

Friendcom Product Catalogue



COMPANY PROFILE



ABOUT>>> FRIENDCOM

Friendcom, founded in 2002, listed in 2017, is a leading global provider of Internet of Things (IoT) products, services, and solutions.

With 600+ employees, 250+ R&D personnel, Friendcom focuses on providing comprehensive smart energy management solutions, and our solutions connected to 100+ million devices in 100+ countries, worldwide.

In the latest 3 years, Friendcom became the top-10 provider of AMI meter, DCU, DTU and FTU for STATE GRID of China. Total 10+ million single phase meter and 1.5+ million three phase meter were deployed.



△ Shenzhen Headquarters



△ Dongguan production base



△ Wuhan Industrial Park



△ Jiangmen Production Base



AMI Solution Products

- ▶ SEM400 Single Phase Post Payment Meter
- ▶ SEM400 Single Phase Prepayment Meter
- ▶ TEM660 Three Phase Smart Meter
- ▶ FC2112 Data Concentrator Unit (DCU)

SEM400

Single Phase Post Payment Meter

Overview

Friendcom SEM400 is designed based on IEC62052-11, IEC62053-21/23 and the communication protocol comply with DLMS. It is widely used in the scenarios of residential consumption and photovoltaic power sales.



Key Features

- Work in post-payment mode
- Import and export active & reactive energy
- Four-quadrant reactive energy
- Support over 5 tariffs
- Phase and neutral measurement
- Harmonic measurement function
- Disconnect/connect both on phase and neutral
- Support Anti-tamper function
- Infrared and RS485 communication interfaces
- Exchangeable plug-play PLC, RF and cellular communication
- Exchangeable battery
- High security (DLMS security suite 0)
- DLMS conformance

Technical Parameters

Parameter	Value
Connection	1 phase 2 wire
Sensor (S) Numbers	2S (Both on phase and neutral)
Relay (R) Numbers	2R (Both on phase and neutral)
Rated Voltage	230V
Rated Current	5(60)A
Starting Current	0.002Ib
Frequency	50Hz
Active Energy Accuracy Class	1
Reactive Energy Accuracy Class	2
Ingress Protection	IP54
Power Consumption:	Voltage Circuit: 2W and 10VA
	Current Circuit: 4 VA
Two-way Communication Port	General slot
Dimension(L*W*H)	302.8*158*82.8mm

SEM400

Single Phase Post Payment Meter

Overview

Friendcom SEM400 is designed based on IEC62052-11, IEC62053-21/23. The prepayment function comply with STS. It is widely used in the scenarios of residential consumption and photovoltaic power sales.



Key Features

- Work in prepayment mode
- 12 digit keypad
- Import and export active & reactive energy
- Four-quadrant reactive energy
- Support over 5 tariffs
- Phase and neutral measurement
- Harmonic measurement function
- Disconnect/connect both on phase and neutral
- Support Anti-tamper function
- Infrared and RS485 communication interfaces
- Exchangeable plug-play PLC, RF and cellular communication
- Exchangeable battery
- High security (DLMS security suite 0)
- DLMS conformance
- STS certificate

Technical Parameters

Parameter	Value
Connection	1 phase 2 wire
Sensor (S) Numbers	2S (Both on phase and neutral)
Relay (R) Numbers	2R (Both on phase and neutral)
Rated Voltage	230V
Rated Current	5(60)A
Starting Current	0.002Ib
Frequency	50Hz
Active Energy Accuracy Class	1
Reactive Energy Accuracy Class	2
Ingress Protection	IP54
Power Consumption:	Voltage Circuit: 2W and 10VA
	Current Circuit: 4 VA
Two-way Communication Port	General slot
Dimension(L*W*H)	302.8*158*82.8mm

TEM660

Three Phase Smart Meter

Overview

Friendcom TEM660 three phase smart energy meter is certificated with DLMS/COSEM, it provides an excellent and stable accuracy and performance. The plug-and-play communication module can be PLC/RF/Cellular, so the meter can be managed remotely by HES.



Key Features

Parameter	Value
Measurement unit	Import/export active, quadrant reactive energy, combined active/reactive energy
	Active/reactive energy in T1-T4, total energy
	Phase A/B/C energy, voltage, current, power, frequency etc.
Demand	Import/export active/reactive demand event and stamp
	The demand calculation supports block and sliding-window mode, the slip period is configurable
Tariff & TOU	4 tariffs, support special tariff setting in holiday and weekend
Communication	The physical layer of the communication channel is independent of each other, and the damage of any one doesn't affect the normal operation of others (RS485 communication, Optical port, PLC, micro-power wireless, GPRS).

Technical Parameters

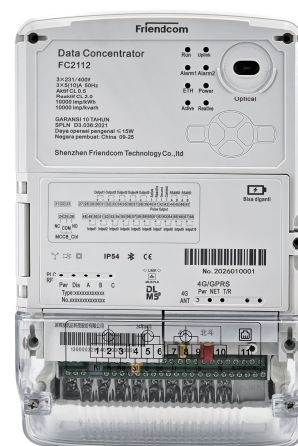
Parameter	Value
Standard	IEC62052-11, IEC62053-21, IEC62053-23, IEC62055-31, EN50470-1, EN50470-3, IEC62058-31, BS7856, IEC62056-21, IEC62056-53
voltage	3* 230 / 400 V
Operating Voltage	70%Un ~130%Un
Accuracy	Active: Class1, Reactive: Class 2
Frequency	(50±2.5)Hz
Operating Temperature	-25°C~+55°C
Limiting Temperature	-40°C~+70°C
Relative Humidity	≤95%
Current	3*5(100)A
Start Current	0.4%Ib
Creeping Current	Anti-creep design
Lifetime	≥15 years
Dimension(L×W×H)	300.5mm×175.0mm×92.0mm

FC2112

Data Concentrator Unit

Overview

The FC2112 Data Concentrator Unit (DCU) is a core technology within Advanced Metering Infrastructure (AMI), designed to deliver reliable, secure, and scalable data aggregation for utility operations. Acting as the central gateway between smart meters and the Head-End-System (HES), the DCU ensure seamless two-way communication, accurate data delivery, and operational efficiency.



Key Features

- Centralized collection and aggregation data from multiple smart meters
- Secure two-way communication between smart meters and HES
- Local data buffering to ensure data continuity
- Remote configuration, monitoring, and firmware upgrades
- Comprehensive event, alarm, and operation log management
- Designed full compliance with SPLN D3.036:2021 IEC62056, IEC62052-11, IEC62053-22/23, IEC61000-4

Technical Parameters

Parameter	Value
Rated Voltage	3 x 230/400 V
Wiring Method	Three Phase – 4 Wire
Rated Current	5(10) A
Rated Frequency	50 Hz
Accuracy Active	Energy Class 0.5 Reactive Energy Class 2
Power Consumption	Standby Mode: ≤ 10W Active Communication: ≤15 VA
Connector Communication	2x5-pin IDC, 2.54mm pitch
Communication port:	1 Optical port, 1 USB, 1 Bluetooth, 1 Ethernet, 2 RS485
Uplink Communication:	3G/4G
HPLC channel (Downlink communication)	
Frequency range	0.2 – 12 MHz
Operating Band / Modulation	0.781 – 2.930 MHz / OFDM
Data Rate / Power Density	93/205 Kbps / ≤-45 dBm/Hz
Anti Attenuation	20dBμV
RF channel (Downlink communication)	
Frequency range	920–923 MHz
Modulation / Data Rate	OFDM / 29.3- 375 kbps
Max. Transmit Power	24 dBm
Receiver Sensitivity	Up to -115 dBm@29.3kbps



LV & MV Distribution Products

- ▶ FC-D31 Distribution Terminal Unit (DTU)
- ▶ FC-FX3100L Load Switch Controller
- ▶ FC-FX3100 Feeder Terminal Unit (FTU)
- ▶ FC-5321 Intelligent Low-voltage Line Terminal Unit (LTU)
- ▶ FC-W6000 Remote Terminal Unit (RTU)
- ▶ FC2171 Intelligent Fusion Terminal (IFT)
- ▶ FC-5697 Intelligent Substation Visualized Gateway
- ▶ FC-W620 Microgrid Coordination Control Device
- ▶ FC-5124 Intelligent Circuit Breaker

FC-D31

Distribution Terminal Unit (DTU)



Overview

The distribution terminal unit (DTU) is installed in distribution rooms, switchgear stations, and ring main units below 38 kV, offering functions such as local monitoring, remote control, fault handling, and data transmission. By comprehensively monitoring the operational status of primary ring main units and distribution lines, the DTU enables rapid fault resolution, fault isolation, fault location identification, and power restoration. In collaboration with the distribution HES, it achieves closed-loop control, significantly enhancing the reliability and operational efficiency of distribution systems.

Key Features

- Standardized design with module-level replaceability ensures safe, reliable operation and scalability, fully compliant with typical design standards.
- Platform-based hardware tailored for edge-computing architectures, featuring a cooperative real-time core and management core.
- A dedicated security chip with embedded encryption algorithms guarantees the integrity, confidentiality, and availability of data exchanges.
- Low-power design: total terminal power consumption does not exceed 30 VA.
- Industrial-grade product with wide temperature tolerance, resistant to magnetic interference, shock, moisture, and lightning.
- Comprehensive interfaces: 2 Ethernet ports and multiple RS-232/485 ports, supporting mainstream communication protocols such as IEC 60870-5-101/104, IEC 61850, and DNP3.0.

Technical Parameters

Parameter		Value
Work environment	Temperature	-40 °C ~ +70 °C
	Relative humidity	10% to 100%, no condensation
Rated voltage		AC100/V3V
Zero-sequence voltage		AC100V
Frequency		50Hz
Power consumption		≤30VA
Rated current		1A or 5A
Zero-sequence current		1A
Remote signal power supply		DC24V
Switch measurement and control capacity		1. Capacity configuration: Number of circuits determined by the actual number of switch bays. 2. Telemetry: Measures three-phase voltage and zero-sequence voltage per unit, and three-phase current and zero-sequence current per circuit. 3. Remote signaling: Six status points per circuit: breaker closed, breaker open, earthing switch position, spring charged status, remote/local status, and control circuit failure. 4. Remote control: Trip and close control outputs provided for each circuit.
Accuracy of measurement	Voltage, Current	Level 0.5
	Active power, reactive power	Level 1
	Frequency	±0.02 Hz
Remote signaling	Stabilization time	20 ms (adjustable from 10 ms to 6000 ms)
	SOE resolution ratio	5ms
CI		3 RS485 interfaces, 1 RS232 interface, and more than 2 Ethernet interfaces
Communicating protocol		Supports mainstream communication protocols such as IEC60870-5-101/104, IEC61850, and DNP3.0
Clock precision		≤2s/d
IP rating		IP54
MTBF		≥50000h
Life length		≥10 years

FC-FX3100

Feeder Terminal Unit (FTU)



Overview

Designed for distribution lines up to 38 kV, the feeder terminal unit (FTU) can be used on load switches, circuit breakers, and reclosing devices, integrating fault protection, power measurement, status monitoring, feeder automation, and fault recording into a single solution to meet the distributed control and operation maintenance requirements of smart distribution networks.

Key Features

- **Highly integrated functionality:** Beyond conventional protection, the device supports advanced distribution functions including over/under-frequency protection, over/under-voltage protection, voltage vector shift detection, synchronization check, cold-load pickup protection, live-line work interlocking, breaker life prediction, reverse power protection, and broken-line protection.
- **Strong environmental adaptability:** Operating temperature -40°C to $+70^{\circ}\text{C}$, suitable for altitudes up to 3,000 m. The enclosure meets IP65, (optional cooling components can achieve IP54) while maintaining dustproof, waterproof, heat-resistant, and corrosion-resistant performance.
- **Flexible disturbance recording start conditions:** Recording can be triggered by overcurrent, earth fault, voltage loss, reclosing, current surge, and other events. Each record includes 4 pre-fault cycles and 8 post-fault cycles for detailed analysis.
- **Optimized wiring design:** Uses aviation-style integrated terminals with clearly separated zones for power, control, analog signals, and Ethernet, ensuring neat wiring and easy installation.
- **Excellent mechanical and electrical performance:** Relays offer high output capacity, adjustable pulse width, and long mechanical life, and meet IEC requirements for vibration, shock, impact, and comprehensive EMC immunity.
- **Comprehensive O&M functions:** Supports online/offline setting configuration, project backup and recovery, message analysis, logic monitoring, and remote firmware upgrades, and is compatible with smart substation and distribution automation O&M systems.

Technical Parameters

Parameter		Value
Working temperature limit		-40°C to +70°C, with a maximum temperature change rate of 1°C/min
Rated parameter	Accessory power supply	AC220V, voltage allowable deviation $\pm 20\%$
	Switching and status quantity input voltage	DC 24V
AC circuit parameters	Secondary PT rated phase voltage	3.25/ $\sqrt{3}$ V, voltage error $< 0.2\%$, phase difference $< 10'$, overload voltage 20V
	Secondary CT rated phase current	1A (5A): Current error $< 0.1\%$, phase difference $< 5'$, short-term tolerance to 20 times rated current for 1 second
Accuracy of measurement	Voltage measurement	0.01–1.2 U_n , accuracy $\leq \pm 0.2\%$
	Electric current measurement	0.01–1.2 I_n , accuracy $\leq \pm 0.2\%$
	Power and power factor	The accuracy of active and reactive power is $\leq \pm 0.5\%$; the accuracy of power factor is $\leq \pm 1\%$ or $\pm 0.01\%$.
	Frequency measurement	45Hz~65Hz, accuracy $\leq \pm 0.01\text{Hz}$
	DC voltage measurement	0V~30V, accuracy $\leq \pm 0.5\%$
Event resolution		$\leq 1\text{ms}$
Communication protocol		IEC 60870-101, IEC 60870-104, IEC 61850, DNP 3.0
Power supply specifications		DC24V lead-acid battery
Protection grade		IP65

FC-FX3100L

Load Switch Controller

Overview

Designed for distribution systems up to 38 kV, this device is primarily used for fault diagnosis and isolation of load switches, power restoration, switch control, energy measurement, and status monitoring. It features integrated capabilities in protection, measurement, control, and communication.



Key Features

- **Comprehensive protection functions:** It provides three-stage overcurrent/inverse-time overcurrent, three-stage zero-sequence overcurrent/inverse-time zero-sequence overcurrent, negative-sequence overcurrent, overvoltage, sensitive earth-fault, underload, current imbalance, and sectionalizer-mode protection. Optional functions include second harmonic distortion (SHD) protection, complex voltage protection, and directional blocking protection.
- **Integrated measurement, control, and disturbance recording:** High-precision acquisition of three-phase current, voltage, power, frequency, and energy. Supports daily and time-tagged energy freezing. Fault recording complies with the COMTRADE standard, with 128 samples per cycle and storage for up to 256 disturbance records.
- **Comprehensive event logging:** Millisecond time-stamped records support up to 2,048/1,024 remote-signal events, fault events, and operation events, enabling detailed fault tracing and operational analysis.
- **High-reliability design:** Unified hardware architecture with fewer board types and simplified spare-part management; employs isolation and shielding with SMT manufacturing, and passes stringent vibration, shock, and EMC tests.

Technical Parameters

Parameter		Value
Environmental parameter	Work temperature limit	-40°C to +70°C, maximum rate of change 1°C/min
	Relative humidity	10% to 95%, no condensation
Key technical performance indicators Rated parameter	Accessory power supply	AC 85~264V
	Switching and status quantity input voltage	DC 24V
	Voltage and current measurement accuracy	Class 0.5
	Measurement accuracy of power and power factor	Class 1
	Frequency measurement accuracy	±0.02Hz
Standby power supply	Event Resolution	≤1ms
	Power supply specifications	DC24V lead-acid battery
Communication Protocol		IEC60870-5-101/104, IEC61850, and DNP 3.0
IP rating		IP54
MTBF		≥50000h
Life length		≥10 years

FC-5321

Intelligent Low-voltage Line Terminal Unit (LTU)

Overview

The FC-5321 intelligent low-voltage line terminal unit (LTU) is primarily installed on 0.4kV lines at low-voltage outgoing cables, distribution branch boxes, overhead lines, meter boxes, and distribution boxes. As a critical sensing device at the end of modern smart distribution substation systems, it enables real-time monitoring of voltage, current, and power at all branch points, detects line short-circuit and grounding faults promptly, and supports advanced functions such as automatic substation line topology identification and line loss analysis.



Key Features

- Equipped with a high-performance 32-bit ARM microprocessor for real-time signal processing and data acquisition.
- Protective current transformer signals and metering current transformer signals are separately collected.
- Calculates line phase voltage, phase metering current, phase active power, phase reactive power, temperature, and phase protection current.
- Provides fault indication using the fundamental component of the protection current as the detection input; indication remains latched until the fault is cleared.
- Supports pressure status monitoring (pressure / loss of pressure).
- Enables advanced functions such as automatic topology identification and line loss analysis.

Technical Parameters

Parameter		Value
Work environment	Temperature	-40℃ ~ +70℃
	Relative humidity	10% to 100%, no condensation
Power parameter	Rated voltage	AC3X220V
	Frequency	50Hz
	Power consumption	< 10VA
Measurement accuracy	Voltage, current, active Power	Class 0.5S
	Reactive power	Class 1
	Frequency	±0.01 Hz
Communicating protocol		Supports protocols such as IEC60870-5-101, DL/T645, Q/GDW11778, and Modbus, as well as protocol extensions.
Clock precision		≤0.5s/d
Local communication		PLC+RF, external module
Dimensions (L×W×H)		190mm×65mm×75.5mm
MTBF		≥50000h
IP grade		IP51
Life length		≥10 years

FC-W6000

Remote Terminal Unit (RTU)



Overview

This device is suitable for distribution lines from 6.6 kV up to 38 kV and below. It supports optional electromagnetic or electronic CT/VTs and integrates remote measurement, remote signaling, remote control, protection, and data forwarding functions. It enables fault isolation on distribution feeders and supports feeder automation and self-healing, serving as a new-generation microprocessor-based remote terminal unit for distribution automation.

Key Features

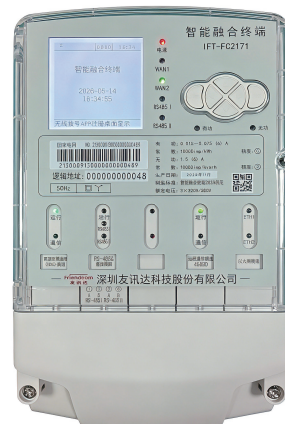
- **Superior performance:** It uses advanced digital signal processing, high-speed industrial networking, and an embedded platform for stable operation, high real-time performance, and wide temperature tolerance, while supporting user-defined extended protection and control logic.
- **Modular hardware:** Board-based architecture with multiple Ethernet ports and multi-channel RS-485/RS-232 serial interfaces; supports up to 48 digital inputs and 20 relay outputs with flexible interface configuration.
- **Comprehensive protection:** It provides three-stage overcurrent, inverse-time overcurrent, three-stage zero-sequence overcurrent, voltage protection, post-acceleration, multi-shot reclosing, and other functions, compatible with IEC and IEEE standard inverse-time characteristic curves.
- **Powerful communications:** Dual Ethernet ports and four switchable RS-485/RS-232 serial ports, supporting IEC 60870-5-101/104 and DNP3.0, and enabling device cascading, remote firmware upgrade, and settings modification.
- **Robust safety and EMC:** Designed in strict accordance with power-industry safety standards, with comprehensive grounding, ESD, and surge protection. Insulation, dielectric strength, impulse withstand, and damp-heat performance meet industrial requirements, with high electromagnetic immunity.

Technical Parameters

Parameter	Value
AC voltage loop	Electronic type: 3.25V/100V (input/display); Electromagnetic type: 100/V3V, 100V
AC current Loop	Electronic type: 0.225V/1A (input/display); Electromagnetic type: 5A/1A
DC sampling voltage	DC0V~DC60.0V
Rated frequency	50Hz, 60Hz
Overall power consumption	DC power supply $\leq 10W$
Sampling measurement range	Voltage: 10V~250V; Current: 0.005A~20A (rated: 1A)
Voltage and current measurement accuracy	Class 0.2
Power measurement accuracy	Class 1
Frequency measurement error	$\leq 0.005Hz$
SOE event resolution	$\leq 1ms$
24h clock self-walking error	$< 2s$
Number of DO Circuits	10 channels per board, maximum: 20 channels
Number of DI Circuits	16 channels/board, maximum 48 channels
Work temperature	$-40^{\circ}C \sim +70^{\circ}C$
DC supply voltage	Nominal: 24V, input range: 21V~29V

FC2171

Intelligent Fusion Terminal (IFT)



Overview

The FC2171 intelligent fusion terminal (IFT) functions as an edge IoT gateway for low-voltage distribution zones, following the principle of “one terminal per power distribution zone, one channel per key.” Taking the distribution zone as the smallest management unit, it deeply integrates distributed edge computing and IoT communication technologies to provide comprehensive, real-time monitoring and measurement of low-voltage distribution zones, forming an integrated management and control system centered on smart distribution zone terminals.

By strengthening business integration, the device enables full-status monitoring of distribution equipment and end-to-end visibility of operational processes, making distribution network operation and information processing online, transparent, mobile, and intelligent. This significantly enhances medium- and low-voltage fault diagnosis capabilities, improves fault repair efficiency, increases power supply reliability, and raises overall customer service quality.

Key Features

- Industrial-grade multi-core processor running at 1.2 GHz provides strong computing performance.
- Decoupled hardware–software architecture with edge-computing support; application software is delivered as apps, enabling flexible function customization.
- High-capacity storage design ensures fast, secure handling of large data volumes.
- Industrial-grade wide-range power supply, suitable for harsh environments featuring high temperature, high voltage, high salinity, and strong electromagnetic fields.
- Supports minute-level data collection with a single-scan success rate above 99.5%.
- Supports data acquisition in large distribution zones, able to handle up to 2,048 electricity meters.
- Compatible with multiple standard functional modules to support comprehensive application scenarios.

Technical Parameters

Parameter		Value
Work environment	Temperature	-40℃ ~ +70℃
	Relative humidity	10% to 100%, no condensation
Power parameter	Rated voltage	AC3X220V/380V
	Frequency	50Hz
	Power consumption	≤15W
Measurement accuracy	Voltage, current, active power, etc.	Class: 0.5S
	Reactive power	Class 1
	Frequency	±0.01 Hz
Remote signaling	Stabilization time	20 ms (adjustable from 10 ms to 6000 ms)
	Resolution ratio	5ms
CI		1 Bluetooth port, 2 RS-485 communication interfaces, 1 remote communication interface
Communicating protocol		Supports protocols such as IEC60870-5-101, IEC60870-5-104, MQTT, DL/T645, Q/GDW11778, Modbus, and DL/T842, as well as protocol extensions.
Clock precision		≤0.5s/d
Data storage capacity		≥16GB
MTBF		≥50000h
Dimensions (L×W×H)		290mm×180mm×95mm
IP grade of protection		IP51
Life length		≥10 years

FC-5697

Intelligent Substation Visualized Gateway



Overview

The FC-5697 Intelligent Substation Visualized Gateway acts as the “sensory system” in distribution substation monitoring and as an edge node in the IoT “cloud–pipe–edge–end” architecture. With a platform-based hardware design, software-defined functions, modular structure, hardware–software decoupling, and adaptive communication protocols, it supports high-concurrency processing, large-capacity storage, multi-source data acquisition, and AI-enabled analytics.

By integrating AI analysis, edge computing, and IoT communication, the gateway connects sensors, control devices, and video modules, performs protocol conversion across heterogeneous sensing networks, and enables real-time monitoring of environmental conditions, equipment status, disaster events, and video streams. It is mainly deployed in substations, switchgear stations, ring main units, distribution rooms, server rooms, base stations, and warehouses.

Key Features

- Industrial-grade multi-core processor running at 2.4 GHz provides strong computing performance.
- Decoupled hardware–software architecture with edge-computing support; application software is delivered as apps, enabling flexible function customization.
- High-capacity storage design ensures fast and secure handling of large data volumes.
- Industrial-grade wide-range power supply suitable for harsh environments with high temperature, high voltage, high salinity, and strong electromagnetic fields.
- Supports customized linkage/control strategies tailored to on-site requirements.
- Supports multiple communication methods, including RS-485 and LoRa, for deployment in complex field scenarios.

Technical Parameters

Parameter		Value
Work environment	Temperature	-40℃ ~ +70℃
	Relative humidity	10% to 100%, no condensation
Power parameter	Rated voltage	AC220V±20%50Hz//DC24V
	Power consumption	≤30W
Port configuration	RS485	Route 6
	RS232	Route 1
	USB	Route 3
	SATA interface	Route 1
	LoRa	Route 2
	Bluetooth interface	Route 1
	Ethernet interface	Route 8
	Public network wireless	2G 4G
	Radio frequency wireless	4 channels (2 LoRa 470 MHz channels and 2 LoRa 2.4 GHz channels)
	Remote signaling	Route 4
	Remote control	Route 4
Hardware performance	CPU basic frequency	An 8-core 64-bit CPU with a clock speed of 2.4 GHz
	Internal storage	8GB
	SC	2TB
	Artificial Intelligence computing power	≥6Tops
	Exceptional scenario Identification accuracy	≥95%
	Video frame handling time	≤0.2 seconds
Communicating protocol	Remote communication protocol	Supports protocols such as MQTT and DL/T634.5104
	Local communication protocol	Supports IoT low-power wireless communication protocols for power transmission and transformation equipment, IoT sensor data specifications for power transmission and transformation equipment, Modbus protocol, GB28181, or RTSP.
MTBF		5000

FC-W620

Microgrid Coordination Control Device



Overview

The FC-W620 microgrid coordination control device is an intelligent controller for microgrid, distributed generation, and energy storage systems. It can be integrated with photovoltaic arrays, wind turbines, energy storage units, and charging stations. By collecting and analyzing microgrid data, it monitors the operating status and health of PV, wind, storage, and charging equipment, and performs real-time dynamic control of distributed generation, storage, and loads. This supports local integration of renewables, enhances grid stability, and mitigates load fluctuations. The device enables effective demand management, improves microgrid efficiency, reduces power supply costs, and ensures safe, reliable, and economical microgrid operation.

Key Features

- **Modular design:** Plug-and-play modular architecture with high scalability, allowing configurations tailored to site requirements.
- **Data acquisition:** Supports multi-channel real-time communication via serial ports, Ethernet, and other interfaces, integrating with diverse PV inverters, wind turbines, energy storage systems, diesel generators, and related equipment.
- **Edge computing:** Provides flexible alarm thresholds, proactive alarm reporting, data aggregation and calculation, logic control, breakpoint resume, data encryption, and 4G routing.
- **Policy management:** Supports anti-backflow control, scheduling curves, peak shaving and valley filling, demand control, active/reactive power control, and PV-storage coordination, with fully customizable strategies.
- **System security:** User permissions follow a zero-trust model to block unauthorized access; combined with data encryption, integrity verification, calibration, and anti-tamper mechanisms, ensuring data integrity and traceability.
- **Operational safety:** Collects and analyzes comprehensive site signals and measurements—including battery status, temperature control, and fire protection—to enable early warning and predictive safety analysis.
- **Local monitoring:** Built-in LCD panel enables on-site status viewing and control..

Technical Parameters

Parameter		Value
Work environment	Temperature	-40℃ ~ +70℃
	Relative humidity	10% to 100%, no condensation
Power parameter	Rated voltage	AC220V/DC220V/DC110V
	Frequency	50Hz
	Power consumption	<10W
Measurement accuracy	Voltage, current, active power	0.5S class
	Reactive power	Level 1
	Frequency	±0.01 Hz
Remote signaling	Stabilization time	20 ms (adjustable from 10 ms to 6000 ms)
	Resolution ratio	2ms
Remote control accuracy rate		100%
Communicating protocol		Supports protocols such as Modbus RT/TP, DL/T645, IEC 61850, IEC 60870-5-101, IEC 60870-5-104, SNMP, and MQTT.
Clock precision		≤0.5s/d
Dimensions (L×W×H)		190mm×65mm×75.5mm
MTBF		≥50000h
IP grade		IP51
Life length		≥10 years

FC-5124

Intelligent Circuit Breaker



Overview

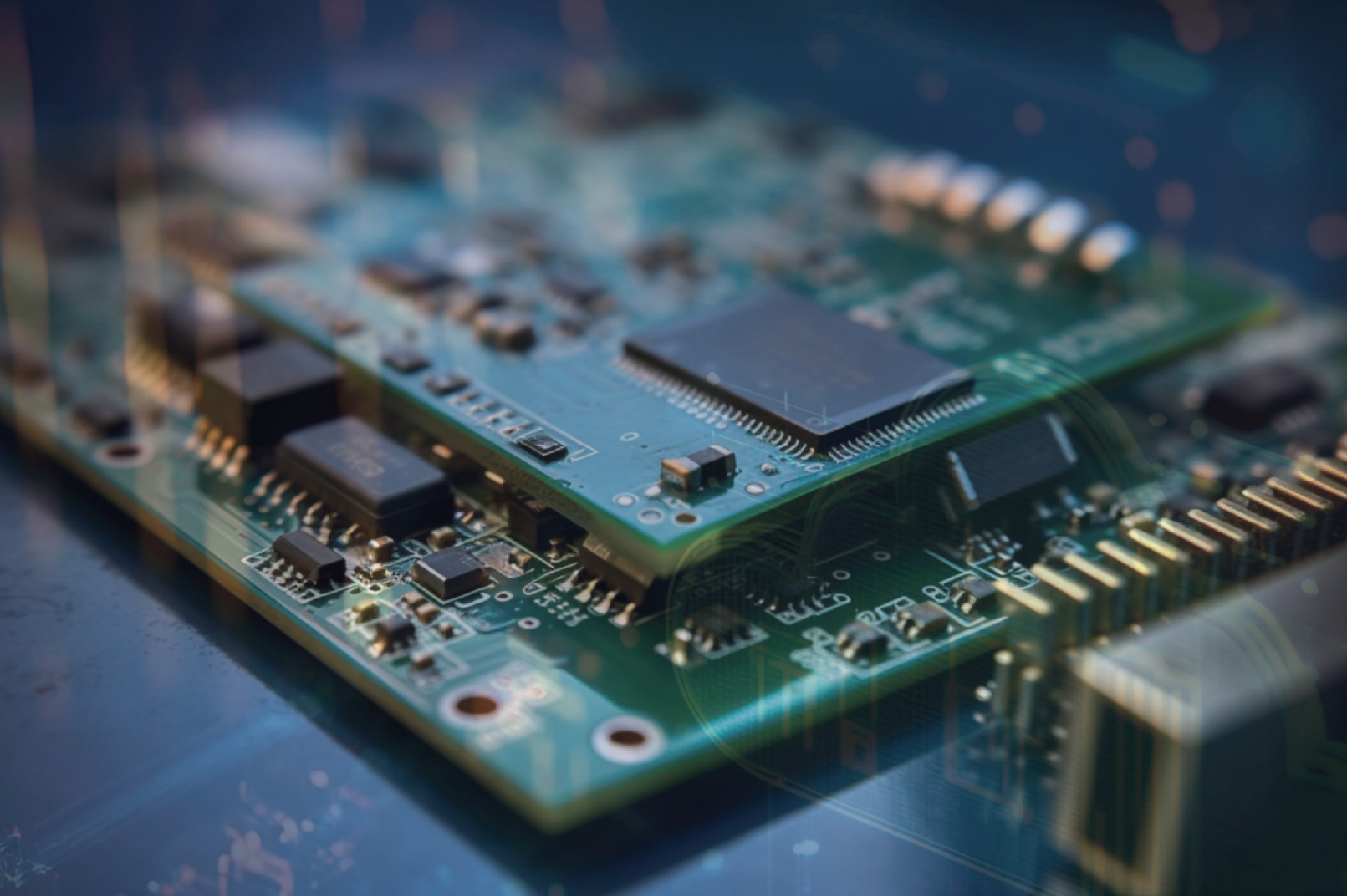
The FC-5124 intelligent circuit breaker has a rated insulation voltage of 2.5 kV and is intended for three-phase, four-wire TT distribution systems (neutral directly grounded) operating at 50 Hz, with a rated voltage of 380 V and rated current from 125 A to 630 A. It provides indirect contact protection against fire hazards caused by earth-fault currents due to insulation failure, while also performing power distribution and protection against line overload and short circuits. In addition, it offers protection against line overvoltage, undervoltage, and phase loss.

Key Features

- Equipped with a high-performance 32-bit ARM microprocessor for real-time signal processing and intelligent control.
- Provides residual current (leakage) protection with automatic reclosing.
- Continuously monitors and tracks line residual current, with automatic threshold adjustment to ensure high operating reliability.
- Offers three-stage protection (long-time, short-time, and instantaneous) with electronic tripping independent of supply voltage.
- High breaking capacity ensures dependable short-circuit protection.
- Identifies and displays trip causes (residual current, overcurrent, overload, undervoltage, overvoltage, phase loss) and supports event storage, query, and deletion.
- Supports advanced functions such as automatic topology identification and line loss analysis.
- Local communication module supports external pluggable expansion.

Technical Parameters

Parameter		Value
Shell frame current (A)		125/250/400/630
Polar number		3P+N/3P
Power parameter	Rated voltage	AC3X220V//380V
	Frequency	50Hz
	Power consumption	< 10VA
Measurement accuracy	Voltage, current, active power	Class 0.5S
	Reactive power	Class 1
	Frequency	±0.01 Hz
Automatic reclosing time		20-60s
Communicating protocol		Supports protocols such as IEC60870-5-101, DL/T645, Q/GDW11778, and Modbus, as well as protocol extensions.
Clock precision		≤0.5s/d
Local communication		HPLC+RF, external module
MTBF		≥50000h
IP grade		IP51
Life length		≥10 years



Communication Modules

- ▶ WSN27-915R Wi-SUN Router Module
- ▶ FC-2601B HPLC+HRF Hybrid Module
- ▶ WMB14-868LR Hybrid Module(Wireless M-Bus + LoRaWAN)
- ▶ WMB14-433LR Hybrid Module(Wireless M-Bus + LoRaWAN)
- ▶ WMB14-868 Wireless M-Bus Module
- ▶ WMB14-433 Wireless M-Bus Module
- ▶ WSL05-868/915MHz LoRaWAN Module
- ▶ WSL05-433/470MHz LoRaWAN Module
- ▶ PULSE915-LRW
- ▶ PANACEA Meter Collector



WSN27-915R

Wi-SUN Router Module

Features

- UART TTL interface
- AT command
- 24 x 18 x 3mm

Supported Frequency Band

- Frequency Band: 433, 490, 868, 915 MHz
- Output Power: Up to 27 dBm
- Power Supply: 3.3V
- Data Rate: 50-300Kbps
- Sensitivity (CER < 10-3): -108 dBm (50 kbps)

STANDARDS

- Wi-SUN FAN certified, WSA0294.



WSN27-915R

FC-2601B

HPLC+HRF Hybrid Module

Features

- Phase recognition
- Hybrid mode communication
- High speed

Hplc Characteristics

- Frequency Band: 0.7-12MHz
- Modulation: OFDM
- RF CHARACTERISTICS
- Frequency Band: Customized Sub-1GHz
- Max Data Rate: 1000kbps
- Tx Power: <50mW
- Rx Sensitivity: -109dBm

Standards

- IEEE 802.15.4g
- IEEE P1901.3



FC-2601B



WMB14-868LR

Hybrid Module(Wireless M-Bus + LoRaWAN)

○ Features

- UART TTL interface
- 2.2V- 3.6V power supply
- Ultra low Power consumption <2μA@25°C
- 25.5 x 14.2 x 3.75mm

○ Supported Frequency Band

- 868.3 MHz-869.525 MHz
- EU868, US915, AU915, IN865, AS923, KR920, RU864

○ Security

- AES128 data encryption

○ STANDARDS

- Conforms to EU R & TTE directive (EN 300 220, EN 301 489, EN 60950)
- Complies with EN 13757- 4 & OMS



WMB14-868LR

WMB14-433LR

Hybrid Module(Wireless M-Bus + LoRaWAN)

○ Features

- UART TTL interface
- 2.2V- 3.6V power supply
- Ultra low Power consumption <2μA@25°C
- 25.5 x 14.2 x 3.75mm

○ Supported Frequency Band

- 433.5 MHz-434.475 MHz, EU433

○ Security

- AES128 data encryption

○ Standards

- Conforms to EUR & TTE directive (EN 300 220, EN 301 489, EN60950)
- Complies with EN 13757- 4 & OMS



WMB14-433LR



WSL05-868/915MHz

LoRaWAN Module

○ Features

- UART TTL interface
- Power Supply: 2.4 to 3.6 V
- Ultra low Power consumption $<2\mu\text{A}@25^{\circ}\text{C}$
- 22.2mm×14.2mm×3.2mm

○ Supported Frequency Band

- Eu868, US915, AU915, IN865, AS923, KR920, RU864

○ Security

- AES128 data encryption

○ Standards

- Conform with EU&TTE&FCC requirements
(EN 300 220, EN301 489, EN 60950)



WSL05-868/915MHz

WSL05-433/470MHz

LoRaWAN Module

○ Features

- UART TTL interface
- Power Supply: 2.4 to 3.6 V
- Ultra low Power consumption $<2\mu\text{A}@25^{\circ}\text{C}$
- 22.2mm×14.2mm×3.2mm

○ Supported Frequency Band

- Eu433

○ Security

- AES128 data encryption

○ Standards

- Conform with EU&TTE&FCC requirements
(EN 300 220, EN301 489, EN 60950)



WSL05-433/470MHz



WMB14-868

Wireless M-Bus Module

Features

- UART TTL interface
- 2.2V- 3.6V power supply
- Ultra low Power consumption <2μA@25°C
- 25.5mm×14.2mm×3.75mm

Supported Frequency Band

- 868.3MHz–869.525MHz

Security

- AES128 data encryption

Standards

- Conforms to EU R & TTE directive (EN 300 220, EN 301 489, EN 60950)
- Complies with EN 13757- 4 & OMS



WMB14-868

WMB14-868

Wireless M-Bus Module

Features

- UART TTL interface
- 2.2V- 3.6V power supply
- Ultra low Power consumption <2μA@25°C
- 25.5mm×14.2mm×3.75mm

Supported Frequency Band

- Eu433

Security

- AES128 data encryption

Standards

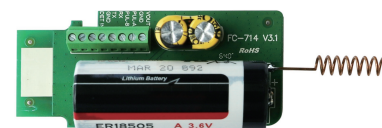
- Conforms to EU R & TTE directive (EN 300 220, EN 301 489, EN 60950)
- Complies with EN 13757- 4 & OMS



WMB14-433

FC-714

PULSE915-LRW



Product Description

This product is primarily used for pulse collection from water and gas meters. It supports two sampling modes—passive pulse (reed switch) and active pulse (Hall sensor)—as well as both single-pulse and dual-pulse input configurations. Equipped with a LoRaWAN module, it enables active data transmission. The device offers easy deployment, high reliability, low power consumption, long communication range, and extended service life.

Key Features

- Long-range wireless data transmission
- Supports active (Hall) and passive (reed switch) pulse sensors
- Multi-band operation: EU433, CN470, EU868, US915, AU915, IN865, etc.
- Configurable reporting interval
- Built-in antenna and pre-installed long-life battery
- Configuration via UART serial port or over-the-air
- Firmware upgrade via UART or FOTA
- Battery level monitoring with optional automatic power status reporting
- Typical service life of up to 10 years*
- IP67-rated waterproof enclosure

* Actual lifetime depends on installation environment and reporting interval.

Technical Parameters

Item	Parameter
Dimension	50mm (L) x 45.5mm(W) x 134 mm (H)
Weight	146g (Contains the weight of 1 meter long cable)
Cable length	1m
Communication range	Up to 15km (In visibility conditions)
Radio Characteristics	Tx Power: Max. 20dBm Rx Sensitivity: < -138dBm
Power Consumption	<8 μ A@ Standby mode
MAC Layer	LoRaWAN [®]
Operating Temperature	-40°C to +70°C (Industrial Grade)
Operating humidity	5%RH to 95%RH
Antenna Option	Build-in Antenna
Power Supply	Pre-installed long-life battery, 2.6V to 3.7V
Configuration	UART serial port or over-the-air
Environmental Compliance	RoHS, REACH
Certification	CE, FCC, LoRa Alliance*, ANATEL

PANACEA

Meter Collector

Overview

The FC-777 PANACEA Collector is a modular IoT data acquisition terminal designed for non-invasive retrofitting of traditional mechanical water/gas meters. It features replaceable communication modules and batteries, addressing challenges such as difficult retrofitting and high maintenance costs, while providing a future-proof data collection solution for water and gas industries.



Key Features

- **Modular Design, Future-Proof**

Hot-pluggable communication modules (NB-IoT / LoRaWan / WMbus / Wi-SUN / 4G Cat.1) adapt to network evolution, extending product lifecycle and protecting customer investments.

- **Long Battery Life, Easy Maintenance**

User-replaceable lithium-thionyl chloride battery supports external battery expansion packs, reducing maintenance costs while ensuring ultra-long operation.

- **Versatile Compatibility**

Compatible with various sensor heads (image recognition/magnetoresistive pulse/IR/ultrasonic) to cover mechanical, pulse, and ultrasonic meters.

- **Industrial-Grade Reliability**

IP68 rating and -40 °C to +85 °C operating range ensure stable performance in harsh environments.

Technical Parameters

Category	Item	Details
Mechanical & Environmental	Protection Rating	IP68 (submersible up to 1.5m depth)
	Operating Temperature	-40°C ~ +85°C
	Storage Temperature	-45°C ~ +90°C
	Housing Material	(UV)Flame-retardant ABS+PC, UV-resistant
Electrical	Power Supply	User-replaceable ER18505 Li-SOCl ₂ battery
	Battery Life	≥6 years (1 report/day; varies with frequency and network conditions)
	Standby Current	≤ 10 μA (MCU deep sleep)
	Peak Current	≤ 500 mA (during transmission)
Data Acquisition	Methods	Magnetoresistive/reed pulse, IR (ultrasonic meters)
	Reporting Interval	Remotely configurable (1 min ~ 24 hours, default: 24 hours)
	Data Storage	Local storage ≥366 days of daily data, supports offline transmission
Communication	Module Interface	Standard hot-pluggable port with anti-tamper design
	Supported Protocols	NB-IoT (B3/B5/B8...)
		4G Cat.1
		LoRaWAN
		WMbus
		Wi-SUN
	RX Sensitivity	via module replacement
		NB-IoT: ≤-129 dBm
		4G Cat.1: ≤-100 dBm
		LoRaWan: -138dBm@SF=12
		WMbus: -104dBm@100kbps
Reliability & Lifespan	TX Power	23 dBm ±2dB
	Data Success Rate	≥ 99.9% (in stable network conditions)
	MTBF	≥ 100,000 hours
	Mechanical Life	Battery compartment and latches withstand ≥500 insertions/cycles
	Module Plug Life	≥ 100 cycles



Gas Meter

- ▶ FC-Radon Ultrasonic Gas Meter(G1.6-G6)
- ▶ FC-730 Ultrasonic Gas Meter(G6-G25)
- ▶ FC-722C-JME Ultrasonic Gas Metering Module(G1.6-G6)
- ▶ FC-730 Ultrasonic Gas Metering Module(G6-G40)
- ▶ NB-IoT Diaphragm Gas Meter(For Indonesia)

FC-760-G4

Friendcom-Radon Ultrasonic Gas Meter

Overview

Product Introduction: Relying on its independently developed ultrasonic gas metering module, Friendcom has launched the G1.6–G6 full-electronic civil ultrasonic gas meter. Based on the ultrasonic time-difference principle, the product accurately measures flow by detecting the time difference of gas propagation in the forward and reverse directions. It excels in metering accuracy, turndown ratio, safety, intelligence, and temperature/pressure compensation. Moreover, with no mechanical wear and low maintenance costs, it further enhances product reliability and overall advantages.



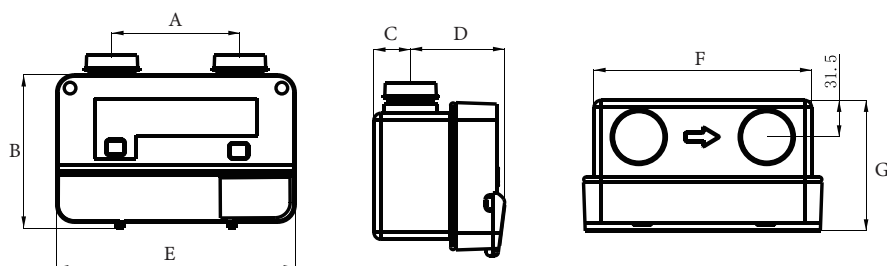
Product Advantages

High Accuracy	Accuracy better than Class 1.5
Wide Turndown Ratio	Wide range metering
High Sensitivity	Low starting flow rate, capable of detecting micro-flow leaks
Safety Protection	Real-time monitoring of abnormal flow and abnormal gas usage environment; upon detecting an anomaly, interlocking valve closure and active reporting are triggered
Modular Communication Design	Supports selection of mainstream communication modules such as NB-IoT, Cat.1, LoRaWAN, WM-Bus
Strong Anti-interference	No magnetically sensitive components, unaffected by magnetic fields
Additional Functions	Optional seismic/tilt sensor
	Optional NFC
	Optional SMA external antenna interface

Technical Parameters

Parameter	G6-G40			
Model	G1.6	G 2.5	G4	G6
Qmax m³/h	2.5	4	6	10
Qmin m³/h	0.016	0.025	0.04	0.06
Qt m³/h	0.25	0.4	0.6	1.0
Qr m³/h	3.0	4.8	7.2	12
Qs dm³/h	≤3	≤4	≤5	≤8
Measurement Level	Class 1.5			
MPE	qmin≤q<qt		±3%	
	qt≤q≤qmax		±1.5%	
	qt≤q≤qmax		≤0.5%	
Working Temperature	-25 °C ~55 °C			
Working Pressure	≤30 kPa			
Temperature and Pressure Compensation	Support			
Combined Working Current	≤ 40uA (19 hours static + 4 hours constant flow + 1 hour pulsating flow)			
Working Power Supply	1 battery 3,6V DC 19 Ah lithium for metrology circuit 1 battery 3,6V DC 19 Ah lithium for communication circuit			
Meter Life Cycle	More than 10 Years			
Explosion-Proof Grade	ATEX Zone 2-II 3G Ex ic IIA T3 Gc			
Communication Method	NB-IoT/ WMBus/LoRaWAN			
Comply With Standards	EN 14236-2018, EN 13757, UNI 11291, DLMS protocol			

Product Dimension



G1.6-G4+						Unit: mm
A	B	C	D	E	F	G
130	132	31.5	80.8	205	187	112.3

FC-730

Ultrasonic Gas Meter

Overview

Relying on its independently developed ultrasonic gas metering module, Friendcom has launched the G6/G10 and G16/G25 full-electronic industrial/commercial ultrasonic gas meters. Based on the ultrasonic time-difference principle, the product accurately measures flow by detecting the time difference of gas propagation in the forward and reverse directions. It excels in metering accuracy, turndown ratio, safety, intelligence, and temperature/pressure compensation. Moreover, with no mechanical wear and low maintenance costs, it further enhances product reliability and overall advantages.



G6/G10



G16/G25

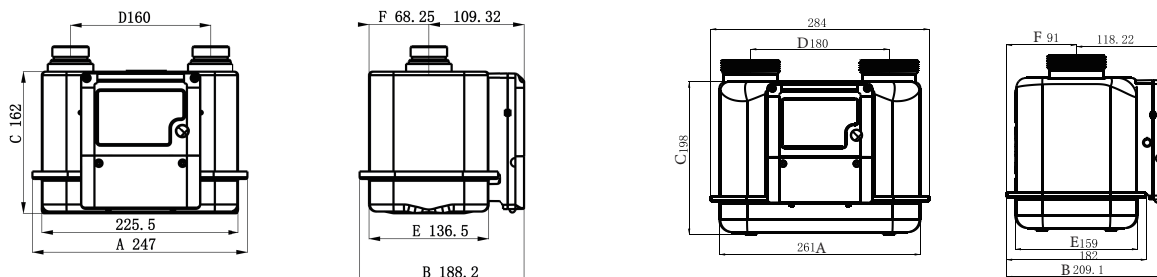
Product Advantages

High Accuracy	Accuracy better than Class 1.5
Wide Turndown Ratio	Wide range metering
High Sensitivity	Low starting flow rate, capable of detecting micro-flow leaks
Safety Protection	Real-time monitoring of abnormal flow and abnormal gas usage environment; upon detecting an anomaly, interlocking valve closure and active reporting are triggered
Modular Communication Design	Supports selection of mainstream communication modules such as NB-IoT, Cat.1, LoRaWAN, WM-Bus
Strong Anti-interference	No magnetically sensitive components, unaffected by magnetic fields
Additional Functions	Optional seismic/tilt sensor
	Optional NFC
	Optional SMA external antenna interface

Technical Parameters

Parameter	G6-G40				
Model	G6	G10	G16	G25	G40
Qmax m³/h	10	16	25	40	65
Qmin m³/h	0.06	0.1	0.16	0.25	0.4
Qt m³/h	1.0	1.6	2.5	4.0	6.5
Qr m³/h	12	19.2	30	48	78
Qs dm³/h	≤8	≤13	≤13	≤20	≤32
Measurement Level	Class 1.5				
MPE	qmin≤q<qt		±3%		
	qt≤q≤qmax		±1.5%		
	qt≤q≤qmax		≤0.5%		
Working Temperature	-25 °C ~55 °C				
Working Pressure	≤50 kPa				
Temperature and Pressure Compensation	Support				
Combined Working Current	≤ 40uA (19 hours static + 4 hours constant flow + 1 hour pulsating flow)				
Working Power Supply	4 batteries 1,5V DC AA alkaline + 1 battery 3,6V DC lithium-thionyl chloride OR 2 batteries 3,6V DC lithium-thionyl chloride				
Meter Life Cycle	More than 10 Years				
Explosion-Proof Grade	ATEX Zone 2-II 3G Ex ic IIA T3 Gc				
Communication Method	NB-IoT/ WMBus/LoRaWAN				
Comply With Standards	EN 14236-2018, EN 13757, UNI 11291, DLMS protocol				

Product Dimension



G6-G10						G16/G25						Unit: mm
A	B	C	D	E	F	A	B	C	D	E	F	
225.5	188.2	162	160	136.5	68.25	261	209.1	198	180	159	91	

FC-722C-JME

Ultrasonic Gas Metering Module

Overview

The FC-722C-JME series is a civil ultrasonic gas metering module completely independently developed by Friendcom based on a series of key technological breakthroughs. This product mainly covers the flow range of G1.6, G2.5, G4 and G6 ultrasonic gas meters, achieving stable metering throughout the entire lifecycle under different environments and gas qualities.



Solution 1



Solution 2

Functional characteristics

Wide range	G1.6–G6 full range coverage, turndown ratio up to 1:625
Highly integrated solution (Option 1)	Covers all metering functions, realising the "module is the meter" design philosophy, reducing user development difficulty
Measurement separation scheme (Option 2)	Acts as a basic flow sensor, outputs accurate flow information; PIN TO PIN, plug-and-play replacement for imported modules
High accuracy	Accuracy better than Class 1.5
High sensitivity	Low starting flow rate, capable of detecting micro-flow leaks
Wide temperature range	-25°C ~ 55°C
Temperature & pressure compensation	Equipped with integrated temperature & pressure sensor, supports real-time compensation
Self-diagnosis	Supports real-time alarm self-diagnosis
Easy installation	Small size, easy to install, supports vertical or L-shaped installation

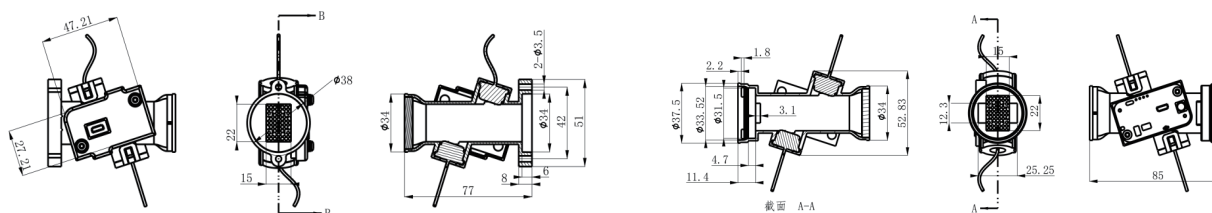
Technical Parameters

Parameter	G1.6-G6			
Model	G1.6M	G 2.5M	G4M	G6M
Qmax m³/h	2.5	4	6	10
Qmin m³/h	0.016	0.025	0.04	0.06
Qt m³/h	0.25	0.4	0.6	1.0
Qr m³/h	3.0	4.8	7.2	12
Qs dm³/h	≤3	≤4	≤5	≤8
Measurement Level	Class 1.5			
MPE	qmin≤q<qt		±3%	
	qt≤q≤qmax		±1.5%	
	qt≤q≤qmax		≤0.5%	
Working Temperature	-25 °C ~55 °C			
Working Pressure	≤50 kPa			
Temperature and Pressure Compensation	Support			
Combined Working Current	≤ 30uA (19 hours static + 4 hours constant flow + 1 hour pulsating flow)			
Power Supply	3.0V-3.6V external power supply			
Interface	UART			

Product Advantages

Accurate metering	Stable and reliable metering, strong adaptability to gas quality (supports up to 53% hydrogen blending)
Convenient to use	Modules fully calibrated and shipped from factory, significantly improving user meter calibration efficiency
High quality	Fully automated module production line ensures quality control and production capacity
High safety	Supports abnormal flow monitoring and analysis, ensuring gas safety
High cost-performance	Excellent cost-performance ratio while ensuring performance
Technical service	Provides timely and effective local technical service

Product Dimension



Solution	Length	Width	Height	Cross-sectional Area	Connection Method
1	77mm	42mm	51mm	15×22=330mm ²	Round hole screws
2	85mm	52.83mm	37.5mm	15×22=330mm ²	Round hole screws

FC-730

Ultrasonic Gas Metering Module

Overview

The FC-730 series is an industrial/commercial ultrasonic gas metering module completely independently developed by Friendcom based on a series of key technological breakthroughs. This series mainly covers the flow range of G6, G10, G16, G25 and G40 ultrasonic gas meters, achieving stable metering throughout the entire lifecycle under different environments and gas qualities.



Functional characteristics

Wide range	G6–G40 full range coverage, turndown ratio up to 1:625
Highly integrated solution (Option 1)	Covers all metering functions, realising the "module is the meter" design philosophy, reducing user development difficulty
High accuracy	Accuracy better than Class 1.5
High sensitivity	Low starting flow rate, capable of detecting micro-flow leaks
Wide temperature range	-25°C ~ 55°C
Temperature & pressure compensation	Equipped with integrated temperature & pressure sensor, supports real-time compensation
Self-diagnosis	Supports real-time alarm self-diagnosis
Easy installation	Small size, easy to install, supports vertical or L-shaped installation

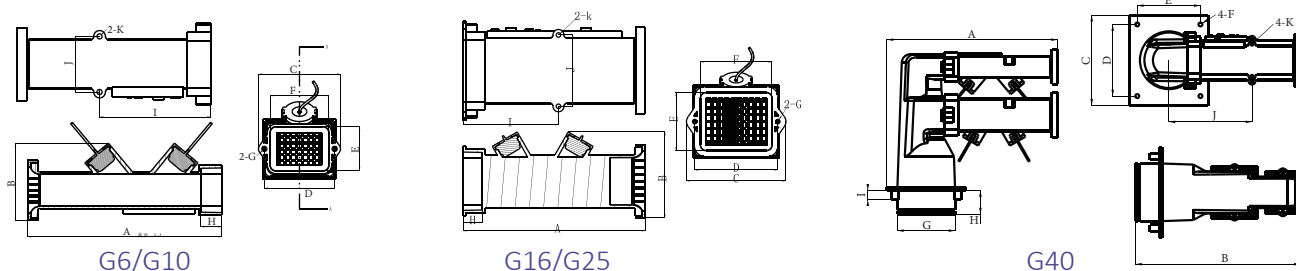
Technical Parameters

Parameter	G6-G40				
Model	G6M	G10M	G16M	G25M	G40M
Qmax m³/h	10	16	25	40	65
Qmin m³/h	0.06	0.1	0.16	0.25	0.4
Qt m³/h	1.0	1.6	2.5	4.0	6.5
Qr m³/h	12	19.2	30	48	78
Qs dm³/h	≤8	≤13	≤13	≤20	≤32
Measurement Level	Class 1.5				
MPE	qmin≤q<qt			±3%	
	qt≤q≤qmax			±1.5%	
	qt≤q≤qmax			≤0.5%	
Working Temperature	-25℃~55℃				
Working Pressure	≤50 kPa				
Temperature and Pressure Compensation	Support				
Combined Working Current	≤ 30uA (19 hours static + 4 hours constant flow + 1 hour pulsating flow)				
Power Supply	External power supply: 3.0V–3.6V				
Interface	UART				

Product Advantages

Accurate metering	Stable and reliable metering, strong adaptability to gas quality (supports up to 53% hydrogen blending)
Convenient to use	Modules fully calibrated and shipped from factory, significantly improving user meter calibration efficiency
High quality	Fully automated module production line ensures quality control and production capacity
High safety	Supports abnormal flow monitoring and analysis, ensuring gas safety
High cost-performance	Excellent cost-performance ratio while ensuring performance
Technical service	Provides timely and effective local technical service

Product Dimension



Unit: mm											
Model	A	B	C	D	E	F	G	H	I	J	K
G6/G10	133	53	56	48	30	40	Φ3.3	14.6	76	38	Φ3.3
G16/G25	133	63	70	60.5	42	52	Φ3.3	14	69.5	52	Φ3.3
G40	200	193.4	106	84	74.07	Φ4.5	Φ67.8	27.9	10.8	97.5	Φ3.3

NB-IoT

Diaphragm Gas Meter

Overview

Relying on its independently developed ultrasonic gas metering module, Friendcom has launched the G6/G10 and G16/G25 full-electronic industrial/commercial ultrasonic gas meters. Based on the ultrasonic time-difference principle, the product accurately measures flow by detecting the time difference of gas propagation in the forward and reverse directions. It excels in metering accuracy, turndown ratio, safety, intelligence, and temperature/pressure compensation. Moreover, with no mechanical wear and low maintenance costs, it further enhances product reliability and overall advantages.



Product Advantages

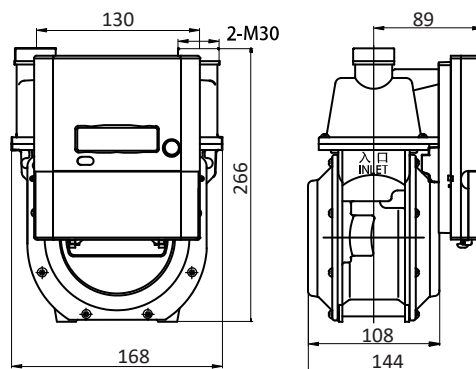
Smart remote meter reading	No need for entry, automatic collection of gas usage data
Modular communication design	Supports selection of mainstream communication modules such as NB-IoT, Cat.1, LoRaWAN, WM-Bus
24/7 safety protection	Real-time monitoring of gas meter operating status; instantly closes valve and actively reports any abnormality, ensuring gas safety
Remote intelligent control	Supports remote valve control and parameter configuration with permission levels, making management more flexible and secure
Low power consumption & long endurance	Lithium battery life ≥ 10 years; automatically reports low battery level, worry-free operation
Massive data storage	Continuously stores 1 year of daily usage and 80 days of hourly data; backend smart settlement; clear meter-side information display
All-round tamper protection	Automatically closes valve and triggers alarm under strong magnetic field, bypass, malicious activation, etc.; complete protection without blind spots

Technical Parameters

Parameter	G1.6-G4		
Model	G1.6	G2.5	G4
Max flow rate (q _{max}) m ³ /h	2.5	4	6
Min flow rate (q _{min}) m ³ /h	0.016	0.025	0.04
Starting flow rate m ³ /h	≤3	≤5	≤5
Total pressure loss Pa	≤120	≤200	≤250
Accuracy class	1.5		
Maximum cumulative volume	99999.999 (resets to 0 beyond range)		
Operating pressure	≤30 kPa		
Total pressure loss (sealing test)	≤250 Pa		
Sealing	No leakage when 45 kPa pressure is applied		
Explosion protection standard	EXib IIBT3 Gb		
Base meter operating temperature	-10°C ~ 40°C		
Medium conditions	Various fuel gases, air, non-corrosive gases		
Base meter housing material	Aluminium		
Power supply mode	Lithium battery type ER26500		
Operating voltage	DC 3.6 V lithium battery		
Sampling method	Pulse (Hall) sampling		
Valve control	Supports remote valve control with different permission levels (normal close, authorised close, authorised open)		
Valve reliability	>10,000 consecutive switching cycles		
Communication method	NB-IoT (compatible with China Telecom, China Mobile, China Unicom)		
Monthly meter reading success rate	≥99.9%		
Service life	>10 years		

Product Dimension

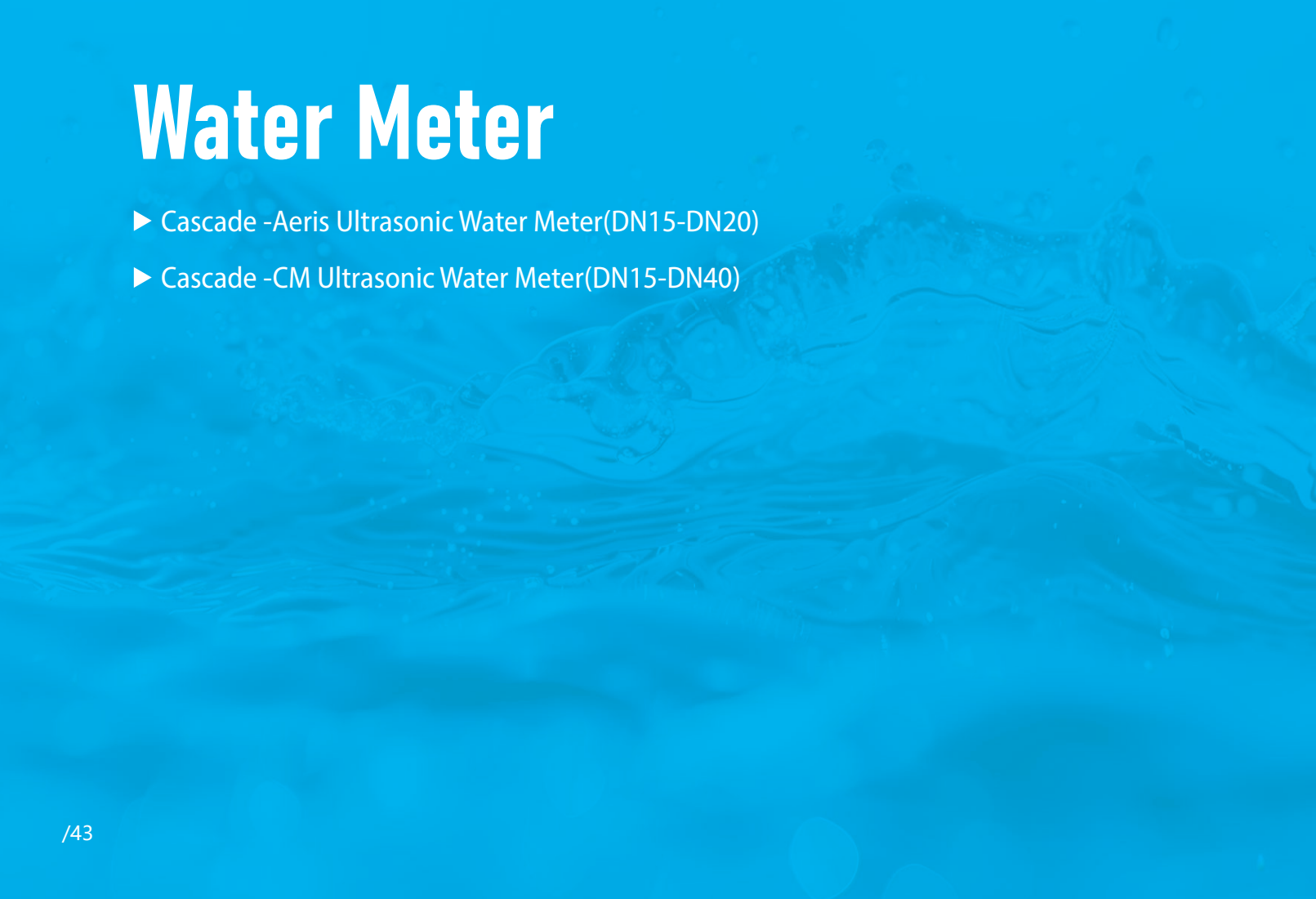
Unit: mm						
A	B	C	D	E	F	G
168	266	144	130	108	89	2-M30





Water Meter

- ▶ Cascade -Aeris Ultrasonic Water Meter(DN15-DN20)
- ▶ Cascade -CM Ultrasonic Water Meter(DN15-DN40)



Cascade-CM

Ultrasonic Water Meter

Overview

The Friendcom Cascade-CM series ultrasonic water meter offers a turndown ratio up to R1000. It features IP68 protection rating, high resistance to water hammer shock and magnetic field interference, and a composite material body. Characterised by high measurement accuracy, ultra-low power consumption, and stable, reliable operation, the ultrasonic water meter supports wireless communication modules such as WM-Bus/LoRaWAN dual-mode and NB-IoT. It provides flow monitoring, forward/reverse metering, and intelligent alarm functions, adapting to diverse metering scenarios.



Product Advantages

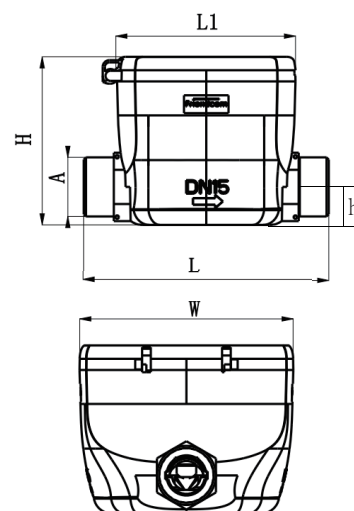
No mechanical parts	Ultrasonic measurement, no moving mechanical parts, no wear
Long-term stability & accuracy	Maintains high stability and high accuracy during long-term operation
Modular communication design	Supports LoRaWAN and WM-Bus dual-mode communication; NB-IoT + WM-Bus dual-mode currently under development
Separate power supplies	Metering circuit and communication circuit are powered independently, no mutual interference
Wide turndown ratio	Maximum turndown ratio up to R1000
Easy installation	Compact structure, easily installs in tight spaces
Ultra-long life	Battery life up to 20 years
Ultra-low starting flow	Starting flow rate as low as 1 litre/hour, accurately captures
Bidirectional measurement	Supports forward and reverse bidirectional flow measurement
Convenient maintenance	Standard NFC and infrared communication interfaces, easy on-site parameter setting and maintenance
Additional functions	Pressure sensor
	SMA interface for external antenna

Technical Parameters

Parameter	DN15	DN20
Continuous Flow Rate Q3 (m³/h)	2.5	4
Overload Flow Rate Q4 (m³/h)	3.125	5
Transitional Flow Rate Q2 (l/h)	4	6.4
Minimum Flow Rate Q1 (l/h)	2.5	4
Starting Flow Rate(l/h)	1	1
Dynamic Range R (Q3/Q1)	R400/R500/R630/R800/R1000	
Temperature Class	T30/T50	
Sensitivity Level	U0D0	
Maximum Display (m³)	999999.999	
Environment Class	M1, E2	
Installation Class	Outdoor or Indoor	
Maximum Permissible Error in the range $Q2 \leq Q \leq Q4$	$\pm 2\%$ ($T \leq 30^\circ\text{C}$) $\pm 3\%$ ($T > 30^\circ\text{C}$)	
Maximum Permissible Error in the range $Q1 \leq Q < Q2$	$\pm 5\%$	
Battery	1 battery 3,6V DC 8.5 Ah lithium for metrology circuit 1 battery 3,6V DC 8.5 Ah lithium for communication circuit	
RF	868 MHz up to 10 mW E.R.P.	
Maximum Pressure (bar)	MAP16	
Pressure Loss at Q3 (bar)	0.25	
Installation Orientation	H, V, H/V	
Protection Level	IP68	
Water Meter Length (mm)	110	130

Product Dimension

DN	Dimensions(mm)					
	L	L1	H	A	W	h
DN15	110	81	75	G3/4''B	97	17
DN20	130	81	75	G1/B	97	17



Cascade -Aeris

Ultrasonic Water Meter

Overview

The Friendcom Cascade-Aeris series ultrasonic water meter offers a turndown ratio up to R1000 and IP68 protection rating. It features strong resistance to water hammer and magnetic interference, with optional copper or stainless steel body to suit different installation environments.

Characterised by high accuracy, ultra-low power consumption, and stable operation, the water meter supports wireless communication modules such as WM-Bus/LoRaWAN dual-mode and NB-IoT. It provides flow monitoring, forward/reverse metering, and intelligent alarm functions, adapting to diverse metering scenarios.



Brass/Stainless Steel



Brass/Stainless Steel
(With Valve)

Product Advantages

No mechanical parts	Ultrasonic measurement, no moving mechanical parts, no wear
Long-term stability & accuracy	Maintains high stability and high accuracy during long-term operation
Modular communication design	Supports LoRaWAN and WM-Bus dual-mode communication; NB-IoT + WM-Bus dual-mode currently under development
Separate power supplies	Metering circuit and communication circuit are powered independently, no mutual interference
Wide turndown ratio	Maximum turndown ratio up to R1000
Easy installation	Compact structure, easily installs in tight spaces
Ultra-long life	Battery life up to 20 years
Ultra-low starting flow	Starting flow rate as low as 1 litre/hour, accurately captures
Bidirectional measurement	Supports forward and reverse bidirectional flow measurement
Convenient maintenance	Standard NFC and infrared communication interfaces, easy on-site parameter setting and maintenance
Additional functions	Pressure sensor
	SMA interface for external antenna

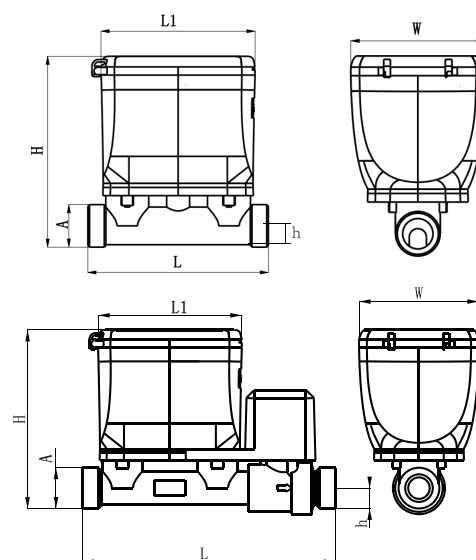
Technical Parameters

Nominal Diameter	DN15	DN20	DN25	DN32	DN40
Continuous Flow Rate Q3 (m³/h)	2.5	4	6.3	10	16
Overload Flow Rate Q4 (m³/h)	3.125	5	7.875	12.5	20
Transitional Flow Rate Q2 (l/h)	4	6.4	10.08	16	32
Minimum Flow Rate Q1 (l/h)	2.5	4	6.3	10	20
Starting Flow Rate (l/h)	1	1	1	3	3
Dynamic Range R (Q3/Q1)	R400/R500/R630/R800/R1000				
Temperature Class	T30/T50				
Sensitivity Level	U0D0				
Maximum Display (m³)	999999.999				
Environment Class	M1, E2				
Installation Class	Outdoor or Indoor				
Maximum Permissible Error in the range Q2≤Q≤Q4	±2% (T≤30℃)				
	±3% (T>30℃)				
Maximum Permissible Error in the range Q1≤Q<Q2	±5%				
Battery	1 battery 3,6V DC 8.5 Ah lithium for metrology circuit 1 battery 3,6V DC 8.5 Ah lithium for communication circuit				
RF	868 MHz up to 10 mW E.R.P.				
Maximum Pressure (bar)	MAP16				
Pressure Loss at Q3 (bar)	0.4				
Installation Orientation	H, V, H/V				
Protection Level	IP68				
valve	Support				
Material	Stainless Steel/Brass				
Water Meter Length (mm)	110/165	130/190	225/260	260	300

Product Dimension

DN	Dimensions(mm)					
	L	L1	H	A	W	h
DN15	110/165	94	117	G3/4"B	78	13.5
DN20	130/190	94	121	G1"B	78	17.7
DN25	225/260	94	130	G5/4"B	78	21.4
DN32	260	94	141.5	G3/2"B	78	30.5
DN40	300	94	145.8	G2"B	78	30.6

DN	Dimensions(mm)					
	L	L1	H	A	W	h
DN15	165	94	117	G3/4B	78	13.5
DN20	190	94	121	G1B	78	17.7





EV-Boat Motor

► FCEV-10 Series

EV-Boat Motor

FCEV-10 Series

Overview

High-performance electric outboard motor designed for modern vessels with advanced technology that delivers high efficiency, quiet operation, and environmentally friendly performance.

Key Features

- High Efficiency Electric Motor: High performance with optimal efficiency.
- Ultra Low Noise Operation: Quiet operation for maximum comfort.
- Zero Emission Technology: Environmentally friendly with zero exhaust emissions.
- Fast Response Control: Fast response and precise control.
- Low Maintenance: Easy maintenance and lower operational costs.



FCEV-10BM

Excellent Design, Maximum Performance

Motor Housing

Robust design, corrosion-resistant, and suitable for marine environments.

Control Unit

Precise and responsive electronic control system.

Tiller/Handle

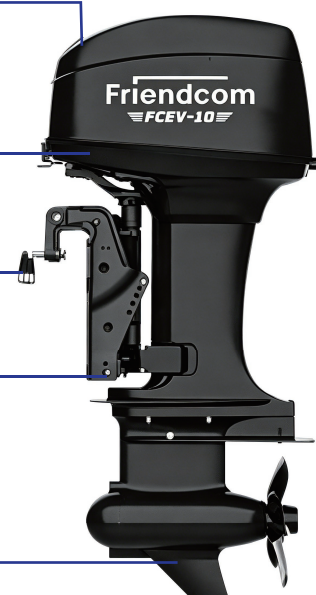
Ergonomic steering system for comfortable and easy control.

Cooling System

Natural cooling system to maintain stable performance during long operations.

High Efficiency Propeller

Specially designed propeller for powerful thrust and high efficiency.



FCEV-10TM

Technical Parameters

Parameters	FCEV-10TM	FCEV-10BM
Rated Power	9-12kW	10-15 kW
Equivalent Gasoline Engine	12-16 HP	13-20 HP
Maximum Torque	56 Nm	70 Nm
Operating Voltage	96 VDC	96 VDC
Maximum Rotation Speed	2.500 rpm	3.550 rpm
Thrust Force	1.022 N	1.058 N
Acceleration 0-Max	5 detik	3 detik
Protection Rating	IP66	
Motor Type	PMSM(Permanent Magnet Synchronous Motor)	
Cooling System	Natural Cooing	
Steering System	Tiller/ Handle	
Propeller	3-Blade Aluminum	
Applications	Fishing Boats,Passenger Boats, Rubber Boats,Tourist Boats	

Main Features

Performance

- High torque
- Fast acceleration
- Stable in various water conditions

Energy System

- 96 VDC voltage
- High energy efficiency
- Longer operating duration

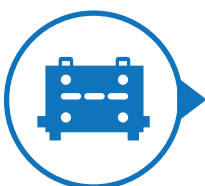
Acoustic Advantage

- Ultra-quiet operation
- Minimal vibration
- More comfortable riding experience

Working System



Battery(Lithium)



Controller



Motor



Propeller

Applications



Fishing Boats



Passenger Boats



Rubber Boats



Tourist Boats



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