kamstrup

Data sheet

Wired M-Bus Modules

for MULTICAL® 403 and 603

- For billing, analysis and controlling purposes
- Configurable datagrams
- Readout of loggers
- Up to 19200 baud communication speed
- Primary/secondary/enhanced secondary addressing
- Two pulse inputs, two pulse outputs or Thermal Disconnect
- Remote software update
- According to M-Bus standard EN 13757:2013
- According to OMS TR02:2015

Contents

Introduction

A new generation of advanced high-performance and flexible M-Bus modules has been introduced for the MULTICAL® 403 and MULTICAL® 603 energy meter families.

A new unique power control design allows intensive readings without reducing the battery lifetime of the meter while maintaining the galvanic isolation between the meter and the M-Bus network.

The modules can be factory or on-site configured with different pre-defined datagrams or configured with customer-specified datagram, that can be tailor-made for specific products and applications. The modules fulfill the requirements of the M-Bus standard EN 13757:2013 as well as the OMS TR02:2015 and can be used in a wide variety of applications which use M-Bus protocol.

Applications

The M-Bus module is designed with focus on high flexibility to fulfill a wide range of applications.

Analysis

The MULTICAL® 403 and 603 supports high quantities of data and all relevant data for analysis can be read out. This is valid for both actual meter data as well as for historical logger data.

Billing

All relevant data for billing purposes can be read out from MULTICAL® 403 and MULTICAL® 603.

Emulation

With the flexible data configuration, MULTICAL® 403 and 603 can be configured to send out datagrams that match a number of different meters and modules from different manufacturers.

Controlling and regulating

The module can deliver online data in 10 second intervals for controlling and regulating purposes with very a high communication speed.

Applications

Thermal Disconnect

The M-Bus module HC 003-22 is equipped with an output for connection of a 24 VAC Normally Open or Normally Closed thermal or rotary actuator powered through the module's power supply terminals. The Thermal Disconnect enables remote cutoff of the flow for e.g. energy saving, maintenance or as a result of leakage detection. The Thermal Disconnect is physically placed on the M-Bus module. However, the control of the output is handled by the MULTICAL® calculator as a result of commands sent over the M-Bus network.

As PC program, the Kamstrup USB Meter Reader program for Windows is used.

For the HC 003-22 module to operate, MULTICAL® must be configured for "controlled outputs" by setting the PP configuration to 99.

The module has screw terminals for an external AC power supply and screw terminals for connection of a valve controlled by a thermal or rotary actuator.

When the MULTICAL® meter is equipped with the Thermal Disconnect function, 24 or 230 V AC mains supply is mandatory.

Multiple M-Bus

In MULTICAL® 603, it is possible to install two M-Bus modules offering multiple M-Bus connections from the same meter. Each M-Bus module can be configured with its own primary address. The secondary and the enhanced secondary addresses are common for both M-Bus modules.

M-Bus addressing

The modules support primary, secondary and enhanced secondary addressing.

Primary addressing (000-250)

When nothing else is specified the M-Bus modules will automatically use the last 2-3 digits of the MULTICAL® customer number as the primary address.

During the order process or by use of the METERTOOL HCW programming software, dedicated primary addresses can be selected. Furthermore, the primary address can be changed via the M-Bus network using standardized M-Bus commands and via the front keys on the MULTICAL®.

Secondary addressing (M-Bus ID no. 00000000-99999999)

The last eight digits of the customer number are used as M-Bus ID number for secondary addressing. During the order process or by the use of METERTOOL HCW programming software, the secondary addresses can be selected. Furthermore, the M-Bus ID number for secondary addressing can be changed via the M-Bus network using standardised M-Bus commands.

Enhanced secondary addressing
(M-Bus ID no. 00000000-99999999)/(M-Bus fabrication no. 00000000-99999999)

Enhanced secondary addressing is supported by adding the meter's serial number as M-Bus fabrication number to the secondary address.

Wild card search with break detection (00000000-FFFFFFFF)

The M-Bus modules supports wild card search for an easy search for connected meters. Some or all digits of the meter's secondary and/or enhanced secondary addresses can be replaced with wild cards when searching for meters in an M-Bus network. The integrated break detection functionality eases the meter search on the M-Bus network.

Installation

The module is easily mounted into the module slot of the meter. Normally, no configuration is necessary. A configuration might only be necessary if a specific primary address is required. Configuring the primary address can be done with METERTOOL HCW, directly via the meter's front keys or via the M-Bus network.

By using the two sets of M-Bus screw terminals, the M-Bus cable can easily be looped through the meter whereby external junction boxes can be omitted.

The M-Bus modules can be used in meters with both battery and mains supply.

Wiring

Module with pulse inputs (HC-003-20)
Max cable size 1.5 mm²
M-Bus connection
Terminal 24: M-Bus connection, polarity independent
Terminal 25: M-Bus connection, polarity independent
Pulse input connection
Terminal 65: Pulse input A/In-A (+)
Terminal 66: Pulse input A/In-A (-)
Terminal 67: Pulse input B/In-B (+)
Terminal 68: Pulse input B/In-B (-)

Module with pulse outputs (HC-003-21)
Max cable size 1.5 mm²
M-Bus connection
Terminal 24: M-Bus connection, polarity independent
Terminal 25: M-Bus connection, polarity independent
Pulse output connection
Terminal 16: Pulse output C/Out-C (+)
Terminal 17: Pulse output C/Out-C (-)
Terminal 18: Pulse output D/Out-D (+)
Terminal 19: Pulse output D/Out-D (-)

Module with Thermal Disconnect (HC-003-22)
Max cable size 1.5 mm²
M-Bus connection
Terminal 24: M-Bus connection, polarity independent
Terminal 25: M-Bus connection, polarity independent
External power supply 24 VAC
Terminal 97
Terminal 98
Thermal actuator connections
Terminal 118
Terminal 119

Communication

Communication is in accordance with the M-Bus standard EN 13757:2013.

Communication speed

The modules support 300, 2400, 9600 and 19200 baud communication speed and automatically detect the communication speed used by the M-Bus master.

Communication interval

In order to maintain the full battery lifetime of the meter, the reading interval shall be >10 seconds. It is, however, recommended to use mains supply for very frequent reading applications.

As the modules do not have any form of communication limitations, they can be read out in second interval, but this will reduce the battery lifetime of the meter when the meter is battery-supplied.

The most frequent integration interval in MULTICAL® 403 is 4 seconds.

The most frequent integration interval in MULTICAL® 603 is 2 seconds.

A more frequent reading is not recommended as this will provide redundant information.

Communication via optical readout head

Apart from the configurations in MULTICAL® itself, the primary M-Bus address can be configured via the optical readout head.

Communication from M-Bus master

The following parameters can be configured with M-Bus commands via the connected M-Bus master:

- Primary address
- M-Bus ID number for secondary addressing
- Preset of the meter's pulse inputs
- Meter clock synchronization

The M-Bus modules support download of new module software for implementing e.g. new functionality in already installed module, as well as for reconfiguring of the datagram. These functionalities are supported by the Kamstrup READy program platform.

Communication

Pulse inputs

The M-Bus module HC-003-20 is equipped with two pulse inputs, In-A and In-B, to collect and accumulate pulses remotely, e.g. from water meters and electricity meters. The pulse inputs are physically placed on the M-Bus module. However, the accumulation and data logging of values are made by the MULTICAL® calculator.

When installing the M-Bus module with pulse inputs in slot 2 of MULTICAL® 603, the pulse inputs will be registered in the meter as In-A2 and In-B2.

Pulse outputs

The M-Bus module HC-003-21 has two configurable pulse outputs, Out-C and Out-D, which are suitable for pulsing out selected registers from MULTICAL® 403 and 603. The pulse outputs are physically placed on the M-Bus module, but the pulses are made by the MULTICAL® calculator.

Thermal Disconnect

The M-Bus module HC 003-22 is equipped with an output for connection of a 24 VAC Normally Open or Normally Closed thermal actuator powered through the module's power supply terminals. The Thermal Disconnect enables remote cutoff of the flow for e.g. energy saving, maintenance or as a result of leakage detection. The Thermal Disconnect system is physically placed on the M-Bus module. However, the control of the output is handled by MULTICAL® as a result of commands sent over the M-Bus network. For the remote control of the thermal actuators, the Windows-based PC program USB Meter Reader from Kamstrup is to be used.

Communication from M-Bus module

A number of different datagrams are available when ordering meters. Further datagrams can be configured with METERTOOL HCW and READy.

Communication

Examples of available datagrams

Standard profile	Tariff profile	DACH profile	Control profile
Heat energy E1	Heat energy E1	Heat energy E1	Heat energy E1
Cooling energy E3	Cooling energy E3	Cooling energy E3	Cooling energy E3
Energy E8 (T1 x m^3)	Volume V1	Heat with discount A1	Volume V1
Energy E9 (T2 x m^3)	Pulse input A	Heat with surcharge A2	Temp. 1 Inlet
Volume V1	Pulse input B	Volume V1	Temp. 2 Outlet
Pulse input A	Tariff 2	Pulse input A	Differential temp.
Pulse input B	Tariff 3	Pulse input B	Actual power
Hour counter	Tariff 4	Tariff 2	Actual flow
Error hour counter	Hour counter	Tariff 3	Info
Temp. 1 Inlet	Error Hour Counter	Tariff 4	Meter type
Temp. 2 Outlet	Temp. 1 Inlet	Temp. 1 Inlet	Serial number
Differential temp.	Temp. 2 Outlet	Temp. 2 Outlet	Module configuration
Actual power	Differential temp.	Differential temp.	Module SW version
Max power this month	Actual power	Temp. 5 Ref. Outlet	
Actual flow	Max power this month	Actual power	
Max flow this month	Actual flow	Max power this month	
Info	Max flow this month	Actual flow	
Date / time	Info	Max flow this month	
Heat energy E1, Target	Date / time	Info	
Cooling energy E3, Target	Heat energy E1, Target	Heat energy E1, Target	
Energy E8 (T1 x m^3), Target	Cooling energy E3, Target	Cooling energy E3, Target	
Energy E9 (T2 x m^3), Target	Volume V1, Target	Pulse input A, Target	
Volume V1, Target	Pulse input A, Target	Pulse input B, Target	
Pulse input A, Target	Pulse input B, Target	Heat with discount A1, Target	
Pulse input B, Target	Tariff 2, Target	Heat with surcharge A2, Target	
Max power, Target	Tariff 3, Target	Tariff 2, Target	
Max flow, Target	Tariff 4, Target	Tariff 3, Target	
Target date	Max power, Target	Tariff 4, Target	
Meter type	Max flow, Target	Max power, Target	
Serial number	Target date	Target date	
Module configuration	Meter type	Meter type	
Module SW version	Serial number	Serial number	
	Module configuration	Module configuration	
	Module SW version	Module SW version	

Loggers via M-Bus

Data from the meter's historical loggers can be read out with M-Bus commands.

The following loggers are available for reading:

- Yearly logger
- Monthly logger
- Daily logger
- Minute loggers

The available registers depend on the meter configuration.

Reading the logger is very flexible, and both the number of logs as well as the log period can be selected.

Customer-specified datagrams

Dedicated datagrams can be specified in corporation with Kamstrup A/S. The datagram can be sent to already installed meters via METERTOOL HCW, connected to module via the connector on the module. Using READy, an update via the M-Bus network is also possible.

Module update

The module firmware as well as the module configuration can be updated with READy via the M-Bus master and directly through the connector on the module with METERTOOL HCW.

Technical specifications

Physical

Only suitable for installation in MULTICAL® 403 and 603.

Galvanic isolated according to PTB-A50.1.

Communication

Protocol	M-Bus standard according to EN 13757:2013
Readout speed	300/2400/9600/19200 baud with automatically speed detection
Configuration	METERTOOL HCW via module connector
	READy via M-Bus master

Supply

Power supply	Applicable in MULTICAL® 403 and 603 with battery and mains supply
Power consumption	1 unit load (1.5 mA) per M-Bus slave
Rin / Cin	422 Ω/0.5 nF
Max cable resistance	29 Ω/180 nF per pair
Operational temperature	5 - 55°C

Thermal Disconnect

External power supply	24 VAC, e.g. Kamstrup safety transformer type no. 6699-403
Max output load	5W
Actuator reaction time	< 5 minutes

The thermal or rotary actuator must be a 24 VAC, max 5W.

For thermal actuators with max 2.5 W consumption, the above safety transformer may be used for supplying both the MULTICAL® meter and the thermal actuator.

Notes

For Thermal Disconnect applications, MULTICAL® may not be battery-supplied.

The thermal actuator must be supplied by an external safety transformer.

Markings/approvals

EN 1434 in conjunction with the type approval of MULTICAL® 403 as well as of MULTICAL® 603.

EN 13757

CE approval

Ordering

Description	Order no.
M-Bus module with pulse inputs for MULTICAL® 403 and 603	HC-003-20
M-Bus module with pulse outputs for MULTICAL® 403 and 603	HC-003-21
M-Bus module with Thermal Disconnect for MULTICAL® 403 and 603	HC-003-22
M-Bus Master MultiPort 250D	MBM-M210000
M-Bus Master MultiPort 250L	MBM-M200000
USB configuration cable for H/C-modules	6699-035
Infrared optical readout head w/USB A plug	6699-099
Infrared optical readout head w/RS-232 D-SUB 9F	6699-102
Transformer 230/24 VAC	6699-403
METERTOOL HCW	www.kamstrup.com
USB Meter Reader	www.kamstrup.com
READy	www.kamstrup.com

Available datagrams

	XX	YY	ZZZ	Suitable for MULTICAL® 403	Suitable for MULTICAL® 603
Module type					
Wired M-Bus module + 2 pulse inputs	20				
Wired M-Bus module + 2 pulse outputs	21				
Wired M-Bus module + Thermal Disconnect	22				
System configuration					
Standard		00			
Datagram					
Standard Profile Yearly Target Data			101	•	•
Standard Profile Monthly Target Data			102	•	•
Tariff Profile Yearly Target Data			103	•	•
Tariff Profile Monthly Target Data			104	•	•
DACH Profile Yearly Target Data			105	•	•
DACH Profile Monthly Target Data			106	•	•
Control Profile			107	•	•
CP Profile Yearly Target Data			108	•	•
...			...		
Extended Pulse Input Profile Yearly Target Data			301		•
Extended Pulse Input Profile Monthly Target Data			302		•
Dual ULTRAFLOW Profile Yearly Target Data			303		•
Dual ULTRAFLOW Profile Monthly Target Data			304		•
Alternative Profile Yearly Target Data			305		•
Alternative Profile Monthly Target Data			306		•
PDO Profile Monthly Target Data			307		•
Energy Profile SNG			310		•
...			...		
MULTICAL® 402/602 compatible data (402020/670020) Yearly Target Data			998	•	•
MULTICAL® III compatible data (6604/660S) Yearly Target Data			999	•	•

Not all registers are available in all meters. The cooling register E3, for example, will only be available in a meter configured as a cooling or combined heat/cooling meter. It will not be available in a heat meter.

For reading target registers, the wanted registers must be defined in the RR-configuration (logger contents).

Datagrams with the ZZZ values 301 to 399 are created for MULTICAL® 603. If they are used in MULTICAL® 403, some registers will not be available in the reading.

Kamstrup A/S • 58101450_F1_GB_09.2017

Kamstrup A/S
Industrivej 28, Stilling
DK-8660 Skanderborg
T: +45 89 93 10 00
F: +45 89 93 10 01
info@kamstrup.com
kamstrup.com