

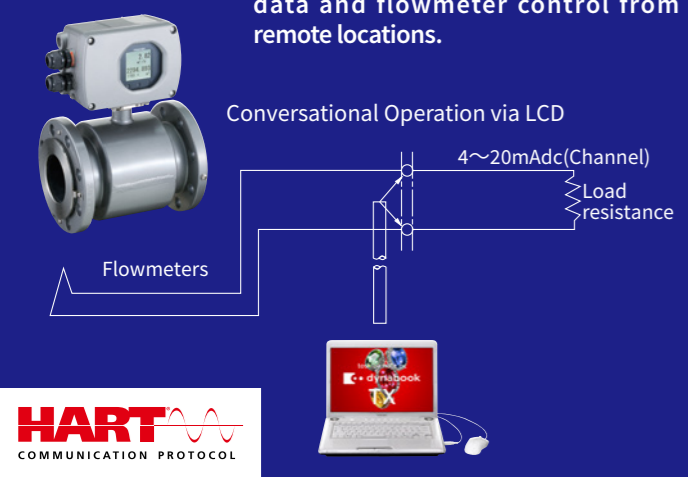
# Intelligent Functions for Greater Ease of Operation

## Multifunctional

A built-in microprocessor makes possible the numerous functions listed in the table of converter specifications. Though there are restrictions on the number of DI and DO points, the customer is free to choose from among numerous available functions.

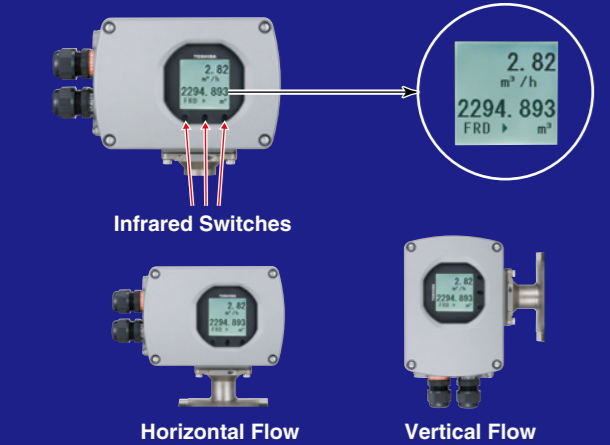
## Communication Functions(HART Protocol)

"Smart" transmission functions employ multiplexing of analog flow rate signals (4 to 20 mA dc) and digital signals. Together with the "Dev Com2000 Smart Device Communicator" or the Communicator of third party connected to a 4 to 20 mA line, they enable read-out of measurement data and flowmeter control from remote locations.



## Conversational Operation via LCD Display, or Enclosed Operation

Various flowmeter operations can be performed while viewing Full dot-matrix 128x128 LCD display. In highly humid environments, the flowmeter can be operated without opening the converter cover (enclosed operation). (Standard on the LF620, LF622, LF232 & LF502)Also LF620 & LF622 converter LCD display allows the LCD to be rotated electronically to 90, 180 and 270 degrees.



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

## Converters

| Model                          | LF620 (Integral type)   | LF622 (Remote type) | LF546 (Integral type)              | LF232 (Remote type)   |
|--------------------------------|---|---------------------|------------------------------------|---|
| Input                          | Digital Input: 1 (Note1)  |                     |                                    | Digital Input: 2 (option)   |
| Output                         | Current output : 4-20mAdc<br>Digital output :<br>1 transistor open-collector<br>1 solidstate relay contact<br>(Note1, Note2)  |                     |                                    | Current output :4-20mAdc<br>Digital output :<br>1 transistor open-collector<br>3 Solidstate relay contact<br>(option) |
| Comm. functions                | HART protocol, PROFIBUS Modbus  |                     | HART protocol<br>PROFIBUS (option) | HART protocol   |
| Other functions                | Pulse output<br>Multi-range selection output<br>High, High high, Low and/or Low low alarm<br>Empty Pipe Alarm (Note3)<br>Preset count (Simple batch system configurable using DI, DO)<br>Low cut<br>Fixed-Values for current and pulse outputs<br>Zero-span calibration<br>Zero adjustment function |                     |                                    |   |
| Display                        | LCD display (back-light provided)<br>Full dot matrix LCD  |                     |                                    | 2-row LCD   |
| Surge protection               | Built in power supply, current signal output circuit, digital Input/Output circuit  |                     |                                    |   |
| Power Supply                   | 100-240Vac 50/60Hz, 110Vdc<br>24Vdc (option)  |                     | 100-240Vac                         | 100-240Vac (Note4)<br>24Vdc (Note5)   |
| Structure                      | NEMA 4X (IP67) Watertight   |                     |                                    | NEMA 4 (IP67) Watertight  |
| Hazardous location Certificate | cFMus Div.2   |                     |                                    |   |

- Note1: DI, DO1, DO2 and HART cannot be used with Modbus communication.
- Note2: Current output and HART cannot be used with PROFIBUS communication.
- Note3: Not applicable to LF546
- Note4: 100-120Vac in case of partially-filled type.
- Note5: Applicable for meter size 1/10" to 18".



The works producing the flowmeter is registered as an environment management system factory specified by ISO14001.

### Safety Instructions

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

Specifications are May, 2018 and subject to change without notice.  
For further information, please contact your nearest Toshiba Representative or International Operations-Producer Goods.

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# TOSHIBA

# Toshiba's Line-Up of Electromagnetic Flowmeters



# TOSHIBA'S ELECTROMAGNETIC FLOWMETERS: INTELLIGENCE, HIGH QUALITY AND DURABILITY

Electromagnetic flowmeters are instruments for measuring the flow of conductive fluids, using Faraday's principle of electromagnetic induction.

Toshiba has been marketing electromagnetic flowmeters since the late 1960's. Toshiba flow-meters, the result of a wealth of experience and considerable engineering expertise, have won accolades in all areas of industry.

A full lineup of products covering diameters from 1/10" to 120" as well as various liner materials to accommodate diverse fluids are available, making possible fluid measurements in almost any imaginable application.

## Main Applications

- Water and Waste
- Foods, Beverage and Pharmaceutical
- Steel, Nonferrous Metals
  - Cooling water, Metals Processing,
  - Stack gas desulfurization
- Fertilizers and Inorganic Chemicals
  - Fertilizers, Soda, Aqueous acid solutions,
  - Aqueous alkaline solutions
- Pulp and Paper
  - Paper making processes, Pulp
- Polymer Chemicals
  - Chemical fibers, Water-soluble applications,
  - Water-soluble adhesives
- Liquids Containing Solid Matter
  - Concrete slurries, Mortar, Slurries of solid matter

## Toshiba Technology Meets Diverse Needs

- The divided multi-sampling system provides reliable and accurate measurement of a wide variety of fluids.
- Unique noise suppression technology reduces chemical noise.
- A high-purity alumina ceramic measurement tube eliminates potential problems in the measurement of fluids at elevated temperatures, corrosive chemicals, and fluids under other adverse conditions.
- Toshiba's functional magnetic field distribution technique and the reduced number of flowmeter components result in improved flow measurement efficiency and reliability.



## Intelligent Functions for Industry Requirements

- LF620 and LF622 converters are available to select the communication from HART protocol, PROFIBUS and Modbus (RS485).
- Userfriendly design provides ease of installation and operation.
- Wiring/connection access of the LF620 and LF622 converter is via the front panel of the unit.
- LCD display rotates 90, 180 and 270 degrees to fit every installation condition (Available for LF620, LF622 and LF546).
- All the converters are equipped with infrared switches. No need to open cover when setting.

## Enhanced Resistance to Harsh Environments

- Ceramic measurement tubes improve resilience
  - The LF470, LF414 and LF516 detectors (1/10" to 4") employ an alumina ceramic measurement tube, for improved resistance to abrasion, pressure and temperature.
- LF654 PFA liner for remote detector enable the flowmeter to operate under the extreme ambient temperature -40°F. Also LF654 is filled up resin between detector and converter bring more reliability for cooling water applications such as anti-freeze liquid.

## Full Product Lineup

### Conventional Electromagnetic flowmeters

A complete lineup of flowmeter models with pipe diameters ranging from 1/10" to 120", and with various lining materials, accommodate diverse applications ranging from infinitesimal flow to largeflow measurements and from measurement of water flow to measurements of chemicals and solutions.

### Capacitance type LF516/LF546

This technology makes LF516 be able to measure low conductivity liquid and high density slurry. Normal electromagnetic flowmeter can't measure low conductivity liquid such like purified water, syrup and so on. LF516 can measure these liquid.

### Electromagnetic Flowmeters for Sanitary Applications (LF494, LF516 sanitary 3A approved)

Model LF494 and LF516 sanitary are used for the measurement flow under sanitary conditions. The flowmeters are designed for handling cleaning-in-place (CIP) and sterilization-in-place (SIP) requirements with quick connect components.

### Ready for Use in Diverse Applications

Please consult a sales representative for information on specialized applications.

## Detectors

| Models                                   | General ( high performance)   | General  | General ( for abrasive )  |  | For food and beverage                          | For injection  | For purified water and syrup   | Large size   | Ultra large size  | For waste water  |
|--|---|--|---|--|--|--|--|--|---|--|
|  | LF654 Flanged   | GF630 / GF632 Flanged  | LF414 Wafer   |  | LF494 Sanitary                                 | LF470 Fractional   | LF516 Capacitance  | LF664 Flanged (large)  | LF150 Flanged (large)   | LF502 Partially-filled   |
| Mounting style between converter         | Integral type / Remote type   |  |   |  |  | Remote type  | Integral type  | Integral type/Remote type  | Remote type   | Remote type  |
| Meter size Unit : inch (mm)              | 1/2", 1", 1-1/4", 1-1/2", 2", 2-1/2", 3", 4", 6", 8", 10", 12", 14", 16", 18" (15 to 450mm)   | 1/2", 1", 1-1/4", 1-1/2", 2", 2-1/2", 3", 4", 6", 8", 10", 12", 14", 16", 18", 20", 24" (15 to 600mm)          | 1/2", 1", 1-1/2", 2", 3", 4", 6", 8" (15, 25, 40, 50, 80, 100, 150, 200mm)          |  | 1", 1-1/2", 2", 3", 4" (25, 40, 50, 80, 100mm) | 1/10", 1/6", 1/4" (2.5, 4, 6mm)  | 1", 1-1/2", 2", 3", 4" (25, 40, 50, 80, 100mm)   | 20", 24", 28", 30", 32", 36", 40", 42", 44", 48", 54", 60", 64", 66", 72", 78", (500 to 1,950mm)   | 80", 88", 96", 104", 112", 120" (2,000 to 3,000mm)  | 6", 8", 10", 12", 14", 16", 20", 24" (150, 200, 250, 300, 350, 400, 500, 600mm)                          |
| Measurement Range (Flow rate equivalent) | 1.0 - 39.4ft/s (0.3m/s to 12m/s)  | 1.0 - 32.8ft/s (0.3m/s to 10m/s)   |   |  |  |  | 1.64 - 32.8ft/s (0.5m/s to 10m/s)  | 1.0 - 32.8ft/s (0.3m/s to 10m/s)   |   |  |
| Accuracy                                 | < 1/2" to 18" (15 mm to 450 mm) ><br>±0.2% of Rate*<br>*This pulse output error result is established under standard operating conditions at Toshiba's admitted flow calibration facility. (NIST Traceable)<br>*Individual meter measurement error may vary up to ±0.5% of Rate at 1.64 ft/s (0.5m/s) or more and ±0.3% of rate ±0.039 inch/s (1mm/s) at 1.64 ft/s or less.<br>*Current output : plus ±8µA (0.05% of span.)<br>*Refer to individual calibration data for each individual meter's measurement error. |  |   |  |  | Measurement range: 3.3-32.8 ft/s (1.0-10m/s)<br>Flow rate 50-100%: ±0.8% of rate<br>Flow rate 0-50%: ±0.4% of FS | Measurement range: 3.28-32.8 ft/s (1.0-10m/s)<br>Flow rate 50-100%: ±0.5% of rate<br>Flow rate 0-50%: ±0.25% of FS | 20", 24": Accuracy ±0.3% of Rate*<br>• This output error result is established under standard operating conditions at Toshiba's admitted flow calibration facility. (NIST Traceable)<br>• Individual meter measurement error may vary up to ±0.5% of Rate at 3.28ft/s (1.0 m/s) or more and ±0.3% of Rate ±0.079 inch/s (2 mm/s) at 3.28 ft/s (1.0m/s) or less.<br>• Current output: plus ±8µA (0.05% of span.)<br>• Refer to individual calibration data for each individual meter's measurement error. | 28" to 120": Accuracy ±0.5% of Rate*<br>• This pulse output error result is established under standard operating conditions at Toshiba's flow calibration facility, Fuchu Japan.<br>• Individual meter's measurement error may vary up to ±0.8% of Rate at 3.28ft/s (1.0m/s) or more and ±0.4% of Rate ±0.157inch/s (4mm/s) at 3.28ft/s (1.0m/s) or less.<br>• Current output : plus ±8µA (0.05% of span.)<br>• Refer to individual calibration data for each individual meter's measurement error. | ±2%FS  |
| Mounting style                           | Flange  |  | Wafer   |  | Sanitary clamp                                 | Threaded   | Wafer + Sanitary clamp   | Flange   |   | Flange   |
| Lining material (Meter size)             | PFA: All Sizes<br>Polyurethane (*2): All Sizes  | FEP: 1/2" to 10" (15 - 250mm)<br>PTFE: 12" to 24" (300 - 600mm)<br>Polyurethane (*2): 1/2" to 18" (15 - 450mm) | ceramic (std.): 1/2" to 4" (15-100mm)   |  | PFA (All Sizes)                                | Alumina ceramic (All Sizes)  |  | Natural rubber<br>Hard rubber (*2) (All Sizes)   | Chloroprene rubber (All Sizes)  | EPDM: 6" to 16" (150-400mm)<br>Chloroprene: 20" & 24" (500 & 600mm)                                      |
| Electrode material                       | Polyurethane: 316L stainless steel (std.)<br>PFA lining: Hastelloy C equivalent (*1)(std.)  | Polyurethane: 316L stainless steel (std.)<br>FEP, PTFE lining: Hastelloy C equivalent (*1)(std.)               | Hastelloy C equivalent (*1)(std.)   |  | 316L stainless steel (std.)                    | Pr-Ir  | Nothing at the wetting part  | 316L stainless steel (std.), others  |   | 316L stainless steel (std.)  |
| Grounding ring material                  | 316 stainless steel (std.)  | Polyurethane, FEP: 316 stainless steel (opt.)<br>PTFE: 316 stainless steel (std.)                              | 316 stainless steel (std.)  |  |  | 316 stainless steel (std.)   | 316 stainless steel (std.)   | 316 stainless steel  | Chloroprene rubber:<br>304 stainless steel (std.)   | 6" to 16" (150-400mm): 316 stainless steel (std.)<br>20" & 24" (500 & 600mm): 304 stainless steel (std.) |
| Detector body material                   | Carbon steel  |  | 1" to 4" (25-100mm): Stainless steel<br>1/2", 6", 8" (15, 150, 200mm): Carbon steel |  | Stainless steel                                | Aluminum alloy   | Stainless steel  | Carbon steel   |   | Carbon steel   |
| Structure                                | NEMA 4X (IP67) Watertight<br>NEMA 6P (IP68) Submersible (to depth of 15m)(opt.)   |  | NEMA 4X (IP67) Watertight   |  | NEMA 4 (IP67) Watertight                       |  | NEMA 4X (IP67) Watertight<br>NEMA 6P (IP68) Submersible (to depth of 15m)(opt.)                                    |  | NEMA 4X (IP67) Watertight<br>NEMA 6P (IP68) Submersible (to depth of 15m)(opt.)   | NEMA 4X (IP67) Watertight<br>NEMA 6P (IP68) Submersible (to depth of 15m)(opt.)                          |
| Compatible converters                    | LF620 (Combined type), LF622 (Separate type)  |  |   |  |  | LF622 (separate type)  | LF546  | LF620 (combined type),<br>LF622 (separate type)  | LF232 AB  | LF232 AF   |
| Range of fluid levels                    | Fully-filled  |  |   |  |  |  |  |  |   | 1 - 1/4"(30mm) to fully-filled condition.  |
| Hazardous location Certificate           | cFMus Div.2   |  |   |  |  |  | cFMus Div.2  | cFMus Div.2 (only for LF664)   |   |  |

\*1: Hastelloy C is a registered trademark of Haynes International Inc. \*2: NSF approvals available.