



**Documentation of the Master/Slave Application of the
following Controllers:**

- E1100-GP (-HC, -XC)
- E1130-DP (-HC, -XC)
- E1100-RS (-HC, -XC)
- E1100-DN (-HC, -XC)
- E1100-CO (-HC, -XC)



Master/Slave V3.9
User Manual

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Note

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1. System Overview

The Master/Slave application SW is an additional firmware part for the following features:

- Current master motor with a maximum of three current slave motors to increase force, the current delay in all slaves is about 300us
- Gantry master motor with maximum of three gantry slave motors, which have the same position setpoints. The setpoint delay for all slaves is about 300us.



If a synchronous communication mode is used, or if the cycle time of the used fieldbus is short enough, it is recommended to realise the master gantry mode within the PLC, because of higher flexibility and easier use (2 normal axis instead of 1 master axis with attached slave information; especially in the error handling case).

The Master/Slave application SW supports the Master/Slave communication link either over the CAN bus (X7/X8, X10/X11 or X5) or the RS485 (X7/X8 or X5). For the CAN bus interfaces (like CANopen or DeviceNet) the RS485 based link has to be used. For all other interfaces the CAN bus link mode should be used, because the RS232 maintenance link on X5 Connector is still available. The performance of both links CAN or RS485 is the same.

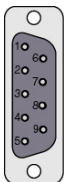


If the Master/Slave is linked over the RS485 it is not possible anymore to configure to debug the controller over the RS232 (X5). LinMot-Talk1100 supports an USB to CAN converter (Part No. 0150-3134) for this purpose.

2. Connecting the CAN bus

Pin Assignment of the COM / Config Connector (X5):

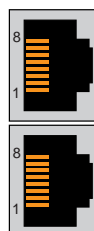
DSUB 9 male:



| | | | |
|--------------|------------|--------------|--------------|
| Pin 1 | RS-485 Y | Pin 6 | RS-485 B |
| Pin 2 | RS-232 TX | Pin 7 | RS-485 Z |
| Pin 3 | RS-232 RX | Pin 8 | CAN L |
| Pin 4 | RS-485 A | Pin 9 | CAN H |
| Pin 5 | GND | | |

Pin Assignment of the CMD Connectors X7/X8 :

The CMD connector exists only on the E1100-DP(-HC/-XC) and E1100-RS(-HC/-XC) controllers, 2xRJ45 with 1:1 connected signals. Standard twisted pairs: 1/2, 3/6, 4/5, 7/8. Over the X7/X8 the CAN-Bus linked or the RS485 linked Master/Slave mode could be used.



Pin 1 RS485 A
Pin 2 RS485 B
Pin 3 RS485 Y
Pin 4/5 Ground
Pin 6 RS485 Z
Pin 7 CAN H
Pin 8 CAN L



Use a crossed Ethernet patch cable (Art. Nr. 0150-1853) between the master and first slave, and a normal patch cable 1:1 (Art. Nr. 0150-1852) between the slaves.

Master \longleftrightarrow **Slave 1** \longleftrightarrow **Slave 2** \longleftrightarrow **Slave 3,4**
 Crossed patch cable normal patch cable normal patch cable
 Art. Nr. 0150-1853 Art. Nr. 0150-1852 Art. Nr. 0150-1852

Master/Slave Wiring over COM Connector X5:

If the CMD connectors (X7/X8) are used for wiring a fieldbus, the Master/Slave can be wired over the COM connector X5:

RS485 Master/Slave Wiring on X5:

Master \longleftrightarrow **Slave 1** \longleftrightarrow **Slave 2** \longleftrightarrow **Slave 3,4**
 Pin 4 RS-485 A ----- Pin 1 RS-485 Y ----- Pin 1 RS-485 Y ----- Pin 1 RS-485 Y
 Pin 6 RS-485 B ----- Pin 7 RS-485 Z ----- Pin 7 RS-485 Z ----- Pin 7 RS-485 Z
 Pin 1 RS-485 Y ----- Pin 4 RS-485 A ----- Pin 4 RS-485 A ----- Pin 4 RS-485 A
 Pin 7 RS-485 Z ----- Pin 6 RS-485 B ----- Pin 6 RS-485 B ----- Pin 6 RS-485 B

CAN Master/Slave Wiring on X5:

Master \longleftrightarrow **Slave 1** \longleftrightarrow **Slave 2** \longleftrightarrow **Slave 3,4**
 Pin 8 CAN L ----- Pin 8 CAN L ----- Pin 8 CAN L ----- Pin 8 CAN L
 Pin 9 CAN H ----- Pin 9 CAN H ----- Pin 9 CAN H ----- Pin 9 CAN H

Pin Assignment of the Master Encoder Connectors X10/X11 for the GP servos:

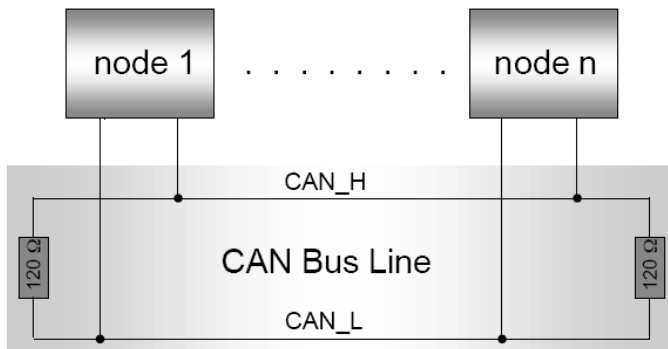
With the E1100-GP(-HC/-XC) controllers, the CAN bus is also available on the two RJ45 connectors X10 (ME IN) and X11 (ME OUT) with 1:1 connected signals. Standard twisted pairs: 1/2, 3/6, 4/5, 7/8. Use Ethernet cables according the EIA / TIA 568A standard to loop through the CAN bus over this connector (Art. Nr. 0150-1852). Over the X10/X11 connection only the CAN bus linked Master/Slave mode can be used (no RS485)!



| | |
|--------------|--------------|
| Pin 1 | A |
| Pin 2 | /A |
| Pin 3 | B |
| Pin 4 | Z |
| PIN 5 | /Z |
| Pin 6 | /B |
| Pin 7 | CAN H |
| Pin 8 | CAN L |

CAN/RS 485 Termination

The CAN bus must be terminated by two 120 Ohm resistors at both ends of the bus line, according the following scheme:



For easy installation, the LinMot E1100 controllers have built in termination resistors, which have to be activated on both the master and the slave servo, using the Master/Slave application SW over CAN bus and the RS 485 link.

S3

On- Off

| | | |
|------------|--------------------------|---|
| Interface | <input type="checkbox"/> | 4 |
| CAN Term | <input type="checkbox"/> | 3 |
| RS485 Term | <input type="checkbox"/> | 2 |
| RS485/232 | <input type="checkbox"/> | 1 |

The built in termination resistor for the CAN bus can be activated by setting the dip switch "CAN Term" to "ON".
The built in termination resistor for the RS 485 bus can be activated by setting the dip switch "RS485 Term" to "ON".

4. Using the Master/Slave SW

To install the Master/Slave application software start the LinMot-Talk1100 SW (if already started and logged in then logout), click on the Install Firmware button and select the installation script:

```
//Firmware_V3Sxxyzz.sct
```

Then choose the application “MasterSlave”



The same Master/Slave application SW has to be loaded to the master as well as the slave servo controller(s).

Select the required serial link CAN or RS 485 (UPID 3EF7h).

After the Master/Slave application SW has been installed, log in the servo controller and select the correct Master/Slave mode (UPID 30D4h) on all servo controllers. The rest can be left as configured by default.

After power up the master servo controller try to connect to its slave controller, when it succeed to connect to the slave, the application Warn Flag bit 15 vanish ant the connection state (UPID 3A98h or 3A99h) changes to 1 which means 'Data Exchange'.

The state of the slave servo controller can be monitored over the variables “Slave 0..2 State Var” (UPID 3B70h, UPID 3B72h, UPID 3B74h,).

As the slave servo is in a streaming mode (current or position) in state 8 'Operation Enabled' bit 5 'Motion Active' normally is set and bit 6 'In Target Position' is cleared in the Slave State Var. Bit 8 'Homed ' indicates if the slave servo has correctly homed or not.

The slave state machine is controlled from the master, so if connecting a serial fieldbus link to the slave servo for monitoring reasons, take care **not to write to the slave's control word**. So with Profibus DP interface do not configure the control status module for any slave, the status word can be watched by using a monitoring channel UPID 1D51h.

NOTE: Both master and slave(s) have to be configured by using the MotorWizard.

5. Master Slave Parameters

The Master/Slave servo controllers have an additional parameter tree branch, which can be configured with the distributed LinMot-Talk1100 software. With these parameters, the Master/Slave behavior is set up. The software LinMot-Talk1100 can be downloaded from <http://www.linmot.com> under the section download, software & manuals.

Master Slave Mode defines the master/slave behavior of the controller.

| Master Slave Appl\ Serial Link Selection | |
|--|---|
| CAN [0] | Master/Slave communication over CAN bus 1Mbaud. |
| RS485[1] | Master/Slave communication over RS485. |

Master Slave Mode defines the master/slave behavior of the controller.

| Master Slave Appl\ Master Slave Mode | |
|--------------------------------------|--|
| Disable [0] | Servo controller runs without Master Slave behavior. |
| Current Master[1] | Servo controller acts as current master |
| Current Slave [2] | Servo controller acts as current slave |
| Gantry Master [3] | Servo controller acts as gantry master |
| Gantry Slave [4] | Servo controller acts as gantry slave |

Master Config In this section the further master configuration is done.

Master MACID The ID of the master servo, default = 1. Do not change this parameter.

Number of Slaves The number of slaves, a maximum of three slaves is possible

Slave Config In this section the further slave configuration is done.

Slave MACID The ID for all slave servos, default = 2. Do not change this parameter.

Slave Number Every used slave has to be defined with a unique number (0-2, allocation upwards)

Direction Choose 'Normal' if the slave motor is mounted in the same way as the master and moves in the same direction as the master does, otherwise choose 'Inverted'.

CAN Baud Rate In this section the CAN baud rate is configured.

Baud Rate Parameter Definition

The CAN baud rate is fixed to 1M baud by this parameter.

6. Reconnection after Quick Stop / Error

After a quick stop or an error it is important to synchronize the position of the master and the slave axis. In this case use the state "Go to Initial Position"(see "State Machine" in the document *Usermanual_MotionCtrSW_1100*).

7. Contact Addresses

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