

# Manual - MCO6



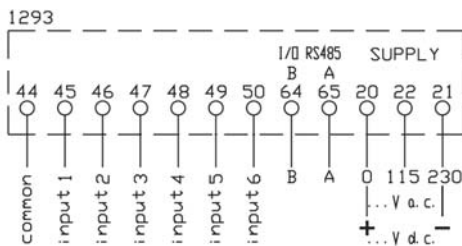
## 1. SAFETY PRECAUTIONS

The following general safety precautions must be observed during all phases of installation and operation of this instrument.

- Installation and operation of this instrument can be performed by qualified personnel only and according to the relevant norms.
- Servicing can be performed at Factory only.
- Before installing the instrument make sure that the housing is not damaged, otherwise the unit must be rejected and returned to the Factory for servicing.
- Ensure that the line and auxiliary power supply are switched off before connecting the instrument to the circuits.
- Wiring diagrams must be respected according to the required model.
- Make sure to operate the instrument according to the technical specifications as listed in this Manual.
- Do not operate the instrument in an explosive atmosphere and in presence of flammable liquids or vapours.
- The environmental operating conditions must be in the range as specified in this Manual.
- Never attempt to open the instrument's housing for any reason.
- Water or other liquid cleaners must be avoided.
- Failure to comply with these precautions and with the instructions given elsewhere in this Manual violates safety standards of design, manufactures, and intended use of this instrument.
- LANGER MESSTECHNIK GMBH assumes no liability for the Customer's failure to comply with these requirements.

**NOTE:** The contents of this Manual are subject to change without prior notice as a result of improvements in performances and functions. Should you have any questions, please contact Langer Messtechnik GmbH.

## 2. TECHNICAL CHARACTERISTICS



number of inputs  
input type (common grnd)  
minimum pulse length  
maximum pulse frequency  
serial interface  
communication protocol  
communication parameters

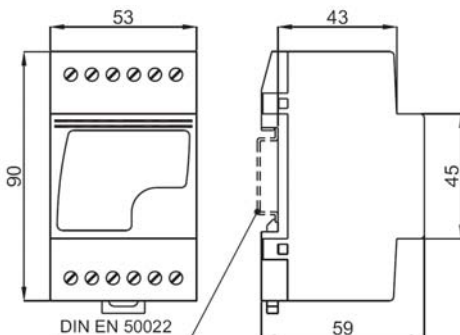
max. 6  
for potential free contact  
80 msec.  
5 / sec.  
RS485  
ModBus RTU  
Baud- rate: 4800, 9600 or 19200 bps (default: 9600)  
start-bits: 1  
Data length: 8 bits  
Parity: none, even or odd (default: none)  
Stop-bits: 1 or 2 (default: 2)

addressing range  
operating temperature  
storage temperature  
standard power supply  
on request power supplies

1...247 programm.  
-10...0...+45...+50°C  
-30...+70°C  
115 - 230V +/-10%, 45-65Hz  
24, 48, 400V +/-10%, 45-65Hz;  
24, 48, 110, 220V D.C. +20 -15%

power supply consumption  
galvanic insulation  
test voltage

2VA  
inputs/power supply/output  
2.5kV, 50Hz, 60sec.



**Langer**  
MESSTECHNIK

Langer Messtechnik  
Soyerhofstraße 16  
81547 München

☎ 0700-LANGER-01  
☎ 089 - 69 99 86 78  
Fax 089 - 69 99 86 79

eMail & Internet:  
info@Langer-Messtechnik.de  
www.Multimes.de

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## 3. INSTALLING

Install the product according to the safety precautions of paragraph 1 and according to the wiring diagram of paragraph 5. When installing the meters, a protection of the voltage input terminals and of the auxiliary supply terminals must be carried out by means of fast or ultrafast fuses with rated current at 1A or 2A, rated voltage suitable to the system voltage, and breaking power adequate to the short-circuit current available at the connection point (the types 10x38, with ceramic body, rated voltage at 500V or at 660V, gG or FF characteristic and breaking power at 100KA are normally suitable for this application).

## 4. MODBUS PROTOCOL

Implemented functions:

Code	Description
16 (10 Hex)	Preset multiple registers
03	Read holding registers

Exception responses:

Code	Description
01	ILLEGAL FUNCTION: / Writing disabled or function not implemented
02	ILLEGAL DATA ADDRESS: / register address not valid
03	ILLEGAL VALUE: / data field length not valid

Timings:

Minimum interval between the end of a response and the start of the next query: 500 ms.

Minimum response time-out: 500 ms.

Notes:

The device logical address can be any value between 1 and 247 (it is factory preset at 1)

It is possible to modify the device logical address writing the new value in the relevant registers (i.e. address 2 = 0000 0002H, address 128 = 0000 0080H).

The device accepts the preset multiple registers function both if addressed to its own logical address or in broadcast mode (logical address 0); in the last case it will never generate a response message.

To perform any register writing, it is first necessary to send a write enabling message by writing the value 0000 00A5H in the control registers; after that all the writing functions are enabled until the device is switched off or any other value is written in the control registers.

All registers are available for both writing and reading, but the high and low words of each variable must be written or read together

The maximum number of registers that can be read or written in a single message is 12.

The values of the counters are in 32 bits form and occupy two adjacent registers; the one with the lower address contains the higher word. The content of the counters is expressed in W/h (or Var/h).

The pulse weight represents how many W/h (or Var/h) are counted for each pulse received.

Acceptable values for baud rate: 4800, 9600, 19200.

Acceptable values for parity registers: 0 (none), 1 (odd), 2 (even).

Acceptable values for stop bits registers: 1, 2.

Registers table:

Register no.	Address (Hex)	Description
1	0000	Control register (Hi word)
2	0001	Control register (Lo word)
3	0002	Logical device address (Hi word)
4	0003	Logical device address (Lo word)
5	0004	Counter 1 (Hi word)
6	0005	Counter 1 (Lo word)
7	0006	Counter 2 (Hi word)
8	0007	Counter 2 (Lo word)
9	0008	Counter 3 (Hi word)
10	0009	Counter 3 (Lo word)
11	000A	Counter 4 (Hi word)
12	000B	Counter 4 (Lo word)
13	000C	Counter 5 (Hi word)
14	000D	Counter 5 (Lo word)
15	000E	Counter 6 (Hi word)
16	000F	Counter 6 (Lo word)
17	0010	Pulse weight Counter 1 (Hi word)
18	0011	Pulse weight Counter 1 (Lo word)
19	0012	Pulse weight Counter 2 (Hi word)
20	0013	Pulse weight Counter 2 (Lo word)
21	0014	Pulse weight Counter 3 (Hi word)
22	0015	Pulse weight Counter 3 (Lo word)
23	0016	Pulse weight Counter 4 (Hi word)
24	0017	Pulse weight Counter 4 (Lo word)
25	0018	Pulse weight Counter 5 (Hi word)
26	0019	Pulse weight Counter 5 (Lo word)
27	001A	Pulse weight Counter 6 (Hi word)
28	001B	Pulse weight Counter 6 (Lo word)
29	001C	Baud rate (Hi word)
30	001D	Baud rate (Lo word)
31	001E	Parity bits (Hi word)
32	001F	Parity bits (Lo word)
33	0020	Stop bits (Hi word)
34	0021	Stop bits (Lo word)



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