

Data sheet

## LON TP/FT-10 Module

### for MULTICAL® 603

- LONWORKS® 2.0 compatible
- LON Free Topology communication TP/FT-10
- Communication speed up to 78 Kbits/s
- Two pulse inputs for additional water and electricity meters
- Twisted pair transceiver
- No polarity on bus terminals
- Powered by MULTICAL®



## Introduction

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A new high-performance and flexible LON module is available for the MULTICAL® 603 energy meter. The LON communication module enables the MULTICAL® 603 energy meter to be integrated into a building automation system or to be part of industrial applications. The LON network is a 2-wire high-speed communication bus.

## Applications

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The LON module design focuses on high flexibility to fulfill a wide range of applications. The LON module supports fast exchange of meter data, e.g. flow, energy and temperatures, to facilitate monitoring and control tasks.

### Analysis

The MULTICAL® 603 energy meter supports high quantities of data, and all relevant data for analysis is available over the LON network.

### Alarms

The MULTICAL® 603 info codes for general alarm, flow error, temperature error, water leakage, very high flow, air in the system and wrong flow direction are available to the LON system.

### Control and regulation

Data can be read out at intervals of few seconds at very high speed whereby the data can be used for control and regulation purposes.

## Installation

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The module fits into both module slots of the meter. The LON module does not require any configuration.

The LON Neuron-ID comes with the module as a barcode printed on two adhesive stickers. The Neuron-ID is for commissioning the LON module together with the belonging XIF file. The LON module is power-supplied from the MULTICAL® 603's internal 230 VAC or 24 VAC high-power supply module.

## Cable connections

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<b>Wire size</b>
Max cable size 1.5 mm <sup>2</sup>
<b>LON connection</b>
Terminal 55: A
Terminal 56: B
<b>Pulse input connection</b>
Terminal 65: Pulse input A/In-A (+)
Terminal 66: Pulse input A/In-A (-)
Terminal 67: Pulse input B/In-B (+)
Terminal 68: Pulse input B/In-B (-)



### LON connection

Two sets of screw terminals for the LON bus signals A and B enable looping of the bus wires inside MULTICAL® 603.

### Pulse inputs connection

Screw terminals for connection of the two pulse inputs. The pulse inputs are used to collect and accumulate pulses remotely, e.g. from water and electricity meters. The pulse inputs are physically placed on the LON module, however the accumulation and data logging of values are made by the MULTICAL® 603 calculator.

## Communication from module

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### Protocol

Designed according to LonMark® Interoperability Guidelines v3.4.

### Bus

Free topology TP/FT-10.

### LON addressing

The module contains a unique Neuron ID. This Neuron ID is needed for commissioning the module. The Neuron ID is marked on the module and is readable on the display of MULTICAL® as well.

### Communication speed

The modules support 78 Kbits/s.

### Available network variables

The module transfers the MULTICAL® 603 internal data registers into LON network variables, SNVTs, which exchange information over the LON network. The SNVTs are contained in the Device interface file (XIF file) which is available on the Kamstrup home page.

Meter registers are readable as either floating-point variables or as "RAW" binary values.

In case of float-values, LON only operates with predefined SI units. The module converts all readings from the meter into the predefined SI units.

The RAW values reflect the data from the meter with decimal point and measuring unit.

## Network variables

Name	index	Type	Unit	Description
nviRequest	0	SNVT_obj_request		
nvoStatus	1	SNVT_obj_status		
nvoSerialNumber	2	SNVT_str_asc	ascii string	Serial number
nvoV1_Flow	3	SNVT_flow_f	l/s	Flow 1
nvoV2_Flow	4	SNVT_flow_f	l/s	Flow 2
nvoPowerV1	5	SNVT_power_f	W	Actual power
nvoTemperature1	6	SNVT_temp_p	°C	Temp. 1 inlet
nvoTemperature2	7	SNVT_temp_p	°C	Temp. 2 outlet
nvoTemperature3	8	SNVT_temp_p	°C	Temp 3
nvoTemperature4	9	SNVT_temp_p	°C	Temp 4
nvoTempDiff	10	SNVT_temp_p	°C	Differential temp.
nvoAnalogInput1	11	SNVT_reg_val		Analog module input 1
nvoAnalogInput2	12	SNVT_reg_val		Analog module input 2
nvoE1	13	SNVT_elec_whr_f	Wh	Heat energy E1
nvoE2	14	SNVT_elec_whr_f	Wh	Energy E2
nvoE3	15	SNVT_elec_whr_f	Wh	Cooling energy E3
nvoE4	16	SNVT_elec_whr_f	Wh	Energy E4
nvoE5	17	SNVT_elec_whr_f	Wh	Energy E5
nvoE6	18	SNVT_elec_whr_f	Wh	Energy E6
nvoE7	19	SNVT_elec_whr_f	Wh	Energy E7
nvoE8	20	SNVT_reg_val		Energy E8 [t1*m <sup>3</sup> ]
nvoE9	21	SNVT_reg_val		Energy E9 [t2*m <sup>3</sup> ]
nvoE10	22	SNVT_reg_val		Energy E10
nvoE11	23	SNVT_reg_val		Energy E11
nvoTA2Energy	24	SNVT_elec_whr_f	Wh	Tariff 2 - Energy
nvoTA2Volume	25	SNVT_vol_f	l	Tariff 2 - Volume
nvoTA3Energy	26	SNVT_elec_whr_f	Wh	Tariff 3 - Energy
nvoTA3Volume	27	SNVT_vol_f	l	Tariff 3 - Volume
nvoTA4Energy	28	SNVT_elec_whr_f	Wh	Tariff 4 - Energy
nvoTA4Volume	29	SNVT_vol_f	l	Tariff 4 - Volume
nvoA1	30	SNVT_elec_whr_f	Wh	Heat with discount A1
nvoA2	31	SNVT_elec_whr_f	Wh	Heat with surcharge A2
nvoV1_Volume	32	SNVT_vol_f	l	Volume V1
nvoV2_Volume	33	SNVT_vol_f	l	Volume V2
nvoInputAVolume	34	SNVT_vol_f	l	Pulse input A - Volume *
nvoInputAEnergy	35	SNVT_elec_whr_f	Wh	Pulse input A - Energy *
nvoInputBVolume	36	SNVT_vol_f	l	Pulse input B - Volume *
nvoInputBEnergy	37	SNVT_elec_whr_f	Wh	Pulse input B - Energy *
nvoInputA2Volume	38	SNVT_vol_f	l	Pulse input A2 - Volume *
nvoInputA2Energy	39	SNVT_elec_whr_f	Wh	Pulse input A2 - Energy *
nvoInputB2Volume	40	SNVT_vol_f	l	Pulse input B2 - Volume *
nvoInputB2Energy	41	SNVT_elec_whr_f	Wh	Pulse input B2 - Energy *
nvoCP	42	SNVT_reg_val		Coefficient of performance CP
nvoT5Limit	43	SNVT_temp_p	°C	t5 Limit
nvoVBPower	44	SNVT_power_f	W	VB Power
nvoQPAvgTime	45	SNVT_time_min	min	QP Avg Time

## Network variables

Name	index	Type	Unit	Description
nvoTL2Power	46	SNVT_power_f	W	Tariff Limit 2 - Power
nvoTL2Temp	47	SNVT_temp_p	°C	Tariff Limit 2 - Temperature
nvoTL2TempDiff	48	SNVT_temp_p	°C	Tariff Limit 2 - Temperature difference
nvoTL2Flow	49	SNVT_flow_f	l/s	Tariff Limit 2 - Flow
nvoTL2Time	50	SNVT_time_stamp	Date & time	Tariff Limit 2 - Time
nvoTL3Power	51	SNVT_power_f	W	Tariff Limit 3 - Power
nvoTL3Temp	52	SNVT_temp_p	°C	Tariff Limit 3 - Temperature
nvoTL3TempDiff	53	SNVT_temp_p	°C	Tariff Limit 3 - Temperature difference
nvoTL3Flow	54	SNVT_flow_f	l/s	Tariff Limit 3 - Flow
nvoTL3Time	55	SNVT_time_stamp	Date & time	Tariff Limit 3 - Time
nvoTL4Power	56	SNVT_power_f	W	Tariff Limit 4 - Power
nvoTL4Temp	57	SNVT_temp_p	°C	Tariff Limit 4 - Temperature
nvoTL4TempDiff	58	SNVT_temp_p	°C	Tariff Limit 4 - Temperature difference
nvoTL4Flow	59	SNVT_flow_f	l/s	Tariff Limit 4 - Flow
nvoTL4Time	60	SNVT_time_stamp	Date & time	Tariff Limit 4 - Time
nvoMass1	61	SNVT_mass_f	g	Mass 1
nvoMass2	62	SNVT_mass_f	g	Mass 2
nvoInfoBits	63	SNVT_state_64		Info bits
nvoHourCounter	64	SNVT_count_f		Hour counter
nvoEHourCounter	65	SNVT_count_f		Error hour counter
nvoConfigNo1	66	SNVT_str_asc	ascii string	Config no. 1
nvoConfigNo2	67	SNVT_str_asc	ascii string	Config no. 2
nvoConfigNo3	68	SNVT_str_asc	ascii string	Config no. 3
nvoConfigNo4	69	SNVT_str_asc	ascii string	Config no. 4
nvoMeterNoHigh	70	SNVT_str_asc	ascii string	Meter number (high)
nvoMeterNoLow	71	SNVT_str_asc	ascii string	Meter number (low)
nvoMeterType	72	SNVT_str_asc	ascii string	Meter type
nvoMainSubType	73	SNVT_str_asc	ascii string	Meter main/subtype
nvoDateTime	74	SNVT_time_stamp		Date and time
nviDateTime	75	SNVT_time_stamp		Current date and time
nviHeartbeat	76	SNVT_count		Enable Heartbeat
nvoTimeAlive	77	SNVT_count_32		Time alive in seconds

- \* Pulse input A and pulse input B are the inputs from the module placed in module slot number 1.  
Pulse input A2 and pulse input B2 are the inputs from the module placed in module slot number 2.

## nvoInfobits

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MULTICAL®603 maintains this register with its current runtime status. The register is an array of 64 bits, and if one or more of the bits are set, it signals an alarm situation. The bits are numbered from 0 to 63, and their meanings are described in this table:

Bit	Info
0	Supply voltage disconnected
1	Low battery level
2	External alarm (e.g. via KMP)
3	t1 Above measuring range or switched off
4	t2 Above measuring range or switched off
5	t1 Below measuring range or short-circuited
6	t2 Below measuring range or short-circuited
7	Wrong $\Delta t$ (t1-t2)
8	V1 Air
9	V1 Wrong flow direction
11	V1 Increased flow (flow1 > qs, for more than 1 hour)
12	In-A1 Leakage in the system
13	In-B1 Leakage in the system
14	In-A1/A2 External alarm
15	In-B1/B2 External alarm
16	V1 Communication error
17	V1 Wrong meter factor
18	In-A2 Leakage in the system
19	In-B2 Leakage in the system
20	t3 Above measuring range or switched off
21	t3 Below measuring range or short-circuited
22	V2 Communication error
23	V2 Wrong pulse figure
24	V2 Air
25	V2 Wrong flow direction
27	V2 Increased flow (flow2 > qs, for more than 1 hour)
28	V1/V2 Burst, water loss (flow1 > flow2)
29	V1/V2 Burst, water penetration (flow1 < flow2)
30	V1/V2 Leakage, water loss (M1 > M2)
31	V1/V2 Leakage, water penetration (M1 < M2)
32..63	Reserved

## nviDateTime

The date and time in MULTICAL® 603 may be adjusted by setting the time and date through this variable.

## nviHeartbeat

Assigning a value from 5 to 65535 will enable the built-in heartbeat function, which will ensure that meter data is refreshed at the set intervals in the LON network. The interval is counting seconds.

Setting the nviHeartbeat to "0" (zero) turns off the heartbeat function.

## Technical specifications

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### Physical

Usage Only suitable for installation in MULTICAL® 603

### Communication

Protocol LonTalk  
Transmission speed 78 Kbit/s

### Bus

Galvanic isolation According to PTB-A50.1  
Cable type 2-wire, 22 or 24 AWG twisted pair (CAT 5 cable)  
Cable length 500...2700 m, depending on cable type and installation conditions

### Supply

Power supply MULTICAL® 603 with 230 VAC high-power supply  
MULTICAL® 603 with 24 VAC high-power supply

### Environment

Operational temperature 5 °C – 55 °C  
Humidity 25 – 85 %RH non-condensing

### Programming

Firmware update Via the LON bus using a LON commissioning tool

### Markings/approvals

CE and EN 1434 in conjunction with the type approval of MULTICAL® 603

## Ordering

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### Description

LON TP/FT-10 module + 2 pulse inputs  
Optical read-out head w/USB  
Optical read-out head w/RS-232 D-SUB 9F  
USB configuration cable for H/C modules

### Type no.

HC-003-60  
6699-099  
6699-102  
6699-035

