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MB-LG-4 Hi

Operating time meter,
4-channel,
with Modbus RTU output

5 908312 598466

Do not dispose of this device in the trash along with other waste! According to the Law on Waste, electro coming from households free of chage and can give any amount to up to that end point of collection, as well as to store the occasion of the purchase of new equipment (in accordance with the principle of old-for-new, regardless of brand). Electro thrown in the trash or abandoned in nature, pose a threat to the environment and human health.

Purpose

The MB-LG-4 meter is a 4-channel, 1-way time counter with the possibility to exchange recorded data via RS-485 port in accordance with the Modbus RTU protocol.

Functions

» 4 independent meters;
» Total results in FLOAT (floating point) values for hours and INT (integer) broken down by result into seconds, minutes, hours, days (4 registers per meter);
» Meter input suitable for operation with AC/DC signals;
» Choice of state 1 triggering option: high or low voltage; Time filter to limit the maximum length of the input signal (elimination of interference at the meter input);
» Memory of meter status after power failure;
» Digital input.

Functioning

The MB-LG-4 module is a 4-channel, 1-way counter. Each channel is independent and counts the operating time according to individual settings. The result is presented as a floating point number and in parallel as integer values broken down into components in the form of days, hours, minutes and seconds.
The counter has a software function to reset the counter status of each channel independently. The maximum time is approximately 150 years. When the maximum count is reached (overflow), the counter automatically resets and counts from 0. The module has configurable options for counting with a low (0V) or high (V+) signal and for closing or opening the input signal circuit.
The counter has the ability to set the minimum length of time an input signal will be seen at the input and be treated as an input activation (time filter). Shorter signals are ignored. This serves to eliminate interference (false pulses) that may occur at the input. The counting input can be used as a digital DI input with the possibility of reading its status.
Reading of counted values, setting of all counting parameters, communication and data exchange are carried out via the RS-485 port using the Modbus RTU communication protocol. The activation of the power supply voltage is signalled by the illumination of the green U LED. Correct data exchange between the module and the other device is signalled by the illumination of the yellow Tx LED.

Mounting

The use of anti-interference and surge filters (such as OP-230) is recommended.

It is recommended to use shielded twisted-pair cables to connect the module to another device.

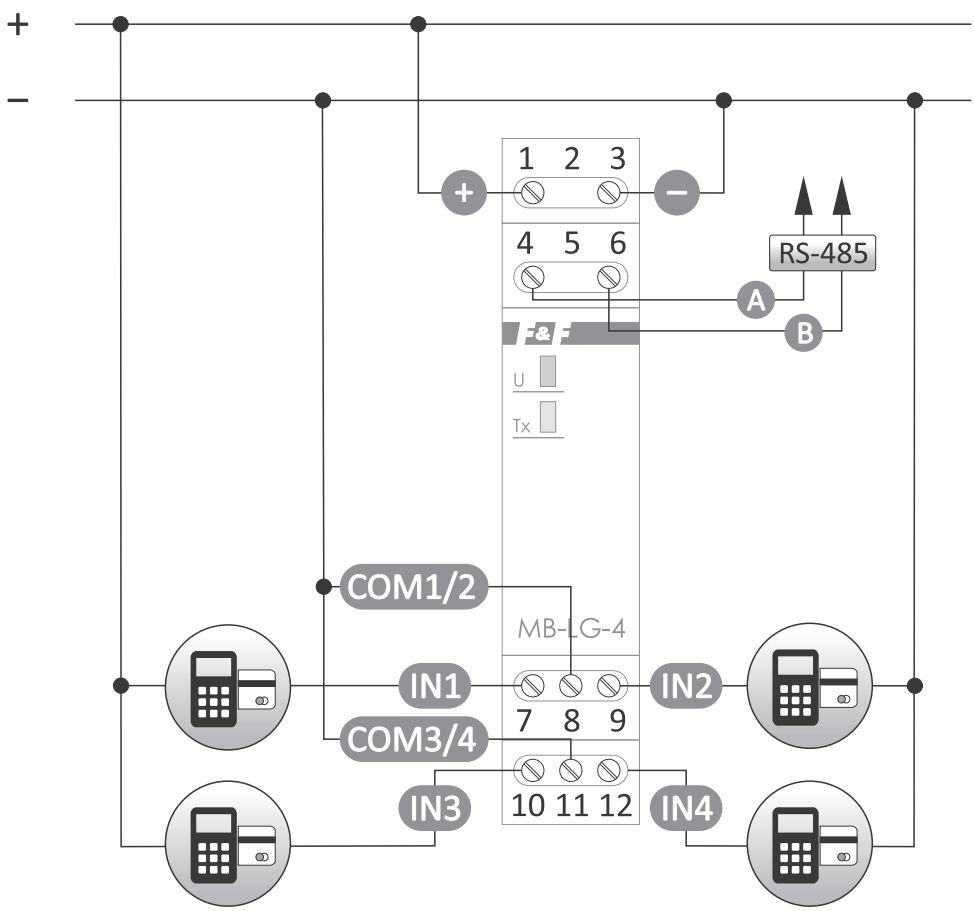
When using shielded cables, ground the shields only on one side and as close to the device as possible.

Do not route signal cables in parallel in close proximity to high and medium voltage lines.

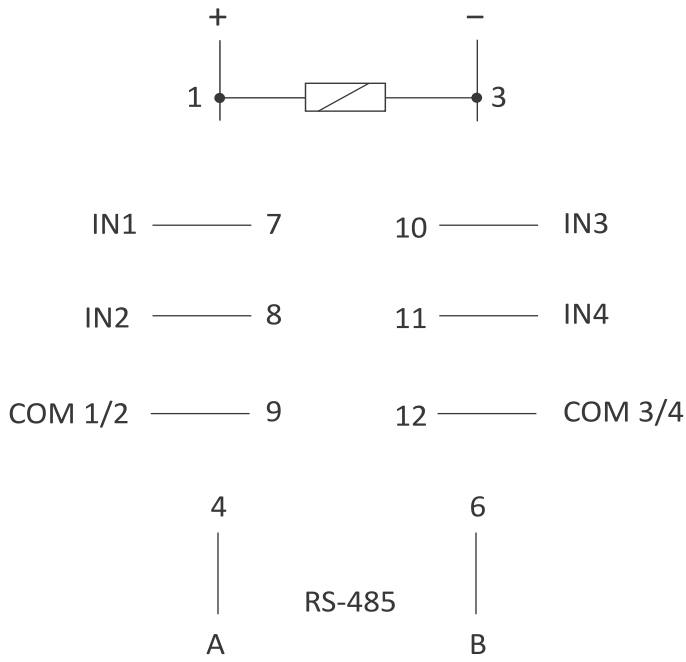
Do not install the module in the immediate vicinity of high-power electric receivers, electromagnetic measuring instruments, phase power control devices and other devices that may cause interference.

1. Before installing the module, set the selected Modbus communication parameters and measurement options.
2. Disconnect the power supply in distribution box.
3. Install the module on the rail.
4. Connect the module power supply to terminals 1-3 as indicated.
5. Connect signal output 4-6 (RS-485 port) to the master output.
6. Connect the signal wires to the counter inputs according to the selected trigger option (low or high signal).

Wiring diagram



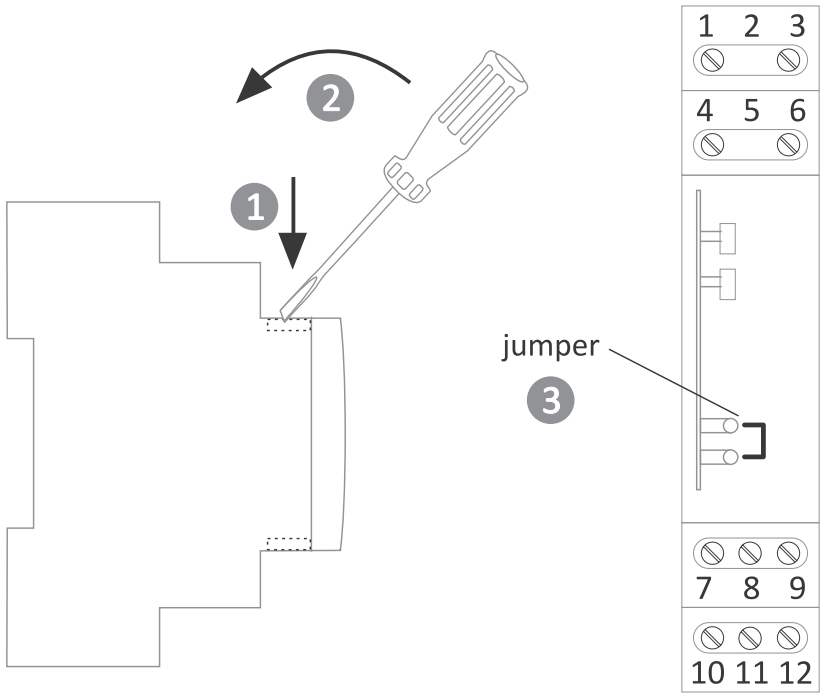
Terminal description



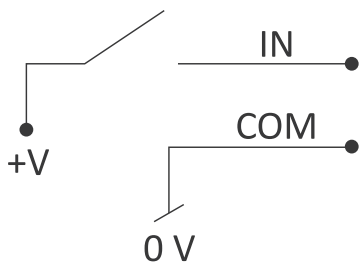
1-3	9÷30 V DC power supply
4-6	RS-485 serial port
7	IN1 meter input
8	IN2 meter input
9	COM input (common) for IN1 and IN2
10	IN3 meter input
11	IN4 meter input
12	COM input (common) for IN3 and IN4

Communication settings reset

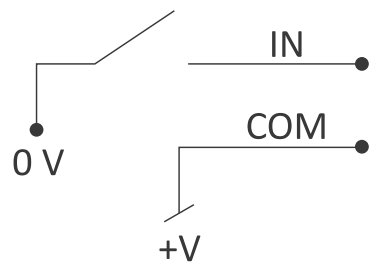
A configuration jumper is available under the module casing. Starting the controller with the jumper closed restores the factory settings of the communication parameters. To do this, remove the casing of the module and put the jumper on both pins. After the reset is done, remove the jumper.



Implement. of connection counting and digital inputs



Triggering level
high voltage



Triggering level
low voltage

Security

1. Galvanic isolation between the IN..., COM... contacts and the rest of the circuit (min. 2.5 kV). and the rest of the system (min. 2.5 kV).
2. No galvanic isolation between module power supply and RS-485 lines.
3. Overcurrent protection for power supply and communication inputs (up to a maximum of 60 V DC) with automatic return function.

An external control voltage is needed to trigger the input in any case. If the module's supply voltage is used for this, the galvanic separation between the control inputs and the power supply and communication is lost.

Modbus RTU protocol parameters

Communication parameters	
Protocole	Modbus RTU
Operating mode	Slave
Port settings (factory settings)	Number of bits per second: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 Data bits: 8 Parity: NONE, EVEN, ODD Start bits: 1 Stop bits: 1/1,5/2

Communication parameters (cont.)

Network address range (factory settings)	1÷245 (1)
Command codes	1: Read inputs status (0×01 – Read Coils) 3: Read the values of a group of registers (0×03 – Read Holding Register) 6: Set the value of a single register (0×06) – Write Single Register)
Max. frequency of queries	15 Hz

Communication registers

address	description	func.	type	atr.
256	Read current and write new base address: 1÷245	03 06	int	R/W
257	Read current and write the baud rate: 0:1200/1:2400/ 2:4800/3:9600/4:19200/ 5:38400/6:57600/7:115200	03 06	int	R/W
258	Read current and write new parity value: 0:NONE/1:EVEN/2:ODD	03 06	int	R/W

Communication registers (cont.)

address	description	func.	type	atr.
259	Read current and write new number of stop bits: 0:1 bit/1:1,5 bit/2:2 bits	03 06	int	R/W
260	Restore the factory settings: Set the value 1.	06	int	W

Note!
Changes in communication parameters (baud rate, number of stop bits, parity) are only taken into account only after the power is restarted.

1024 ÷ 1025	Module working time [s] $R1024+256^2 \times R1025$	03	int	R
1026 ÷ 1027	Serial number $R1026+256^2 \times R1027$	03	int	R
1028	Production date: 5 bits – day; 4 bits – month; 7 bits – year (without 2000)	03	int	R
1029	Software version	03	int	R
1030	Execution: 0 – Lo; 1 – Hi	03	int	R
1031 ÷ 1035	Identifier: F& | F | MB | -4 | LG	03	int	R
1039	Configuration jumper: 0 – open; 1 – close	03	int	R

Converter does not support broadcast commands (address 0).

Digital input registers

address	description	func.	type	atr.
0	Read inputs status: 0/1 – 4 bits (e.g. 1001) Order: | In4 | In3 | In2 | In1 |	01	int	R
16	In1: Input status 0/1	03	int	R
32	In2: Input status 0/1	03	int	R
48	In3: Input status 0/1	03	int	R
64	In4: Input status 0/1	03	int	R

Meter registers

address	description	func.	type	atr.
16÷17	In1: operating time – total score [hours]	03	float	R
18	In1: operating time – component part [days]	03	int	R
19	In1: operating time – component part [hours]	03	int	R
20	In1: operating time – component part [minutes]	03	int	R
21	In1: operating time – component part [seconds]	03	int	R

Meter registers (cont.)

address	description	func.	type	atr.
23	In1: number of input activation	03	int	R
31	In1: resetting meter. Set value 0.	06	int	W
32÷33	In2: operating time – total score [hours]	03	float	R
34	In2: operating time – component part [days]	03	int	R
35	In2: operating time – component part [hours]	03	int	R
36	In2: operating time – component part [minutes]	03	int	R
37	In2: operating time – component part [seconds]	03	int	R
39	In2: number of input activation	03	int	R
47	In2: resetting meter. Set value 0.	06	int	W
48÷49	In3: operating time – total score [hours]	03	float	R
50	In3: operating time – component part [days]	03	int	R

Meter registers (cont.)

address	description	func.	type	atr.
51	In3: operating time – component part [hours]	03	int	R
52	In3: operating time – component part [minutes]	03	int	R
53	In3: operating time – component part [seconds]	03	int	R
55	In3: number of input activation	03	int	R
63	In3: resetting meter. Set value 0.	06	int	W
64÷65	In4: operating time – total score [hours]	03	float	R
66	In4: operating time – component part [days]	03	int	W
67	In4: operating time – component part [hours]	03	int	R
68	In4: operating time – component part [minutes]	03	int	R
69	In4: operating time – component part [seconds]	03	int	R
71	In4: number of input activation	03	int	R

Meter registers (cont.)

address	description	func.	type	atr.
79	In4: resetting meter. Set value 0.	06	int	W

Total result and component results
For the In1 input: registers 18÷21 are the four components of the overall value from registers 16÷17.
E.g.: Operating time (R16÷R17)=12.53 (hours) when converted from decimal form will give the values: R18=0 (days); R19=12 (hrs); R20=31 (mins); R21=48 (s).
Similarly for the inputs In2, In3 and In4.

Configuration registers

address	description	func.	type	atr.
512	In1: min. pulse time [ms]. Range 1÷15000	03 06	int	R/W
513	In1: logic. 0: open circuit; 1: closed circuit	03 06	int	R/W
...	...	...	...	...
528	In2: min. pulse time [ms]. Range 1÷15000	03 06	int	R/W
529	In2: logic. 0: open circuit; 1: closed circuit	03 06	int	R/W
...	...	...	...	...
544	In3: min. pulse time [ms]. Range 1÷15000	03 06	int	R/W

Configuration registers (cont.)				
address	**description**	**func.**	**type**	**atr.**
545	In3: logic. 0: open circuit; 1: closed circuit	03 06	int	R/W
...	...	...	...	...
560	In4: min. pulse time [ms]. Range 1÷15000	03 06	int	R/W
561	In4: logic. 0: open circuit; 1: closed circuit	03 06	int	R/W
Default values: logic = 1; puls time = 10 ms.				

Legend:
R – read, W – write

Table of input trigger options

option	setting register	close 	setting	open 
+V level	0	True	0	False
	1	False	1	True
0V level	0	True	0	False
	1	False	1	True

Technical data

power supply	9÷30 V DC
number of counting inputs	4
counting input voltage	160÷265 V AC/DC
maximum counting frequency	100 Hz
maximum time measured	>150 years
input circuit impedance	≥300 kΩ
port	RS-485
communication protocol	Modbus RTU
operating mode	Slave
power indication	green LED
communication indication	yellow LED
comunication parameters	
baud rate (adjustable)	1200÷115200 bit/s
data bits	8
stop bits	1/1.5/2
parity bit	EVEN/ODD/NONE
address	1÷247
power consumption	0.1 W
working temperature	-20÷50°C
terminal	2.5 mm² screw terminals
tightening torque	0.4 Nm
dimensions	1 module (18 mm)
mounting	on TH-35 rail
ingress protection	IP20

Warranty

The F&F products are covered by a warranty of the 24 months from the date of purchase. Effective only with proof of purchase. Contact your dealer or directly with us.

CE declaration

F&F Filipowski L.P. declares that the device is in conformity with the essential requirements of The Low Voltage Directive (LVD) 2014/35/EU and the Electromagnetic Compatibility (EMC) Directive 2014/30/UE.

The CE Declaration of Conformity, along with the references to the standards in relation to which conformity is declared, can be found at www.fif.com.pl on the product page.