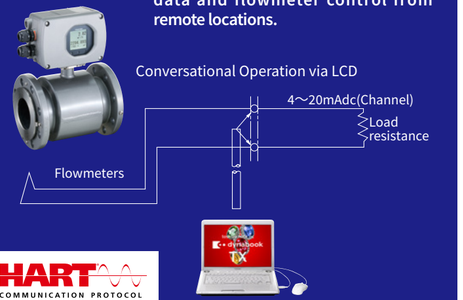
Intelligent Functions for Greater Ease of Operation

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)

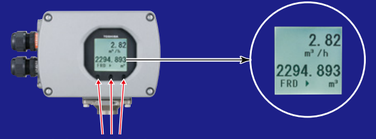
"Smart" transmission functions employ multiplexing of analog flow rate signals (4 to 20 mA dc) and digital signals. Together with the "Dev Com2000 Smart Device Communicator" or the Communicator of third party connected to a 4 to 20 mA line, they enable read-out of measurement data and flowmeter control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



HART COMMUNICATION PROTOCOL

Conversational Operation via LCD Display, or Enclosed Operation

Various flowmeter operations can be performed while viewing Full dot-matrix 128×128 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.



Infrared Switches

Horizontal Flow

Vertical Flow

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 Digital output : 1 transistor open-collector 1 solidstate relay contact (Note1, Note2)			Current output :4-20mAdc Digital output : 1 transistor open-collector 3 Solidstate relay contact (option)
Comm. functions	HART protocol, PROFIBUS Modbus		HART protocol PROFIBUS (option)	HART protocol
Other functions	Pulse output Multi-range selection output High, High high, Low and/or Low low alarm Empty Pipe Alarm (Note3) Preset count (Simple batch system configurable using DI, DO) Low cut Fixed-Values for current and pulse outputs Zero-span calibration Zero adjustment function			
Display	LCD display (back-light provided) 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 24Vdc (option)		100-240Vac	100-240Vac (Note4) 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".

ISO9001 Certified.

ISO14001 Certified.
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.

Toshiba Infrastructure Systems & Solutions Corporation
Industrial Systems Division
72-34, Horikawa-cho, Saiwai-ku, Kawasaki-shi, Kanagawa 212-8585, Japan
Tel. +81-44-331-1693 Fax. +81-44-548-9547

'19-01(TBLS)TIC-7861U

Toshiba International Corporation
Industrial Division Houston U.S.A.
Tel. +1-713-466-0277
Fax. +1-713-896-5225

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.

FM C US APPROVED　NSF Certified to NSF/ANSI 61　3A 28-04

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 antifreeze 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.

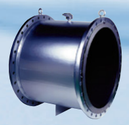
Electromagnetic Flowmeters for Sanitary Applications (LF494, LF516 sanitary 3A approved)

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)		6": 0 – 264 GPM (std) to 0 – 1320 GPM 8": 0 – 484 GPM (std) to 0 – 2420 GPM 10": 0 – 770 GPM (std) to 0 – 3850 GPM 12": 0 – 1100 GPM (std) to 0 – 5500 GPM 14": 0 – 1540 GPM (std) to 0 – 7700 GPM 16": 0 – 1980 GPM (std) to 0 – 9900 GPM 20": 0 – 3124 GPM (std) to 0 – 15620 GPM 24": 0 – 4400 GPM (std) to 0 – 22000 GPM
Accuracy	< 1/2" to 18" (15 mm to 450 mm) > ± 0.2% of Rate* *This pulse output error result is established under standard operating conditions at Toshiba's admitted flow calibration facility. (NIST Traceable) *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. *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. (NIST Traceable) *Individual meter measurement error may vary up to ±0.5% of Rate at 3.28 ft/s (1.0m/s) or more and ±0.3% of rate ±0.079 inch/s (2mm/s) at 3.28 ft/s (1.0m/s) or less. *Current output: plus ±8μA (0.05% of span.) *Refer to individual calibration data for each individual meter's measurement error.					Measurement range: 3.3-32.8 ft/s (1.0-10m/s) Flow rate 50-100%: ±0.8% of rate Flow rate 0-50%: ±0.4% of FS Measurement range: 1.0-3.3 ft/s (0.3-1.0m/s) Flow rate 0-100%: ±0.8% of FS	Measurement range: 3.28-32.8 ft/s (1.0-10m/s) Flow rate 50-100%: ±0.5% of rate Flow rate 0-50%: ±0.25% of FS Measurement range: 1.64-3.28 ft/s (0.5-1.0m/s) Flow rate 0-100%: ±0.5% of FS	20", 24": Accuracy :± 0.3% of Rate* • This output error result is established under standard operating conditions at Toshiba's admitted flow calibration facility. (NIST Traceable) • 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. • Current output: plus ±8μA (0.05% of span.) • Refer to individual calibration data for each individual meter's measurement error. 28" to 120": Accuracy :±0.5% of Rate* • This pulse output error result is established under standard operating conditions at Toshiba's flow calibration facility, Fuchu Japan. • 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. • Current output : plus ±8μA (0.05% of span.) • 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 Polyurethane (*2): All Sizes	FEP: 1/2" to 10" (15 - 250mm) PTFE: 12" to 24" (300 - 600mm) 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 Hard rubber (*2) (All Sizes)	Chloroprene rubber (All Sizes)	EPDM: 6" to 16"(150-400mm) Chloroprene: 20" & 24"(500 & 600mm)
Electrode material	Polyurethane: 316L stainless steel (std.) PFA lining: Hastelloy C equivalent (*1)(std.)	Polyurethane: 316L stainless steel (std.) 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.) PTFE: 316 stainless steel (std.)	316 stainless steel (std.)			316 stainless steel (std.)	316 stainless steel (std.)	316 stainless steel	Chloroprene rubber: 304 stainless steel (std.)	6" to 16" (150-400mm): 316 stainless steel (std.) 20" & 24" (500 & 600mm): 304 stainless steel (std.)
Detector body material	Carbon steel		1" to 4" (25-100mm): Stainless steel 1/2", 6", 8" (15, 150, 200mm): Carbon steel		Stainless steel	Aluminum alloy	Stainless steel	Carbon steel		Carbon steel
Structure	NEMA 4X (IP67) Watertight NEMA 6P (IP68) Submersible (to depth of 15m)(opt.)		NEMA 4X (IP67) Watertight			NEMA 4 (IP67) Watertight		NEMA 4X (IP67) Watertight NEMA 6P (IP68) Submersible (to depth of 15m)(opt.)		NEMA 4X (IP67) Watertight NEMA 6P (IP68) Submersible (to depth of 15m)(opt.)
Compatible converters	LF620 (Combined type), LF622 (Separate type)					LF622 (separate type)	LF546	LF620 (combined type), 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.