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 address 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.
**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

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**System survey**

Computer for reading and datalogging

M-Bus Master

MULTICAL® energy meters

M-Bus slave built into MULTICAL®
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 position 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 initialization 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) |
| Aux 2*    | Extra register, (m³ or El) |
| 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/space: <1 sec./300 baud
- Address field: 001-250 primary addressing
- Communication: 300/2400 baud, 1 start-bit, 8 databits, 1 parity-bit, 1 stopbit
- Communication protocols: IEC 1107/IEC870/RS232
- Cable length: Max. 1000 - 1800 m
- Cable cross-section: 0.5 to 0.8 mm²
- $R_{\text{max}}/C_{\text{max}}$: 29 Ω/180 nF
- Cross-section (recom.): 0.8 mm²

**ELECTRICAL DATA (M-BUS MASTER WITH DISPLAY)**
- Load at 40 slaves: 75 mA
- Load at 40 slaves (with display): 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**

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<th>Type No.</th>
<th>Description</th>
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<tbody>
<tr>
<td>6698</td>
<td></td>
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<tr>
<td>1</td>
<td>Top Without display</td>
</tr>
<tr>
<td>A</td>
<td>With display</td>
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</tbody>
</table>

**Module**
- No Module: 0
- Cascade Module: 1
- Modem Module: 2

**Delivery code (Supplied by Kamstrup)**: XXX

**Accessories**

<table>
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<tr>
<th>Type No.</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>66 04 000 100</td>
<td>M-Bus slave with pulse inputs for MULTICAL® III</td>
</tr>
<tr>
<td>66 07 000 100</td>
<td>M-Bus slave with pulse outputs for MULTICAL® III</td>
</tr>
<tr>
<td>66 08 000 100</td>
<td>M-Bus slave with pulse inputs for MULTICAL® 66-CDE</td>
</tr>
<tr>
<td>66 09 000 100</td>
<td>M-Bus slave with pulse outputs for MULTICAL® 66-CDE</td>
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<tr>
<td>66 98 001 100</td>
<td>M-Bus cascade module</td>
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<tr>
<td>66 98 002 118*</td>
<td>M-Bus Modem with pulse dialing</td>
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<tr>
<td>66 98 002 319*</td>
<td>M-Bus Modem with DTMF dialing</td>
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<tr>
<td>66 99 102</td>
<td>IR read-out head with 9-pole D-sub connector to COM port at PC</td>
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<tr>
<td>66 99 106</td>
<td>Data cable with 9-pole D-sub connector to COM port at PC</td>
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<tr>
<td>S7530-007</td>
<td>PcM-Bus read-out software for Windows 95/98</td>
</tr>
<tr>
<td>5511 710</td>
<td>Technical Description M-Bus system</td>
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* Kamstrup recommends DTMF dialing where possible. Please contact Kamstrup for further details.