



RS-485 Communication

Background information on RS-485 communication and applications in the Danfoss inverter product range.

Introduction

All inverters are delivered with an RS-485 communication interface installed.



Figure 1 UniLynx Indoor Inverter



Figure 2 UniLynx Outdoor inverter



Figure 3 TripleLynx inverter

The interface is accessed via two female RJ45 connectors located at the bottom of the inverter or in the installation channel on the side or for TXL inside the inverter.

All inverter parameters can be accessed through this interface via the ComLynx communication protocol. These parameters include production data, status information and other parameters relevant to the operation of the inverter and the PV-system. Relevant parameters and data can be monitored on the inverter display or they can be logged by a data logger for later monitoring and analysis.

Connecting inverters via an RS-485 bus

Up to 64 inverters can be connected to the bus¹. The length of each cable is unimportant as long as the total chain length is less than 1 kilometre. If longer distances are required commercially available RS-485 repeaters may be used. All components are to be connected in a daisy-chain manner. Tree/star structure is not allowed.

¹ 1) The ComLynx data logger can maximum handle 20 inverters and the ComLynx weblogger can maximum handle 50 inverters..

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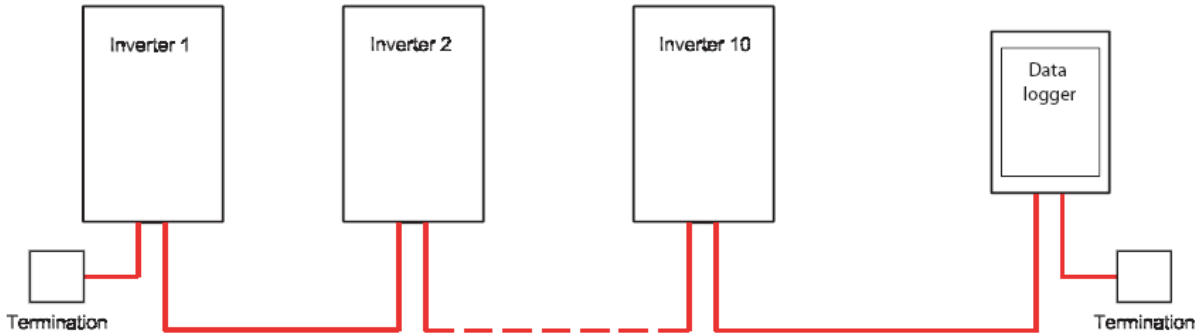


Figure 4 inverters in a daisy-chain

The RS-485 communication interface

Two identical and interchangeable female RJ45 connectors, are used when connecting inverters and other RS-485 units in a daisy-chain. The order of the units on the bus is unimportant. This means data and webloggers which have two RJ45 connectors can be placed either at the end or in the middle of the daisy chain. It is important that a termination is plugged into the unused RJ45 connector of the two RS-485 units at each end of the bus.

UniLynx Indoor Inverters

The RS-485 communication interface is located under the black cover in the lower part of the installation channel. The interface is connected with two female RJ45 connectors which are accessible from the outside.



Figure 5 Indoor inverter

UniLynx Outdoor Inverters

The RS-485 communication interface in an outdoor inverter is located internally between the two connector areas. The interface is equipped with two female RJ45 connectors. In the cabinet frame two RJ45 connectors with a sealing of IP68 are mounted. Two wires connect the RJ45 connectors on the interface and the externally accessible RJ45 connectors.

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Figure 6 Outdoor inverter

TripleLynx inverters

The RS-485 communication interface is located inside the inverter on the communication board. The interface can be used either with RJ45 connectors or directly wired to the terminal blocks. The cables should always be placed in the special EMC cable clamps. Please look to the TripleLynx installation manual for detailed cabling information.



Figure 7 TripleLynx inverter

Cables and terminations

The cables used to connect units on an RS-485 bus should be of the STP type (Shielded, Twisted Pair). The quality of the cable should be Cat 5 STP (FTP or better). The cables used must have a male shielded RJ45 connector at each end – known as a patch cable where the 8 wires run straight through.

Pins used are

- 1. **GND**
- 2. GND
- 3. **RX/TX A (-)**
- 4. BIAS L
- 5. BIAS H
- 6. **RS/TX B (+)**
- 7. Not connected
- 8. Not connected

Bold = Compulsory, Cat5 cable contains all 8 wires.

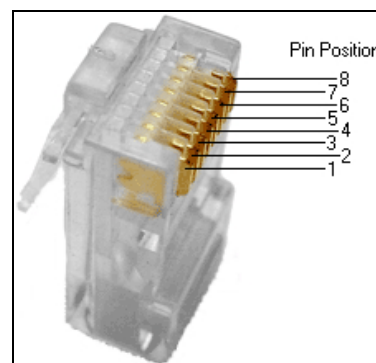


Figure 8 Pinout

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Product and Application Note - 2009-09-08

A termination is simply a male shielded RJ45 connector with a short between pin 3 and 4 and a short between pin 5 and 6. The large termination is for use on the UniLynx indoor inverter and option products. The smaller is for use on the UniLynx outdoor inverter². On the UniLynx outdoor inverter the cap on the RS-485 interface is opened the termination inserted and the cap carefully closed again.



Figure 9 Termination

The RS-485 communication Bus on the TripleLynx products is terminated by doing the following:

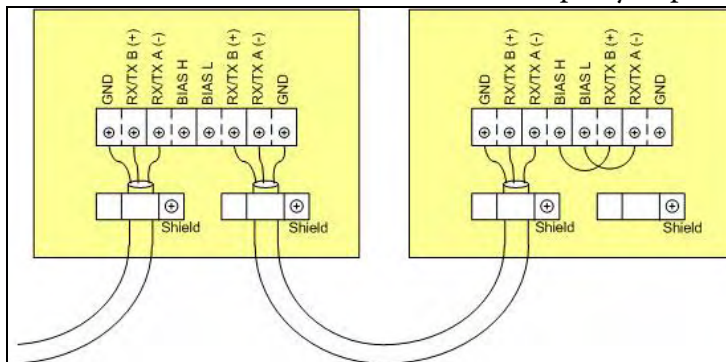


Figure 10 RS-485 detail of Communication Board. BIAS L and Bias H are to be connected to RX/TXB and RX/TX A respectively for termination of RS-485 bus

UniLynx Outdoor

The connectors used to connect outdoor inverter on the RS-485 bus must be the Ethernet Buccaneer type from Bulgin, with part no.: PX083x. This connector type must be used to secure the sealing grade.



Figure 11 Buccaneer connector

² When purchasing a data or weblogger termination plugs are in the scope of delivery. Replacement terminators can be obtained from Danfoss

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