

Introduction

The electromagnetic flowmeter uses Faraday’s Law of electromagnetic induction to measure the process flow. The device consists of two units: a detector, through which the fluid to be measured flows and in which low-level signals proportional to flow rates are obtained; and a converter, which supplies excitation current to the detector, and amplifies the signals from the detector and then processes and converts the signals into the 4–20mA dc current signal or communication signal*1&2. Combined with a multi-functional converter LF620 (combined type) or LF622 (separate type) equipped with its original **Noise-Sentry** noise-suppression circuit and advanced algorithms. The GF630 has a very high tolerance to noise, giving the unit a very stable output even for slurry fluid measurement. IR (Infrared) switches enable the parameter setting of the converter without removing the cover. Flow direction can be set in either way and its unique 128 x 128 dot matrix LCD display allows the LCD to be rotated electronically to 90, 180, and 270 degrees without opening the cover. The terminal block on the LCD side makes it easy to wire in case of the combined type.

*1: HART protocol (Highway Addressable Remote Transducer) is a communication protocol for industrial sensors recommended by the HCF (HART Communication Foundation).

*2: Modbus is the communication protocol. Physical layer is RS485.

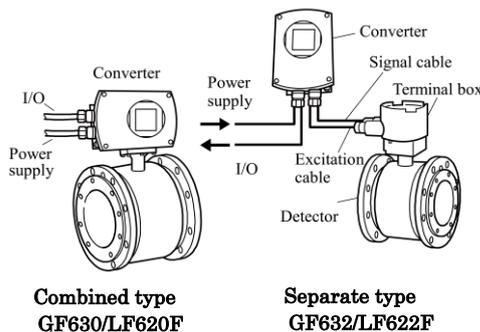


Figure 1. Configuration



GF630/LF620
GF630/LF620F

GF632

LF622
LF622F

Figure 2. GF630 Premium Value series Flowmeters



Certified to NSF/ANSI/CAN 61

For certified products, please see Table 5 & 6

Cable gland openings have only dust caps which are not water tight. Water tight status is not met until properly wired and connected.

Specifications

Overall Specifications

Measurement range in terms of flow velocity:

1.0 ft/s to 32.8 ft/s (0.3 m/s to 10 m/s).

0.3 ft/s to 1.0 ft/s (0.1 m/s to 0.3 m/s)

the range is available optionally for meter size 1/2" to 18" (15 to 450 mm).

Accuracy:

< 1/2" to 18" (15 mm to 450 mm) >

±0.2 % of Rate *1.

- *1 This pulse output error result is established under standard operating conditions at Toshiba's flow calibration facility, Fuchu Japan (NIST Traceable).
- *1 Individual meter measurement error may vary up to ±0.5% of Rate at 1.64 ft/s (0.5m/s) or more. Or it may vary up to ±0.3% of rate ±0.039 inch/s (1mm/s) at 1.64 ft/s (0.5m/s) or less.
- *1 Current output: plus ± 8µA (0.05% of span).
- *1 Refer to individual calibration data for each individual meter's measurement error.

< 20" and 24" (500 mm and 600 mm) >

±0.3 % of Rate *2.

- *2 This pulse output error result is established under standard operating conditions at Toshiba's flow calibration facility, Fuchu Japan.
- *2 Individual meter measurement error may vary up to ±0.5% of Rate at 3.28 ft/s (1.0 m/s) or more. Or it may vary up to ±0.3% of rate ±0.079 inch/s (2 mm/s) at 3.28 ft/s (1.0 m/s) or less.
- *2 Current output: plus ± 8µA (0.05% of span).
- *2 Refer to individual calibration data for each individual meter's measurement error.

Fluid conductivity: 3µS/cm minimum

Fluid temperature:

- 4 to 212 °F (-20 to +100 °C): FEP lining
- 4 to 248 °F (-20 to +120 °C): PTFE lining
- 4 to 104 °F (-20 to + 40 °C): Polyurethane lining
- * Consult Toshiba before using the meter at the high temperature, because the product lifetime may be shortened.

Ambient temperature: - 4 to 140 °F (-20 to +60 °C)

Structure:

- Standard** — IP 67 and NEMA 4X Watertight
- Option** — IP68 and NEMA 6P Submersible type allow for accidental submergence up to 15m for 48 hours. Polyurethane-lined detector tubes are NEMA 6P/IP68 compliant when a TOSHIBA approved Potting kit is properly Field or Factory installed.

NOTE: FEP/PTFE lining detector shall become valid for the IP68/NEMA 6P function after being connected to the pipeline. It needs to avoid being put under the rain or water by itself before connecting.

Power consumption:

- AC100-240:MAX12W(27VA)
- DC24: MAX16W
- With communication function

Approved hazardous location certifications:

- Model: GF630/LF620F and GF632/LF622F
- cFMus Nonincendive for use in hazardous (classified) locations: Class I, II, III, Division 2, Groups A-G

Detector and converter combination:

- GF630/LF620F: Combined type with Ex approval of Class I, II, III, Division 2 (cFMus).
- GF632/LF622F: Separate type with Ex approval of Class I, II, III, Division 2 (cFMus).

Drinking water approvals:

NSF/ANSI standard 61

For certified products, please see Table 1 5 & 6

Model GF630 and GF632 Detector

Mounting style:

- Flange connection type,
- 18"(450mm) or less: ISO13359 for direct replacement of existing ISO13359 magmeters.
- More than 20"(500mm): Toshiba original meter length

Fluid pressure:

0 psi or 0 bar (0 Pa) to the nominal pressure of the connection flange

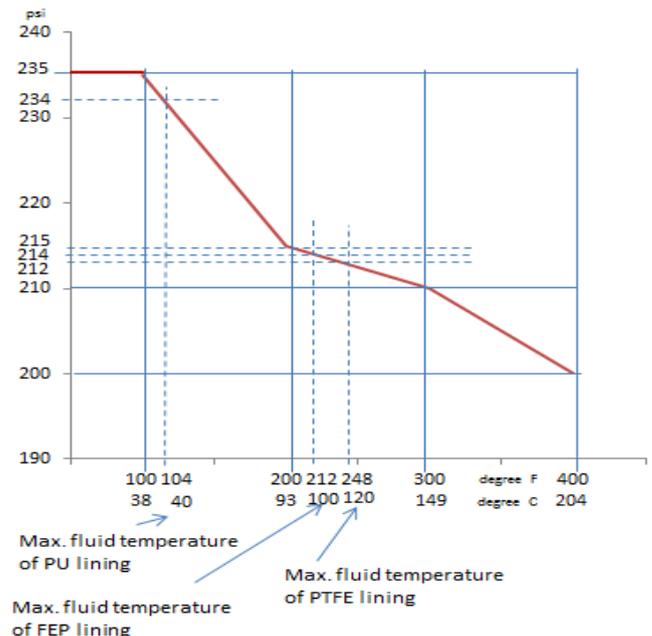


Figure 2 Nominal pressure and fluid temp

Connection flange standards:

- ASME B 16.5 class 150 : 1/2" to 24" (15 to 600 mm)
- JIS B 2220 10K: 1/2" to 24" (15 to 600 mm)

Principal materials:

- Case** — carbon steel
- Flange material** — carbon steel
- Linings** —
 - FEP with NSF approval: Meter sizes 1/2" to 10" (15 to 250mm)
 - PTFE with NSF approval: Meter sizes 12" to 24" (300 to 600mm)

Polyurethane (PU) without NSF approval:
 Meter sizes 1/2" to 3" (15 to 80mm)
 Polyurethane (NPU) with NSF approval:
 Meter sizes 4" to 18" (100 to 450mm)
 For NSF-certified products, please see Table 1 5 & 6.

Electrodes —

Type - Super smooth, polished with self-cleaning finish, and non-stick shape.
 316L stainless steel (for PU lining).
 Hastelloy C equivalent (for FEP, PTFE lining).

Measuring tube material — 304 stainless steel

Terminal box — Aluminum alloy (for separate type)

Grounding ring —

PU, FEP lining:
 None (std.), 316 stainless steel (opt.)
 PTFE lining: 316 stainless steel (std.)

Coating: Corrosion-resistant resin coating (std.), gray colored

Dimensions and weights: See Figure 3 and 4.

Cable connection port: for separate type detectors.

Applicable diameter —

0.433 to 0.512 inch (11 to 13mm)

Cable glands —

GF632 with cFMus Approval:
 Not provided, 1/2-14NPT male threads are required.

■ Model LF620 and LF622 converters

Input signals

Analog signal — the voltage signal from detector, proportional to process flow rate (for LF622 separate type converter).

Digital input DI

Signal type: 20 to 30Vdc voltage signal
 Input resistance: 10k Ω
 Number of inputs: one point

Note: DI cannot be used with the Modbus communication.

DI function — One of the following functions can be assigned to the optional DI signal.

- **Range switching** — Selects either the higher or lower range in the unidirectional or bidirectional 2-range setting.
- **Totalizer control** — 'Starts/Stops' or 'Resets/Starts' operation in the built-in totalizer.
- **Fixed-value outputs** — Outputs fixed-values for current and pulse outputs.
- **Zero adjustment** — Executes zero adjustment

(on-stream at zero flow rate).

Output signals

Current output:

4–20 mAdc (load resistance 0 to 750 Ω)

Digital outputs — Two points are available as follows.

Digital output DO1:

Output type: Transistor open collector
 Number of outputs: One point
 Output capacity: 30Vdc, 200mA maximum

Note: DO1 cannot be used if Modbus communication connection is 3 lines.
 (Refer table 8 for details)

Digital output DO2:

Output type:
 Solid-state relay output (non-polarity)
 Number of outputs: One point
 Output capacity: 150Vdc, 150mA maximum
 or 150Vac (peak to peak), 100mA maximum

Note: DO2 cannot be used with the Modbus communication. (Refer table 8 for details)

DO1 and DO2 functions — One of the following functions can be assigned to DO1 and/or DO2.

• Pulse output (available only for DO1,DO2)

Pulse rate: Max 10kHz (10,000pps)(DO1)
 Max 100Hz (100pps) (DO2)
 (Over 1kpps, auto-setting)

Pulse width: 0.3 to 500ms (but it is 40% or less of the full-scale cycle.)

Note: The same and simultaneous pulse is not available between DO1 and DO2.

• Multi-range selection outputs (Note 1)

• High, High high, Low, and/or Low low alarm outputs (Note 2)

• Empty pipe alarm output (Note 2)

• Preset count output

• Converter failure alarm output

Note 1: Two outputs (DO1 and DO2) are needed for 4-range switching and forward/reverse 2-range switching.

Note 2: Normal Open (default set) or Normal Close is selected for alarm outputs when programming.

When power failure occurs, unit will be fault to Normal Open.

Communications output:

- **HART (std.)** — Digital signal is superimposed on 4–20mAdc current signal as follows:

Conforms to HART protocol

Load resistance: 240 to 750 Ω

Load capacitance: 0.25 μ F maximum

Load inductance: 4mH maximum

•**MODBUS (opt.)**

Physical layer : RS485

Protocol : Modbus

Mode : RTU

Baudrate : 4800, 9600, 19200bps

Data length : 8bit

Parity bit : None, Odd, Even

Stop bit : 1bit, 2bit

Error check : CRC-16

Max. station number : 32(with Master device)

Max. cable length : 1.2km (Note)

Note: This length is specification of 3 line connection.

LCD display:

Full dot-matrix 128×128 dot LCD display (backlight provided)

A parameter change will rotate the display.

Parameter settings — Parameters can be set as follows:

• **IR Switches:** Three key switches are provided to set configuration parameters.

• **Digital communication:** HART, Modbus is needed to set parameters.

Counter control: If the digital input is set for counter control, counter control is available for the integrated value and the pulse output.

Zero adjustment: Zero point adjustment can be started by pressing the switch in the converter.

Damping: 0.5, 1 to 60 seconds (selectable in 1 second increments)

“Converter Field re-verification” Mag-Prover —

Toshiba’s Zero span verification tool allows unit to be re-verified using an internal software program. The meter’s excitation current is a NIST traceable parameter. This parameter can be verified in the field through the converter to verify the meter is still within factory calibration. (For more information contact Toshiba International Corp.)

Conditions when power fails:

Parameter setting values are stored in non-volatile memory and the values will be restored when the power returns to normal condition. The outputs and display will remain as follows when power fails.

- Current output: 0mAdc
- Digital output: OFF
- LCD display: No display
- HART: No communication

- Modbus: No communication

Power supply:

One of the following can be selected:

100 to 240Vac (allowable voltage range: 80 to 264Vac 50/60Hz)

24Vdc (allowable voltage range: 18 to 36Vdc) or

110Vdc (allowable voltage range: 90 to 130Vdc)

Surge protection:

Arresters are installed in the power supply, **digital input/outputs circuit**, and current signal output circuit to help protect the meter from lightning and improve personnel safety.

Confirmed by the following tests

IEC 61000-4-2 Electrostatic discharge immunity test

IEC 61000-4- Electrical first transient/burst immunity test

IEC 61000-4-5 Surge immunity test

Case: Aluminum alloy (equal to IP 67)

Coating: Acrylic resin-baked coating, pearl-gray colored

Cable connection port:

Cable glands —

LF620F and LF622F with cFMus Approval:

Not provided, 1/2–14NPT male threads are required.

Vibration resistance:

No resonance to the following levels of vibration:

- 10 to 150Hz with acceleration of 9.8m/s²
- Vibration of 30Hz with 29.4 m/s² in 4h in each direction will not cause any defect to unit.

Note: Avoid using the flowmeter in an environment with constant vibration.

Converter LF622 Dimensions and Weights:

See Figure 5 (for separate type)

MTBF:

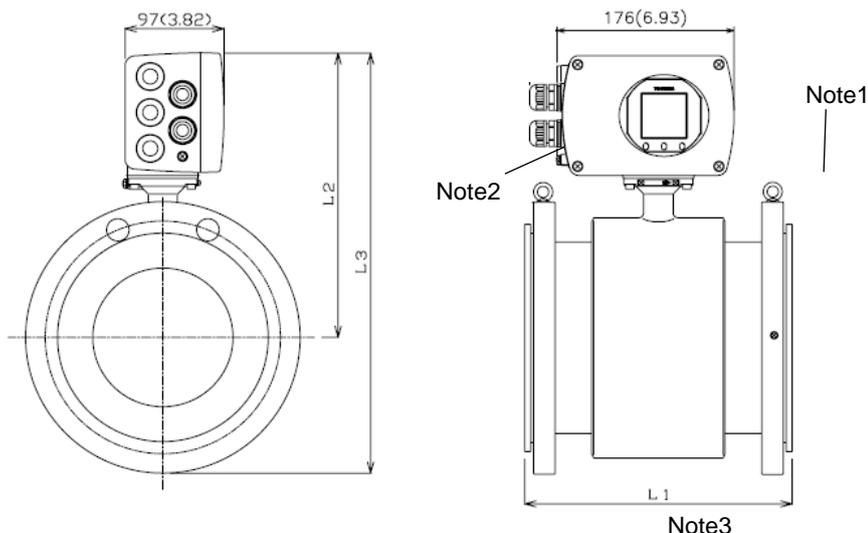
Converter: 220,000 hours (25 years) at 77 °F (25 °C) based on strict military specification MIL-HDBK-217F.

Detector: 350,000 hours (40 years) at 77 °F (25 °C) based on strict military specification MIL-HDBK-217F.

Installation

■ Dimensions

Combined type GF630/LF620F



Note1: Eye bolts are provided at the flange for flowmeters sized 8" (200mm) or above.

Note2: This drawing is the image when LF620 set with cable gland.

Cable glands are not provided for GF630/LF620F cFMus approved type. Refer to the part Cable connection port at detector.

Note3: L1 of PTFE lining contains the thickness of grounding rings.

Note4: The weight of PTFE lining includes the weight of grounding rings.

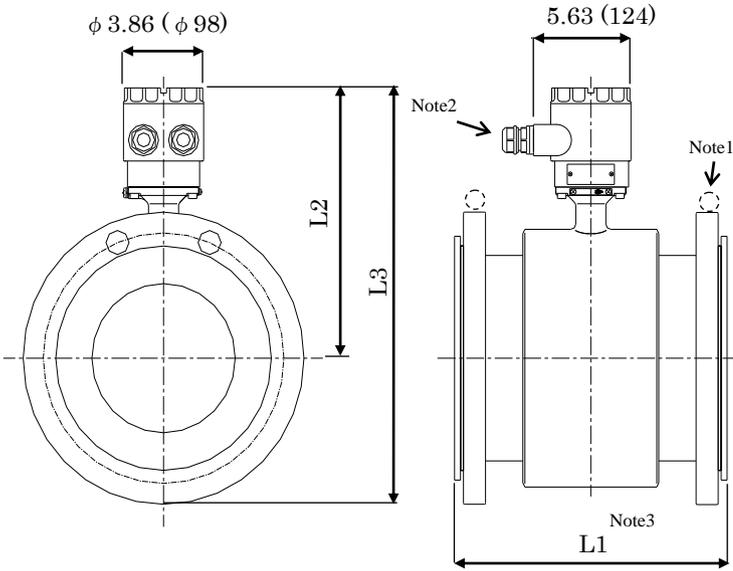
Note5: 1 inch = 25.4mm

Unit: inch (mm)

Size		L1		L2		L3		No. of bolts	Weight approx.					
inch	mm	inch	mm	inch	mm	inch	mm		FEP		PTFE		PU	
									lbs	kg	lbs	kg	lbs	kg
1/2	15	8.11	200	8.06	220	9.93	268	4	16	7			16	7
1	25	8.11	200	8.46	230	10.92	293	4	18	8			18	8
1-1/4	32	8.11	200	8.65	235	11.31	303	4	20	10			20	10
1-1/2	40	8.11	200	8.85	240	11.61	310	4	23	11			23	11
2	50	8.11	200	9.24	250	12.30	328	4	29	12			29	12
2-1/2	65	8.11	200	9.80	263	13.20	350	4	34	15			34	15
3	80	8.11	200	9.93	268	13.57	360	4	42	16			42	16
4	100	10.08	250	10.37	279	14.50	384	8	56	23			56	23
5	125	10.08	250	11.15	299	16.07	424	8	71	29			71	29
6	150	12.05	300	11.74	314	17.26	454	8	84	34			84	34
8	200	14.02	350	12.73	339	19.22	504	8	128	48			128	48
10	250	17.95	450	13.52	359	21.39	559	12	188	70			188	70
12	300	19.69	500	14.50	384	23.26	606	12			292	101	274	93
14	350	21.65	550	15.39	406	25.03	651	12			349	137	327	127
16	400	23.62	600	16.49	434	27.51	714	16			430	149	402	136
18	450	23.62	600	17.35	456	29.56	766	16			468	468		
20	500	23.62	600	18.34	481	31.63	819	20			538	538		
24	600	23.62	600	20.50	536	36.15	934	20			741	741		

**Figure 3. GF630/LF620F combined type flowmeters
Meter sizes 1/2" (15mm) to 24" (600mm)**

Separate type GF632/LF622 and GF632/LF622F



Note1: Eye bolts are provided at the flange for flowmeters sized 8" (200mm) or above.

Note2: This drawing is the image when LF620 set with cable gland.

Cable glands are not provided for GF632/LF622F cFMus approved type. Refer to the part Cable connection port at detector.

Note3: L1 of PTFE lining contains the thickness of grounding rings.

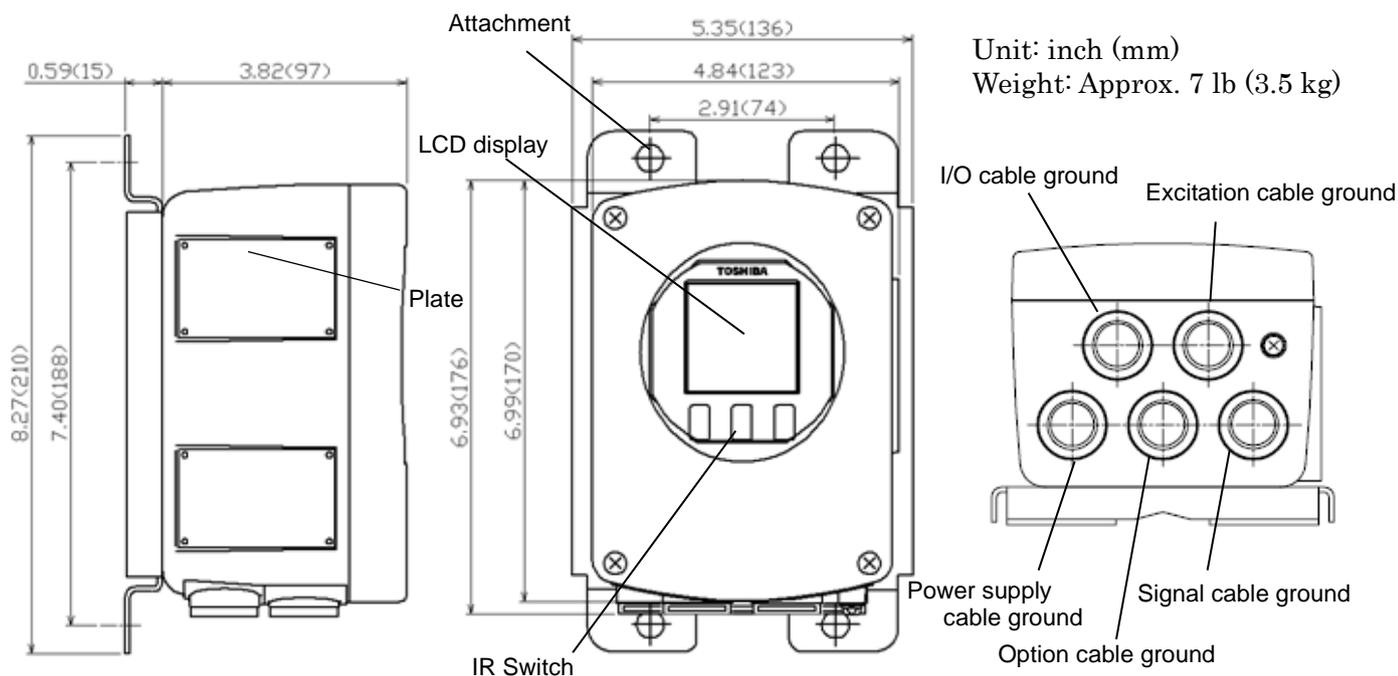
Note4: The weight of PTFE lining includes the weight of grounding rings.

Note5: 1 inch = 25.4mm

Unit: inch (mm)

Size		L1		L2		L3		No. of bolts	Weight approx.					
inch	mm	inch	mm	inch	mm	inch	mm		FEP		PTFE		PU	
								lbs	kg	lbs	kg	lbs	kg	
1/2	15	8.11	200	6.77	172	8.64	220	4	12	5			12	5
1	25	8.11	200	7.17	182	9.63	245	4	14	6			14	6
1-1/4	32	8.11	200	7.36	187	10.02	255	4	16	8			16	8
1-1/2	40	8.11	200	7.56	192	10.31	262	4	18	9			18	9
2	50	8.11	200	7.95	202	11.00	280	4	25	10			25	10
2-1/2	65	8.11	200	8.44	215	11.89	302	4	29	13			29	13
3	80	8.11	200	8.64	220	12.28	312	4	38	14			38	14
4	100	10.08	250	9.07	231	13.21	336	8	51	21			51	21
5	125	10.08	250	9.86	251	14.78	376	8	67	27			67	27
6	150	12.05	300	10.45	266	15.96	406	8	80	32			80	32
8	200	14.02	350	11.44	291	17.93	456	8	124	46			124	46
10	250	17.95	450	12.22	311	20.10	511	12	183	68			183	68
12	300	19.69	500	13.21	336	21.97	558	12			287	99	269	91
14	350	21.65	550	14.09	358	23.74	603	12			344	135	322	125
16	400	23.62	600	15.20	386	26.22	667	16			426	147	397	134
18	450	23.62	600	16.06	408	28.27	718	16			463	169		
20	500	23.62	600	17.05	433	30.33	771	20			534	183		
24	600	23.62	600	19.21	488	34.86	886	20			737	251		

**Figure 4. Separate type detectors GF632
Meter sizes 1/2" (15mm) to 24" (600mm)**

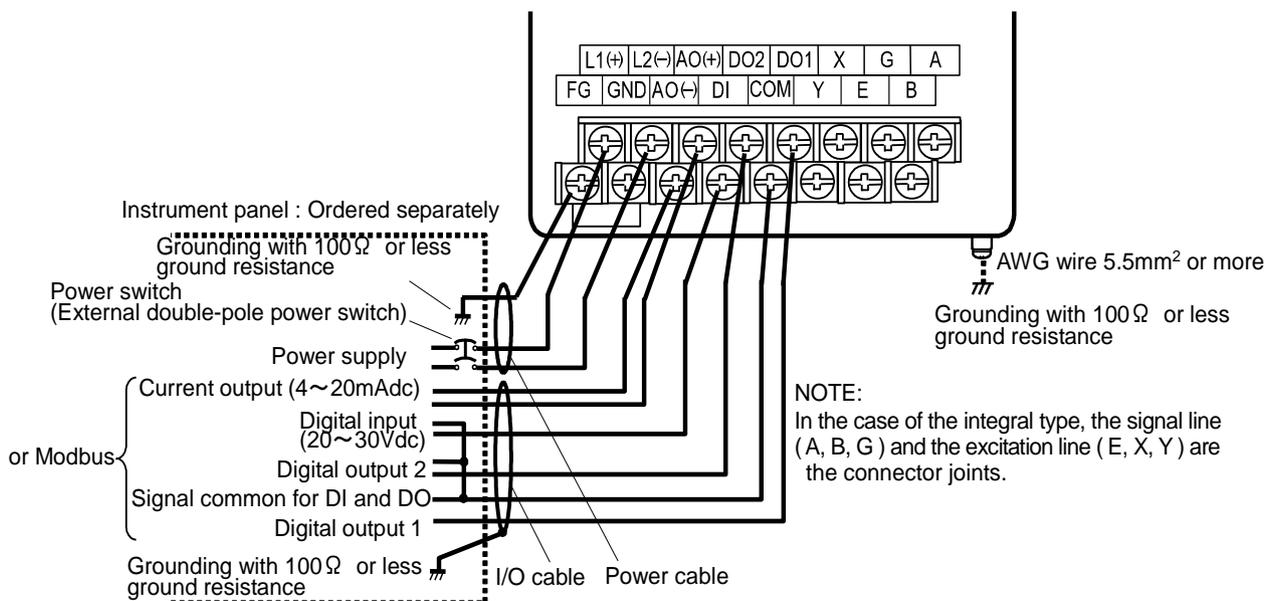


Note: Cable glands are not provided for LF622F cFMus approved type. Refer to the part Cable connection port at converter.
 Note: 1 inch = 25.4 mm

Figure 5. Separate type converter LF622F

External Connections

Combined type GF630/LF620F flowmeters



***1** Locate an external double-pole power switch on the power line near the flowmeter within easy reach of operation. Use the appropriate switch rating as shown below:
 Switch rating: 250Vac, 6A or more
 In rush current: 15A or more

Figure 6. Combined type GF630/LF620 and GF630/LF620F flowmeters Wiring Diagram

Separate type GF632/LF622F flowmeters

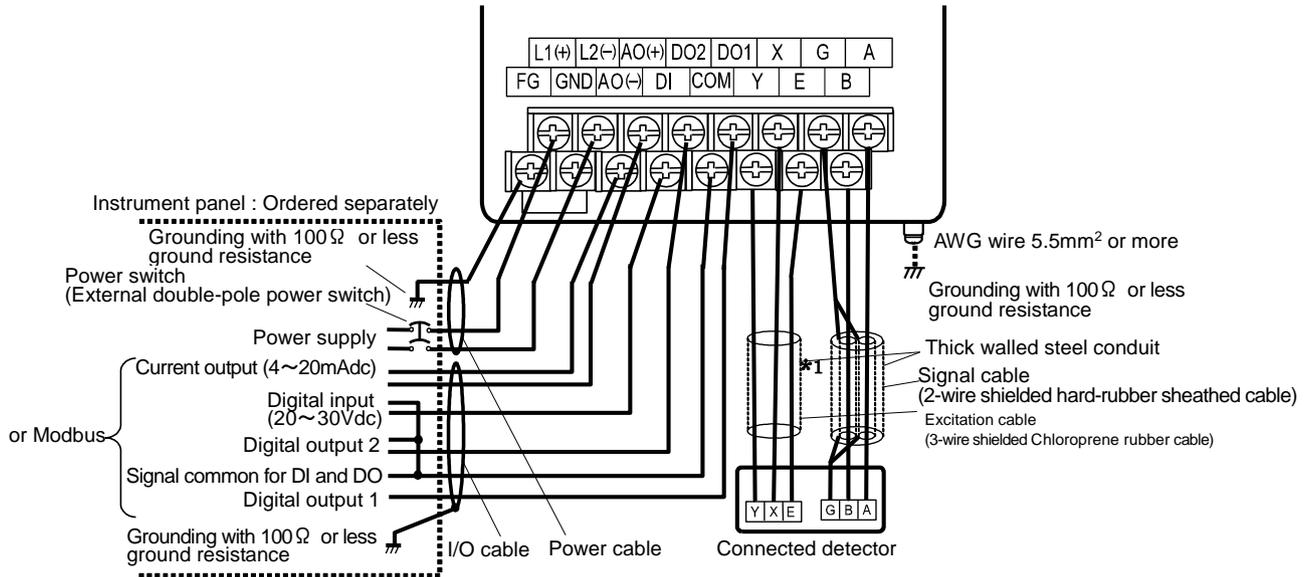


Figure 7. Separate GF632/LF622F type Converter Wiring Diagram

Table 1. LF620F and LF622F Converters Signal Table

Symbol	Description	Cable
L1 (+)	Power supply	Power cable
L2 (-)		
GND	Ground (for arrester)	
FG	Frame ground	
DI	Digital Input (20~30Vdc)	I/O cable
DO1	Digital Output 1	
DO2	Digital Output 2	
COM	Signal Common for DI, DO1, DO2	
+	Current Output (4~20mA dc)	
-		
X	Excitation Output	Excitation cable (for LF622F only)
Y		
E		
A	Signal Input	Signal cable (for LF622F only)
B		
G		
T+	Modbus(+)	Twisted-pair polyethylene insulated vinyl sheath cable (JKEV,AWG24(0.2mm ²))
T-	Modbus(-)	
TG	Modbus(GND)	

Note: Symbol of the terminal is changed as follows for Modbus.

DO2 → T+, DI → T-, COM → TG

■ Wiring Precautions

- (1) Explosion-proof type flowmeters are not provided with cable glands.
Refer to the part Cable connection port at detector and converter.
- (2) Connect the grounding wire (IV wire 5.5mm² or more) to a good earth ground (100Ω or less ground resistance). Make the wire as short as possible. Do not use a common ground shared with other equipment where earth current may flow. Independent earth ground is recommended.
- (3) The allowable cable lengths between the detector and converter for the separate type flowmeter depend on the electrical conductivity of the object fluid. See Figure 8.
- (4) DO1, DO2, and DI use the same common terminal (COM). This COM can not connect to other equipments which have their own ground terminal. (Power supply for connecting to DI or DO, etc...) Need to wire separately.

■ Wiring Precautions (Modbus)

- (1) For wiring path, avoid places near electrical equipment that may cause electromagnetic induction or electrostatic induction interference (such as a motor, transformer and wireless transmitter).
- (2) The electromagnetic flowmeter is not equipped with terminating resistors. Use the terminating resistor unit for Modbus or junction box, if necessary.
- (3) Only one Modbus cable goes through a cable gland of the Electromagnetic Flowmeter. Use the junction box at system configuration.
- (4) Install a terminator to flowmeter that connected to the end of Modbus network.

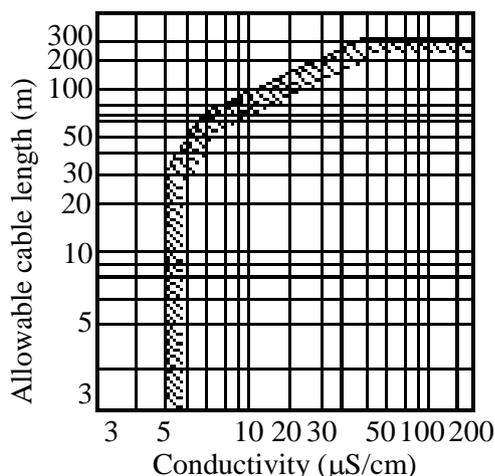


Figure 8. Electrical Conductivity and Cable Length

■ Meter Size

To select the meter size:

See Table 2 to 3 and find meter sizes within the velocity of 0.3 to 32.8 ft/s (0.1 to 10m/s) for a specified full-scale (measuring range high limit) flow. Select one that has its full-scale velocity between 3.0 and 10 ft/s (1 and 3m/s).

Note: Make sure the full-scale flow rate used for the final planning stage stays within 32.8 ft/s (10m/s) in terms of flow velocity.

Table 2. Flow Rate and Flow velocity

(English unit)

Unit: gal/min

Size (inch)	Flow rate				
	0.328 ft/s	0.98 ft/s	3.0ft/s	10 ft/s	32.8 ft/s
1/2'	0.2801	0.8403	2.561	8.532	28.01
1	0.7781	2.334	7.115	23.72	77.81
1 ¼	1.275	3.824	11.66	38.86	127.5
1 ½	1.992	5.975	18.21	60.71	199.2
2	3.112	9.337	28.46	94.86	311.2
2 ½	5.260	15.78	48.09	160.3	526.0
3	7.967	23.90	72.85	242.8	796.7
4	12.45	37.35	113.8	379.4	1,245
5	19.45	58.35	177.9	592.9	1,945
6	28.01	84.03	256.1	853.8	2,801
8	49.80	149.4	455.3	1,518	4,980
10	77.81	233.4	711.5	2,372	7,781
12	112.0	336.1	1,025	3,415	11,200
14	152.5	457.5	1,394	4,648	15,200
16	199.2	597.5	1,821	6,071	19,920
18	252.1	756.3	2,305	7,684	25,210
20	—	933.7	2,846	9,486	31,120
24	—	1,344	4,098	13,660	44,820

Table 3. Flow Rate and Flow velocity (SI unit)

Unit: m³/h

Size (mm)	Flow rate				
	0.1 m/s	0.3 m/s	1.0 m/s	3.0 m/s	10 m/s
15	0.06362	0.1908	0.6361	1.908	6.361
25	0.1767	0.5301	1.767	5.301	17.67
32	0.2895	0.8686	2.895	8.686	28.95
40	0.4523	1.357	4.523	13.57	45.23
50	0.7067	2.120	7.067	21.20	70.67
65	1.195	3.583	11.95	35.83	119.5
80	1.809	5.428	18.09	54.28	180.9
100	2.827	8.482	28.27	84.82	282.7
125	4.417	13.25	44.17	132.5	441.7
150	6.361	19.08	63.61	190.8	636.1
200	11.31	33.93	113.1	229.3	1,131
250	17.67	53.01	176.7	530.1	1,767
300	25.45	76.34	254.5	763.4	2,545
350	34.64	103.9	346.4	1,039	3,464
400	45.23	135.7	452.3	1,357	4,523
450	57.25	171.7	572.5	1,717	5,725
500	—	212.1	706.9	2,121	7,069
600	—	305.4	1,018	3,054	10,180

■ Piping Precautions

- (1) Design piping so that the flowmeter detector pipe is always filled with the fluid being measured, whether the fluid is flowing or not.
- (2) The detector has no adjustable piping mechanism. Install an adjustable short pipe where needed.
- (3) The required straight pipe length should comply with the requirements as follows.
- (4) Be sure to ground the flowmeter according to the flow meter instruction manual.

Required straight pipe length

Upstream side	When using 90-degree bend, tee, diffuser or fully opened valve	$L \geq 5D$
	When using other types of valves	$L \geq 10D$
Downstream side	When no valve plate protrudes into the detector pipe	$L \geq 0$

L: Required straight pipe length, D: Meter size

■ Piping materials (to be ordered separately)

Mating flanges:

The flowmeter must be mounted with its detector pipe connected between the flanges in the pipeline. If no flanges are used where the flowmeter is to be mounted, mating flanges are required.

Adjustable short pipe:

When both the upstream and downstream pipe sections cannot be adjusted laterally along the pipeline, an adjustable short pipe may be required.

Reducers:

When the flowmeter with its Meter size smaller than that of the pipeline should be installed, reducers are required on both ends of the flowmeter detector.

Reducers with pipe extensions:

Reducers with adjustable piping mechanism.

■ About establishment environment

Do not store or install the flowmeter :

- Where there is direct sunlight.
- Where excessive vibration or mechanical shock occurs.
- Where high temperature or high humidity conditions exist.
- Where corrosive atmospheres exist.
- Places that can be submerged under water.
- Where there is a sloped floor. To put the flowmeter temporarily on the floor, place it carefully with something, such as a block, to support it so that the flowmeter will not topple over.

In areas like the following, there may be the case that infrared switches do not function correctly. (If these are unavoidable, use an appropriate cover.)

- (1) Where unit (operation panel) is exposed to direct sunlight, reflection of light onto window pane and diffused light reflection.
- (2) Where smoke and steam may occur.
- (3) Where exposed to direct snow, ice or mud.

Ordering Information

1. When ordering the GF630Teries flowmeters, refer to Tables 5 to 7 (Type Specification Codes). An entry must be made for each of the columns in each of these tables.
2. Fluid characteristics:
 - (1) Type of fluid to be measured and its characteristics
 - (2) Fluid temperature
 - (3) Fluid pressure
 - (4) Electrical conductivity of the fluid
3. Measuring range
4. I/O function setting
5. Ordering scope:
 - Flow calibration data: (required or not)
6. Other items
 - Specifications other than standard items

Consult a Toshiba representative when choosing materials for lining, electrodes, and grounding rings.

**Toshiba International Corp. (Houston) stocks
Hazardous location certification type
flowmeters as standard inventory.**

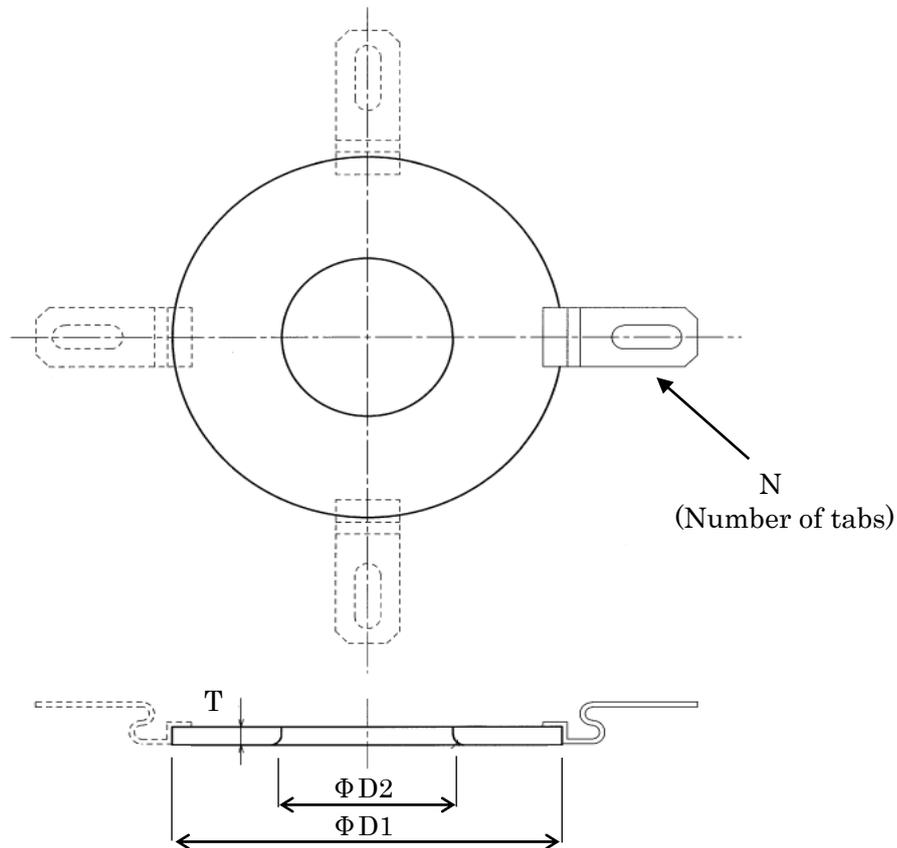
Ordering Grounding rings

When you purchase the grounding ring, refer to Table 4.

Note: The grounding ring ordering code includes 2-metal grounding rings.

Table 4. Ordering code of the Grounding ring

Meter size		ASME B 16.5 class 150 flange
inch	mm	
1/2	15	GFR01
1	25	GFR02
1-1/4	32	GFR03
1-1/2	40	GFR04
2	50	GFR05
2-1/2	65	GFR06
3	80	GFR08
4	100	GFR10
5	125	GFR12
6	150	GFR15
8	200	GFR20
10	250	GFR25
12	300	GFR30
14	350	GFR35
16	400	GFR40
18	450	GFR45



Meter size		ΦD1		ΦD2		T		N
inch	mm	inch	mm	inch	mm	inch	mm	N
1/2	15	1.65	42	0.63	16	0.16	3	2
1	25	2.36	60	1.06	27	0.16	3	2
1-1/4	32	2.76	70	1.34	34	0.16	3	2
1-1/2	40	3.03	77	1.65	42	0.12	3	2
2	50	3.74	95	2.05	52	0.12	3	2
2-1-2	65	4.69	115	2.44	67	0.12	3	2
3	80	5.08	125	3.03	82	0.12	3	2
4	100	5.91	150	4.09	104	0.12	3	2
5	125	7.28	185	5.08	129	0.12	3	2
6	150	8.46	215	6.06	154	0.12	3	2
8	200	10.43	265	8.03	204	0.12	3	4
10	250	13.11	325	10.04	255	0.12	3	4
12	300	15.59	372	12.01	305	0.12	3	4
14	350	17.32	416	13.11	333	0.12	3	4
16	400	19.8	479	15.12	384	0.12	3	4
18	450	21.34	534	17.05	433	0.12	3	4

Figure 9. Grounding ring Meter sizes 1/2" (15mm) to 18" (450mm)

Table 5. Specification Code (Flange type detector GF630 (Combined type))

Model					Specification Code										Description	Lining		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	PU		FEP	PTFE	
G	F	6	3	0											Combined (Integral) type	●	●	●
															Meter size			
					0	1									1/2" (15 mm)	●	●	-
					0	2									1" (25 mm)	●	●	-
					0	3									1-1/4" (32 mm)	●	●	-
					0	4									1-1/2" (40 mm)	●	●	-
					0	5									2" (50 mm)	●	●	-
					0	6									2-1/2" (65 mm)	●	●	-
					0	8									3" (80 mm)	●	●	-
					1	0									4" (100 mm)	●	●	-
					1	2									5" (125 mm)	●	●	-
					1	5									6" (150 mm)	●	●	-
					2	0									8" (200 mm)	●	●	-
					2	5									10" (250 mm)	●	●	-
					3	0									12" (300 mm)	●	-	●
					3	5									14" (350 mm)	●	-	●
					4	0									16" (400 mm)	●	-	●
					4	5									18" (450 mm)	●	-	●
					5	0									20" (500 mm)	-	-	●
					6	0									24" (600 mm)	-	-	●
							A								Connection flange standard			
							J								ASME B 16.5 class 150	●	●	●
															JIS B 2220 10K	●	●	●
															Lining (Note 4)			
							N								Polyurethane(PU) with NSF approval (Note 2&3)	●	-	-
							U								Polyurethane(PU) (Note 2&3)	●	-	-
							F								FEP (Note 1&2)	-	●	-
							E								FEP with NSF approval (Note 1&2)	-	●	-
							P								PTFE (Note1 & 2)	-	-	●
							T								PTFE with NSF approval (Note1&2)	-	-	●
															Electrode Material			
							B								316L stainless steel	●	-	-
							F								Hastelloy C (Equivalent)	-	●	●
															Flow and calibration velocity range			
															1.0 to 32.8 ft/s (standard range calibration)	●	●	●
															PU coating pearl-gray colored	●	●	●
															*Direct burial detector coating			
															Contact Toshiba International Corp. (Houston)			

Code explanation... ●: Standard ○: Option —: Not available

Note1: FEP lined 1/2" (15mm) to 10" (250mm) & PTFE lined, 12" (300mm) to 24" (600mm) meters are NSF approved. PTFE Lined detectors are provided with 316 stainless steel grounding rings.

Note2: Potting kit is available for IP68/NEMA6P submersible option when selecting separate (remote) type PU lining. Potting kit is **Not** available for Combined or Remote GF Teflon lined meters.

Note3: Non-NSF Polyurethane (PU) sizes 1/2" (15mm) to 3" (80mm), NSF approved Polyurethane 4" (100mm) to 18" (450mm).

Note 4: In case of JIS10K flange, only 'U', 'F' or 'P' is available to be selected at 9th code.

Table 6. Specification Code (Flange type detector GF632 (Separate type))

Model					Specification Code									Description	Lining			
1	2	3	4	5	6	7	8	9	10	11	12	13	14		PU	FEP	PTFE	
G	F	6	3	2											Separate (Remote) type (Note 3)	●	●	●
					0	1									Meter size 1/2"(15mm)	●	●	-
					0	2									1"(25mm)	●	●	-
					0	3									1-1/4"(32mm)	●	●	-
					0	4									1-1/2"(40mm)	●	●	-
					0	5									2"(50mm)	●	●	-
					0	6									2-1/2"(65mm)	●	●	-
					0	8									3"(80mm)	●	●	-
					1	0									4"(100mm)	●	●	-
					1	2									5"(125mm)	●	●	-
					1	5									6"(150mm)	●	●	-
					2	0									8"(200mm)	●	●	-
					2	5									10"(250mm)	●	●	-
					3	0									12"(300mm)	●	-	●
					3	5									14"(350mm)	●	-	●
					4	0									16"(400mm)	●	-	●
					4	5									18"(450mm)	●	-	●
					5	0									20"(500mm)	-	-	●
					6	0									24"(600mm)	-	-	●
							A								Connection flange standard ASME B 16.5 class 150	●	●	●
							J								JIS B 2220 10K	●	●	●
								N							Lining (Note 4)	●	-	-
								U							Polyurethane(PU) with NSF approval (Note 2&3)	●	-	-
								F							Polyurethane(PU) (Note 2&3)	-	●	-
								E							FEP (Note 1&2)	-	●	-
								P							FEP with NSF approval (Note 1&2)	-	-	●
								T							PTFE (Note 1&2)	-	-	●
															PTFE with NSF approval (Note1&2)	-	-	●
									B						Electrode Material	●	-	-
									F						316L stainless steel	-	●	●
															Hastelloy C (Equivalent)	-	●	●
										A					Flow and calibration velocity range 1.0 to 32.8 ft/s(standard range calibration)	●	●	●
															Cable glands and cFMus 1/2-14NPT connection port without cable glands With cFMus logo.	●	●	●
											1				PU coating pearl-gray colored *Direct burial detector coating Contact Toshiba International Corp. (Houston)	●	●	●

Code explanation... ●: Standard ○: Option —: Not available

- Note1:** FEP lined 1/2" (15mm) to 10" (250mm) & PTFE lined, 12" (300mm) to 24" (600mm) meters are NSF approved. PTFE Lined detectors are provided with 316 stainless steel grounding rings.
- Note2:** Potting kit is available for IP68/NEMA6P submersible option when selecting separate (remote) type PU lining. Potting kit is **Not** available for Combined or Remote GF Teflon lined meters.
- Note3:** Non-NSF Polyurethane (PU) sizes 1/2" (15mm) to 3" (80mm), NSF approved Polyurethane 4" (100mm) to 18" (450mm).
- Note 4:** In case of JIS10K flange, only 'U' , 'F' or 'P' is available to be selected at 9th code.

Table 7. Specification Code for converters

Model				Specification Code										Contents	LF620 type	LF622 type	
1	2	3	4	5	6	7	8	9	10	11	12	13	14				
L	F	6	2												Electromagnetic flowmeter converter		
			0												Combined (Integral) type	●	—
			2												Separate (Remote) type	—	●
				F											Purpose cFMus class I, Division 2 approved	●	●
					B										Shape Standard type with case (2022 renewed version)	●	●
						A									Converter mounting fitting None Panel, Accessory for wall mounting (BNP material: SUS304) Accessory for pipe installation (BNP material: SUS304)	●	○
						C										—	●
						E										—	○
							2								Digital input/output Digital output points 2 (DO1+DO2) +Digital input point 1 (DI)	●	●
								1							Current output and Communication function(Note1) Current output + HART communication Current output + Modbus (RS485) communication	●	●
								3								○	○
									1							Power supply(Note2) 100Vac-240Vac 50/60Hz , 110Vdc 24Vdc 110Vdc	●
									2						○		○
									3						○		○
										E					Instruction manual English	●	●

Code explanation... ●: Standard ○: Option —: Not available

Note 1:When Modbus communication is provided, digital output points 1(DO1) and digital output points(DO2), digital input point 1(DI), HART communication cannot be used.

Refer Table 8 for more details.

Note2: Select 110Vdc for test report inspected under the condition of 110Vdc.

Table8. Communication functions and output selection table

Selection of Function		Availability of outputs			
Code (10 th digit)	Selected Communication	4-20mA dc	DO1	DO2	DI
1	HART	✓	✓	✓	✓
3	Modbus	✓	✓ (Note)	X	X

Code explanation: ✓:Available X:Not Available

Note: When digital output 1 function and Modbus communication function are used at one time, TG (signal ground) of the Modbus communication function cannot be connected (2 line connection).

ISO9001 and ISO14001 are certified.

Specifications are subject to change without notice.

Printed in Japan 2024-2 (TBLS)

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Misuse of this product can result in damages to property or human injury.
Read related manuals carefully before using this product.