LORRIC

Ultrasonic Flow & Energy Meter

FU-TX320

Taiwan Utility Model Patent





EchoSense®

FU-TX320

Pipe Size: 2” – 16” (DN50 ~ DN400)

Non-invasive
No pipe cutting, suitable for various applications

Easy Setup
Built-in pipe & liquid database simplifies configuration.



Gel-Free Coupling
Time and cost efficient without coupling gel

Flexible Installation
Remote-mount design and patented clamps support challenging installations.

Enhanced Measurement Accuracy
Advanced signal processing delivers stable and reliable readings.

Temperature Sensor Compatible
Add a PT100 sensor as optional add-on for thermal energy monitoring.

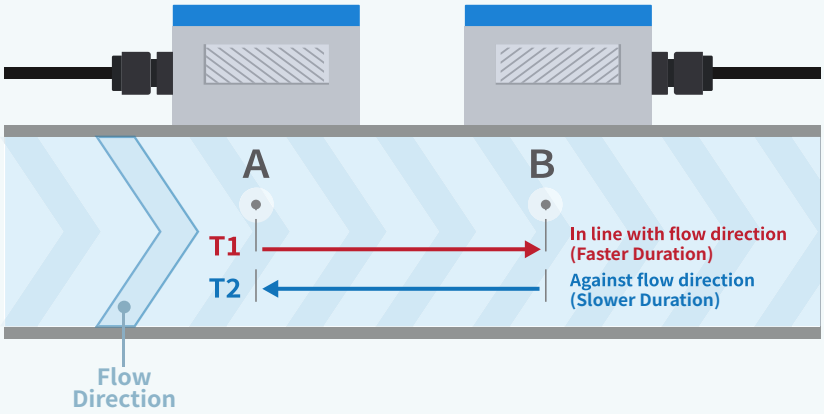
EchoSense® Technology Principle

Time-of-Flight (ToF) measures wave travel time to accurately determine or flow velocity

Flow Rate = Cross-Sectional Area × Flow Velocity

Where flow velocity was obtained through the **Time of Flight method** (Calculating time offset from A → B and B → A)

Flow velocity =
A to B and B to A time offset
(T2 - T1)



EchoSense®



Suitable for Various Fluids, Pipe Materials, and Pipe Sizes

The EchoSense™ ultrasonic flow meter is highly versatile, accurately measuring water, oil, and various chemicals. FU-TX320 is compatible with multiple piping materials — including stainless steel, PVC, PP, and PVDF — and supports major international pipe standards. Covering pipe sizes from 2” to 16” (DN50–DN400), FU-TX320 delivers stable, reliable performance across a wide range of industries.

Applicable Fluids







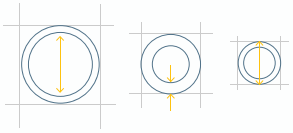
Pipe Materials


Stainless Steel


PVC


Others
(such as PP, PVDF, etc)

Pipe Specs



2” ~ 16”

For other pipe diameter needs, please contact us



Complete all settings seamlessly with

Built in Pipe & Liquid Database

No need to calculate or enter pipe specs by hand. FU-TX320’ s built-in database covers common pipe sizes, materials, and standards (PVC, PP, PVDF, PFA, stainless steel, copper — CNS/JIS/ASTM/DIN), plus a library of common liquids — so for standard installations, setup means selecting from a menu instead of keying in wall thickness, diameter, or fluid sound-velocity values by hand. Once pipe and liquid are selected, the device calculates the required probe spacing and displays it on screen, ready to guide installation.

- ✓ Faster commissioning
- ✓ Fewer setup errors
- ✓ Supports global pipe standards
- ✓ Simplifies installation for maintenance personnel



Flexible Installation for

HVAC and Chilled Water Systems

Remote-Mount Design for Easier Installation in Mechanical Rooms and Elevated Locations



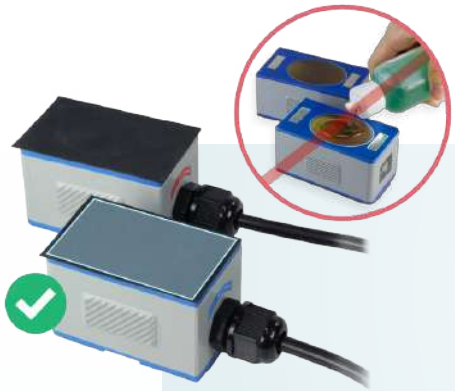
The FU-TX series uses a remote-mount architecture. The probes can be installed directly on chiller, cooling tower, or HVAC piping, while the main unit can be mounted on a convenient wall or in a control cabinet, with probe cables of up to 10 meters. This design is especially well suited to HVAC mechanical rooms, rooftop cooling towers, and ceiling plenums, where piping is high and workspace is limited. Maintenance personnel can read data without climbing, which simplifies daily operation and maintenance.

Applications:

- Chilled water systems
- Cooling water loops
- Utility piping
- Oil & gas transport lines

EchoSense® Four Key Upgrades

A Complete Leap Beyond Conventional Designs



No More Ultrasonic Gel,

More efficient and cost saving operations

HVAC and chilled water pipes are usually insulated, so reapplying couplant means removing and re-wrapping the insulation at every maintenance visit, which is slow and costly. The TM-1 probe' s durable rubber pad maintains stable acoustic coupling without couplant in most installations. Couplant is only needed in special cases such as thick pipe walls or thick liners, greatly reducing long-term maintenance effort and cost.

Precise Alignment, Secure Hold

Taiwan Utility Model Patent
M567858



For accurate readings, the two probes must be precisely aligned with each other. This is especially critical in two-sided installations, where two clamps must be aligned on opposite sides of the pipe with no line of sight between them, so even a small error affects signal quality. Once HVAC pipes are insulated, it is even harder to verify or adjust probe positions afterward. LORRIC' s patented guide-rail clamp establishes the probe position by design, so the probes stay firmly in place and resist shifting even under insulation. The same clamp works for both same-side and opposite-side installations, and its design resists loosening under gravity.



Enhanced Signal Processing

Signal quality is easily disturbed in fluids containing air bubbles or impurities. HVAC and chilled water systems typically have larger pipe diameters, where more air bubbles can also be present. The latest-generation EchoSense™ technology strengthens signal analysis and processing algorithms to effectively filter out noise, improve linearity, and reduce zero drift, maintaining stable readings even in large pipes with high air-bubble content.

Field Interference Immunity

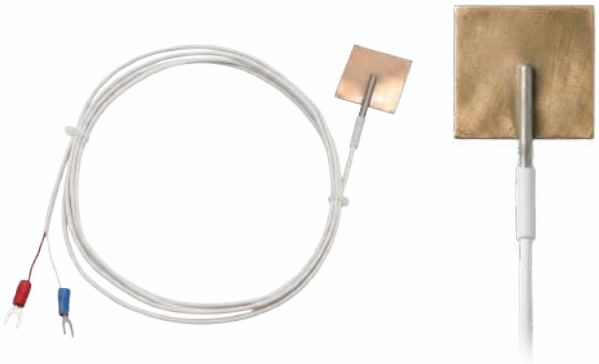
Field interference such as pump cavitation, VFD electrical noise, or mechanical vibration can affect flowmeters with weaker signals. The FU-TX320' s signal filtering technology effectively distinguishes genuine flow signals from interference, ensuring that readings truly reflect the actual flow in the pipe.



Optional Temperature Sensors
Simultaneous Flow and Thermal Energy Monitoring

The FU-TX320 standard configuration provides flow measurement only. Adding optional PT100 temperature sensors (copper-pad type) enables thermal energy (BTU) monitoring, suitable for chilled water systems and cooling water loops.

Copper-Pad Surface Temperature Sensor

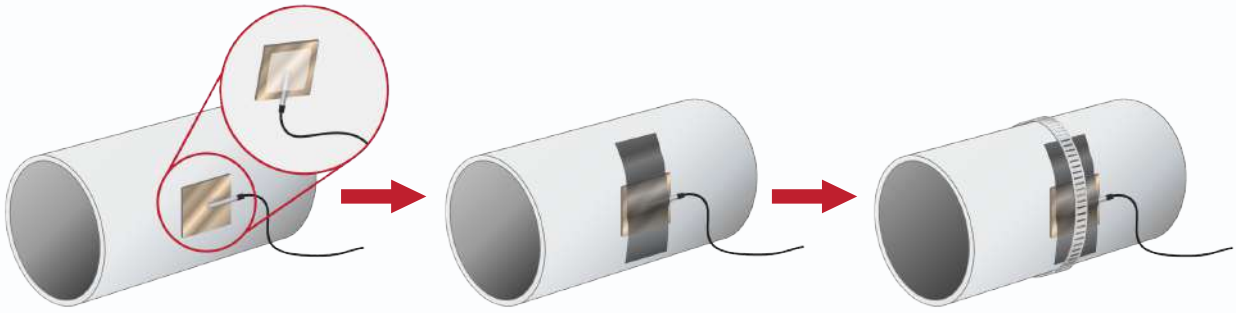


Model	LS-0-1 Surface Copper-Pad Sensor
Sensor Type	PT100, TF3M waterproof type
Accuracy	1/3 Class B, ±0.1°C
Temperature Range	-40°C ~ 180°C (-40°F ~ 356°F)
Cable Length	5m / 10m, 3-wire
Sensor Dimensions	Copper pad 20×20×3.2Φ×30L
Sensing Material	Copper
Cable Material	TEFLON
Wire Gauge	24AWG*3C

Notes:
- Temperature sensors must be specified when ordering; see "How to Order" *(p.8)*
- Temperature sensors are third-party components. Specifications are subject to change without notice. Please confirm the latest specifications with Sales before placing an order.

Temperature Sensor Installation Instructions

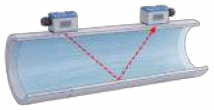
The sensors are supplied as a pair, installed at the upstream and downstream positions of the pipe respectively. Be sure to distinguish between the two.
During installation, first apply thermal paste to the back of the sensor to ensure tight contact with the pipe wall, then temporarily secure it with high-temperature tape, and finally tighten it with a metal strap to prevent loosening from vibration or thermal expansion and contraction over long-term use.



Note: When routing the wiring, keep it away from motors and variable frequency drives (VFDs), and connect it to the flowmeter' s temperature terminals.

How to Install

1. Choose the Installation Method (V Method / Z Method)

	V Method	Z Method
		
Mounting Side	Same side	Opposite Side
Applicable Range	2”–8” (DN50–200)	8”–16” (DN200–400)
Signal Path	Single reflection	Direct, no reflection
Space Required	One side of the pipe	Both sides of the pipe
Advantages	Less space needed and easier alignment; standard for small to medium industrial piping	No signal reflection, for stronger & more stable signal

Choose the V Method (same-side) or Z Method (opposite-side) based on pipe size and available space.. This choice must be confirmed before powering on and configuring the device.

V / Z Method Selection Guide:

- 3”–8” pipes: Both methods apply. Use Z if both sides are accessible (best signal strength), or V if only one side is accessible (simpler installation).
- High-interference liquids (air bubbles, impurities, scale buildup): Use Z. Its direct path resists signal attenuation better than the V Method’ s longer reflected path.

2. Wiring

Connect the probe cables to the main unit and a 24VDC power supply, then power on for setup.

3. Configure the Device

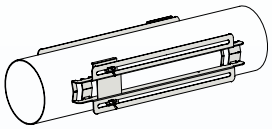
In setup mode, enter the pipe specifications (A01, A04, A06, A08) and liquid specifications (A10, A12), then set the installation method (A27) according to Step 1. The device calculates the required probe spacing at [A29 Probe Spacing]. Note this value for Step 6.

For complete parameter descriptions, please refer to the FU-TX320 User Manual.



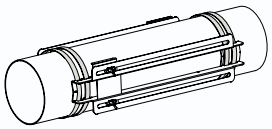
4. Select the Installation Location

Choose a straight run of pipe — at least 10 diameters upstream and 5 downstream of any elbow, valve, or pump (the “10D/5D rule”) — and mount on the side, where the pipe runs full, not the top (air pockets) or bottom (sediment). Keep the pipe surface clean and free of rust, flaking paint, or debris that could disrupt the ultrasonic signal.



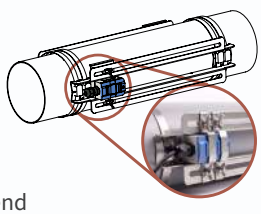
5. Secure the Bracket to the Pipe

Use the included metal straps to secure the mounting bracket at the pipe location selected in Step 4.



6. Install the Probes on the Clamp

The probes are color-coded: red [UP] for upstream and blue [DN] for downstream. Mount them on the guide rail at the spacing from Step 3. Couplant is not required but may be used if the signal is weak. Tighten the screws firmly. The probe’ s rubber pad needs enough clamping force for good acoustic coupling and stable readings, so tightness directly affects signal quality. If needed, install the temperature sensors at the same time (see the temperature sensor page).



After powering on, check the signal strength (RSSI) reading shown on the screen; we recommend keeping it at 10% or higher. If the signal is low, try fine-tuning the probe spacing, checking the pipe section for sediment or scale buildup, or re-aligning the probes.

How to Order

1. Choose one option from each of Steps 1–5 and record the corresponding code for each selection.

ⓘ *Temperature sensors must be specified at time of order — they cannot be added after shipment.*

Please Choose Main Unit:

① Power Supply

DC	External 24 VDC supply via 8-pin cable with flying leads
AC	Global AC to 24 VDC adapter (universal input)

② Transducer Cable

61WP	IP61 TM1, waterproof connector
68WP	IP68 TM1, waterproof connector
61M12	IP61 TM1, M12 connector
68M12	IP68 TM1, M12 connector

③ Temperature Sensor

N	None
T5	5 m 3-wire PT100 surface copper-pad sensors (pair)
T10	10 m 3-wire PT100 surface copper-pad sensors (pair)

④ Mounting

DIN	DIN rail back-plate module (DIN rail not included)
SCR	Screw-mount onto flat surface (screws not included)

⑤ Communication Cable

S	2m, 8-pin cable with flying leads
SAC	2m, 8-pin cable + 110 VAC 60 Hz to 24 VDC trans-former
S5	5m, 8-pin cable with flying leads
SAC5	5m, 8-pin cable + 110 VAC 60 Hz to 24 VDC trans-former

X Standard Option X Optional

2. Combine the selected codes in sequence, separated by dashes:

Example:

	① Power Supply	② Transducer Cable	③ Temperature Sensor	④ Mounting	⑤ Communication Cable
FU-TX320 –	DC	61WP	N	DIN	S

3. Choose the installation method and the applicable pipe size. The clamp set is ordered separately.

Please Choose Clamp Set:

V method

V23	**2”– 3”pipe** (320mm clamp x1 + 320mm strap x2)
V34	**3”– 4”pipe** (320mm clamp x1 + 450mm strap x2)
V45	**4”– 5”pipe** (320mm clamp x1 + 550mm strap x2)
V56	**5”– 6”pipe** (460mm clamp x1 + 700mm strap x2)
V78	**7”– 8”pipe** (460mm clamp x1 + 900mm strap x2)

ⓘ Pipe size ≤ 4” (DN100):
Use the Z Method only in environments with particularly poor signal quality; otherwise it may result in inaccurate measurements.

Z method

Z3	**3”pipe** (320mm clamp x2 + 320mm strap x4)
Z34	**3”– 4”pipe** (320mm clamp x2 + 450mm strap x4)
Z45	**4”– 5”pipe** (320mm clamp x2 + 550mm strap x4)
Z56	**5”– 6”pipe** (320mm clamp x2 + 700mm strap x4)
Z78	**7”– 8”pipe** (320mm clamp x2 + 900mm strap x4)
Z810	**8”– 10”pipe** (460mm clamp x2 + 900mm strap x4)
Z1214	**12”– 14”pipe** (460mm clamp x2 + 1300mm strap x4)
Z16	**16”pipe** (460mm clamp x2 + 1500mm strap x4)

4. Submit both the flowmeter order code and clamp set code to LORRIC sales representative.

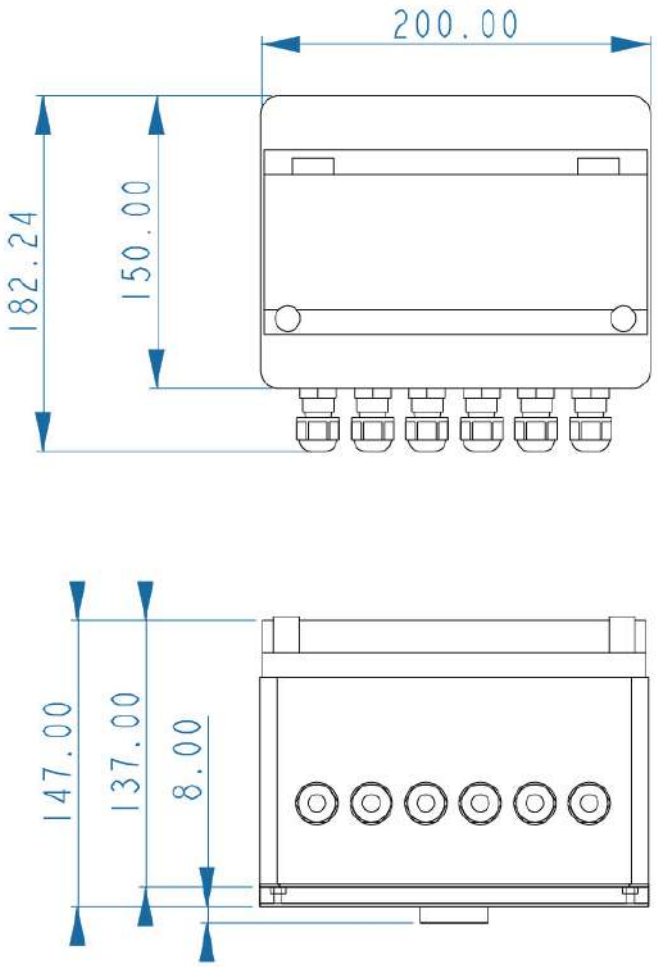
Note:

* Options marked **Optional** are subject to additional fees beyond the standard configuration. Please contact LORRIC sales for a quote when making your inquiry.
* Some options shown above are not yet available to order. Please contact LORRIC sales for updates on availability.
* Temperature sensor options are custom add-ons that must be specified at time of order — they cannot be added after shipment. If a factory calibration report is also required, please notify us when ordering as it cannot be arranged afterwards and is subject to an additional charge.
* Pipe sizes refer to Nominal Pipe Size (NPS). DN equivalents shown for reference. Contact sales if your pipe OD falls between standard sizes.
* Clamp stock: 460mm → 420mm, 320mm → 310mm, staggered strap positions

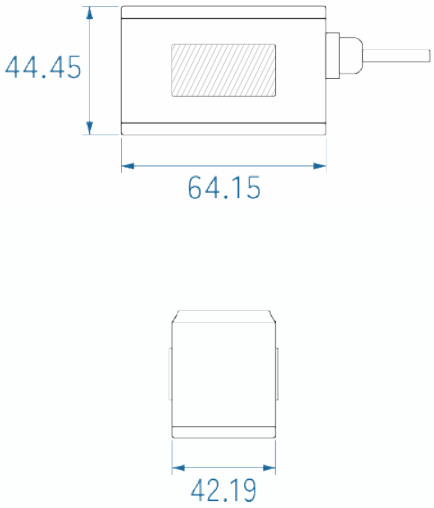
FU-TX320

Product Dimensions

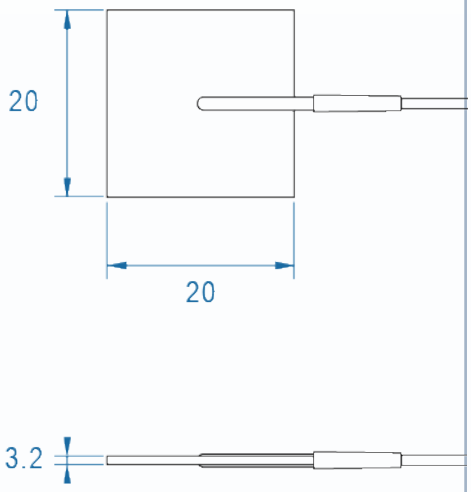
Device



TM-1 Transducer



PT100 Surface Copper-Pad Temperature Sensor



Product Specifications

1. Mechanical Specification

Installation method	Outside the pipe (clamp-on type)	
Applicable pipe material	Metal pipe, Plastic pipe (UPVC/PPH/PVDF/PFA/PTFE)	
Applicable pipe size	2”～16” (DN 50 ~ 400)	
Pipe wall working temperature	**Standard:** 0 ~ 80°C	**High-temp:** 0 ~ 150°C
Device working environment temperature	-10 ~ 60°C (14 ~ 140°F)	
Comm./Power Cable Length	2m / 5m 8-pin flying leads	
Flow Probe Cable Length	10 m (Waterproof / M12 connector)	
Temp. Sensor Cable Length	5m / 10m, 3-wire	
IP Rating* **	**Wall-mounted main unit:** IP67 / **Probe:** Standard IP61 / IP68 (optional)	

2. Measurement Specifications

Pipe Size	DN50 (2”)	DN65 (2½”)	DN75 (3”)	DN100 (4 ”)	DN125 (5”)	DN150 (6”)	DN200 (8”)	DN250 (10”)	DN300 (12”)	DN350 (14”)	DN400 (16”)
Applicable Pipe OD (mm)	60-63	73-76.3	88.9-90	114.3–117	141.3–144	168.3–171	219–222	273–276	324–327	355.6–358	406–409
Flow Range (LPM)	11.8–707	19.9–1195	26.5–1590	47.1–2827	73.6–4418	106–6362	188–11310	295–17671	424–25447	577–34636	754–45239

Measurement principle	Ultrasonic Time of Flight (ToF)
Applicable fluid	Liquids with no or minimal impurities and air bubbles
Velocity Range *	Measurable from ±0.1 to 6.0 m/s
Linearity	± 0.5 % FS (> 0.3 m/s)
Repeatability	± 0.4 %
Accuracy	10% to 100% of F.S.: ±3.0% of Reading (OR) / 0% to 10% of F.S.: ±0.3% FS**
Response Time	≤ 0.5 s to 1 s
Instantaneous data	Instantaneous flow rate, instantaneous flow velocity
Totalized Data	Totalized flow (positive, negative, or net flow selectable)
Temperature measurement	3-wire PT100
Device Temperature range	-20 ~ 150°C
Temp. Measurement Range	-40°C ~ 180°C (-40°F ~ 356°F)
Temperature Accuracy	1/3 Class B, ±0.1°C

* The specified flow velocity range is based on measurements with water in PVC pipe. Different liquids or pipe materials may affect ultrasonic signal transmission and result in a different measurable flow velocity range.

** The measurement accuracy of this product is calibrated under controlled laboratory conditions using clean water at room temperature and CNS UPVC pipe fittings. In real-world applications, actual measurement results may differ from laboratory data due to variations in fluid properties, pipe conditions, installation location, and environmental factors.

*** IP67 stands for Ingress Protection 67. The IP rating is a classification system for the degree of protection provided by enclosures of electrical equipment against the intrusion of foreign objects. The IP rating format is IPXX, where XX represents two Arabic numerals. The first digit indicates the level of protection against contact and foreign objects (used to denote dust protection), and the second digit indicates the level of waterproof protection. The higher the number, the better the protection. The “6” in IP67 means: completely prevents dust ingress; the “7” means: no harm from high-pressure water jets.

Product Specifications

3. Electrical Specifications

System Power	
Power specification	DC 24V 200mA (4-20mA and RS485 currents not included)
Reverse voltage protection	Yes

Optocoupler Output	
Power specification	5V ~ 30V 200mA
Reverse voltage protection	Yes
NPN wiring	Supported
PNP wiring	Supported
Max. output frequency	700Hz
Over-current protection	200mA

Analog Current Output (4-20mA, 0-20mA)	
Wiring	3-wire
Power	Shared with host power, no separate power needed
Output range	0-20 mA or 4-20 mA (selectable)
Max. output range (incl. error signal range)	0 ~ 21.6 mA (0 ~ 20 mA mode) / 2.4 ~ 21.6 mA (4-20 mA mode)
Resolution	16-bit (0 ~ 24 mA physical range)
Response time	≤ 0.5 ~ 1 second, same update rate as the display
Max Loop resistance	600 ohm @ 24V

Digital Communication Modbus RTU RS485	
Baud rate	9600, 19200, 38400, 57600
Wiring	2-wire
Max. nodes per network	256

4. User Interface

Language	English, Traditional Chinese, Simplified Chinese
Unit	**Volume:** L, ft^3, Imp gal, US gal, m^3 **Time:** Minute, Second, Day, Hour **Velocity:** m/s, ft/s
Display	3-color backlight, 3-line 16-character LCD
Display effective digits	LCD 10 digits (plus sign and decimal point)
Operation buttons	4-key touch buttons
Wired communication	Analog output self-powered 4-20mA / 0-20mA Modbus RTU RS485 (2-wire); optocoupler switch signal (2m signal cable included)

LORRIC

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FU-TX320 Website

FU-TX320 Manual