

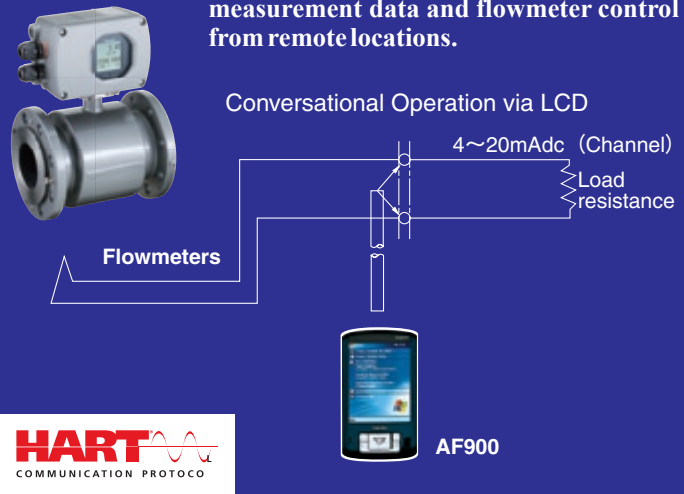
Intelligent Functions for Greater Ease of Operation

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.

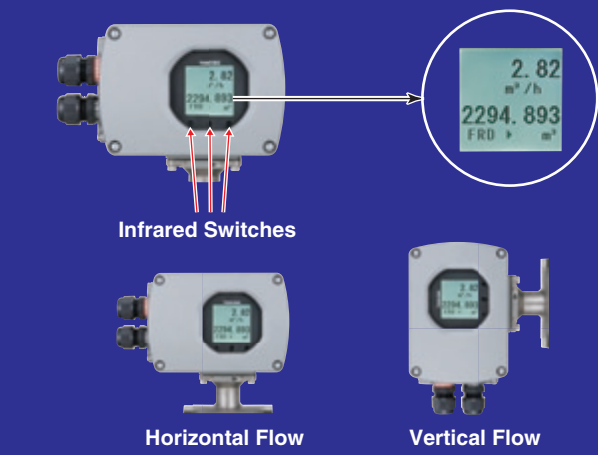
Communication Functions(HART Protocol)

"Smart" transmission functions employ multiplexing of analog flow rate signals (4 to 20mAdc) and digital signals. Together with the model AF900 handheld communication terminal or the HART Communicator model 375 connected to a 4 to 20mA 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 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.



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			Digital Input: 2 (option)
Output	Current output: 4-20mAdc Digital output: 1 transistor open-collector 1 solidstate relay contact			Current output: 4-20mAdc Digital output: 1 transistor open-collector 3 Solidstate relay contact (option)
Comm. functions	HART protocol, PROFIBUS & Modbus (option)		HART protocol & PROFIBUS (option)	HART protocol
Other functions	a) Pulse output b) Multi-range selection output c) High, High high, Low and/or Low low alarm d) Empty Pipe Alarm (Note1) e) Preset count (Simple batch system configurable using DI, DO) f) Low cut g) Fixed-Values for current and pulse outputs h) Zero-span calibration i) Zero adjustment function			
Display	LCD display (back-light provided) 2-row LCD			
Surge protection	Built in power supply, current signal output circuit			
Power Supply	100-240Vac 24Vdc (option) 110Vdc (option)		100-240Vac	100-240Vac (Note2) 24Vdc (Note3)
Structure	NEMA 4 (IP67) Watertight			
Explosion proof	In process of application			

Note1: Not applicable to LF541  
Note2: 100-120Vac for meter size 500 to 3000mm and partially-filled type.  
Note3: 24Vdc for meter size 2.5 to 450mm.



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Safety Instructions

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

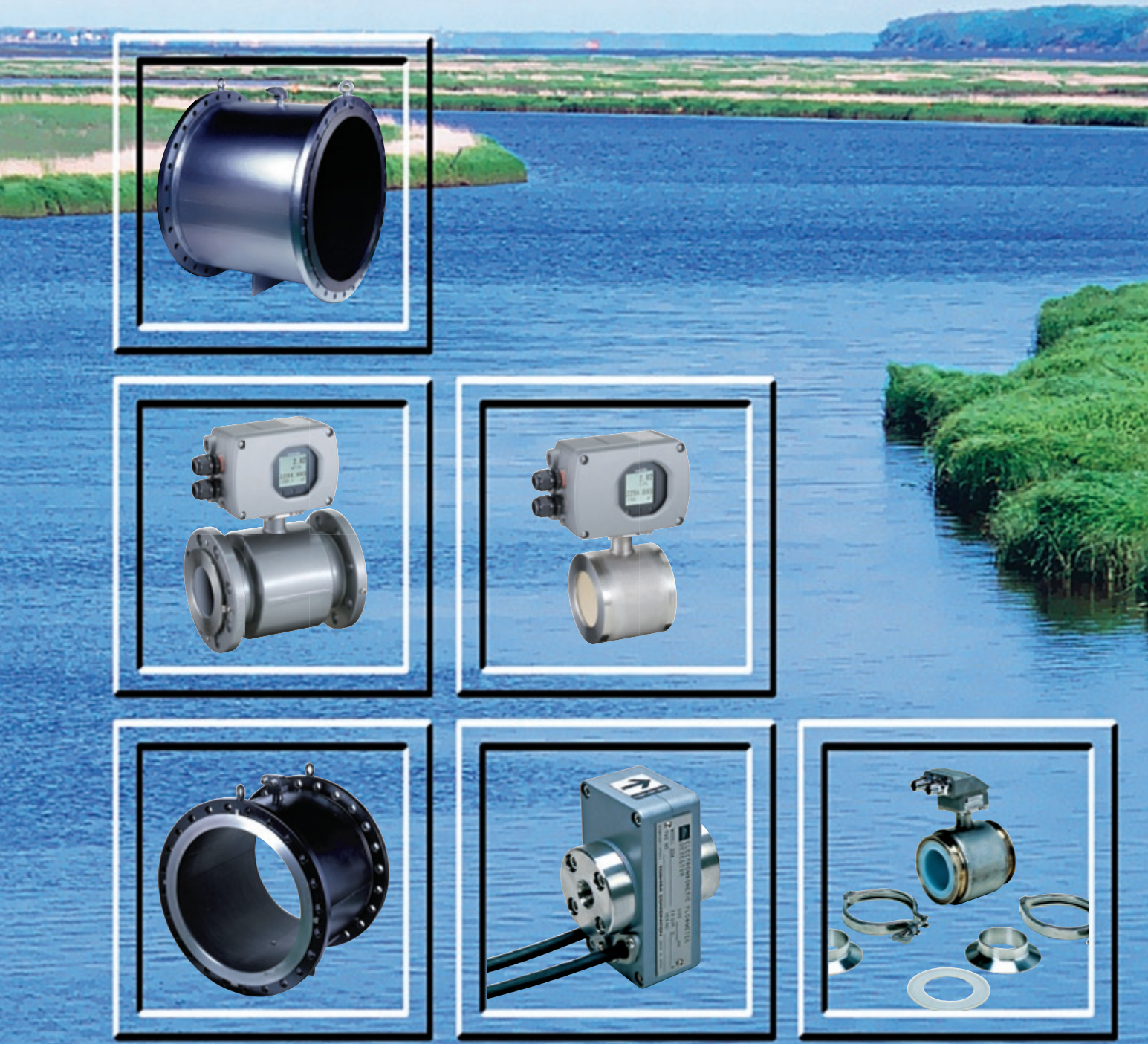
Specifications are November, 2009 and subject to change without notice.  
For further information, please contact your nearest Toshiba Representative or International Operations-Producer Goods.

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TOSHIBA  
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 2.5mm to 3000mm 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**  
Papermaking 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.



## Flowmeters Ready for Use Worldwide

- LF620 and LF622 converters are provided with universal power supplies as standard equipment, enabling use anywhere in the world. They can be powered at 100Vac to 240Vac; 24Vdc and 110 Vdc power supplies are also available.

## Enhanced Resistance to Harsh Environments

- **Ceramic measurement tubes improve resilience**  
The LF470, LF410 and LF511 detectors (2.5 to 100mm) employ an alumina ceramic measurement tube, for improved resistance to abrasion, pressure and temperature. The ceramic measurement tube is surrounded by metal in a construction impervious to stresses in pipe installation and stresses caused by rapid changes in temperature.
- **EPDM lining to improve ozone confinement**  
EDPM lining material provides excellent ozone resistance, so that flowmeters can be used without hesitation in high-grade water treatment and other plants where ozone resistance is important.

## Full Product Lineup

### Conventional Electromagnetic flowmeters

A complete lineup of flowmeter models with pipe diameters ranging from 2.5mm to 3000mm, and with various lining materials, accommodate diverse applications ranging from infinitesimal flow to largeflow measurements and from measurement of water flow to mesurements 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.






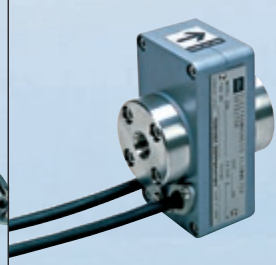

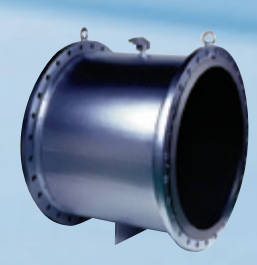

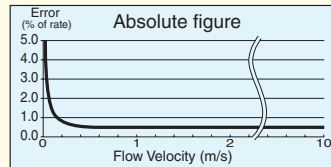
### Electromagnetic Flowmeters for Sanitary Applications (LF490, LF511 sanitary, 3A approved)

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.

## ● Detectors

Models	GF630 Flanged	LF650 Flanged (*3)	LF430 Flanged		LF410 Wafer	LF490 Sanitary	LF470 (334) Fractional	LF511 Capacitance	LF150 & LF450 Flanged (large)	LF502 Partially-filled
										
Mounting style between converter	Integral type / Remote type						Remote type	Integral type	LF450: Integral type / Remote type LF150: Remote type	Remote type
Meter size Unit : mm (inch)	15, 25, 32, 40, 50, 65, 80, 100, 150, 200, 250, 300, 250, 300, 350, 400, 450, 500, 600, 700, 750, 800, 900 (1/2" to 36")	15, 25, 32, 40, 50, 65, 80, 100, 150, 200, 250, 300, 350, 400, 450 (1/2" to 18")	15, 25, 40, 50, 80, 100, 150, 200, 250, 300, 350, 400, 450 (1/2" to 18")		15, 25, 40, 50, 80, 100, 150, 200 (1/2", 1", 1-1/2", 2", 3", 4", 6", 8")	25, 40, 50, 80, 100 (1", 1-1/2", 2", 3", 4")	2.5, 4, 6 (1/10", 1/6", 1/4")	25, 40, 50, 80, 100 (1", 1-1/2", 2", 3", 4")	500, 600, 700, 800, 900, 1000, 1100, 1200, 1350, 1500, 1600, 1800, 2000, 2200-3000 (20" to 120")	150, 200, 250, 300, 350, 400, 500, 600 (6", 8", 10", 12", 14", 16", 20", 24")
Measurement Range(Flow rate equivalent)	[0-0.1]-[0-10]m/s	[0-0.3]-[0-12]m/s	[0-0.1]-[0-10]m/s				[0-0.3]-[0-10]m/s	[0-0.5]-[0-10]m/s	[0-0.3]-[0-10]m/s	150mm: 0-60m <sup>3</sup> /h (Std.) to 0-300m <sup>3</sup> /h 200mm: 0-110m <sup>3</sup> /h (Std.) to 0-550m <sup>3</sup> /h 250mm: 0-175m <sup>3</sup> /h (Std.) to 0-875m <sup>3</sup> /h 300mm: 0-250m <sup>3</sup> /h (Std.) to 0-1250m <sup>3</sup> /h 350mm: 0-350m <sup>3</sup> /h (Std.) to 0-1750m <sup>3</sup> /h 400mm: 0-450m <sup>3</sup> /h (Std.) to 0-2250m <sup>3</sup> /h 500mm: 0-710m <sup>3</sup> /h (Std.) to 0-3350m <sup>3</sup> /h 600mm: 0-1000m <sup>3</sup> /h (Std.) to 0-5000m <sup>3</sup> /h ±2%FS
Accuracy	<15mm to 450mm> Pulse output: Vs>0.5m/s (1.64ft/s): ±0.5% of rate. <500mm to 600mm> Pulse output: Vs>1.0m/s (3.28ft/s): ±0.5% of rate. <700mm to 900mm> Pulse output: Vs>1.0m/s (3.28ft/s): ±0.8% of rate. *For the details, refer to the specification sheet.	Pulse output: Vs>0.5m/s (1.64ft/s): +/-0.4% of rate. Vs<0.5m/s (1.64ft/s): +/-0.4% of rate +/-1mm/s (0.039 inch/s). Current output: plus +/- 8µA (0.05% of span) (Note: Span=Range in the magmeters.)	Pulse output: Vs>0.5m/s (1.64ft/s): +/-0.5% of rate. Vs<0.5m/s (1.64ft/s): +/-0.3% of rate +/-1mm/s (0.039 inch/s). Current output: plus +/- 8µA (0.05% of span) (Note: Span=Range in the magmeters.)			Span: 1-10m/s Flow rate 50-100%: ±0.8% of rate Flow rate 0-50%: ±0.4FS Span: 0.3-under 1m/s Flow rate 0-100%: ±0.8%FS	Span: 1.0-10m/s Flow rate 50-100%: +/-0.5% of rate Flow rate 0-50%: +/-0.25% FS Span: 0.5-under 1.0m/s Flow rate 0-100%: +/-0.5% FS	500-1000mm Span: 1.0-10m/s: ±0.5%FS Span: 0.3-under 1.0m/s: ±0.8FS 1100-3000mm Span: 1.0-10m/s: ±0.8%FS Span: 0.3-under 1.0m/s: ±1.2FS		
Mounting style	Flange				Wafer	Sanitary clamp	Threaded	Wafer · Sanitary clamp	Flange	
Lining material (Meter size)	FEP: 15-250mm (1/2" to 10") PTFE: 300-600mm (12" to 24")	PFA, Polyurethane	PFA: 15-400mm (1/2" to 16") EPDM rubber: 80-450mm (3" to 18")		Alumina ceramic (std.): 15-100mm (1/2" to 4") PFA: 15-200mm (1/2" to 8")	PFA	Alumina ceramic		Chloroprene rubber (std.)	EPDM: 150-600mm (6" to 24") PFA: 150-400mm (6" to 16" ) Chloroprene: 500 & 600mm (20" & 24")
Electrode material	Polyurethane(PU): 15-400mm (1/2" to 16") Chloroprene rubber(CR): 450-900mm (18" to 36")	Polyurethane lining: 316L stainless steel(std.) PFA lining: Hastelloy C equivalent (*1)(std.)	PFA lining: Hastelloy C equivalent (*1)(std.) EPDM rubber lining: 316L stainless steel (std.)		316L stainless steel (std.)		Pt-Ir	Nothing at the wetting part	316L SS (std.), others	316L stainless steel (std.)
Grounding ring material	FEP,PTFE lining: Hastelloy C equivalent (*1)(std.) PU,CR lining: 316L stainless steel (std.)	316 stainless steel (std.)					316L stainless steel (std.)		LF150: 304 SS (std.), others LF450: None (std.), others	150-400mm (6" to 16"): 316 stainless steel (std.) 500 & 600mm (20" & 24"): 304 stainless steel (std.)
Detector body material	Carbon steel				25-100mm (1" to 4"): Stainless steel 15, 150, 200mm:(1/2", 6", 8"): Carbon steel	Stainless steel	Aluminum alloy	Stainless steel	Carbon steel	
Structure	NEMA 4 (IP67) Watertight	NEMA 4 (IP67) Watertight NEMA 6 (IP68) Submersible (to depth of 5m)(opt.)	NEMA 4 (IP67) Watertight NEMA 6 (IP68) Submersible (to depth of 5m)(opt.)	NEMA 4 (IP67) Watertight					NEMA 4 (IP67) Watertight NEMA 6 (IP68) Submersible (opt.)	NEMA 4 (IP67) Watertight NEMA 6 (IP68) Submersible (to depth of 5m)(opt.)
Compatible converters	LF620, LF622 or LF232						LF622 or LF232	LF541	LF150/LF232, LF450/LF620 or LF622 (*2)	
Range of fluid levels	Fully-filled									30mm to fully-filled (150-300mm) 10% of inside tube diameter to fully-filled (350-600mm)
Explosion proof	In process of application							In process of application		

\*1: Hastelloy C is a registered trademark of Haynes International Inc..

\*2: Model LF450 is combined with LF620 or LF622 converter. Its meter size is 500 & 600mm (20" & 24").

\*3: LF650 series will be released on April, 2010.