Interface Description

U1681 ... U1689

Electric Meters for Active Energy
LON Interface

3-349-139-03
1/7.00

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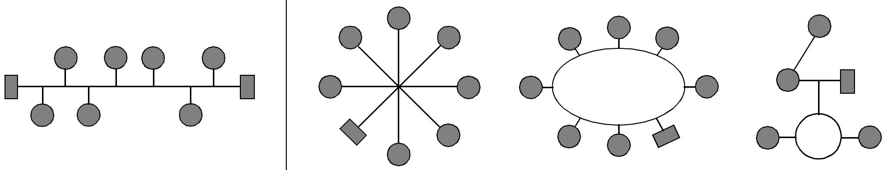
1 System Design

The most commonly used data transmission medium for industrial applications and building management is the twisted pair copper cable, which is operated with the electrically isolated FTT-10A transceiver. Both cable strands can be connected as desired, making polarity reversal impossible during installation.

Maximum transmission distances are influenced by the electrical characteristics of the cable and the network topology. In order to prevent communications interference, the utilized cable should conform with the stipulated specifications. Only one cable type may be used within any given bus segment in order to avoid possible reflection.

Network Topologies:



Bus Topology (terminated at both ends) — Free Topology (terminated at one end only)

The individual users are connected one after the other in parallel with bus topology. The bus must be terminated at the beginning, and at the end. Wiring with free topology necessitates only one bus terminator, although it is restricted as regards maximum transmission distance.

The bus signal can be amplified through the use of repeaters, thus increasing maximum range. Only one passive repeater may be used within any given bus segment due to time response considerations. Transition to other physical transmission media and/or targeted forwarding of data frames to individual bus segments is accomplished with the help of routers.

The following recommendations result from values based upon experience which has been gathered by GOSSEN-METRAWATT GMBH during initial start-up projects with LON systems. The environment within which the cable is laid decisively influences the selection of a cable type, and must therefore be taken into consideration during the planning stages. All applicable guidelines for the laying of control and communications cables must be observed during installation.

1.1 Maximum Cable Lengths

Cable Type / Designation	Bus Topology (terminated at both ends)	Free Topology (terminated at one end only)
JY (ST) Y 2 x 2 x 0.8 mm	900 m	500 m max. 320 m from device to device
UNITRONIC bus cable	900 m	500 m max. 320 m from device to device
Level IV, 22AWG	1400 m	500 m max. 400 m from device to device
Belden 8471	2700 m	500 m max. 400 m from device to device
Belden 85102	2700 m	500 m

The specified values indicate overall cable length and apply for use with the FTT-10A transceiver.

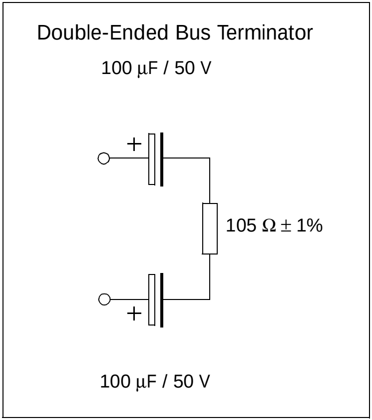
1.2 Cable Type

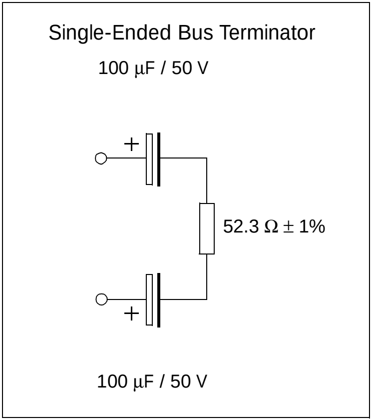
For applications in environments with minimal interference, wiring can be carried out inexpensively with cable type JY (ST) Y 2 x 2 x 0.8 mm, with twisted pair strands. The 0.8 mm dimension specifies the wire diameter which results in a wire cross-section of 0.5 square mm.

Shielding is usually not required. If communications difficulties occur in environments with high levels of interference, the problem might be eliminated by connecting the shield at one end only. If cables are used which include more than one twisted wire pair, shielding of the individual pairs may be advantageous. Special LON bus cables can be utilized for special requirements.

1.3 Bus Terminators

Additional bus terminators are required if repeaters are used in a bus topology. These are available as LON accessory component U1664 in rail-mount housing, and each includes a single and a double-ended bus terminator.





2 Network Interface

The neuron ID number used for addressing purposes within the LON network is printed on the serial plate of the energy meter.

2.1 Network Variables

Energy meter measured quantities and status information available within the network are defined as standard network variable types (SNVT).

All information and software tools required for integration are available as an .XIF file from GMC-Instruments' website (http://www.gmc-instruments.com).

2.1.1 List of Available Network Variables (nv)

nv #	nv Name	SNVT Type / Data Type	Physical Unit of Measure	Comment
0	nviRequest	SNVT_obj_request	–	Status query
1	nvoStatus	SNVT_obj_status	–	Status query
2	nvo00NodeType	SNVT_str_asc	–	Device type
3	nvo00Version	SNVT_count	–	Software version
4	nvo00Date	SNVT_time_stamp	time	Date of manufacture
5	nvo00Voltage	SNVT_volt	V	Nominal voltage
6	nvo00Current	SNVT_amp	A	Nominal current
7	nci00StsMaxSendT	SNVT_elapsed_tm	time	Adjustable from 1 s to 18 h
8	nvo01EnergyInL	signed long whr	–	Energy import in Wh
9	nvo01EnergyInF	SNVT_elec_whr_f	Wh	Energy import in Wh
10	nvo01EnergyOutL	signed long whr	–	Energy export in Wh
11	nvo01EnergyOutF	SNVT_elec_whr_f	Wh	Energy export in Wh
12	nvo01PulseRate	SNVT_count	–	Pulse constant, 1 to 20000 pulses per kWh
13	nvi01SetTime	SNVT_time_stamp	time	Time stamp triggers storage of meter readings to memory
14	nvo01TimeStamp	SNVT_time_stamp	time	Time stamp
15	nvo01EnergyInLp	signed long whr	–	Energy import saved to memory in Wh
16	nvo01EnergyInFp	SNVT_elec_whr_f	Wh	Energy import saved to memory in Wh
17	nvo01EnergyOutLp	signed long whr	–	Energy export saved to memory in Wh
18	nvo01EnergyOutFp	SNVT_elec_whr_f	Wh	Energy export saved to memory in Wh
19	nci01MaxSendT	SNVT_elapsed_tm	time	Adjustable from 1 s to 18 h
20	nci01MinSendT	SNVT_elapsed_tm	time	Adjustable from 1 s to 18 h
21	nci01MinDeltaF	signed long whr	–	Adjustable from 1 Wh to 1 MWh measured value deviation
22	nvo02Power	SNVT_power_f	W	Instantaneous power
23	nci02MaxSendT	SNVT_elapsed_tm	time	Adjustable from 1 s to 18 h
24	nci02MinSendT	SNVT_elapsed_tm	time	Adjustable from 1 s to 18 h
25	nci02MinDelta	SNVT_power_f	W	Adjustable from 1 W to 100 kW measured value deviation

Signed long: 4 byte variable, corresponds to s32_type in neuron C

2.1.2 Status Upon Delivery

Domain Index	Domain Size	Domain ID	Subnet	Node	Auth Key
0	1	00	1	1	FF FF FF FF FF FF
1	Unused				

2.1.3 Status Query

The energy meter consists of three objects: the node, the energy meter and the power meter.

Object request codes 00, 02 and 05 are supported. All three objects generate the same object status message.

When the status message is queried, the nviRequest = (object_id object_request) network variable is activated. The nvoStatus (object_id object_Status) network variable provides the status information.

Status Query, Object

Definition	Node	Energy Meter	Power Meter
object_id	0000	0001	0002
object_request Code	00	00	00
	02	02	02
	05	05	05

Object request code:

00	RQ_NORMAL	Generates status message shown below for the selected object
02	RQ_UPDATE_STATUS	Generates status message shown below for the selected object
05	RQ_REPORT_MASK	Generates bit mask for bits utilized for the selected object

2.1.4 Status Message

Bit No.	Definition	Description
31	invalid_id	Invalid object ID
30	invalid_rq	Invalid object request code
28	out_of_limits	P > Pmax
27	open_circuit	Phase failure
21	electrical_fault	Phase sequence error
18	fail_self_test	Internal error
12	report_mask	Mask for supported status bits

2.1.5 Send Condition for Network Variables

The send condition for a new value is determined by MaxSendTime, MinSendTime and MinDelta. New values are not sent until deviation from the last value amounts to MinDelta, and MinSendTime has elapsed. If a given value does not change, or if its change does not exceed the MinDelta threshold, it is sent after MaxSendTime.

2.1.6 Storage of Measurement Values to Memory

If network variable nvi01SetTime is sent to the meter, the meter stores its current readings to internal permanent memory along with a time stamp.

3 Product Support

If required please contact:

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