Section 3

Multi Protocol Board MPB-TP

Card Description

Version 1.4

CAUTION !

The device should only be installed by qualified personnel, observing the instructions given in section 3 and 4 of this document.

No guarantee claims will be recognised for faults arising from the improper handling of the device.

The panel should not be used for the implementation of any safety functions relating to the protection of personnel and machinery.

No liability is accepted for claims for damages arising from a failure or functional defect in the device.

CONTENTS

1 Introduction

This documentation describes the functions of the MPB-TP multi protocol board.
This can only be used in conjunction with specific devices (target hardware), e.g. Touch Panel VTP or Multi Terminal Interface (MTI) which are provided with a suitable slot.

The MPB-TP is used in the target hardware in the slot assigned for the communications card.
Ensure that the card is only fitted or removed from the device when it is switched off.

The MPB-TP supports all the drivers of the PLCs types described in this documentation.

The number of drivers that can be supported depends on the current version of the firmware (see title page).

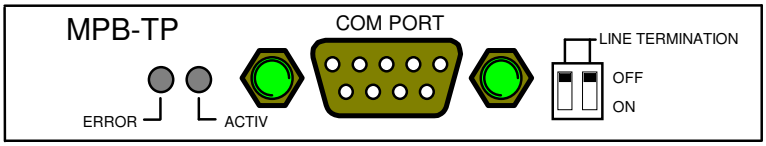
If a driver for your PLC type is not available in the current version, ask after any other possible newer versions.

The MPB-TP can be configured for all standard physical interfaces (RS232, TTY, RS422 and RS485), by means of jumpers.

Remember that the card is supplied with the RS485 interface as the default configuration setting.

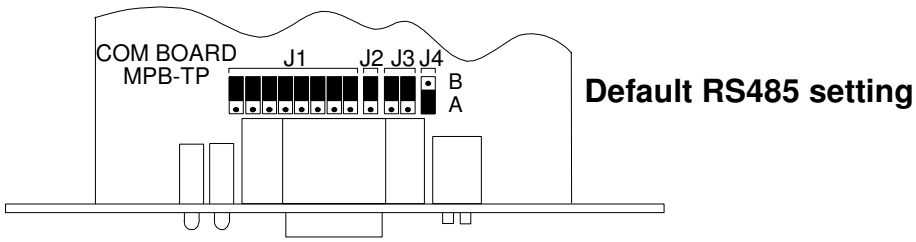
2 MPB-TP configuration

MPB-TP DISPLAY



COM PORT	The COM PORT can be configured with jumpers for RS232, RS422 and RS485 operation. Only one of these interfaces can be active at any time. See also **Interface configuration** for information on how to configure the interfaces.
LINE TERMINATION	Bus terminating resistors for RS485 and RS422 These must be switched on at the first and last stations in a network (ON = switched on). With point to point connections (only two stations) these should always be switched on.
ERROR	If the “ERROR” (red) LED is lit, the last data transmission to the PLC could not be carried out correctly. The LED will not go out until the last data transmission to the PLC is correctly carried out. In normal operation this LED should be off.
ACTIV	Green LED. Lit during active data transmission between MPB-TP and the PLC. In normal operation this LED should flash shortly (approx. 50 ms) with every data transmission.

INTERFACE CONFIGURATION



PIN ASSIGNMENT					
	COM BOARD MPB-TP (9 Pin female)				PROG PORT
PIN	RS232	TTY	RS485	RS422	RS232
1	-	IN ‹	-	DTR+›	-
2	RxD ‹	-	-	TxD+ ›	TxD ›
3	TxD ›	-	A ‹›	RxD+‹	RxD ‹
4	DTR ›	-	-	DSR+‹	DSR ‹
5	GND	GND	GND	GND	GND
6	DSR ‹	-	-	DTR- ›	DTR ›
7	-	-	B ‹›	TxD- ›	-
8	-	-	-	RxD- ‹	-
9	-	OUT ›	-	DSR- ‹	(+5V)

3 Preparing the communication cables

The preparation of the cables for the serial interface (COM PORT) is an important factor in the electromagnetic compatibility (EMC) of the target hardware, both in terms of interference immunity and emission.

The EMC values stated in the technical data can only be guaranteed if the cables are prepared according to the following specifications.

3.1 Communications cable

The communications cable must be shielded. The cable shield must be made from copper braid. Use a metal or metallised connector casing. Connect the cable shield directly to the connector casing for the MPB-TP. This ensures that the cable shield is properly connected to the housing of the target hardware via the screws and the protective metal shroud of the plug connector.

Refer to the relevant operating instructions of the PLC manufacturer for the correct connection procedure for the cable shield to the PLC. Unless otherwise stated, connect the cable shield to the connector casing of the PLC.

Provide a potential equalisation cable with a suitable cross-section between control cabinets if the target hardware and PLC (or another communications partner) are installed in different control cabinets and the cable shield is directly or indirectly connected to the protective earth at the PLC end. This will prevent the occurrence of excessive compensation currents on the shield and shield connections, as may occur in the event of a possible shorting of a device on the protective earth system.

3.2 Cable lengths

The possible cable length and wire recommendations depend on the physical interface used.

Transmission errors may occur if these limits are not observed.

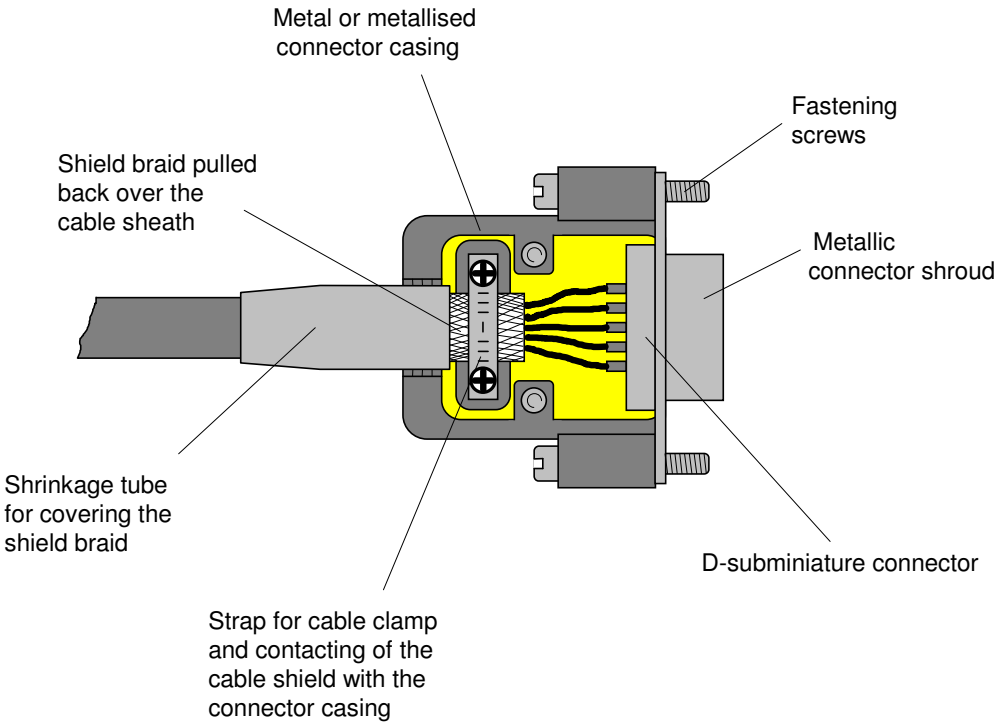
Interface	Baud rate	Length	Comments
RS232	19’200	15 m	Only suitable for point-to-point connections
	9’600	30 m	
	4’800	60 m	
RS422/ 485	< 100’000	1200 m	Using twisted pair communication cables can increase reliability of the data line concerned.
	< 500’000	600 m	
	<1’000’000	120 m	The line terminating resistors must be switched on between the first and last data terminals
TTY	< 20’000	1000 m	

3.3 Shield connection

Only use metal or metallised connector casings with a cable clamp for cable anchoring fastened on one side of the connector. This ensures an optimum contact area and low impedance connection with the connector casing.

The following procedure is recommended for connecting the cable shield:

1. Strip the cable
2. Shorten the exposed shield braid by approx. 3 cm.
3. Turn back the braid over the cable sheath.
4. Use a shrinkage tube or insulation tape to cover the exposed cable sheath with the folded back screen braid so that 5 to 8 mm of exposed cable shield is left at the sheath end and is cleanly covered at the back.
5. Fit the connector.
6. The cable is then fastened at the exposed shield braid and the cable sheath below it directly underneath the cable clamp strap of the connector casing.



4 Commissioning

1. Insert the MPB-TP into the slot for the communications card of the target hardware with the power supply switched off.

2. Connect the COM PORT of the MPB-TP to the corresponding communications port of the PLC used.

   Use the communications cable for the PLC concerned (see table in the section PLC interfaces).

3. The green ACTIV LED on the MPB-TP is lit when communication with the PLC is active. The ACTIV LED will go out when communication is completed.
   The red ERROR LED is lit if a correct data exchange with the PLC **cannot** be carried out.

   Further information on commissioning only refers to the event of errors. None of the LEDs are lit or the red ERROR LED is lit.
   Otherwise commissioning is completed at this point.

4. If none of the two LEDs are lit, a driver has probably been selected that cannot be supported by the current version.
   In this case contact our support department and ask for newer versions of the MPB-TP and always take into account the error messages of the target hardware.

   Further information on commissioning only refers to the errors in which the red ERROR LED is lit.

5. Check first of all whether the physical interface of the MPB-TP is compatible with that of the PLC (RS232, TTY, RS485, RS422) = 30% of all commissioning errors.

6. Check the communications cable for breakage or short-circuits.

7. Check the communications cable used (wiring test) by means of the diagram for the PLC in use approx. 60% of all commissioning errors).

8. If the red ERROR LED is lit only intermittently, check whether the cable shields have been connected as described.

9. Furthermore pay particular attention to the PLC notes given in the section PLC interfaces. All the interfaces described in this section have been tested and are used in real applications.
   If the interface you require is not listed, try an alternative interface for the PLC and contact our support centre.

10. Further information on particular devices is given in the section Commissioning the target hardware.

5 MPB-TP V 1.4 driver list

The version of the driver list and MPB-TP includes all current PLC versions
The PLC related version refers to the corrections and additions for the types concerned.

MANUFACTURER	PROTOCOL	VERS.	DATA TYPES	MPB_V	NOTES
ABB	Modbus	2.01	I, B	From 1.0	Masterpiece 90
AEG Modicon	Modbus	2.01	R, M	From 1.0	Modicon 984
Allen-Bradley	DF1	1.12	N, B	From 0.5	PLC5 (with channel 0)
	DF1 (1747KE)	1.12	N	From 0.5	SLC500
	DF1	2.00	N,B	From 1.0	SLC500
Elin	ECS2000	1.00	V,X,Y,I,E,A	From 1.0	ELDATIC MC1
Festo	Commando Inter.	1.00	R, MW	From 1.0	FPC405
Jetter	Sympas	1.00	R	From 1.0	PASE
Klöckner Moeller	Suconet K1	2.00	MW	From 0.5	PS3, PS3x6
	Suconet K1	2.11	MB	From 1.2	PS4-200
	Suconet K	1.30	MB	From 1.3	PS4-200
	Suconet K	1.30	TP (Array/Word)	From 1.3	PS416
	SUCOM-A	2.00	MW	From 0.5	PS3x6
	SUCOM-A	2.11	MW	From 1.0	PS32
Honeywell	IPC620-ABC	1.01	RG, M	From 1.0	IPC620
Matsushita	PG-Protocol	1.01	DT,R,SV,EV,X,Y	From 1.0	FB1, FP3, FP5
MDS	TP1	2.00	DW	From 1.0	Free interface
	TP2	2.00	DW	From 1.0	Free interface
Mitsubishi	Computer Link	1.51	M, D	From 0.5	AJ71C24 and compatible
	PG-AX	1.51	M, D	From 0.5	AX series
	PG-FX	1.51	M, D	From 0.5	FX series
Omron	Host Link	1.11	HR, IR	From 1.0	C20
	Host Link	1.11	HR, DM, IR	From 1.0	C500, K series, H series
Seitec	ISY-GLT	1.01	DW	From 1.4	GLT Master
Siemens	DK512 / R3964R	2.00	DW	From 0.5	CP524/525 and compatible
	AS511	2.00	DW	From 0.5	S5 series
	R3964R	2.00	DW	From 0.5	CP521-SI (S5-AG103)
Siemens TI	TI500	1.00	V	From 0.5	TI500 series
SIG	SBC-2	1.02	C, D	From 1.0	VME1
Telemecanique	UNI-Telway	1.01	W	From 1.0	TSX17
Westinghouse	Modbus	2.01	R, M	From 1.0	PC1100/ PC1200

6 PLC Interfaces

This section describes all interfaces for connection to different PLC types that have been tested and used in practice

Unlisted connection variants to existing PLC types can theoretically be deduced. Please contact our support department if you have any problems.

New PLC types can only be implemented by the manufacturer. In this case ask for any other new versions of MPB-TP or any possibilities for implementing your PLC type.

With RS422 particularly note which of the two types are stated in the wiring list.

“RS422” or “RS422 MP” (Multi Point)

Configure the physical interface accordingly.

6.1 Mitsubishi

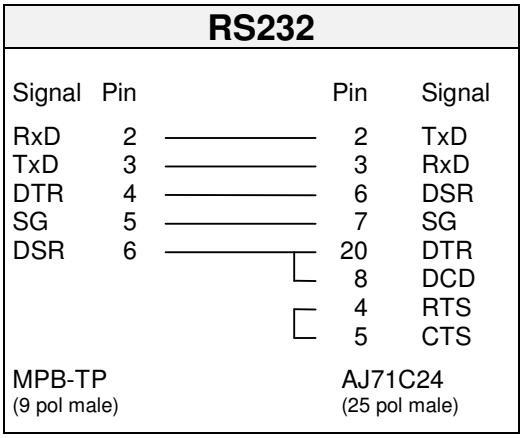
MITSUBISHI

PLC Type	Protocol	PLC Port	Parameters
A seriess	Computer Link	AJ71C24 Format 1 (Mode 1)	9600 baud, 8 data bits, 1 stop bit, No parity Checksum on

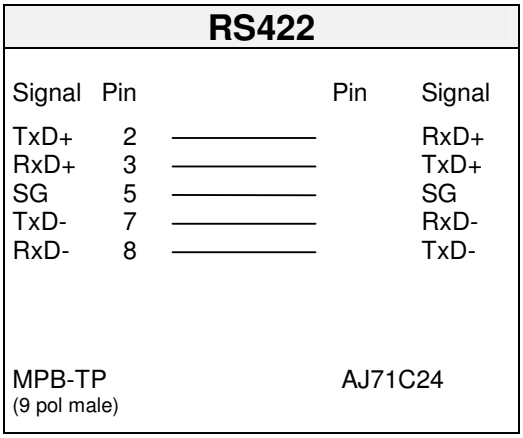
DRIVER DESIGNATION (2, 1) : MITSUBISHI > AJ71C24
SUPPORTED DATA TYPES : M, D

WIRING LIST

RS232



RS422



NOTES

- Check in accordance with the manual for the Computer Link Module AJ71xx whether the mentioned parameters and interface (RS232 or RS422) are correctly set.

  Note: the switch assignment is not identical for all AJ71xx!
- Select protocol format 1 for the AJ71xx and station number 0 (fixed for MPB-TP).
- Remember that changes to settings on the AJ71xx are not effective until the PLC has been restarted.
- Correct data transmisssion on the AJ71xx using RS232 is indicated by the flashing of LEDs 2SD and 2RD, and LEDs 4SD and 4RD when using RS 422.

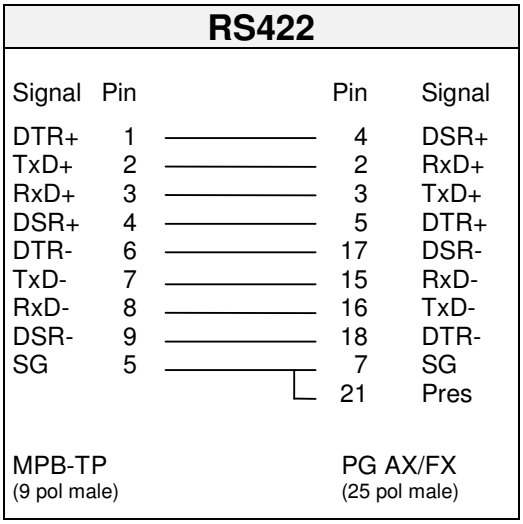
MITSUBISHI

PLC Type	Protocol	PLC Port	Parameters
AX series	Port Communication	PG-Port	9600 baud, 8 data bits, 1 stop bit, Parity Odd Checksum on
FX series	Direct Access	PG-Port	9600 baud, 7 data bits, 2 stop bit, Parity Even Checksum on

DRIVER DESIGNATION **(2, 2) : MITSUBISHI > PG-AX**
(2, 3) : MITSUBISHI > PG-FX
SUPPORTED DATA TYPES : M, D

WIRING LIST

RS422



NOTES

- No special notes;

  The connection is the same as for the programming device provided that all parameters are fitted and no other driver or configuration is required in the PLC.

6.2 Siemens

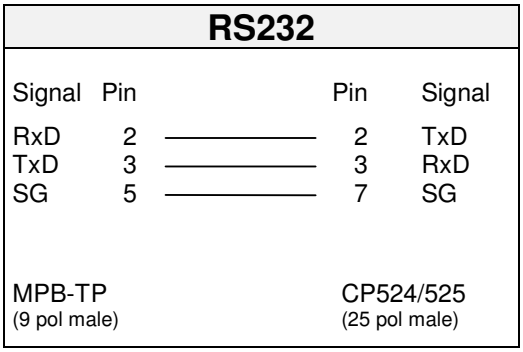
SIEMENS

PLC Type	Protocol	PLC Port	Parameters
S5	DK512 (R3964R)	CP524/525135 or compatible	9600 baud, 8 data bits, 1 stop bit, Parity Even low priority

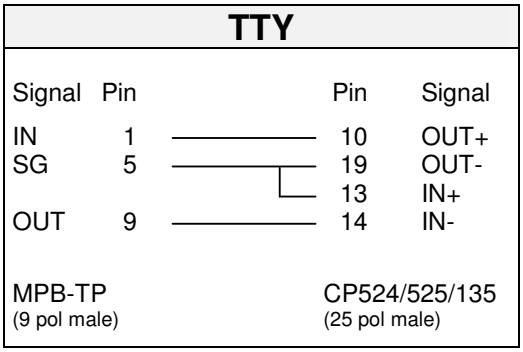
DRIVER DESIGNATION (3, 1) : SIEMENS > DK512
SUPPORTED DATA TYPES : DW

WIRING LIST

RS232



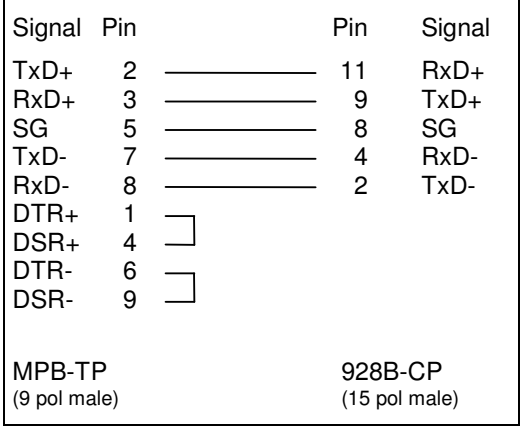
TTY



PLC Type	Protocol	PLC Port	Parameters
S5-928B	DK512 (R3964R)	CP	9600 baud, 8 data bits, 1 stop bit, Parity Even low priority

WIRING LIST

RS422



NOTES

- Configure the communications processor used for the specified parameters and select the low priority for the PLC.
- Do not program any jobs for your CP but simply use the standard function blocks (RECEIVE_ALL and FETCH_ALL). The MPB-TP cannot accept jobs that are initiated by the CP.
- For active data exchange with the CP the function blocks mentioned must be called up in the main program of the PLC (OB1).
- Remember that this interface is not only for the R3964R protocol but also requires the DK512 (= RK512) data interpreter.

  Example:
  The CPU944 can run the R3963R protocol on the second interface using the 6ES5-816-1BB21 module.

  This only enables data transport, however, the interpreter would have to be implemented in the control program of the PLC (not recommended).

  Note: this CPU can also process the AS511 protocol on the second interface.
- PLC and CP must both be in Run status.
- If data blocks or data words are addresssed that are not available in the PLC, this will cause errors in the communication.

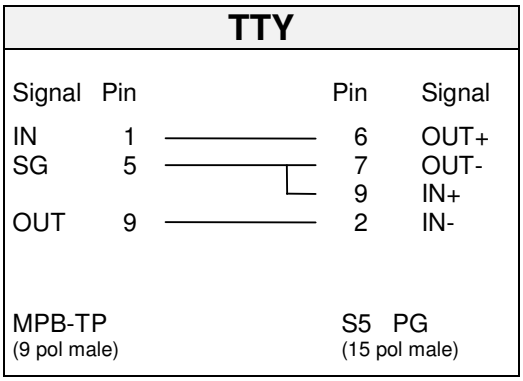
SIEMENS

PLC Type	Protocol	PLC Port	Parameters
S5	AS511	PG-Port	9600 baud, 8 data bits, 1 stop bit, Parity Even

DRIVER DESIGNATION (3, 2) : SIEMENS > AS511
SUPPORTED DATA TYPES : DW

WIRING LIST

TTY



NOTES

- The interface to the PG-Port of the S5 is the same as for the programming device. No parameter settings or function blocks are required.
- With CPUs that have two interfaces it is best to use the second one since usually not all PG functions are available on this. All the functions of the MPB-TP can be implemented with this port.
- The PLC must be in Run status for active communication.
- If both data blocks or data words are addresssed that are not available in the PLC, this will cause errors in the communication.

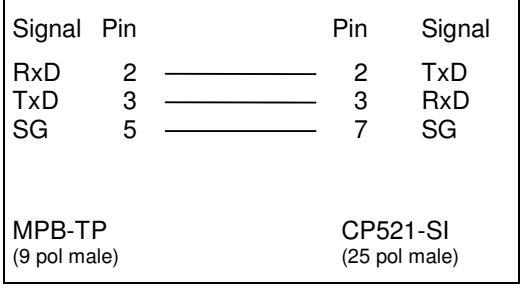
SIEMENS

PLC Type	Protocol	PLC Port	Parameters
S5-103	R3964R	CP521-SI	9600 baud, 8 data bits, 1 stop bit, Parity Even

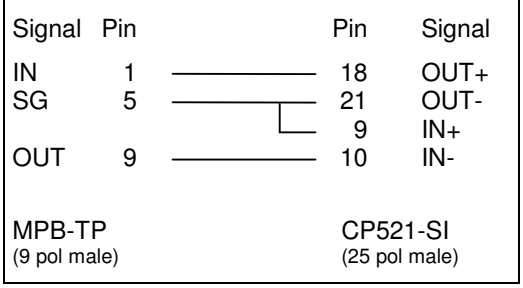
DRIVER DESIGNATION (3, 4) : SIEMENS > CP521-SI
SUPPORTED DATA TYPES : DW

WIRING LIST

RS232



TTY



NOTES

- The AG103 with the CP521-SI supports the R3964R protocol.
- An interpreter with a scaled-down version of DK512 (max 4 data byte) can be obtained for this PLC from your MPB-TP dealer.
- If the interpreter is implemented in the PLC (see appropriate documentation), the MPB-TP is capable of implementing RECEIVE and FETCH jobs as with the CP524.
- The PLC must be in Run status for active communication.
- If both data blocks or data words are addresssed that are not available in the PLC, this will cause errors in the communication.

6.3 Klöckner Moeller

KLÖCKNER MOELLER

PLC Type	Protocol	PLC Port	Parameters
PS3, PS3x6, PS4-200	Suconet K1	Suconet	187.5 Kbaud

DRIVER DESIGNATION (1, 2) : KL.MOELLER > Suconet K1
SUPPORTED DATA TYPES : MB, MW, TP (Array/Word)

WIRING LIST

RS485

Signal	Pin		Pin	Signal
A	3	———	4	A
SG	5	———	3	SG
B	7	———	1	B

MPB-TP (9 pol male) — PS3/PS3x6 (5 pol DIN-male)

RS485

Signal	Pin		Pin	Signal
A	3	———	3	A
SG	5	———	5	SG
B	7	———	7	B

MPB-TP (9 pol male) — PS4-200 (9 pol male)

NOTES

- The MPB-TP interface via Suconet requires the use of a driver for interpreting incoming data and copying it to the appropriate markers.
- The driver is available in two versions for the PLC type concerned and can be obtained from KM with the appropriate documentation:

  a) for only one device with MPB-TP
  b) for several devices with MPB-TP
- The station number via which the MPB-TP must report within the network, must match the number in the driver.
- The PLC must be in Run state for active communication.
- The appropriate driver must also be correctly integrated in the PLC program.
- Also ensure when using RS485 that the first and the last station in the network have their bus terminating resistors switched on.

KLÖCKNER MOELLER

PLC Type	Protocol	PLC Port	Parameters
PS4-200, PS416	Suconet K	Suconet	375 and 187.5 kBaud

DRIVER DESIGNATION (1, 5) : KL.MOELLER > Suconet K
SUPPORTED DATA TYPES : MB, TP (Array/Word)

WIRING LIST

RS485

Signal	Pin		Pin	Signal
A	3	———	4	A
SG	5	———	3	SG
B	7	———	1	B

MPB-TP (9 pol male) — PS4-200 (5 pol DIN-male)

RS485

Signal	Pin		Pin	Signal
A	3	———	3	A
SG	5	———	5	SG
B	7	———	7	B

MPB-TP (9 pol male) — PS416 (9 pol male)

NOTES

- The MPB-TP interface via Suconet requires the use of a driver for interpreting incoming data and copying it to the appropriate markers.
- The driver is available in two versions for the PLC type concerned and can be obtained from KM with the appropriate documentation:

  a) for only one device with MPB-TP
  b) for several devices with MPB-TP
- The station number via which the MPB-TP must report within the network, must match the number in the driver.
- The PLC must be in Run state for active communication.
- The appropriate driver must also be correctly integrated in the PLC program.
- Also ensure when using RS485 that the first and the last station in the network have their bus terminating resistors switched on.

KLÖCKNER MOELLER

PLC Type	Protocol	PLC Port	Parameters
PS3x6 **PS32**	SUCOM-A	PC	9600 baud, 8 data bits, 2 stop bit, No parity

DRIVER DESIGNATION **(1, 4) : KL.MOELLER > PS3x6 PRG**
(1, 8) : KL.MOELLER > PS32 PRG
SUPPORTED DATA TYPES **: MW**

WIRING LIST

RS485

Signal	Pin		Pin	Signal
A	3	———	4	A
SG	5	———	3	SG
B	7	———	1	B

MPB-TP (9 pol male) — PS3x6 (5 pol DIN-male)

RS485

Signal	Pin		Pin	Signal
A	3	———	3	A
SG	5	———	5	SG
B	7	———	7	B

MPB-TP (9 pol male) — PS32 (9 pol male)

NOTES

- The interface to the PC port (SUCOM-A) of the PS3x6 and PS32, is the same as for a programming device.
  Neither parameters nor any drivers are required.
- The PLC must be in Run state for an active communication.
- If marker words are addresssed that are not available in the PLC, this will cause errors in the communication.

6.4 Omron

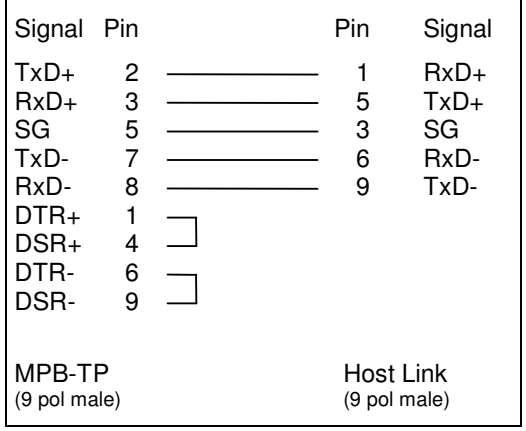
OMRON

PLC Type	Protocol	PLC Port	Parameters
C-/H-/K series	Host Link	Host Link Unit	9600 baud, 7 data bits, 2 stop bit, Parity Even

DRIVER DESIGNATION (6, 1) : OMRON > CHK series
SUPPORTED DATA TYPES : HR, IR, DM

WIRING LIST

RS422



NOTES

- No specific notes
- Shield connections are given in the OMRON manual.

6.5 Allen-Bradley

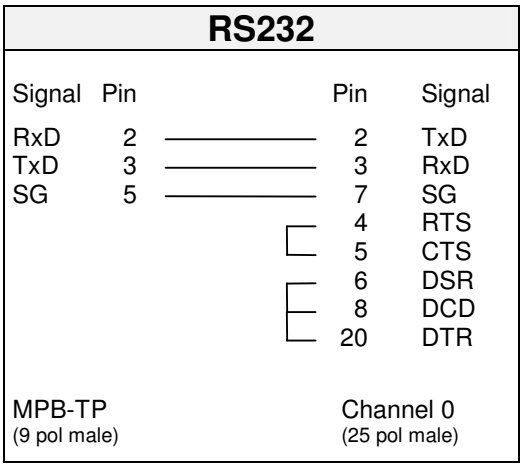
ALLEN-BRADLEY

PLC Type	Protocol	PLC Port	Parameters
PLC5	DF1	Channel 0	9600 baud, 8 data bits, 1 stop bit, Parity Even Full Duplex

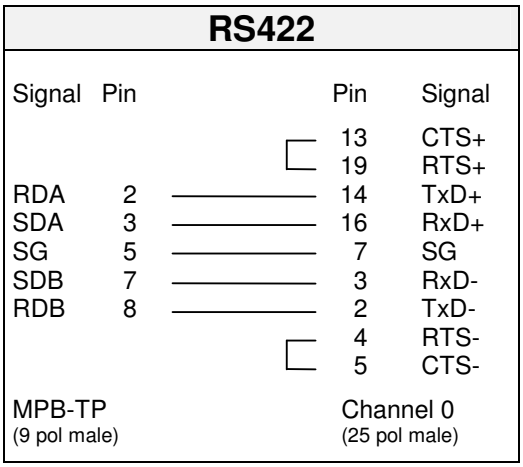
DRIVER DESIGNATION (7, 1) : A.-BRADLEY > PLC-5
SUPPORTED DATA TYPES : N, B

WIRING LIST

RS232



RS422



NOTES

- Configure the transmission parameters in the PLC5 for channel 0 according to the parameters specified.

  The parameters are set in the “MENU ONLINE CONFIGURATION” in the “GENERAL UTILITY” of the Allen-Bradley programming software:

  Channel 0 SYSTEM (Point To Point).

- The “NODE ADRESS” must match the address set for the MPB-TP.
  The MPB-TP itself reports itself as station number 0.
- Ensure that all files to be addressed (N and B) are available in the PLC and are large enough.
- Addressing files or data words that are not available in the PLC will lead to faulty communication (red LED “ERROR” lit).

ALLEN-BRADLEY

PLC Type	Protocol	PLC Port	Parameters
SLC500	DF1	1747-KE	9600 baud, 8 data bits, 1 stop bit, Parity Even Full Duplex

DRIVER DESIGNATION (7, 2) : A.-BRADLEY > SLC-500
SUPPORTED DATA TYPES : N, B

WIRING LIST

RS232

Signal	Pin		Pin	Signal
RxD	2	———————	3	TxD
TxD	3	———————	2	RxD
SG	5	———————	5	SG
MPB-TP (9 pol male)			DF1-Port (9 pol female)	

NOTES

- The 1747-KE communications module from Allen-Bradley is required in order to link the MPB-TP to the SLC500.
- Configure the DF1 port of 1747-KE using any VT100 terminal (or Windows terminal) for the interface parameters and type (RS232) mentioned.
- The parameter setting of the 1747-KE is described in chapter 4 of the manual. The interfaces are set as standard for RS232 so that only JW4 for configuring the 1747-KE needs to be set to the required position.
- Connect the cable with the CONFIG port of the 1747-KE and their VT100 terminal (1200 baud). After the the PLC is switched on, the module responds by activating the menu described in chapter 5. Set the parameters mentioned for the DF1 port.
- The following parameters are required for the DF1 protocol in addition to the ones mentioned:
  FULL-DUPLEX
  - Duplicate Packet Detection : Disable
  - Checksum : BCC
  - Constant Carrier Detect : Disable
  - Modem Init String :
  - Embedded Response Detect : ADER
  - ACK Timeout : 200 x 5ms
  - ENQuiry Retries : 3
  - NAK Received Retries : 3
- The “NODE ADRESS” must correspond with the one to be addressed by the MPB-TP. This is the address of the SLC500 and not that of the 1747-KE.
  The MPB-TP reports itself as station number 0.

NOTES (Continuation SLC-500)

- Switch off the PLC after the configuration and set JW4 to OPERATION.
- The MPB-TP can only exchange data with the 1747-KE via the CIF file (Common Interface File = fix no. #9). Only open this file in the required size.

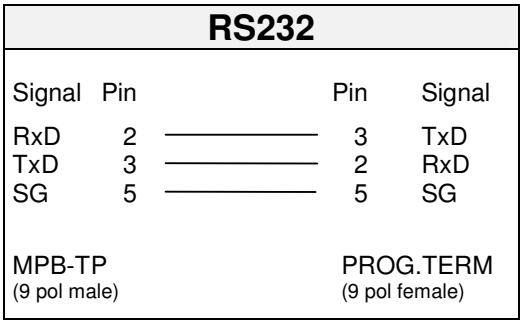
ALLEN-BRADLEY

PLC Typ	Protokoll	PLC Port	Parameter
SLC503 **SLC504**	DF1	PROG.TERM	9600 baud, 8 data bits, 1 stop bit, Parity Even Full Duplex

DRIVER DESIGNATION (7, 3) : A.-BRADLEY > SLC503/504
SUPPORTED DATA TYPES : N, B

WIRING LIST

RS232



NOTES

- Configure the transmission parameters in the SLC503/4 the interface PROG.TERM (Channel 0) according to the parameters specified.

  The parameters are set in the „MENU ONLINE CONFIGURATION“ in the „GENERAL UTILITY“ of the Allen-Bradley programming software :

  System Channel 0 : FULL DUPLEX
- The „DESTINATION ADRESS“ (=PLC) must match the address set for the MPB-TP.
  The „SOURCE ADRESS“ reports to the MPB-TP is fixed as 0 .
- Ensure that all files to be addressed (N and B) are available in the PLC are large enough. Addressing files that are not available, will lead to faulty communication (red Led „ERROR“ lit).
- If you are also using the same interface „PROG.TERM“ for the programming, the parameter are change always only in the menu „ONLINE“ and after in the enu „ONLINE CONFIG“.

  In this case the programming cable is identically with the descibed communications cable.

6.6 Matsushita

MATSUSHITA

PLC Type	Protocol	PLC Port	Parameters
FP1	PG-Port	PG-Port	9600 baud, 8 data bits, 1 stop bit, Parity Odd

DRIVER DESIGNATION (8, 1) : MATSUSHITA > FP1/3/5
SUPPORTED DATA TYPES : DT, R, SV, EV, X, Y

WIRING LIST

RS422

Signal	Pin		Pin	Signal
DTR+	1	———	4	DSR+
TxD+	2	———	15	RxD+
RxD+	3	———	14	TxD+
DSR+	4	———	5	DTR+
SG	5	———	2	SG
DTR-	6	———	13	DSR-
TxD-	7	———	7	RxD-
RxD-	8	———	6	TxD-
DSR-	9	———	12	DTR-
MPB-TP (9 pol male)			AFP15205 (15 pol male)	

NOTES

- The MPB-TP is linked to the FP1 via the AFP15205 converter directly on the PG port of the PLC (converter = round 15 pole D-sub connector).
- The connection to the PG port of the FP1 is the same as for a programming device and active communication should be possible without any further steps.
- The PLC must be switched on and in Run status.

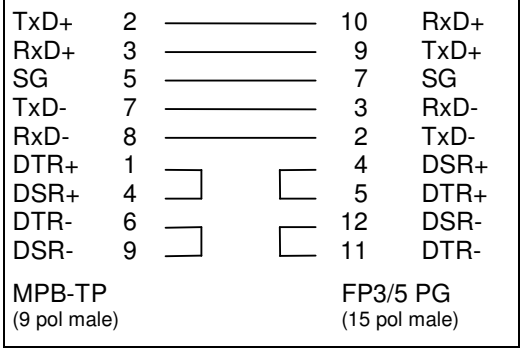
MATSUSHITA

PLC Type	Protocol	PLC Port	Parameters
FP3 / **FP5**	PG-Port	PG-Port	9600 baud, 8 data bits, 1 stop bit, Parity Odd

DRIVER DESIGNATION (8, 1) : MATSUSHITA > FP1/3/5
SUPPORTED DATA TYPES : DT, R, SV, EV, X, Y

WIRING LIST

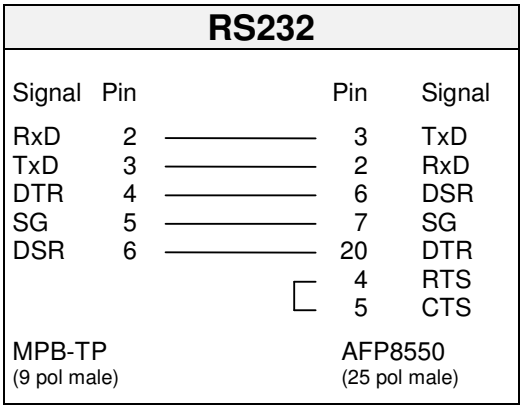
RS422



NOTES

- The connection to the PG port of the FP3 and FP5 is the same as for a programming device. Active communication should be possible without any further steps.
- The PLC must be switched on and in Run status.
- An additional possibility of connecting to the FP1, FP3, and FP5 is via the AFP850 RS 232 <-> RS422 converter (see below).
- Remember that the physical interface of the MPB-TP must be adapted for this (RS232).

RS232



6.7 Texas Instruments

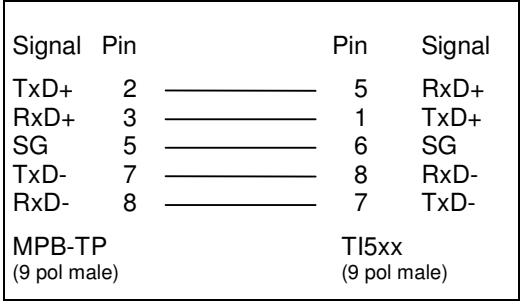
TEXAS INSTRUMENTS

PLC Type	Protocol	PLC Port	Parameters
TI500	PG-Port	PG-Port	9600 baud, 7 data bits, 1 stop bit, Parity Odd

DRIVER DESIGNATION (3, 5) : SIEMENS > TI-500
SUPPORTED DATA TYPES : V

WIRING LIST

RS422



NOTES

- The MPB-TP is connected to the TI-500 via the PG port. Active communication should be possible without any further steps.
- Check whether the setting of SW1..12 (in the battery compartment) matches the parameters listed.

  SW1 = ON; SW2 = X; SW3..5 = ON; SW6 = OFF; SW7..12 = ON

  For switch positions see the cover of the battery compartment or PLC manual.
- The PLC must be switched on and in Run status.

6.8 Elin Eldatic

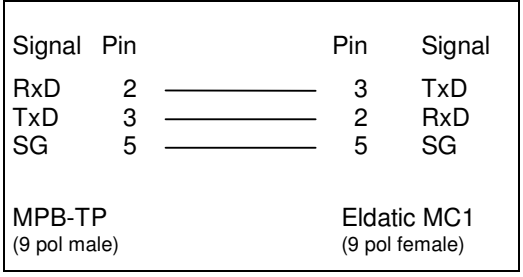
ELIN ELDATIC

PLC Type	Protocol	PLC Port	Parameters
MC1	ECS2000	PG-Port	9600 baud, 8 data bits, 2 stop bit, No parity

DRIVER DESIGNATION (10, 1) : OTHERS > ELIN-MC1
SUPPORTED DATA TYPES : V, X, Y, I, E, A

WIRING LIST

RS232



NOTES

- The MPB-TP is connected to the Eldatic MC1 directly via the PG port. Active communication should be possible without any further steps.
- The MPB.-TP has the status of a charging device with the station number 253.
- Data can only be exchanged with the PLC connected (point-to-point) and the number of the connected stations to be addressed must match.
- Is the data to be exchanged (V, X, Y, I, E, A) actually present in the PLC?
- Are the transmission parameters correctly set?

  9600 baud in the "ORG" menu under "Communication" (check via "LAD" menu)
- The PLC must be switched on and must be in Run status.

6.9 Festo

FESTO

PLC Type	Protocol	PLC Port	Parameters
FPC405	Commando Interpreter	DIAG-Port	9600 baud, 8 data bits, 1 Stop bit, No parity

DRIVER DESIGNATION (10, 2) : OTHERS > FPC405
SUPPORTED DATA TYPES : R, MW

WIRING LIST

RS232

Signal	Pin		Pin	Signal
RxD	2	———	3	TxD
TxD	3	———	2	RxD
SG	5	———	5	SG

MPB-TP (9 pol male) — DIAG-Port (9 pol male)

NOTES

- The MPB-TP is connected to the FPC405 directly via the DIAG port. Active communication should be possible without any further steps.
- The PLC must be switched on and in Run status.

6.10 AEG Modicon

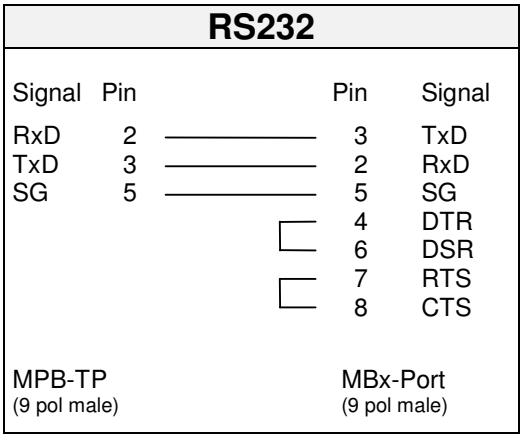
AEG MODICON

PLC Type	Protocol	PLC Port	Parameters
984 Series	Modbus RTU	MB-Port 1 oder 2	9600 baud, 8 data bits, 1 Stop bit, Parity Even

DRIVER DESIGNATION (11, 1) : BUS > MB RTU1
SUPPORTED DATA TYPES : R, M

WIRING LIST

RS232



NOTES

- The MPB-TP is connected to the Modicon 984 via one of the two MB ports (1 or 2).
- Two different data types are available. "R" are word registers and correspond to 4x registers (40001...). "M" are markers or bit registers and correspond to 0x registers (00001...).
- Ensure that the connected station and the station to be addressed (number) match, and that the PLC is in RUN mode.
- The MPB-TP uses the standard parameters for the MB port which are the factory settings when the PLC is delivered. Active communication should therefore be possible immediately.
- If this is not the case, try to address the appropriate MB port using the programming software and the same parameters and address (e.g.: Online Editor).
- If the MB port cannot be addressed via the programming software either, check the setting of the port address. This can be set either via the software or via the hardware (see PLC manual, "Configuration of the MB port").
- If access via the programming software with the same parameters, address and protocol type (Modbus RTU) is possible, the MPB-TP can be connected again to the MB port.
- The PLC requires a long time after startup before it is in RUN mode. The target device may therefore temporarily report an error after being switched on.

  Remedy: Switch on target device with PLC!

6.11 Telemecanique

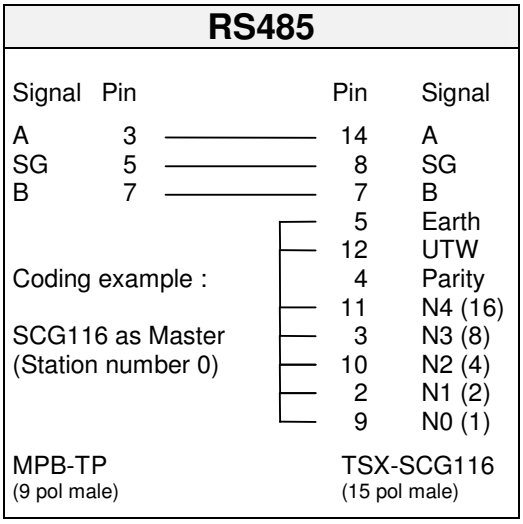
TELEMECANIQUE

PLC Type	Protocol	PLC Port	Parameters
TSX17	UNI-Telway	TSX-SCG116	9600 baud, 8 data bits, 1 Stop bit, Parity Odd

DRIVER DESIGNATION (11, 3) : BUS > TELWAY-S
SUPPORTED DATA TYPES : W

WIRING LIST

RS485



„Parity“ also be connected to „Earth“ if the number of the „Nx“ connected to earth is even.

Detailed notes on the address coding are given in the manual on the UNI-Telway Bus (TSX D24 004G).

NOTES

- With this connection the MPB-TP is run as a slave and the SCG116 acts as master.
- Configure the communication module using the dialogue block as described in the manual on the TSX SCG116 (section 3.1-2), using the following parameters :

  UTW Master (exact number of slave), 9600 baud, Timeout 100ms
- The station number of the master is always 0.
  The number of slaves defined must be as high as the last address in the network. The station number of the MPB-TP in this case must be higher than 0 and corresponds to the station number via which the MPB-TP has logged on.
- The "NET" and "ADR" LEDs of the TSX SCG116 must not be lit.
  If the "ADR" LED is lit, this means that the wired address is not correct. If "NET" is lit, this means that one or several configured stations are not responding.

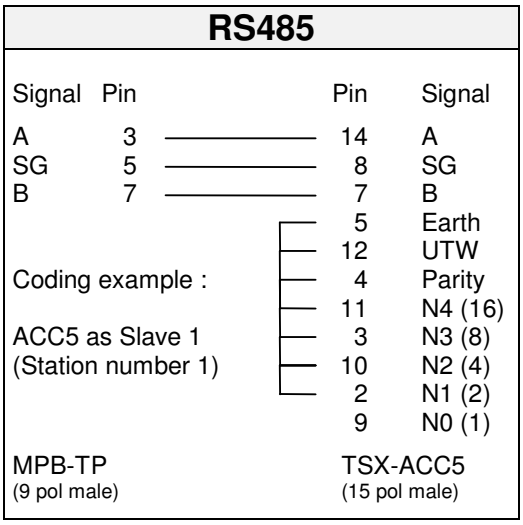
TELEMECANIQUE

PLC Type	Protocol	PLC Port	Parameters
TSX17	UNI-Telway	TSX-ACC5	9600 baud, 8 data bits, 1 Stop bit, Parity Odd

DRIVER DESIGNATION (11, 4) : BUS > TELWAY-M
SUPPORTED DATA TYPES : W

WIRING LIST

RS485



„Parity“ also be connected to „Earth“ if the number of the „Nx“ connected to earth is even.

Detailed notes on the address coding are given in the manual on the UNI-Telway Bus (TSX D24 004G).

NOTES

- With this connection the MPB-TP acts as master. However, only one slave can be run with this (point-to-point).
- Configure the communication module using a dialogue block, as described in the manual on the TSX ACC5 (section 2.1-1). Use the following parameters:

  UTW : 9600 baud, ODD Parity, 8 data bits, 1 stop bit
- In this case the station number of the MPB-TP is 0 (Master).
  The set station number on the ACC5 must correspond to the station number to be addressed via the MPB-TP.

WIRING NOTES

- The connections described are made directly on the communications card without the use of a two-way branch (e.g.: TSX SCA62).
- In this case, however no BUS terminating resistors are provided at the PLC end. This is permissible for a point-to-point connection.
  In this case switch on the bus terminating resistors of the RS485 on the MPB-TP.
- If several stations are connected to the same BUS, a two-way branch with bus terminating resistors switched on must be used for at least the first and last PLC. If the MPB-TP is at the end of the link, its bus terminating resistors must be switched on (see configuration of the MPB-TP).

6.12 Honeywell

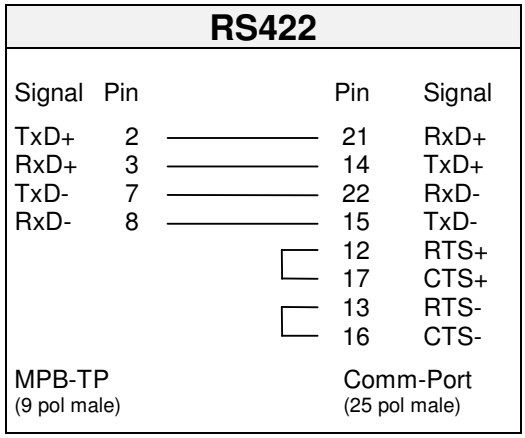
HONEYWELL

PLC Type	Protocol	PLC Port	Parameters
IPC620	ABC	Comm-Port	9600 baud, 8 data bits, 1 Stop bit, No parity Full duplex

DRIVER DESIGNATION (4, 5) : HONEYWELL > ABC
SUPPORTED DATA TYPES : RG, M

WIRING LIST

RS422



NOTES

- The MBP-TP is conneccted to the IPC620 directly on the Comm port or alternatively via a DCM module with the ABC protocol.
- This interface must be configured with the IPC software beforehand. For this set the Ser. Port to "Permitted" under "Edit Proc. Conf." and under "Serial Port Parameters":

  FULL DUPLEX, 9600 baud, NO Parity, 1 Stop bit, Nodal Address > 0; Protocol ABC .
- The station number set (Nodal address) must correspond to the station number to be addressed via the MPB-TP.

6.13 Jetter

JETTER

PLC Type	Protocol	PLC Port	Parameters
PASE	SYMPAS	Viadukt Port	9600 baud, 8 data bits, 1 Stop bit, No parity

DRIVER DESIGNATION (10, 5) : OTHERS > PASE
SUPPORTED DATA TYPES : R

WIRING LIST

RS232

Signal	Pin		Pin	Signal
RxD	2	———————	2	TxD
TxD	3	———————	3	RxD
SG	5	———————	7	SG
MPB-TP (9 pol male)			Viaduct-port (9 pol male)	

Note the poles since the two devices are connected with the same D-Sub connectors and the assignment is not identical.

NOTES

- The MPB-TP is connected to the PASE via the Viaduct Port using the PG protocol and requires specific parameters to be set.
- The registers "R" are divided into 1):
  - **1**R Range REG 00001..01996 / 16 Bit Access
  - **2**R Range REG 00001..01996 / 24 Bit Access
  - **3**R Range REG 50001..01996 / 16 Bit Access
  - **4**R Range REG 50001..01996 / 24 Bit Access
- **1) Read next section SPECIAL NOTE (without fail!)**

SPECIAL NOTE

Data is normally transferred in word or double word format, e.g.:

1R0141	HI-BYTE	LO-BYTE
1R0142	HI-BYTE	LO-BYTE
1R0143	HI-BYTE	LO-BYTE
1R0144	HI-BYTE	LO-BYTE

All values in the PASE, however, are "24-Bit" (3 BYTE) in length.

In the range 1R and 3R the MPB-TP sends a 00 for the most significant 8 bits:

This has the disadvantage that only bytes (range 0..255) and words (range 0..65535) can be sent, whilst ShortIntegers (range -128..+127) and Integers (range -32768..+32767) cannot.

If the most significant bit (in this case bit 7) of a ShortInteger is set the value is negative:

ShortInteger : -1 = FF_h; -2 = FE_h; -128 = 80_h; 127 = $7F_h$ ...

The value -5, for example, is represented in the PASE accordingly as 251 ($0000FB_h$) instead of $FFFFFB_h$ and must be converted inside the PLC:

The same applies to the Integers (2 bytes).

The ranges 2R and 4R are reserved exclusively for LONG values since they are also transferred in a special way by the DRIVER.

BSP	2R0241	HI-BYTE	LO-BYTE
	2R0242	HI-BYTE	LO-BYTE
	2R0243	HI-BYTE	LO-BYTE
	2R0244	HI-BYTE	LO-BYTE
transferred	2R0241	MED-BYTE	LO-BYTE
	2R0241	UNUSED	HI-BYTE
	2R0243	MED-BYTE	LO-BYTE
	2R0243	UNUSED	LO-BYTE

The two registers 242 and 244 are therefore not written and can be used as required in the PLC program.

Long values are normally in the range of +/- 2,147 billion (32-bits). The min MIN / MAX for the PASE must not, however, exceed +/- 8,388 million (24-bit).

Higher values are shortened by the DRIVER to 24-bit and are therefore transferred incorrectly.

ShortIntegers and Integers are also not permissible in these ranges!

6.14 ABB

ABB

PLC Type	Protocol	PLC Port	Parameters
Masterpiece 90	MODBUS	MMK Port	9600 baud, 8 data bits, 1 Stop bit, No parity

DRIVER DESIGNATION (11, 5) : BUS > ABB-MMK
SUPPORTED DATA TYPES : R, M

WIRING LIST

RS232

Signal	Pin		Pin	Signal
RxD	2	———————	2	TxD
TxD	3	———————	3	RxD
SG	5	———————	5	SG
MPB-TP (9 pol male)			MMK-Port (9 pol male)	

NOTES

- The MPB-TP is connected to the Masterpiece 90 via the serial interface 2 of the CPU unit.
- Two different data types are possible. "I" data types are word registers and correspond to “4x” registers, for ABB they are DAT(I). "B" data types are marker or bit registers and correspond to the “0x” registers, for ABB these are the DAT(B).
- The station number under which the PLC is to be addressed is **fixed at Station 1**.
- Your system software must also be provided with the Modbus functions, you therefore need the version QMP93 or QMP95.
- Also ensure that all data words that can be addressed via the MPB-TP are also defined in the PLC. Refer for this to the ABB manual on how to define the data words and what effective Modbus addresses are accessed (COLA listing).
- If a value is generated, this will be given a Valid for the subsequent MODBUS address.
- Ensure particularly therefore that no data is written to this Valid or read from it.
- Normally you simply need to leave an address free (see also in the COLA list).

6.15 Westinghouse

WESTINGHOUSE

PLC Type	Protocol	PLC Port	Parameters
PC1100/1200	Modbus RTU	"D" Connector NL1075/NL1075B	9600 baud, 8 data bits, 1 Stop bit, Parity Even

DRIVER DESIGNATION (11, 1) : BUS > MB RTU1
SUPPORTED DATA TYPES : R, M

WIRING LIST

RS485

Signal	Pin		Pin	Signal
A	3	———	9	A
SG	5	———	18	SG
B	7	———	17	B

MPB-TP (9 pol male) — „D" Connector (25 pol female)

RS485

Signal	Pin		Pin	Signal
A	3		8	A
SG	5		6	SG
B	7		2	B

MPB-TP (9 pol male) — NL1075/1075B (Terminalsttrip)

NOTES

- Two different data types are available. "R" are word registers and correspond to the "4x" registers. With Westinghouse these are "HR" registers.
  "M" are marker or bit registers and correspond to "0x" registers. With Westinghouse these are "Coils".
- The station number under which the MPB-TP is to address the PLC must be defined with the "UA" command in the PLC (see also in UA command in the PLC manual).
- The port 3 (RS485) for the interface parameters must also be defined with the CP command.
- The SW1 on the CPU board of the PC-1200 must be in the RS485 position (all closed = RS485 terminated/all open = RS485 not terminated).

  The first and last station in the line of a RS485 network must be terminated (bus terminating resistors). With a point-to-point connection on both devices in all cases (PLC and MPB-TP).
- Note particularly that all data words to be exchanged with the MPB-TP are also defined in the PLC. In the event of using HR registers, data can only be read or written that is also used in the PLC program.

6.16 MDS

MDS

PLC Type	Protocol	PLC Port	Parameters
Universal	TP1 TP2	Variable	9600 baud, 8 data bits, 1 Stop bit, No parity

DRIVER DESIGNATION **(16, 2) : DIVERS > TP1**
(16, 4) DIVERS > TP2
SUPPORTED DATA TYPES : DW

WIRING LIST

RS232

Signal	Pin		Pin	Signal
RxD	2	———		TxD
TxD	3	———		RxD
SG	5	———		SG

MPB-TP (9 pol male) — Variabel

RS422

Signal	Pin		Pin	Signal
RDA	2	———		TxD+
SDA	3	———		RxD+
SG	5	———		SG
SDB	7	———		RxD-
RDB	8	———		TxD-

MPB-TP (9 pol male) — Variabel

RS485

Signal	Pin		Pin	Signal
A	3	———		A
SG	5	———		SG
B	7	———		B

MPB-TP (9 pol male) — Variabel

NOTES

- The TP protocols are open interfaces to the MPB-TP and enable data exchange with any PLC provided with programmable interfaces.
- The major difference between the two protocols (TP1 and TP2) is that TP1 transfers individual values and TP2 data blocks.

  For this see the following sections.
- The protocol does not require a hardware handshake and can be used with any interface.
  The final wiring to your PLC must be made according to the physical interface (see WIRING LIST).

6.16.1 Data transfer protocol

The data exchange between the PLC and the MPB is carried out only on request.

Two different commands are provided for this. which are each initiated by an STX (02_h).

40_h : Send (MPB sends data to the PLC)
44_h : Receive (MPB expects data from the PLC)

The Send command is only initiated by the MPB if new values are detected from the application for the PLC data.

The Receive command is processsed normally by the MPB cyclically (approx. every 100 ms) each time data is polled by the PLC from the application.

When using the TP1 protocol, each data word is transferred individually of the TP2 protocol data blocks (n-bytes).

6.16.2 Control characters

RECEIVE : 44_h Data direction -> MPB
SEND : 40_h Data direction MPB -> PLC
STX : 02_h Start transmission
ETX : 03_h End end transmission
NAK : 15_h Command or data invalid
ACK : 06_h Command or data valid
CR : $0D_h$ String end (only for TP1 protocol)

6.16.3 Data format

When using the TP1 protocol, all data words and addresses are transferred as ASCII hex strings.

Addresses are fixed bytes 000_h..800_h
Values are 4 bytes 0000_h..$FFFF_h$
Each of these hex strings are completed with a CR (0dh).

Examples:

Decimal	Hexadecimal	Hexadecimal String
2368	0940_h	30_h 33_h 34_h 30_h
17238	4356_h	34_h 33_h 35_h 36_h
-15364	$C3FC_h$	43_h 33_h 46_h 43_h

When using the TP2 protocol, all data words and addresses are transferred as 2 bytes with the HI byte being transferred before the LO byte.

The TP2 protocol is considerably more efficient than the TP1 protocol. However, it is more difficult to implement the TP2 protocol in some programmable controllers.

6.16.4 Troubleshooting

If the MPB receives no response from the PLC after a delay (VZ) of up to 500ms (Timeout) after STX the request (STX) is re-started.

If the command was not detected from the PLC (RECEIVE or SEND) or if another error is present in the data package, the PLC must send a NAK (15_h) within a VZ.

If the MPB does not receive a NAK or another character as ACK (06_h) within a VZ, the request is started.

6.16.5 Send TP1 procedure command

MPB	PLC	REMARKS
STX (02h)		Start transfer
	ACK (06h)	PLC ready
SEND (40h)		Data direction MPB -> PLC
D_NR		Data word number (0..2048)
CR (0Dh)		String end
D_VAL		Value of the data word
CR (0Dh)		String end
ETX (03h)		End transfer
CHK		Checksum (Addition of all bytes from SEND to incl. ETX)
	ACK (06h)	Data received

6.16.6 Send TP2 procedure command

MPB	PLC	REMARKS
STX (02h)		Start transfer
	ACK (06h)	PLC ready
SEND (40h)		Data direction MPB -> PLC
ADR_HI		HI byte start address
ADR_LO		LO byte start address
BYTE COUNT		Number of data bytes
DATA0_HI		HI byte 1st data word (1st byte)
DATA0_LO		LO byte 1st data word (2nd byte)
DATA1_HI		HI byte 2nd data word (3rd byte)
DATA1_LO		LO byte 2nd data word (4th byte)
...		(max.no “BYTE COUNT”)
ETX (03h)		Transfer end
CHK		Checksum (addition of all bytes SEND to and incl. ETX)
	ACK (06h)	Data received

6.16.7 Notes

The MPB awaits the first ACK (06_h) within VZ in response to a send request to send data.

If this is the case, the data and checksum are then transferred. If not, the MPB repeats the request with STX (02_h).

If the MPB receives the second ACK after sending the data, the data is considered as having been correctly transferred and the transfer is finished.

If the VZ has elapsed or a different character to ACK is received, the transfer is restarted.

These notes also apply to the "RECEIVE" command.

6.16.8 Receive TP1 procedure command

Troubleshooting see also 6.16.4 and 6.16.7

MPB	PLC	REMARKS
STX (02h)		Start transfer
	ACK (06h)	PLC ready
RECEIVE (44h)		Data direction PLC -> MPB
D_NR		Data word number (0..2048)
CR (0Dh)		String end
ETX (03h)		Transfer end
CHK		Checksum (addition of all bytes from RECEIVE to and incl.ETX)
	STX (02h)	Header correct, transfer start
	D_VAL	Value of data word
	CR (0Dh)	String end
	ETX (03h)	Transfer end
	CHK	Checksum (Addition of all bytes from D_VAL to and incl. ETX)

6.16.9 Receive TP2 Procedure command

Troubleshooting see also 6.16.4 and 6.16.7

MPB	PLC	COMMENTS
STX (02h)		Start transfer
	ACK (06h)	PLC ready
RECEIVE (44h)		Data direction PLC-> MPB
ADR_HI		HI byte Start address
ADR_LO		LO byte Start address
BYTE COUNT		Number of data bytes
ETX (03h)		End transfer
CHK		Checksum (Addition of all bytes from RECEIVE to and incl. ETX)
	STX (02h)	Header correct, start transfer
	DATA0_HI	HI byte 1st Data word (1st Byte)
	DATA0_LO	LO byte 1st Data word (2nd Byte)
	DATA1_HI	HI byte 2nd Data word (3rd Byte)
	DATA1_LO	LO byte 2nd Data word (4th Byte)
	...	(max. number “BYTE COUNT”)
	ETX (03h)	Transfer end
	CHK	Checksum (addition of all bytes from D_VAL to and incl. ETX)

6.16.10 Special note

The PLC should not be processing any time consuming functions during the transfer operation (after ACK was sent) in order to ensure that data is not lost. The MPB sends in this phase 1 byte to the PLC every 1ms.

Complex tasks should be processed before an ACK is sent in response to a transfer start (MPB sends STX).

This is necessary since no hardware handshake is activated and therefore data can be overwritten.

6.16.11 Implementation aids

In order to simplify implementation, we have written programs for IBM-PCs which simulate your PLC and the MPB itself.

TP.EXE / TP.PAS	Exec and Source Code, Simulation of a PLC with TP1 Protocol
TP2EXE / TP2PAS	Exec und Source Code, Simulation of a PLC with TP2 Protocol
TP2SIM.EXE	Simulates an MPB with TP2 Protocol; Can be very useful in order to test your own PLC driver with MPB.

Further information is provided in the README file on diskette.

6.17 Seitec

SEITEC

PLC Typ	Protokoll	PLC Port	Parameter
GLT	ISYGLT	GLT-Bus	9600 or 38400 Baud 8 data bits, 1 stop bit, Parity Programmed

DRIVER DESIGNATION **(9, 2) : USER > GLT 9600**
(9, 4) : USER > GLT 38400
SUPPORTED DATA TYPES : DW

WIRING LIST

RS485

Signal	Pin		Pin	Signal
A	3	———		A
SG	5	———		SG
B	7	———		B
MPB-TP (9 pol male)			GLT-Bus	

NOTES

- The MPB-TP interface via GLT-Bus requires the use of a spezific module for interpreting incoming data and copy it to the appropriate markers.

  Example : MODULE 1 MDP/B ; MPB-TP is awaiting on station 1
- This module is a component of the PLC firmware and need no further programming.
- The station number via which the MPB-TP must report within the network must match the module number in the PLC program.
- The PLC must be in Run state for active communication.
- If there are more than one MPB-TP in the network, every MPB-TP must have his own station number.
- There are two drivers available one for 9600 Baud and one for 38400 Baud.

  Importend : Take care that every module have the same baudrate !
- Also ensure when using RS485 that the first and the last station in the network have their bus terminating resisitors switched on.