

Introduction

IR (Infrared) switches enable 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.

*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.

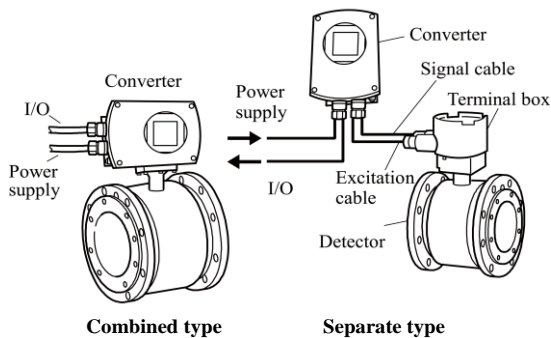


Figure1. Configuration connecting with detector



LF620

LF622

Figure2. LF620 series Flowmeter Converters

Specifications

■ 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: 10kΩ

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 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 for loop check.
- **Zero adjustment** — Executes zero adjustment (on-stream at zero flow rate).

Output signals

Current output:

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

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 to table 3 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 to table 3 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 (10000pps)(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 4–20mA_{dc} current signal as follows:

Conforms to HART protocol

Load resistance: 240 to 750Ω

Load capacitance: 0.25μF 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 the 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, or 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)

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: 0mA_{dc}

- 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 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 —**

G(PF) 1/2 thread (standard)

Cable glands provided.

- Applicable cable diameter: 9 to 14 mm
- Material: Nylon 66

Vibration resistance:

No resonance to the following levels of vibration:

- 10 to 150Hz with acceleration of 9.8m/s^2
- Vibration of 30Hz with 29.4 m/s^2 in 4h in each direction will not cause any defect to unit.

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

Dimensions and Weights:

See Figure 3 (for Separate type)

MTBF:

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

Installation

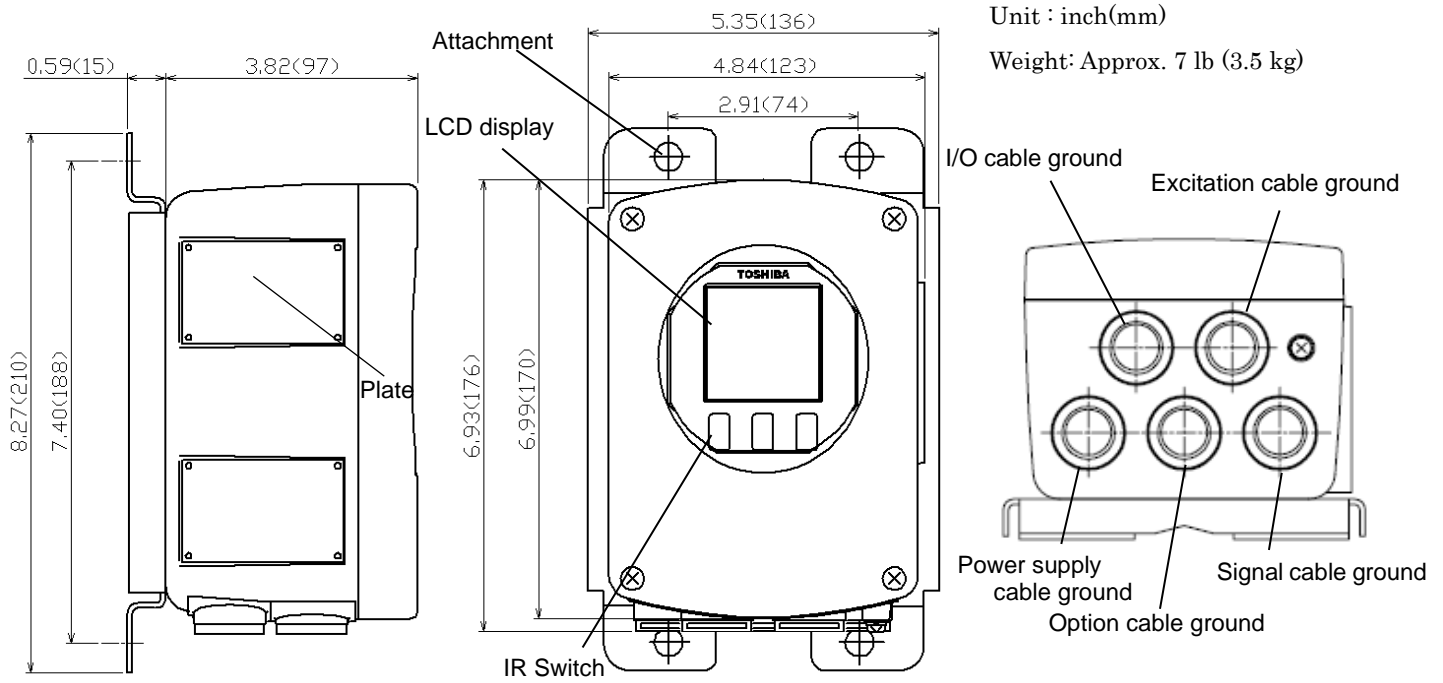
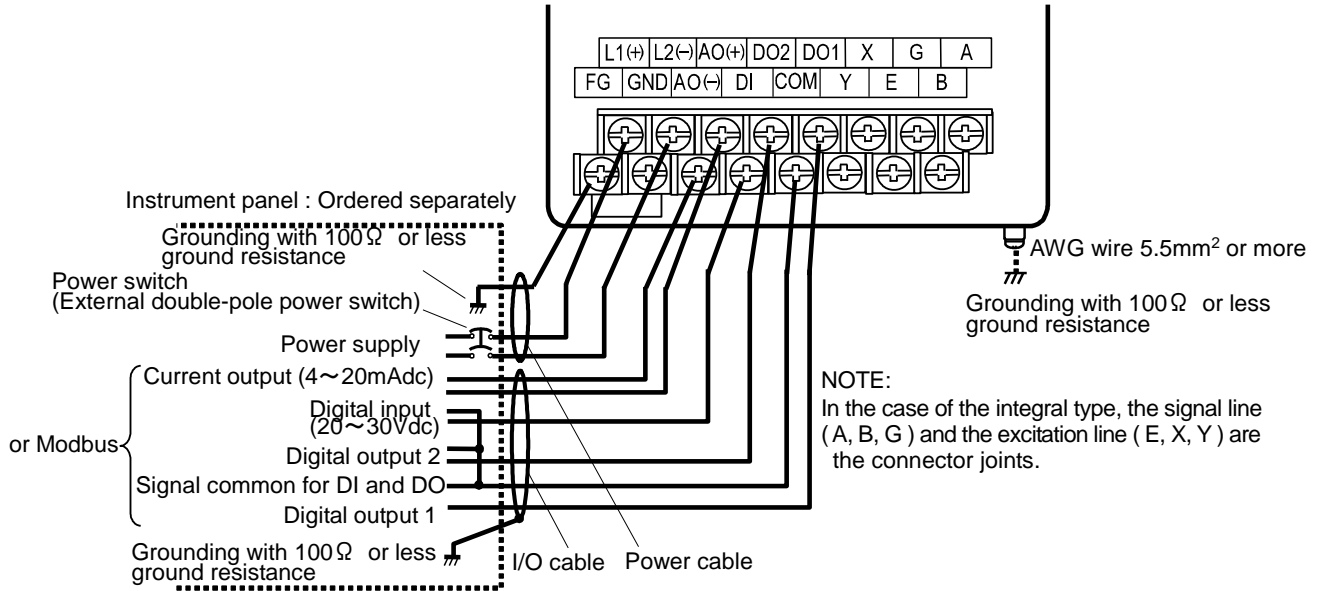


Figure 3. Separate type converter LF622

■ External Connections

● Combined type LF620 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 4. Combined type LF620 flowmeters Wiring Diagram

• Separate type LF622 flowmeters

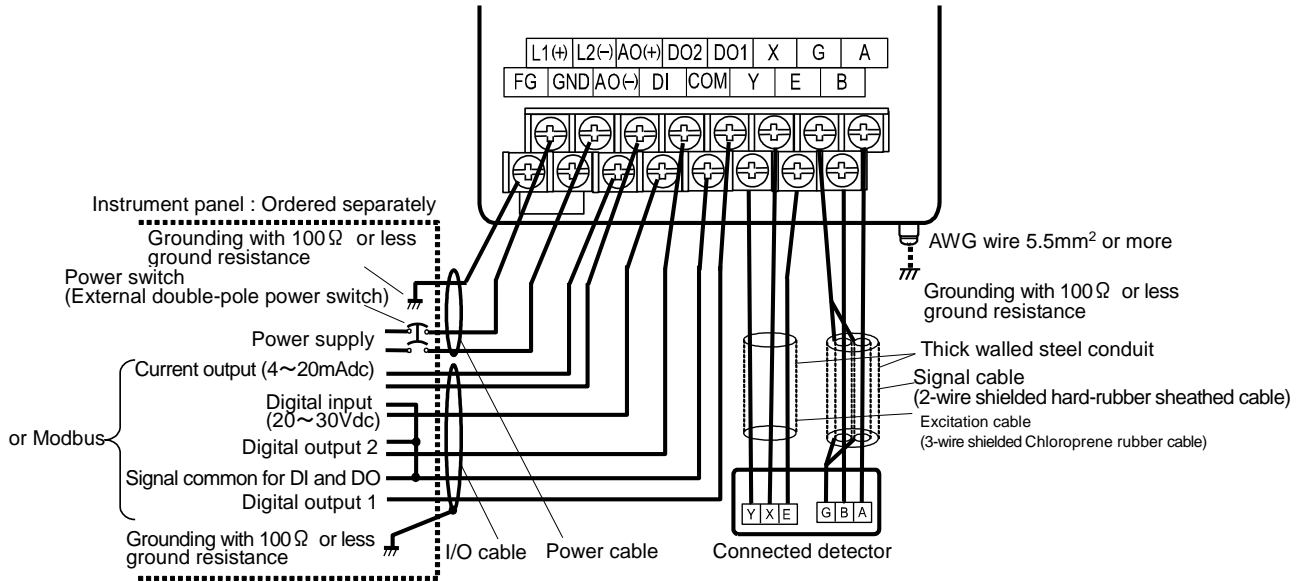


Figure 5. Separate type LF622 flowmeters wiring Diagram

Table 1. LF620 and LF622 Converters Signal Table

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 LF622 only)
Y		
E		
A	Signal Input	Signal cable (for LF622 only)
B		
G		
T+	Modbus(+)	Twisted-pair polyethylene insulated vinyl sheath cable (JKEV,AWG24(0.2mm ²))
T-	Modbus(-)	
TG	Modbus(GND)	

Note: The 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) DO1, DO2, and DI use the same common terminal (COM). This COM can not be connected 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 the 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) General cables are designed for indoor use where cables are not exposed to humidity, rain, etc. When you install cables, make sure to check the operating conditions such as the operating temperature range of the cable by contacting its manufacturer.
- (3) When you carry out cable end treatment, use a dedicated cable stripper to avoid the core wire of the cable being nicked or damaged. In addition, for cables, be careful of allowable maximum bend diameter. (Do not allow excessive twisting or bending of cables).
- (4) The electromagnetic flowmeter is not equipped with terminating resistors. Use the terminating resistor unit for Modbus or junction box, if.
- (5) Only one Modbus cable goes cable gland of the Electromagnetic Flowmeter. Please use the junction box at system configuration.
- (6) Install a terminator to flowmeter that connected to the end of Modbus network.

Table 2. 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	—	●
					A										Purpose Standard	●	●
						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						○	○
											F				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 to Table 3 for more details.

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

Table3. 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).