

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. Thanks to the unique patented magnetic field distribution technology, the meter is highly immune for upstream flow disturbances. Combined with multi-functional converter LF600 (combined type) or LF602 (separate type) equipped with its original noise-suppression circuit and arithmetic operation capability, LF410 has high tolerance to noise, giving stable output even for slurry fluid measurement. IR (Infrared) switch enables parameter setting of the converter without removing the cover. Flow direction can be set in either way, and its 128 x 128 dot matrix LCD display allows the LCD rotated to 90, 180 and 270 degrees with a software.

The AF900 hand-held terminal or Model 375 HART communicator can be used to communicate with the flowmeter from remote places. See the following page for the HART communication protocol.

Note: 375 HART is being registered.

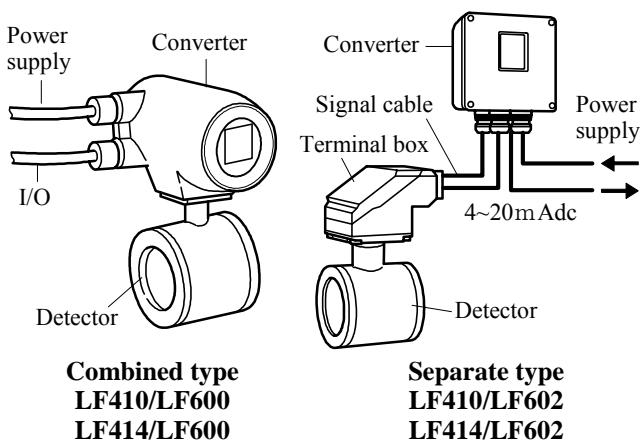


Figure1. Configuration



LF410/LF600
LF414/LF600

LF410
LF414

LF602

Figure2. LF410 Series flowmeter



Note : CE is being applied.

Specifications

Overall Specifications

Measurement range in terms of flow velocity:
0–0.3 m/s to 0–10 m/s (0–1.0 ft/s to 0–32.8 ft/s).
0–0.1 m/s to 0–0.3 m/s (0–0.3 ft/s to 0–1.0 ft/s)
range is available optionally.

Accuracy: See the following graph.

Pulse output:

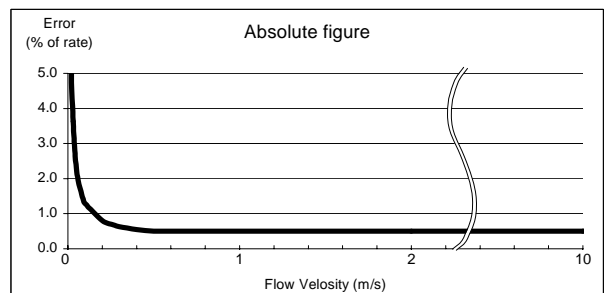
$V_s > 0.5$ m/s (1.64 ft/s): +/-0.5 % of rate.

$V_s < 0.5$ m/s (1.64 ft/s): +/-0.3 % of rate

+/- 1 mm/s (0.039 inch/s).

Current output: plus +/-8 uA (0.05 % of span)

Note: Span = Range in the magmeters.



Note: The accuracy above is measured under standard operating conditions using the weighing method at Toshiba's flow calibration facility.

Fluid conductivity: 5 μ S/cm minimum

Fluid temperature:

-10 to +120 °C: Combined type flowmeters
(14 to 248 °F) (Ceramic tube or teflon PFA liner)

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

Structure: NEMA 4X (IP 67) Watertight

Power consumption: approximately 10W(17VA)

Conformance to European Community Directives:

EMC directive 89/336/EEC

The low voltage 93/68/EEC

PED 97/23/EC (Note 1)

Note : See table 2 for detail.

Approved hazardous location certifications:

Model: LF414/LF600 and LF414/LF602

- FM explosion proof:
FM Class I, Division 2, Groups A, B, C, and D.
FM Class II, Division 2, Groups F and G.
FM Class III.
- CSA explosion proof:
CSA Class I, Division 2, Groups A, B, C, and D.
CSA Class II, Division 2, Groups E, F, and G.
CSA Class III.

Detector and converter combination:

LF410/LF600: Combined type for standard specification.

LF410/LF602: Separate type for standard specification.

LF414/LF600: Combined type with Ex approval of Class I, Division 2 (FM & CSA).

LF414/LF602: Separate type with Ex approval of Class I, Division 2 (FM & CSA).

■ Model LF410 and LF414 Detectors

Mounting style: Wafer type

Fluid pressure: -0.1 to 2.0MPa
(-15 to 300psi, or -1.0 to 20 bar)

Note: The test pressure before shipping from the factory is equal to twice the nominal pressure rating of the customer specified flange connection during 15 minutes.

Connection flange standards: ANSI 150, ANSI 300, BS10 and 16, DIN PN10 and PN16, JIS10K, JIS16K and JIS20K

Principal materials:

Case — 25 to 100mm (1" to 4"): stainless steel 15, 150, and 200mm (1/2", 6", and 8"): carbon steel

Linings — 15 to 100mm (1/2" to 4"): Ceramic tube (std.) & teflon PFA (opt.)

150 and 200mm (6" to 8"): teflon PFA

Electrodes — 316L stainless steel (std.)

Grounding rings — 316 stainless steel (std.)

Note: See Table 3 or 6 for optional materials and other related information.

Measuring tube material — 304 stainless steel (in case of Teflon PFA lining)

Coating — 25 to 100mm (1" to 4"): no coating (stainless steel body).

15, 150, and 200mm (1/2", 6", and 8"): phthalic acid resin coating with pearl-gray colored.

Heat shock resistance : for a ceramic tube detector

Heating: $\Delta T \leq 150 \text{ }^\circ\text{C}/0.5\text{sec}$ (302°F/0.5sec)

Cooling: $\Delta T \leq 100 \text{ }^\circ\text{C}/0.5\text{sec}$ (212°F/0.5sec)

Note: The above means that the ceramic tube detector withstands the shock of sudden heating (temperature difference 150°C or less per 0.5seconds) and sudden cooling (temperature difference 100°C or less per 0.5seconds).

Dimensions and weights: See Figures 3 to 8.

Cable connection port: for separate type detectors.

Cable glands —

LF410: Provided as standard, R(PT) 1/2 male screws.

LF414: Not provided, 3/4-14NPT male screws are required.

Applicable diameter — 11 to 13mm
(0.433 to 0.512 inch)

■ Model LF600 and LF602 converters

Input signals

Analog signal — the voltage signal from detector, proportional to process flow rate (for LF602 separate type converter).

Digital input DI (opt.)

Signal type: 20 to 30Vdc voltage signal

Input resistance: 2.7k Ω

Number of inputs: one point

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 and stops 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:

4-20mA_{dc} (load resistance 0 to 750 Ω)

Digital outputs — One point (std.) and one more point is optionally available as follows.

Digital output DO1 (std.):

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

Digital output DO2 (opt.):

Output type: Solidstate relay output (non polarity)
 Number of outputs: One point
 Output capacity: 150Vdc, 150mA maximum or 150 V ac (peak to peak), 100mA maximum

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

• **Pulse output (available only for DO1)**

Pulse rate: 3.6 to 3,600,000 pulses/hr
 Pulse width: 0.5 to 500ms (but less than half of the period for 100% flow rate)

• **Multi-range selection outputs (Note 1)**

• **High and/or low limit alarm outputs (Note 2)**

• **Empty pipe alarm output**

• **Digital Output Active Status (DO1 and DO2) (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. The Status when power failure is kept to Normal Open.

Communications output — Digital signal is superimposed on 4–20mA dc current signal as follows:

• **Conforms to HART protocol**

Load resistance: 240 to 750Ω
 Load capacitance: 0.25μF maximum
 Load inductance: 4mH maximum

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

• **ProfibusPA (optional)**

LCD display: Full dot-matrix 128×128 dot LCD display (back-light provided)

The data on the LCD inside the converter can rotate to 90, 180, and 270 degrees by a software, without rotating the indicator itself. (Combined type only)

Parameter settings — Parameters can be set as follows:

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

• **Digital communication:** The AF900 hand-held terminal or the Model 375 HART communicator is needed to set parameters.

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

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

Zero and span calibration: Built-in calibration signal source allows converter unit check.

Conditions when power fails: The outputs and display will remain as follows 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.

- Current output: 0mA dc
- Digital output: OFF
- LCD display: No display

Power supply: One of the following can be selected:

- 100 to 240Vac, 50/60Hz (std.) (allowable voltage 80 to 264Vac)
- 24Vdc (allowable voltage 18 to 36Vdc)
- 110Vdc (allowable voltage 90 to 130Vdc)

Surge protection: Arresters are installed in the power supply, and current signal output circuit.

Case: Aluminum alloy (equivalent of IP 67)

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

Cable connection ports:

Cable glands —

LF600 and LF602:

Provided as standard
 OD of cable φ 11~13mm
 Material Nylon 66
 G (PF) 1/2 male screws

LF600 and LF602 for FM Approved:

Not provided, 1/2-14NPT male screws are required.

Applicable diameter — 11 to 13mm (0.433 to 0.512 inch)

Vibration resistance: No resonance to the following levels of vibration:

- 10 to 150Hz with acceleration of 9.8m/s²
 No defect in putting vibration to each direction of 30Hz with 29.4 m/s² in 4h.

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

Dimensions and weights:

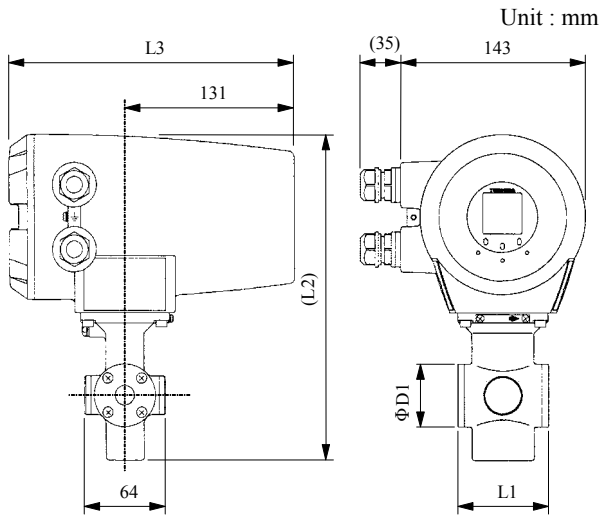
See Figure 9. (for separate type)

MTBF:

220,000 hours at 25 deg.C (77 deg.F) based on MIL-HDBK-217F

Installation

■ Dimensions



BS16, DIN PN16 and JIS 10K dimensions:

Meter size (mm)	L1 (mm)	L2 (mm)	D1 (mm)	Weight (kg)
15	70	252	49	approx. 5

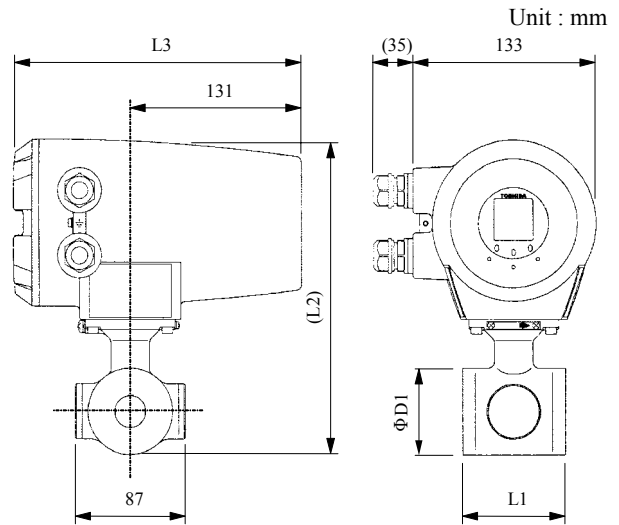
ANSI class 150 and class 300 dimensions:

Meter size (inch)	L1 (inch)	L2 (inch)	D1 (inch)	Weight (lb)
1/2	2.76	9.92	1.93	approx. 11

Converter type	L3	
	(mm)	(inch)
With display	225	8.85

Note: 1 inch = 25.4mm

**Figure 3. LF410/LF600 and LF414/LF600 flowmeters
Meter size 15mm (1/2")**



BS16, DIN PN16 and JIS 10K dimensions:

Meter size (mm)	L1 (mm)	L2 (mm)	D1 (mm)	Weight (kg)
25	80	241	66	approx. 5

ANSI class 150 and class 300 dimensions:

Meter size (inch)	L1 (inch)	L2 (inch)	D1 (inch)	Weight (lb)
1	3.15	9.48	2.60	approx. 11

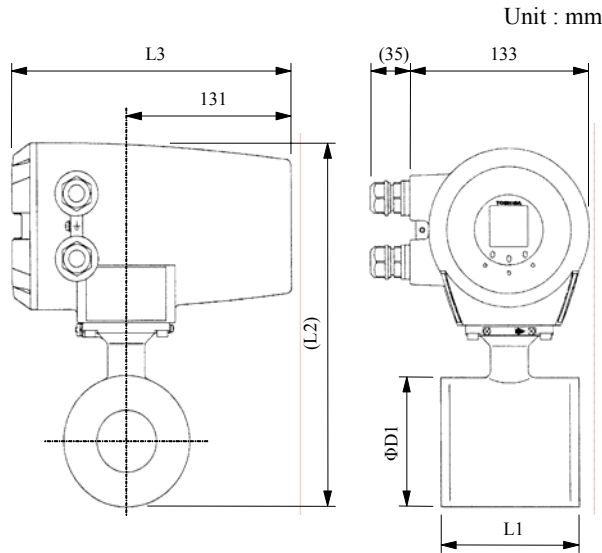
Converter type	L3	
	(mm)	(inch)
With display	225	8.85

Note: 1 inch = 25.4mm

**Figure 4. LF410/LF600 and LF414/LF600 flowmeters
Meter size 25mm (1")**

The dimension of L1 is changed when the material of grounding ring is chosen Pt-Ir or Ta.

Meter size	L1
15mm (1/2")	77mm (3.03 inch)
25mm (1")	95mm (3.74 inch)
40mm (1 1/2")	115mm (4.53 inch)
50mm (2")	126mm (4.96 inch)
80mm (3")	126mm (4.96 inch)
100mm (4")	136mm (5.35 inch)
150mm (6")	242mm (9.53 inch)
200mm (8")	312mm (12.28 inch)



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

BS16, DIN PN16 and JIS 10K dimensions

Meter size (mm)	L1 (mm)	L2 (mm)	D1 (mm)	Weight (kg)
40	100	264	85	approx. 6
50	110	280	102	approx. 7
80	110*	306	127	approx. 8
100	120*	338	159	approx. 10
150	230	407	216	approx. 22
200	300	458	267	approx. 32

ANSI class 150 and class 300 dimensions

Meter size (inch)	L1 (inch)	L2 (inch)	D1 (inch)	Weight (lbs)
1-1/2	3.94	10.39	3.35	approx. 13
2	4.33	11.02	4.02	approx. 15
3	4.33*	12.04	5.00	approx. 18
4	4.72*	13.30	6.26	approx. 22
6	9.06	16.02	8.50	approx. 49
8	11.81	18.03	10.51	approx. 70

*When Teflon PFA lining is selected, L1 in the table above becomes as follows:

- L1: 115mm (4.53 inch) for meter size 80mm (3")
- L1: 126mm (4.96 inch) for meter size 100mm (4")

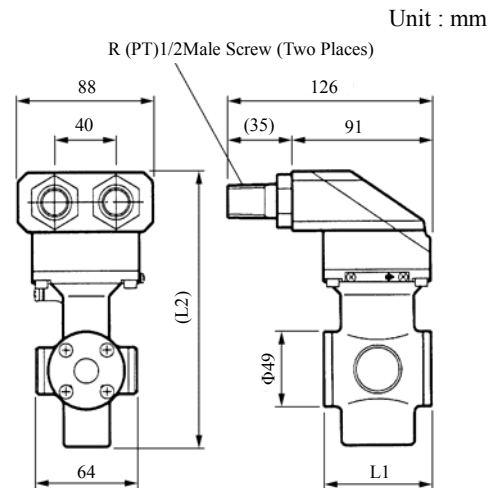
Converter type	L3	
	(mm)	(inch)
With display	225	8.85

Note: 1 inch = 25.4mm

**Figure 5. LF410/LF600 and LF414/LF600 flowmeters
Meter sizes 40 (1 1/2") to 200mm (8")**

The dimension of L1 is changed when the material of grounding ring is chosen Pt-Ir or Ta

Meter size	L1
15mm (1/2")	77mm (3.03 inch)
25mm (1")	95mm (3.74 inch)
40mm (1 1/2")	115mm (4.53 inch)
50mm (2")	126mm (4.96 inch)
80mm (3")	126mm (4.96 inch)
100mm (4")	136mm (5.35 inch)
150mm (6")	242mm (9.53 inch)
200mm (8")	312mm (12.28 inch)



Note1: Cable glands are not provided for LF414 of FM and CSA approved type.

Refer to the part of Cable connection port at detector.

Note2: 1 inch = 25.4mm

BS16, DIN PN16 and JIS 10K dimensions:

Meter size (mm)	L1 (mm)	L2 (mm)	D1 (mm)	Weight (kg)
15	70	179	49	approx. 3

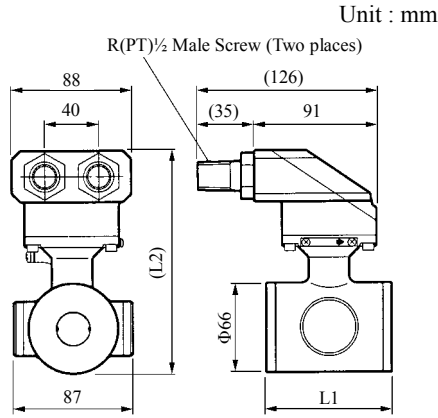
ANSI class 150 and class 300 dimensions:

Meter size (inch)	L1 (inch)	L2 (inch)	D1 (inch)	Weight (lb)
1/2	2.76	7.05	1.93	approx. 7

**Figure 6. Separate type detectors
LF410 and LF414
Meter size 15mm (1/2")**

The dimension of L1 is changed when the material of grounding ring is chosen Pt-Ir or Ta

Meter size	L1
15mm (1/2")	77mm (3.03 inch)
25mm (1")	95mm (3.74 inch)
40mm (1 1/2")	115mm (4.53 inch)
50mm (2")	126mm (4.96 inch)
80mm (3")	126mm (4.96 inch)
100mm (4")	136mm (5.35 inch)
150mm (6")	242mm (9.53 inch)
200mm (8")	312mm (12.28 inch)



Note1: Cable glands are not provided for LF414 of FM and CSA approved type.
Refer to the part Cable connection port at detector.
Note2: 1 inch = 25.4mm

BS16, DIN PN16 and JIS 10K dimensions:

Meter size (mm)	L1 (mm)	L2 (mm)	D1 (mm)	Weight (kg)
25	80	168	66	approx. 3

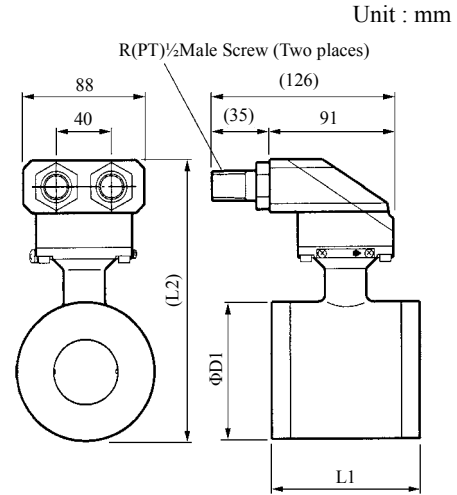
ANSI class 150 and class 300 dimensions:

Meter size (inch)	L1 (inch)	L2 (inch)	D1 (inch)	Weight (lb)
1	3.15	6.61	2.60	approx. 7

Figure 7. Separate type detectors LF410 and LF414 Meter size 25mm (1")

The dimension of L1 is changed when the material of grounding ring is chosen Pt-Ir or Ta

Meter size	L1
15mm (1/2")	77mm (3.03 inch)
25mm (1")	95mm (3.74 inch)
40mm (1 1/2")	115mm (4.53 inch)
50mm (2")	126mm (4.96 inch)
80mm (3")	126mm (4.96 inch)
100mm (4")	136mm (5.35 inch)
150mm (6")	242mm (9.53 inch)
200mm (8")	312mm (12.28 inch)



Note1: Cable glands are not provided for LF414 of FM and CSA approved type.
Refer to the part of Cable connection port at detector.
Note2: Eye bolts are provided at the top for flowmeters sized 200mm (8").
Note3: 1 inch = 25.4mm

BS16, DIN PN16 and JIS 10K dimensions:

Meter size (mm)	L1 (mm)	L2 (mm)	D1 (mm)	Weight (kg)
40	100	190	85	approx. 4
50	110	207	102	approx. 5
80	110*	232	127	approx. 6
100	120*	264	159	approx. 9
150	230	324	216	approx. 21
200	300	385	267	approx. 35

ANSI class 150 and class 300 dimensions:

Meter size (inch)	L1 (inch)	L2 (inch)	D1 (inch)	Weight (lbs)
1-1/2	3.94	7.48	3.35	approx. 9
2	4.33	8.15	4.02	approx. 11
3	4.33*	9.13	5.00	approx. 13
4	4.72*	10.39	6.26	approx. 20
6	9.06	12.76	8.50	approx. 47
8	11.81	15.16	10.51	approx. 78

* When Teflon PFA lining is selected, L1 in the table above becomes as follows:
·L1: 115mm (4.53 inch) for meter size 80mm (3")
·L1: 126mm (4.96 inch) for meter size 100mm (4")

Figure 8. Separate type detectors LF410 and LF414 Meter size 40 (1 1/2") to 200mm (8")

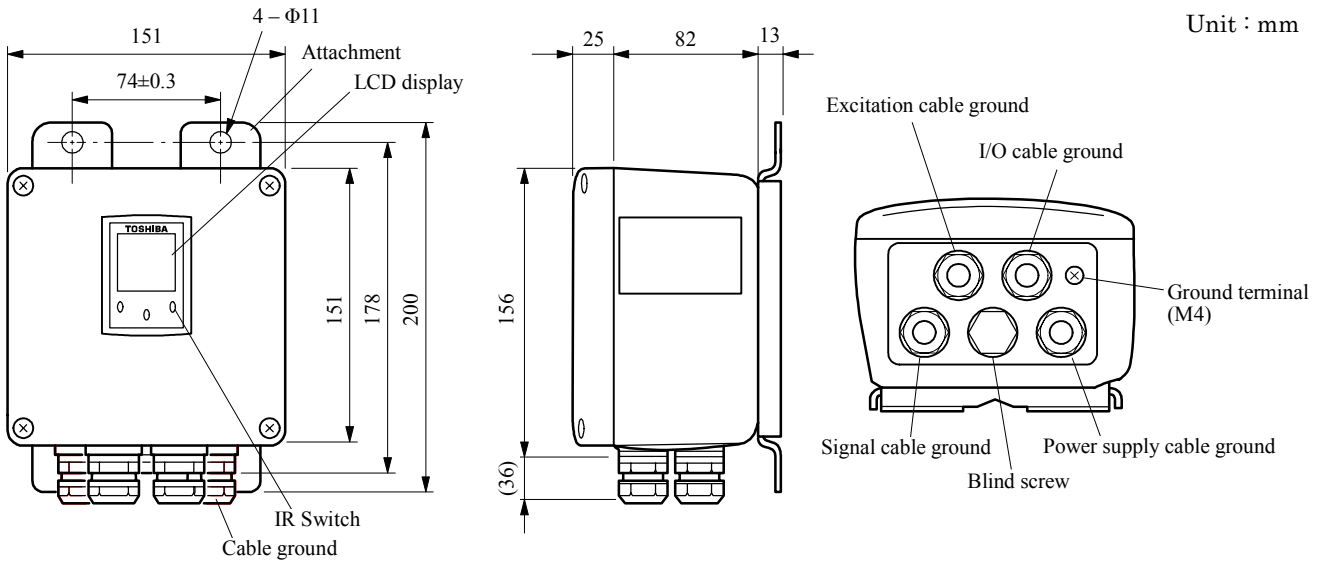
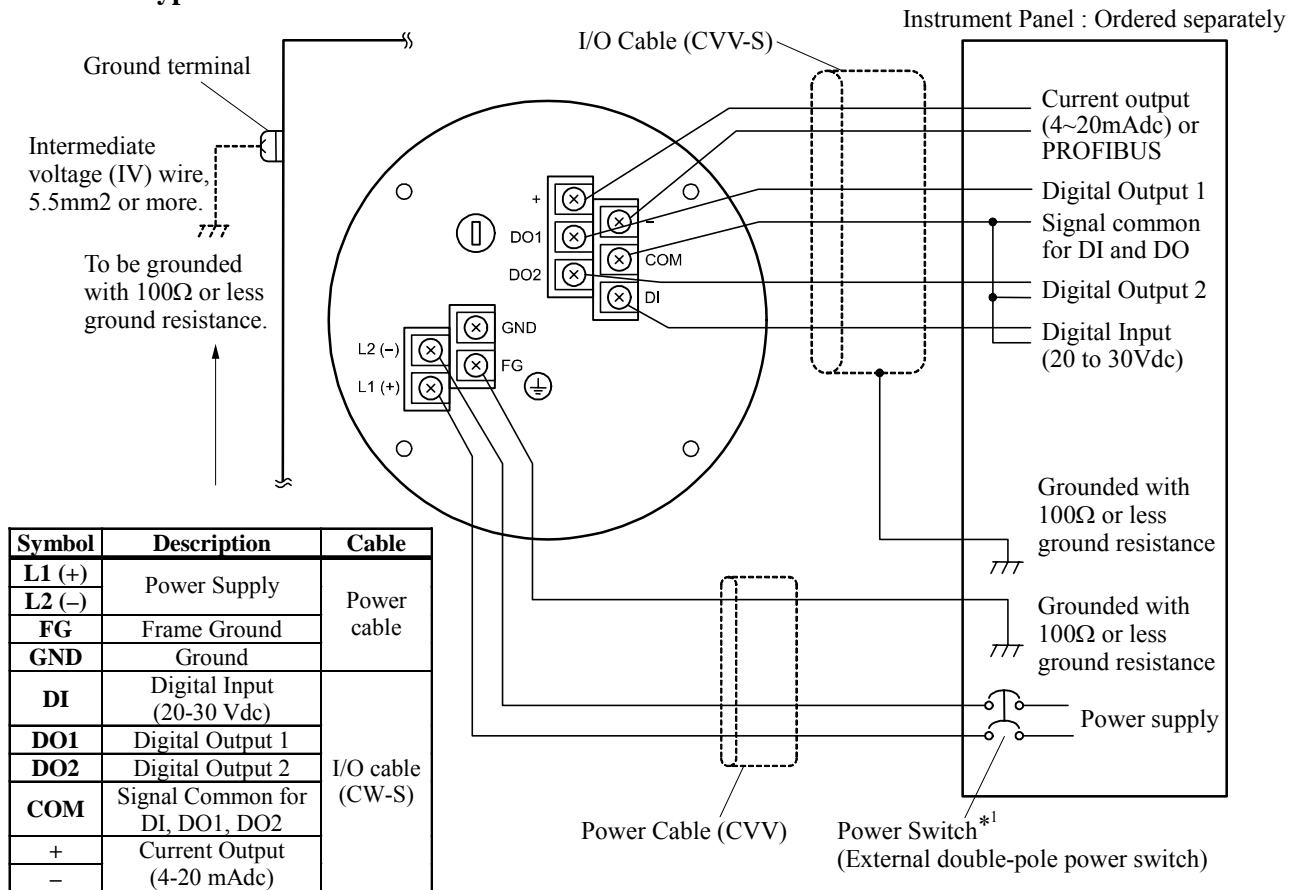


Figure 9. Separate type converter LF602

External Connections

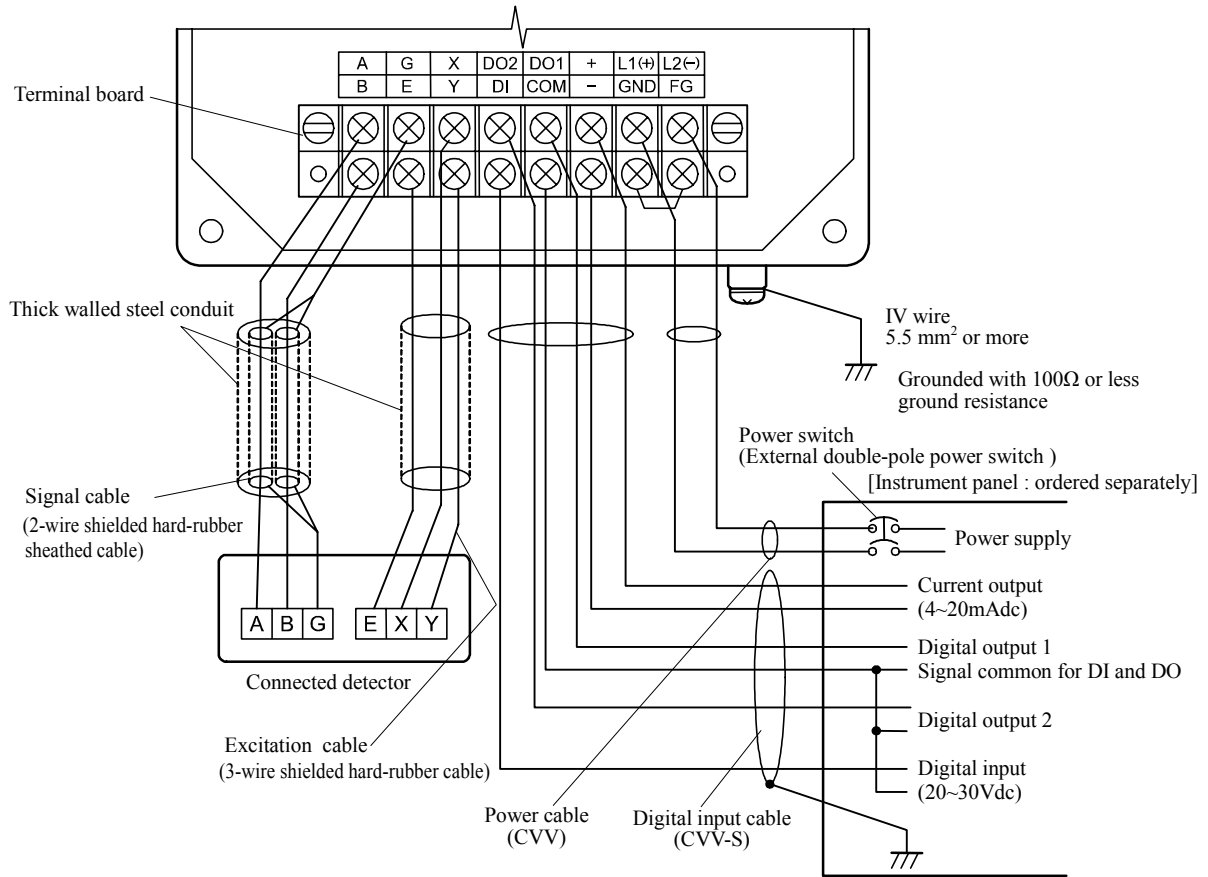
- Combined type LF410/LF600 and LF414/LF600 flowmeters



*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 10. Combined type LF410/LF600 and LF414/LF600 flowmeters Wiring Diagram

<Separate type LF410/LF602 and LF414/LF602 flowmeters>



Symbol	Description	Cable
L1 (+)	Power supply	Power cable (CVV)
L2 (-)		
GND	Ground (for arrester)	
FG	Frame ground	
DI	Digital Input (20~30Vdc)	I/O cable (CVV-S)
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 only)
Y		
E		
A	Signal Input	Signal cable (for only)
B		
G		

Figure 11. Separate type LF410/LF602 and LF414/LF602 flowmeters wiring Diagram

Wiring Precautions

- (1) Explosion proof type flowmeters are not provided 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. An 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 12 below.
- (4) DO1, DO2 (opt.), and DI (opt.) 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.

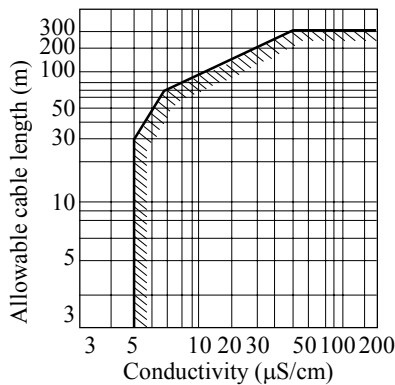


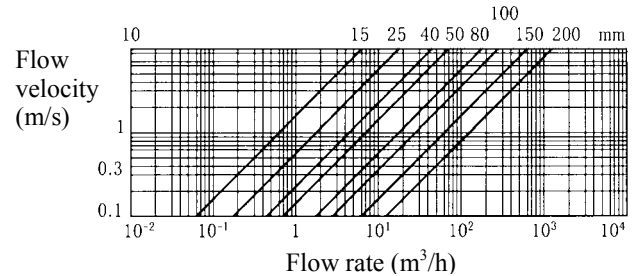
Figure 12. Electrical Conductivity and Cable Length

Meter Size

To select the meter size:

See Figure 13 and find meter sizes within the velocity of 0.1 to 10m/s for a specified full-scale (measuring range high limit) flow. Select one that has its full-scale velocity between 1 and 3m/s.

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



For SI unit Unit: m³/h

Meter size (mm)	Flow rate		
	0.3 m/s	1 m/s	10 m/s
15	0.1908	0.6361	6.361
25	0.5301	1.767	17.67
40	1.357	4.523	45.23
50	2.120	7.067	70.67
80	5.428	18.09	180.9
100	8.482	28.27	282.7
150	19.08	63.61	636.1
200	33.93	113.1	1131

For English unit Unit: gal/min

Meter size (inch)	Flow rate		
	0.33ft/s	0.98ft/s	32.8ft/s
1/2	0.28148	0.83591	27.977
1	0.78189	2.3220	77.715
1 1/2	2.0016	5.9443	198.95
2	3.1128	9.2879	310.86
3	8.0065	23.777	795.80
4	12.510	37.152	1243.4
6	28.148	83.591	2797.7
8	50.041	148.61	4973.8

Figure 13. Flow Rate and Flow Velocity

■ **Calibration Range**

If the calibration range is not specified, the standard range as shown below will be used. If the range is specified, we will use the specified range for calibration.

Table 1. Standard Flow Range

Meter size mm (inch)	Standard flow range		
	Flow rate (m ³ /h)	Flow velocity (m/s)	Flow rate (gal/min)
15 (1/2)	2	3.145	25
25 (1)	6	3.395	75
40 (1 1/2)	15	3.315	175
50 (2)	25	3.535	300
80 (3)	60	3.315	650
100 (4)	100	3.535	1000
150 (6)	200	3.145	2500
200 (8)	300	2.653	4500

Note: The unit of "gal/min" is not exchanged (converted) by "m³/h".

■ **PED matrix in each flange connection.**

The following sizes fall under the category for PED in each flange connection when the meter ships to EU. All of them had complied with it from a notified body.

Table 2 PED matrix in each flange connection

Flange standard	Meter size
DIN PN 16 and BS 16	150 to 400mm (6 to 16 inch)
DIN PN 10 and BS 10	250 to 400mm (10 to 16 inch)
ANSI 150 and JIS10K	6 to 16 inch (150 to 400mm)

Ordering Information

1. When ordering the LF410 series flowmeters, refer to Tables 3 and 4 (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 Toshiba before ordering when choose material at the wetting parts such as lining, electrodes, and grounding rings.

Table 3. Specification Code (Wafer type detector LF410 Series)

Model					Specification Code									Description	Detector category			
1	2	3	4	5	6	7	8	9	10	11	12	13	14		Normal type		Ex. type	
															Gr.-A	Gr.-B	Gr.-C	Gr.-D
L	F	4	1	0										Normal specification type	√	√		
L	F	4	1	4										Hazardous location certification type (Note 1)			√	√
					D									Meter size				
					E									15mm (1/2")	√		√	
					F									25mm (1")	√		√	
					G									40mm (1 1/2")	√		√	
					H									50mm (2")	√		√	
					J									80mm (3")	√		√	
					K									100mm (4")	√		√	
					L									150mm (6")		√		○
														200mm (8")		√		○
					L									Mounting Style				
					M									Detector/Converter combined type (LF410/LF600)	√	√		
					P									Detector/Converter separate type (LF410/LF602)	√	√		
					Q									Detector/Converter combined type with PED (LF410/LF600) (Note 6)	√	√		
														Detector/Converter separate type with PED (LF410/LF602) (Note 6)	√	√		
					A									FM and CSA Class - 1 Division 2 type (Note 1)				
					B									Detector/Converter combined type (LF414/LF600)			√	○
														Detector/Converter separate type (LF414/LF602)			√	○
					C									Connection flange standard (Note 2)				
					D									ANSI 150	●	●	●	●
					E									ANSI 300	●	●	●	●
					F									BS PN 10	●	●	●	●
					G									BS PN 16	●	●	●	●
					H									DIN PN 10	●	●	●	●
					J									DIN PN 16	●	●	●	●
					K									JIS 10K	●	●	●	●
					L									JIS 16K	●	●	●	●
					Z									JIS 20K	●	●	●	●
														other	○	○	-	-
					B									Electrode Material (Note 6)				
					C									316L stainless steel	●	●	●	●
					D									Ti (titanium)	○	○	○	○
					E									Pt-Ir (platinum/iridium)	○	○	○	○
					F									Ta (tantalum)	○	○	○	○
					Z									Hastelloy C(Equivalent)	○	○	○	○
														other	○	○	-	-
					A									Lining Material (Note 6)				
					B									Alkali-resistant ceramic (Note 3)	●	-	●	-
					C									Acid-resistant ceramic (Note 3)	●	-	●	-
														Teflon PFA	○	●	○	●
					C									Grounding Ring Material (Note 6)				
					D									316 stainless steel	●	●	●	●
					E									316L stainless steel	○	○	○	○
					F									Ti (titanium)	○	○	○	○
					G									Ta (tantalum)	○	○	○	○
					H									Pt-Ir (platinum/iridium)	○	○	○	○
					Z									Hastelloy C (Equivalent)	○	○	○	○
														other	○	○	-	-
					A									Flow and calibration velocity range				
					B									0.3 to 10 m/s (standard range calibration)	●	●	●	●
					C									0.3 to 10 m/s (specified range calibration)	○	○	○	○
														0.1 to 10 m/s (specified range calibration)	○	○	○	○
					A									Excitation and Signal Cables				
					B									not provided	●	●	●	●
					C									30m cable, provided (Note 4)	○	○	○	○
														other lengths, provided (Note 4)	○	○	○	○
					A									Coating				
					B									no coating	●	-	●	-
					C									phthalic acid resin coating pearl-gray colored (Note 5)	○	●	○	●
					D									black tar epoxy resin 0.3 mm	○	○	○	○
					E									black tar epoxy resin 0.5 mm	○	○	○	○
														Black tar epoxy resin 0.5 mm for submersible type (Note 7)	○	○	○	○

Size code explanation: √:Object ●: Standard ○: Option -: Not available

Note1: Cable glands are not provided. Refer to the part of "Cable connection port" at detector and converter.

Note2: Same shape of flange standard among ANSI 150, ANSI 300, BS10, BS16, DIN10, DIN16, JIS10K, JIS16K, and JIS20K.

Note3: The type of material used is alumina ceramic, this is suitable for both acid and alkali liquids.

This ceramic lining and the electrodes are held with seals, there are two types, one for acids, and the other for alkalis.

Note4: Separate type detector only. Specifying the code "C", indicate the length of cables from 1 to 300m in 1 meter increments.

Note5: Phthalic acid resin coating is standard for the flowmeter with meter size 15mm(1/2"), 150mm(6"), and 200mm(8").

Note6: Consult Toshiba before ordering when choose materials at the wetting parts.

Note7: Ceramic lining only. (Teflon PFA lining is not available.)

Note8: Check the Table 2 whether your chosen meter size meets this directive or not when the meter is shipped to EU. If yes, need to choose this code.

Table 4. Specification Code for converters

Model				Specification Code										Contents	LF600 type	LF602 type	
1	2	3	4	5	6	7	8	9	10	11	12	13	14				
L	F	6	0												Electromagnetic flowmeter converter		
				0											Integral type	○	—
				2											Separate type	—	○
					A										Purpose		
					F										Standard	○	○
															FM and CSA class I, Division 2 approved	○	○
						A									Shape		
						B									Integral type with case	○	—
															Separate type with case	—	○
							A								Converter mounting fitting		
							C								None	○	○
															Panel, Accessory for wall mounting (BNP material: SUS304)	—	○
								E							Accessory for pipe installation (BNP material: SUS304)	—	○
									1	1					I/O and Communication function		
															Current output + pulse output points 1 (DO1) + HART communication	○	○
									1	2					Pulse output points 1 (DO1) + PROFIBUS communication	○	○
									2	1					Current output + pulse output points 2 (DO1+DO2) + digital input point 1 (DO1) + HART Communication	○	○
									2	2					Pulse output points 2 (DO1+DO2) + digital input point 1 (DI) + PROFIBUS communication	○	○
											1				Power supply		
											2				100Vac-240Vac, 50/60Hz	○	○
											3				24Vac	○	○
															110Vac	○	○
												A			Instruction manual		
												E			Japanese	○	○
															English	○	○

○: Selectable —: Unselectable

ISO9001 and ISO14001 are certified.

Specifications are subject to change without notice.



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

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