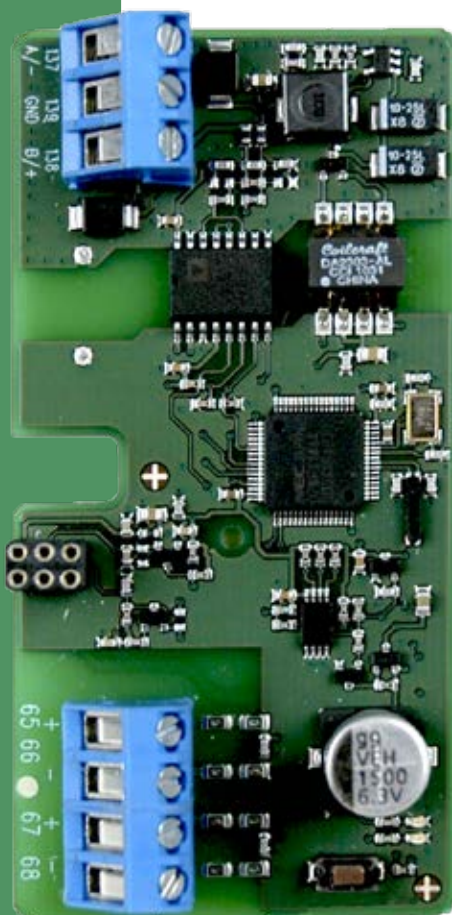


Data sheet

Modbus RTU Slave Module

Modbus communication module for MULTICAL® 62/601/602/6L2/6M2/801

- RS-485 based RTU communication
- Communication speed of up to 76,800 bits/sec.
- Programmable data, communication speed and parity settings
- Two pulse inputs for additional water and electricity meters
- RS-485 galvanically isolation from meter



Description

Application

Modbus is an open, widespread and well- established serial communication protocol used within building automation.

The Modbus base module for MULTICAL® ensures a simple integration from Kamstrup's heat, cooling and water meters into a Modbus based system.

The Modbus module is mounted in MULTICAL® and is used for data transfer from MULTICAL® heat, cooling and water meters to a Modbus system.

Functionality

The Modbus module communicates as a RTU (Remote Terminal Unit) slave device on RS-485.

The Modbus module transfers a number of both actual data as well as accumulated data.

Furthermore, MULTICAL® info codes for general alarm, flow error, temperature error, water leakage, pipe burst, air in system and wrong flow direction can be transmitted to the Modbus system.

The two pulse inputs allow connection and reading of two additional meters for e.g. water and electricity with pulse output.

Reliability

The RS-485 port of the Modbus module is galvanically separated from the meter's voltage potential, thereby improving the security for smooth operations. At the same time, the risk of influencing the meter due to influences of the RS-485 port is reduced to a minimum.

The Modbus module is in full compliance with and included in the MID approval for MULTICAL®.

Addressing range

The module can be addressed as a slave in the range of 1-247.

By default, the Modbus address equals the last three digits of the meter's customer number.

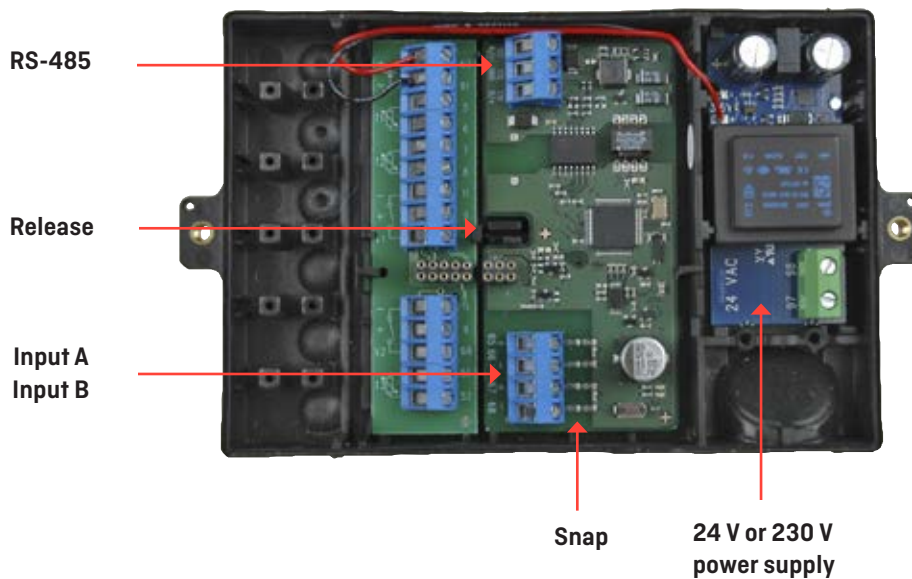
If the customer number of the meter results in an address larger than 247, only the last two digits are used for the Modbus address of the module.

Note: If the customer number of the meter ends with 000, the Modbus module automatically changes to address 247.

Configuration

Data content, address, baud rate and parity of the Modbus module is changeable via the optical interface of the meter and METERTOOL HCW.

Connection



The module is mounted in the connecting base of the meter in the following way:

The module is placed in the "Snap" at an angle and is thereafter pushed towards the connecting base until the "Release" clicks around the meter's PCB.

The module is removed in the following way:

The module is released by pressing the "Release" upwards and at the same time drawing the connection terminals at the top of the module.

Electrical connection:

The Modbus module is automatically connected with the meter via the 6-pole connector just below the "Release" when the top part of the meter is mounted.

The RS-485 cable is connected via the cable inlets on the connecting base.

Transferred data

Standard Datagram (all SW versions)

- Customer number (programmable)
- Serial number
- Accumulated heat energy (E1)
- Accumulated cooling energy (E3)
- Accumulated volume flow (V1)
- Accumulated volume flow (V2)
- Inlet temperature (T1)
- Outlet temperature (T2)
- Temperature (T3)
- Actual flow in (V1)
- Max power
- Accumulated values from additional meters via pulse In A and pulse In B
- MULTICAL® info codes
- Program number
- Config number 1 (DDDEE)
- Config number 2 (FFGGMN)
- Hour counter
- Meter type
- Tariff TA2
- Tariff TL2
- Tariff TA3
- Tariff TL3

Alternative Datagram (from SW version C1)

- Customer number (programmable)
- Serial number
- Accumulated heat energy (E1)
- Control Energy (E2)
- Accumulated cooling energy (E3)
- Actual flow in (V1)
- Actual flow out (V2)
- Accumulated volume flow (V1)
- Accumulated volume flow (V2)
- Inlet temperature (T1)
- Outlet temperature (T2)
- Temperature (T3)
- Accumulated values from additional meters via pulse In A and pulse In B
- Mass (V1)
- Mass (V2)
- Actual power
- Max power
- Program version
- MULTICAL® info codes
- Meter type
- Meter number
- Program number
- Config number 1 (DDDEE)
- Config number 2 (FFGGMN)
- Hour counter
- Fluid type code (6M2 only) Technical data

Transferred data

Modbus functions

- Communicates with the bus using RS-485 (default 19200, 8, E, 1)
- Supported baud rates: 300, 2400, 9600, 19200, 38400, 76800
- Supported parity settings: none, odd and even
- Supported stop bit settings: one and two
- Supported data bits: 8
- The module can be addressed as a slave in the range of 1-247
- Data content, baud rate, parity and address are stored in MULTICAL® and can be changed using a Kamstrup optical read-out head and METERTOOL HCW.
- Supports RTU transmission mode
- Supported function codes and their possible exception codes:
 - 0x03 Read Holding Registers with exception codes:
 - 0x02 – Illegal data address
 - 0x03 – Illegal data value
 - 0x04 Read Input Registers with exception codes:
 - 0x02 – Illegal data address
 - 0x03 – Illegal data value
 - 0x08 Diagnostics with exception code:
 - 0x01 – Illegal function
 - Subcode 0x01 Restart with exception code:
 - 0x03 – Illegal data value
 - 0x2B Encapsulated interface transport with exception code:
 - 0x01 – Illegal function
 - Subcode 0x0E Read Device Identification with exception code:
 - 0x03 – Illegal data value
- 0x41 and 0x42 Reserved as Kamstrup Specific Function code Modbus data model mapping of MULTICAL® values

Modbus data model mapping of MULTICAL® values

The PDU address region from 0 to 168 is described in details below. The PDU address is in bytes so that a 32-bit register results in the following register to be placed at an address 4 higher. A more detailed description of each column will be given later on.

Data model mapping for byte-addressed region, standard datagram

Memory	Memory (hex)	Individual description	Size in bytes	Contents	Data type	Update status
0	0x0000	Heat energy E1	4	Values in float	IEEE Float - 32 bit	Dynamic
4	0x0004	Actual flow	4	Values in float	IEEE Float - 32 bit	Dynamic
8	0x0008	Volume V1	4	Values in float	IEEE Float - 32 bit	Dynamic
12	0x000C	Actual power	4	Values in float	IEEE Float - 32 bit	Dynamic
16	0x0010	Inlet temperature T1	4	Values in float	IEEE Float - 32 bit	Dynamic
20	0x0014	Outlet temperature T2	4	Values in float	IEEE Float - 32 bit	Dynamic
24	0x0018	Pulse input A	4	Values in float	IEEE Float - 32 bit	Dynamic
28	0x001C	Pulse input B	4	Values in float	IEEE Float - 32 bit	Dynamic
32	0x0020	Heat energy E1	2	Units	Word - 16 bit	Dynamic
34	0x0022	Actual flow	2	Units	Word - 16 bit	Dynamic
36	0x0024	Volume V1	2	Units	Word - 16 bit	Dynamic
38	0x0026	Actual power	2	Units	Word - 16 bit	Dynamic
40	0x0028	Heat energy E1	4	Values in integer	Double Word - 32 bit	Dynamic
44	0x002C	Actual flow	4	Values in integer	Double Word - 32 bit	Dynamic
48	0x0030	Volume V1	4	Values in integer	Double Word - 32 bit	Dynamic
52	0x0034	Actual power	4	Values in integer	Double Word - 32 bit	Dynamic
56	0x0038	Inlet temperature T1	4	Values in integer	Signed Double Word - 32 bit	Dynamic
60	0x003C	Outlet temperature T2	4	Values in integer	Signed Double Word - 32 bit	Dynamic
64	0x0040	Pulse input A	4	Values in integer	Double Word - 32 bit	Dynamic
68	0x0044	Pulse input B	4	Values in integer	Double Word - 32 bit	Dynamic
72	0x0048	Heat energy E1	2	Decimal	Word - 16 bit	Dynamic
74	0x004A	Actual flow	2	Decimal	Word - 16 bit	Dynamic
76	0x004C	Volume V1	2	Decimal	Word - 16 bit	Dynamic
78	0x004E	Actual power	2	Decimal	Word - 16 bit	Dynamic
80	0x0050	Pulse input A	2	Decimal	Word - 16 bit	Dynamic
82	0x0052	Pulse input B	2	Decimal	Word - 16 bit	Dynamic
84	0x0054	Version	2	Program version	Word - 16 bit	Static
86	0x0056	Info code	2	Info code	Word - 16 bit	Dynamic
88	0x0058	Reserved	4		IEEE Float - 32 bit	

Modbus data model mapping of MULTICAL® values

Memory	Memory (hex)	Individual description	Size in bytes	Contents	Data type	Update status
92	0x005C	Cooling energy E3	4	Values in float	IEEE Float - 32 bit	Dynamic
96	0x0060	Volume - V2	4	Values in float	IEEE Float - 32 bit	Dynamic
100	0x0064	Temperature T3	4	Values in float	IEEE Float - 32 bit	Dynamic
104	0x0068	Cooling energy E3	2	Units	Word - 16 bit	Dynamic
106	0x006A	Volume - V2	2	Units	Word - 16 bit	Dynamic
108	0x006C	Cooling energy E3	4	Values in integer	Double Word - 32 bit	Dynamic
112	0x0070	Volume - V2	4	Values in integer	Double Word - 32 bit	Dynamic
116	0x0074	Temperature T3	4	Values in integer	Signed Double Word - 32 bit	Dynamic
120	0x0078	Cooling energy E3	2	Decimal	Word - 16 bit	Dynamic
122	0x007A	Volume - V2	2	Decimal	Word - 16 bit	Dynamic
124	0x007C	Max power	4	Values in float	IEEE Float - 32 bit	Dynamic
128	0x0080	Tarif 2	4	Values in float	IEEE Float - 32 bit	Dynamic
132	0x0084	Tarif 3	4	Values in float	IEEE Float - 32 bit	Dynamic
136	0x0088	Tarif limit 2	4	Values in float	IEEE Float - 32 bit	Static
140	0x008C	Tarif limit 3	4	Values in float	IEEE Float - 32 bit	Static
144	0x0090	Meter type	4	Parameters	Double Word - 32 bit	Static
148	0x0094	Meter number 1	4	Parameters	Double Word - 32 bit	Static
152	0x0098	Serial number	4	Parameters	Double Word - 32 bit	Static
156	0x009C	Program number	4	Parameters	Double Word - 32 bit	Static
160	0x00A0	Config number 1	4	Parameters	Double Word - 32 bit	Static
164	0x00A4	Config Number 2	4	Parameters	Double Word - 32 bit	Static
168	0x00A8	Hour counter	4	Parameters	Double Word - 32 bit	Dynamic
172	0x00AC	Fluid type and percent	4	Parameters	Double Word - 32 bit	Static

Modbus data model mapping of MULTICAL® values

The PDU address region from 256 to 340 is described in detail below. The PDU address is in words so that a 32-bit register results in the following register to be placed at an address 2 higher. Besides the different way of addressing the memory, it is identical to the table seen above.

Data model mapping for word-addressed region, standard datagram:

Memory	Memory (hex)	Individual description	Size in bytes	Contents	Data type	Update status
256	0x0100	Heat energy E1	4	Values in float	IEEE Float - 32 bit	Dynamic
258	0x0102	Actual flow	4	Values in float	IEEE Float - 32 bit	Dynamic
260	0x0104	Volume V1	4	Values in float	IEEE Float - 32 bit	Dynamic
262	0x0106	Actual power	4	Values in float	IEEE Float - 32 bit	Dynamic
264	0x0108	Inlet temperature T1	4	Values in float	IEEE Float - 32 bit	Dynamic
266	0x010A	Outlet temperature T2	4	Values in float	IEEE Float - 32 bit	Dynamic
268	0x010C	Pulse input A	4	Values in float	IEEE Float - 32 bit	Dynamic
270	0x010E	Pulse input B	4	Values in float	IEEE Float - 32 bit	Dynamic
272	0x0110	Heat energy E1	2	Units	Word - 16 bit	Dynamic
273	0x0111	Actual flow	2	Units	Word - 16 bit	Dynamic
274	0x0112	Volume V1	2	Units	Word - 16 bit	Dynamic
275	0x0113	Actual power	2	Units	Word - 16 bit	Dynamic
276	0x0114	Heat energy E1	4	Values in integer	Double Word - 32 bit	Dynamic
278	0x0116	Actual flow	4	Values in integer	Double Word - 32 bit	Dynamic
280	0x0118	Volume V1	4	Values in integer	Double Word - 32 bit	Dynamic
282	0x011A	Actual power	4	Values in integer	Double Word - 32 bit	Dynamic
284	0x011C	Inlet temperature T1	4	Values in integer	Double Word - 32 bit	Dynamic
286	0x011E	Outlet temperature T2	4	Values in integer	Double Word - 32 bit	Dynamic
288	0x0120	Pulse input A	4	Values in integer	Double Word - 32 bit	Dynamic
290	0x0122	Pulse input B	4	Values in integer	Double Word - 32 bit	Dynamic
292	0x0124	Heat energy E1	2	Decimal	Word - 16 bit	Dynamic
293	0x0125	Actual flow	2	Decimal	Word - 16 bit	Dynamic
294	0x0126	Volume V1	2	Decimal	Word - 16 bit	Dynamic
295	0x0127	Actual power	2	Decimal	Word - 16 bit	Dynamic
296	0x0128	Pulse input A	2	Decimal	Word - 16 bit	Dynamic
297	0x0129	Pulse input B	2	Decimal	Word - 16 bit	Dynamic
298	0x012A	Version	2	Program version	Word - 16 bit	
299	0x012B	Info code	2	Info code	Word - 16 bit	Dynamic
300	0x012C	Reserved	4		IEEE Float - 32 bit	
302	0x012E	Cooling energy E3	4	Values in float	IEEE Float - 32 bit	Dynamic
304	0x0130	Volume - V2	4	Values in float	IEEE Float - 32 bit	Dynamic
306	0x0132	Temperature T3	4	Values in float	IEEE Float - 32 bit	Dynamic
308	0x0134	Cooling energy E3	2	Units	Word - 16 bit	Dynamic
309	0x0135	Volume - V2	2	Units	Word - 16 bit	Dynamic
310	0x0136	Cooling energy E3	4	Values in integer	Double Word - 32 bit	Dynamic
312	0x0138	Volume - V2	4	Values in integer	Double Word - 32 bit	Dynamic
314	0x013A	Temperature T3	4	Values in integer	Double Word - 32 bit	Dynamic
316	0x013C	Cooling energy E3	2	Decimal	Word - 16 bit	Dynamic
317	0x013D	Volume - V2	2	Decimal	Word - 16 bit	Dynamic
318	0x013E	Max power	4	Values in float	IEEE Float - 32 bit	Dynamic

Modbus data model mapping of MULTICAL® values

Memory	Memory (hex)	Individual description	Size in bytes	Contents	Data type	Update status
320	0x0140	Tarif 2	4	Values in float	IEEE Float - 32 bit	Dynamic
322	0x0142	Tarif 3	4	Values in float	IEEE Float - 32 bit	Dynamic
324	0x0144	Tarif limit 2	4	Parameters	Double Word - 32 bit	Static
326	0x0146	Tarif limit 3	4	Parameters	Double Word - 32 bit	Static
328	0x0148	Meter type	4	Parameters	Double Word - 32 bit	Static
330	0x014A	Meter number 1	4	Parameters	Double Word - 32 bit	Static
332	0x014C	Serial number	4	Parameters	Double Word - 32 bit	Static
334	0x014E	Program number	4	Parameters	Double Word - 32 bit	Static
336	0x0150	Config number 1	4	Parameters	Double Word - 32 bit	Static
338	0x0152	Config Number 2	4	Parameters	Double Word - 32 bit	Static
340	0x0154	Hour counter	4	Parameters	Double Word - 32 bit	Dynamic

Modbus data model mapping of MULTICAL® values

The PDU address region from 0 to 208 is described in details below. The PDU address is in bytes so that a 32-bit register results in the following register to be placed at an address 4 higher. A more detailed description of each column is be given later on.

Data model mapping for byte-addressed region, alternative datagram (from SW version C1)

Memory	Memory (hex)	Individual description	Size in bytes	Contents	Data type	Update status
0	0x0000	Heat energy E1	4	Values in float	IEEE Float - 32 bit	Dynamic
4	0x0004	Control energy E2	4	Values in float	IEEE Float - 32 bit	Dynamic
8	0x0008	Cooling energy E3	4	Values in float	IEEE Float - 32 bit	Dynamic
12	0x000C	Actual flow 1	4	Values in float	IEEE Float - 32 bit	Dynamic
16	0x0010	Actual flow 2	4	Values in float	IEEE Float - 32 bit	Dynamic
20	0x0014	Volume register V1	4	Values in float	IEEE Float - 32 bit	Dynamic
24	0x0018	Volume register V2	4	Values in float	IEEE Float - 32 bit	Dynamic
28	0x001C	Inlet temperature T1	4	Values in float	IEEE Float - 32 bit	Dynamic
32	0x0020	Outlet temperature T2	4	Values in float	IEEE Float - 32 bit	Dynamic
36	0x0024	Temperature T3	4	Values in float	IEEE Float - 32 bit	Dynamic
40	0x0028	Pulse input A	4	Values in float	IEEE Float - 32 bit	Dynamic
44	0x002C	Pulse input B	4	Values in float	IEEE Float - 32 bit	Dynamic
48	0x0030	Mass register V1	4	Values in float	IEEE Float - 32 bit	Dynamic
52	0x0034	Mass register V2	4	Values in float	IEEE Float - 32 bit	Dynamic
56	0x0038	Actual power	4	Values in float	IEEE Float - 32 bit	Dynamic
60	0x003C	Max power	4	Values in float	IEEE Float - 32 bit	Rare
64	0x0040	Heat energy E1	2	Units	Word - 16 bit	Dynamic
66	0x0042	Control energy E2	2	Units	Word - 16 bit	Dynamic
68	0x0044	Cooling energy E3	2	Units	Word - 16 bit	Dynamic
70	0x0046	Actual flow 1	2	Units	Word - 16 bit	Dynamic
72	0x0048	Actual flow 2	2	Units	Word - 16 bit	Dynamic
74	0x004A	Volume register V1	2	Units	Word - 16 bit	Dynamic
76	0x004C	Volume register V2	2	Units	Word - 16 bit	Dynamic
78	0x004E	Mass register V1	2	Units	Word - 16 bit	Dynamic
80	0x0050	Mass register V2	2	Units	Word - 16 bit	Dynamic
82	0x0052	Actual power	2	Units	Word - 16 bit	Dynamic
84	0x0054	Max power	2	Units	Word - 16 bit	Rare
86	0x0056	Heat energy E1	4	Values in integer	Double Word - 32 bit	Dynamic
90	0x005A	Control energy E2	4	Values in integer	Double Word - 32 bit	Dynamic
94	0x005E	Cooling energy E3	4	Values in integer	Double Word - 32 bit	Dynamic
98	0x0062	Actual flow 1	4	Values in integer	Double Word - 32 bit	Dynamic
102	0x0066	Actual flow 2	4	Values in integer	Double Word - 32 bit	Dynamic
106	0x006A	Volume register V1	4	Values in integer	Double Word - 32 bit	Dynamic
110	0x006E	Volume register V2	4	Values in integer	Double Word - 32 bit	Dynamic

Modbus data model mapping of MULTICAL® values

Memory	Memory (hex)	Individual description	Size in bytes	Contents	Data type	Update status
114	0x0072	Inlet temperature T1	4	Values in integer	Signed Double Word - 32 bit	Dynamic
118	0x0076	Outlet temperature T2	4	Values in integer	Signed Double Word - 32 bit	Dynamic
122	0x007A	Temperature T3	4	Values in integer	Signed Double Word - 32 bit	Dynamic
126	0x007E	Pulse input A	4	Values in integer	Double Word - 32 bit	Dynamic
130	0x0082	Pulse input B	4	Values in integer	Double Word - 32 bit	Dynamic
134	0x0086	Mass register V1	4	Values in integer	Double Word - 32 bit	Dynamic
138	0x008A	Mass register V2	4	Values in integer	Double Word - 32 bit	Dynamic
142	0x008E	Actual power	4	Values in integer	Double Word - 32 bit	Dynamic
146	0x0092	Max power	4	Values in integer	Double Word - 32 bit	Rare
150	0x0096	Heat energy E1	2	Decimal	Word - 16 bit	Dynamic
152	0x0098	Control energy E2	2	Decimal	Word - 16 bit	Dynamic
154	0x009A	Cooling energy E3	2	Decimal	Word - 16 bit	Dynamic
156	0x009C	Actual flow 1	2	Decimal	Word - 16 bit	Dynamic
158	0x009E	Actual flow 2	2	Decimal	Word - 16 bit	Dynamic
160	0x00A0	Volume register V1	2	Decimal	Word - 16 bit	Dynamic
162	0x00A2	Volume register V2	2	Decimal	Word - 16 bit	Dynamic
164	0x00A4	Pulse input A	2	Decimal	Word - 16 bit	Dynamic
166	0x00A6	Pulse input B	2	Decimal	Word - 16 bit	Dynamic
168	0x00A8	Mass register V1	2	Decimal	Word - 16 bit	Dynamic
170	0x00AA	Mass register V2	2	Decimal	Word - 16 bit	Dynamic
172	0x00AC	Actual power	2	Decimal	Word - 16 bit	Dynamic
174	0x00AE	Max power	2	Decimal	Word - 16 bit	Rare
176	0x00B0	Version	2	Program version	Word - 16 bit	Static
178	0x00B2	Info code	2	Info code	Word - 16 bit	Dynamic
180	0x00B4	Meter type	4	Parameters	Double Word - 32 bit	Static
184	0x00B8	Meter number 1	4	Parameters	Double Word - 32 bit	Static
188	0x00BC	Serial number	4	Parameters	Double Word - 32 bit	Static
192	0x00C0	Program number	4	Parameters	Double Word - 32 bit	Static
196	0x00C4	Config number 1	4	Parameters	Double Word - 32 bit	Static
200	0x00C8	Config Number 2	4	Parameters	Double Word - 32 bit	Static
204	0x00CC	Hour counter	4	Parameters	Double Word - 32 bit	Rare
208	0x00D0	Fluid type code [6M2]	4	Parameters	Double Word - 32 bit	Static

Modbus data model mapping of MULTICAL® values

The PDU address region from 256 to 360 is described in detail below. The PDU address is in words so that a 32-bit register results in the following register to be placed at an address 2 higher. Besides the different way of addressing the memory, it is identical to the table seen above.

Data model mapping for word-addressed region, alternative datagram (from SW version C1)

Memory	Memory (hex)	Individual description	Size in bytes	Contents	Data type	Update status
256	0x0100	Heat energy E1	4	Values in float	IEEE Float - 32 bit	Dynamic
258	0x0102	Energy E2	4	Values in float	IEEE Float - 32 bit	Dynamic
260	0x0104	Cooling energy E3	4	Values in float	IEEE Float - 32 bit	Dynamic
262	0x0106	Actual flow 1	4	Values in float	IEEE Float - 32 bit	Dynamic
264	0x0108	Actual flow 2	4	Values in float	IEEE Float - 32 bit	Dynamic
266	0x010A	Volume V1	4	Values in float	IEEE Float - 32 bit	Dynamic
268	0x010C	Volume V2	4	Values in float	IEEE Float - 32 bit	Dynamic
270	0x010E	Inlet temperature T1	4	Values in float	IEEE Float - 32 bit	Dynamic
272	0x0110	Outlet temperature T2	4	Values in float	IEEE Float - 32 bit	Dynamic
274	0x0112	Temperature T3	4	Values in float	IEEE Float - 32 bit	Dynamic
276	0x0114	Pulse input A	4	Values in float	IEEE Float - 32 bit	Dynamic
278	0x0116	Pulse input B	4	Values in float	IEEE Float - 32 bit	Dynamic
280	0x0118	Mass 1	4	Values in float	IEEE Float - 32 bit	Dynamic
282	0x011A	Mass 2	4	Values in float	IEEE Float - 32 bit	Dynamic
284	0x011C	Actual power	4	Values in float	IEEE Float - 32 bit	Rare
286	0x011E	Max power	4	Values in float	IEEE Float - 32 bit	Rare
288	0x0120	Heat energy E1	2	Units	Word - 16 bit	Dynamic
289	0x0121	Energy E2	2	Units	Word - 16 bit	Dynamic
290	0x0122	Cooling energy E3	2	Units	Word - 16 bit	Dynamic
291	0x0123	Actual flow 1	2	Units	Word - 16 bit	Dynamic
292	0x0124	Actual flow 2	2	Units	Word - 16 bit	Dynamic
293	0x0125	Volume V1	2	Units	Word - 16 bit	Dynamic
294	0x0126	Volume V2	2	Units	Word - 16 bit	Dynamic
295	0x0127	Mass 1	2	Units	Word - 16 bit	Dynamic
296	0x0128	Mass 2	2	Units	Word - 16 bit	Dynamic
297	0x0129	Actual power	2	Units	Word - 16 bit	Rare
298	0x012A	Max power	2	Units	Word - 16 bit	Rare
299	0x012B	Heat energy E1	4	Values in integer	Double Word - 32 bit	Dynamic
301	0x012D	Energy E2	4	Values in integer	Double Word - 32 bit	Dynamic
303	0x012F	Cooling energy E3	4	Values in integer	Double Word - 32 bit	Dynamic
305	0x0131	Actual flow 1	4	Values in integer	Double Word - 32 bit	Dynamic
307	0x0133	Actual flow 2	4	Values in integer	Double Word - 32 bit	Dynamic
309	0x0135	Volume V1	4	Values in integer	Double Word - 32 bit	Dynamic

Modbus data model mapping of MULTICAL® values

Memory	Memory (hex)	Individual description	Size in bytes	Contents	Data type	Update status
311	0x0137	Volume V2	4	Values in integer	Double Word - 32 bit	Dynamic
313	0x0139	Inlet temperature T1	4	Values in integer	Signed Double Word - 32 bit	Dynamic
315	0x013B	Outlet temperature T2	4	Values in integer	Signed Double Word - 32 bit	Dynamic
317	0x013D	Temperature T3	4	Values in integer	Signed Double Word - 32 bit	Dynamic
319	0x013F	Pulse input A	4	Values in integer	Double Word - 32 bit	Dynamic
321	0x0141	Pulse input B	4	Values in integer	Double Word - 32 bit	Dynamic
323	0x0143	Mass 1	4	Values in integer	Double Word - 32 bit	Dynamic
325	0x0145	Mass 2	4	Values in integer	Double Word - 32 bit	Dynamic
327	0x0147	Actual power	4	Values in integer	Double Word - 32 bit	Rare
329	0x0149	Max power	4	Values in integer	Double Word - 32 bit	Rare
331	0x014B	Heat energy E1	2	Decimal	Word - 16 bit	Dynamic
332	0x014C	Energy E2	2	Decimal	Word - 16 bit	Dynamic
333	0x014D	Cooling energy E3	2	Decimal	Word - 16 bit	Dynamic
334	0x014E	Actual flow 1	2	Decimal	Word - 16 bit	Dynamic
335	0x014F	Actual flow 2	2	Decimal	Word - 16 bit	Dynamic
336	0x0150	Volume V1	2	Decimal	Word - 16 bit	Dynamic
337	0x0151	Volume V2	2	Decimal	Word - 16 bit	Dynamic
338	0x0152	Pulse input A	2	Decimal	Word - 16 bit	Dynamic
339	0x0153	Pulse input B	2	Decimal	Word - 16 bit	Dynamic
340	0x0154	Mass 1	2	Decimal	Word - 16 bit	Dynamic
341	0x0155	Mass 2	2	Decimal	Word - 16 bit	Dynamic
342	0x0156	Actual power	2	Decimal	Word - 16 bit	Rare
343	0x0157	Max power	2	Decimal	Word - 16 bit	Rare
344	0x0158	Version	2	Program version	Word - 16 bit	Static
345	0x0159	Info code	2	Info code	Word - 16 bit	Dynamic
346	0x015A	Meter type	4	Parameters	Double Word - 32 bit	Static
348	0x015C	Meter number 1	4	Parameters	Double Word - 32 bit	Static
350	0x015E	Serial number	4	Parameters	Double Word - 32 bit	Static
352	0x0160	Program number	4	Parameters	Double Word - 32 bit	Static
354	0x0162	Config number 1	4	Parameters	Double Word - 32 bit	Static
356	0x0164	Config Number 2	4	Parameters	Double Word - 32 bit	Static
358	0x0166	Hour counter	4	Parameters	Double Word - 32 bit	Dynamic
360	0x0168	Fluid type and percent	4	Parameters	Double Word - 32 bit	Static

Memory (data model address)

This contains the address of a particular element within a data block in the Modbus data model.

Memory in hex (PDU address)

This contains the Modbus PDU (Protocol Data Unit) address to be used when communicating with the Kamstrup Modbus module.

Individual description

Describes which MULTICAL® register value is contained.

Size in bytes

All registers have a size of either 16 bit or 32 bit.

Contents

Describes what kind of data is stored in the particular register.

All registers within a table have the same kind of contents.

- Values in float
 - Data should be interpreted as a 32-bit IEEE float.
- Values in integer
 - Data should be interpreted as a 32-bit unsigned integer or 32 bit signed integer as stated in the table.
- Units
 - Data is stored in a 16-bit unsigned word and should be interpreted in the following way:

Decimal	Hexadecimal	Unit
1	0x0001	kW
2	0x0002	MW
17	0x0011	kWh
18	0x0012	MWh
33	0x0021	l
34	0x0022	m ³
35	0x0023	m ³ x10
49	0x0031	l/h
50	0x0032	m ³ /h
65	0x0041	ton

- Decimal
 - Data is stored in a 16-bit unsigned word and indicates the number of decimals.
- Parameters
 - Data is stored in a 32-bit unsigned double word.
- Info code
 - Data is stored in a 16-bit unsigned word and indicates the MULTICAL® info code.
- Program version
 - Data is stored in a 16-bit unsigned word and represents the official program version in the module.

Update status

Dynamic indicates that a memory location is continuously updated (every 30 seconds for MULTICAL® 601 and every 10 seconds for other meters) while static means that the memory location is only updated once.

Rare means that the registers are updated every 10th reading cycle updated (every 300 seconds for MULTICAL® 601 and every 100 seconds for other meters).

Hardware

The module is power supplied from the meter's internal 230 VAC/3.6 VDC or 24 VAC/3.6 VDC supply module.

Supported meter types: MULTICAL® 62, MULTICAL® 601, MULTICAL® 602, MULTICAL® 6L2, MULTICAL® 6M2, MULTICAL® 801

Bus communication: RS-485 twisted pair

RS-485 connection: Screw terminals for:

A/-

B/+

GND

Bus termination: By use of external resistor

Approvals

CE and MID in conjunction with the specific MULTICAL® meter.

Ordering

Description	Model no.	Type no.
Modbus RTU + pulse inputs	5550-1277	6700-67
Optical eye with USB		6699-099
Optical eye with D-sub 9F for RS-232		6699-102
METER TOOL HCW – www.kamstrup.com		

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