M-Bus Master

Remote data acquisition from heat meters via M-Bus

Up to 40 meters connected to one M-Bus Master

IR and RS232 interface

With or without display

Datalogging facilities

Modular space for future expansions

Application

The M-Bus Master forms part of Kamstrup's M-Bus system, which consists of M-Bus slave, M-Bus Master and M-Bus software for PC.

The M-Bus Master reads M-Bus slaves mounted in MULTICAL® energy meters. The M-Bus Master can read via computer, and in addition the M-Bus Master with display can show data in the display for all energy meters connected to the M-Bus Master.

The M-Bus is a standardized bus according to EN 1434-3 which enables reading of up to 250 energy meters from a central point.

When using electronic reading the data path from energy meter to reading programme is secured.

When the M-Bus Master is at rest, it still supplies the connected M-Bus slaves.

When reading the slaves the M-Bus Master transmits an address to the network, and the slave module with the adress in question replies.

Optocouplers are used to transmit data between the M-Bus and the energy meter, effectively separating the bus and meter galvanically.

The M-Bus Master makes it possible to be supplied with fresh data from the energy meter at any time, but the slave automatically acquires data from the energy meter every 12 hours, or after reset/start up.

The read-out address, which activates the slave, consists of the last three digits in the MULTICAL® customer ID no., making it unnecessary to control the slaves individual addresses or preprogram them. The address is easily changed with the hand terminal MULTITERM.

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M-Bus system

M-Bus

The M-Bus system is developed especially for communication with and reading of district heating energy meters as described in detail in EN 1434. The purpose is to offer a standardized bus, making it easy for the district heating plants to specify and use network for reading meters.

The M-Bus system consists of a computer, a M-Bus Master and up to 250 slaves. The computer initiates all communication via the M-Bus Master, i.e. it requests and the coupled slaves respond according to number.

Topology

The slaves are parallel coupled together in bus topology, facilitating expansions of the number of slaves on the topology.

Addressing the slaves

Each slave needs a unique three digit address between 001 and 250 to avoid conflicts on the bus. The slaves use the last three digits in MULTICAL®'s customer ID no. as address. In cases where two slaves have the same address, one address can easily be changed using the Kamstrup MULTITERM hand terminal.

Reading the slaves

The meters data are read by connecting a computer.

M-Bus Master with display can read all meter's data on the display immediately. At start-up the M-Bus Master with display initiates the system by scanning the bus and saves the addresses of the responding slaves.

When Kamstrup's M-Bus software PcM-Bus is installed, it is an easy-to-use Windows programme for reading and storage of data.

Reading and datalogging is made via the computer which is connected to the master either via the IR head or by connection to the built-in RS232 interface.

Standards

Kamstrup's M-Bus system meets all requirements of EN 1434-3.

The slave is designed to meet all demands of the "Level A" specification. The power consumption corresponds to a Unit Load, i.e. less than 1.5 mA per slave. The baud rate is 300 or 2400 baud.

Data read are max. 12 hours old.

Command Set

Following commands are supported by the slaves:

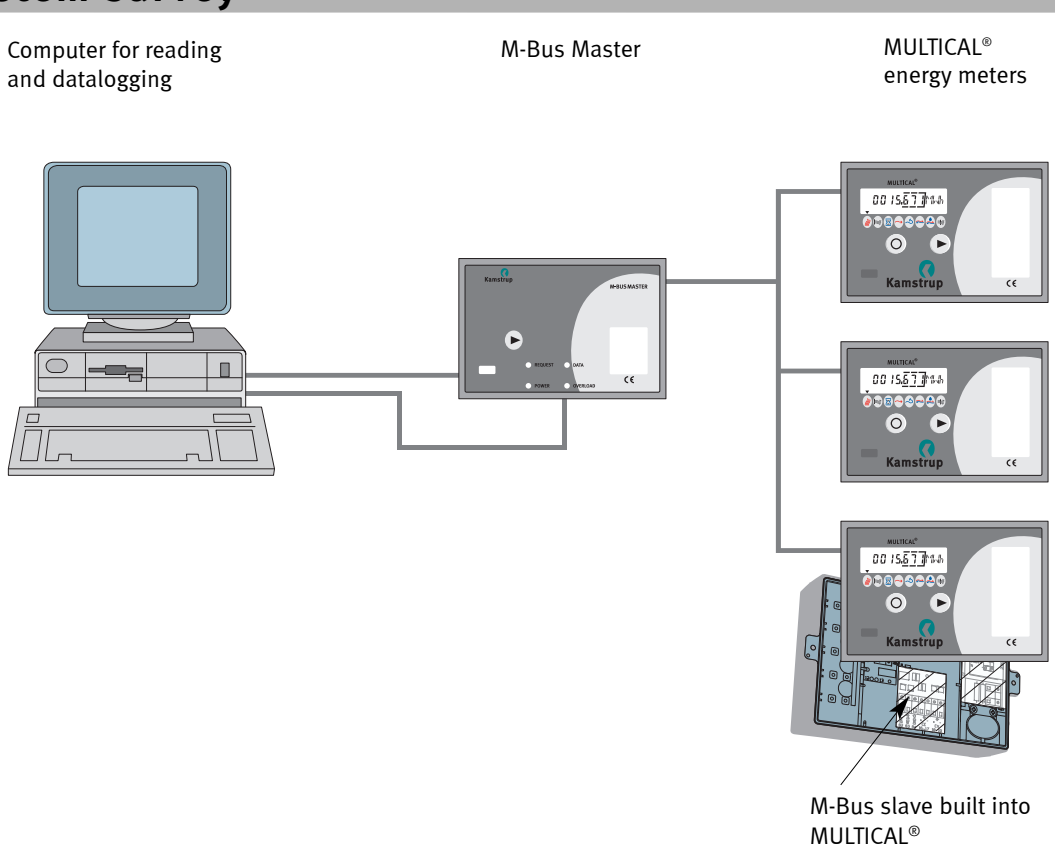
M-Bus Master to slave:

REQ_UD2	acquire data from the slave
SND_NKE	initiate the slave
SND_UD1	send data to the slave

Slave to M-Bus Master:

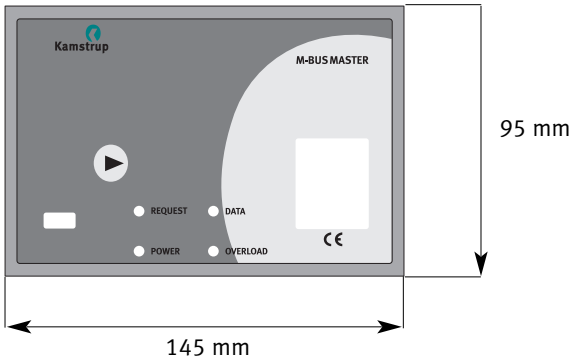
RSP_UD1	send data to the M-Bus Master
CON_ACK	data from M-Bus Master ok

System survey

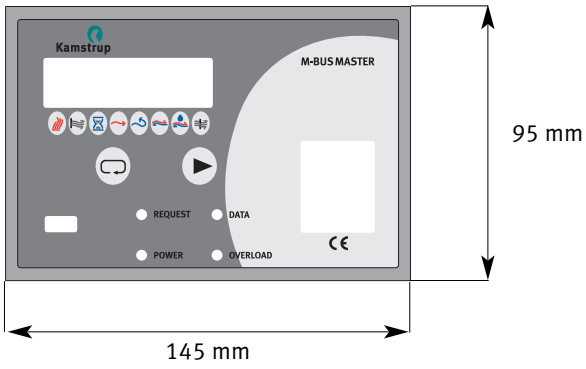


Dimensional drawings

M-Bus Master without display



M-Bus Master with display



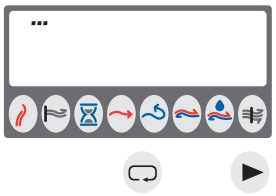
Display values

The display values are shown in two levels. First level shows information on the attached meters, and second level informs of the consumption of the individual meter.

1. Level (the attached meters)

Neutral position

When the three dots in the top left corner of the display flash one at a time the M-Bus Master is in neutral position and everything is in order. The M-Bus Master automatically reverts to neutral positon after having performed an action.

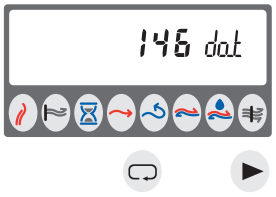


Initialization

By pressing both buttons for 3 - 10 seconds, the display show “ini”. The M-Bus Master now goes through the entire M-Bus system, and makes the addresses accessible to which meters are attached.

Seeking addresses

After intialization the accessible addresses can be looked over by pressing the left button.



Data registers

Info code	If the info code is different from 0
Energy	Shown in MWh, kWh or GJ
Volume	m³
Aux 1*	Extra register, (m³ or El_a)
Aux 2*	Extra register, (m³ or El_b)
Target date	yymmdd

*only if FF ≠ 0

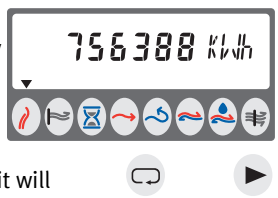
2. Level (the individual meter)

Acquire data

When the address in question has been found, data can be acquired by pressing the right button. Data is now acquired from the meter in question within 10 - 15 seconds. The display shows the address in question and “dat”.

Show data

The data registers are shown one by one in exactly the same way as on the energy meter by pressing the right button.



If the INFO code is different from 0, it will always be shown first.

Target date energy	Shown in MWh, kWh or GJ
Target date volume	m³
Forward temperature	°C
Return temperature	°C
Δ temperature	°C
Power	kW or MW
Flow	m³/h, l/h
m³ x $T_{forward}$	Only from MULTICAL®66-C
m³ x T_{return}	Only from MULTICAL®66-C
Cooling energy	MWh, kWh or GJ, only from MULTICAL®66-C
Yearly peak power	kW or MW, only from MULTICAL®66-C

Technical data

Electrical data (general)

Supply	230 VAC
Bus mark/space	30 VDC/ 18 VDC
Typical response time/slave	< 1 sec./300 baud
Address field	001-250 primary addressing
Communication	300/2400 baud, 1 startbit, 8 databits, 1 paritybit , 1 stopbit
Communication protocols	IEC 1107/IEC870/RS232
Cable length	Max. 1000 - 1800 m [1]
Cable cross-section	0.5 to 0.8 mm²
R_{max}/C_{max}	29 Ω/180 nF
Cross-section (recom.)	0.8 mm²

Electrical data (M-Bus Master without display)

Load at 40 slaves	75 mA

[1] Dependant on number of slaves and cable cross-section

Electrical data (M-Bus Master with display)

Load at 40 slaves	85 mA
Display	LCD
Background light	Yes, during operation

Indicators

M-Bus Master is furnished with LED indicators

Power	Red LED
Request	Red LED
Data	Red LED
Overload	Red LED

Mechanical data

Weight	0.4 kg
Protection class	IP54
Humidity	Not condensing
Ambient temperature	0...55° C
Storage temperature	-20...+60° C
Material top	SAN
PCB house	ABS

Order specification

Type No. 6698 - □ - □ - □ - □□□

Top	
Without display	1
With display	A
Bottom	1
Module	
No Module	0
Cascade Module	1
Modem Module	2
Delivery code (Supplied by Kamstrup)	XXX

Accessories

Type No.	Description
66 04 000 100	M-Bus slave with pulse inputs for MULTICAL® III
66 07 000 100	M-Bus slave with pulse outputs for MULTICAL® III
66 08 000 100	M-Bus slave with pulse inputs for MULTICAL® 66-CDE
66 09 000 100	M-Bus slave with pulse outputs for MULTICAL® 66-CDE
66 98 001 100	M-Bus cascade module
66 98 002 118*	M-Bus Modem with pulse dialing
66 98 002 319*	M-Bus Modem with DTMF dialing
66 99 102	IR read-out head with 9-pole D-sub connector to COM port at PC
66 99 106	Datacable with 9-pole D-sub connector to COM port at PC
S7530-007	PcM-Bus read-out software for Windows 95/98
5511 710	Technical Description M-Bus system

* Kamstrup recommends DTMF dialing where possible. Please contact Kamstrup for further details.

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