

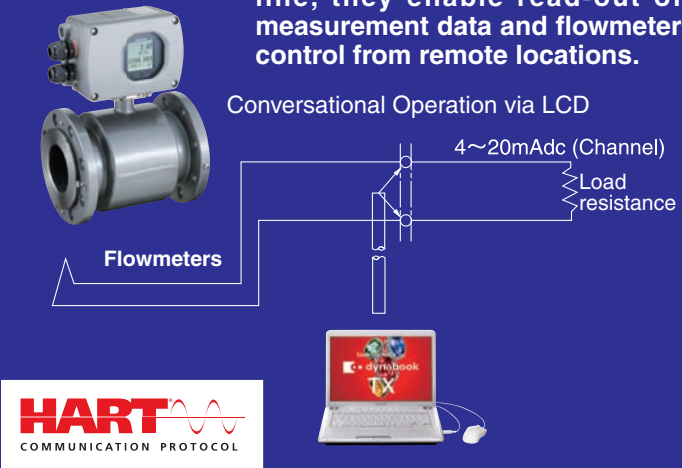
Intelligent Functions for Greater Ease of Operation

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.

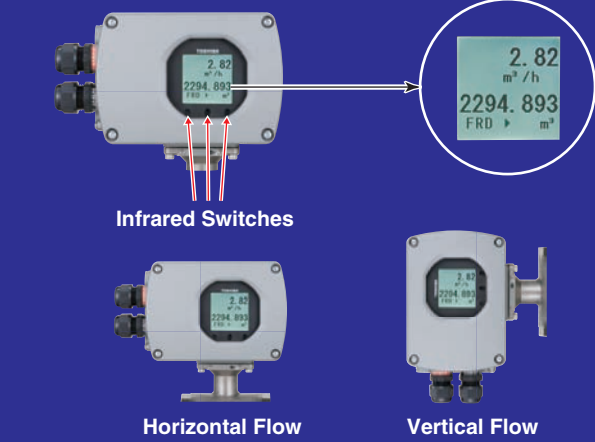
Communication Functions(HART Protocol)

"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)	LF541 (Integral type)	LF232 (Remote type)
				
Input	Digital Input: 1 (Note1)			Digital Input: 2 (option)
Output	Current output : 4-20mA dc Digital output : 1 transistor open-collector 1 solidstate relay contact (Note1, Note2)			Current output :4-20mA dc 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 LF541
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.

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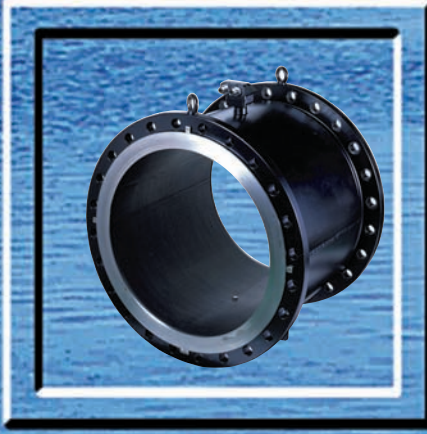
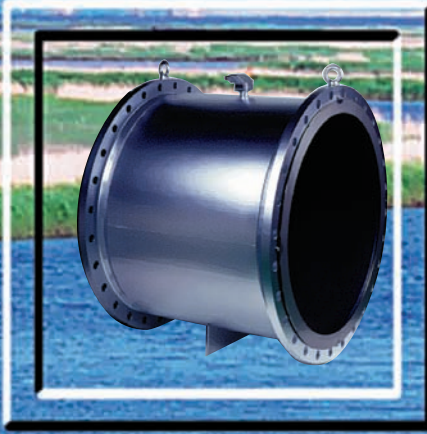
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Toshiba Group contributes to the sustainable future of planet Earth.



TOSHIBA
Leading Innovation >>>

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 flowmeters, 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.

● Detectors

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 satisfied the easy installation and operation.
- LF620 and LF622 converters can open the cover from front to achieve easy wiring access.
- LCD display rotates 90, 180 and 270 degrees to fit every installation condition (Available for LF620, LF622 and LF541).
- All the converters are equipped with infrared switch. No need to open cover when setting.

Enhanced Resistance to Harsh Environments

- Ceramic measurement tubes improve resilience
The LF470, LF410 and LF511 detectors (1/10" to 4") employ an alumina ceramic measurement tube, for improved resistance to abrasion, pressure and temperature.
- LF650 PFA liner enable the flowmeter to operate under the extreme ambient temperature -40°F. Also LF650 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 24", 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 LF511/LF541








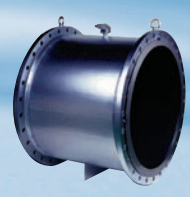

Toshiba's advanced capacitance technology achieves to electrode-less type of electromagnetic flowmeter at the wetting part inside detector pipe.

Electromagnetic Flowmeters for Sanitary Applications (LF490, LF511 sanitary 3A approved)

Model LF490 and LF511 sanitary are used for the measurement flow under sanitary conditions. The flowmeters are designed for handling of clean in place requirements with quick connect components.

Ready for Use in Diverse Applications

Please consult a sales representative for information on specialized applications.

Models	GF630 Flanged	LF650 Flanged	LF430 Flanged		LF410 Wafer	LF490 Sanitary	LF470 Fractional	LF511 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", 20", 24" (15 to 600mm)	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)	[0-1.0] - [0-32.8]ft/s (0-0.3m/s to 0-10m/s)								[0-1.64] - [0-32.8]ft/s (0-0.5m/s to 0-10m/s)	[0-1.0] - [0-32.8]ft/s (0-0.3m/s to 0-10m/s)		
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: 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		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.	
							Measurement range: 1.0-3.3 ft/s (0.3-1.0m/s) Flow rate 0-100%: ±0.8% of FS		Measurement range: 1.64-3.28 ft/s (0.5-1.0m/s) Flow rate 0-100%: ±0.5% of FS		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 measurment error.	
Mounting style	Flange				Wafer	Sanitary clamp	Threaded	Wafer • Sanitary clamp	Flange		Flange	
Lining material (Meter size)	FEP: 1/2" to 10" (15 - 250mm) PTFE: 12" to 24" (300 - 600mm) Polyurethane (*2): 1/2" to 16" (15 - 450mm)	PFA, Polyurethane (*2) Hard rubber (*2): 4" to 18" (100mm-450mm)	PFA: 1/2" to 16" (15-400mm) EPDM rubber: 3" to 18" (80-450mm) Hard rubber(*2): 4" to 24"(100mm-600mm)		ceramic (std.): 1/2" to 4" (15-100mm) PFA: 1/2" to 8" (15-200mm)	PFA	Alumina ceramic		Natural rubber Hard rubber (*2)	Chloroprene rubber	EPDM: 6" to 24"(150-600mm) PFA: 6" to 16" (150-400mm) Chloroprene: 20" & 24"(500 & 600mm)	
Electrode material	PU, 316L stainless steel (std.) FEP,PTFE lining: Hastelloy C equivalent (*1)(std.)	Polyurethane, Hard rubber lining: 316L stainless steel (std.) PFA lining: Hastelloy C equivalent (*1)(std.)	PFA lining: Hastelloy C equivalent (*1)(std.) EPDM, Hard rubber lining: 316L stainless steel (std.)		ceramic Lining: 316L stainless steel (std.) PFA lining: 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	PU, FEP: 316 stainless steel (opt.), others PTFE: 316 stainless steel (std.), others	PFA, Polyurethane, Hard rubber: 316 stainless steel (std.), others	PFA, EPDM, Hard rubber: 316 stainless steel (std.), others		ceramic, PFA: 316 stainless steel (std.), others		316 stainless steel, others	ceramic: 316 stainless steel, others	Hard rubber, Natural rubber: 316 stainless steel (opt), others	Chloroprene rubber: 304 stainless steel (std.), others	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 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.)		NEMA 4X (IP67) Watertight		NEMA 4 (IP67) Watertight	NEMA 4X (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)	LF541	LF620 (combined type), LF622 (separate type)	LF232 AB (*5)	LF232 AF (*5)	
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.

*3: 316 Stainless steel Grounding ring is installed as standard for PTFE lining.

*4: Model LF664 is combined with LF620 or LF622 converter. Its meter size is from 20" to 78" (500 to 1950mm)

*5: cFMus Div.2 for LF232 is pending.