
C	14.6				25.7			
D	35.1				50.8			
H					305			
H1	127				176			
E	42.7	47.1	47.1	46	56	62.9	62.9	60.1
F	21.4	23.5	23.5	23	28	31.4	31.4	30.1
G	14	14	14	13	14	17	17	13
WEIGTH kg	2.8				3.7			

TYPE	INTEGRAL/REMOTE							
CODE	DY040(40A)				DY050(50A)			
PROCESS CONNECTION	AA1	AA2	AA3	AD1 - AD4	AA1	AA2	AA3	AD1 - AD4
L	70				75			
B								
C	39.7				51.5			
D	73				92			
H	276				307.5			
H1	136				158			
E	69.7	80.8	80.8	77.8		48.6	48.6	
F	34.8	40.4	40.4	38.9		58.7	58.7	
G	14	20	20	17		17	17	
WEIGTH kg	4.3				6.0			

TYPE	INTEGRAL/REMOTE									
CODE	DY080(80A)					DY100(100A)				
PROCESS CONNECTION	AA1	AA2	AA3	AD1 - AD2	AD3 - AD4	AA1	AA2	AA3	AD1 - AD2	AD3 - AD4
L	100					120				
B	40					50				
C	71					93.8				
D	127					157.2				
H	342					372				
H1	175					190				
E		64.4	64.4	61.2	61.2	72.9	76.6	82.6	68.9	72.7
F		77.7	77.7	73.9	73.9	88	92.5	99.7	83.1	87.8
G		20	20	17	17	17	20	23	17	21
WEIGTH kg	9.4					12.8				

(Note) In the case of with Indicator/Totalizer, add 0.2kg

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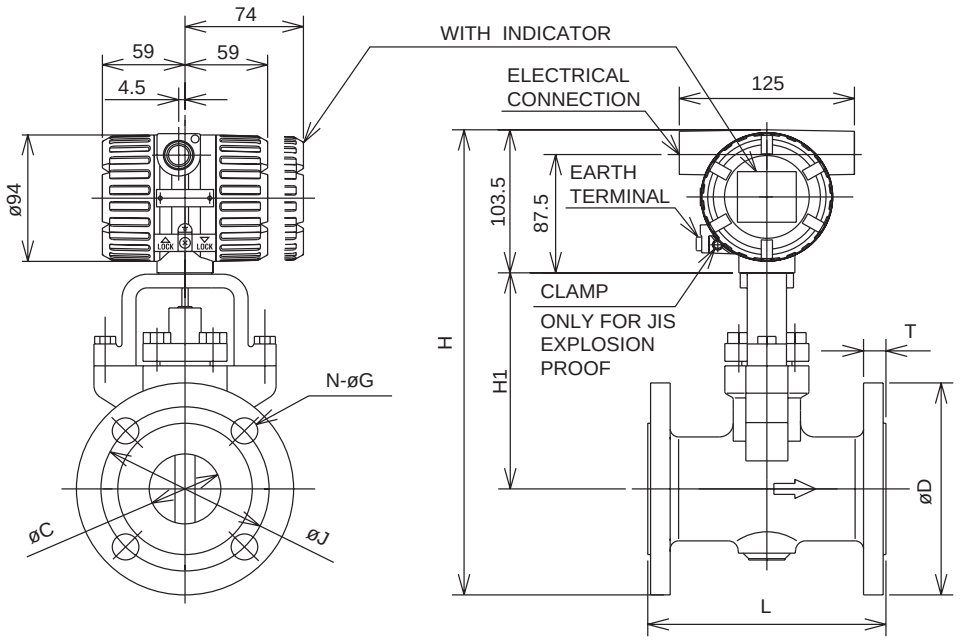
■ **Flange type (15A - 100A)**

Unit: mm



TYPE	INTEGRAL/REMOTE													
CODE	DY015(15A)						DY025	DY015	DY025(25A)					
PROCESS CONNECTION	BA1	BA2	BA3	BA4	BD1 - BD4	BD5 - BD6	BD7	BD7	BA1	BA2	BA3	BA4	BD1 - BD4	BD5 - BD6
	130			160	130		170	140	150			190	150	
C	14.6						25.7	14.6	25.7					
D	88.9	95.3	95.3	120.7	95	105	140	105	108	124	124	149.4	115	140
H	275	278	278	291	278	283	303	283	287	295	295	308	290	303
H1	127						129	127	129					
T	11.2	14.2	21	28.8	16	20	24	20	14.2	17.5	24	34.9	18	24
J	60.5	66.5	66.5	82.6	65	75	100	75	98.6	114.3	114.3	101.6	110	125
N	4						4	4	4					
G	15.7	15.7	15.7	22.4	14	14	18	14	15.7	19	19	25.4	14	18
WEIGHT kg	4.1	4.3	4.6	5.0	4.2	5.4	?	?	6.6	7.2	7.7	8.1	6.9	9.7

TYPE	INTEGRAL/REMOTE														
CODE	DY040 (40A)						DY050	DY040	DY050(50A)						
PROCESS CONNECTION	BA1	BA2	BA3	BA4	BD1 - BD4	BD5 - BD6	BD7	BD7	BA1	BA2	BA3	BA4	BD1 - BD4	BD5	BD6
L	150			200	150		195	180	170			230	170		
C	39.7						51.1	51.1	51.1						
D	127	155.4	155.4	177.8	150	170	195	170	152.4	165.1	165.1	215.9	165	180	195
H	303	317	317	329	315	325	359	324.5	338	344	344	370	344	352	359
H1	136						158	136	158						
T	17.5	20.6	28.8	38.2	18	26	30	28	19.1	22.4	31.8	45.5	20	26	28
J	98.6	114.3	114.3	124	110	125	145	125	120.7	127	127	165.1	125	135	145
N	4						4	4	4	8	8	8	4	4	4
G	15.7	22.4	22.4	28.4	18	22	26	22	19	19	19	25.4	18	22	26
WEIGHT kg	8.1	9.3	11.3	11.7	8.8	12.7	?	?	11.7	13.2	14.8	15.2	11.3	14.3	15.1

TYPE	INTEGRAL/REMOTE																			
CODE	DY080 (80A)								DY080	DY100	DY100(100A)									
PROCESS CONNECTION	BA1	BA2	BA3	BA4	BD1 - BD2	BD3 - BD4	BD5	BD6	BD7	BD7	BA1	BA2	BA3	BA4	BD1 - BD2	BD3 - BD4	BD5	BD6		
L	200			245	200				230	260	220		240	280	220					
C	71								71	93.8	93.8									
D	190.5	209.6	209.6	241.3	200	200	215	230	230	265	228.6	254	273	292.1	220	235	250	265		
H	374	384	384	400	379	379	386	394	393.5	426	409	421	430	440	404	411	419	426		
H1	175								175	190	190									
T	23.9	28.4	38.2	44.5	20	24	28	32	36	40	23.9	31.8	44.5	50.9	20	24	30	36		
J	152.4	168.2	168	190.5	160	160	170	180	180	210	190.5	200.2	216	235	180	190	200	210		
N	4	8	8	8	8	8	8	8	8	8	8									
G	19	22.4	22.4	25.4	18	18	22	26	26	30	19	22.4	25.4	31.8	18	22	26	30		
WEIGHT kg	20	23.8	25.6	26.0	19.4	20	24.1	27	?	?	27.4	35.9	50.8	51.2	23.2	27.4	33	39.7		

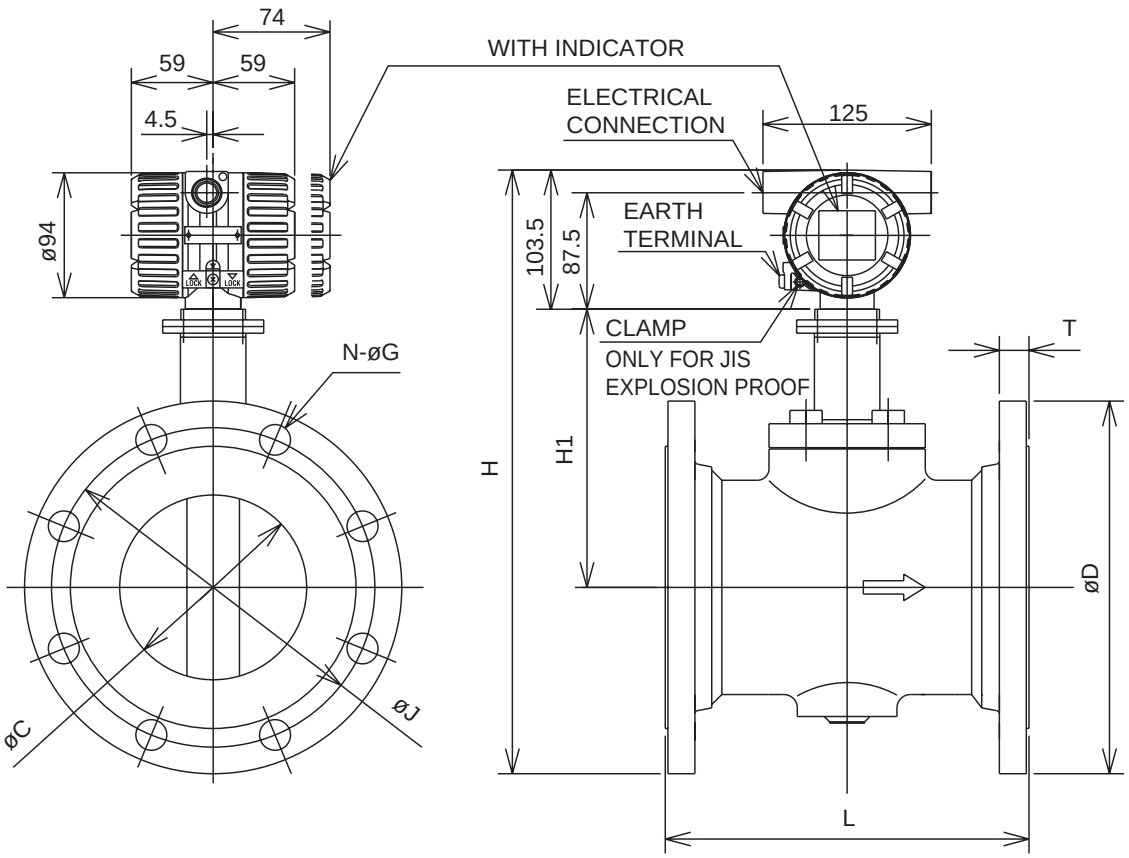
(NOTE 1) Integral weight is the same as Remote

(NOTE 2) In the case of with Indicator/Totalizer, add 0.2 kg

F02.06-01.EPS

■ **Flange type (150A - 200A)**

Unit: mm



TYPE	INTEGRAL/REMOTE															
CODE	DY150 (150A)								DY200(200A)							
PROCESS CONNECTION	BA1	BA2	BA3	BA4	BD1 -BD2	BD3 -BD4	BD5	BD6	BA1	BA2	BA3	BA4	BD1	BD2	BD3	BD4
L	270		310		270				310		375		310			
C	138.8								185.6							
D	279.4	317.5	356		285	300	345	355	342.9	381			340	340	360	375
H	553	473	491		455	463	485	490	516	535			515	515	525	532
H1	209								241							
T	25.4	36.6	54.4		22	28	36	44	28.4	41.1			24	24	30	34
J	241.3	269.7	292		240	250	280	290	298.5	330.2	349.3		295	295	310	320
N	8	12	12		8	8	8	12	8	12	12		8	12	12	12
G	22.4	22.4	28.4		22	26	33	33	22.4	25.4	31.8		22	22	26	30
WEIGHT kg	36.4	54.4	84.4		33.4	42.9	58.1	76.4	55.4	80.4	140.5		46.3	46.3	53.6	55.9

F02.06-02.EPS

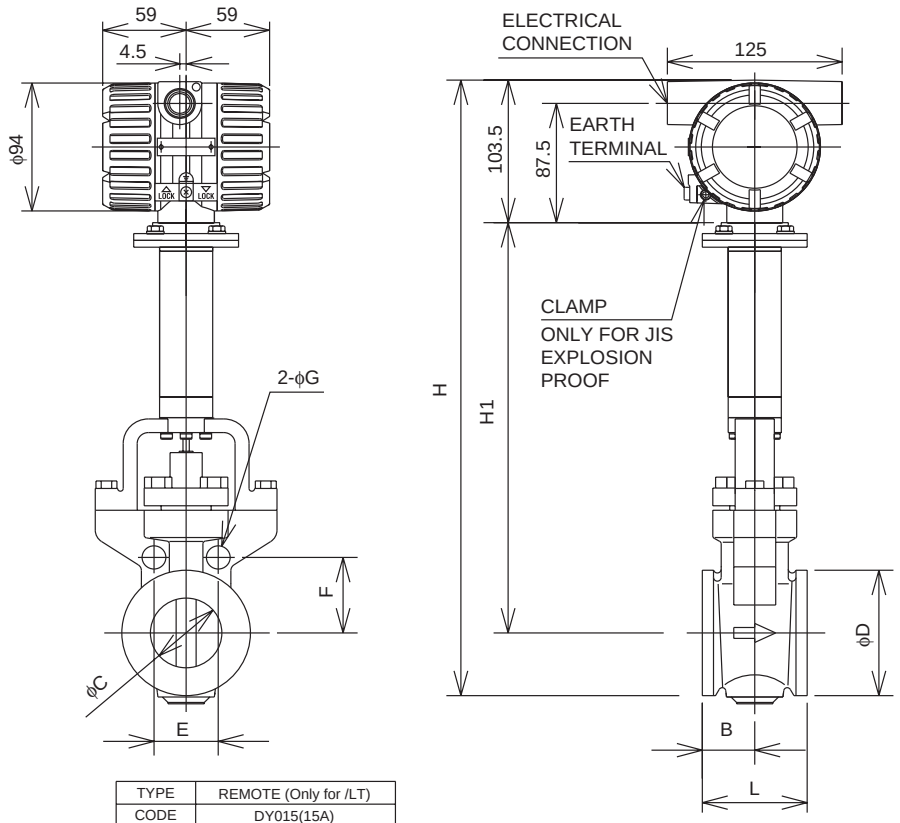
(Note1) Integral weight is the same as Remote
(Note 2) In case of with indicator/Totalizer, add 0.2kg

■ **High Process Temperature Version (/HT): 25A to 100A**

■ **Cryogenic Version (/LT): 15A to 100A**

■ **Wafer type**

Unit: mm



TYPE	REMOTE (Only for /LT)			
CODE	DY015(15A)			
PROCESS CONNECTION	AA1	AA2	AA3	-AD4
L	70			
B				
C	14.6			
D	35.1			
H	391			
H1	270			
E	42.7	47.1	47.1	46
F	21.4	23.5	23.5	23
G	14	14	14	13
WEIGHT kg	2.3			

TYPE	REMOTE											
CODE	DY025(25A)				DY040(40A)				DY050(50A)			
PROCESS CONNECTION	AA1	AA2	AA3	AD1 -AD4	AA1	AA2	AA3	AD1 - AD4	AA1	AA2	AA3	AD1 - AD4
L	70				70				75			
B												
C	25.7				39.7				51.5			
D	50.8				73				92			
H	401				419				450.5			
H1	272				279				301			
E	56	62.9	62.9	60.1	69.7	80.8	80.8	77.8		48.6	48.6	
F	28	31.4	31.4	30.1	34.8	40.4	40.4	38.9		58.7	58.7	
G	14	17	17	13	14	20	20	17		17	17	
WEIGHT kg	2.8				3.4				5.1			

F02.06-06.EPS

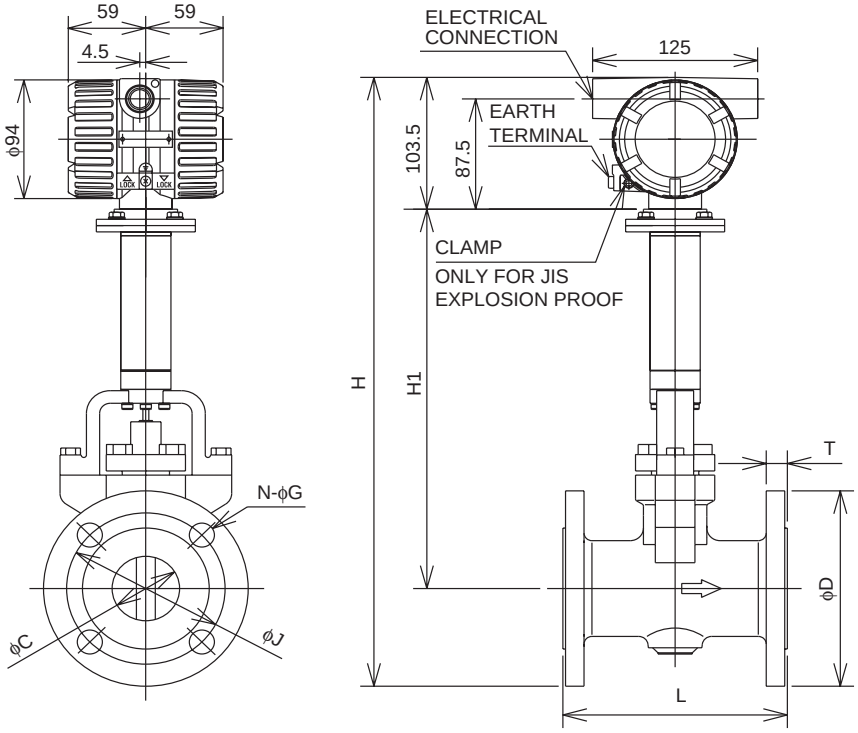
TYPE	REMOTE									
CODE	DY080(80A)					DY100(100A)				
PROCESS CONNECTION	AA1	AA2	AA3	AD1 - AD2	AD3 - AD4	AA1	AA2	AA3	AD1 - AD2	AD3 - AD4
L	100					120				
B	40					50				
C	71					93.8				
D	127					157.2				
H	485					515				
H1	318					333				
E		64.4	64.4	61.2	61.2	72.9	76.6	82.6	68.9	72.7
F		77.7	77.7	73.9	73.9	88	92.5	99.7	83.1	87.8
G		20	20	17	17	17	20	23	17	21
WEIGHT kg	8.5					11.9				

■ **High Process Temperature Version (/HT): Size 25A to 100A**

■ **Cryogenic Version (/LT): 15A to 100A**

■ **Flange type**

Unit: mm



TYPE	REMOTE											
CODE	DY015(15A) Only for /LT						DY025(25A)					
PROCESS CONNECTION	BA1	BA2	BA3	BA4	BD1 ~BD4	BD5 ~BD6	BA1	BA2	BA3	BA4	BD1 ~BD4	BD5 ~BD6
L	130			160	130		150			190	150	
C	14.6						25.7					
D	88.9	95.3	95.3	120.7	95	105	108	124	124	149.4	115	140
H	418	421	421	434	421	426	430	438	438	451	433	446
H1	270						272					
T	11.2	14.2	21	28.8	16	20	14.2	17.5	24	34.9	18	24
J	60.5	66.5	66.5	82.6	65	75	98.6	114.3	114.3	101.6	110	125
N	4						4					
G	15.7	15.7	15.7	22.4	14	14	15.7	19	19	25.4	14	18
WEIGHT kg	3.6	3.8	4.1	4.5	3.7	4.9	6.1	6.7	7.2	7.6	6.4	6.4

TYPE	REMOTE												
CODE	DY040 (40A)						DY050(50A)						
PROCESS CONNECTION	BA1	BA2	BA3	BA4	BD1 ~BD4	BD5 ~BD6	BA1	BA2	BA3	BA4	BD1 ~BD4	BD5	BD6
L	150			200	150		170			230	170		
C	39.7						51.1						
D	127	155.4	155.4	177.8	150	170	152.4	165.1	165.1	215.9	165	180	195
H	446	460	460	472	458	468	481	487	487	513	487	495	502
H1	279						301						
T	17.5	20.6	28.8	38.2	18	26	19.1	22.4	31.8	45.5	20	26	28
J	98.6	114.3	114.3	124	110	125	120.7	127	127	165.1	125	135	145
N	4						4	8	8	8	4	4	4
G	15.7	22.4	22.4	28.4	18	22	19	19	19	25.4	18	22	26
WEIGHT kg	7.6	8.8	10.8	11.2	8.3	8.3	11.2	12.8	14.3	14.7	10.8	13.8	14.7

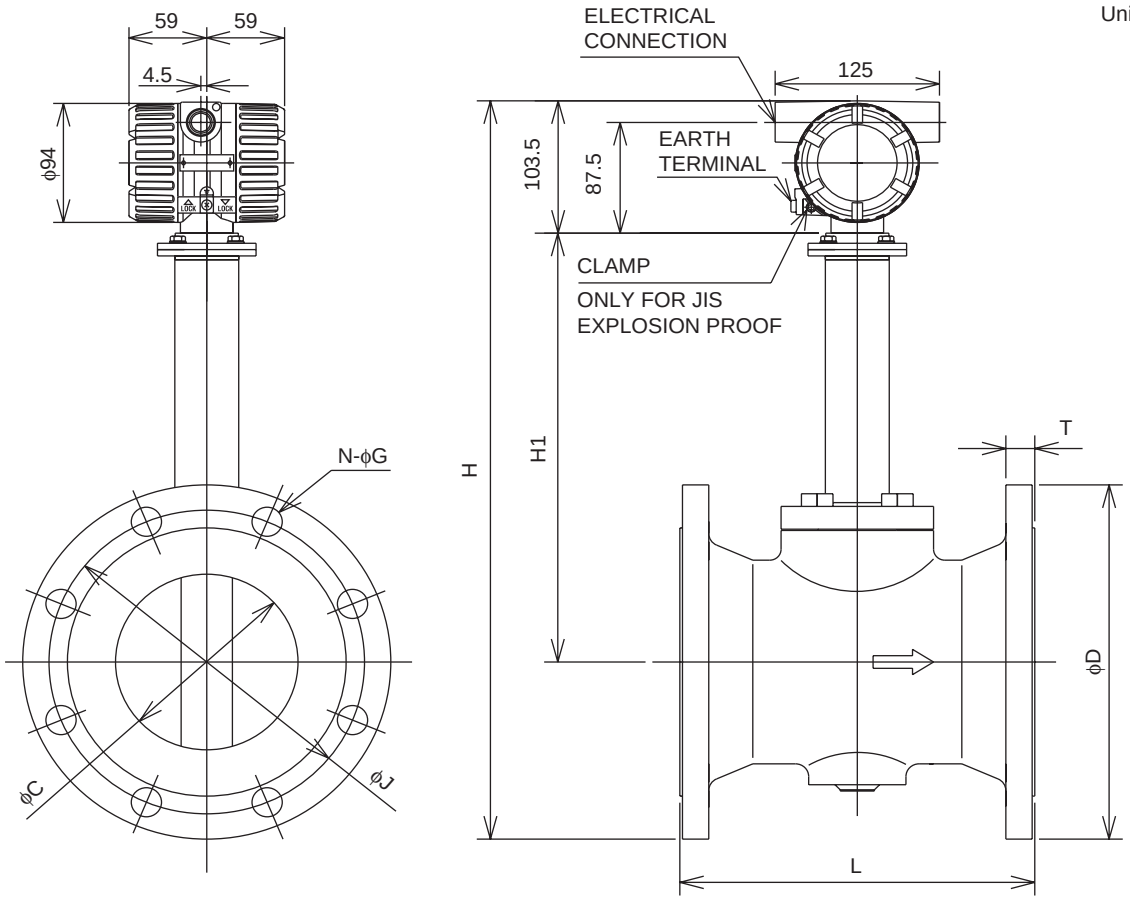
TYPE	REMOTE													
CODE	DY080 (80A)								DY100(100A)							
PROCESS CONNECTION	BA1	BA2	BA3	BA4	BD1 ~BD2	BD3 ~BD4	BD5	BD6	BA1	BA2	BA3	BA4	BD1 ~BD2	BD3 ~BD4	BD5	BD6
L	200			245	200				220		240	280	220			
C	71								93.8							
D	190.5	209.6	209.6	241.3	200	200	215	230	228.6	254	273	292.1	220	235	250	265
H	517	527	527	543	522	522	529	537	551	564	573	583	547	554	562	569
H1	318								333							
T	23.9	28.4	38.2	44.5	20	24	28	32	23.9	31.8	44.5	50.9	20	24	30	36
J	152.4	168.2	168	190.5	160	160	170	180	190.5	200.2	216	235	180	190	200	210
N	4	8	8	8	8	8	8	8	8							
G	19	22.4	22.4	25.4	18	18	22	26	19	22.4	25.4	31.8	18	22	26	30
WEIGHT kg	19.5	23.3	24.9	25.3	18.9	19.5	23.6	26.5	26.9	35.4	50.3	50.7	22.7	32.5	32.5	39.2

F02.06-04.EPS

■ **High Process Temperature Version (/HT): 150A to 200A**

■ **Flange type**

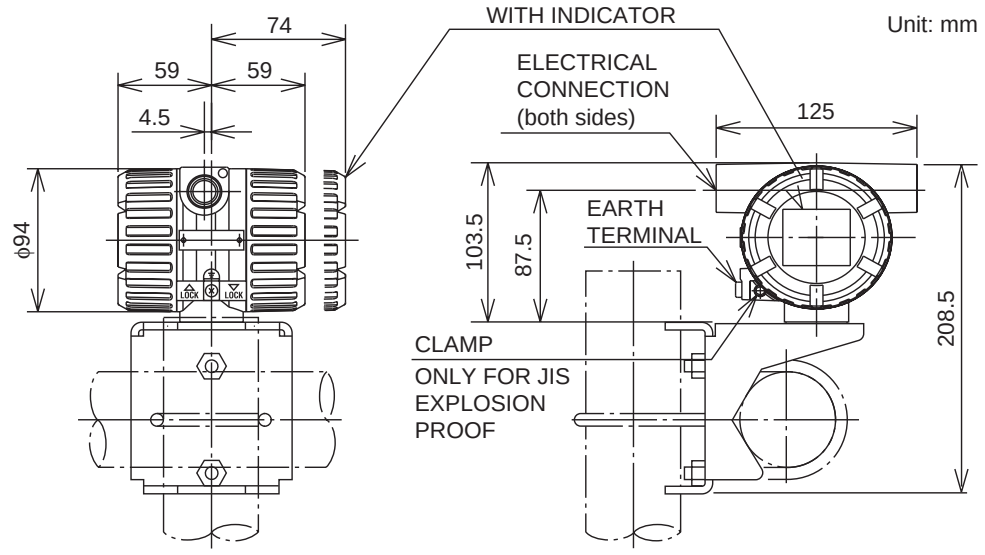
Unit: mm



TYPE	REMOTE															
CODE	DY150 (150A)								DY200(200A)							
PROCESS CONNECTION	BA1	BA2	BA3	BA4	BD1 ÅBD2	BD3 ÅBD4	BD5	BD6	BA1	BA2	BA3	BA4	BD1	BD2	BD3	BD4
L	270		310		270				310		375		310			
C	138.8								185.6							
D	279.4	317.5	356		285	300	345	355	342.9	381			340	340	360	375
H	583	601	621		585	593	615	620	646	665			645	645	655	662
H1	339								371							
T	25.4	36.6	54.4		22	28	36	44	28.4	41.1			24	24	30	34
J	241.3	269.7	292		240	250	280	290	298.5	330.2	349.3		295	295	310	320
N	8	12	12		8	8	8	12	8	12	12		8	12	12	12
G	22.4	22.4	28.4		22	26	33	33	22.4	25.4	31.8		22	22	26	30
WEIGHT kg	35.6	53.6	83.6		32.8	42.3	57.5	75.8	54.6	87.6	139.6		45.7	45.7	53	55.3

F02.06-05.EPS

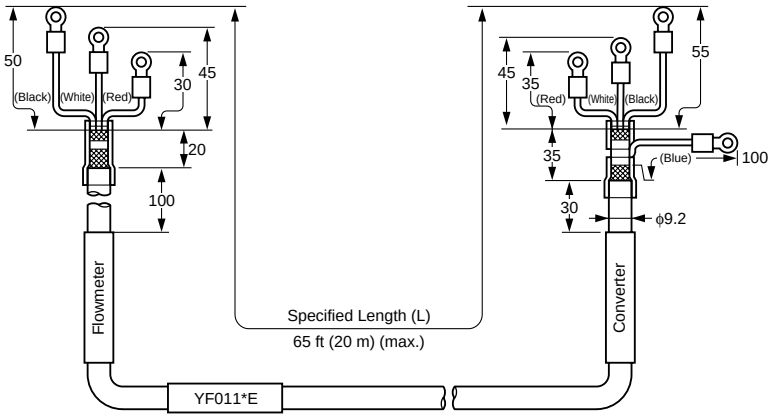
■ **Remote Type Converter**



Weight: 1.9 kgf
Note: For flowmeters with indicator, add 0.2 kg.

F02.06-07.EPS

■ **Signal Cable for Remote Type**



Cable Color and Terminal

Color	Terminal
Red	A
White	B
Black	C
Blue	G

F0204_27.EPS

= = = = ORDERING INSTRUCTIONS = = = =

Specify the following when ordering :

1. Model and suffix codes (if sizing was done).
2. Process conditions
   a. Fluid name, or Gas composition
   b. Maximum scale reading, normal flow rate and minimum flow rate.
   c. Maximum and normal operating temperatures.
   d. Maximum and normal operating pressures.
   e. Density at operating conditions.
      Density of gas at standard conditions.
   f. Viscosity at normal operating conditions
   h. Compressebility factor at normal operating conditions (gas only).
   i. adjacent pipe diameter, pressure rating
   j. 20mA set-point, tag number etc.

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GS 1F6A0-01E-H

Printed in The Netherlands, 01-104 (A)