Toshiba’s Line-Up of Electromagnetic Flowmeters

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 "DevCom2000 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.

Intelligent Functions for Greater Ease of Operation

Conversational Operation via LCD Display, or Enclosed Operation
Various flowmeter operations can be performed while viewing the 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, LF546 & LF232) Also LF620 & LF622 converter LCD display allows the LCD to be rotated electronically to 90, 180 and 270 degrees.

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

Notes:
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”.

<table>
<thead>
<tr>
<th>Converters</th>
<th>LF620 (Integral type)</th>
<th>LF622 (Remote type)</th>
<th>LF546 (Integral type)</th>
<th>LF232 (Remote type)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>Digital input: 1 (Note1)</td>
<td>Digital input: 2 (option)</td>
<td>Digital input: 1 transistor open-collector</td>
<td>Digital input: 1 transistor open-collector</td>
</tr>
<tr>
<td>Output</td>
<td>Current output: 4-20mAdc</td>
<td>1 solidstate relay contact</td>
<td>Current output: 4-20mAdc</td>
<td>1 solidstate relay contact</td>
</tr>
<tr>
<td>Comm. functions</td>
<td>HART protocol, PROFIBUS Modbus</td>
<td>HART protocol</td>
<td>PROFIBUS (option)</td>
<td>HART protocol</td>
</tr>
<tr>
<td>Pulse output</td>
<td>Multi-range selection output</td>
<td>Preset count (Simple batch system configurable using DI, DO)</td>
<td>Line cut</td>
<td>Fixed/Values for current and pulse outputs</td>
</tr>
<tr>
<td>Other functions</td>
<td>High, High-low, Low and/or Low low alarm</td>
<td>Empty Pipe Alarm (Note3)</td>
<td>Zero-span calibration</td>
<td>Zero adjustment function</td>
</tr>
<tr>
<td>Comm. functions</td>
<td>HART protocol, PROFIBUS Modbus</td>
<td>HART protocol</td>
<td>PROFIBUS (option)</td>
<td>HART protocol</td>
</tr>
<tr>
<td>Power Supply</td>
<td>100-240Vac/50/60Hz, 110Vdc</td>
<td>24Vdc (option)</td>
<td>100-240Vac (Note4)</td>
<td>24Vdc (Note5)</td>
</tr>
<tr>
<td>Surge protection</td>
<td>Built-in power supply, current signal output circuit, digital input/output circuit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure</td>
<td>NEMA 4X (IP67) Watertight</td>
<td>NEMA 4X (IP67) Watertight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hazardous location certification</td>
<td>cFMus Div.2</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

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**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 220” as well as various liner materials to accommodate diverse fluid demands are available, making possible fluid measurements in almost any imaginable application.

**Main Applications**
- Water and Waste
- Foods, Beverage and Pharmaceuticals
- Steel, Nonferrous Metals
- Cooling water, Metals Processing
- Slack gas desulfurization
- Fertilizers and inorganic Chemicals
- Fertilizers, Soda, Aqueous chemicals, and fluids under other adverse conditions.

**Toshiba Technology Meets Diverse Needs**
- The double liquid sampling system provides reliable and accurate measurement of a wide variety of fluids.
- Unique noise suppression technology reduces chemical noise.
- 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 technology and the reduced number of flowmeter component parts 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 Mod- Bus (RS485).
- User-friendly design provides ease of installation and operation.
- Wiring/conversion 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 circuits are equipped with relay switches he need to open cover when setting.

**Enhanced Resistance to Harsh Environments**
- Ceramic measurement tubes improve resolve the LF370, LF414 and LF416 converters (1/2” to 4”) to employ an alumina ceramic measurement tube for improved resistance to abrasion, pressure and temperature.
- LF404 PFA liner for remote detector enable the flowmeter to operate under the extreme ambient temperature -40°F also LF644 PFA lined detector and converter bring the more reliability for cooling water applications such as anti-fouling liquid.

**Rational flow rate measurement**

**Models**

<table>
<thead>
<tr>
<th>General</th>
<th>General</th>
<th>General</th>
<th>For food and beverage</th>
<th>For injection</th>
<th>For purpure water and syrup</th>
<th>For water/coolant</th>
<th>Ultra large size</th>
<th>For waste water</th>
</tr>
</thead>
<tbody>
<tr>
<td>LF644</td>
<td>LF644</td>
<td>LF644</td>
<td>LF646</td>
<td>LF641</td>
<td>LF641</td>
<td>LF641</td>
<td>LF610</td>
<td>LF610</td>
</tr>
</tbody>
</table>

**Input Line Size**

<table>
<thead>
<tr>
<th>Detector size</th>
<th>Integral type</th>
<th>Remote type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8 – 0.75 inch</td>
<td>Integral type</td>
<td>Remote type</td>
</tr>
<tr>
<td>1/2 – 1 1/2 inch</td>
<td>Integral type</td>
<td>Remote type</td>
</tr>
</tbody>
</table>

**Range of Fluid Levels**

**Compatible converters**
- LF620 (combined type), LF622 (separate type)

**Flow rate**

*Flow rate 0-100%: ±0.5% of FS*

*Flow rate 0-50%: ±0.4% of FS*

*Measurement range: 3.3-32.8 ft/s (1.0-10 m/s)*

*Measurement range: 1.64-3.28 ft/s (0.5-1.0 m/s)*

*Measurement range: 0.3-0.8 ft/s (0.1-0.25 m/s)*

**Structure**

Toshiba's admitted flow calibration facility. (NIST Traceable)

**Electromagnetic Flowmeters for Sanitary Applications (LF340, LF345, LF335) 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 fittings.

Please consult a sales representative for information on special applications.

**Grounding ring material**

<table>
<thead>
<tr>
<th>Lining material</th>
<th>Mounting style</th>
<th>Remote type</th>
<th>Integral type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pr-Ir Nothing at the wetting part</td>
<td>Integral type</td>
<td>Remote type</td>
<td>Integral type/Remote type</td>
</tr>
<tr>
<td>316L stainless steel (std.)</td>
<td>Integral type</td>
<td>Remote type</td>
<td>Remote type</td>
</tr>
<tr>
<td>316L stainless steel (std.), others</td>
<td>Remote type</td>
<td>Remote type</td>
<td>Remote type</td>
</tr>
</tbody>
</table>

**FEP lining: Hastelloy C equivalent (*1)(std.)**

- 1/2” to 10” (15 - 250mm)
- 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)
- LF516 Capillarity

**LF644 Lined (Large)**

<table>
<thead>
<tr>
<th>Lining material</th>
<th>Range of fluid levels</th>
<th>Flow rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFA lining: Hastelloy C equivalent (*1)(std.)</td>
<td>20” &amp; 24” (500 &amp; 600mm): 304 stainless steel (std.)</td>
<td>±0.5% of rate 0-100% ±0.079 inch/s (2mm/s) at 3.28 ft/s (1.0m/s) or less.</td>
</tr>
<tr>
<td>FEP: 1/2” to 10” (15 - 250mm)</td>
<td>±0.5% of rate 0-100% ±0.079 inch/s (2mm/s) at 3.28 ft/s (1.0m/s) or less.</td>
<td></td>
</tr>
<tr>
<td>Chloroprene: 20” &amp; 24” (500 &amp; 600mm)</td>
<td>±0.3% of Rate*</td>
<td></td>
</tr>
<tr>
<td>PTFE lining: Hastelloy C equivalent (*1)(std.)</td>
<td>±0.5% of rate 0-100% ±0.079 inch/s (2mm/s) at 3.28 ft/s (1.0m/s) or less.</td>
<td></td>
</tr>
</tbody>
</table>

**Full Product Lineup**

A complete lineup of electromagnetic models with pipe diameters ranging from 1/10” to 220” and with various lining materials, accommodate diverse applications ranging from infinitesimal flow to large-scale measurements and from measurement of water flow to measurements of chemicals and solutions.

**Capacitance type LF351, LF530**

This technology makes LF351 be able to measure low conductivity liquid and highly density slurry. Normal electromagnetic flowmeter can’t measure low conductivity liquid such as purified water, syrup and so on. LF351 can measure these liquid.

**Electromagnetic Flowmeters for Sanitary Applications (LF340, LF345, LF335) Approved Model**

LF340 and LF350 are sanitary used for the measurement flow under sanitary conditions. Flowmeters are designed for handling cleaning-in-place (CIP) and sterilization-in-place (SIP) requirements with quick connect fittings.