

General Specifications

digitalYEWFLO

Model DY Model DY-A Vortex Flowmeter

GS 01F06A00-01E



Model DY-D, DY-E
Integral Type



Model DY-A
Remote Type Converter



Model DY-N
Remote Type Detector

Based on the field proven technology

digitalYEWFLO, combines the field proven sensor and body assembly used in more than 200,000 units installed worldwide, with a unique digital electronics including **SSP (Spectral signal processing)*** 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.

digitalYEWFLO Multi-Variable Type (OPTION:/MV) build in temperature sensor, so that temperature measurement and Mass Flow calculation is available.

* SSP is YOKOGAWA's original technology for digital signal processing.

FEATURES

- New functions with **SSP (Spectral Signal Processing)** technology :
SSP is built into the powerful electronics of digitalYEWFLO. SSP analyses the fluid conditions inside digitalYEWFLO and uses the data to automatically select the optimum adjustment for the application, **providing features never before realized in a vortex flowmeter.**
SSP accurately senses vortices in the low flow range, providing outstanding flow stability.
- Advanced Self-diagnostics :
The application condition, such as high pipeline vibration and abnormal flow, is predicted and indicated.
- High Accuracy :
±0.75% of Reading (Liquid)
(±0.5% of Reading : Typical Accuracy/ Non-Guaranteed)
±1% of Reading (Gas, Steam)
- Wide Process Temperature Range :
High temperature version up to 450°C
Cryogenic version minimum -200°C
- Simple Parameter settings :
Frequently-used selections grouped together in a quick-access format decreases commissioning time.

- Clear, Concise Indicator :
Simultaneous flow rate or temperature (Option) and total flow rate along with process diagnosis conveniently displayed.
- Dual output for Analog / Pulse:
Simultaneous output for flow rate or temperature (Option) and pulse.
- Alarm output (Flow switch)
An alarm signal output, in case alarm occurs.
- No moving parts stainless steel detector : High durable and safety.
- Remote cable length 30m maximum.
- Explosion proof construction, JIS / FM / CENELEC ATEX (KEMA) / CSA / SAA (Explosion proof / Intrinsically safe).

[MULTI-VARIABLE TYPE] (OPTION)

digitalYEWFLO build in temperature sensor (Pt1000) in the vortex shedder bar.

Temperature measurement and Mass Flow Calculation by temperature is available.

- digitalYEWFLO build in steam trend, and Mass measurement of saturated steam and super heat steam (Mass Flow Calculation)
- Accuracy of digitalYEWFLO Multi-Variable type is ±0.5% of rate for temperature measurement, ±2% of rate for Mass Flow Calculation (saturated steam).

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■ STANDARD SPECIFICATIONS

Performance Specifications

Fluid to be Measured :

Liquid, Gas, Steam (Avoid Multiphase Flow and Sticky Fluids)

Measuring Flow Rates :

Refer to Table 7

Accuracy : ±0.75% of Reading (Liquid)

±1% of Reading (Gas, Steam)

Refer to Table 9

When Multi-Variable Type is selected, refer to P9.

Repeatability : ± 0.2% of Reading

Calibration :

This flowmeter is factory-calibrated using a water flow.

Temperature and flow calibration by water flow when /MV is selected.

Normal Operating Condition

Process Temperature Range :

–40 to 260 °C (general)

–200 to 100 °C (Cryogenic Version:option)

–40 to 450 °C (High Process Temperature Version:option)

When Multi-Variable Type is selected, refer to P9.

Refer to Figure 1 for integral converter type.

Process Pressure Limit :

–0.1MPa (–1 kg/cm²) to flange rating.

Ambient Temperature Range :

–40 to 85 °C (Remote type detector, Remote type converter)

–40 to 85 °C (Integral type, refer to Figure 1)

–30 to 80 °C (Integral type with Indicator, refer to Figure 1)

Ambient Humidity : 5 to 100% RH (at 40 °C)

(No Condensation)

Power Supply Voltage : 10.5 to 42 V DC

(Refer to Figure 2 ; Relationship Between Power Supply Voltage and Load Resistance)

Mechanical Specifications

Material (General Type):

Refer to Table.1

Body; SCS14A casting stainless steel (equivalent to CF8M,SUS316)

Shedder bar;

Duplex stainless steel(DCS1,only for 15mm is DSD1-H,Both equivalent to JIS SUS329J1,ASTM CD4MCu)
DCS1 and DSD1-H are registered trademarks of Daido Tokusyu Steel Co.

Gasket; JIS SUS316 stainless steel with polytetrafluoroethylene coating.

Converter housing and case,cover ;
Aluminum alloy

Coating Color:

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

Degree of Protection:

IP67, NEMA4X, JIS C0920 water tightprotection.

Hazardous Area Classifications:

Refer to item "Option Specifications"

Electrical Connection:

JIS G1/2 female, ANSI 1/2 NPT 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 resisting polyethylene

Durable Temperature : –40 to 150 °C

Weight:

Refer to item "External Dimensions".

Mounting:

Integral type and Remote type detector :

Flange mounting or wafer mounting by flange adjacent to the pipeline.

Remote type converter : 2 inch pipe mounting.

Electrical Specifications

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)

Communication Requirement :

Communication Signal :

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

Conditions of Communication Line :

Load Resistance :

250 to 600 (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.

Space from other Power Line: 15cm 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 and wiring.

Load Capacitance: 0.22 μF or less

Load Inductance: 3.3 mH or less

Input Impedance of Receiver Connected to the Receiving Resistance:

10 k or more at 2.4 kHz.

HART:

Communication Distance:

Up to 1.5km,when using multiple twisted pair cables. Communication distance varies depending on type of cable used.

Cable Length for Specific Applications:

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

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

where:

L=length in meters.

R=resistance in (including barrier resistance)

C=cable capacitance in pF/m.

C_f= maximum shunt capacitance of reciving devices in pF/m.

NOTE: HART is a registered trademark of the HART Communication Foundation.

Functions:

Damping Time Constant :

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 output 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 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.

Analog Output Function:

Analog output is selected from flowrate and temperature value when option code /MV is selected.

Status Output Function *:

Flow Switch:

In case flow rate decreases 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.

Correction:

Instrument Error Correction:

Vortex flowmeter instrument errors can be corrected by segment approximations.

Reynolds Number Correction:

Output error at Reynolds number 20000 or less is corrected by using five-break-point line-segment approximation.

Gas Expansion Correction:

When measuring a compressibility gas and steam, this expansion factor is useful to correct the error at high velocity of flow (35m/s or more).

Down-scale or Up-scale burn out.

In case a CPU or EEPROM failure occurs, flow meter output the signal of Up-scale (21.6 mA or more).

Up-scale or Down-scale (3.6 mA or less) is user-selectable through the fail mode alarm jumper.

Indicator:

Flow rate (% or engineering units) or temperature value and totalizer can be indicated simultaneously.

Short message for self diagnostics indicated.

Local parameter setting can be operated by key switches.

In mounting direction, the right and left 90° is rotatable.

EMC Conformity Standards:

EN61326

AS/NZS 2064

Note: For remote converter type,the signal cable should be used within the metal conduit.

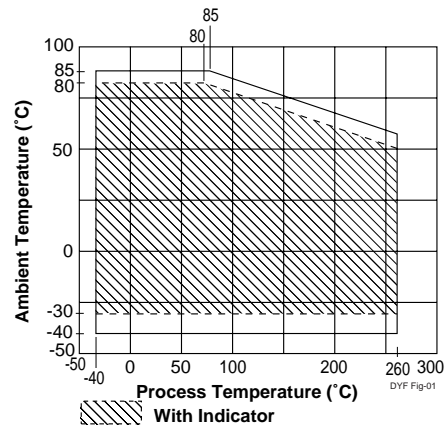


Figure 1 Ambient Temperature limit (Integral Type)

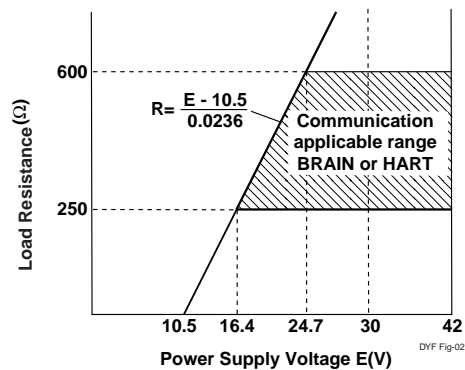


Figure 2 Relationship Between Power Supply and Load Resistance

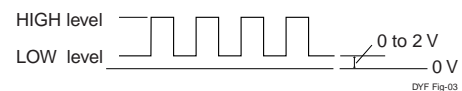


Figure 3 High and low level (Pulse output)

Model and Suffix Codes

DY Vortex Flowmeter (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)
DY250	.....	Size 250 mm (10 inch)
DY300	.....	Size 300 mm (12 inch)
Output Signal /Communication *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 *2	A	SCS14 A *11
	B	CF8M *3
	C	DIN 1. 4552
	W	WCB
	X	Others
Shedder bar Material *4	L	DCS1 (15mm is DSD1- H)
	M	CD4MCu
	X	Others
Process Connection *5	AJ1	JIS 10 K Wafer
	AJ2	JIS 20 K Wafer
	AJ4	JIS 40 K Wafer
	AA1	ANSI Class 150 Wafer
	AA2	ANSI Class 300 Wafer
	AA4	ANSI Class 600 Wafer
	AD1	DIN PN10 Wafer
	AD2	DIN PN16 Wafer
	AD3	DIN PN25 Wafer
	AD4	DIN PN40 Wafer
	BJ1	JIS 10K Flange(Raised Face)
	BJ2	JIS 20K Flange(Raised Face)
	BJ4	JIS 40K Flange(Raised Face)
	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)
	CA	ANSI Class 600 Flange(Ring Joint)
CA5	ANSI Class 900 Flange(Ring Joint)	
Electrical Connection *12	-0.....	JIS G 1/2 Female
	-2.....	ANSI 1/2 NPT Female *6
	-4.....	ISO M20×1.5 Female
Indicator *7	D	With Indicator
	N	None Indicator, Remote type detector
Options	/□	Refer to Option Specifications

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DYA Vortex Flowmeter Converter(Remote Type)

Model	Suffix Code	Description
DYA	.....	Vortex Flowmeter Converter (Remote Type)
Output Signal /Communication *1	-D.....	4 to 20 mA DC, Pulse BRAIN Communication
	-E.....	4 to 20 mA DC, Pulse HART Communication
Electrical Connection	0.....	JIS G 1/2 Female
	2.....	ANSI 1/2 NPT Female *6
	4.....	ISO M20 ×1.5 Female
Indicator	D	With Indicator
	N	None Indicator
Options	/□	Refer to Option Specifications

DYC Signal Cable

Model	Suffix Code	Description
DYC	.....	Signal Cable
Cable End	-0.....	Without End finish *8
	-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 *9
Options	/C□.....	Cable End Finish Parts *10
	/MV.....	Signal cable for temperature sensor type

* 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.
In case of /NC or /HX or /HY or /HT or /LT, select X (others).
The body material (SCS14A or CF8M or DIN 1.4452 or WCB) varies according to each sales area. Please contact to YOKOGAWA sales person.

* 3 : In case of B (CF8M), the process connection is available for ANSI (AA1, AA2, AA4, BA1, BA2, BA4, BA5, CA4, CA5)

* 4 : Refer to Table 1.
In case of /NC or /HX or /HY or /HT or /LT, select X (others).
The shedder bar material (DCS1 (15mm is DSD1-H), CD4MCu) varies according to each sales area. Please contact to YOKOGAWA sales person.

* 5 : Refer to Table 2.

* 6 : In case of /FF1 or /CF1, the screw length is deeper than ANSI standard for 0.5 to 3.5 threads.

* 7 : Indicator is not available for remote type detector.

* 8 : One set of end finish part is attached.

* 9 : Fill in two digit figure per 5m unit (for example, 35m, 40m etc).
The cable can be cut to required length within 30m at customer side.
In this case, select Cable End Code [-0].

*10: An entered digit figure shows required set quantity.
Only for Cable End Code [-0].

*11: In case of A (SCS14A), the process connection is available for JIS (AJ1, AJ2, AJ4, BJ1, BJ2, BJ4)

*12: In case of an explosion protect type, it depends for an electrical connection on the kind of an explosion protect type. Refer to "OPTION SPECIFICATION (HAZARDOUS AREA CLASSIFICATIONS)"

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Table 1 Body, Shedder ber, Gasket Material

Option Item (Note 1)	Option Code (Note 1)	Material			Process Connection	
		Body (Note 2)	Shedder bar (Note 3)	Gasket	Wafer Nominal Size	Flange Nominal Size
General (REFERENCE)	—	SCS14A CF8M DIN1.4552 WCB	DCS1 (DSDH-1) CD4MCu	(Note 4)	15 mm up to 100 mm	15 mm up to 300 mm
Compliance with NACE	NC	CF8M	Hastelloy C	(Note 4)	15 mm up to 100 mm	15 mm up to 200 mm
Anti-corrosion Version I	HX	Hastelloy C	Hastelloy C	(Note 5)	15 mm up to 50 mm	—
Anti-corrosion Version II	HY	SCS14A CF8M DIN1.4552 WCB	Hastelloy C	(Note 4)	15 mm up to 100 mm	15 mm up to 100 mm
High Process Temperature Version	HT	SCS14A CF8M DIN1.4552 WCB	Hastelloy C	JIS SUS316 stainless steel plated with silver	25 mm up to 100 mm	25 mm up to 200 mm
Cryogenic Version	LT	SCS14A CF8M DIN1.4552	Hastelloy C	(Note 4)	15 mm up to 100 mm	15 mm up to 100 mm

(Note 1) Refer to item "Option Specifications"

(Note 2) In case of /NC or /HX or /HY or /HT or /LT, select body material code [-X]. The body material (SCS14A or CF8M or DIN1.4552 or WCB) varies according to each sales area. Please contact to YOKOGAWA sales person.

(Note 3) In case of /NC or /HX or /HY or /HT or /LT, select shedder bar material code [-X]. The shedder bar material (DCS1 (15mm is DSD1-H), CD4MCu) varies according to each sales area. Please contact to YOKOGAWA sales person.

(Note 4) JIS SUS316 stainless steel with polytetrafluoroethylene (Teflon) coating

(Note 5) Hastelloy C with polytetrafluoroethylene coating.

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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
JIS 10 K	AJ1	15 mm up to 100 mm	BJ1	15 mm up to 300 mm	—	—
JIS 20 K	AJ2	15 mm up to 100 mm	BJ2	15 mm up to 300 mm	—	—
JIS 40 K	AJ4	15 mm up to 100 mm	BJ4	15 mm up to 150 mm	—	—
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 PIN 10	AD1	15 mm up to 100 mm	BD1	15 mm up to 200 mm	—	—
DIN PIN 16	AD2	15 mm up to 100 mm	BD2	15 mm up to 200 mm	—	—
DIN PIN 25	AD3	15 mm up to 100 mm	BD3	15 mm up to 200 mm	—	—
DIN PIN 40	AD4	15 mm up to 100 mm	BD4	15 mm up to 200 mm	—	—
DIN PIN 64	—	—	BD5	15 mm up to 150 mm	—	—
DIN PIN 100	—	—	BD6	15 mm up to 150 mm	—	—

DYF Tab-07

OPTION SPECIFICATIONS (HAZARDOUS AREA CLASSIFICATIONS)

Item	Specification	Code
Japanese Industrial Standards (JIS)	JIS Flame proof Approval (Note 1) Flame proof Ex d IIC T6 Certified by TIIS. (TIIS is the abbreviation of Technology Institution of Industrial Safety.) Amb. Temp: -20 to 60°C Electrical connection : JIS G1/2 female	JF3
Factory Mutual (FM)	FM Explosion proof Approval Type of Protection : Explosionproof for Class I, Division 1, Groups A, B, C and D; Dust-ignitionproof Class II/III, Division 1, Groups E, F, and G. "SEAL ALL CONDUITS WITHIN 18 INCHES." "WHEN INSTALLED IN DIV.2, SEALS NOT REQUIRED." Enclosure Rating : NEMA TYPE 4X Temperature Code : T6 Ambient Temperature : -40 to 60°C Ambient Humidity : 0 to 100%RH Maximum Working Pressure : 15MPa(2160 psi) (DY015 to DY200) 5MPa(720 psi) (DY250 and DY300) Coating of Enclosure : Epoxy resin coating or Polyurethane resin coating. Electrical Connection : ANSI 1/2NPT female	FF1
	FM Intrinsically safe Approval (Note 2) Type of Protection : Intrinsically Safe for Class I, II, III, DIV.1, Groups A, B, C, D, E, F and G, T4, and Class I, Zone 0, AEx ia IIC T4 Nonincendive for Class I, II, Div.2, Groups A, B, C, D, F and G, Class III, DIV.1, T4, and Class I, Zone 2, Groups IIC, T4 Ambient Temperature : -40 to +60°C (Integral Type Flowmeter and Remote Type Converter) -40 to +80°C(Remote Type Flowmeter) Ambient Humidity : 0 to 100% RH (No condensation) Indoors and Outdoors : NEMA TYPE 4X Electrical Parameter : Vmax=30Vdc Imax=165mAdc, Pi=0.9W, Ci=12nF, Li=0.15mH Electrical Connection : ANSI 1/2NPT female	FS1
CENELEC ATEX (KEMA)	CENELEC ATEX(KEMA) Explosionproof Approval Type of protection : EExd IIC T6...T1(Integral Type Flowmeter and Remote Type Flowmeter) EExd IIC T6 (Remote Type Converter) Groups : Group IIG Category : Category 2 Temperature Class : T6...T1(Integral Type Flowmeter and Remote Type Flowmeter) T6(Remote Type Converter) 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) Degree of Protection of Enclosure : IP67 Tamb: -40 to +60°C : -30 to +60°C (For integral Type Flowmeter and Remote Type Converter with indicator) Ambient Humidity : 0 to 100% RH Maximum working Pressure : 16MPa(DY015 to DY200) 5MPa(DY250 and DY300) Coating of Enclosure : Epoxy resin coating or Polyurethane resin coating. Electrical Connection : ANSI 1/2 NPT female, ISO M20 X 1.5 female.	KF1
	CENELEC ATEX(KEMA) Intrinsically safe Approval (Note 2) Type of protection : EEx ia IIC T4...T1(Integral Type Flowmeter and Remote Type Flowmeter) EEx ia IIC T4(Remote Type Converter) Groups : IIG Category : 1 Maximum Working Pressure : 16MPa (DY015 to DY200) 5MPa (DY250 and DY300) Tamb.(Integral Type Flowmeter and Remote Type Converter) : -40 to +60°C Tamb.(Remote Type Flowmeter) : -40 to 80°C Ambient Humidity : 0 to 100%RH (No condensation) 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) For connection to certified Intrinsically Safe circuit with Signal/Supply and Pulse circuit of Integral Type Flowmeter and Remote Type Converter Ui=30Vdc, Ii=165mAdc, Pi=0.9W, Ci=6nF, Li=0.15mH Connect sensor circuit of DYA and DY-N(/HT) Maximum cable capacitance:160nF Electrical connection : ANSI 1/2NPT female, ISO M20 X 1.5 female.	KS1

(Note 1) In case of JIS Flameproof (/JF3), specify in the option code with Flame proof packing ground (/G11, /G12) for the cable wire construction. In case the ambient temperature exceeds 50deg.C, use heat resistant cables with maximum allowable temperature of 70degC or above.

(Note 2) For intrinsically safe approval, use the barrier certified by the testing laboratories (BARD-400 is not applicable).

DYF Tab-05.EPS

Option Specifications (HAZARDOUS AREA CLASSIFICATIONS)

Item	Specification	Code
Canadian Standards Association (CSA)	<p>CSA Explosion proof Approval</p> <p>Type of Protection : Explosionproof for Class I, Groups B, C and D; Class II, Groups E, F, and G; Class III. For Class I, Division 2 locations- "FACTRY SEALED, CONDUIT SEAL NOT REQUIRD" Enclosure : Type 4X Temperature Class : T6...T1 (Integral Type Flowmeter and Remote Type Flowmeter) T6 (Remote Type Converter) Amb.Temp. : -40 to +60°C Process temp. : T6;85°C, T5;100°C, T4;135°C, T3;200°C, T2;300°C, T1; 450°C Enclosure : Type 4X Maximum working Pressure : 15MPa (2160 psi) (DY015 to DY200) 5MPa (720 psi) (DY250 and DY300) Coating of Enclosure: Epoxy resin coating or Polyurethane resin coating. Electrical Connection: ANSI 1/2 female</p>	CF1
	<p>CSA Intrinsically safe Approval (Note 2)</p> <p>Type of Protection : Ex ia IIC T4...T1 and Ex nC IIC T4...T1(Integral Type Flowmeter and Remote Type Flowmeter) Ex ia IIC T4 and Ex nC IIC T4(Remote Type Converter) Process Temp.: T4;135°C, T3;200°C, T2;300°C, T1;450°C (Integral Type Flowmeter and Remote Type Flowmeter) Amb. Temp. : -40 to +60°C Amb. Hum. : 0 to 100%RH (No condensation) Degree of Protection of Enclosure:IP67 Electrical Parameter:Ui=30Vdc, Ii=165mAdc, Pi=0.9W, Ci=12nF, Li=0.15mH. Electrical Connection: ANSI 1/2 NPT female</p> <p>Type of Protection : Intrinsically Safe for Class I, II, III, DIV.1, Groups A, B, C, D, E, F and G Non-incendive for Class I, II, DIV.2, Groups A, B, C, D, E, F and G, ClassIII, DIV.1. Temperature Code : T4...T1(Integral Type Flowmeter and Remote Type Flowmeter) T4(Remote Type converter) Process Temp. : T4;135°C, T3; 200°C, T2; 300°C, T1; 450°C (Integral Type Flowmeter and Remote Type Flowmeter) Amb. Temp. : -40 to +60°C Amb. Hum. : 0 to 100%RH (No condensation) Enclosure : Type 4X Electrical Parameter:Vmax =30Vdc, Iimax =165mAdc, Pmax = 0.9W, Ci =12nF, Li = 0.15mH. Electrical Connection: ANSI 1/2 NPT female</p>	CS1
Standards Association of Australia (SAA) (Note 3)	<p>SAA Flame proof Approval</p> <p>Ex d IIC T6...T1, IP67, Class I, Zone 1 Amb.Temp.: -40 to +60°C Max. process temp. : T6; 85°C, T5; 100°C, T4; 135°C, T3; 200°C, T2; 300°C, T1;450°C Electrical connection: ANSI 1/2 NPT female, ISO M20 X 1.5 female</p>	SF1
	<p>Type of Protection: Ex ia IIC T4...T1 IP67 (Integral Type Flowmeter and Remote Type Flowmeter) Ex ia IIC T4 IP67 (Remote Type Converter) Hazardous Area: Class I, Zone 0 Maximum Input Voltage (Ui)=30V Maximum Input Current (Ii)=165mA Maximum Input Power (Pi)=0.9W Internal Capacitance (Ci)=6nF Internal Inductance (Li)=0.15mH</p> <p>Type of Protection: Ex n IIC T4... T1 IP67 (Integral Type Flowmeter and Remote Type Flowmeter) Ex n IIC T4 (Remote Type Converter) Hazardous Area: Class I, Zone 2 Maximum Input Voltage (Ui)=30V Ambient Temperature: -40°C to 60°C Ambient Humidity: 0 to 100% RH (No condensation) Temperature Class: T4...T1 (Integral Type Flowmeter and Remote Type Flowmeter) T4 (Remote Type Converter) Process Temperature: T4;135°C, T3;200°C, T2;300°C, T1;450°C</p>	SS1

(Note 2) For intrinsically safe approval, use the barrier certified by the testing laboratories (BARD-400 is not applicable).

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

DYF Tab-6.EPS

■ OPTION SPECIFICATIONS

Item	Specification	Applicable Model	Code
Multi-Variable Type	Build in Temperature sensor (Pt 1000Ω) in vortex shedder bar.	DY/DYA	MV
Stainless Steel Tag Plate (Note 1)	SUS304 tag plate, hung on converter case.	DY/DYA	SCT
Stainless Steel Bolt & Nut Assembly	SUS304 bolt/nut assembly. Used when a wafer type is installed.	DY Wafer Type	BL
Paint Color Change	Only for converter covers: See refer to Table.3.	DY / DYA	See Table3
Material Certificate	Reproduced material certificated for body and shedder bar from material manufacture. Available for the general type material.	DY	M01
Static Pressure and Leakage Test Certificate	Using hydraulic or nitrogen pressure according to the table 4. Test time is 10 minutes. Available for the general type.	DY	T01
Degrease Treatment (Note 2)	All wetted parts are assembled after degreasing for stainless body. After flow calibration, the body is cleaned by trichloroethylene.	DY	K1
Epoxy Coating	Epoxy coating for meter cover and case.	DY / DYA	X1
High Process Temperature Version	This specification temperature is from -40 to +450°C Refer to Table 1 , Figure 4. Refer to Table 5 for minimum velocity. In case of another size, please contact to YOKOGAWA sales person.	DY***-N	HT
Cryogenic Version	This specification temperature is from -200 to +100°C Refer to Table 1 , Figure 5. In case of another size, please contact to YOKOGAWA sales person.	DY***-N	LT
Stainless Steel Bracket for Remote Converter (DYA)	The bracket material for remote converter type (DYA) is SUS304.	DYA	SB
GOST Certificate (Note 4)	Calibration Certificate for GOST(only for products produced at YFT)	DY / DYA	GOS
Lightning Protector	There is an arrester inside converter for power supply line. Maximum power supply voltage : 30VDC	DY***-D,E / DYA	A
Compliance with NACE	Compliance with NACE. Refer to Table 1.	DY	NC
Compliance with NAMUR	Compliance with NAMUR43. Current signal for measurement is 4mA up to 20.5mA. Set output 3.6mA or less when burn-out occurred.	DY / DYA	NM
Anti-corrosion Version I	Anti-corrosion Version I. Refer to Table 1.	DY	HX
Anti-corrosion Version II	Anti-corrosion Version II. Refer to Table 1.	DY	HY
Converter Installing Direction 180° Change (Note5)	Converter installing direction 180° change inversely when shipped.	DY	CRC
Down-scale burn-out in CPU or EEPROM failure (Note 3)	Set output 3.6mA or less when burn-out occurred.	DY***-D,E / DYA	C1
Flameproof Packing Adapter	Power source connection port and signal cable (remote type) connection port. JIS G1/2 female thread. Other cable shape: ø 8 to ø 12. G11 : One piece, G12 : Two pieces.	DY / DYA	G11
			G12
Calibration Certificate	Level 2 Declaration and Calibration Equipment List	DY	L2
	Level 3 Declaration and Primary Standard List	DY	L3
	Level 4 Declaration and YOKOGAWA Measuring	DY	L4

(Note 1) When /SCT is not chosen, the specified Tag Number is engraved on the data plate.

When /SCT is chosen, the specified Tag Number is engraved on the data plate and stainless tag plate.

(Note 2) There is a case that calibration water should stay in the meter tube. So this is not degrease treatment in the strict sense.

(Note 3) The output is set 3.6mA or less (General type is set 21.6mA or more at shipping).

(Note 4) Now preparing.

(Note.5) When /CRC is chosen, the electrical connection turn to a downstream side.

(Note.6) Refer to "OPTION MULTI-VARIABLE (BUILD IN TEMPERATURE SENSOR) TYPE (/MV)"

DYF Tab-07

OPTION MULTI-VARIABLE (BUILD IN TEMPERATURE SENSOR) TYPE (/MV) (*1)

This options is the same as standard specification except the following items.

		Multi-variable Type					Standard Type	
Size	Wafer Type	25mm to 100mm					15mm to 100mm	
	Flange Type	25mm to 200mm					15mm to 300mm	
Function		Only for indication and output	Mass Flow calculation. (Volumetric flowrate at Standard condition for GAS)					
Fluid		Liquid, Gas Saturated Steam Superheat Steam	Saturated Steam	Superheat Steam	Gas	Liquid	Liquid, Gas Saturated Steam Superheat Steam	
		-40 to 260°C	100 to 260°C	100 to 260°C	-40 to 260°C	-40 to 260°C	-40 to 260°C	
Accuracy (*2)	Mass Flow	Refer to Table 3						
	Temperature		±0.5% OF RATE	±1% OF RATE	±1% (Less than 100°C) ±1% OF RATE (100°C or more)	±0.5°C (Less than 100°C) ±0.5% OF RATE (100°C or more)		
Temperature Response (50% response)		60sec (Churning Underwater)						
Mass Flow Calculation Method			Density Calculation (*3)	Density Calculation (Constant pressure is assumed) (*4)	Temp.-Pressure Correction (Constant pressure is assumed) (*5)	Density change Calculation (*6)		
Output	Analog Output	Select from Flow rate or temperature (*7)					Only for Flow Rate	
	Pulse Output	Only for Flow rate					Only for Flow Rate	
	Alarm Output	Standard Alarm+ Error of thermometer etc.					Only for Standard	
	StatusOutput	Only for Flow Switch					Flow Switch	
Display	Upper	Select from Flow rate (%Engineering Unit) or Temperature (%) (*8)					Only for Flow Rate	
	Lower	Select from Total Rate or temperature (°C, °F) (*9)					Only for Total Rate	
Remote Type		Flow Converter : Select DYA-□□□/MV Signal Cable : Select DYC-□□□/MV (*10)						

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- (*1) When /MV is selected /HT, /LT is not available.
- (*2) Measurement temperature is changed by the heat-insulation method of piping and piping method. Refer to "REMARKS ON INSTALLATION" about heat-insulation. In case of the Mass Flow measurement of saturated steam and superheat steam, it is necessary to make a heat-insulation.
- (*3) Mass Flow rate is calculated from density values by temperature measurement using saturated steam table.
- (*4) Mass Flow rate is calculated from density values to temperature measured by using steam table. In order to measure superheated steam, it is necessary to make constant pressure value. A pressure values which is indicated by order sheet is used.
- (*5) In order to measure gas, Pressure-Temperature correction is carried out. It is necessary to make constant pressure value. A pressure values at operational condition, temperature and pressure value at standard condition which is indicated by order sheet is used.
- (*6) In order to measure mass flowrate of liquid application, the density at normal condition is used, and if fluid temperature deviates from normal temperature density values is calculated by 2 dimensional equation. In this case, temperature coefficient should be prepared by user's side.
- (*7) Default setting is Flow rate. It is necessary to change the parameter of output in case of setting temperature output.
- (*8) In case of indicating the temperature %, the display indicate not only "%" but also "t". ("t" is the means of temperature)
- (*9) Default setting is "temperature" but "Total" is setup when ordering the Total Rate.
- (*10) In case of Multi variable(/MV), it is necessary to setup the parameter of Cable Length.

Table 3 Detailed Accuracy (for Table 8 Range of Guaranteed Accuracy)

Fluid	Nominal Size	Accuracy
Liquid	25 mm up to 100 mm	± 2.0% of Reading (20000 ≤ Re < D × 10 ³)
	150 mm, 200 mm	± 1.5% of Reading (D × 10 ³ ≤ Re)
		± 2.0% of Reading (40000 ≤ Re)
Gas, Steam	25 mm up to 200 mm	± 2.0% of Reading (Velocity 35 m/s or less)
		± 2.5% of Reading (Velocity 35 m/s up to 80 m/s)

D: Inner diameter of YEWFL0 (mm)
Re: Reynolds number (non unit)

Note: In case of analog output, add up ± 0.1% of full scale to the values mentioned above.

T09-2.EPS

Table 4 Paint Color and Codes

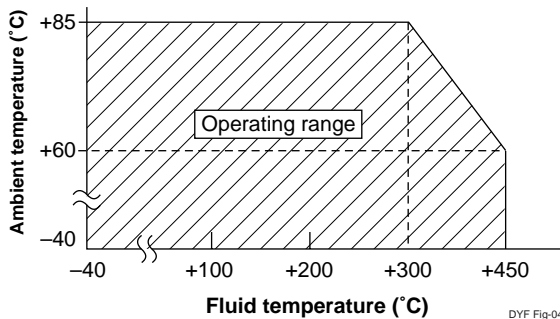
Codes	Munsell Renotation Code	Color
P1	N1.5	Black
P2	7.5BG4/1.5	Jade green
P7	—————	Metallic silver

DYF Tab-08

Table 5 Pressure Test Value

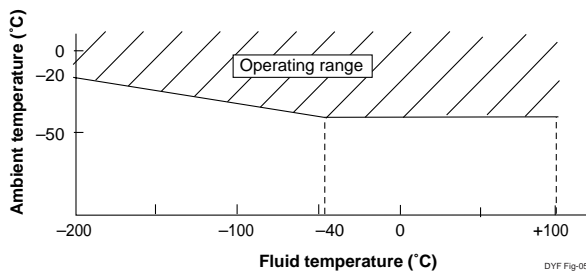
Flange Rating	Pressure
JIS 10 K	2.1 MPa {21 kgf/cm ² }
JIS 20 K	5.0 MPa {51 kgf/cm ² }
JIS 40 K	10.0 MPa {102 kgf/cm ² }
ANSI Class 150	2.9 MPa {29 kgf/cm ² }
ANSI Class 300	7.5 MPa {76 kgf/cm ² }
ANSI Class 600	14.9 MPa {152 kgf/cm ² }
ANSI Class 900	22.3 MPa {228 kgf/cm ² }

DYF Tab-09



DYF Fig-04

Figure 4 Fluid temperature range of high process temperature version



DYF Fig-05

Figure 5 Fluid temperature range of cryogenic version

■ SIZING

The following items are the basic specifications. In case of the definite sizing, it is necessary to check by the sizing software.

■ Measurable minimum flow velocity

Table 6 Relationship between Minimum Velocity and Density (Use the Large 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	$\sqrt{250/\rho}$	—	$\sqrt{80/\rho}$ or 3	—
25	$\sqrt{122.5/\rho}$	$\sqrt{490/\rho}$	$\sqrt{45/\rho}$ or 2	$\sqrt{125/\rho}$ or 2
40	$\sqrt{90/\rho}$	$\sqrt{490/\rho}$	$\sqrt{31.3/\rho}$ or 2	$\sqrt{125/\rho}$ or 2
50	$\sqrt{90/\rho}$	$\sqrt{160/\rho}$	$\sqrt{31.3/\rho}$ or 2	$\sqrt{61.3/\rho}$ or 2
80	$\sqrt{90/\rho}$	$\sqrt{160/\rho}$	$\sqrt{31.3/\rho}$ or 2	$\sqrt{61.3/\rho}$ or 2
100	$\sqrt{90/\rho}$	$\sqrt{160/\rho}$	$\sqrt{31.3/\rho}$ or 2	$\sqrt{61.3/\rho}$ or 2
150	$\sqrt{90/\rho}$	$\sqrt{160/\rho}$	$\sqrt{31.3/\rho}$ or 3	$\sqrt{61.3/\rho}$ or 3
200	$\sqrt{122.5/\rho}$	$\sqrt{202.5/\rho}$	$\sqrt{45/\rho}$ or 3	$\sqrt{80/\rho}$ or 3
250	$\sqrt{160/\rho}$	—	$\sqrt{61.3/\rho}$ or 3	—
300	$\sqrt{160/\rho}$	—	$\sqrt{61.3/\rho}$ or 3	—

ρ : Density at operating conditions (kg/m³)
 Liquid density is 400 up to 2000kg/m³
 Gas and steam density is 0.5kg/m³ or more.

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Table 7 Range of Measurable flow velocity

Fluid	Nominal Size	Minimum flow velocity	Maximum flow velocity (Note)
Liquid	15mm up to 300 mm	"flow velocity obtained from Table.5" or "flow velocity at Reynolds number of 5000", whichever is greater. For liquid Reynolds number of 5000 : Use Figure.6	10 m/s
Gas, Steam	15mm up to 300 mm	"flow velocity obtained from Table.5" or "flow velocity at Reynolds number of 5000", whichever is greater. For Gas and steam Reynolds number of 5000 : Use of a calculation formula on the following page.	80 m/s

DYF Tab-11

When the flow velocity is lower than minimum, both the analog output and the pulse output is displayed as zero "0".
 (Note) A span setting is available up to 1.5 times of the maximum flow velocity.

Guaranteed accuracy at minimum flow velocity

Table 8 Range of Guaranteed Accuracy Flow Velocity

Fluid	Nominal Size	Minimum flow velocity	Maximum flow velocity
Liquid	15 mm up to 100 mm	"flow velocity obtained from Table.5" or "flow velocity at Reynolds number of 20000", whichever is greater. For liquid Reynolds number of 20000 : The value is four times velocity value in Figure.6	10 m/s
	150 mm up to 300 mm	"flow velocity obtained from Table.5" or "flow velocity at Reynolds number of 40000", whichever is greater. For liquid Reynolds number of 40000 : The value is eight times velocity value in Figure.6	
Gas, Steam	15 mm up to 100 mm	"flow velocity obtained from Table.5" or "flow velocity at Reynolds number of 20000", whichever is greater. For gas and steam Reynolds number of 20000 : Use of a calculation formula	80 m/s
	150 mm up to 300 mm	"flow velocity obtained from Table.5" or "flow velocity at Reynolds number of 40000", whichever is greater. For gas and steam Reynolds number of 40000 : Use of a calculation formula	

DYF Tab-12

Table 9 Detailed Accuracy (for Range of Guaranteed Accuracy)

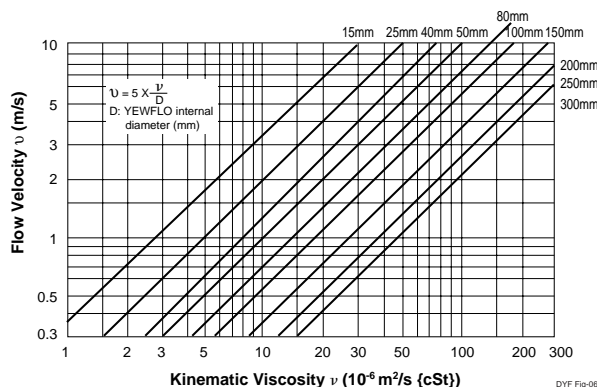
Fluid	Nominal Size	Accuracy
Liquid	15mm	± 1.0% of Reading (20000 ≤ Re)
	25 mm up to 100 mm	± 1.0% of Reading (20000 ≤ Re < D × 10 ³) ± 0.75% of Reading (D × 10 ³ ≤ Re) (± 0.5% of Reading: Typical Accuracy/Non-Guaranteed)
	150 mm up to 300 mm	± 1.0% of Reading (40000 ≤ Re)
Gas, Steam	15 mm up to 300 mm	± 1.0% of Reading (Velocity 35m/s or less) ± 1.5% of Reading (Velocity 35m/s up to 80m/s)

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D : Inner diameter of YEWFLOW (mm)
Re: Reynolds 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.

Flow velocity at Reynolds Number of 5000(Liquid)

Kinematic Viscosity : Use of equation(2). When the nominal size is 50mm and the Kinematic viscosity is 10cSt, the flow velocity at Reynolds number of 5000 is 1m/s using Figure 6.



DYF Fig-06

Figure 6 Flow velocity at Reynolds number of 5000(Liquid)

Calculation formula

How to calculate volume flow rate at operating conditions.

• $Q_f = \frac{v \times D^2}{354}$ or $Q_f = 3600 \times v \times S$

How to calculate the velocity of a Reynolds number.

- $v = 5 \times \nu / D$ (Reynolds number of 5000)
- $v = 20 \times \nu / D$ (Reynolds number of 20000)
- $v = 40 \times \nu / D$ (Reynolds number of 40000)

however

• $Re = \frac{354 \times 10^3 \times Q_f}{\nu \times D}$ (1)

• $\nu = \frac{\mu}{\rho f} \times 10^3$ (2)

Qf : Volume flow rate at operating conditions (m³/h)

D : Inner diameter of YEWFLOW (mm)

S : Sectional area of YEWFLOW(m²)

v : Flow velocity (m/s)

Re : Reynolds number (none unit)

ρf : Density at operating conditions (kg/m³)

μ : Viscosity at operating conditions (mPa·s{cP})

ν : Kinematic viscosity at operating conditions (10⁻⁶m²/s{cSt})

Table 10 Inner Diameter and Nominal value

Nominal Size		Inner Diameter mm	Nominal K-Factor Pulse/L	Nominal Pulse 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
250	10	230.8	0.0966	4.04	0.0268
300	12	276.2	0.0563	3.37	0.0156

Typical fluid example

Table 11 Range of Measurable Water Flow Rate (At standard condition of 15°C, ρ = 1000 kg/m³)

Nominal Size		Measurable Flow Rate in m ³ /h	Range of Guaranteed Accuracy 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 142	4.6 up to 142
100	4	7.5 up to 248	7.5 up to 248
150	6	17 up to 544	18 up to 544
200	8	34 up to 973	34 up to 973
250	10	60 up to 1506	60 up to 1506
300	12	86 up to 2156	86 up to 2156

DYF Tab-14a

Table 12 Range of Measurable 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	37.8	48.7	61.6	79.2	97	149	184	229
	max.	356	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.	70.1	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	211	272	334	442	540	786	1031	1277
	max.	1990	3954	5919	9847	13775	17703	21632	31453	41274	51095
150 mm	min.	268	377	485	808	1131	1453	1776	2583	3389	4196
	max.	4358	8659	12960	21559	30163	38765	47365	68867	90373	111875
200 mm	min.	575	809	990	1445	2202	2599	3175	4617	6059	7501
	max.	7792	15482	23172	38549	53933	69313	84693	123138	161591	200046
250 mm	min.	1037	1461	1788	2306	3127	4019	4911	7140	9370	11600
	max.	12049	23939	35833	59611	83400	107181	130968	190418	249881	309334
300 mm	min.	1485	2093	2561	3303	4479	5756	7033	10226	13419	16612
	max.	17256	34286	51317	85370	119441	153499	187556	272699	357856	443017

- (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 5. 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.

DVF Tab-15

Table 13 Range of Measurable 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.	5.8(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	47.7	53.8	59	72	93	116	138
	max.	405	591	954	1310	1662	2012	2884	3759	4640	5532
50 mm	min.	44.0	53	67.3	79	89	98	119	156	192	229
	max.	671	979	1580	2170	2753	3333	4778	6228	7688	9166
80 mm	min.	84.9	103	130	152	171	189	231	300	371	442
	max.	1295	1891	3050	4188	5314	6435	9224	12024	14842	17694
100 mm	min.	148	179	227	267	300	330	402	524	647	772
	max.	2261	3300	5326	7310	9276	11232	16102	20986	25907	30883
150 mm	min.	324	392	498	600	761	922	1322	1723	2127	2536
	max.	4950	7226	11661	16010	20315	24595	35258	45953	56729	67624
200 mm	min.	697	841	1068	1252	1410	1649	2364	3081	3803	4534
	max.	8851	12918	20850	28627	36325	43976	63043	82165	101433	120913
250 mm	min.	1256	1518	1929	2260	2546	2801	3655	4764	5882	7011
	max.	13687	19977	32243	44268	56172	68005	97489	127058	156854	186978
300 mm	min.	1799	2174	2762	3236	3646	4012	5235	6823	8423	10041
	max.	19602	28609	46175	63397	80445	97390	139614	181960	224633	267772

- (1) Maximum flow rate is the lower of 80 m/s.
 (3) Minimum values are determined from Table 5. 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.

DVF Tab-16

Pressure Loss

At velocity of 10 m/s by water, P = 108 kPa
 At velocity of 80 m/s by atmospheric air,
 P = 9 kPa

obtained from the following equations.

$$P = 108 \times 10^{-5} \cdot \rho_f \cdot v^2 \dots\dots\dots (1)$$

or

$$P = 135 \times \rho_f \cdot \frac{Q_f^2}{D^4} \dots\dots\dots (2)$$

where,

- P : Pressure loss (kPa)
- ρ_f : Density at operating condition (kg/m³)
- v : Flow velocity (m/s)
- Q_f : Actual flow rate (m³/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 30m³/h.

1. Since the density of water at 80°C is 972kg/m³, substitute this value in equation (2):

$$P = 135 \times 972 \times \frac{30^2}{51.1^4} = 17.3\text{kPa}$$

2. Obtain the pressure loss using equation (1). The flow velocity when the flow rate is 30m³/h is given by:

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

Therefore, substitute this value in equation (1):

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

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

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

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.

$$P = 2.7 \cdot P + 1.3 \cdot P_o \dots\dots\dots (3)$$

Where,

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

(Example) Confirmation of presence of cavitation

Suppose that the line pressure is 120 kPa abs and the flow rate scale is 0 to 30 m³/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:

$$P_o = 47.4 \text{ kPa abs}$$

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.

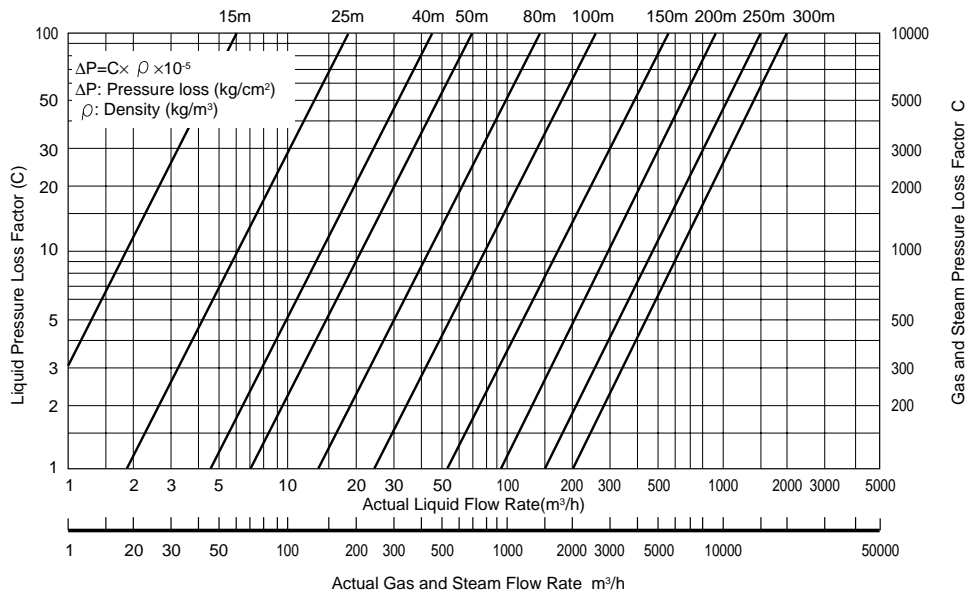


Figure 7 Pressure Loss

REMARKS ON INSTALLATION

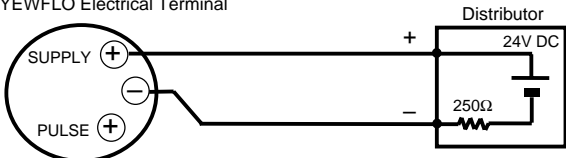
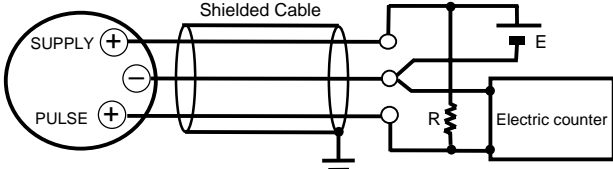
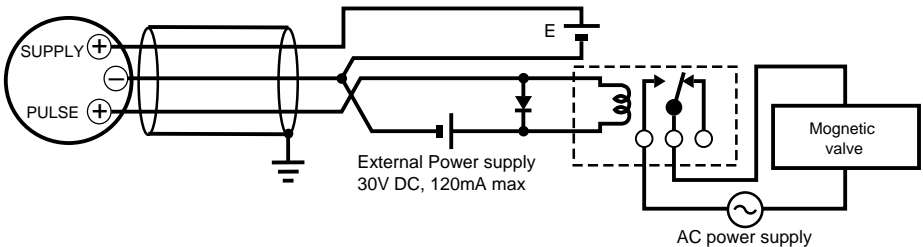
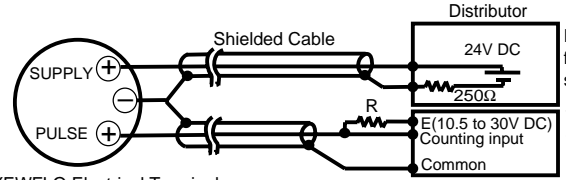
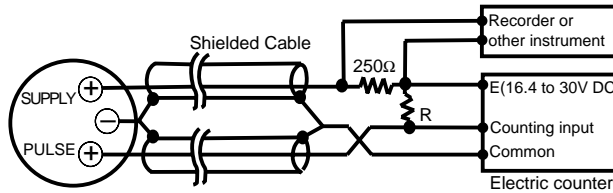
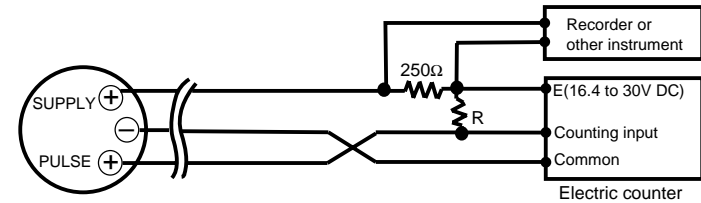
Description	Figure
<p>Piping support: Typical vibration immunity level is 1G for normal piping condition. Piping support should be fixed in case of over 1G vibration level.</p>	
<p>Installation direction: If a pipe is always filled with liquids, the pipe can be installed vertically or at inclined angle.</p>	
<p>Adjacent pipes: The process pipeline inner diameter should be larger than the YEWFLO inner diameter. Use the following adjacent pipe. Nominal size 15mm up to 50mm : Sch 40 or less. Nominal size 80mm up to 300mm : Sch 80 or less.</p>	
<p>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. (D: nominal YEWFLO diameter)</p>	
<p>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.</p>	
<p>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.</p>	
<p>Valve position and straight pipe length:</p> <ul style="list-style-type: none"> ■ Install the valve on the downstream side of the flowmeter. The upstream straight pipe length dependent on the element located on the upstream such as reducer/expander, bent and etc., refer to description as above. Keep 5D or more for downstream straight pipe length. ■ In case the valve has to be installed on the upstream of the flowmeter, ensure the upstream straight pipe length to be 20D or more, and the downstream straight pipe length be 5D or more. 	
<p>Fluid vibration: For a gas line which uses a position-type or roots-type blower compressor or a high-pressure liquid line (about 1MPa or more) which uses piston-type or plunger-type pump, fluid vibrations may be produced. In these case, install valve on the upstream side of YEWFLO. For inevitable fluid vibration, put a vibration damping device such as throttling plate or expansion section in the upstream side of YEWFLO.</p>	
<p>Piston-type or plunger pump: Install the accumulator on the upstream side of YEWFLO to reduce fluid vibrations.</p>	

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Description	Figure
<p>Valve positon (T-type piping exist): When pulsation causes by a T-type piping exist, install the valve on the upstream of the flowmeter. Example:As shown in the figure, when the valve V1 is turned off, the fluid flow 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'.</p>	
<p>Pressure and Temperature Taps: Pressure tap outlet: install this tap between 2D and 7D on the downstream side of a flowmeter. Temperature tap outlet: install this on the downstream side 1D to 2D away from a pressure tap.</p>	
<p>Mounting Gasket: Avoid mounting gaskets which protrude into the pipe line. This may cause inaccurate readings. Use the gaskets with bolt holes, even if YEWFLO is the wafer type. When using a spiral gasket(without bolt holes), confirm the size with the gasket -manufacturer, as standard items may not be used for certain flange ratings.</p>	
<p>Heat-Insulation: When an integral-type flowmeter or a remote type detector is installed and the pipe carrying higt-temperature fluids is heat-insulated, do not wrap adiabatic materials around the installation bracket of the converter.</p>	
<p>Flushing of the pipe line: Flush and clean scale, incrustation and sludge on the inside of pipe for newly installed pipe line and repaired pipe line before the operation. For flushing, the flow should flow through bypass-piping to avoid damaging the flowmeter. If there is no bypass-piping, install short pipe instead of the flowmeter.</p>	

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

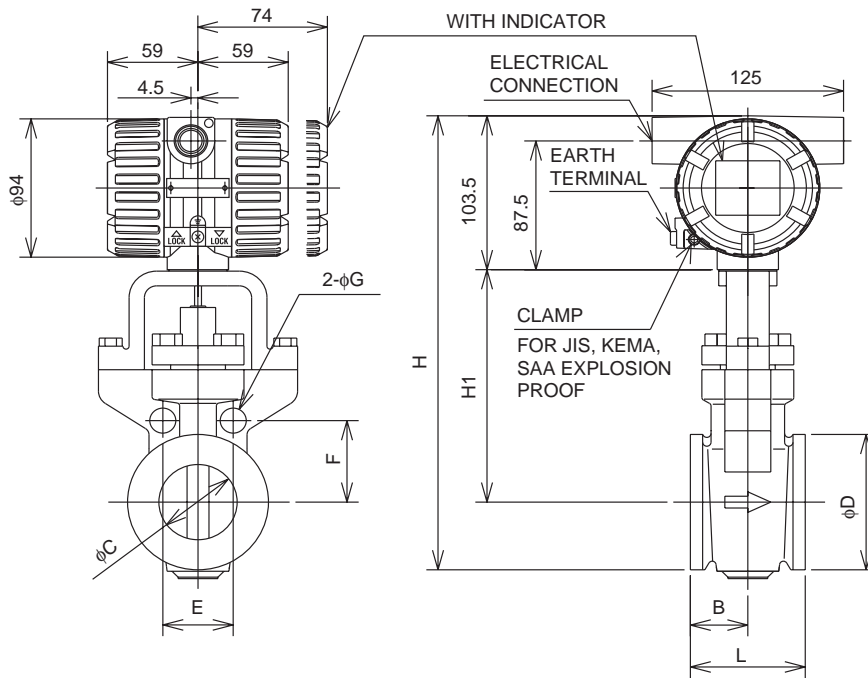
Connection	Description
<p>Analog Output</p> <p>In this case, Communication is possible (Up to a distance of 2km when a CEV cable is used.)</p>	<p>YEWFLO Electrical Terminal</p> 
<p>Pulse Output</p> <p>In this case, No communication is possible.</p>	<p>YEWFLO Electrical Terminal</p> <p>Use the Three-wire shielded cable.</p> 
<p>Status Output Alarm Output</p> <p>In this case, No communication is possible.</p>	<p>YEWFLO Electrical Terminal</p>  <p>External Power supply 30V DC, 120mA max</p> <p>AC power supply</p> <p>Magnetic valve</p>
<p>Simultaneous Analog -Pulse Output</p> <p>Example 1 In this case, Communication is possible (up to a distance of 2km when a CEV cable is used).</p> <p>Example 2 In this case, Communication is possible (up to a distance of 200m when a CEV cable is used) and R = 1kΩ.</p> <p>Example 3 In this case, No communication is possible (when shielded cable is not used).</p>	<p>When analog and pulse output are used, the length of communication line is subjected to wiring conditions. Refer to example 1 to 3. If the communication carries out from amplifier, no need to consider wiring conditions.</p> <p>Example 1: For the shielded cables in this example of flowmeter installation, use two-wire separately shielded cables. This supply voltage requires a power source with a maximum output current of no less than E/R.</p>  <p>Example 2: For the shielded cables in this example of flowmeter installation, use two-wire separately shielded cables. This supply voltage requires a power source with a maximum output current of no less than E/R+25mA. The supply voltage requires output impedance no more than 1/1000 of R (load resistance).</p>  <p>Example 3: This supply voltage requires a power source with a maximum output current of no less than E/R+25mA.</p> 
<p>The range of load resistance R for the pulse output.</p>	<p>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.</p> $\frac{E (V)}{120} \leq R (k\Omega) \leq \frac{0.1}{C (\mu F) \times f (kHz)}$ <p>Example of CEV cable capacitance ≈ 0.1μF/km</p> $P (mW) = \frac{E^2 (V^2)}{R (k\Omega)}$ <p>Where E = 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)</p>

T004.02.EPS

EXTERNAL DIMENSIONS

Wafer type (15mm up to 100mm)

Unit: mm



TYPE	INTEGRAL/REMOTE													
	DY015 (15mm)							DY025 (25mm)						
CODE	AJ1 AJ2 AJ4 AA1 AA2 AA4 AD1 - AD4							AJ1 AJ2 AJ4 AA1 AA4 AD1 - AD4						
PROCESS CONNECTION	AJ1	AJ2	AJ4	AA1	AA2	AA4	AD1 - AD4	AJ1	AJ2	AJ4	AA1	AA4	AD1 - AD4	AD1 - AD4
L	70							70						
B	35							35						
C	14.6							25.7						
D	35.1							50.8						
H	248							258						
H1	127							129						
E	49.5	49.5	56.6	42.7	47.1	47.1	46	63.6	63.6	67.2	56	62.9	62.9	60.1
F	24.7	24.7	28.3	21.4	23.5	23.5	23	31.8	31.8	33.6	28	31.4	31.4	30.1
G	13	13	17	14	14	14	13	17	17	17	14	17	17	13
WEIGHT kg	2.8							3.7						

TYPE	INTEGRAL/REMOTE													
	DY040 (40mm)							DY050 (50mm)						
CODE	AJ1 AJ2 AJ4 AA1 AA2 AA4 AD1 - AD4							AJ1 AJ2 AJ4 AA1 AA4 AP4 AA4 AD1 - AD4						
PROCESS CONNECTION	AJ1	AJ2	AJ4	AA1	AA2	AA4	AD1 - AD4	AJ1	AJ2	AJ4	AA1	AA4	AP4 AA4	AD1 - AD4
L	70							75						
B	35							37.5						
C	39.7							51.1						
D	73							92						
H	276							307.5						
H1	136							158						
E	74.2	74.2	84.9	69.7	80.8	80.8	77.8	(Note 3)	45.9	49.8	(Note 3)	48.6	48.6	(Note 3)
F	37.1	37.1	42.4	34.8	40.4	40.4	38.9	(Note 3)	55.4	60.1	(Note 3)	58.7	58.7	(Note 3)
G	17	17	21	14	20	20	17	(Note 3)	17	17	(Note 3)	17	17	(Note 3)
WEIGHT kg	4.3							6.0						

TYPE	INTEGRAL/REMOTE															
	DY080 (80mm)							DY100 (100mm)								
CODE	AJ1 AJ2 AJ4 AA1 AA2 AA4 AD1 - AD2 AD3 - AD4							AJ1 AJ2 AJ4 AA1 AA4 AD1 - AD2 AD3 - AD4								
PROCESS CONNECTION	AJ1	AJ2	AJ4	AA1	AA2	AA4	AD1 - AD2	AD3 - AD4	AJ1	AJ2	AJ4	AA1	AA4	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	57.4	61.2	65.1	(Note 3)	64.4	64.4	61.2	61.2	67	70.8	78.5	72.9	76.6	82.6	68.9	72.7
F	69.3	73.9	78.5	(Note 3)	77.7	77.7	73.9	73.9	80.8	85.5	94.7	88	92.5	99.7	83.1	87.8
G	17	21	21	(Note 3)	20	20	17	17	17	21	23	17	20	23	17	21
WEIGHT kg	9.4							12.8								

(Note 1) Integral weight is the same as Remote.

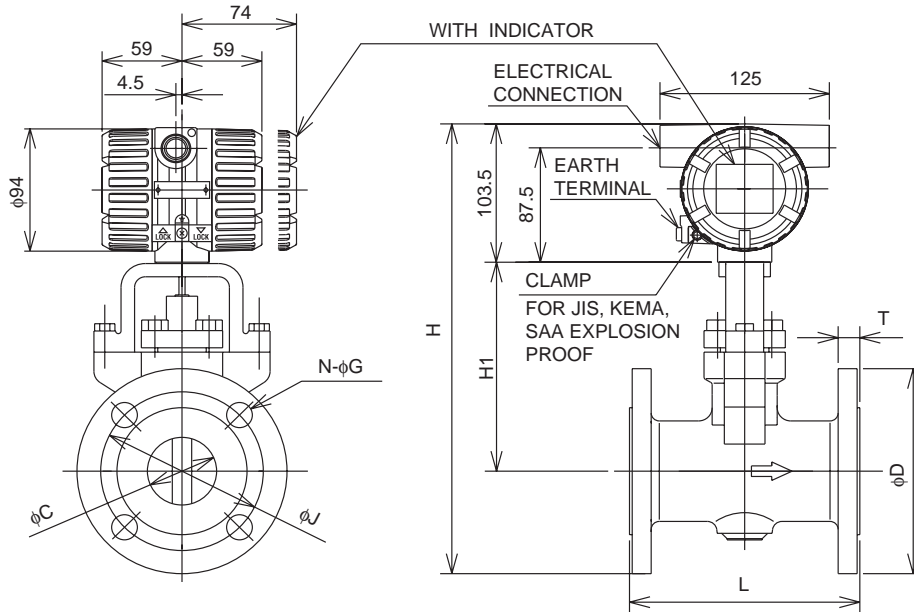
(Note 2) In case of with Indicator, add 0.2kg.

(Note 3) The hole is not provided.

F02.06-03.EPS

■ Flange type (15mm up to 100mm)

Unit: mm



TYPE	INTEGRAL/REMOTE																					
CODE	DY015 (15mm)										DY025 (25mm)											
PROCESS CONNECTION	BJ1	BJ2	BJ4	BA1	BA2	BA4	BA5	BD1 - BD4	BD5 - BD6	CA4	CA5	BJ1	BJ2	BJ4	BA1	BA2	BA4	BA5	BD1 - BD4	BD5 - BD6	CA4	CA5
L	130										150											
C	14.6										25.7											
D	95	95	115	88.9	95.3	95.3	120.7	95	105	95.3	120.7	125	125	130	108	124	124	149.4	115	140	124	149.4
H	278	278	288	275	278	278	291	278	283	278	291	295	295	297.5	286.5	294.5	294.5	307	290	302.5	294.5	307
H1	127										129											
T	12	14	20	11.2	14.2	21	28.8	16	20	19.9	28.8	14	16	22	14.2	17.5	24	34.9	18	24	24	34.9
J	70	70	80	60.5	66.5	66.5	82.6	65	75	66.5	82.6	90	90	95	79.2	89	89	101.6	85	100	89	101.6
N	4										4											
G	15	15	19	15.7	15.7	15.7	22.4	14	14	15.7	22.4	19	19	19	15.7	19	19	25.4	14	18	19	25.4
WEIGHT kg	4.2	4.3	5.9	4.1	4.3	4.6	6.7	4.2	5.4	4.5	6.8	6.9	7.1	8.6	6.6	7.2	7.7	11.1	6.9	9.6	7.9	11.4

TYPE	INTEGRAL/REMOTE																						
CODE	DY040 (40mm)										DY050 (50mm)												
PROCESS CONNECTION	BJ1	BJ2	BJ4	BA1	BA2	BA4	BA5	BD1 - BD4	BD5 - BD6	CA4	CA5	BJ1	BJ2	BJ4	BA1	BA2	BA4	BA5	BD1 - BD4	BD5 - BD6	CA4	CA5	
L	150										170												
C	39.7										51.1												
D	140	140	160	127	155.4	155.4	177.8	150	170	155.4	177.8	155	155	165	152.4	165.1	165.1	215.9	165	180	195	165.1	215.9
H	309.5	309.5	319.5	303	317	317	328.5	314.5	324.5	317	328.5	339	339	344	337.5	344	344	369.5	344	351.5	359	344	369.5
H1	136										158												
T	16	18	26	17.5	20.6	28.8	38.2	18	26	28.8	38.2	16	18	26	19.1	22.4	31.8	44.5	20	26	28	33.3	46
J	105	105	120	98.6	114.3	114.3	124	110	125	114.3	124	120	120	130	120.7	127	127	165.1	125	135	145	127	165.1
N	4										4												
G	19	19	23	15.7	22.4	22.4	28.4	18	22	22.4	28.4	19	19	19	19	19	19	25.4	18	22	26	19	25.4
WEIGHT kg	8.2	8.4	11.9	8.1	9.3	11.3	16.2	8.8	12.7	11.7	16.3	11.1	11.6	14.3	11.7	13.2	14.8	26.5	11.3	14.3	15.2	15.8	26.9

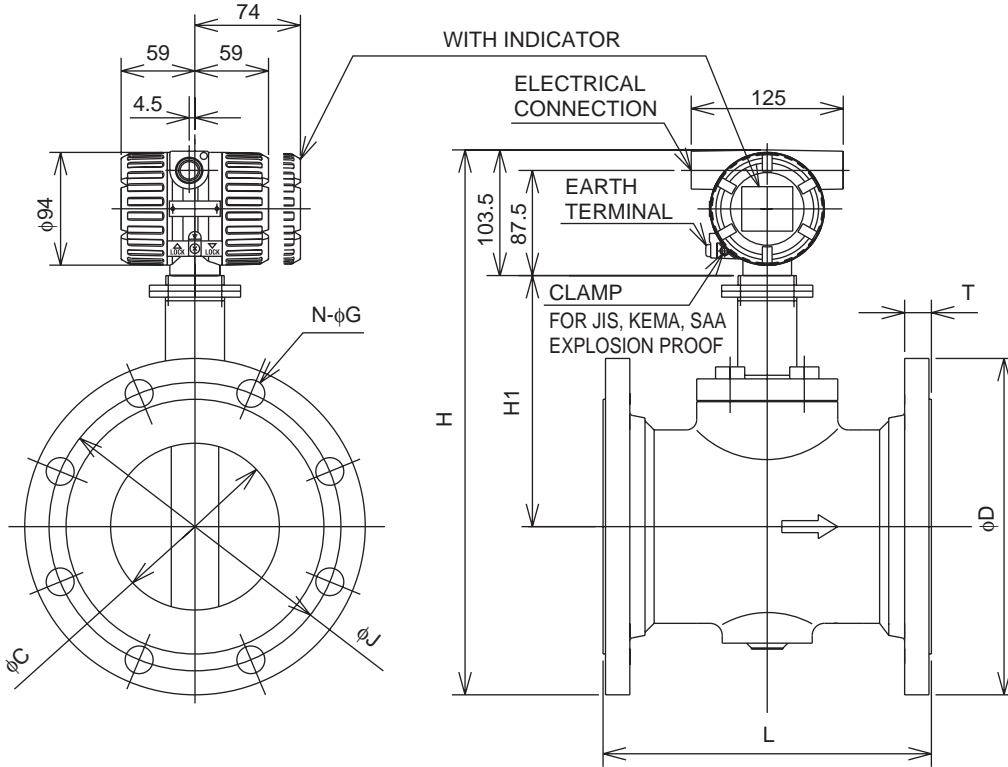
TYPE	INTEGRAL/REMOTE																									
CODE	DY080 (80mm)												DY100 (100mm)													
PROCESS CONNECTION	BJ1	BJ2	BJ4	BA1	BA2	BA4	BA5	BD1 - BD2	BD3 - BD4	BD5	BD6	CA4	CA5	BJ1	BJ2	BJ4	BA1	BA2	BA4	BA5	BD1 - BD2	BD3 - BD4	BD5	BD6	CA4	CA5
L	200												220													
C	71												93.8													
D	185	200	210	190.5	209.6	209.6	241.3	200	200	215	230	209.6	241.3	210	225	250	228.6	254	273	292.1	220	235	250	265	273	292.1
H	371	378.5	383.5	374	383.5	383.5	399	378.5	378.5	386	393.5	383.5	399	398.5	406	418.5	409	420.5	430	439.5	403.5	411	418.5	426	430	439.5
H1	175												190													
T	18	22	32	23.9	28.4	38.2	44.5	20	24	28	32	39.7	46	18	24	36	23.9	31.8	44.5	50.9	20	24	30	36	46	52.4
J	150	160	170	152.4	168.2	168	190.5	160	160	170	180	170	180	175	185	205	190.5	200.2	216	235	180	190	200	210	216	235
N	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
G	19	23	23	19	22.4	22.4	25.4	18	18	22	26	22.4	25.4	19	23	25	19	22.4	25.4	31.8	18	22	26	30	25.4	31.8
WEIGHT kg	17.4	20	25.4	20	23.8	25.4	35.7	19.4	20	24.1	27	27.1	36.3	22.8	26.8	38.1	27.4	35.9	50.8	55.9	23.2	27.4	33	39.7	52.8	66.6

(Note 1) Integral weight is the same as Remote
 (Note 2) In the case of with Indicator, add 0.2 kg

F02.06-01.EPS

■ Flange type (150mm up to 300mm)

Unit: mm



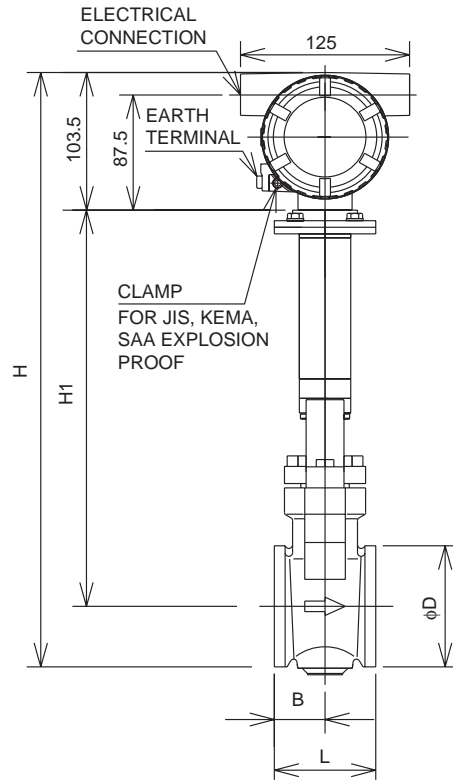
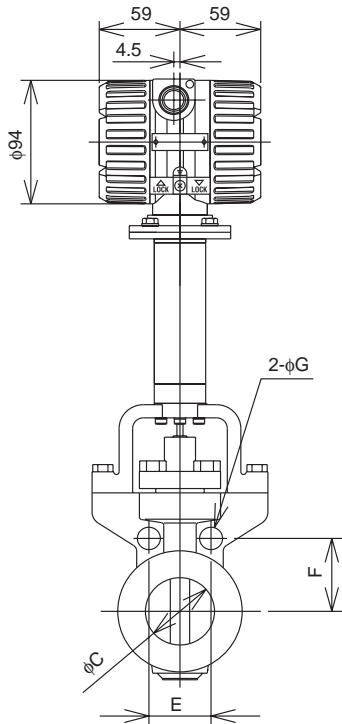
TYPE	INTEGRAL/REMOTE																								
CODE	DY150 (150mm)										DY200 (200mm)														
PROCESS CONNECTION	BJ1	BJ2	BJ4	BA1	BA2	BA4	BA5	BD1	BD3	BD5	BD6	CA4	CA5	BJ1	BJ2	BA1	BA2	BA4	BA5	BD1	BD2	BD3	BD4	CA4	CA5
L	270				310	336	270				325	340	310				370	386	310				375	390	
C	138.8										185.6														
D	280	305	355	279.4	317.5	356	381	285	300	345	355	356	381	330	350	342.9	381	419.1	469.9	340	340	360	375	419.1	469.9
H	453	465	490	452	471	491	503	455	463	485	490	491	503	510	520	516	535	554	579	515	515	525	532	554	579
H1	209										241														
T	22	28	44	25.4	36.6	54.4	62	22	28	36	44	55.7	63.6	22	30	28.4	41.1	62	69.9	24	24	30	34	63.6	71.4
J	240	260	295	241.3	269.7	292	317.5	240	250	280	290	292	317.5	290	305	298.5	330.2	349.3	393.7	295	295	310	320	349.3	393.7
N	8	12	12	8	12	12	12	8	8	8	12	12	12	12	12	8	12	12	12	8	12	12	12	12	12
G	23	25	33	22.4	22.4	28.4	31.8	22	26	33	33	28.4	31.8	23	25	22.4	25.4	31.8	38.1	22	22	26	30	31.8	38.1
WEIGHT kg	33.4	43.4	76.4	36.4	54.4	84.4	106	33.4	42.9	58.1	76.4	90	107	45.4	52.4	55.4	80.4	136	182	46.3	46.3	53.6	55.9	139	183

TYPE	INTEGRAL/REMOTE							
CODE	DY250 (250mm)				DY300 (300mm)			
PROCESS CONNECTION	BJ1	BJ2	BA1	BA2	BJ1	BJ2	BA1	BA2
L	370				400			
C	230.8				276.2			
D	400	430	406.4	444.5	445	480	482.6	520.7
H	581	596	584	603	633	651	652	671
H1	277				307			
T	25	35	31.2	48.8	25	37	32.8	51.8
J	355	380	362	387.4	400	430	431.8	450.9
N	12	12	12	16	16	16	12	16
G	25	27	25.4	28.5	25	27	25.4	31.8
WEIGHT kg	78	100	90	125	100	128	140	178

(Note 1) Integral weight is the same as Remote
 (Note 2) In case of with indicator, add 0.2kg

F02.06-02.EPS

- High Process Temperature Version (/HT): 25mm up to 100mm
- Cryogenic Version (/LT): 15mm up to 100mm
- Wafer type



Unit: mm

TYPE	Only for REMOTE						
CODE	DY015 (15mm) Only for /LT						
PROCESS CONNECTION	AJ1	AJ2	AJ4	AA1	AA2	AA4	AD1 -AD4
L	70						
B	35						
C	14.6						
D	35.1						
H	391						
H1	270						
E	49.5	49.5	56.6	42.7	47.1	47.1	46
F	24.7	24.7	28.3	21.4	23.5	23.5	23
G	13	13	17	14	14	14	13
WEIGHT kg	3.2						

TYPE	Only for REMOTE																				
CODE	DY025 (25mm) /LT, /HT						DY040 (40mm) /LT, /HT						DY050 (50mm) /LT, /HT								
PROCESS CONNECTION	AJ1	AJ2	AJ4	AA1	AA2	AA4	AD1 -AD4	AJ1	AJ2	AJ4	AA1	AA2	AA3	AD1 -AD4	AJ1	AJ2	AJ4	AA1	AA2	AA3	AD1 -AD4
L	70						70						75								
B	35						35						37.5								
C	25.7						39.7						51.1								
D	50.8						73						92								
H	401						419						450.5								
H1	272						279						301								
E	63.6	63.6	67.2	56	62.9	62.9	60.1	74.2	74.2	84.9	69.7	80.8	80.8	77.8	(Note 1)	45.9	49.8	(Note 1)	48.6	48.6	(Note 1)
F	31.8	31.8	33.6	28	31.4	31.4	30.1	37.1	37.1	42.4	34.8	40.4	40.4	38.9	(Note 1)	55.4	60.1	(Note 1)	58.7	58.7	(Note 1)
G	17	17	17	14	17	17	13	17	17	21	14	20	20	17	(Note 1)	17	17	(Note 1)	17	17	(Note 1)
WEIGHT kg	4.1						4.7						6.4								

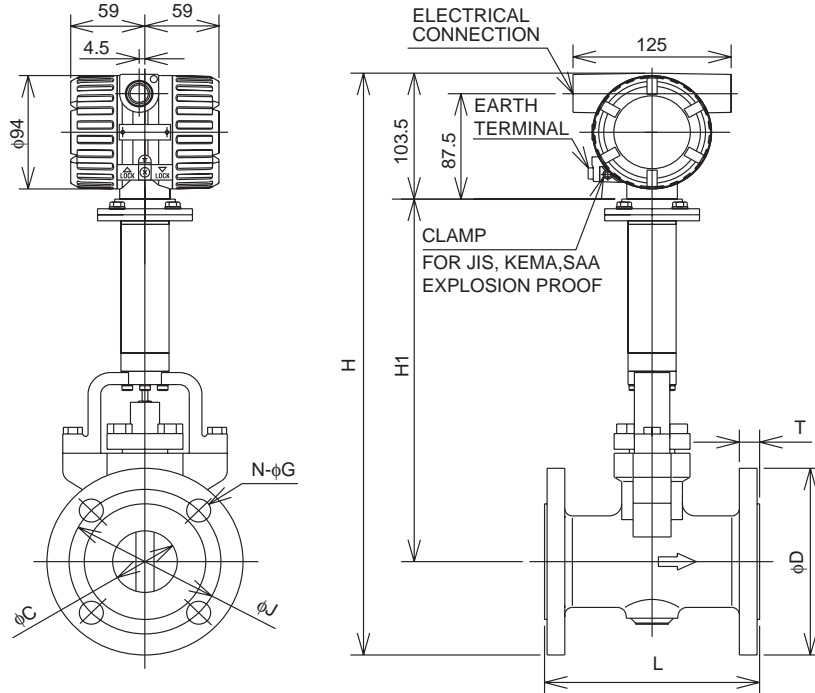
TYPE	Only for REMOTE															
CODE	DY080 (80mm) /LT, /HT							DY100 (100mm) /LT, /HT								
PROCESS CONNECTION	AJ1	AJ2	AJ4	AA1	AA2	AA4	AD1 -AD2	AD3 -AD4	AJ1	AJ2	AJ4	AA1	AA2	AA4	AD1 -AD2	AD3 -AD4
L	100							120								
B	40							50								
C	71							93.8								
D	127							157.2								
H	485							515								
H1	318							333								
E	57.4	61.2	65.1	(Note 1)	64.4	64.4	61.2	61.2	67	70.8	78.5	72.9	76.6	82.6	68.9	72.7
F	69.3	73.9	78.5	(Note 1)	77.7	77.7	73.9	73.9	80.8	85.5	94.7	88	92.5	99.7	83.1	87.8
G	17	21	21	(Note 1)	20	20	17	17	17	21	23	17	20	23	17	21
WEIGHT kg	9.8							13.2								

(Note 1) The hole is not provided.

F02.06-06.EPS

- High Process Temperature Version (/HT): 25mm up to 100mm
- Cryogenic Version (/LT): 15mm up to 100mm
- Flange type

Unit: mm



TYPE CODE	Only for REMOTE																					
PROCESS CONNECTION	DY015 (15mm) Only for /LT								DY025 (25mm) /LT, /HT													
L	BJ1	BJ2	BJ4	BA1	BA2	BA4	BA5	BD1 - BD4	BD5 - BD6	CA4	CA5	BJ1	BJ2	BJ4	BA1	BA2	BA4	BA5	BD1 - BD4	BD5 - BD6	CA4	CA5
C	130								150													
D	95	95	115	88.9	95.3	95.3	120.7	95	105	95.3	120.7	125	125	130	108	124	124	149.4	115	140	124	149.4
H	421	421	431	418	421	421	434	421	426	421	434	438	438	441	430	438	438	450	433	446	438	450
H1	14.6								25.7													
T	12	14	20	11.2	14.2	21	28.8	16	20	19.9	28.8	14	16	22	14.2	17.5	24	34.9	18	24	24	34.9
J	70	70	80	60.5	66.5	66.5	82.6	65	75	66.5	82.6	90	90	95	79.2	89	89	101.6	85	100	89	101.6
N	4								4													
G	15	15	19	15.7	15.7	15.7	22.4	14	14	15.7	22.4	19	19	19	15.7	19	19	25.4	14	18	19	25.4
WEIGHT kg	4.6	4.7	6.3	4.5	4.7	5.0	7.1	4.6	5.8	4.9	7.2	7.3	7.5	9.0	7.0	7.6	8.1	11.5	7.3	10.0	8.3	11.8

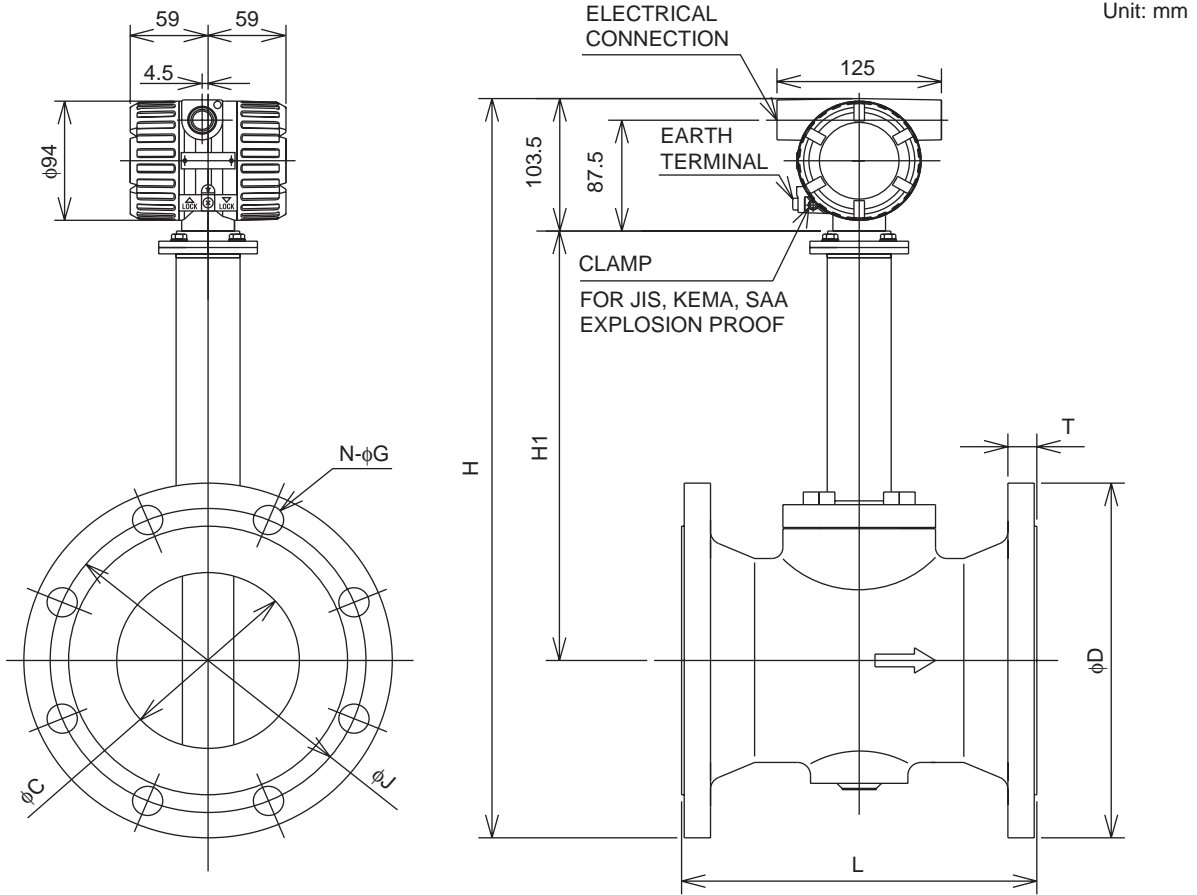
TYPE CODE	Only for REMOTE																						
PROCESS CONNECTION	DY040 (40mm) /LT, /HT								DY050 (50mm) /LT, /HT														
L	BJ1	BJ2	BJ4	BA1	BA2	BA4	BA5	BD1 - BD4	BD5 - BD6	CA4	CA5	BJ1	BJ2	BJ4	BA1	BA2	BA4	BA5	BD1 - BD4	BD5 - BD6	CA4	CA5	
C	150								170														
D	140	140	160	127	155.4	155.4	177.8	150	170	155.4	177.8	155	155	165	152.4	165.1	165.1	215.9	165	180	195	165.1	215.9
H	453	453	463	446	460	460	472	458	468	460	472	482	482	487	481	487	487	513	487	495	502	487	513
H1	39.7								51.1														
T	16	18	26	17.5	20.6	28.8	38.2	18	26	28.8	38.2	16	18	26	19.1	22.4	31.8	44.5	20	26	28	33.3	46
J	105	105	120	98.6	114.3	114.3	124	110	125	114.3	124	120	120	130	120.7	127	127	165.1	125	135	145	127	165.1
N	4								4														
G	19	19	23	15.7	22.4	22.4	28.4	18	22	22.4	28.4	19	19	19	19	19	19	25.4	18	22	26	19	25.4
WEIGHT kg	8.6	8.8	12.3	8.5	9.7	11.7	16.6	9.2	13.1	12.1	16.7	11.5	12.0	14.7	12.1	13.6	15.2	26.9	11.7	14.7	15.6	16.2	27.3

TYPE CODE	Only for REMOTE																									
PROCESS CONNECTION	DY080 (80mm) /LT, /HT								DY100 (100mm) /LT, /HT																	
L	BJ1	BJ2	BJ4	BA1	BA2	BA4	BA5	BD1 - BD2	BD3 - BD4	BD5	BD6	CA4	CA5	BJ1	BJ2	BJ4	BA1	BA2	BA4	BA5	BD1 - BD2	BD3 - BD4	BD5	BD6	CA4	CA5
C	200								250																	
D	185	200	210	190.5	209.6	209.6	241.3	200	200	215	230	209.6	241.3	210	225	250	228.6	254	273	292.1	220	235	250	265	273	292.1
H	514	522	527	517	527	527	542	522	522	529	537	527	542	542	549	562	552	564	573	583	547	554	562	569	573	583
H1	71								93.8																	
T	18	22	32	23.9	28.4	38.2	44.5	20	24	28	32	39.7	46	18	24	36	23.9	31.8	44.5	50.9	20	24	30	36	46	52.4
J	150	160	170	152.4	168.2	168	190.5	160	160	170	180	170	180	175	185	205	190.5	200.2	216	235	180	190	200	210	216	235
N	8	8	8	4	8	8	8	8	8	8	8	8	8	8												
G	19	23	23	19	22.4	22.4	25.4	18	18	22	26	22.4	25.4	19	23	25	19	22.4	25.4	31.8	18	22	26	30	25.4	31.8
WEIGHT kg	17.8	20.4	25.8	20.4	24.2	25.8	36.1	19.8	20.4	24.5	27.4	27.5	36.7	23.2	27.2	38.5	27.8	36.3	51.2	56.3	23.6	27.8	33.4	40.1	53.2	57.0

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■ High Process Temperature Version (/HT): 150mm up to 200mm

■ Flange type

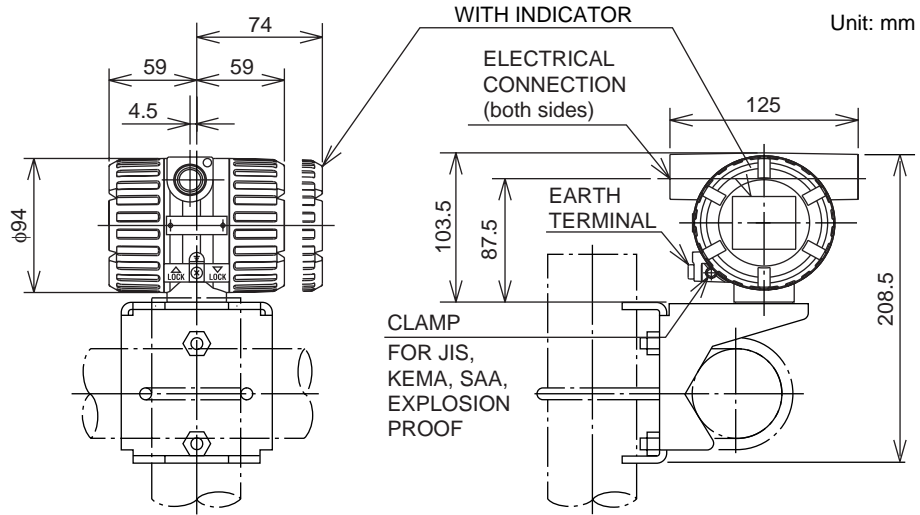


Unit: mm

TYPE	Only for REMOTE																											
CODE	DY150 (150mm) /HT												DY200 (200mm) /HT															
PROCESS CONNECTION	BJ1	BJ2	BJ4	BA1	BA2	BA4	BA5	BD1 - BD2	BD3 - BD4	BD5	BD6	CA4	CA5	BJ1	BJ2	BA1	BA2	BA4	BA5	BD1	BD2	BD3	BD4	CA4	CA5			
L	270						310	336	270				325	340	310						370	386	310				375	390
C	138.8												185.6															
D	280	305	355	279.4	317.5	356	381	285	300	345	355	356	381	330	350	342.9	381	419.1	469.9	340	340	360	375	419.1	469.9			
H	583	595	620	582	601	621	633	585	593	615	620	621	633	640	650	646	665	684	709	645	645	655	662	684	709			
H1	339												371															
T	22	28	44	25.4	36.6	54.4	62	22	28	36	44	55.7	63.6	22	30	28.4	41.1	62	69.9	24	24	30	34	63.6	71.4			
J	240	260	295	241.3	269.7	292	317.5	240	250	280	290	292	317.5	290	305	298.5	330.2	349.3	393.7	295	295	310	320	349.3	393.7			
N	8	12	12	8	12	12	12	8	8	8	12	12	12	12	12	8	12	12	12	8	12	12	12	12	12			
G	23	25	33	22.4	22.4	28.4	31.8	22	26	33	33	28.4	31.8	23	25	22.4	25.4	31.8	38.1	22	22	26	30	31.8	38.1			
WEIGHT kg	33.4	43.4	76.4	36.4	54.4	84.4	106	33.4	42.9	58.1	76.4	90	107	45.4	52.4	55.4	80.4	136	182	46.3	46.3	53.6	55.9	139	183			

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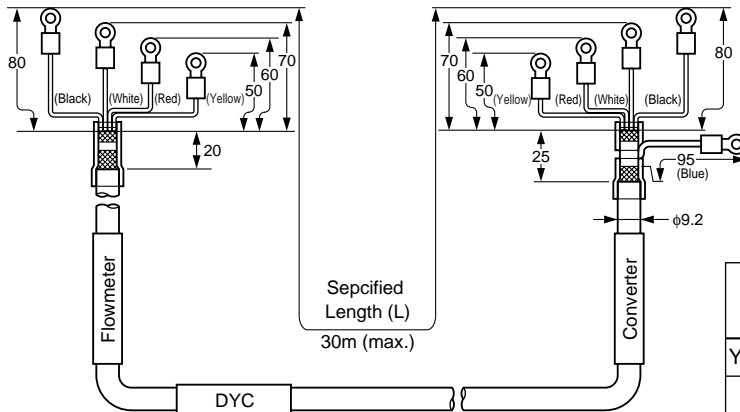
■ Remote Type Converter



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

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■ Signal Cable for Remote Type



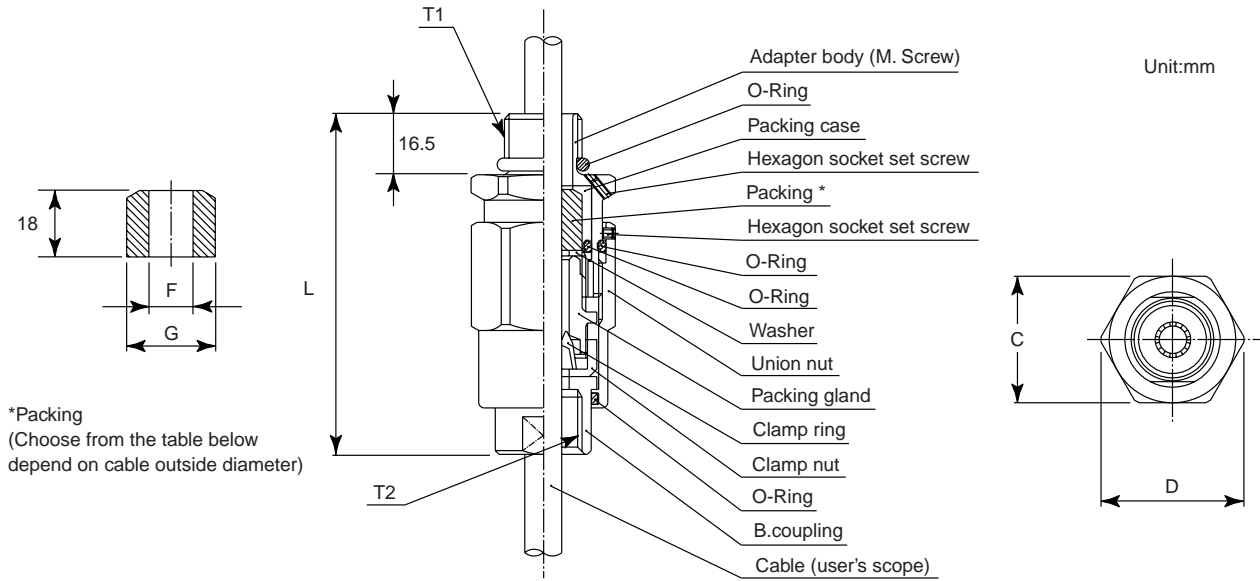
Cable Color and Terminal

Color	Terminal	
	Flow meter	Converter
Yellow ^(*)	T	T
Red	A	A
White	B	B
Black	\perp	C
Blue		\perp

(*) Only for /MV

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■ Flameproof Packing Adapter (Option code /G11,/G12)



*Packing
(Choose from the table below
depend on cable outside diameter)

Size					Cable outer diameter	Packing dimensions		Identification mark	Weight (kg)
T1	T2	C	D	L		F	G		
G 1/2	G 1/2	35	39	94.5	φ8 to φ10	φ10.0	φ20.0	16 8-10	0.26
					φ10 to φ12	φ12.0		16 10-12	

Fig50

==== OPERATING INSTRUCTIONS =====

Specify the following when ordering :

1. Model and suffix codes.
2. Flow conditions (Please fill out the order sheet "WS 1F6A0-01E")
 - a. Fluid name (in case of a mixed gas, fill out the gas composition).
 - b. Maximum scale reading (It can be set up to 32000), normal flow and minimum flow rates.
 - c. Maximum and normal operating temperatures.
 - d. Maximum and normal operating pressures.
 - e. Density at normal conditions.
 - f. Viscosity at normal conditions.
 - g. Deviation factor (if required for gas).
 - h. Output type (analog output, pulse output or simultaneous output)
 - i. Pulse rate
 - j. Totalized value rate
 - k. Nominal size
- l. Selection of temperature sensor function: only for option "/MV" (Temperature value indication / output, Mass flow calculation)

==== RELATED- INSTRUMENTS =====

- YFCT Flow Computing Totalizer See GS 1P1B1-E
 SDBT Distributor See GS 1B4T1-E
 See GS 1B4T2-E

==== RELATED MATERIAL =====

- How to fill in YEWFO Vortex Flowmeter. TI 1F2B4-01E
 YEWFO Vortex Flowmeter Sizing TI 1F2B4-02E
 YEWFO Vortex Flowmeter Guide Book TI 1F2B4-03E
 Model DY Vortex Flowmeter TI 1F6A0-01E
 YFCT Flow Computing Totalizer
 Operation and Parameter TI 1P1B1-03E
 YFCT Flow Computing Totalizer
 Auxiliary Data Entry Guide TI 1P1B1-11E