

**Introduction**

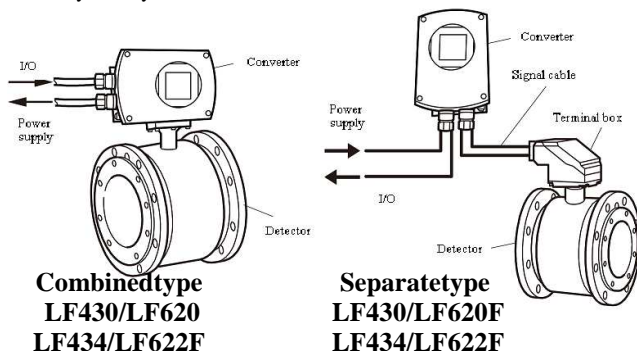
The electromagnetic flowmeter uses Faraday's Law of electromagnetic induction to measure the process flow. The device consists of two units: a detector, through which the fluid to be measured flows and in which low-level signals proportional to flow rates are obtained; and a converter, which supplies excitation current to the detector, and amplifies the signals from the detector and then processes and converts these signals into the 4–20mA dc current signal or communication signal. With the unique patented magnetic field distribution technology, the meter is highly immune to upstream flow disturbances. Combined with a multi-functional converter LF620 (combined type) or LF622 (separate type) equipped with its original noise-suppression circuit and arithmetic operation capability, the LF430 has high tolerance to noise, giving stable output even for slurry fluid measurement. The LF620 has an IR (Infrared) switch to enable parameter setting of the converter without removing the cover. Flow direction can be set in either way, and it has a 128x128 dot matrix LCD display. The LCD can be rotated electronically to 90, 180 and 270 degrees with software. The terminal block in the LCD side makes easy connection to wire in case of the combined type.

The AF900 hand-held terminal (HART\*<sup>1</sup> communicator) can be used to communicate with the flowmeter from a remote place. PROFIBUS-PA\*<sup>2</sup> or Modbus\*<sup>3</sup> interface is available as an option.

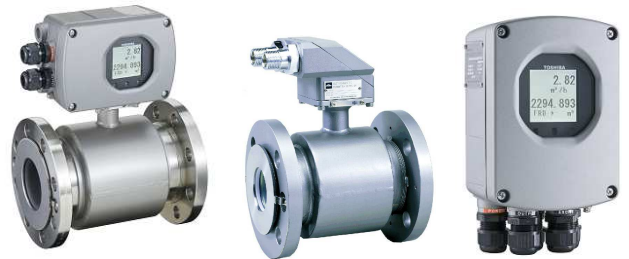
\*1: HART protocol (Highway Addressable Remote Transducer) is a communication protocol for industrial sensors recommended by the HCF (HART Communication Foundation).

\*2: PROFIBUS is the communications protocol for factory automation and process automation that the PROFIBUS Organization recommends. Instead of analog control with a conventional analog signal (4–20mA), it is one kind of the fieldbus which digitizes all signals. Flowmeters support PROFIBUS-PA.

\*3: Modbus is the communication protocol that Modicon Inc. developed. Physical layer is RS485.



**Figure 1. Configuration**



**LF430/LF620**  
**LF430**  
**LF622**

**Figure 2. LF430 series Flowmeters**



Certification number  
Z01207

**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:**

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

**±0.2% of Rate\***

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

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

**±0.3% of Rate \***

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

**Fluidconductivity:** 5 $\mu$ S/cmminimum

**Fluidtemperature:**

- 10to+120°C:TeflonPFAlinedflowmeter (14to248°F)
- 10to+80°C:EPDMrubberlinedflowmeter (14to176°F)

**Ambienttemperature:**

-20to+60°C( -4to140°F)

**Structure:**

- Standard** —IP67andNEMA4XWatertight
- Option**— IP68andNEMA6PSubmersibletype isavailableonlywhenEPDMrubberlineris used,the coatingforthis typeisblacktar epoxyresincoating0.5mm.This typeof flowmeterissubmersibleto5minwater.

**Powerconsumption:**

Standard:10W(14VA)  
 atAC100VandExcitationcurrent:0.2 A  
 MAX:15W(22VA)  
 MAX:17W(24VA)withPROFIBUS

**ConformancetoEuropeanCommunityDirectives:**

PED97/23/EC(Note1)  
 Note: SeetableIfordetail.

**Approvedhazardouslocationcertifications:**

Model:LF434/LF620FandLF434/LF622F  
 cFMusNonincendiveforusein  
 hazardous(classified)locations:  
 ClassI,II,III,Division2,GroupsA-G

**Detectorandconvertercombination:**

- LF430/LF620:Combinedtypeforstandard specification.
- LF430/LF622:Separatetypeforstandard specification.
- LF434/LF620F:CombinedtypewithExapproval ofClassI,Division2(cFMus).
- LF434/LF622F:SeparatypewithExapproval ofClassI,Division2(cFMus).

■ **ModelLF430DetectorandLF434Detectors**

**Mountingstyle:** Flangeconnectiontype

**Fluidpressure:** -15psior -1.0bar( -1.0Mpa)to thepressurelimitedbytheconnectionflange.

Note: Thetestpressurebeforeshippingfromthe factoryisequaltotwicethenominalpressure ratingofthecustomerspecifiedflange connectionduring15minutes.

**Connectionflangestandards:**

ASMEB16.5class150,ASMEB16.5class300  
 EN1092-1PN10,EN1092-1PN16

JISB222010K,JISB222016K,JISB222020K

**Principalmaterials:**

- Case** —carbonsteel
- Flangematerial** —304stainlesssteel:15mm (1/2")to200mm(8")  
 carbonsteel:250mm(10")to450mm(18")
- Linings** —15to50mm(1/2"to2"):TeflonPFA  
 80to400mm(3"to16"):EPDMrubber(std.)  
 &TeflonPFA(opt.)  
 450mm(18"):EPDMrubber
- Electrodes** —316Lstainlesssteel(std.)
- Groundingrings** —316stainlesssteel(std.)
- Note:** SeeTable2foroptionalmaterialsandother relatedinformation.
- Measuringtubematerial** —304stainlesssteel

**Coating:** phthalicacidresincoating(std.),  
 pearl-graycolored

**Note:** IftheoptionalIP68andNEMA6Pstructureis specified,the coatingisblacktarepoxyresin coating0.5mm.

**Dimensionsandweights:** SeeFigure2and3.

**Cableconnectionport:** forseparatetype detectors.

- Cablegland** —  
 LF430: Providedasstandard,R(PT)1/2male screws.  
 LF434: Notprovided,3/4–14NPTmale screwsarerequired.

**Applicable diameter**— 11to13mm  
 (0.433to0.512inch)

■ **ModelLF620andLF622converters**

**Inputs signals**

**Analogsignal** — thevoltagesignalfromdetector,  
 proportionaltoprocessflowrate(ForLF622  
 separatetypeconverter).

**DigitalinputDI**

Signaltype:20to30Vdcvoltagesignal  
 Inputresistance:2.7k  $\Omega$   
 Numberofinputs:onepoint

**Note:**DIcannotbeusedwiththeModbus communication.

**DIfunction** —Oneofthefollowingfunctions canbeassignedtotheDISignal.

**Range switching** —Selecteitherthehigheror lowerrangeintheunidirectionalor bidirectional2-rangesetting.

**Totalizercontrol** —Startsandstopsthebuilt-in totalizer.

**Fixed-value outputs** —Outputsfixed-valuesfor currentandpulseoutputs.

**Zeroadjustment** —Executeszeroadjustment (on-streamatzeroflowrate).

**Outputs signals**

**Current output:**

4–20mA dc (load resistance 0 to 750  $\Omega$ )

**Note:** The current output cannot be used with the PROFIBUS-PA communication.

**Digital outputs** — Two points are available as follows.

**Digital output DO1:**

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

**Note:** DO1 cannot be used if Modbus communication connection is 3 lines.

**Digital output DO2:**

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

**Note:** DO2 cannot be used with the Modbus communication.

**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: 0.5 to 500ms (but less than half of the period for 100% flow rate)  
Note: The same and simultaneous pulse is not available between DO1 and DO2.)
- **Multi-range selection outputs (Note 1)**
- **High and/or low limit 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.  
The status when power failure is kept to Normal Open.

**Communications output :**

• **HART (std.)**  
Digital signal is superimposed on 4–20mA dc current signal as follows:

- Conform to HART protocol  
Load resistance: 240 to 750  $\Omega$   
Load capacitance: 0.25  $\mu$ F maximum  
Load inductance: 4mH maximum

**• PROFIBUS (opt.)**

Protocol: PROFIBUS-PA  
Baurate: 31.25kbps  
Bus voltage: 9–30VDC  
Consumption electric current of bus: less than 16mA  
Manufacture Ident-No.: 093B<sub>HEX</sub>  
Standard Ident-No.: 9740<sub>HEX</sub>

Slave address: 0–126 (Default address is 126)

Profile: Profile Ver. 3.01 for Process Control Devices

Function blocks: AI (Flow)  $\times$  1, Totalizer  $\times$  1

**• Modbus (opt.)**

Physical layer: RS485

Protocol: Modbus

Mode: RTU

Baud rate: 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 3line connection.

**LCD display:**

Full dot-matrix 128 $\times$ 128 dot LCD display (back-light provided)

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

**Parameters settings** — Parameters can be set as follows:

- **IR switches** : Three key switches are provided to set configuration parameters.
- **Digital communication** : The AF900 hand-held terminal or PROFIBUS 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 one 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
- PROFIBUS: No communication

**Power supply:**

One of the following can be selected:

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

**Surgeprotection:**

Arresters are installed in the power supply, and a current signal output circuit.

**Case:** Aluminum alloy (equivalent to IP67)

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

**Cable connection port:**

**Cable glands —**

LF620 and LF622 without cFMus Approval:

Provided as standard  
 O.D. of cable  $\phi$  11~13mm  
 Material Nylon66  
 G(PF) 1/2 male screws.

Note: When PROFIBUS or Modbus option are specified, cable gland size is  $\phi$  6~8mm for signal cable,  $\phi$  11~13mm for power cable

LF620F and LF622F with cFMus Approval:  
 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 150 Hz with acceleration of 9.8 m/s<sup>2</sup>  
 No defect in putting vibration to each direction of 30 Hz with 29.4 m/s<sup>2</sup> in 4h.

**Note:** Avoid using the flow meter in an environment with constant vibration.

**Dimensions and Weights:**

See Figure 3 (for Separatetype)

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

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

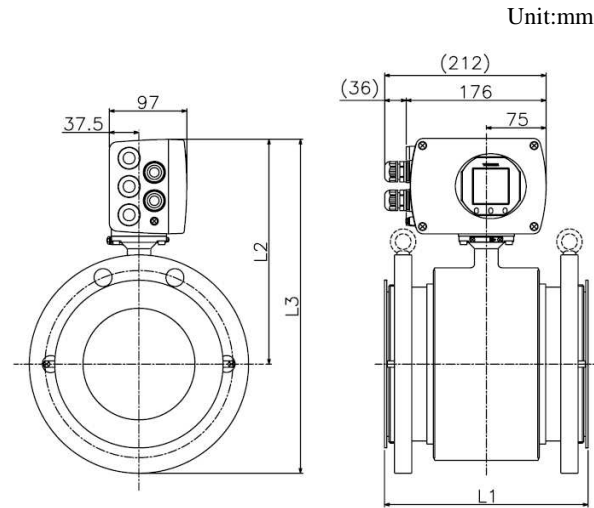
The following sizes fall under the category for PED in each flange connection when the meters ship to EU. All of them had complied with it from an notified body.

**Table 1. PED matrix in each flange connection**

Flange standard	Meter size
EN1092-1PN16	150 to 400mm (6 to 16 inch)
EN1092-1PN10	250 to 400mm (10 to 16 inch)
ASME B16.5 class 150 and JIS B 2220 10K	6 to 16 inch (150 to 400mm)

# Installation

## ■ Dimensions



**Note1:** Eyeboltsareprovidedatthetopforflowmeterssi  
aroll-preventionbaseisprovidedforflowmeterss

zed200mm(8")orabove,andfurther,  
ized250mm(10")orlarger.

**Note2:** CableglansarenoprovidedforLF434ofcFMusap  
Refertothe partCableconectionpartatdetector.

provedtype.

### EN1092-1PN16dimensions:

Metersize (mm)	L1 (mm)	L2 (mm)	L3 (mm)	No.of bolts	Weight (kg)
15	140	205	252	4	approx.5.0
25	160	208	265	4	approx.7.5
40	170	216	291	4	approx.9.5
50	180	225	308	4	approx.11.5
80	230	239	339	8	approx.16.5
100	240	257	367	8	approx.20.5
150	260	287	430	8	approx.36.0
200	300	313	483	12	approx.49.0
250	350	336	539	12	approx.105
300	400	363	593	12	approx.113
350	450	380	640	16	approx.130
400	500	401	684	16	approx.173

### JISB222010Kdimensions:

Metersize (mm)	L1 (mm)	L2 (mm)	L3 (mm)	No.of bolts	Weight (kg)
15	140	205	253	4	approx.5.0
25	160	208	271	4	approx.7.5
40	170	216	286	4	approx.9.5
50	180	225	303	4	approx.11.5
65(*4)	200	234	321	4	approx.14.0
80	230	239	332	8	approx.16.5
100	240	257	362	8	approx.20.5
150	260	287	427	8	approx.36.0
200	300	313	478	12	approx.49.0
250	350	336	536	12	approx.105
300	400	363	586	16	approx.113
350	450	380	625	16	approx.130
400	500	401	681	16	approx.173
450	550	430	740	20	approx.199

### ASMEB16.5class150dimensions:

Metersize (inch)	L1 (inch)	L2 (inch)	L3 (inch)	No.of bolts	Weight (lbs)
1/2	5.51	8.07	9.82	4	approx.11
1	6.30	8.19	10.31	4	approx.15
1-1/2	6.69	8.50	11.00	4	approx.20
2	7.09	8.86	11.85	4	approx.27
3	9.06	9.41	14.91	4	approx.44
4	9.45	10.12	14.63	8	approx.57
6	10.24	11.30	16.79	8	approx.85
8	11.81	12.32	19.07	8	approx.126
10	13.78	13.23	21.23	12	approx.252
12	15.75	14.29	23.80	12	approx.301
14	17.72	14.96	25.46	12	approx.358
16	19.69	15.79	27.54	16	approx.460
18	21.65	16.93	29.43	16	approx.512

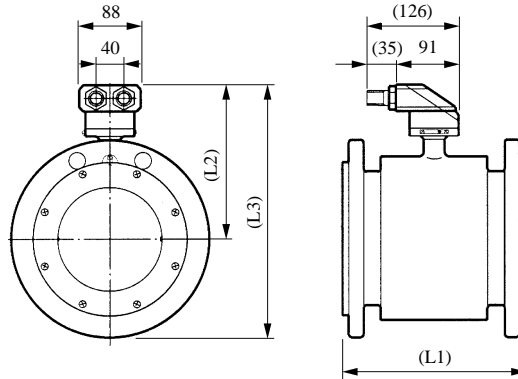
**Note 3 :** 1 inch = 25.4 mm

**Note 4 :** JIS B 2220 10K flange only without any Ex-approvals.

**Figure2.LF430/LF620andLF434/LF620Fcombinedty  
MeterSizes15(1/2")to450mm(18")**

**peflowmeters**

Unit:mm



**Note1:** Eyebolts are provided at the top for flow meters since a roll-prevention base is provided for flow meters.

**Note2:** Cable glands are not provided for LF434 of cFMusa connection port at detector.

zed 200mm (8") or above, and further, sized 250mm (10") or larger.

approved type. Refer to the part Cable

**EN1092-1PN16 dimensions:**

Metersize (mm)	L1 (mm)	(L2) (mm)	L3 (mm)	No.of bolts	Weight (kg)
15	140	147	194	4	approx.4.0
25	160	149	207	4	approx.6.0
40	170	158	233	4	approx.9.0
50	180	167	250	4	approx.11.5
80	230	181	281	8	approx.17.5
100	240	199	309	8	approx.22.0
150	260	229	372	8	approx.37.0
200	300	255	425	12	approx.52.0
250	350	278	481	12	approx.108
300	400	305	535	12	approx.121
350	450	322	582	16	approx.145
400	500	343	633	16	approx.188
450	550	372	707	20	approx.208

**JISB222010K dimensions:**

Metersize (mm)	L1 (mm)	(L2) (mm)	L3 (mm)	No.of bolts	Weight (kg)
15	140	147	194	4	approx.4.0
25	160	149	212	4	approx.6.0
40	170	158	228	4	approx.8.0
50	180	167	244	4	approx.10.0
65(*4)	200	176	263	4	approx.14.0
80	230	181	274	8	approx.15.0
100	240	199	304	8	approx.20.0
150	260	229	369	8	approx.35.0
200	300	255	420	12	approx.48.0
250	350	278	478	12	approx.106
300	400	305	528	16	approx.116
350	450	322	567	16	approx.141
400	500	343	623	16	approx.176
450	550	372	682	20	approx.200

**ASMEB16.5class150 dimensions:**

Metersize (inch)	L1 (inch)	L2 (inch)	L3 (inch)	No.of bolts	Weight (lbs)
1/2	5.51	5.79	7.56	4	approx.8.8
1	6.30	5.87	7.99	4	approx.12.1
1-1/2	6.69	6.22	8.74	4	approx.17.6
2	7.09	6.57	9.57	4	approx.23.1
3	9.06	7.13	10.87	4	approx.39.7
4	9.45	7.83	12.36	8	approx.51.8
6	10.24	9.02	14.53	8	approx.80.5
8	11.81	10.04	16.81	8	approx.120
10	13.78	10.94	18.94	12	approx.249
12	15.75	12.01	21.54	12	approx.298
14	17.72	12.68	23.19	12	approx.355
16	19.69	13.50	25.28	16	approx.459
18	21.65	14.64	27.70	16	approx.507

**Note 3 :** 1 inch = 25.4 mm

**Note 4 :** JIS B 2220 10K flange only without any Ex-approvals.

**Figure3. Separately typed detectors LF430 and LF434 Metersizes 15(1/2") to 450mm (18")**

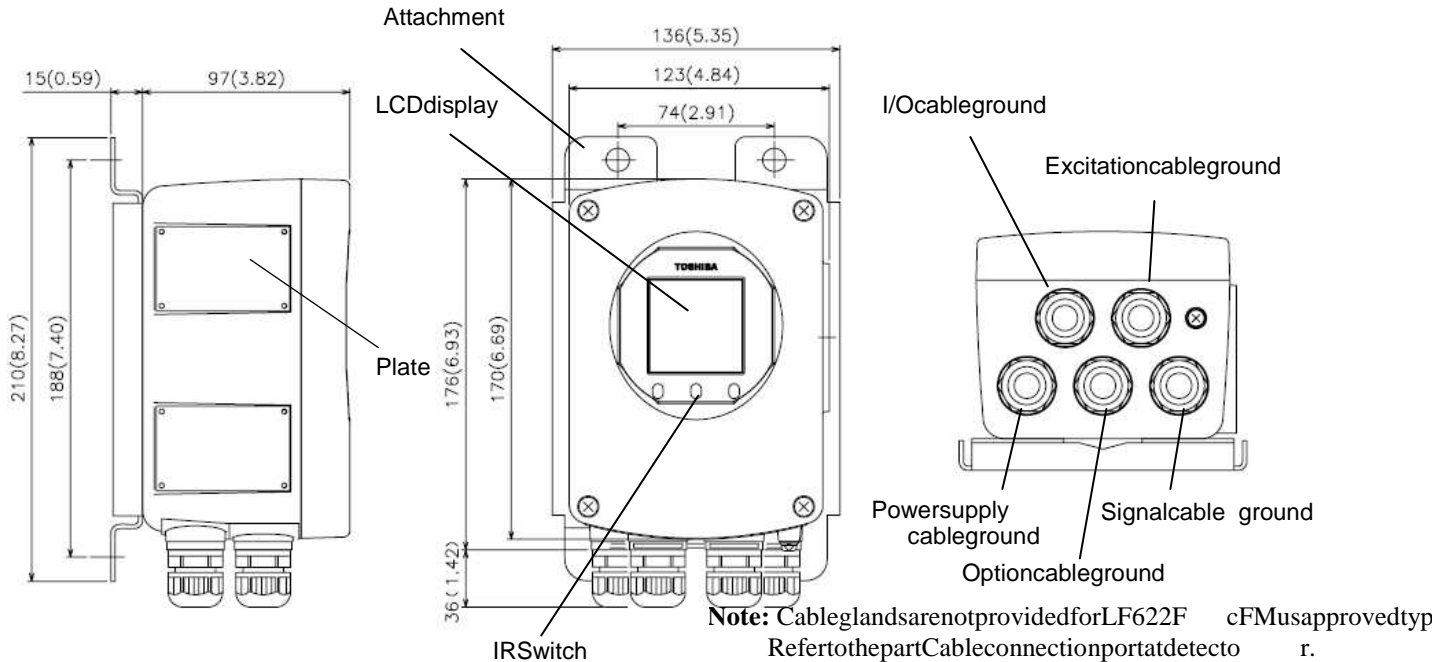
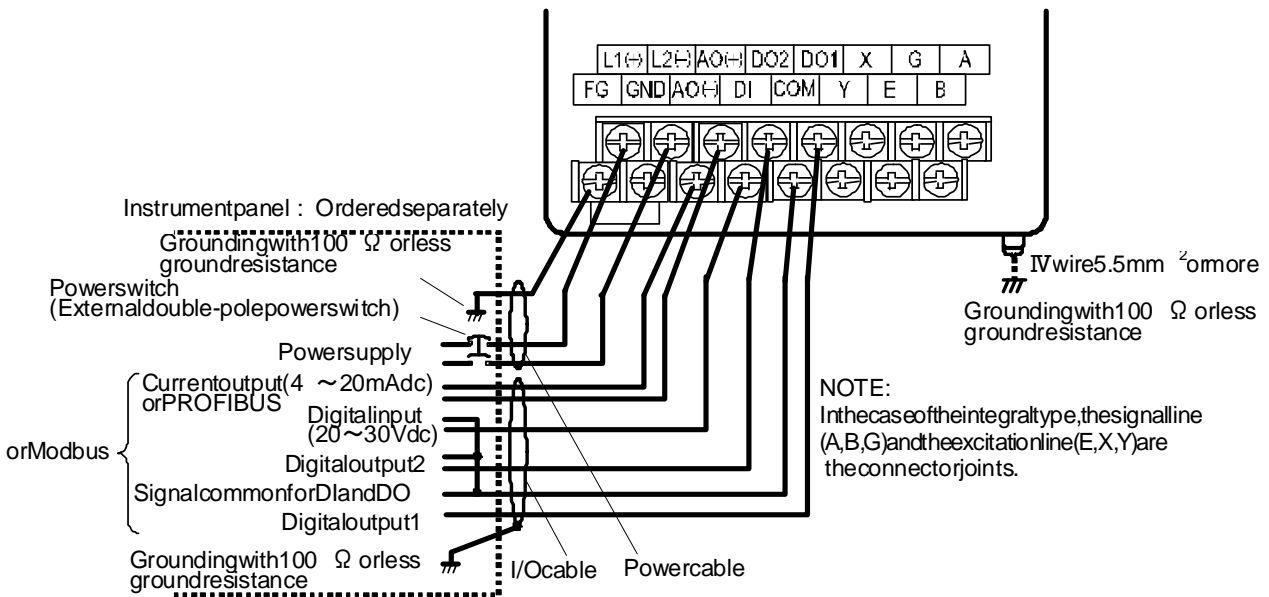


Figure 4. Separately type converter LF622 and LF622F

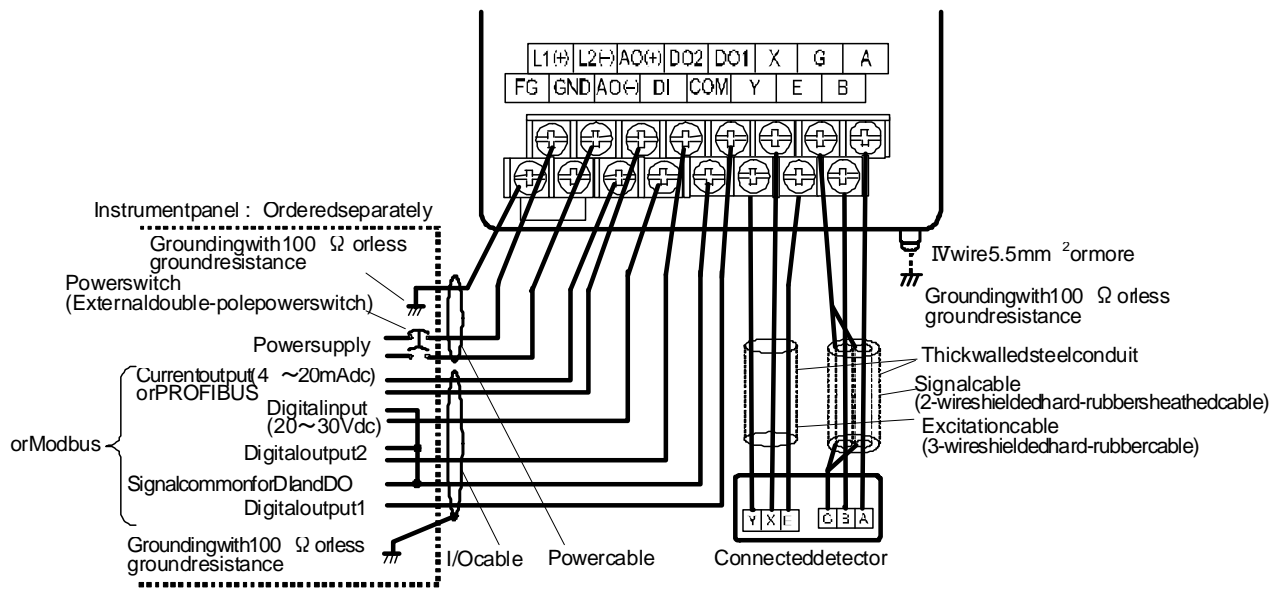
External Connections

- Combined type LF430/LF620 flowmeter and LF434/LF620 F flowmeters



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

Figure 5. Combined type LF430/LF620 and LF434/LF620 F flowmeters Wiring Diagram



Symbol	Description	Cable
L1(+)	Powersupply	Powercable
L2(-)		
GND	Ground(forarrester)	
FG	Frameground	
DI	DigitalInput(20 ~ 30Vdc)	I/Ocable
DO1	DigitalOutput1	
DO2	DigitalOutput2	
COM	SignalCommonforDI,DO1,DO2	
+	CurrentOutput(4 ~ 20mAdc)	Shieldedcablefor PROFIBUS-PA
-	orPROFIBUS	
X	ExcitationOutput	Excitationcable (forLF622,LF622Fonly)
Y		
E		
A	SignalInput	Signalcable (forLF622,LF622Fonly)
B		
G		

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

DO2 → T+, DI → T-, COM → TG

Symbol	Description	Cable
T+	Modbus(+)	Twist-pair polyethylene insulated vinyl sheath cable (JKEV, AWG24(0.2mm <sup>2</sup> ))
T-	Modbus(-)	
TG	Modbus(GND)	

Figure 6. Separate type LF430/LF622 and LF434/LF622 flowmeters wiring Diagram

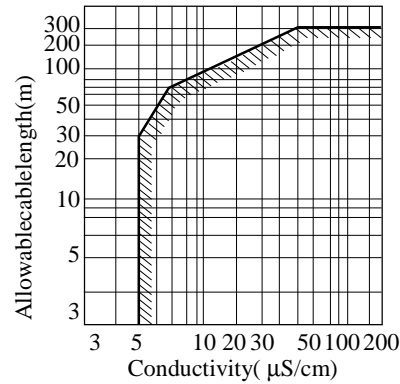


**Wiring Precautions**

- (1) Explosion proof type flow meters are not provided with cable glands. Refer to the part Cable connection port at detector and converter.
- (2) Connect the grounding wire (IV wire 5.5mm<sup>2</sup> or more) to a good earth ground (100 Ω 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 these separate type flow meter depend on the electrical conductivity of the object fluid. See Figure 7.
- (4) DO1, DO2, and DI use the same common terminal (COM). This COM cannot 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 (PROFIBUS or 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) Use a PROFIBUS-PA cable or a RS485 twist-pair cable for signal cable. In addition, make sure to use a shielded cable to improve noise resistance. Furthermore, installation of signal cable in metal conduit is recommended.
- (3) 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.
- (4) When you carry out cable end treatment of cable, use a dedicated cable stripper etc. so that the core wire of the cable will not be nicked or damaged. In addition, for cables, be careful of allowable maximum bend diameter etc. (Basically, do not install cables in a way cables are twisted or bent).
- (5) Consider installing a PROFIBUS-PA arrester in the communication path of PROFIBUS-PA so that the electromagnetic flow meter will not be affected by lightning etc.
- (6) The electromagnetic flow meter is not equipped with terminating resistors. Use the terminating resistor unit for PROFIBUS-PA or junction box, if necessary.
- (7) Only one PROFIBUS-PA cable goes through a cable gland of the Electromagnetic Flow meter. Please use the junction box at system configuration.
- (8) Install a terminator to flow meter that connects to end of Modbus network.



**Figure 7. 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 0.1 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.

**Table2.FlowRateandFlowvelocity(Slunit)**

Unit:m<sup>3</sup>/h

Size (mm)	Flowrate				
	0.1m/s	0.3m/s	1.0m/s	3m/s	10m/s
15	0.0636	0.1908	0.6361	1.908	6.361
25	0.1767	0.5301	1.767	5.301	17.67
32 <sup>*1</sup>	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 <sup>*1</sup>	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
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

**Note1:** JISB222010Kflangetypeonly.

**Table3.FlowRateandFlowvelocity(U.S.unit)**

Unit:gal/min

Size (inch)	Flowrate				
	0.3ft/s	0.98ft/s	3ft/s	10ft/s	32.8ft/s
1/2	0.2801	0.8403	2.561	8.532	28.01
1	0.7781	2.334	7.115	23.72	77.81
1½	1.992	5.975	18.21	60.71	199.2
2	3.112	9.337	28.46	94.86	311.2
3	7.967	23.90	72.85	242.8	796.7
4	12.45	37.35	113.8	379.4	1,245
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	15,250
16	199.2	597.5	1,821	6,071	19,920
18	252.1	756.3	2,305	7,684	25,210

**■ Aboutestablishmentenvironment**

Donotstoreorinstalltheflowmeter:

- Wherethereisdirectsunlight.
- Whereexcessivevibrationormechanicalshock occurs.
- Wherehightemperatureorhighhumidity conditionsexist.
- Wherecorrosiveatmosphereexist.
- Placethatcanbesubmergedunderwater.
- Wherethereisaslopedfloor.Toputtheflowmet temporarilyonthefloor,placeitcarefullywith something,suchasablock,tosupportitsothat flowmeterwillnottoppleover.

Inareaslikethefollowing,theremaybethecase infraredswitchesdonotfunctioncorrectly.(Ifthere areunavoidable,useanappropriatecover.)

- (1)Whereunit(operationpanel)isexposedtodire sunlight,reflectionoflightontowindowpaneand diffusedlightreflection.
- (2)Wheresmokeandsteammayoccur.
- (3)Whereexposedtodirectsnow,iceormud.

**■ CalibrationRange**

Ifthecalibrationrangeisnotspecified,thestan dard rangeasshownbelowwillbeused.Iftherangeis specified,wewillusethespecifiedrangefor calibration.

Table 4. Standard Flow RangeMeter size mm(inch)	Standardflowrange			
	Flow rate (m <sup>3</sup> /h)	Flow velocity (m/s)	Flow rate (gal/min)	Flow velocity (ft/s)
15(1/2)	2	3.144	25	29.283
25(1)	6	3.395	75	31.625
32(1¼)	10	3.454	125	32.171
40(1½)	15	3.316	175	28.826
50(2)	25	3.537	300	31.625
65(2½)	40	3.348	475	29.629
80(3)	60	3.316	650	26.766
100(4)	100	3.537	1,000	26.354
150(6)	200	3.144	2,500	29.283
200(8)	300	2.653	4,500	29.649
250(10)	600	3.395	7,000	29.517
300(12)	900	3.537	10,000	28.283
350(14)	1,200	3.465	12,000	25.817
400(16)	1,600	3.537	16,000	26.354
450(18)	2,500	4.366	20,000	26.029

**Note:** Theunitof"gal/min"isnotexchanged (converted)by"m<sup>3</sup>/h".

**OrderingInformation**

1. WhenorderingtheLF430seriesflowmeters,refe r toTables6and7(TypeSpecificationCodes). Anentrymustbemadeforeachofthecolumnsin eachofthesetables.
2. Fluidcharacteristics:
  - (1)Typeoffluidtobemeasuredanditscharacteri stics
  - (2)Fluidtemperature
  - (3)Fluidpressure
  - (4)Electricalconductivityofthefluid
3. Measuringrange
4. I/Ofunctionsetting
5. Orderingscope:
  - Flowcalibrationdata:(requiredornot)
6. Otheritems
  - Specificationsotherthanstandarditems

**ConsultaToshibarepresentativebeforeordering whenchoosingmaterialsofthewettedpartssuchas lining,electrodes,andgroundingrings**

**Table6.SpecificationCode(Flangetypedetector LF430Series)**

Model					SpecificationCode									Description	Detectorcategory				
1	2	3	4	5	6	7	8	9	10	11	12	13	14		Normaltype		Ex.type		
															Gr.-A	Gr.-B	Gr.-C	Gr.-D	
L	F	4	3	0											Normalspecificationtype	√	√		
L	F	4	3	4											Hazardouslocationcertificationtype(Note1)			√	√
					D										Metersize				
					E										15mm(1/2")	√			
					S										25mm(1")	√			
					F										32mm(1 1/4")(Note7)	√		√	
					G										40mm(1 1/2")	√		√	
					W										50mm(2")	√		√	
					H										65mm(2 1/2")(Note7)	√		√	
					J										80mm(3")		√		
					K										100mm(4")		√		√
					L										150mm(6")		√		√
					M										200mm(8")		√		√
					N										250mm(10")		√		√
					P										300mm(12")		√		√
					Q										350mm(14")		√		√
					R										400mm(16")		√		√
															450mm(18")		√		√
					L										MountingStyle				
					M										Detector/Convertercombinedtype(LF430/LF620)	√	√		
					P										Detector/Converterseparatetype(LF430/LF622)	√	√		
					Q										Detector/ConvertercombinedtypewithPED(LF430/LF 620)(Note6)	√	√		
					A										Detector/ConverterseparatypewithPED(LF430/LF 622)(Note6)	√	√		
					B										FMandCSAClassI-Division2type(Note1)				
															Detector/Convertercombinedtype(LF434/LF620F)			√	√
															Detector/Converterseparatetype(LF434/LF622F)			√	√
					C										Connectionflangestandard				
					D										ASMEB16.5class150	●	●	●	●
					G										ASMEB16.5class300	○	○	○	○
					H										EN1092-1PN10	○	○	○	○
					J										EN1092-1PN16	○	○	○	○
					K										JISB222010K	●	●	●	●
					L										JISB222016K	○	○	○	○
					Z										JISB222020K	○	○	○	○
															Other	○	○	—	—
					B										ElectrodeMaterial(Note5)				
					C										316Lstainlesssteel	●	●	●	●
					D										Ti(titanium)	○	○	○	○
					E										Pt-Ir(platinum/iridium)	○	○	○	○
					F										Ta(tantalum)	○	○	○	○
					Z										HastelloyC(Equivalent)	○	○	○	○
															Other	○	○	—	—
					C										LiningMaterials(Note5)				
					D										TeflonFPA	●	○	●	○
															EPDMrubber	—	●	—	●
					C										GroundingRingMaterial(Note5)				
					D										316stainlesssteel	●	●	●	●
					E										316Lstainlesssteel	○	○	○	○
					F										Ti(titanium)	○	○	○	○
					G										Ta(tantalum)	—	—	—	—
					H										Pt-Ir(platinum/iridium)	—	—	—	—
					Z										HastelloyC(Equivalent)	○	○	○	○
															Other	○	○	—	—
					A										Flowandcalibrationvelocityrange				
					B										0.3to10m/s(standardrange calibration)	●	●	●	●
					C										0.3to10m/s(specifiedrange calibration)	○	○	○	○
															0.1to10m/s(specifiedrange calibration)	○	○	○	○
					A										ExcitationandSignalCables				
					B										notprovided	●	●	●	●
					C										30mcable,provided(Note2)	○	○	○	○
															otherlengths,provided(Note3)	○	○	○	○
					B										Coating				
					C										phthalicacidresincoatingpearl-graycolored	●	●	●	●
					D										blacktarepoxyresin0.3mm	○	○	○	○
					E										blacktarepoxyresin0.5mm	○	○	○	○
															blacktarepoxyresin0.5mmforsubmersibletype(N ote4)	—	○	—	○

Sizecodeexplanation: √:Object ●:Standard ○:Option —:Notavailable  
**Note1:**Cableglandsarenotprovided.Refertothe part of"Cableconnectionport"atdetectorandconverte r.  
**Note2:**Separatypedetectoronly.  
**Note3:**Separatypedetectoronly.Specifyingthecode "C",indicatethelengthofcablesfrom1to300m1 meterincrements.  
**Note4:**EPDMrubberliningisavailabletochooseonlyin thisspecification.  
**Note5:**ConsultToshibabeforeorderingwhenchoosemater ialsatthewettingparts.  
**Note6:**ChecktheTable1whetheryourchosenmetersize meetsthisdirectiveornotwhenthe meterisshipp edtoEU.Ifyes,needtochoosethiscode.  
**Note7:**JISB222010KflangeonlywithoutanyEx-approval s.

**Table7.SpecificationCodeforLF620/LF622conver ters**

Model				SpecificationCode										Contents	LF620 type	LF622 type	
1	2	3	4	5	6	7	8	9	10	11	12	13	14				
L	F	6	2												Electromagneticflowmeterconverter		
				0											Combined(Integral)type	●	—
				2											Separate(Remote)type	—	●
					A										Purpose		
					F										Standard	●	●
															cFMusclassI,Division2approved	○	○
						A									Shape		
															Standardtypewithcase	●	●
							A								Convertermountingfitting		
							C								None	●	○
							E								Panel,Accessoryforwallmounting (BNPmaterial:SUS304)	—	●
															Accessoryforpipeinstallation (BNPmaterial:SUS304)	—	○
								2							Digitalinput/output		
															Digitaloutputpoints2(DO1+DO2)+Digitalinputpo int1(DI)	●	●
									1						CurrentoutputandCommunicationfunction(Note1)		
									2						Currentoutput+HARTcommunication	●	●
									3						PROFIBUScommunication(Currentoutputisnot usable)	○	○
															Currentoutput+Modbus(RS485)communication (Digitaloutputs2(DO1+DO2)andDigital1(DI)inp utarenotusable)	○	○
										1					Powersupply(Note2)		
										2					100Vac-240Vac,50/60Hz	●	●
										3					24Vdc	○	○
															110Vdc	○	○
											F				Instructionmanual		
															English	●	●

Codeexplanation: ●:Standard ○:Option —:Notavailable

Note1:WhenModbuscommunicationisprovided,digitaloutputpoints1(DO1)anddigitaloutputpoints(DO2),digitalinputpoint 1(DI),HARTcommunicationcannotbeused.

WhenPROFIBUScommunicationisprovided,currentoutput(4-20mA)andHARTcommunicationcannotbeused. CheckTable8forthedetails.

Note2:Select110Vdcfortestreportinspectedundertheconditionof110Vdc.

**Table8.Communicationfunctionandoutputselecti ontable**

SelectionofFunction		Availabilityofoutputs			
Code (10 <sup>th</sup> digit)	Selected Communication	4-20mAdc	DO1	DO2	DI
1	HART	✓	✓	✓	✓
2	PROFIBUS	X	✓	✓	✓
3	Modbus	✓	✓ (Note)	X	X

Codeexplanation: ✓:Available X:NotAvailable

Note:Whendigitaloutput1functionandModbus communicationfunctionareusedatonetime,TG( signalground)of theModbuscommunicationfunctioncannotbeconnected(2lineconnection).

**Table 9. Specification Code (Exciting Cable and Signal Cable for Separate type only)**

Model			Specification Code				Description	
1	2	3	4	5	6	7		8
A	C	C						Dedicated preformed cable
			A					Nominal cross-sectional area of Exciting cable (Note 1) 1.25mm <sup>2</sup>
			B					2mm <sup>2</sup>
				A				Nominal cross-sectional area of Signal cable (Note 2) 0.75mm <sup>2</sup>
								Cable length
				0	0	1		1m
				0	0	2		2m
				0	0	3		3m
				0	0	4		4m
				0	0	5		5m From 1 to 10 meters (3.3 to 32.8 feet),
				0	0	6		6m cable can be ordered in 1 meter increments.
				0	0	7		7m
				0	0	8		8m
				0	0	9		9m
				0	1	0		10m
				0	1	5		15m
				0	2	0		20m
				0	2	5		25m
				0	3	0		30m From 10 to 50 meters (32.8 to 164 feet),
				0	3	5		35m cable can be ordered in 5 meter increments.
				0	4	0		40m
				0	4	5		45m
				0	5	0		50m
				0	6	0		60m
				3	0	0		300m
								From 50 to 300 meters (164 to 984 feet), cable can be ordered in 10 meter increments.

**Notes:**

- Exciting cable is a 3-wire chloroprene sheathed cable. For a nominal cross-sectional area of 1.25mm<sup>2</sup>, the overall diameter will be 12mm (15/32 inch); for 2mm<sup>2</sup>, 13mm (1/2 inch).
- Signal cable is a 2-wire shielded chloroprene sheathed cable with a nominal cross-sectional area of 0.75mm<sup>2</sup> and an overall diameter of 12mm (15/32 inch).
- Relation between exciting cable length and its nominal cross-sectional area and overall diameter is as follows.

Exciting cable length	Nominal cross-sectional area	Overall diameter
1 to 200m	1.25mm <sup>2</sup>	12mm
210 to 300m	2mm <sup>2</sup>	13mm


ISO9001 and ISO14001 are certified.

Specifications are subject to change without notice.

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