

# Data sheet

## LoRaWAN, Inputs (In-A, In-B), EU

HC-003-55

- Plug-and-play LoRaWAN module seamlessly integrates with MULTICAL® 403 meters for rapid and reliable installation
- LoRaWAN long-range data transfer and local wireless M-Bus for fallback
- Independent configuration of data frames, transmission intervals, and adaptive data rate (ADR) settings
- Optimized transmission scheduling and data rates ensure minimal battery impact
- Selectable End-to-end encryption for all LoRaWAN and wireless M-Bus data frames



## Description

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The LoRaWAN Module enables secure and energy-efficient long-range communication for Kamstrup's MULTICAL® 403 series of heat and cooling meters at 868 Mhz.

It is designed to meet modern requirements for remote meter reading, data integrity, and cybersecurity, while maintaining full backward compatibility with existing installations.

The module supports unidirectional LoRaWAN communication, allowing meter data to be transmitted reliably to the head-end system (HES) without the need for bidirectional control. In addition, the module includes wireless M-Bus C1 interfaces, providing local readout, on-site configuration, and a robust fallback solution if LoRaWAN connectivity is temporarily unavailable.

## Security

Security is an integral part of the design. All LoRaWAN and OMS encryption keys are generated directly from the meter's internal Data Encryption Key (DEK) or derived through the Kamstrup Security Concept, ensuring complete traceability, authentication, and protection of sensitive data throughout the device's lifecycle.

The flexible configuration concept allows utilities to tailor transmission intervals, data content, and adaptive data rate (ADR) settings to match network conditions and energy requirements. With a highly optimized power profile, the LoRaWAN Module ensures long battery life and stable performance even in challenging RF environments.

## Activation and Network Behaviour

The module supports Over-The-Air Activation (OTAA) in accordance with the LoRaWAN specification, enabling secure and dynamic onboarding to the network. During activation, the device performs a join procedure using its unique DevEUI, JoinEUI and application key (AppKey). Upon successful authentication, the device derives session keys locally, which are used to ensure secure communication and encryption of application data throughout operation.

To optimize power consumption and ensure long battery lifetime, the module transmits uplink messages once by default (NBTrans = 1). Instead of relying on repeated physical retransmissions, redundancy is implemented at application level, where data is transmitted over time with overlapping values to maintain high data availability.

This approach minimizes network load and energy consumption while ensuring robust data delivery. However, it may deviate from strict use of the network-configured NBTrans parameter and should therefore be considered during network planning and traffic analysis.

## Cable Connections

### Terminals

Max cable size 1.5 mm<sup>2</sup>

### HC-003-32: linkIQ®/wM-Bus, inputs (In-A, In-B), EU



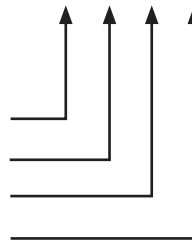
### Pulse inputs

Terminal 65: Pulse In-A (+)

Terminal 66: Pulse In-A (-)

Terminal 67: Pulse In-B (+)

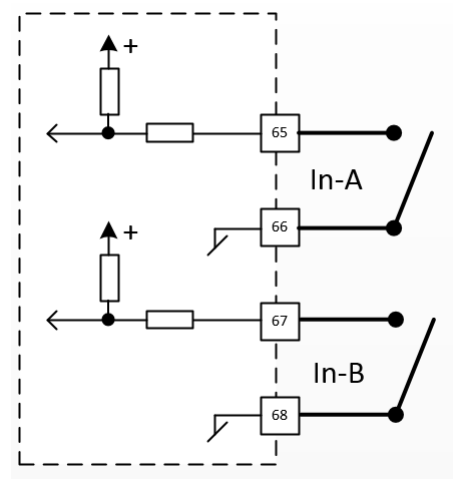
Terminal 68: Pulse In-B (-)



Antenna

The module is equipped with two pulse inputs, In-A and In-B, to collect and accumulate pulses, e.g. from water and electricity meters.

The pulse inputs are physically placed on the module. However, the accumulation and logging of values are performed by the MULTICAL® calculator.

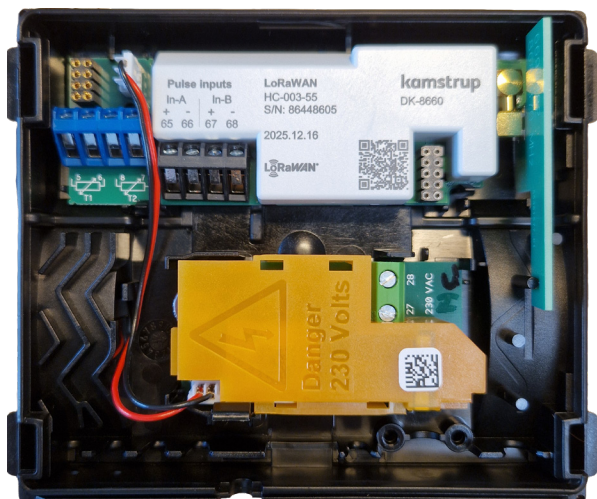


## Powersupply options

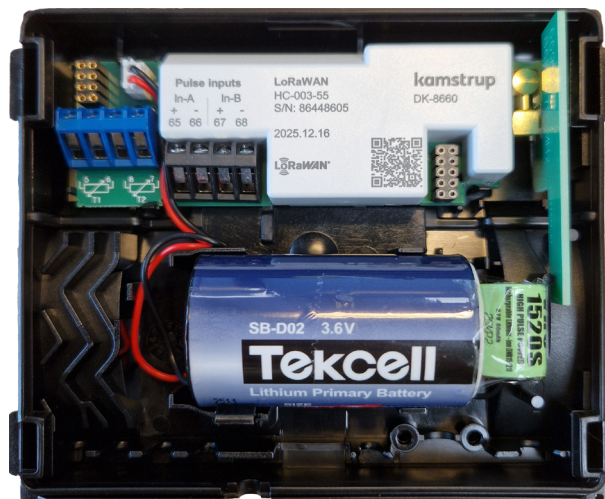
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The module can be installed in the meter using three types of power supply. For battery lifetimes, please refer to the section describing the datagrams.

- VITZROCELL IoT Battery
- 230 V High-Power Supply
- 24 V High-Power Supply



230V High-Power Supply



VITZROCELL IoT Battery

## Datagrams

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The module can support different datagrams and therefore transmit different data depending on the selected datagram code. The datagram is identified by an XX-YY-ZZZ code, where XX = 55 for this LoRaWAN module. YY defines the system configuration, while ZZZ specifies the data content and the transmission interval.

### System configuration

YY	Description	Comment
60	LoRaWAN OMS Security Profile D	Application layer follows the OMS over LoRaWAN protocol and are encrypted via Security profile D
62	LoRaWAN only LoRa encryption	Application layer follows the OMS over LoRaWAN protocol but are not encrypted.

### Datacontent

The data content is defined by the ZZZ part and is shown in the tables below. Data is transmitted in different groups with different transmission intervals. To optimize power consumption, some registers are transmitted less frequently when the module operates at a low data rate. This typically occurs in areas with poor coverage, where higher transmission power is required, which in turn increases battery consumption.

As a result, the meter lifetime depends on the network coverage, since the transmission power is dynamically adjusted according to network conditions.

The Wireless M-Bus data packet is only transmitted when there is no connection to the LoRaWAN network. Once a LoRaWAN connection is established, the Wireless M-Bus transmission will cease.

**55-60/62-101: Application 1**

ZZZ = 101		YY = 60,62			
Application 1		Battery lifetime 16 years			
Group	Transmission interval	Index	Register	KMP register	Source
0	180 min for DR0-1 60 min for DR2-7	0	Date and time	348	Actual Meter
		1	Flow V1 actual	74	
		2	T1 actual	86	
		3	T2 actual	87	
		4	Info bits	369	
1	240 min DR0-7	0	Date	348	Day Log
		1	Volume V1	68	
		2	Energy E8	97	
		3	Energy E9	110	
2	360 min DR0-7	0	Date	348	Month Log
		1	Power max month	143	
		2	Power max month date	389	
		3	Flow V1 max month	139	
		4	Flow V1 max month date	387	
3	180 min for DR0-1 60 min for DR2-7	0	Date and time	348	Hour Log
		1	Heat energy E1	60	
4	180 min for DR0-1 60 min for DR2-7	0	Date and time	348	Hour Log
		1	Heat energy E3	63	
5	180 min for DR0-1 60 min for DR2-7	0	Date and time	348	Hour Log
		1	Heat energy E3 for combined HC	63	
6	Event frame (When infocode is triggered)	0	Date and time	348	Actual Meter
		1	Info bits	369	
		2	t1 actual [2 decimals]	86	
		3	t2 actual [2 decimals]	87	
		4	Flow V1 actual	74	
7	Wireless M-Bus fallback 96s interval. (Only when no LoRa connection)	0	Date and time	348	Actual Meter
		1	Heat energy E1	60	
		2	Cooling energy E3	63	
		3	Volume V1	68	
		4	t1 actual [2 decimals]	86	
		5	t2 actual [2 decimals]	87	
		6	Info bits	369	
		7	Power actual	80	
		8	Flow V1 actual	74	
		9	Date and time	348	
		10	Heat energy E1	60	Month Log
11	Cooling energy E3	63			

55-62-201:

ZZZ = 201		YY = 62			
Germany		Battery lifetime 16 years			
Group	Transmission interval	Index	Register	KMP register	Source
0	6 hours	0	Date and time	348	Month Log
		1	Heat energy E1	60	
		2	Volume V1	68	
		3	Flow V1 max month	139	
		4	Flow V1 max month date	387	
1	2 hours and as event frame	0	Heat energy E1	60	Actual Meter
		1	t1 actual [2 decimals]	86	
		2	t2 actual [2 decimals]	87	
		3	Flow V1 actual	74	
		4	Info bits	369	
2	Wireless M-Bus fallback 96s interval (only when no LoRa connection)	0	Heat energy E1	60	Actual Meter
		1	t1 actual [2 decimals]	86	
		2	t2 actual [2 decimals]	87	
		3	Flow V1 actual	74	
		4	Info bits	369	
		5	Date and time	348	Month Log
		6	Heat energy E1	60	
		7	Volume V1	68	
		8	Flow V1 max month	139	
		9	Flow V1 max month date	387	

## Commissioning

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To commission the meter with the LoRaWAN module, a CALL procedure must be performed. By default, the radio interface is disabled and will only be activated once a CALL is initiated.

A CALL can be triggered manually by pressing and holding:

- The two buttons on MULTICAL® 403

For a few seconds until CALL appears in the meter display. Upon successful completion of the CALL procedure, OK will appear in the lower left corner of the display.

If the CALL is not initiated manually, the meter will automatically perform the CALL once it detects water flow.

The meter display can be used to verify the quality of the connection to the LoRaWAN infrastructure. If the connection is poor or unavailable, an external antenna may be installed to improve coverage.

By checking display index 47, the signal quality can be assessed. If the displayed value is below 10, the use of an external antenna is recommended.

## Display information

The meter display can be used for testing if the module status is OK and if the module is connected to the LoRaWAN infrastructure.

The module information can be found in "TECH loop" on the display.

- Module in module slot 1: Choose menu 2-101 in "TECH loop".
- Module in module slot 2: Choose menu 2-202 in "TECH loop".

Menu	Menu index	Information	Example of display reading
2-x01-00	31	Module type and configuration	
2-x01-01	32	Module firmware and revision	
2-x01-02	47	Connection information with 2 digits of information The digits show the quality of the connection if the connection is achievable: 0: No valid link 1-9: Poor link 10-19: Medium link >=20: Good link	
2-x01-03	49	Communication status 0: Meter is installed successfully 1: Awaiting to join to network 2: Awaiting to install on network 3: Awaiting to join, while transmitting fallback frames	

## Technical data

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### Physical

For installation in MULTICAL® 403.

### Mechanical data

Dimensions (LxWxD) 90 x 35 x 14 mm

Weight < 45 g

### Supply

Battery or AC supply

### Radio communication

LoRaWAN according to 1.0.4 specification

OMS over LoRaWAN protocol

EU frequency band, 868 Mhz

### Encryption keys

**AppKey** is derived from meters DEK key and can be found in .KEM2 file downloaded from [www.kamstrup.com](http://www.kamstrup.com)

### Pulse inputs

Input type Contact input

Open voltage 3.6 V

Current < 5 uA

Max cable length 10 m

### Environment

Operational temperature 5 - 55 °C

Humidity 25 - 85 % RH non-condensing

## Ordering

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<b>Description</b>	<b>Order No.</b>
LoRaWAN, Inputs(In-A, In-B), EU	HC-003-55
USB configuration cable	6699 035
Internal antenna 868Mhz	6699 482
External antenna (mini triangle)	6699 448
METERTOOL HCW	<a href="http://www.kamstrup.com">www.kamstrup.com</a>
Encryption keys	<a href="http://www.kamstrup.com">www.kamstrup.com</a>

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