Premium PLCs
TSX 57/PCX 57
Communication
Network and Bus Interfaces
Installation manual Volume 4

TSX DM 57 xx eng

Document Set

At a Glance

This documentation is made up of 5 Volumes:
- Volume 1
  - Racks/Supplies/Processors
  - Implementation/Diagnostics/Maintenance
  - Standards and operating conditions
  - Process supply
- Volume 2
  - Discrete interfaces
  - Safety
- Volume 3
  - Counting
  - Motion control
- Volume 4
  - Communication
  - Network and bus interfaces
- Volume 5
  - Analog
  - Weighing

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About the Book

At a Glance

Document Scope

This manual describes how to install network and bus interfaces on PLCs from the Premium and Atrium range.
It is made up of 7 sections:

1. Communication on the processor’s terminal port
2. FIPIO communication master integrated into processors
3. AS-i bus interface: **TSX SAY 100**module
4. AS-i bus interface: **TSX SAY 1000**module
5. Communication: **TSX SCY 21601** module and PCMCIA cards
6. Communication: **TSX ETY 110/410/PORT/510** modules
7. Communication: **TSX MDM 10** PCMCIA Modem card

User Comments

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Terminal Port Communication

I

At a Glance

Aim of this Part

This part introduces the communication function via the Terminal Port for Premium and Atrium processors

What's in this Part?

This part contains the following chapters:

Terminal Port

1

At a Glance

Aim of this Chapter

This Chapter introduces the functions of the Terminal Port for Premium and Atrium processors.

What's in this Chapter?

This chapter contains the following sections:

1.1 Introduction to the terminal port

At a Glance

Aim of this Section

This Section introduces the communication function from the Terminal port of a PLC.

What's in this Section?

This section contains the following topics:

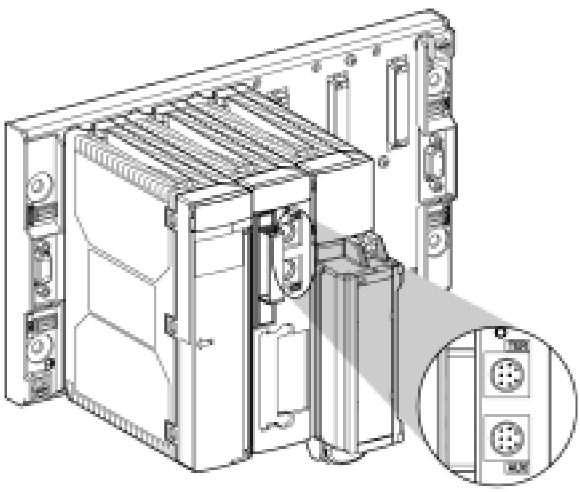
Introduction to the terminal port

At a Glance

As the terminal port uses master UNI-TELWAY, slave UNI-TELWAY and character string communication methods; the following documentation must be referred to for installing the hardware and software for these different methods of communication:
- TSX DG UTW E: UNI-TELWAY Bus communication (user guide).
- TSX DR NET E: X-WAY communication (reference manual).
- TLX DS COM PL7 xx E: Micro/Premium PLC communication (software installation manual).

Premium PLCs

The terminal port on Premium processors is a non-insulated RS 485 link made up of two 8-pin mini-DIN connectors. These two connectors function identically and are found on the processor. They are marked with TER and AUX and are used to physically connect two pieces of equipment together at the same time, such as a programming/adjustment terminal and a man-machine interface console.
Illustration:



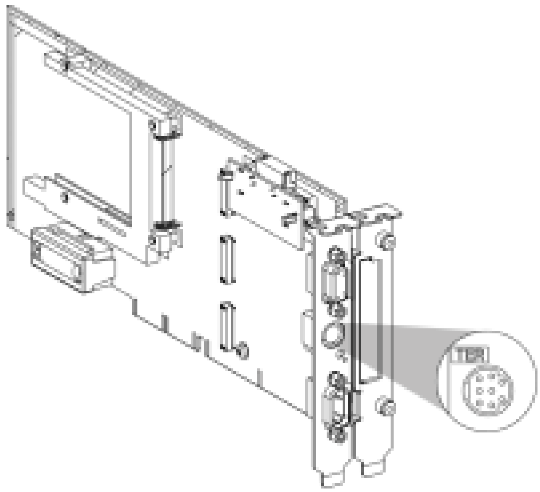
The TER connector also allows power to be supplied to a device which does not have its own power supply (RS 485/RS 232 connecting cable converter, insulating device **TSX P ACC 01** (See *TSX P ACC 01 device, p. 47*), etc).

The terminal port functions by default in master UNI-TELWAY mode. Via configuration it is possible to switch to UNI-TELWAY slave or character mode.

Note: The communication mode (e.g. master UNI-TELWAY, UNI-TELWAY slave or character mode) is the same on both the TER and AUX connectors.

Atrium PLCs

Atrium processors have one single TER terminal port which is identical in all respects to the TER terminal port on Premium PLCs. This is a non-insulated RS 485 link which is made up of a 8-pin mini DIN connector which is used to physically link up a device, such as a programming/adjustment terminal or a man-machine interface console.
Illustration:



This connector is used to supply power to a device which does not have its own power supply (connecting cable converter RS 485/RS 232, insulating device **TSX P ACC 01** (See *TSX P ACC 01 device, p. 47*), etc).

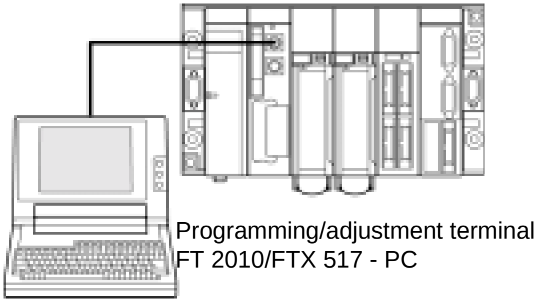
The terminal port functions by default in master UNI-TELWAY mode. Via configuration it is possible to switch to UNI-TELWAY slave or character mode.

Note: Using a **TSX P ACC 01** insulating device makes it possible to duplicate the terminal port in order to use two TER and AUX ports like on the Premium PLC processor

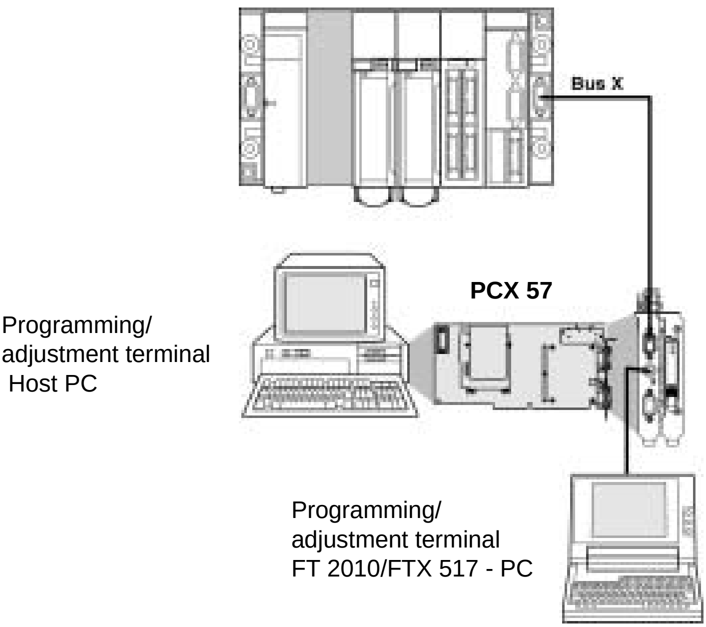
Communication with a programming/adjustment terminal

General

Configured in master UNI-TELWAY (default function), the terminal port is used to connect a programming/adjustment terminal.
Premium station:



Atrium station:

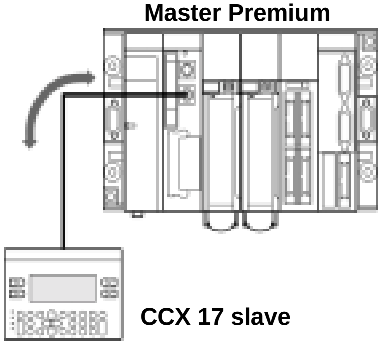


Note: When using an Atrium Station, the programming terminal is generally the PC which accepts the PCX 57 processor. However, as for a Premium station, the programming terminal can also be a PC type terminal connected to the processor port.

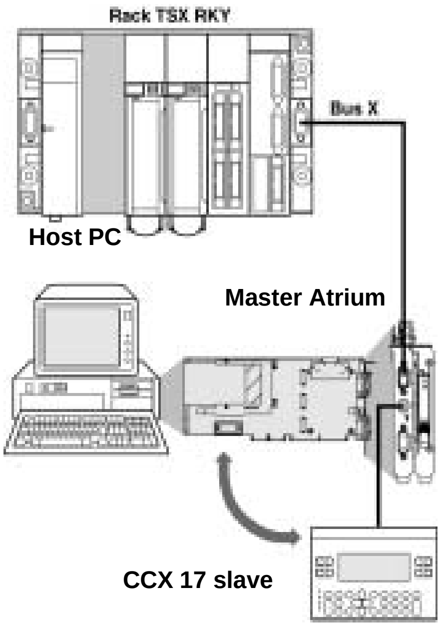
Communicating with a man-machine interface console

General

Configured in master UNI-TELWAY mode (default function), the terminal port makes it possible to manage man-machine interface device.
The man-machine interface device uses UNI-TE protocol to communicate with the local PLC and the other stations on the network architecture.
When using a Premium PLC, the man-machine interface terminal should be connected to the AUX connector in order to free the TER connector for possible connection of a programming/adjustment terminal.
Premium station:



Atrium station:

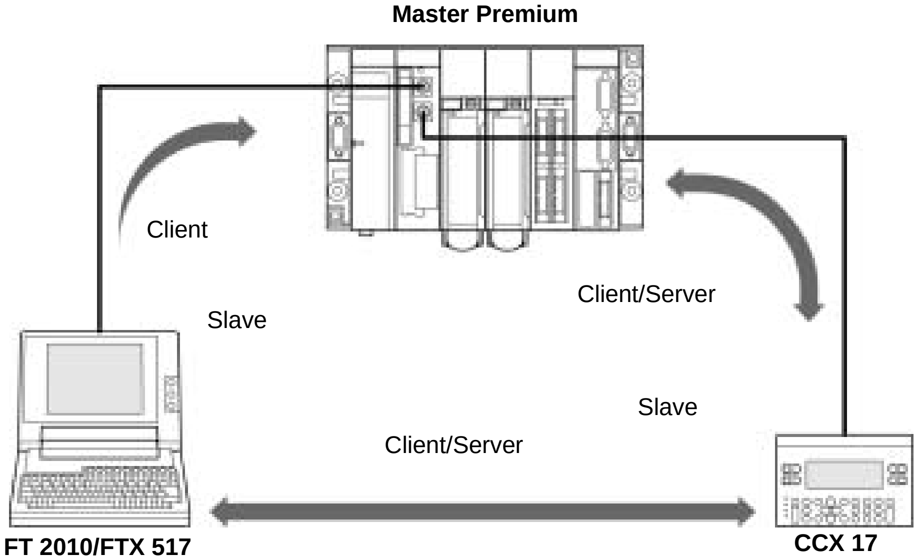


UNI-TELWAY master/slave communication

General

The default communication mode for the terminal port is master UNI-TELWAY. It is mainly used to link up a programming terminal and a slave man-machine interface console.

Illustration:



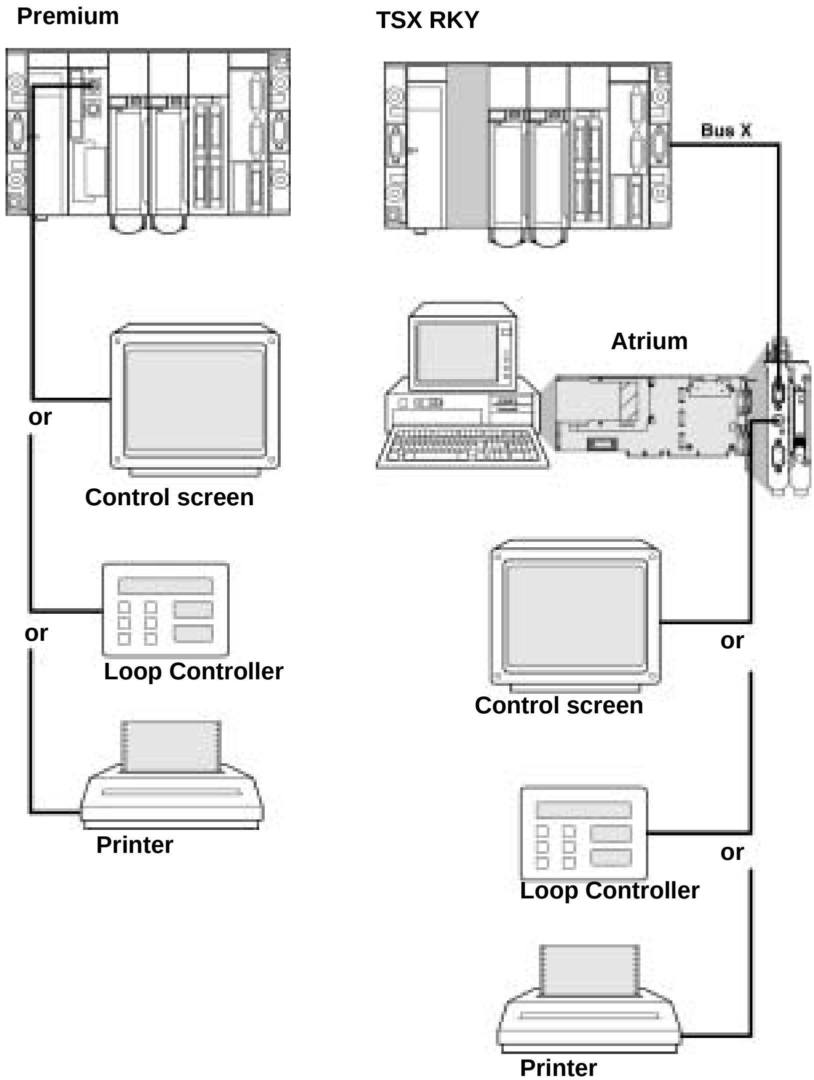
> **Note:** When using an Atrium PLC or if the processor only has one terminal port, this type of connection can be made by using a **TSX P ACC 01 device.** (See *TSX P ACC 01 device, p. 47*)

Character string communication

General

This mode is used to connect up a printer or specialized console (screen control, table controller etc.) to the terminal port of a Premium or Atrium PLC.

Illustration



1.2 Connections

At a Glance

Aim of this Section

This Section deals with the different connections of the Terminal port.

What's in this Section?

This section contains the following topics:

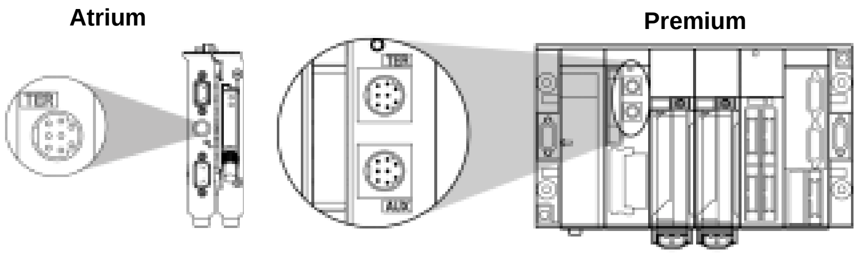
Connections

General

The connector marked TER is used to connect any device which supports UNI-TELWAY protocol, in particular devices which do not have their own power supply (RS 485/RS 232 connector cable converters, **TSX P ACC 01** (See *TSX P ACC 01 device, p. 47*) isolation device, etc).
The connector marked AUX (only on Premium PLCs) only enables devices which have a power supply to be connected (eg. man-machine interface console, third-party devices, etc).
The terminal port has three function modes:

- Master UNI-TELWAY (default configuration)
- Slave UNI-TELWAY
- Character string

Illustration:



Note: For Premium PLCs with two connectors (TER and AUX), the operating mode defined in configuration (master UNI-TELWAY, slave UNI-TELWAY, character mode) is the same for both connectors.

Methods of connection

According to the operating mode selected in configuration, the terminal port is used to connect:

- Premium PLC programming and adjustment terminals
- Man-machine interface devices
- Another PLC, using the **TSX P ACC 01** connection device
- UNI-TELWAY devices (sensors/actuators, speed controller etc.)
- A printer or a control screen (link in character string mode)
- A modem

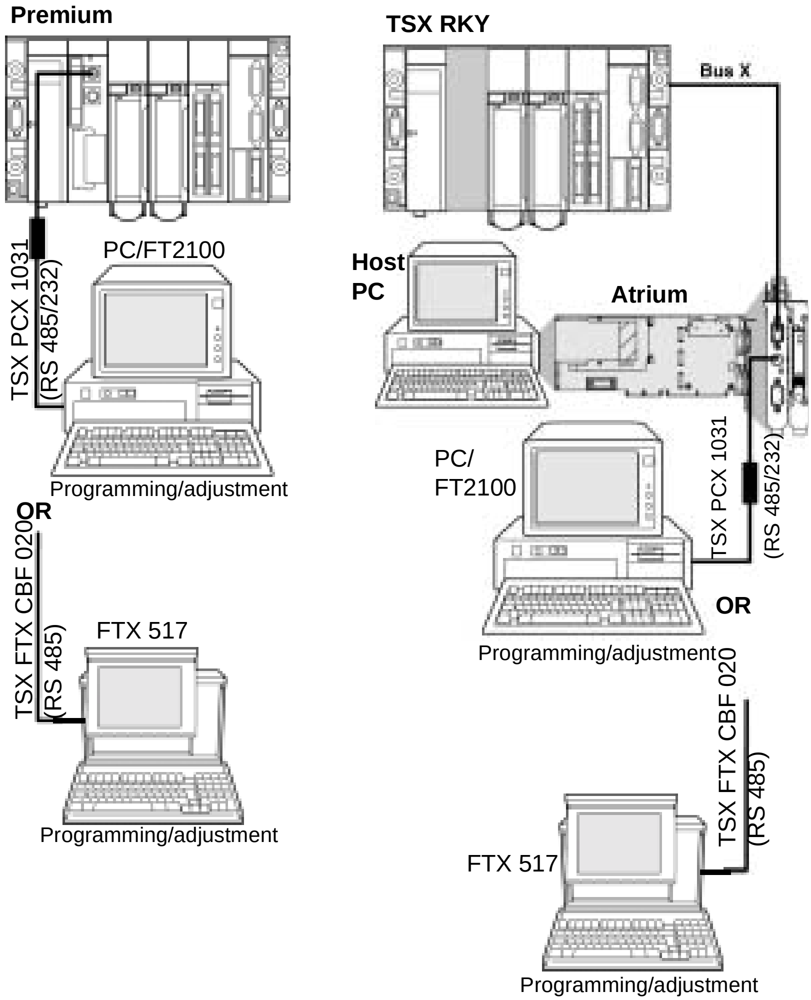
Note: Connecting a Premium/Atrium PLC slave to a UNI-TELWAY Bus requires the use of a **TSX P ACC 01** device.

Programming/Adjustment terminal

General

Terminals with their own power supply (FTX 417, FTX 517) can be connected to both TER and AUX connectors on Premium processors.
If a terminal does not have its own power supply, it must be connected to the processor TER connector.
The programming terminal uses UNI-TE protocol to program, adjust or diagnose the local PLC and all the station devices.
If the PLC is connected to a network architecture, the transparency network enables the programming terminal to reach all the devices in the architecture.
The product reference for the different connection cables is given below.

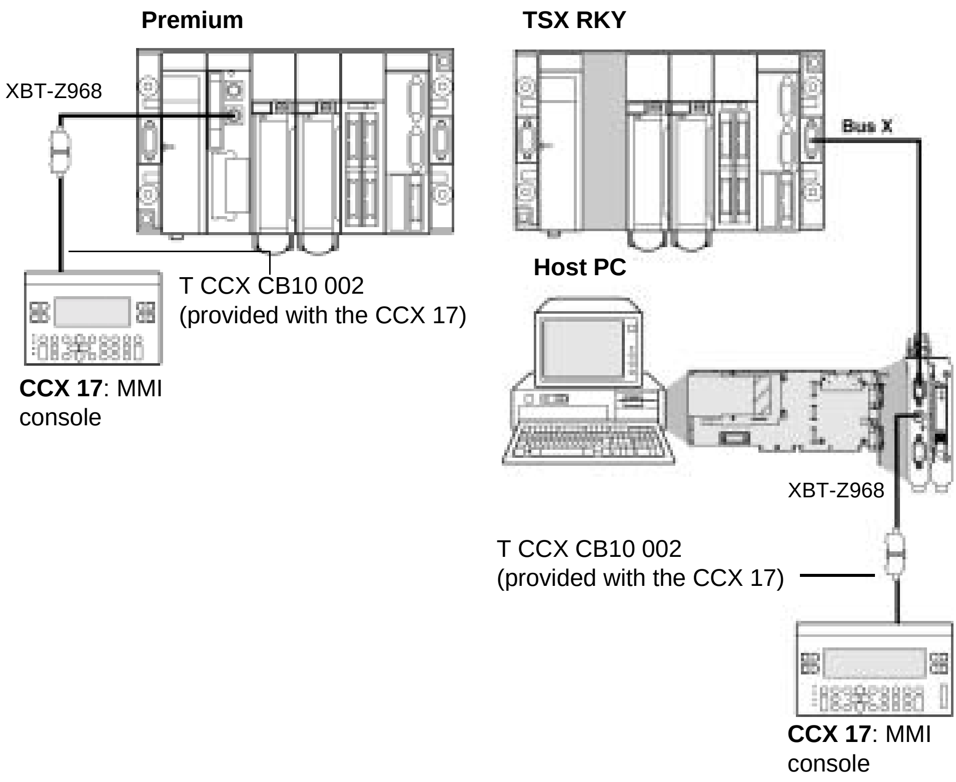
Examples of connection:



Man-machine interface console

General

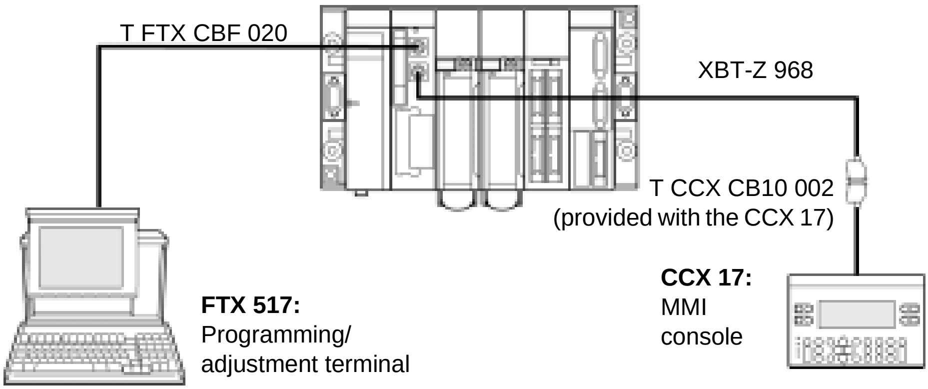
The man-machine interface device uses UNI-TE protocol to communicate with the local PLC and the other stations in the network architecture.
A man-machine console with its own power supply on a Premium PLC must be connected to the AUX port in order to leave the TER port free for a terminal which needs a power supply (FTX 117 Adjust for example).
The product references for connector cables between the terminal port and a CCX 17 man-machine interface console are given below.
Examples of connection:



Programming/adjustment terminal and man-machine interface console

General

The terminal port on a Premium processor can manage two devices in multidrop: the programming/adjustment terminal and an man-machine interface console.
Each of the two connectors on the processor can receive one of these devices.
Examples of connection:



Note: Each connected terminal can be disconnected without disrupting the operation of the other. For an Atrium PLC or if the processor only has one terminal port, this type of connection can be made by using a **TSX P ACC01** (See *TSX P ACC 01 device, p. 47*) device.

Modem on terminal port

General

The terminal port on Premium PLCs is compatible with a modem connection in all protocols: Master UNI-TELWAY, Slave UNI-TELWAY and Character string.

Modem characteristics

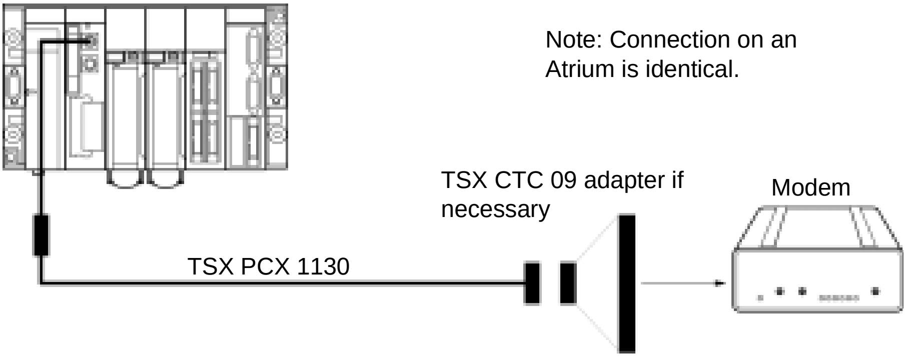
The modem which is to be connected must have the following characteristics:

1. Support 10 or 11 bits per character if the terminal port is used in UNI-TELWAY mode:
   - 1 bit for Start
   - 8 bits of Data
   - 1 bit for Stop
   - Odd parity or without parity
2. Operate without any data compression if the terminal port is used in UNI-TELWAY.
3. Be able to be "forced DTR signal" configured for its RS 232 serial port (if the modem is used in response mode), as this signal is not connected by the cable.
4. Operate without flow control (neither hardware: RTS/CTS, or software: XON/XOFF) for its RS 232 serial port, as the cable to be used for the terminal port can only carry TX, RX and GND signals.
5. Operate without data carrier check. Warning: this operating mode also uses RTS and CTS control signals.
6. Accept an incoming telephone call while characters arrive at its RS 232 serial port (if a modem/telephone network is used in response mode on a terminal port configured in master UNI-TELWAY).

Note: It is **strongly recommended** that you check with your dealer that the above-mentioned characteristics are offered by the intended modem.

Examples

Connecting to a Premium PLC:



- In Master UNI-TELWAY mode with the terminal port connected to a modem/ telephone network in response mode, this modem must have all the above characteristics (1 to 6).
- In character string mode with the terminal port connected to a modem via a specialized line, this modem must have the characteristics of 3 to 5 above.

Configuring the terminal port

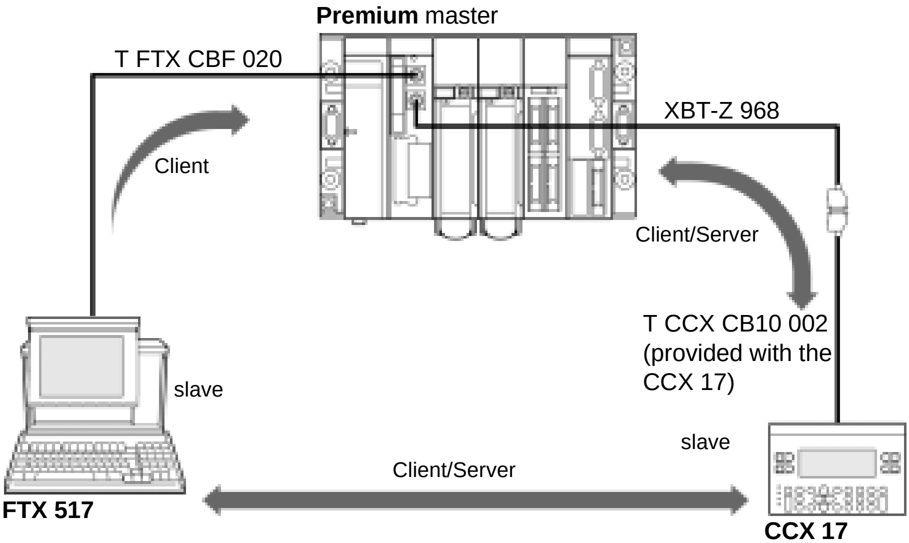
In UNI-TELWAY mode the following parameters must be observed and set in the configuration in PL7 software:
- The wait timeout must be between 100 and 250 ms
- In master mode the number of configured slaves must correspond to the actual number of slaves present on the bus.
- In slave mode the number of addresses must correspond to those used.

Master UNI-TELWAY

General

This is the terminal port default operating mode. It is principally used for:
- Connecting a programming/adjustment terminal and a man-machine interface console if a Premium PLC is used.
- Connecting a programming/adjustment terminal or man-machine interface console in the case of an Atrium PLC with only one terminal port.

Examples of connection:



> **Note:** In the case of an Atrium station where the processor only has one terminal port, this type of connection can be made by using a **TSX P ACC 01**

Important information

The master can scan up to eight link addresses:
- Link addresses 1,2 and 3 are reserved for the programming terminal.
- The five other addresses are available for connecting a device such as a man-machine interface, slave PLC, sensors/actuators or any other slave device which supports UNI-TE protocol. Addresses 4 and 5 are reserved for a man-machine interface console, it one is used (addresses are forced by using a **XBT-Z 968** cable).

This functioning mode is immediately operational. Within the limits of the default configuration, no installation phase is required to connect a device to this type of link.

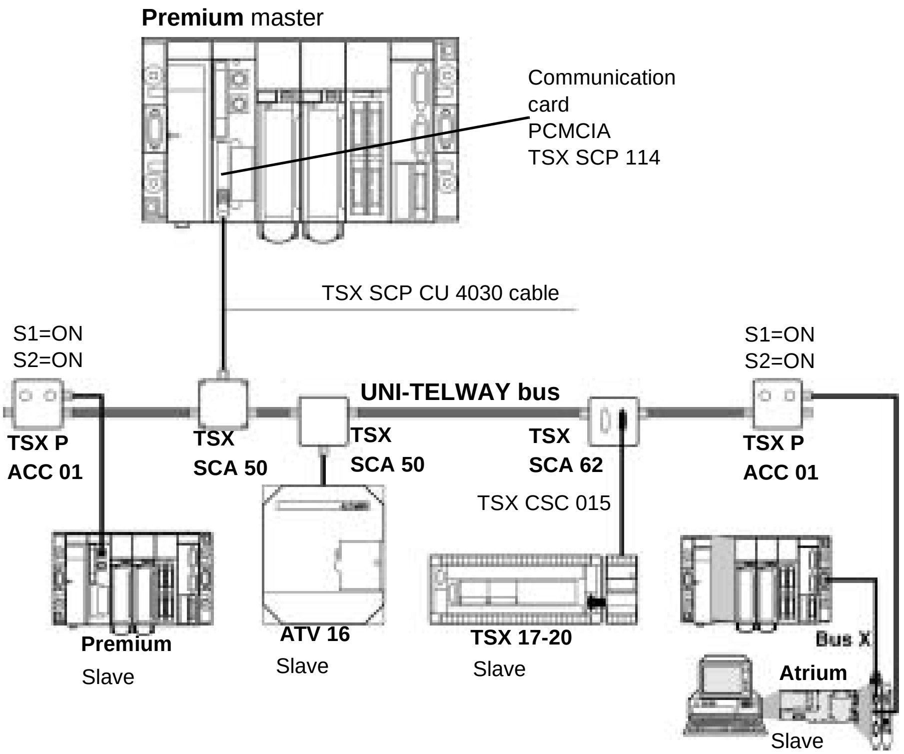
Slave UNI-TELWAY

General

The UNI-TELWAY slave protocol of the terminal port is used to build a slave Premium or Atrium PLC into a UNI-TELWAY bus managed by a Premium or Atrium PLC (PCMCIA communication card or terminal port).

For this connection to be possible it is essential to use a **TSX P ACC 01** connection device.

Examples of connection:



A slave PLC manages up to three consecutive link addresses:

- Ad0 (system address
- Ad1 (client application address)
- Ad2 (listen application address)

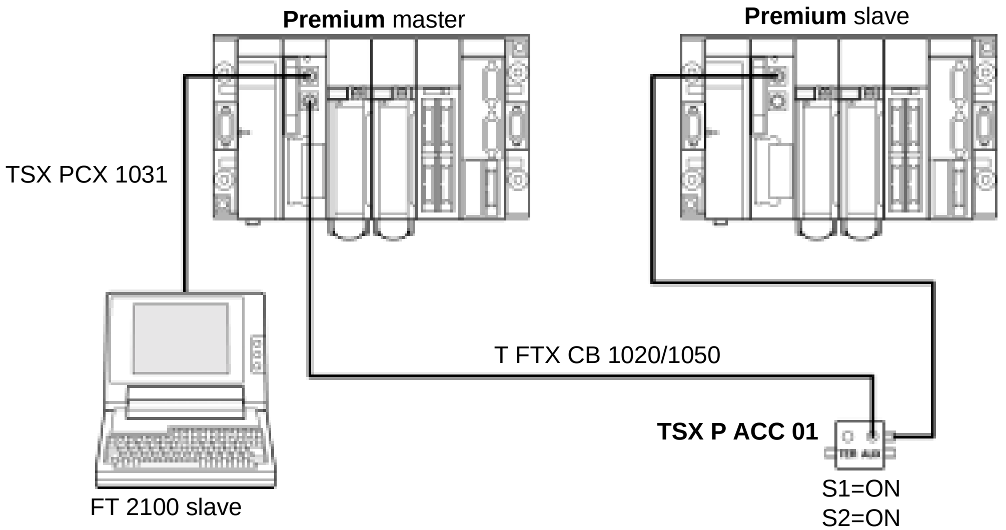
Inter-PLC UNI-TELWAY

General

The terminal port on Premium processors allows two PLCs to be connected, one the master and the other the slave.
For this connection to be possible it is **essential** to use a **TSX P ACC 01** (See *TSX P ACC 01 device, p. 47*) connection device. The different options for connecting this device are given later.

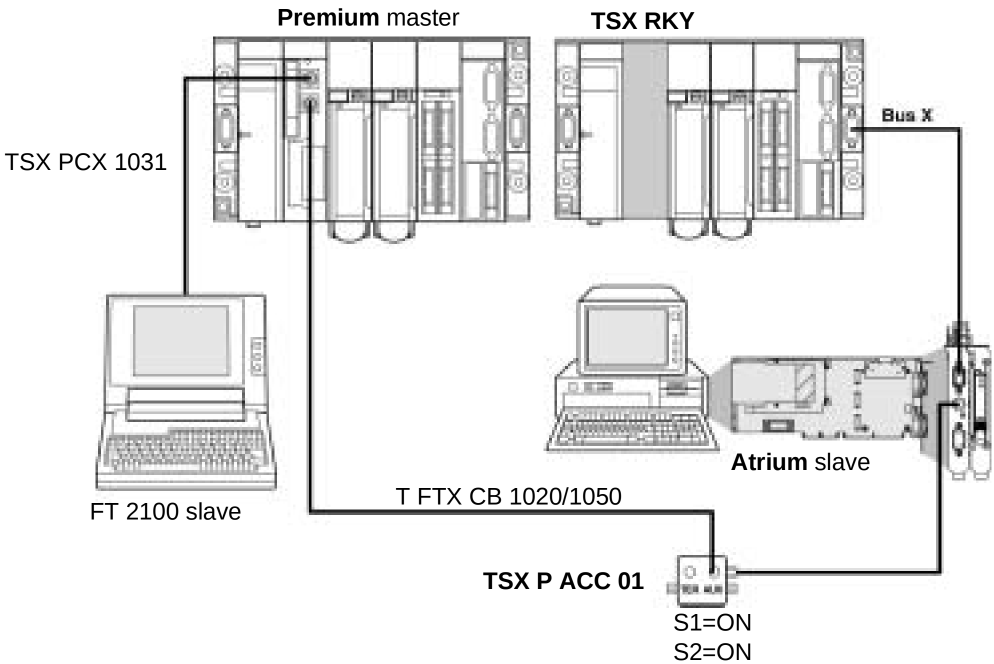
Example of connecting two Premium PLCs

Illustration:



Example of connecting a Premium PLC and an Atrium PLC

Illustration:



Inter-device UNI-TELWAY

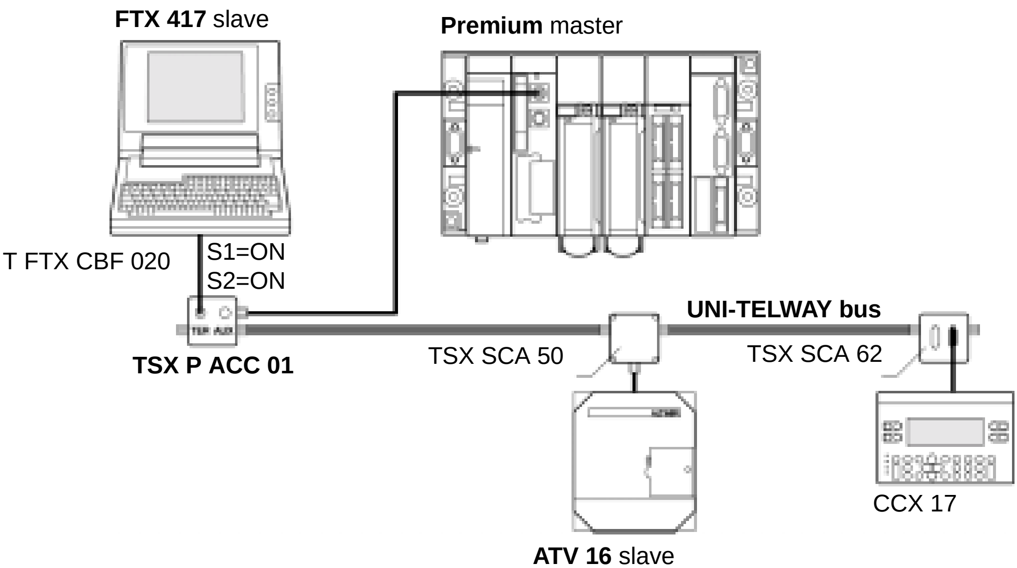
General

The terminal port on Premium/Atrium PLCs enables them to be connected to a UNI-TELWAY bus in order to communicate with devices such as speed controllers, sensor/actuators or with other PLCs

Connecting a Premium/Atrium (master or slave) PLC to a UNI-TELWAY bus requires the use of a **TSX P ACC 01** (See *TSX P ACC 01 device, p. 47*) device.

Example

Examples of connection:



The connected devices communicate with the PLC using UNI-TE protocol.

Communication between the different components is allowed.

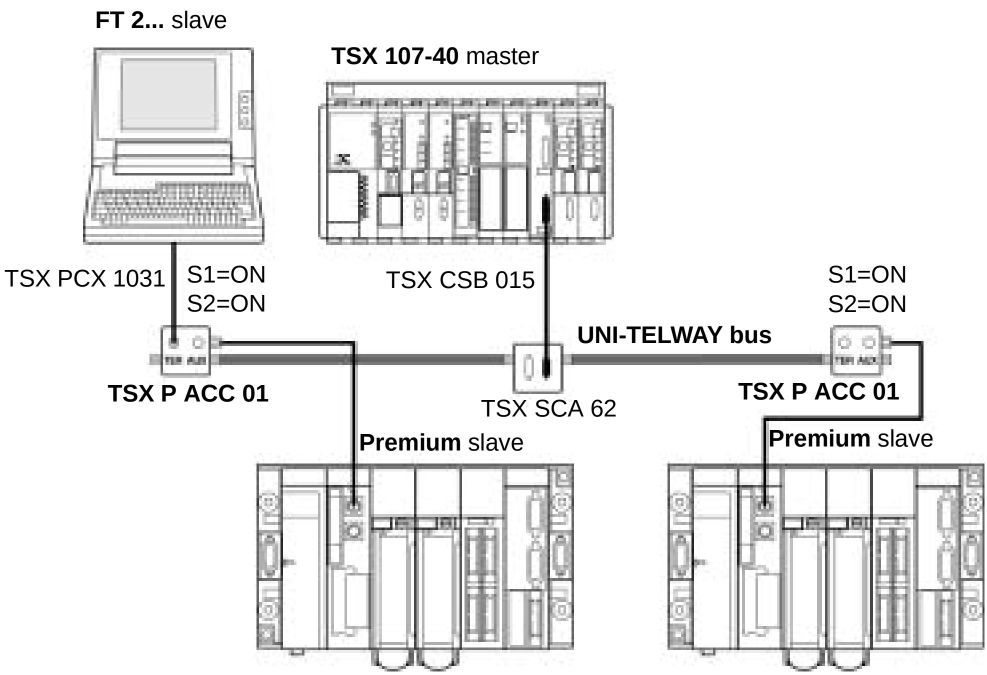
The programming terminal can directly access all these devices to carry out adjustments and diagnostics functions.

Note: To install **TSX SCA 50** and **TSX SCA 62** devices, consult the TSX DG UTW manual: *UNI-TELWAY Bus communication.*

Master PLC type TSX model 40

General

A TSX/PMX model 40 PLC can also be configured in master mode on a UNI-TELWAY bus and can control slave Premium/Atrium PLCs
Example of connection

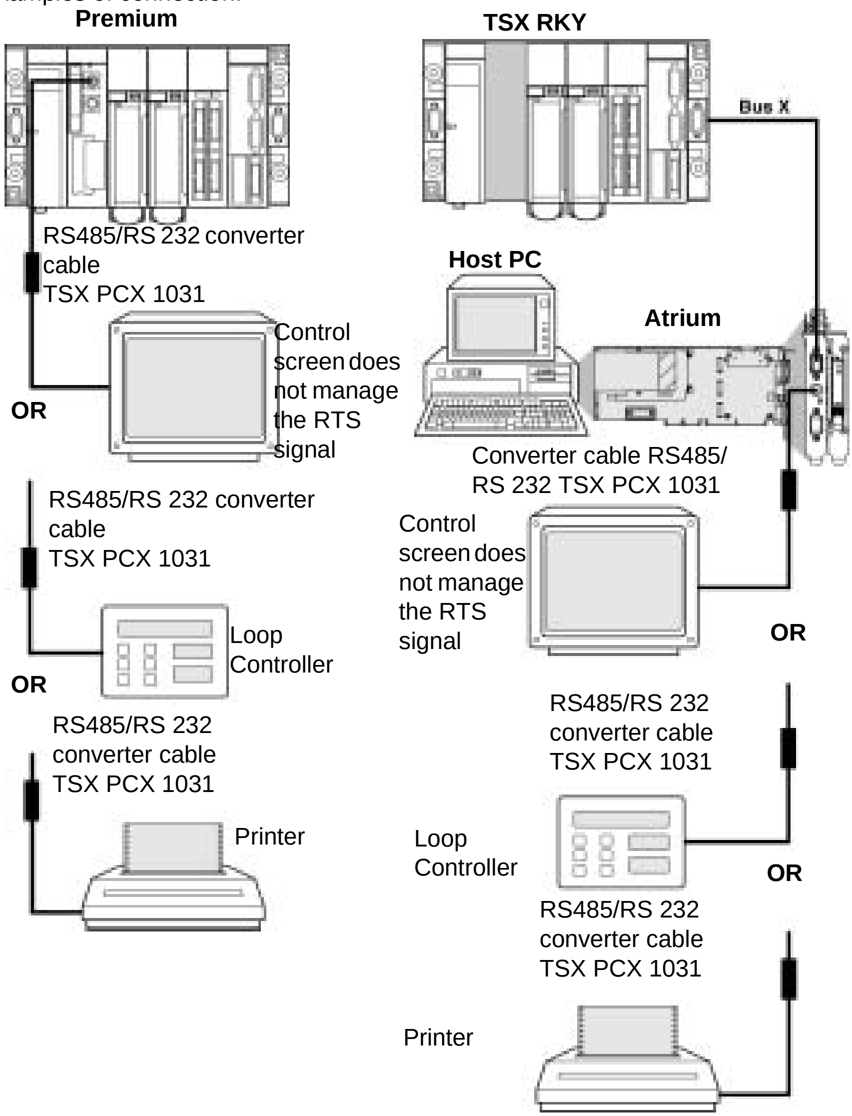


> **Note:** To install **TSX SCA 50** and **TSX SCA 62** devices, consult the TSX DG UTW manual: *UNI-TELWAY Bus communication*

Character String

General

The terminal port, when configured in character mode, can be used to connect a device such as a printer, display screen or a specialized console (table controller for example).
Examples of connection:



Note: In order to ensure all types of connection **TSX PCX 1031 and TSX PCX 1130** cables are delivered with adapters:
- The **TSX PCX 1031** cable is delivered with two adapters/converters:
  - **TSX CTC 07**: male 9-pin to female 25-pin.
  - **TSX CTC 08**: male 9-pin to male 25-pin.
- The **TSX PCX 1130** cable is delivered with one adapter/converter:
  - **TSX CTC 09**: male 9-pin to male 25-pin.

Precautions of Use

The **TSX PCX 1031** cable ensures RS 485/RS 232 conversion and provides 'peripheral slave' information for the printer. It does not function on the AUX port and **the connected device must manage the RTS signal.**
To use the **TSX PCX 1031** cord, one of the following TER port configurations must be used:
- 7 data bits + 1 or 2 stop bits + 1 parity bit,
- 7 data bits + 2 stop bits,
- 8 data bits + 1 stop bit or 1 parity bit,
- 8 data bits + 2 stop bits.

The **TSX PCX 1031** and **TSX PCX 1130** cables should only be connected to the PLC's TER port in order to supply power to the RS 485/RS 232 conversion desktop. To avoid signal conflicts, no devices should be attached to the PLC's AUX port.

Summary table of terminal port connections

General

The table below can be used to define the cable linking terminal port connectors of a Premium/Atrium PLC to peripheral devices.

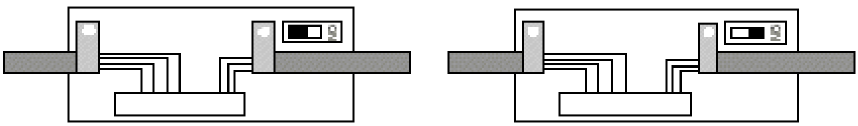
Connection cable	TER Port	AUX Port	Example of connected devices
TSX CB 1020 **TSX CB 1050**		X	**TSX P ACC 01**
T FTX CBF 020	X	X	FTX 517, FTX 417
TSX PCX 1031	X		FT 2100, RS 232 programming and adjustment terminals
TSX PCX 1031	X		Graphics terminals and printers managing RTS signal
XBT-Z938	X	X	CCX 17, XBT
TSX P ACC 01	X		Connection to UNI-TELWAY
TSX PCX 1031	X		Devices not managing RTS signal DTE<-->DTE type: RS 232 programming terminals, printers
TSX PCX 1130	X		Devices not managing RTS signal DTE<-->DCE type: Modem

Adjustment of cables TSX PCX 1031 and TSX PCX 1130

The two cables **TSX PCX 1031** and **TSX PCX 1130** convert RS 485 and RS 232 signals. They authorize the connection of the terminal port to RS 232 devices which do not manage RTS.
Both are equipped with a switch which enables the PLC to be positioned in either Master of Slave mode. The switch is accessible internally by removing the metal cover containing the electronics.
The management of the switch is as follows:

	PL7 Master UNI-TELWAY configuration	**PL7 Slave UNI-TELWAY configuration**	**PL7 character mode configuration**
Switch position M	UNI-TELWAY Master with PL7 configuration	UNI-TELWAY Master with default configuration	UNI-TELWAY Master with default configuration
Switch position S	UNI-TELWAY Slave with default configuration	UNI-TELWAY Slave with PL7 configuration	Character Mode with PL7 configuration

Illustration:



Master mode M   Slave mode S

1.3 Appendices

At a Glance

Aim of this Section

This Section contains the appendices relating to the Terminal port.

What's in this Section?

This section contains the following topics:

Characteristics of the terminal port

General

The following table describes the characteristics of the terminal port:

		UNI-TELWAY mode (master or slave)	Character Mode
Structure	Physical interface	non-isolated RS 485	non-isolated RS 485
Transmission	Protocol	Master/slave multidrop	No protocol
	Binary rate	19,200 bits/s by default, modifiable from 1,200 to 19,200 bits/s (1 start bit; 8 data bits; even, odd or no parity; 1 stop bit).	9,600 bits/s by default, modifiable from 1,200 to 19,200 bits/s (7 or 8 data bits; even, odd or no parity; with or without echo).
Configuration	Number of devices	Maximum eight (eight addresses managed by the master). In slave mode, addresses 4, 5, 6 are selected by default. In master mode, the reserved addresses are: ● 1, 2 and 3 for the programming terminal ● 4 and 5 if a CCX 17 is present The other addresses are available.	One (point to point) device
	Length	10 meters maximum	10 meters maximum
Utilities	UNI-TE	Point to point requests with maximum 128-byte reports at the initiative of every connected device. There is no broadcast at the initiative of the master.	Maximum 120-byte character string. Messages must end with $0D (carriage return).
	Other functions	Transparent communication between all devices within a network architecture via the master.	-
	Safety	A control character on each frame, acknowledgement and possible repetition.	No error reported.
	Monitoring	Table indicating bus state, device states and error counters accessible on slaves	No flow control.

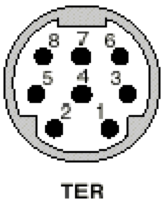
Note: Using a **TSX P ACC 01** (See *TSX P ACC 01 device, p. 47*) connection device means the RS 485 link can be used in isolated mode.

Note: We strongly recommend that, after use, you do not leave a TSX PCU 103• or TSX PCX 1031 cable connected to the Uni-telway bus at one end and unconnected at the other.

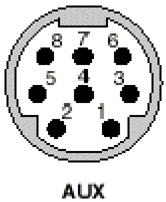
Terminal port connector pin configuration

General

The terminal port connectors marked TER and AUX are 8-pin mini-DIN which can be locked.
The signals are given below:



1 D (B)
2 D (A)
3 not connected
4 /DE
5 /DTP (1 = master)
6 not connected
7 0 volt
8 5 volts



1 D (B)
2 D (A)
3 not connected
4 /DE
5 /DTP (1 = master)
6 not connected
7 0 volt
8 not connected

Note: The operation of the terminal port depends on two parameters:
- Signal status/DTP (0 or 1), fixed by cabling accessory (**TSX P ACC 01** cable).
- Software configuration of the terminal port defined in PL7.

The table below defines the functioning mode of the terminal port according to these two parameters:

PL7 configuration	Signal /DTP = 0	Signal /DTP = 1
Master UNI-TELWAY	Terminal port in UNI-TELWAY slave mode (default)	Terminal port in UNI-TELWAY master mode
Slave UNI-TELWAY	Terminal port in UNI-TELWAY slave mode	Terminal port in UNI-TELWAY master mode (default)
Character mode	Terminal port in character mode	Terminal port in UNI-TELWAY master mode (default)

TSX P ACC 01 device

2

At a Glance

Aim of this Chapter

This Chapter introduces the functions of the **TSX P ACC 01** connection device.

What's in this Chapter?

This chapter contains the following sections:

2.1 At a Glance

At a Glance

Aim of this Section

This Section describes the general characteristics of the **TSX P ACC 01** device.

What's in this Section?

This section contains the following topics:

Functionalities

General

The **TSX P ACC 01** unit is a cabling accessory that connects to the TER connector of the Premium/Atrium PLC processor via an integral cable fitted with a mini-DIN connector at one end.
This is used to:

- Connect several devices to the terminal port of Premium/Atrium PLCs. For this purpose, it is fitted with two mini-DIN connectors, marked TER and AUX, which are functionally identical to the TER and AUX connectors of the Premium PLC processors.
- Isolate Uni-Telway signals in order to extend Premium PLC terminal port links to over 10 meters for the purpose of connecting the PLC to a Uni-Telway bus.
- Adapt the bus when the unit is connected to one of the ends of the Uni-Telway bus.
- Set the operating mode of the terminal port:
  - Uni-Telway master
  - Uni-Telway slave or Character Mode

Note: The TER and AUX ports of the **TSX P ACC 01** unit are not isolated from one another, nor from the TER port of the supplying PLC.

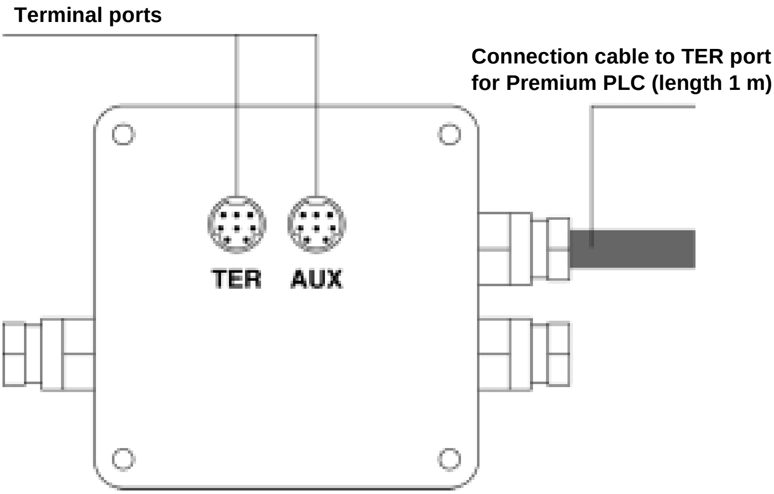
Note: We strongly recommend that, after use, you do not leave a TSX PCU 103• or TSX PCX 1031 cable connected to the Uni-telway bus at one end and unconnected at the other.

External appearance

General

This device is made from zamak and of the same type as Uni-Telway branching or connection devices (**TSX SCA 50** and **TSX SCA 62**). It is designed to be mounted in a cabinet. Its protection index is IP20.

Illustration:



2.2 Hardware installation

At a Glance

Aim of this Section

This Section deals with installing hardware for connection devices **TSX P ACC 01**.

What's in this Section?

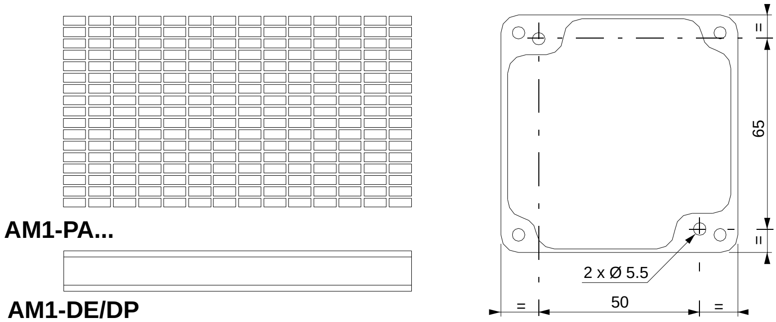
This section contains the following topics:

Dimensions and mounting

General

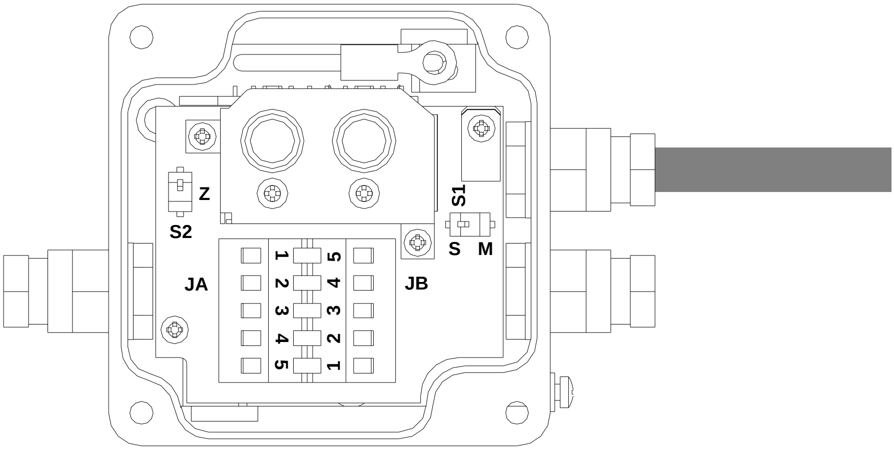
The **TSX P ACC 01** device is installed on a **AM1-PA•••** perforated board or on a DIN rail with a **LA9 D09976** mounting plate.

Illustration:



Internal view

Illustration



S1 Selects functioning mode (master or slave),

S2 Adapts the line end,

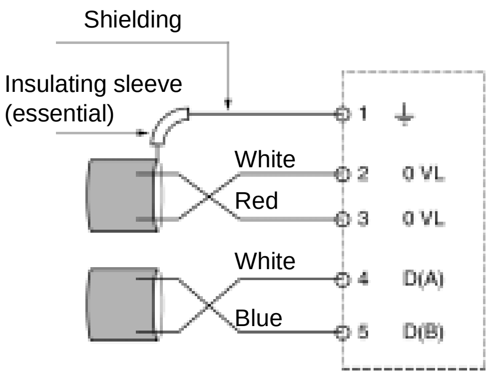
JA and JB Connection terminals on the Uni-Telway Bus.

Connection to Uni-Telway Buses

General

The **TSX P ACC 01** device is connected to the Uni-Telway Bus using connection terminals JA and JB as shown below:

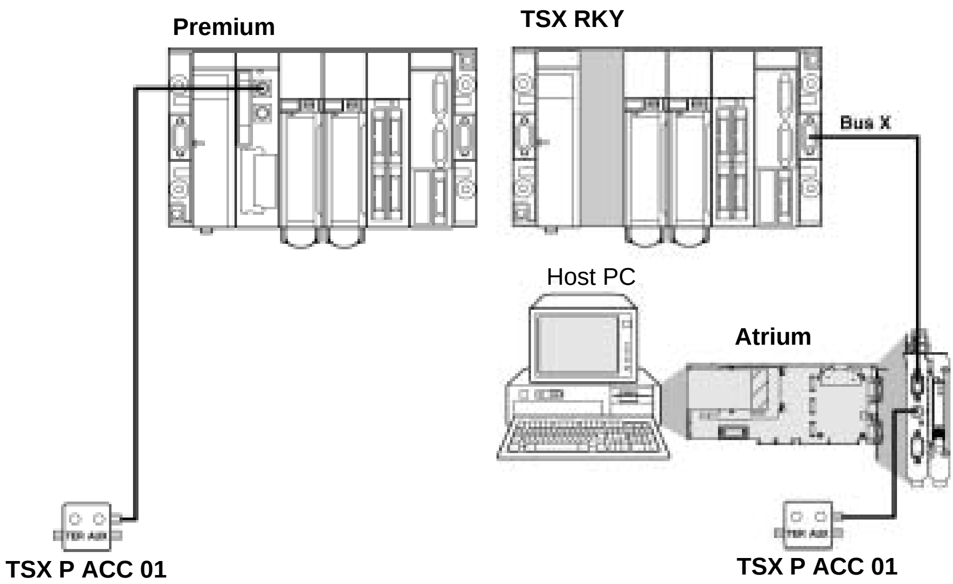
Illustration:



Connecting to Premium and Atrium PLCs

General

When the **TSX P ACC 01** device has to be supplied, it must be connected by its built-in cable to the TER connector on the PLC processor.
The device can be connected and disconnected when the PLC is switched on.
Illustration:



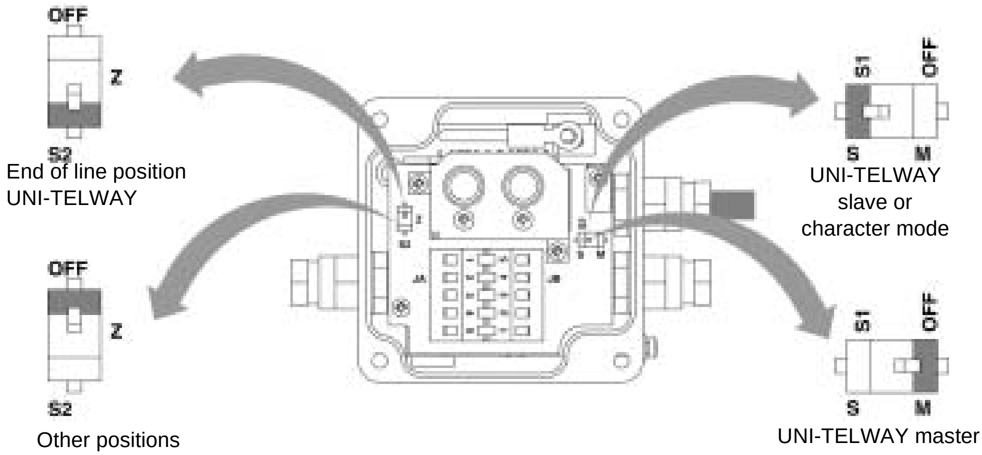
Note:
Only one **TSX P ACC 01** device can be connected to a Premium/Atrium PLC.

Switch configuration

General

- **Configuring line end adaptation**
  Line ends are adapted by the S2 switch as indicated below.
- **Configuring the operating mode**
  The operating mode is selected by switch S1 as indicated below.

Illustration:

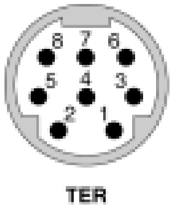


> **Note:** The operating mode selected only concerns the connection cable leading to the TER connector on the PLC processor.

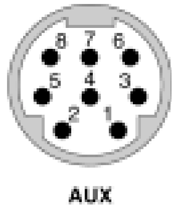
TSX P ACC 01 connector pin configuration

General

The **TSX P ACC 01** device has two parallel connectors, marked TER and AUX. The signals are given below :



1 D(B)
2 D(A)
3 not connected
4 not connected
5 not connected
6 not connected
7 0 V
8 5 V



1 D(B)
2 D(A)
3 not connected
4 not connected
5 not connected
6 not connected
7 not connected
8 not connected

2.3 Example of topologies

At a Glance

Aim of this Section

This Section introduces examples of how to use the **TSX P ACC 01** device.

What's in this Section?

This section contains the following topics:

Connectable devices

General

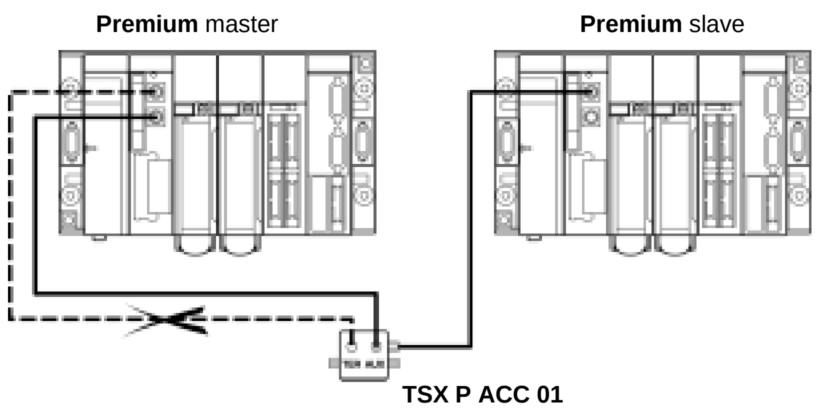
The functionalities of the TER and AUX ports of the **TSX P ACC 01** unit are identical to those of the TER and AUX connectors from the Premium/Atrium PLC processors.

- The unit's TER connector is used to connect any device supporting UNI-TELWAY protocol, in particular non-supplied devices (RS 485/RS 232 converter lead, etc.).
- The unit's AUX connector cannot be used to connect devices with a power supply (operator dialog console, third party devices, etc.).

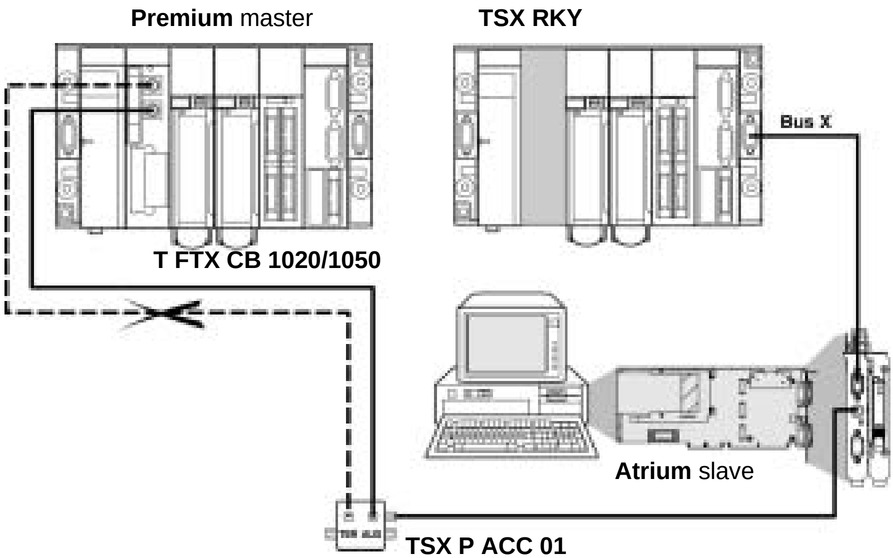
Note: The **TSX P ACC 01** unit is supplied by the TER connector of the PLC to which it is connected. The unit's TER connector can therefore be used to supply self-powered devices (CCX 17, etc.) or non- powered devices (RS 485/RS 232 converter lead, etc.).
If you wish to connect the terminal port of a second PLC to one of the ports of the **TSX P ACC 01** unit, it is essential that you use the AUX connectors (from the unit and the PLC) in order not to put the supplies of the two PLCs into conflict.

Note: We strongly recommend that, after use, you do not leave a TSX PCU 103• or TSX PCX 1031 cable connected to the Uni-telway bus at one end and unconnected at the other.

Example 1:



Example 2:

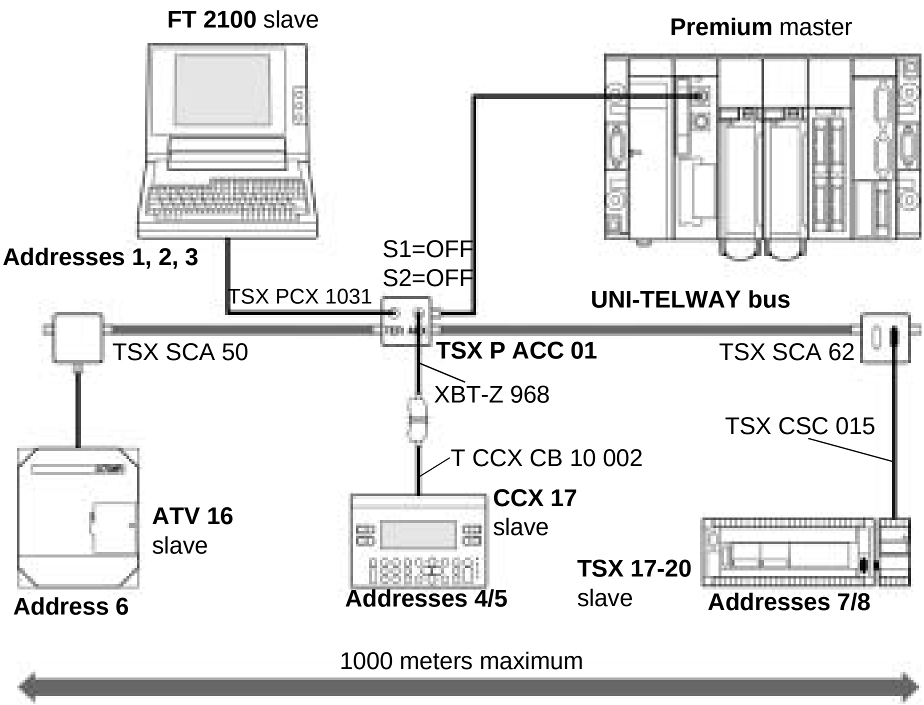

Premium master
TSX RKY
Bus X
T FTX CB 1020/1050
Atrium slave
TSX P ACC 01

UNI-TELWAY master mode

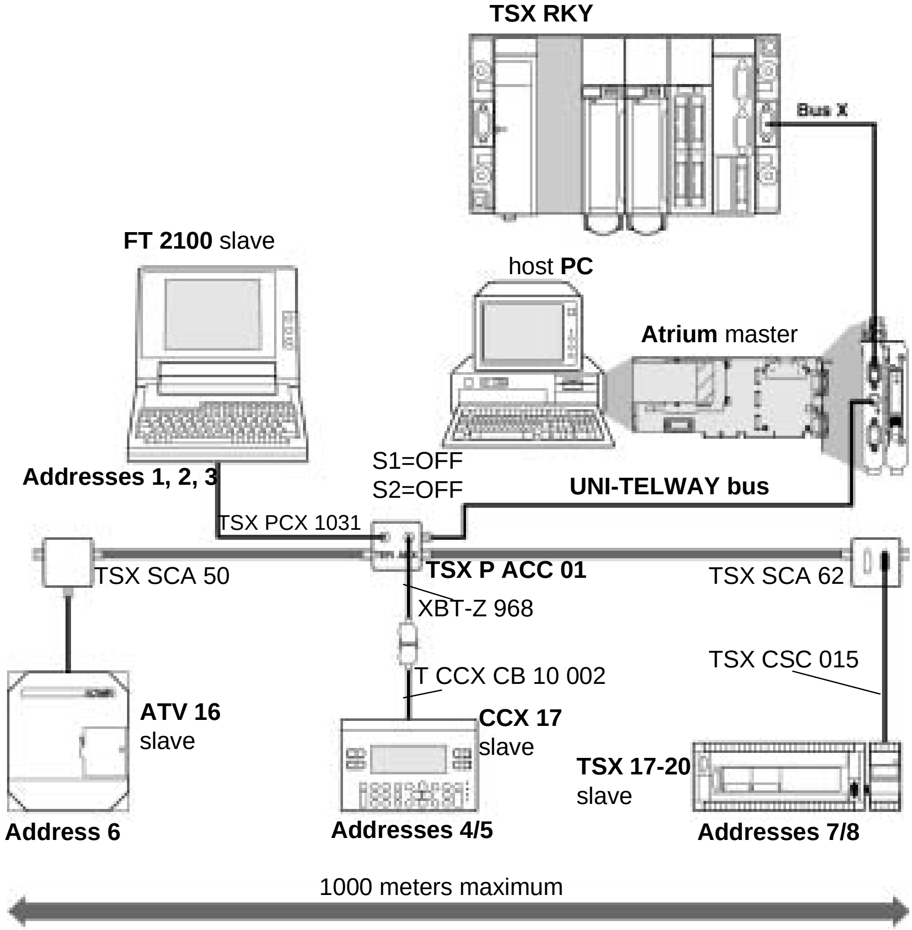
Example

A **TSX P ACC 01** device is connected to a UNI-TELWAY link master PLC as in the example below.
Switches S1 and S2 must be positioned on OFF (master mode).

Example on a Premium station:



Example on an Atrium station:



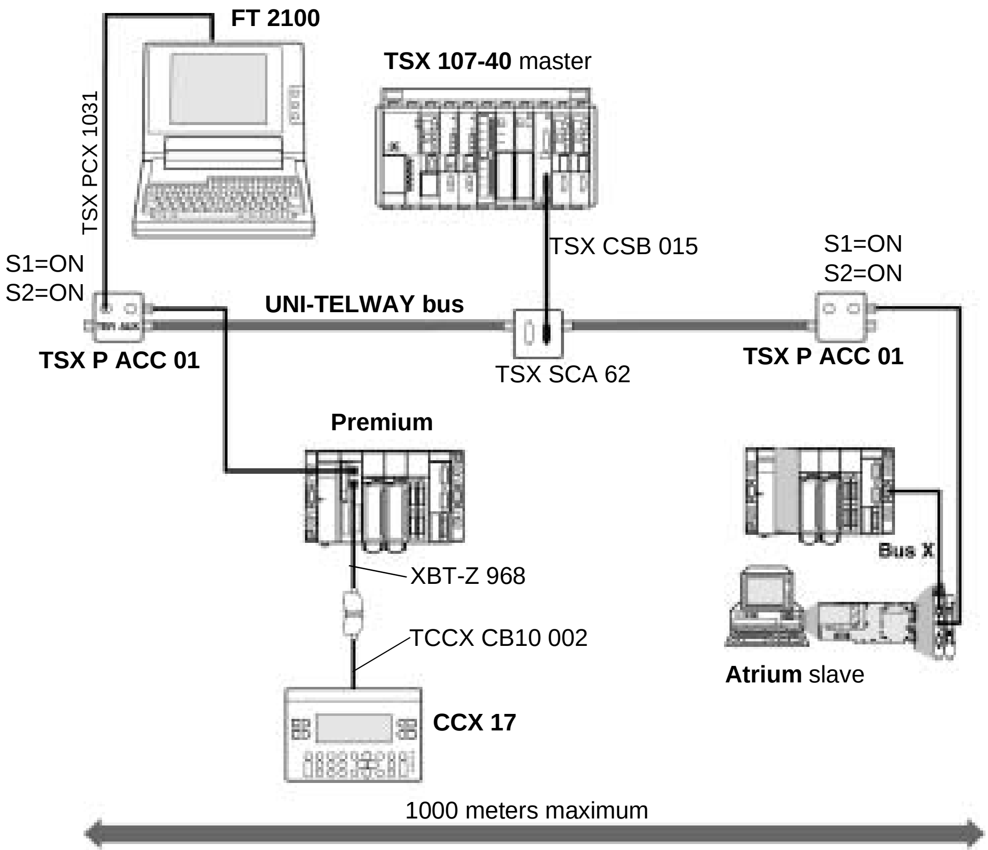
UNI-TELWAY slave mode

Example

A **TSX P ACC 01** device is connected to a UNI-TELWAY link slave PLC as in the example below.

> **Note: Important**: For a PLC to be able to operate in slave mode it must be connected to a **TSX P ACC 01** device by the cable built into it.

Illustration:



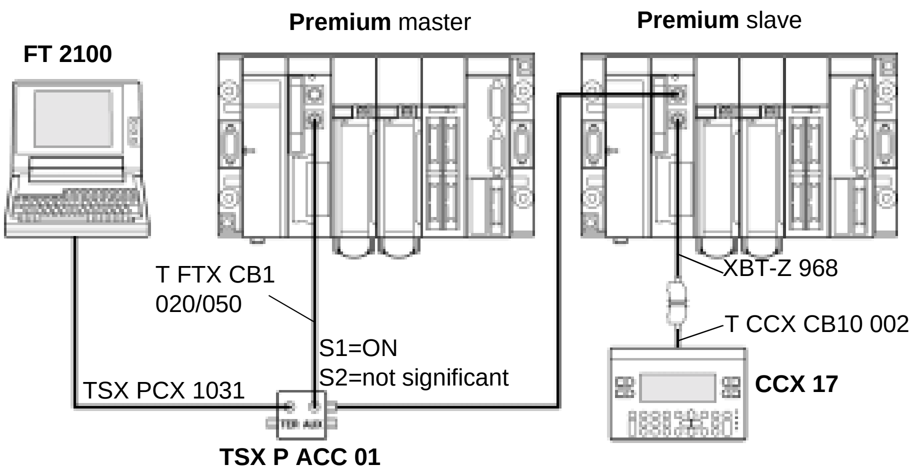
Connection between two PLCs

Reminders

If the user wants to connect the terminal port of a second PLC on one of the ports of the **TSX P ACC 01** device, the AUX port must be used to avoid power supply conflicts in the two PLCs.

Note: Important: For a PLC to be able to work in slave mode it must be connected to a **TSX P ACC 01** device by the device's built-in cable.

In the example given below the **TSX P ACC 01** device must therefore be connected to the UNI-TELWAY slave PLC by the device's integrated cable. Its S1 switch must be positioned on ON
If the device if not placed on a UNI-TELWAY bus, the position of the S2 switch does not matter.
Illustration:



Processor-integrated master FIPIO communication

II

At a Glance

Aim of this Part

This Part deals with the master FIPIO communication function, which is integrated into Premium/Atrium processors.

What's in this Part?

This part contains the following chapters:

Processor-integrated master FIPIO communication

3

At a Glance

Aim of this Chapter

This Chapter deals with the FIPIO communication function integrated into Premium/ Atrium processors.

What's in this Chapter?

This chapter contains the following topics:

Review of the FIPIO bus

General

FIPIO is a field bus which is used to centralize inputs/outputs of a PLC station and its industrial peripherals nearest to the section which is operating.
From a PLC station whose processor has a built-in FIPIO link, the FIPIO bus is used to connect 1 to 127 devices such as:

- Momentum remote input/output modules (discrete and analog)
- TBX remote input/output modules (discrete and analog)
- CCX 17 command consoles
- ATV 16 variable speed controllers
- Devices which conform to standard profiles
- Agent PLCs, PC
- ...

The FIPIO field bus can be used in a single architecture (mono-station) or in a more complex architecture (multi-station) where several FIPIO segments can be brought together by a local network at a higher level such as FIPWAY or Ethernet TCP_IP for example.

Main characteristics

Structure	
Nature	Open field bus, conforming to World FIP standards.
Topology	Links devices through chaining or branching.
Access method	Managed by a bus arbiter
Communication	By exchange of variables which can be accessed by the user in the form of PL7 objects and X-WAY datagrams.
Privileged exchanges	Cyclical exchange of status variables and remote input/output commands

Transmission	
Binary flow	1Mb/s.
Medium	Shielded twisted pair (150 Ohms of characteristic impedance).

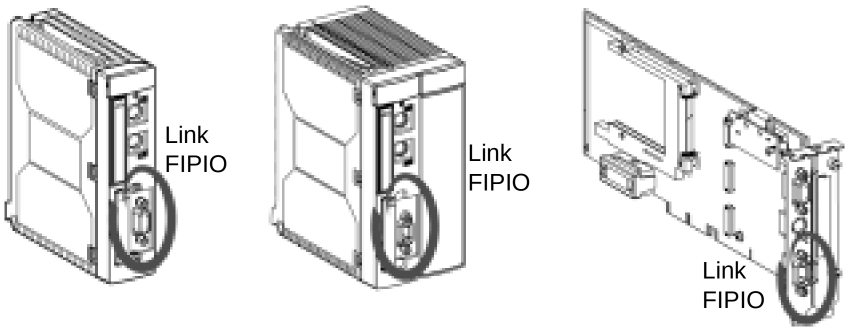
Configuration	
Number of connection points	128 logic connection points for whole architecture
Number of segments	15 maximum (in cascade format) using electrical or optical relays (14 maximum in cascade format).
PLC	One PLC (address connection point 0)

Configuration	
Programming terminal	One programming terminal (must be connected to connection point 63).
Length	The length of a segment depends on its type of branches: • 1000 meters maximum without relay. • 15000 meters maximum between the devices which are the furthest apart.

Integrated FIPIO link on Premium/Atrium processors

General

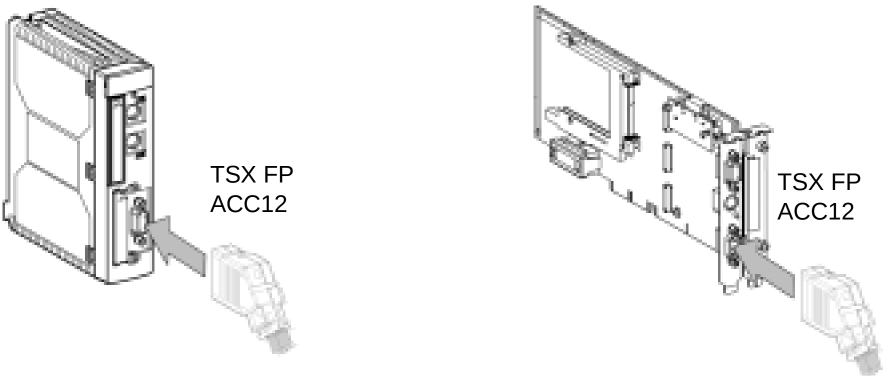
Some processors have as standard an integrated master FIPIO link which makes it possible to connect the PLC station to a FIPIO bus.
Illustration:



Premium processor Atrium processor

Connecting to the FIPIO bus

The processor has a SUB D 9-pin connector which is used to link it to the FIPIO bus using a **TSX FP ACC12** connector.
Illustration:



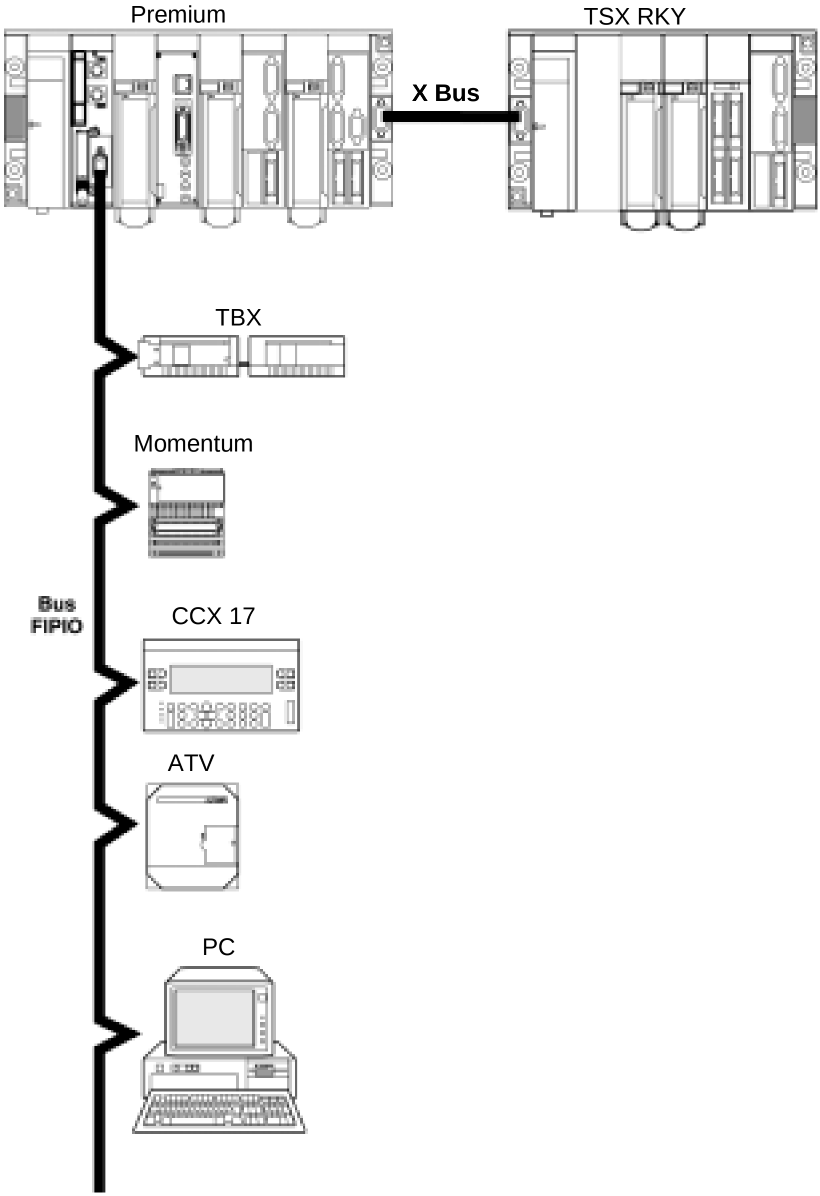
The complete procedure for installing a FIPIO bus (architecture, type of cable to use, cabling accessories etc.) is discussed in the FIPIO Bus reference manual.

> **Note:** The master FIPIO link integrated into processors should not be taken into account when counting the station channels.

Examples of architecture

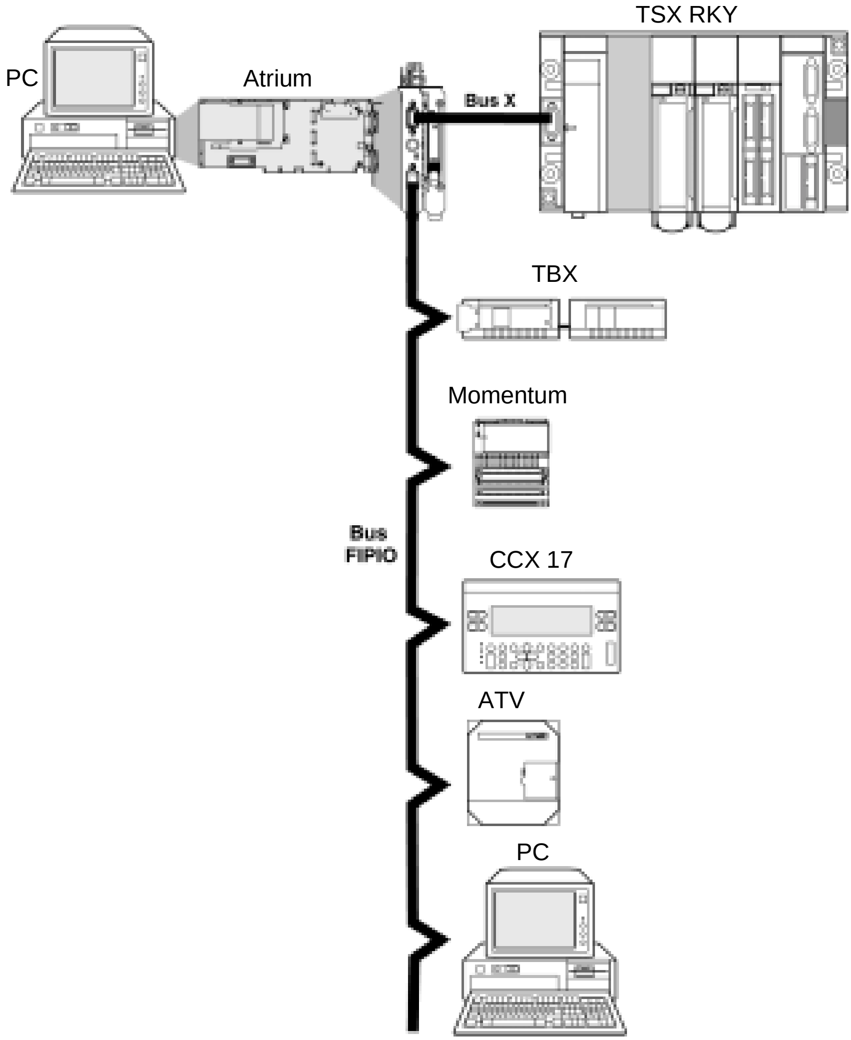
Premium station

Illustration:



Atrium station

Illustration:



AS-i bus interface: TSX SAY 100 module

III

At a Glance

Aim of this Part

This Part deals with the AS-i bus interface module: **TSX SAY 100**.

What's in this Part?

This part contains the following chapters:

AS-i bus interface module: TSX SAY 100

4

At a Glance

Aim of this Chapter

This Chapter only deals with hardware installation of the **TSX SAY 100** interface module, AS-i bus master on a Premium/Atrium PLC. For the complete installation of an AS-i bus you must refer to the following manuals:

- AS-i bus reference manual
- *AS-i installation* section in the Premium PLC Applications Manual - Applications, Volume 1.

What's in this Chapter?

This chapter contains the following sections:

4.1 Review of the AS-i bus

At a Glance

Aim of this Section

This Section introduces the main characteristics of the AS-i bus.

What's in this Section?

This section contains the following topics:

Review of the AS-i bus

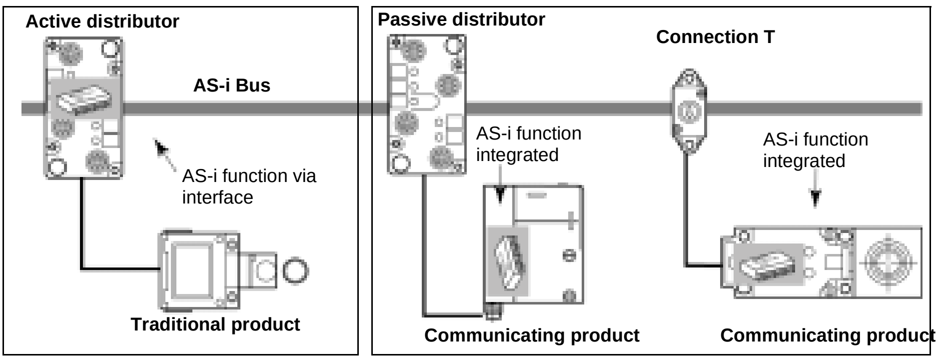
General

The AS-i bus is a field bus (level 0) and can be used to connect sensors/actuators. This allows "Discrete" type information to be routed between a bus master and sensor/actuator slaves.
AS-i is made up of three major basic elements:
- A dedicated power supply providing 30 VDC voltage.
- A bus master.
- Slaves (sensors and actuators).

The main types of sensors/ actuators

1. **Communication sensors/actuators:**
   With a built-in AS-i function they link up directly to the AS-i bus via a passive distributor or a T-piece connection.
2. **The traditional IP65 sensors/actuators:**
   They connect to the bus via an AS-i interface (active distributor or Telefast IP20 discrete input-output bus interface). These interfaces connect the sensors and traditional actuators to the AS-i bus and provide them with dialog capacity on the bus.

Illustration:

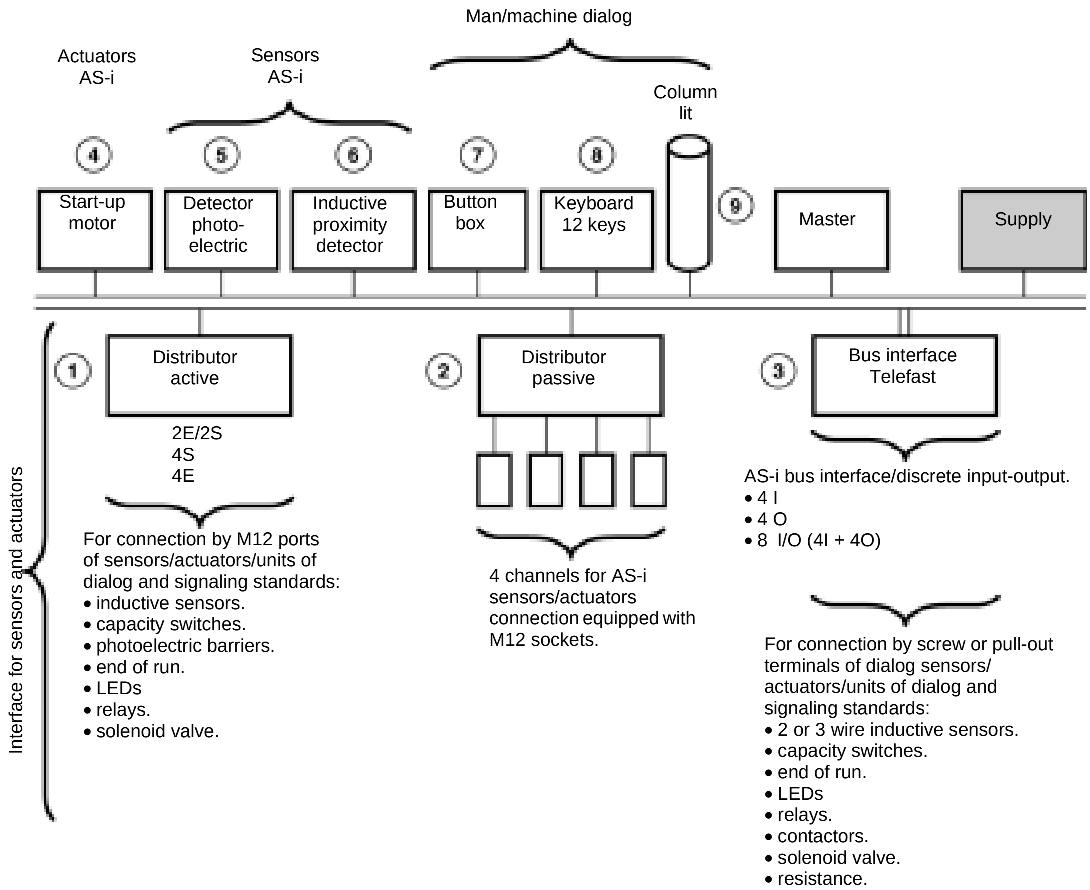


124 products maximum (124 input information and 124 output information)	**31 products (sensors or actuators)**

Overview of AS-i products from the Schneider catalog

General

Non-exhaustive list of AS-i products from the Schneider catalog:

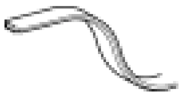


Introduction to the main constituent elements

Cable

This transmits data and carries the power. It can be made up from:
- either an unshielded, polarized twin-wire AS-i ribbon cable.
- Or a standard round, shielded or unshielded twin-wire cable.

Illustration:

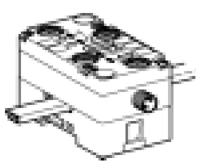


Guiding
ribbon cable

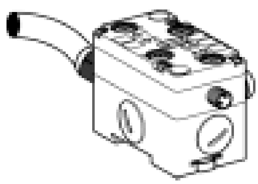
Round cable

Active distributors

IP67 sealed interfaces for connecting sensors/actuators using M12 connectors.
These distributors are used to connect "traditional", non-communicating sensors/ actuators.
Illustration:



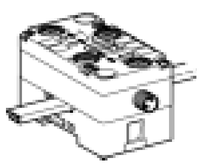
Active distributor
for ribbon cable



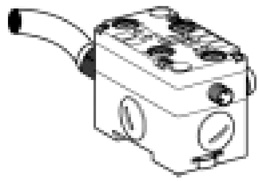
Active distributor for
round cable

Passive distributors

IP67 sealed interfaces for connecting sensors/actuators using M12 connectors. These distributors do not have any electronics and can therefore be used to connect the "communicating" sensors/actuators.
Illustration:



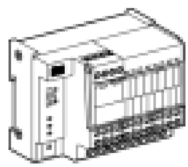
Passive distributor
for ribbon cable



Passive distributor
for round cable

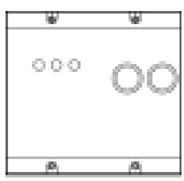
SB2 Telefast discrete inputs-outputs/bus interface

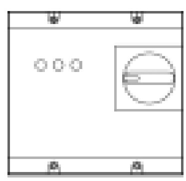
IP20 sealed interface with built-in ASi- function. It enables connection to all types of "traditional" non-communicating sensors/actuators via screw terminal blocks.
Illustration:



AS-i actuators

The direct motor starters and toggle switches in sealed boxes (IP54 and IP65) ensure electrical motors are controlled and protected up to 4KW at 400 VAC.
Illustration:

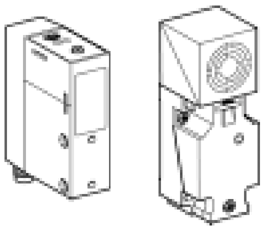




AS-i sensors

- Photo-electric detectors:
  They ensure that all kinds of objects (opaque, reflective etc) are detected with 5 basic systems: barrier, reflex, polarized reflex, proximity and proximity with background blanked out. They offer an IP67 protection level.
- Inductive proximity detectors:
  They detect all metal objects and provide information for the check functions on whether an object is present or not. They offer an IP67 protection level.

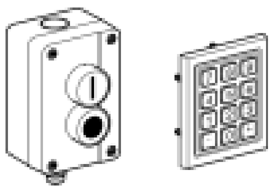
Illustration:



Man-machine interface products

- Button boxes:
  These are made up of dialog tools, which are perfectly adapted to exchanging information between the operator and machine.
- Keyboards:
  Man/machine dialog tools, these have 12 touch sensitive keys. The information delivered is coded in BCD on 4 bits. They offer an IP65 protection level.

Illustration:

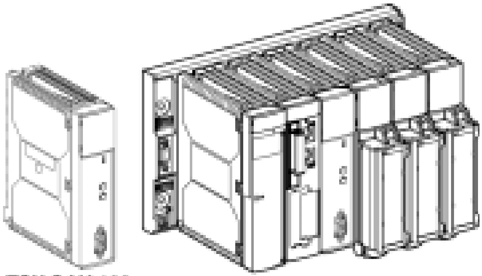


Signaling elements

- Illuminated columns:
  Optical or sound signaling elements.

Bus master

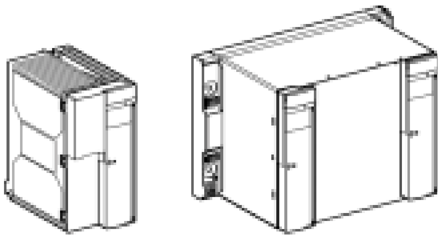
Built into a Premium/Altrium PLC station, the **TSX SAY 100** module (AS-i bus master) manages all data exchanges on the AS-i bus.
Illustration:



TSX SAY 100 **Premium/Atrium station**

AS-i power supply

AS-i dedicated power supply, designed to supply the components connected to the AS-i bus.
The distribution of this power supply uses the same medium as that used for data exchange.
Illustration:



TSX SUP A02 TSX SUP A05

Connecting and branching accessories

T-piece connectors are used to make connections to the AS-i bus. These are designed for linking to AS-i ribbon cables or to ribbon/round cable branches.
Illustration:

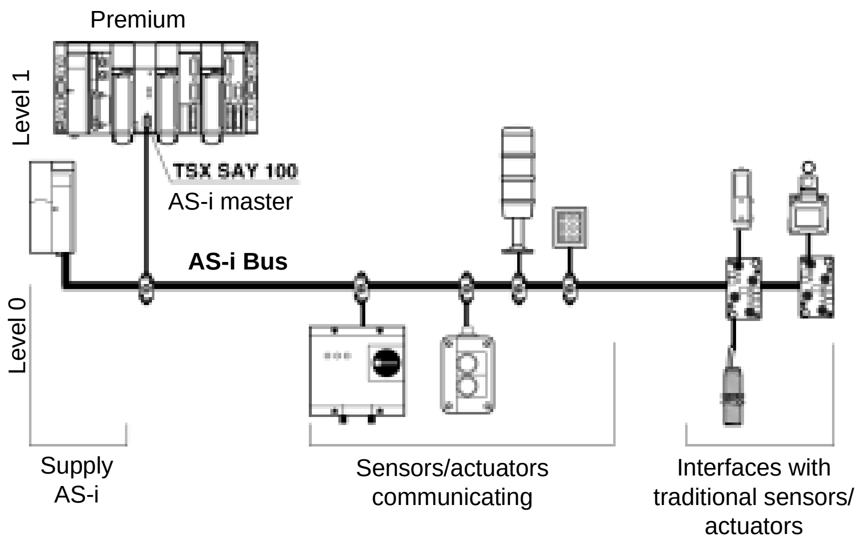
T for ribbon cable

Branch ribbon/round cable

Example of AS-i bus topology

General

Illustration:



Main characteristics of the AS-i bus

General

AS-i is a system in which exchange management is ensured by a single master who calls in succession, by scanning the bus, each detected slave and awaits a response.
The communication series frame carries:

- 4 data bits (D0 to D3), which are the image of inputs or outputs according to the nature of the interface.
- 4 parametering bits (P0 to P3), which are used to set the operating modes of the interface.
  P0 to P3 bits are used for "intelligent" devices, including AS-i ASIC (specific integrated circuit). Operation can be modified while it is running.

The address of the slave is coded on 5 bits.
At the request of the AS-i master, outputs are set and the inputs for AS-i devices are sent in the slave’s response.

Slave addressing

Each slave connected to the AS-i bus must have an address between 1 and 31 (coding on 5 bits).
The slaves delivered from the factory have the address 0 (the address of the slave is memorized in a non-volatile format).
Addresses are programmed using a terminal specifically for addressing, a **XZMC11**.

Note: When replacing a faulty slave whose address has been set, the address of the slave to be replaced can be updated automatically.

Identification of slaves

All slave devices connected to the AS-i bus are identified by:

- An I/O Code (input/output distribution code).
- An identification code, which completes the functional identification of the slave.

These identifications allow the AS-i master to recognize the configuration which is present on the bus
These different profiles have been developed by the AS-i Association. They are used to distinguish modules such as for inputs, outputs, mixed modules, "intelligent" device families, etc.

Maximum number of inputs/outputs

An AS-i bus can support a maximum of 31 slaves.
Each slave can have a maximum of 4 inputs and/or 4 outputs.
This makes it possible to manage a maximum of 124 inputs + 124 outputs, or 240 discrete inputs/outputs when all active devices have 4 inputs and outputs.

AS-i cable

The AS-i cable is a twin-wire link on which communications and power supply for the connected devises are transmitted.
The link does not need to be twisted.

The cross-section of wires can be from 2 x 0.75 mm^2, 2 x 1.5 mm^2 or 2 x 2.5 mm^2, according to the current consumed by the devices.

Topology and maximum length of AS-i bus

The topology of the AS-I bus is flexible. It can be perfectly adapted to meet the user's needs (point to point, on line, tree structure etc.).
In every case, the total length of all the branches of the bus must not exceed 100 meters without a relay.

AS-i bus cycle time

This is the cycle time between slave(s) and the **TSX SAY 100** module.
The AS-i system always transmits information which is the same length to each slave on the bus. The AS-i cycle time depends on the number of slaves connected to the bus.
In the presence of 31 functioning slaves, this time period will be a maximum of 5 ms.

Reliability, flexibility

Reliable operation is ensured by the transmission process used (Manchester current and coding modulation). The master monitors the line supply voltage and the data sent. It detects transmission errors as well as slave failures, and sends the information to the PLC.
Exchanging or connecting a new slave during operation does not disturb communications between the master and the other slaves.

4.2 Description of the TSX SAY 100 module

At a Glance

Aim of this Section

This Section deals with hardware installation and the characteristics of the **TSX SAY 100** module.

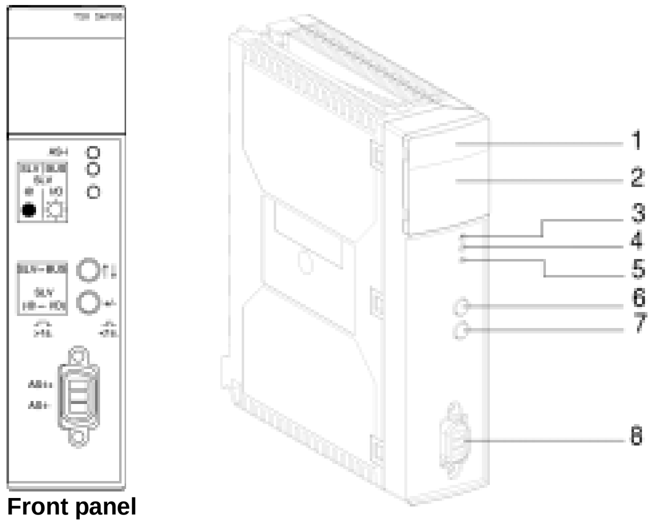
What's in this Section?

This section contains the following topics:

Physical presentation

General

The TSX SAY 100 module comes as a standard format module.
Illustration:



Front panel

Description of TSX SAY 100 module

The module is made up of the following elements:

1. A display panel consisting of 4 LEDs for displaying the operating modes of the module:
   - RUN LED (green): lit indicates normal functioning mode of the module.
   - ERR LED (red): lit indicates a module error.
   - COM LED (green): lit indicates data exchanges on the AS-i network.
   - I/O LED (red): lit indicates an external input/output error on the AS-i bus.
2. Display panel consisting of 32 LEDs (0 to 31) which enable AS-i bus diagnostics, and display the state of each slave connected to the bus.
3. AS-i LED (red): lit indicates an AS-i power supply error.
4. Bus LED (green): lit indicates that display panel**2** is in BUS display mode (slaves displayed on the bus).
5. I/O LED (green): lit indicates that display panel **2** is in Slave "SLV" display mode (displays status of input/output bits for a selected slave).
6. Push button "↑↓" designed for local diagnostics of the AS-i bus. You can move between the different AS-i bus diagnostic modes by pressing this button (long or quick presses), combined with the "+/-" push button.
7. Push button "+/–" designed for local diagnostics of the AS-i bus. You can move between the different AS-i diagnostics modes by pressing this button (long or quick presses), combined with the "↑↓" push button.
8. CANNON SUB D connector for connection to AS-i bus.

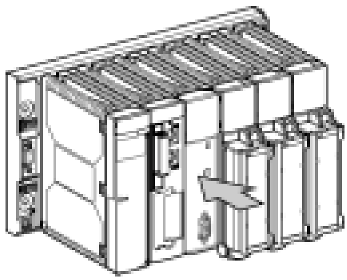
Mounting/installation

General

The **TSX SAY 100** module can be mounted in any position on the **TSX RKY** rack, except for those positions dedicated to processors and power supply.

Note: In the event where the module is mounted on a remote X Bus rack, the maximum allowed distance from the processor must be 175 meters minus the length of the X Bus (max. 100 m).

Inserting and extracting the module is the same as the general procedure for inserting and extracting modules on Premium PLCs (see the Premium PLC installation manual.)
Example of mounting a TSX SAY 100 module:



Note: The module can be mounted and removed with both PLC and AS-i bus power switched on.

Number of modules per station

The maximum number of modules per Premium/Atrium PLC station depends on the type of processor installed:

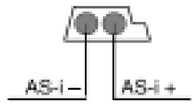
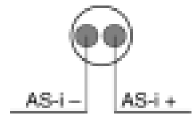
Processors	**Maximum number of AS-i bus connections**	**Maximum number of TSX SAY 100 modules**
57-1xx	2	2
57-2xx	4	4
57-3xx/57-4xx	8	8

Connections

AS-i bus cables

AS-i bus cables carry the signals and supply the sensors and actuators connected to the bus with 30 VDC.

Types of AS-i cables:

Cable type	Characteristics	Illustration
Polarized AS-i ribbon cable	Color: yellow. Wire cross-section: 1.5 mm^2	 (Blue) (Brown)
Standard round cable	Wire cross-section: 1.5 mm^2 or 2.5 mm^2	 (Blue) (Brown)

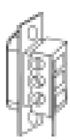
Recommended cable: product reference H05VV-F2x1.5, conforms to the DIN VDE 0281standard. Wire cross-section: 1.5 mm^2.

Cable routing

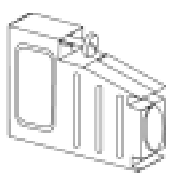
The AS-i cable and the power cables carrying higher power levels must be in separate ducts which are protected by a metal screen.
When using a shared route for control cables it is essential that the connections on these control links should conform to the technology rules (eg. the discharge diode or limiters on the terminals of self-inductive elements etc.).

Link-up connector

A set (connector + cover) is delivered with the module, which is used to connect the module to the AS-i bus. This connector must be linked to the cable of the AS-i bus and assembled by the user according to the procedure described later.
Illustration:



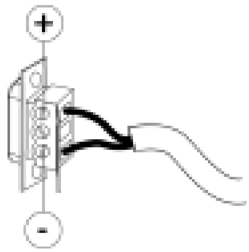
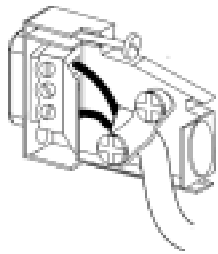
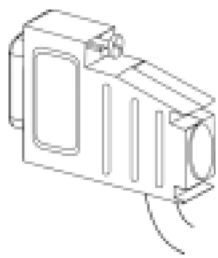
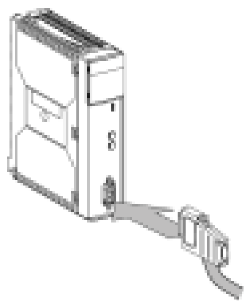
Connector



Cover

Connection of module to bus

To connect a module to the bus, follow the procedure below:

1	Connect the 2 wires of the AS-i cable to the connector, taking the polarities into account:  In the special event that a shielded cable is used, this should be connected to the central terminal.
2	Mount the connector in its cover and fix the cable to it: 
3	Click the cover shut: 
4	Mount the unit on the module: 

Displaying module states

General

This is carried out with 4 LEDs RUN, ERR, COM, I/O which are located on the module. Their state (LED off, flashing or on) provides information on the operating mode of the module.

LED state:

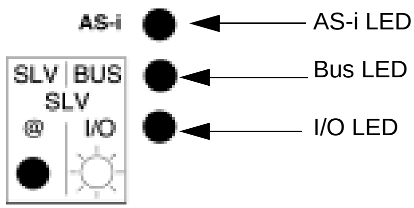
LEDs	**On**	**Flashing**	**Off**
RUN (green)	Module operating normally	Module self-testing (1)	Faulty module, or module switched off
ERR (red)	Serious internal fault, module broken down	Module self-testing (1) Fault: system OK but: ● application fault or ● AS-i bus error	No internal error
COM (green)	-	Module self-testing (1) Communication on AS-i bus	No communication on AS-i bus
I/O (red)	Input/output error	Module self-testing (1)	Module operating normally
(1) the 4 LEDs flash simultaneously during self-testing mode when the module is switched on.			

Specific Display Panels on the TSX SAY 100 Module

General

3 LEDs: AS-i, Bus and I/O display information specific to the TSX SAY 100 module.

View of the 3 LEDs:

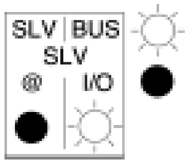
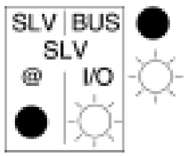
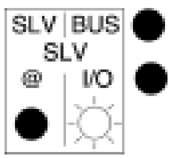


AS-i LED (red)

LED state	Meaning
LED on	Module operating normally
Flashing LED	Supply fault on the AS-i bus
LED off	Automatic addressing initialized

Bus and I/O LEDs

These two LEDs display the view mode selected:
- Bus display mode or
- Slave display mode.

Display module	LED state	Meaning
	Bus LED on, I/O LED off	The 32 LED display panel located at the front of the module is in BUS display mode and displays all the slaves present on the bus.
	Bus LED off, I/O LED on	The 32 LED display panel located on the front of the module is in Slave display mode (SLV) with display of the input/ output status for a selected slave.
	Bus LED off, I/O LED off	The 32 LED display panel located on the front of the module is in Slave display mode (SLV) with display of the address of the slave selected.

Technical characteristics

AS-i Bus

Characteristics	Value
AS-i bus maximum cycle time	5ms
Maximum number of slaves on the AS-i bus	31
Maximum length of AS-i bus (all branches mixed without relay)	100 meters
Maximum number of inputs/outputs	124 inputs + 124 outputs
Nominal supply voltage for AS-i bus	30 VDC

TSX SAY 100 module

Characteristics	Value
Programming the TSX SAY 100 module	from PL7 Junior or PL7 Pro software
Response time with 31 slaves (1) for a PLC cycle time of 10 ms	Typically 27 ms, 37 ms maximum
Calculation of AS-i scanning time for n slaves (normal operation)	156 µs x (n+2) if n<31 156 µs x (n+1) if n=31
PLC current consumed on 5V	Typically 110 mA / 150 mA maximum
AS-i current consumed on 30 V	Typically 50 mA / 60 mA maximum
Dissipated power	2.5 W max.
Protection from polarity inversion on AS-i bus inputs	Yes
Degree of protection	IP20
Operating temperature	0 to 60 degrees Celsius
AS-i master profile	M2
Standards and service conditions	Conforms to those of Premium PLCs (see Volume 1)
(1) Logical response time + time between an AS-i input activated on the bus, processed in the PLC application and applied to an AS-i output.	

Personnel safety

General

To ensure personnel safety it is essential:

- To earth the ground terminal of the PLC.
- To use an AS-i VLSV (very low safety voltage) supply, nominal voltage 30 VDC.
- For PLCs which are connected to an alternating current network, a differentiel circuit breaker must be placed upstream of this network, and this will cut off the PLC power supply source if ground leakage if detected.
- For PLCs which are connected to a direct current supply source you must ensure that the supply placed upstream of the PLC is VLVS.
- To use certified AS-i products on the bus.

Due to its type of technology and connection, the **TSX SAY 100** module only receives 5 VDC and its 0V is linked to the PLC ground.

4.3 Input/output object addressing

Addressing input/output objects

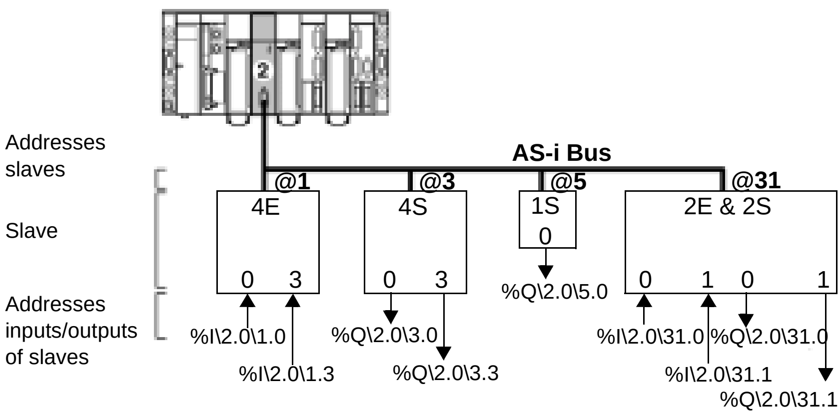
General

Acquisition of inputs and update of slave device outputs connected to the AS-i bus are carried out automatically. This occurs at the start and end of each cycle respectively of the task in which the **TSX SAY 100** module is configured.
The program user has access to these inputs and outputs via the language objects whose syntax is as follows:

%	I or Q	\	xy.0	\	n	.	i
Symbol	Type of object **I**=input **Q**=output		Module/channel address of the TSX SAY 100 **x**=rack number **y**=position number **0**=channel 0 of the module		No. of slave **0 to 31**		Rank of bit **0 to 3**

Example

Particular example of rack 0:
%I\2.0\1.3 indicates: input 3 of slave 1, channel 0 of the **TSX SAY 100** module, positioned in rack slot 0.
%Q\2.0\31.0 indicates: output 0 of slave 31, channel 0 of the **TSX SAY 100** module, positioned in slot 2 of rack 0.
Illustration:



Note: The physical address of an AS-i slave is programmed by the portable console **XZM C11**

4.4 AS-i Bus diagnostics

At a Glance

Aim of this Section

This Section deals with the diagnostics mode carried out by the **TSX SAY 100** module.

What's in this Section?

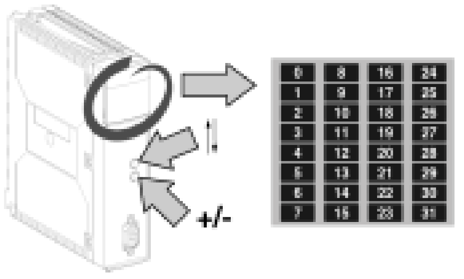
This section contains the following topics:

Introduction to AS-i Bus diagnostics

General

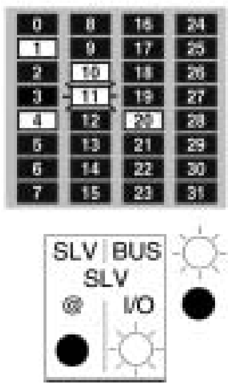
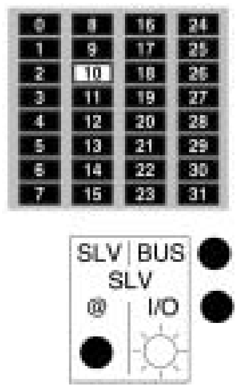
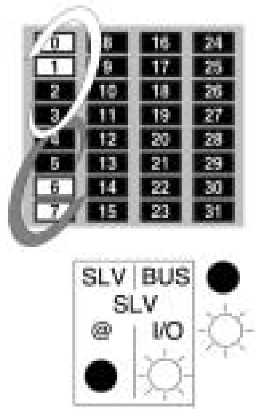
The module display panel is used for:
- Displaying the presence of each slave on the AS-i bus (Bus mode).
- Displaying the state of input/output bits of each slave present on the bus (Slave mode "SLV").

These modes can be accessed by a combination of actions on the push buttons (↑↓ and +/-) on the **TSX SAY 100** module.
Illustration:



Display modes

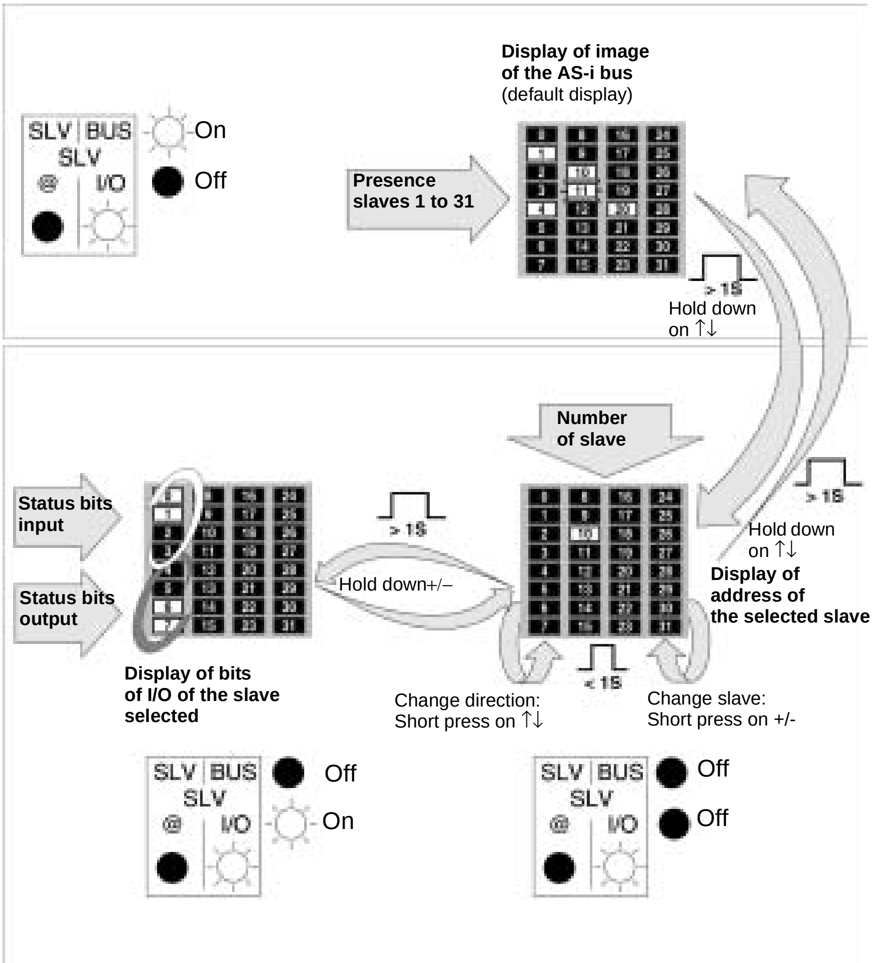
Table giving the 2 display modes of the module:

<table>
<tr><th>Bus mode</th><th colspan="2">Slave mode (SLV)</th></tr>
<tr>
<td>View of AS-i bus image. Each LED 1 to 31 corresponds to a slave address on the bus.
● LED on: slave present
● flashing LED: slave expected and not detected, or not expected and detected.
● LED off: slave not expected and not detected.</td>
<td>View of selected slave address.
● LED on: number of slave selected.</td>
<td>View of input/output bit state for slave selected.
● LEDs 0 to 3 display the state of the input bits.
● LEDs 4 to 7 display the state of the output bits.
● LED on: bit in state 1.
● LED off: bit in state 0 or not significant</td>
</tr>
<tr>
<td>Illustration:

View mode is displayed with the Bus LED on and the I/O LED off.</td>
<td>Illustration:

View mode is displayed by Bus and I/O LEDs both off.</td>
<td>Illustration:

View mode is displayed by the Bus LED off and the I/O LED on.</td>
</tr>
</table>

Moving between the different display modes

Illustration

This illustration shows how to move between the different display modes:

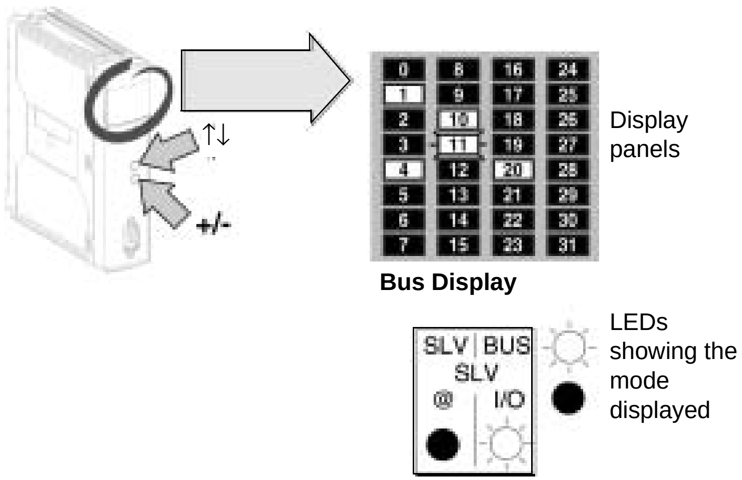


Display of slaves on the AS-i bus

General

This mode is displayed by default when the module is switched on, and is used to display:
- The expected and detected slaves (LED permanently on).
- The unexpected and undetected slaves (LEDs off).
- The expected and undetected slaves (LEDs flashing).

Illustration:



The image of the AS-i network is displayed on the entire display panel. Each LED represents an AS-i bus slave address.
You can move between the different modes by a combination of actions on the push buttons ↑↓ and +/- : see *Moving between the different display modes, p. 101*.
Two LEDs "Bus" and "I/O" indicate the current display mode.

In the current example, the "BUS" LED is on and the LED "I/O" is off which indicates that the display is in Bus mode.
In the illustration above, the display panel indicates that:
- Slaves 1, 4, 10 and 20 (LEDs on) are present.
- Slave 11 (flashing LED) is present and not expected, or expected and missing.

Viewing the state of input/output bits for each slave

General

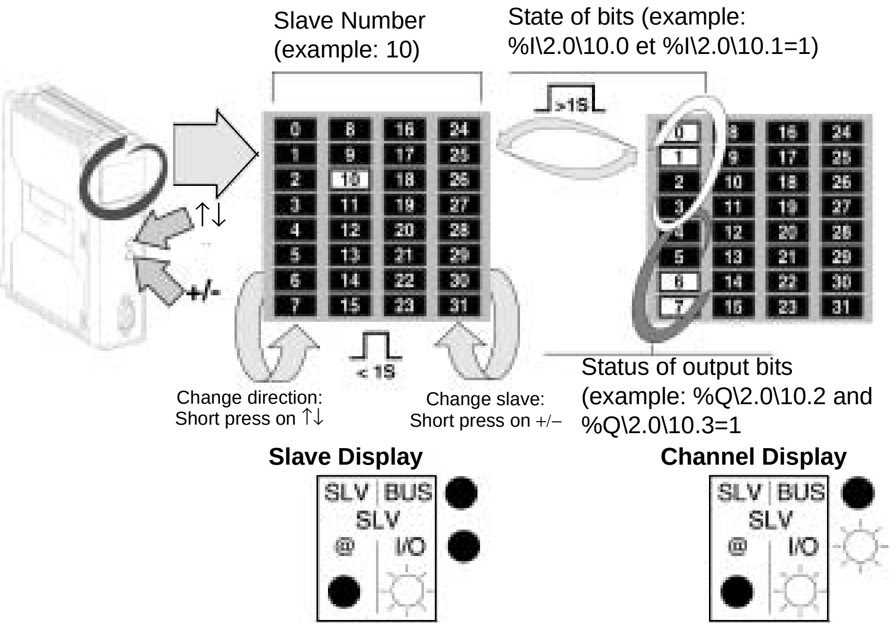
In this mode (Slave "SLV"), the display panel is used to view the state of input/output bits for each slave present on the bus.

Procedure to be followed

To access the state of input/output bits for a slave from BUS mode, proceed as follows:

Order	Action	Result
1	Press **for more than one second** on the button ↑↓	The display switches to Slave "SLV" mode.
2	Press **quickly** on the +/- button	The display of the slave address **goes up** from 1 to 31.
3	Press **quickly** on the button ↑↓	The direction of the slave address scan is reversed.
4	Press **quickly** on the +/- button	The display of the slave address **goes down** from 31 to 1.
5	Press**for more than one second**on the button +/–	• LEDs 0 to 3 display the state of input bits for the slave selected (1). • LEDs 4 to 7 display the state of output bits for the slave selected (1).
6	Press **quickly** on the +/- button	The state of inputs-outputs for the **following** slave is displayed.
7	Press **quickly** on the button ↑↓	The direction of the slave address scan is reversed.
8	Press **quickly** on the +/- button	The state of input-outputs for the **previous** slave is displayed.
9	Press**for more than one second** on the button +/–	The display shows again the number of slave selected.
(1) **LED on = bit on state 1** **LED off = bit on state 0 or no input or output**		

Illustration



4.5 Operating modes of the TSX SAY 100 module

Operating modes of the TSX SAY 100 module

General

For more information, refer to the section on *AS-i installation* in the Premium PLCs Applications Manual - Basic Applications, Volume 1.

Output fallback position

The fallback mode is set in the configuration screen (see Premium PLCs Applications Manual) and can be read in the word %KWxy.0.19:X0:
- %Kwxy.0.19:X0 = 1: fallback to 0
- %KWxy.0.19:X0 = 0: maintain state

(x = rack address, y = module address)

Operation:
When the AS-i channel changes to STOP:
- With **fallback to 0** option: outputs are forced to 0, then communication stops on the medium.
- With **maintain state** option: outputs are maintained, then communication stops on the medium.

Automatic slave addressing

When this function is enabled in the module configuration, it allows the replacement of a faulty slave with a slave of the same type without stopping the AS-i bus, and without the need for special action:
- If the replacement slave is programmed with the same address and has the same profile, it will be automatically inserted in the list of slaves detected, then activated. If this is not the case, the ERR and AS-i LEDs will flash simultaneously.
- If the new slave has never been used (address 0, new slave) and has the same profile, the slave automatically takes on the address of the replaced slave and is therefore in the list of detected slaves and the list of active slaves. If this is not the case, the ERR and AS-i LEDs will flash simultaneously.

These actions are only possible if **one and only one** slave is faulty in the configuration.

Processor error

If there is a communication break with the processor, the module switches to SAFETY position.
Communication breaks are caused by the following:
- Triggering of the processor watchdog if the **TSX SAY 100** module is positioned in the rack supporting the processor.
- Disconnection of the X Bus cable if the **TSX SAY 100** module is positioned in an extension rack.

Module fault

In the event of a serious fault on the **TSX SAY 100** module (faulty component, etc.) the module stops communicating with the X Bus and with the AS-i Bus. The same type of behavior occurs when a module is removed with the power on.

Removing a module with power switched on

Should a module be removed with the power switched on, communication with the X Bus stops and the processor indicates a module fault.
Communication with the AS-i bus is also interrupted without notice. In this case, the slaves with a watchdog set their outputs in the desired state, and the others remain in position and cannot be set to 0 since the module cannot guarantee communication.

Inserting a module with power switched on

After switching on the **TSX SAY 100** module, it waits to receive configuration from the processor or for one of the push buttons ↑↓ or +/- to be pressed, otherwise it remains at a stop.

AS-i supply fault

When an AS-i supply module fault occurs, communication stops with:
- Slaves with a watchdog positioning their outputs in the desired state, except if the slave takes its power from the AS-i.
- Slave commands switch to 0 due to lack of power.

This fault is indicated by the AS-i LED.

Break in the AS-i medium

There are several ways in which a break in the medium can occur:
1. There is a break in the medium as it exits the module:
   Behavior is the same as that for a power outage, with all slaves disappearing and a supply fault being indicated.
2. There is a break in the medium after the **TSX SAY 100** module and the AS-i supply:
   All slaves disappear and no indication of supply fault.
3. There is a break in the medium after the **TSX SAY 100** module, the AS-i supply and some slaves:
   Slaves located after the break disappear and no indication of supply fault.

4.6 Precautions of use

At a Glance

Aim of this Section

This Section deals with the precautions to be taken when installing an AS-i bus.

What's in this Section?

This section contains the following topics:

24 V auxiliary supply

Recommen-dations

When slaves use a 24 V auxiliary supply, the disappearance of this supply is not managed by the **TSX SAY 100** module.
Information on the disappearance of this supply can be accessed by using a 24 V input.

Multiple addressing

Recommen-dations

When one or more slaves are connected, make sure that you do not assign an address which is already being used by a slave on the bus.

If slave address is doubled then two scenarios may occur:

1. The two slaves with identical addresses have the same profile and manage identical I/Os: the AS-i master bus does not detect any error.
2. The two slaves with identical addresses manage different I/Os: the AS-i master bus can detect transmission errors when accessing the I/O from one of the two slaves.

AS-i V2 bus interface: TSX SAY 1000 module

IV

At a Glance

Aim of this Part

This part deals with the AS-i V2 TSX SAY 1000 bus interface module.

What's in this Part?

This part contains the following chapters:

AS-i V2 Bus Interface Module: TSX SAY 1000

5

At a Glance

Aim of this Chapter

This chapter deals with hardware installation of the TSX SAY 1000 interface module, AS-i V2 bus master on a Premium/Atrium PLC.

What's in this Chapter?

This chapter contains the following sections:

5.1 Introduction to the AS-i Bus

At a Glance

Aim of this Section

This section introduces the main characteristics of the AS-i bus.

What's in this Section?

This section contains the following topics:

Introduction to the AS-i Bus

General

The AS-i bus is a field bus (level 0) and can be used to connect sensors/actuators. This allows "Discrete" or analog type information to be routed between a bus master and sensor/actuator slaves.

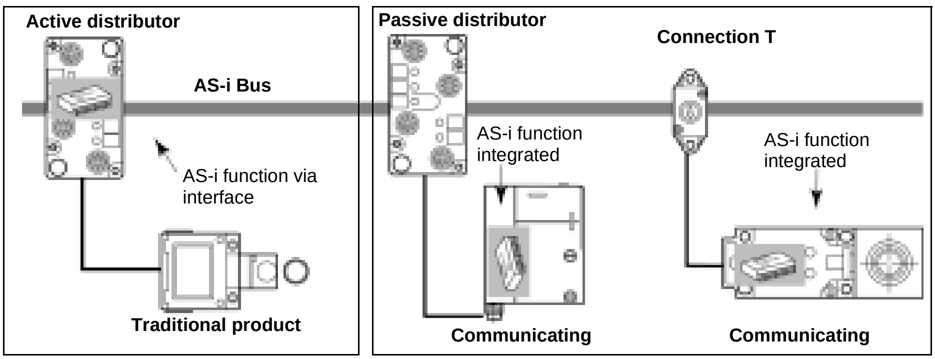
AS-i is made up of three major basic elements:

- A dedicated power supply providing voltage of about 30 VDC.
- A bus master.
- Slaves (sensors, actuators and others).

The main types of sensors/ actuators

1. **Communication sensors/actuators:**
   With a built-in AS-i function they link up directly to the AS-i bus via a passive distributor or a T-piece connection.
2. **Traditional sensors/actuators:**
   These connect to the bus via an AS-i interface (active distributor or TOR Telefast input-output bus interface). These interfaces connect the sensors and traditional actuators to the AS-i bus and provide them with dialog capacity on the bus.

Illustration:

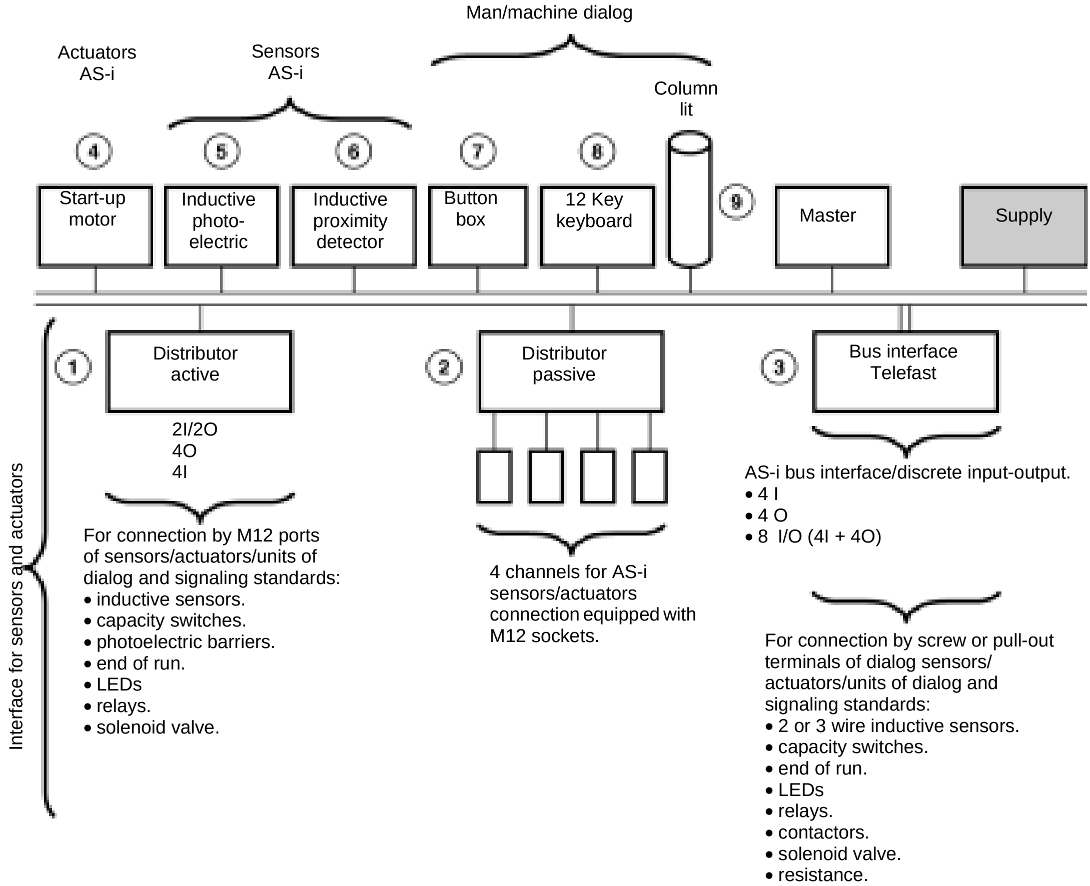


Maximum 434 I/O 248 input 186 output	Maximum 62 slaves (maximum 31 standard or 62 maximum)

Overview of AS-i Products from the Schneider Catalog

General

Non-exhaustive list of AS-i products from the Schneider catalog:



Introduction to the Main Constituent Elements

Cable

This transmits data and carries the power. It can be made up from:
- either an unshielded, polarized twin-wire AS-i ribbon cable.
- Or a standard round, shielded or unshielded twin-wire cable.

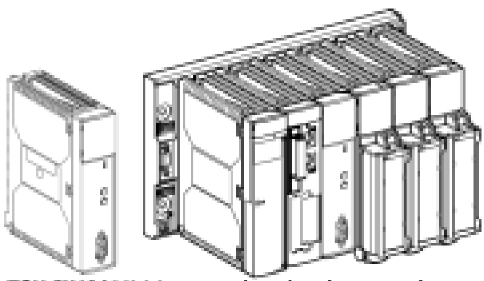
Illustration:

Guiding ribbon cable

Round cable

Bus Master

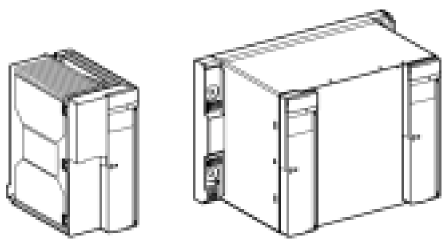
Built into a Premium/Atrium PLC station, the **TSX SAY 1000** module (AS-i bus master) manages all data exchanges on the AS-i bus.
Illustration:



TSX SAY 1000 **Premium/Atrium station**

AS-i Power Supply

AS-i dedicated power supply, designed to supply the components connected to the AS-i bus.
The distribution of this power supply uses the same medium as that used for data exchange.
Illustration:



TSX SUP A02 TSX SUP A05

Main Characteristics of the AS-i V2 Bus

General

AS-i is a system in which exchange management is ensured by a single master which, by scanning the bus, calls each slave in succession and awaits a response.
Communication series frame for slaves with standard AS-i address settings:

- 4 data bits (D0 to D3), which are the image of inputs or outputs according to the type of interface,
- 4 parametering bits (P0 to P3), which are used to set the operating modes of the interface.

Communication series frame for slaves with extended address settings:

- 3 or 4 data bits, which are the image of inputs (4 bits, D0 to D3) or outputs (3 bits, D0 to D2) depending on the type of interface,
- 3 parametering bits (P0 to P2), which are used to set the operating modes of the interface.

All slave devices connected to the AS-i bus are identified by at least one "I/O Code" and one "ID code" which completes the functional identification of the slave.
Some slaves have an ID1 code, which defines the internal functions of the slave: on analog slaves, for example, ID1 shows the slave's analog channel number.

Note: The frame base is the same for analog slaves as it is for TOR slaves. There is ascending compatibility between AS-i and AS-i V2. This means that all slaves on the market are supported by SAY 1000.

Slave Addressing

Each slave connected to the AS-i bus must have an address which lies between 1 and 31, either with "Bank" /A, or with "Bank" /B for extended address settings.
The slaves delivered from the factory have the address 0 (the address of the slave is memorized in a non-volatile format).
Addresses are programmed using a specialized addressing terminal.

Note: When replacing a faulty slave whose address has been set, the address of the slave to be replaced can be updated automatically.

Identification of Slaves

All **standard address setting slaves** connected to the AS-i bus are identified by:
- An I/O Code (input/output distribution code),
- An identification code, which completes the functional identification of the slave.

All **extended address setting slaves** connected to the AS-i bus are identified by:
- An I/O Code (input/output distribution code),
- An identification code which completes the functional identification of the slave.
- An ID1 code which defines the internal functions of the slave,
- An identification code (ID2) which completes the functional identification of the slave.

These identifications allow the AS-i master to recognize the configuration, which is present on the bus.
These different profiles have been developed by the AS-i Association. They are used to distinguish between input, output and mixed modules, "intelligent" device families, etc.

Maximum Number of Inputs/Outputs

On the same bus, an AS-i bus can support a maximum of:
- 31 4I and/or 4O standard address setting slaves, with addresses from 1 to 31
- 62 extended address setting slaves with 4I and/or 3O , using addresses from 1 A/B to 31 A/B.

This makes it possible to manage a maximum of 248 inputs +186 outputs (thus 434 inputs/outputs) when all extended slaves have 4 inputs and 3 outputs.

AS-i Cable

The AS-i cable is a twin-wire link on which communications and power supply for the connected devises are transmitted.
The link does not need to be twisted.
The cross-section of wires can be from 2 x 0.75 mm^2, 2 x 1.5 mm^2 or 2 x 2.5 mm^2, according to the current consumed by the devices.

Topology and Maximum Length of AS-i Bus

The topology of the AS-i bus is flexible. It can be perfectly adapted to meet the user's needs (point to point, on line, tree structure etc.).
In every case, the total length of all the branches of the bus must not exceed 100 meters without a relay.

AS-i Bus Cycle Time

This is the cycle time between slave(s) and the **TSX SAY 1000** module.
The AS-i system always transmits information, which is the same length to each slave on the bus. The AS-i cycle time depends upon the number of slaves connected to the bus in the presence of functioning slaves.

The scan time **t** represents the exchange time between a master and **n** active slaves (a maximum of 31 on /A or /B).
So, for:

- up to 19 active slaves, **t** = 3ms
- 20 to 31 active slaves t = (1+**n**) * 0.156ms
  When two slaves A and B have the same address, each slave in the pair is scanned every two cycles.
  This means that for 31 extended address setting slaves configured in /A, + 31 extended address setting slaves configured in /B. the scan time will be 10 ms.

Maximum cycle time:

- maximum 5 ms for 31 standard or extended address setting slaves,
- maximum 10 ms for 62 extended address setting slaves.

Reliability, Flexibility

Reliable operation is ensured by the transmission process used (Manchester current and coding modulation). The master monitors the line supply voltage and the data sent. It detects transmission errors as well as slave failures, and sends the information to the PLC.
Exchanging or connecting a new slave during operation does not disturb communications between the master and the other slaves.

5.2 Description of the TSX SAY 1000 Module

At a Glance

Aim of this Section

This Section deals with hardware installation and the characteristics of the TSX SAY 1000 module.

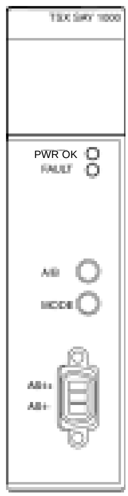
What's in this Section?

This section contains the following topics:

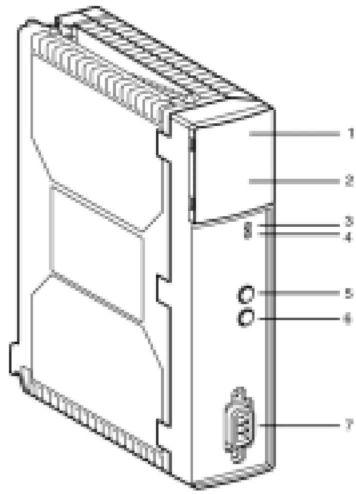
Physical Introduction

General

The TSX SAY 1000 module comes as a standard format module.
Illustration:



Front panel



Description of TSX SAY 1000 module

The module is made up of the following elements:

1. A display panel consisting of 4 LEDs for displaying the operating modes of the module:
   - RUN LED (green): lit indicates normal functioning mode of the module.
   - ERR LED (red): when lit, this indicates a module error.
   - I/O LED (red): when lit, this indicates an AS-i bus error.
   - /B LED (green): displays standard or /A address setting slaves.
2. Display panel consisting of 32 LEDs (0 to 31) which enable AS-i bus diagnostics, and display the state of each slave connected to the bus.
3. PWR OK LED (green): when lit, this indicates that power supply is consistent.
4. FAULT LED (red): when lit, this indicates faults associated with the AS-i bus.
5. A/B push button: this button informs the user of the status of devices on the bus by switching from bank A to bank B.
6. MODE push button: holding this button down causes initialization of slaves and a change to OFF-LINE. This then allows the user to programs the slaves through their infrared interface, or to connect the new diagnostic pocket to the bus. To return to normal mode, just press and hold this button again.
7. CANNON SUB D connector for connection to AS-i bus.

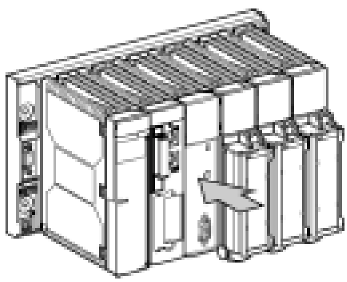
Mounting/Installation

General

The **TSX SAY 1000** module can be mounted in any position on the **TSX RKY** rack or extension rack, except for those positions dedicated to processors and power supply.

Note: Where the module is mounted on a remote X Bus rack, the maximum distance from the processor should be 175 meters minus the length of the X Bus (100 meters max.).

The module should be inserted and extracted using a flat or cross tipped screwdriver. These operations can be carried out whether the power is on or off, with no adverse effects on the module or the rack holding it.
Example of mounting a TSX SAY 1000 module:



Note: The module can be mounted and removed with both PLC and AS-i bus power switched on.

Number of Modules per Station

The maximum number of modules per Premium/Atrium PLC station depends on the type of processor installed:

Processors	Maximum number of TSX SAY 100 or SAY 100 modules
57-1xx	2
57-2xx	4
57-3xx/57-4xx	8

Connections

Connecting to the X Bus

The module connects automatically to BUSX once it is inserted into its rack. If the module is inserted into the base rack, connection to the central unit and power supply module is implicit.

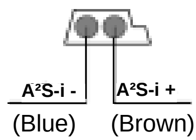
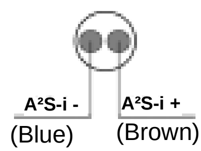
Connection to the AS-i Bus

There is no particular order in which devices (Power Supply, Bus or Slave Master) must be connected to the AS-i network, but the unit as a whole is not guaranteed to be operational during this installation phase.
The AS-i network itself does not need to be grounded. Power supply and PLC devices must, however, adhere to standard installation requirements. You are advised not to place the AS-i network near cables carrying high currents.
The network's connection system is provided for connection to a trapezoid standard multiwire AS-icable (0.75mm to 2.5mm). Regardless of the topology carried over, the combined length of AS-inetwork cabling should not exceed 100m without relay.

AS-i Bus Cables

AS-i bus cables carry the signals and supply the sensors and actuators connected to the bus with 30 VDC.

Types of AS-i cables:

Cable type	Characteristics	Illustration
Polarized AS-i ribbon cable	Color: yellow. Wire cross-section: 1.5 mm^2	
Standard round cable	Wire cross-section: 1.5 mm^2 or 2.5 mm^2	

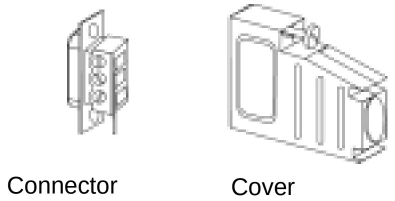
Recommended cable: product reference H05VV-F2x1.5 (flat cable), conforms to the DIN VDE 0281standard. Wire cross-section: 1.5 mm^2.

Cable Routing

The AS-i cable and the power cables carrying higher power levels must be in separate ducts, which are protected by a metal screen.
When using a shared route for control cables it is essential that the connections on these control links should conform to the technology rules (eg. the discharge diode or limiters on the terminals of self-inductive elements etc.).

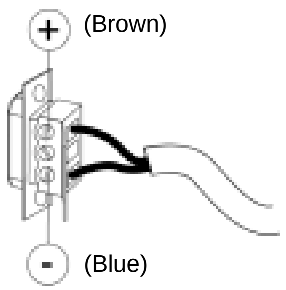
Link-up Connector

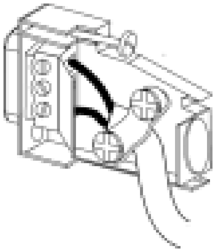
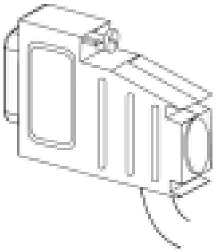
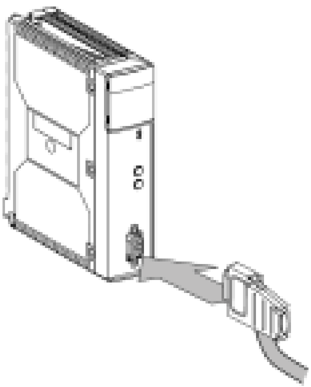
A set (connector + cover) is delivered with the module, which is used to connect the module to the AS-i bus. This connector must be linked to the cable of the AS-i bus and assembled by the user according to the procedure described later.
Illustration:



Connection of Module to Bus

To connect a module to the bus, follow the procedure below:

1	Connect the 2 wires of the AS-i cable to the connector, taking the polarities into account:  In the special event that a shielded cable is used, this should be connected to the central terminal.

2	Mount the connector in its cover and fix the cable to it: 
3	Click the cover shut: 
4	Mount the unit on the module: 

Displaying Module States

General

This is carried out with 4 LEDs: RUN, ERR, A/B, I/O which are located on the module. Their state (LED off, flashing or on) provides information on the operating mode of the module.
LED state:

LEDs	**On**	**Flashing(**)**	**Off**
RUN (green)	Module **OK** and configured	Awaiting configuration	HS Module or autotest fault
ERR (red)	Serious non-rectifiable Module fault	Rectifiable module fault (PL7 configuration, AS-i power supply)	Module **OK**
/B (green)	/A configured slaves display	-	/B configured extended address settings slaves display
I/O (red)	AS-i bus Fault	Fault or awaiting user configuration	AS-i Bus **OK**
0 to 31 (green)	Slave number OK (projected, present and active)	Slave Number /OK (*)	Slave number not projected and absent

(**) all LEDS flash during module autotests.
(*) a slave is declared /OK when one of the conditions required for correct operation is not satisfied, regardless of the error level:

- Error Level 1:
  - Slave declared but not detected,
  - Slave detected but not declared
- Error Level 2:
  - Slave has different profile from declared slave,
  - Slave profile incompatible with address,
  - Slave with incorrect subprofile.
- Error Level 3:
  - Slave refuses parameters,
  - Slave has auxiliary power supply fault,
  - Analog data fault (channel fault),
  - Other faults linked to analog slave characteristics,
  - Input / Output or auxiliary power supply overload,
  - External error:
    - thermal relay,
    - slave autotests NOK.

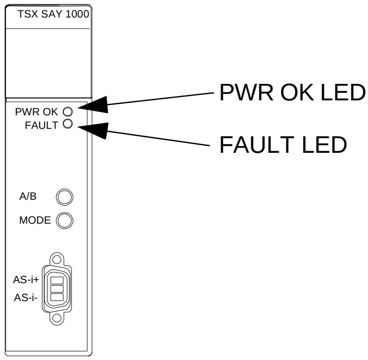
The user must connect his/her programming tool to access detailed information on the faulty slave. The local display can only show a malfunction in its related slave.

Specific Display Panels on the TSX SAY 1000 Module

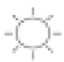
General

2 LEDs: PWR OK and FAULT give specific information on the TSX SAY 1000 module.

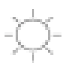
View of the 2 LEDs:



PWR OK LED (green):

LED state	Meaning
 LED on	Power Supply consistent
 LED off	Power Supply inconsistent

FAULT LED (Red)

LED state	Meaning
 LED on	AS-i bus faults
 LED off	No faults

Technical Characteristics of the AS-i V2 Bus

AS-i V2 Bus

Technical Characteristics:

Characteristic	Value
Maximum cycle time of bus: ● - 1 to 19 slaves = 3ms, ● - 20 to 62 slaves = (1+n)*156s where n = number of active slaves.	maximum 5 ms for 31 standard or extended address setting slaves, maximum 10 ms for 62 extended address setting slaves.
Maximum number of slaves on the bus.	31 standard address setting slaves, or, 62 extended address setting slaves.
Maximum length of AS-i bus cables: all branches without relay with two relays	 100 meters 300 meters
Maximum number of I/O managed by the bus	standard address setting slaves: 124 inputs + 124 outputs extended address setting slaves: 248 inputs + 186 outputs
Nominal bus supply voltage	30 VDC

TSX SAY 1000 Module

Technical Characteristics:

Characteristic	Value
Programming the TSX SAY 1000 module	from PL7 Junior, PL7 Pro V4.2, or P-Unit software
Response time with 31 slaves (1) for a PLC cycle time of 10 ms	Typically 27 ms, 37 ms maximum
PLC current consumed on 5V	Typically 100 mA / 150 mA maximum
Current consumed on 30 V AS-i/AS-i	Typically 50 mA / 60 mA maximum
Power dissipation	2.5 W max.
Protection against polarity inversion on bus inputs	Yes
Degree of protection	IP20
Isolated voltage	500 VDC
Operating temperature	0 to 60 degrees Celsius
AS-i master profile	M2e
Standards and service conditions	Conforms to those of Premium PLCs (see Volume 1)
(1) Logical response time + time between an AS-i input activated on the bus, processed in the PLC application and applied to an AS-i output.	

Personnel Safety

General

To ensure personnel safety it is essential:

- To earth the ground terminal of the PLC.
- To use an AS-i VLSV (very low safety voltage) supply, nominal voltage 30 VDC.
- For PLCs which are connected to an alternating current network, a differentiel circuit breaker must be placed upstream of this network, and this will cut off the PLC power supply source if ground leakage if detected.
- For PLCs which are connected to a direct current supply source you must ensure that the supply placed upstream of the PLC is VLVS.
- To use certified AS-i products on the bus.

Due to the type of technology and connection, the **TSX SAY 1000** module only receives 5 VDC and its 0V is linked to the PLC ground.

5.3 Input/Output Object Addressing

Addressing Input/Output Objects

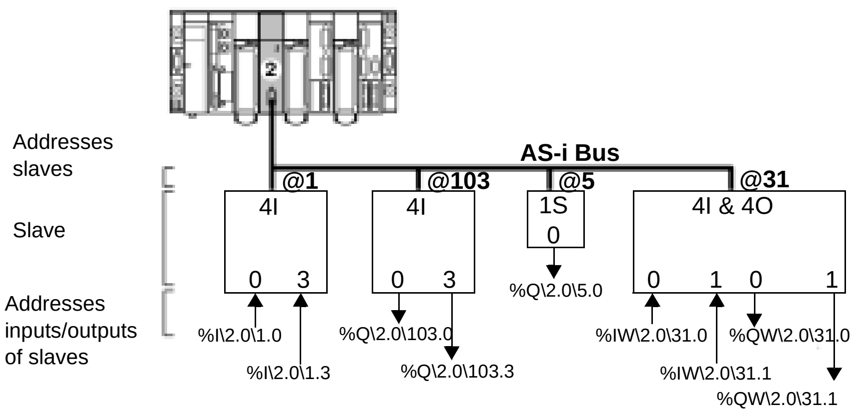
General

Acquisition of inputs and update of slave device outputs connected to the AS-i bus are carried out automatically. This occurs at the start and end of each cycle respectively of the task in which the **TSX SAY 1000** module is configured.
The user program has access to these inputs and outputs via language objects whose syntax for standard or extended address setting slot /A and /B slaves is as follows:

%	I or Q	\	xy.0	\	n	.	i
Symbol	Type of object **I**=input **Q**=output **W**=analog		Module/channel address of the TSX SAY 1000 **x**=rack number **y**=position number **0**=channel 0 of the module		No. of slave: **1 to 31** for /A **101 to 131** for /B		Rank of bit **0 to 3**

Example

Particular example of rack 0:
%I\2.0\1.3 indicates: input 3 of slave TOR /A 1, channel 0 of the **TSX SAY 1000** module, positioned in rack 0 slot 2.
%Q\2.0\103.0 indicates: input 0 of slave TOR /B 103, channel 0 of the **TSX SAY 1000** module, positioned in rack 0 slot 2.
%IW\2.0\31.0 indicates: input 0 of slave ANA /A 31, channel 0 of the **TSX SAY 1000** module, positioned in rack 0 slot 2.
Illustration:



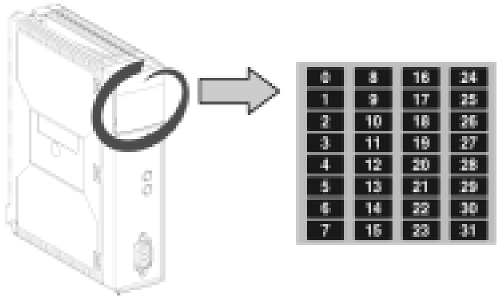
Note: The physical address of an AS-i slave is programmed by the **XZM C11** portable console.
An analog slave is configured only on slot /A.
The number of an extended TOR /B slave lies between 101 and 131.
The number of a standard TOR /A slave, or an ANA slave (which is always standard) lies between 1 and 31.
When a standard address setting slave is set at /A, an extended address setting slave at /B cannot have the same address. Only two extended address setting slaves can have the same address at /A and /B.

5.4 AS-i Bus Diagnostics

Introduction to AS-i Bus Diagnostics

General

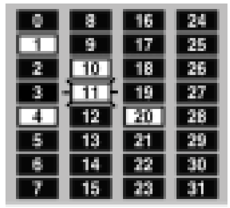
The module display panel displays the presence and operating status of each slave on the AS-i bus.
Illustration:



Diagnostics of the AS-i Bus

Table giving diagnostics of module's standard- and extended address setting slaves:

View of standard- or extended address setting slaves on bank A: /B LED off	**View of extended address setting slaves on bank B: /B LED light**
View of AS-i bus image. Each LED from 1 to 31 corresponds to a standard or extended slave address on the bus. ● LED on: slave active ● LED off: slave not expected and not detected. ● LED flashes rapidly: peripheral fault on slave. ● LED flashing slowly: configuration fault on slave.	View of AS-i bus image. Each LED 1 to 31 corresponds to an extended address setting slave address on the bus. ● LED on: slave present ● LED off: slave not expected and not detected. ● LED flashes rapidly: peripheral fault on slave. ● LED flashing slowly: configuration fault on slave.

<table>
<tr><th>View of standard- or extended address setting slaves on bank A:
/B LED off</th><th>View of extended address setting slaves on bank B:
/B LED light</th></tr>
<tr><td colspan="2">Diagnostics example with 5 slaves addressed at 1, 4, 10, 11, 20:


In brief :
● LEDs for slaves 1, 4, 10, 20 are lit, therefore these slaves are active,
● slave 11's LED is flashing, so it is faulty,
● the other LEDs are off because no slaves are expected or detected at these addresses.</td></tr>
</table>

5.5 Operating Modes of the TSX SAY 1000 Module

Operating Modes of the TSX SAY 1000 Module

General

For more information, refer to the section on *AS-i installation* in the Premium PLCs Applications Manual - Basic Applications, Volume 1(Ref.: TLX DS 57 PL7 V4.2).

Output Fallback Position

Since some AS-i V2 slaves have an internal watchdog based on a communication shutdown, when there is a fallback the module will function in the following way:
- fault detection (PLC stop, UC fault, module fault),
- bus automatically switched OFF LINE by bus master.

Consequences for slaves present on the bus:
- "old generation" slaves: output maintenance,
- "new generation" slaves: preprogrammed fallback positions are implemented in the slave.

Automatic Slave Addressing

When this function is enabled in the module configuration, it allows the replacement of a faulty slave with a slave of the same type without stopping the AS-i bus, and without the need for special action:
- If the replacement slave is programmed with the same address and has the same profile, it will be automatically inserted in the list of slaves detected, then activated. If this is not the case, the ERR and AS-i LEDs will flash simultaneously.
- If the new slave has never been used (address 0, new slave) and has the same profile, the slave automatically takes on the address of the replaced slave and is therefore in the list of detected slaves and the list of active slaves. If this is not the case, the ERR and AS-i LEDs will flash simultaneously.

These actions are only possible if **one and only one** slave is faulty in the configuration.

Communication Fault

If there is a break in communication with the CPU, following a CPU watchdog (where the SAY 1000 module is located in the main rack) or a retraction of the BUSx cable (where the SAY 1000 module is located in the extension rack), the module switches to security mode and stops communication on the AS-i bus.

Module Fault

In the event of a serious fault on the **TSX SAY 1000** module (faulty component, etc.) the module stops communicating with the X Bus and with the AS-i Bus. The same type of behavior occurs when a module is removed with the power on.

Removing a Module with Power Switched On

Should a module be removed with the power switched on, communication with the X Bus stops and the processor indicates a module fault.
Communication with the AS-i bus is also interrupted without notice. In this case, the slaves with a watchdog set their outputs in the desired state, and the others remain in position and cannot be set to 0 since the module cannot guarantee communication.

Inserting a module with power switched on

After voltage is applied to the **TSX SAY 1000** module, it expects to receive a configuration via PL7. If this does not occur it remains in stop mode.

AS-i Supply Fault

When there is an AS-i power supply fault communication stops and the slaves behave differently.

- slaves with a watchdog positioning their outputs in the defined state, except if the slave takes its power from the AS-i.
- all slave commands switch to 0 due to lack of power.

From a language point of view, all slaves seem faulty, and the absence of AS-i power supply is indicated in the Channel Status.

Break in the AS-i Medium

There are several ways in which a break in the medium can occur:

1. There is a break in the medium as it exits the module:
   Behavior is the same as that for a power outage, with all slaves disappearing and a supply fault being indicated.
2. There is a break in the medium after the **TSX SAY 1000** module and the AS-i supply:
   All slaves disappear and no indication of supply fault.
3. There is a break in the medium after the **TSX SAY 1000** module, the AS-i supply and some slaves:
   Slaves located after the break disappear and no indication of supply fault.

5.6 Precautions of Use

At a Glance

Aim of this Section

This Section deals with the precautions to be taken when installing an AS-i bus.

What's in this Section?

This section contains the following topics:

24 VDC Auxiliary Supply

Recommendations

When slaves use a 24 VDC auxiliary supply, the disappearance of this supply is not managed by the TSX SAY 1000 module.
Information on the disappearance of this supply can be accessed by using a 24 VDC input.

Multiple Address Settings

Recommendations

When one or more slaves are connected, make sure that you do not assign an address, which is already being used by a slave on the bus.

WARNING

Double slave addressing

The two slaves with identical addresses have the same profile and manage identical I/Os: the AS-i master bus does not detect any error. The two slaves with identical addresses manage different I/Os: the AS-i master bus can detect transmission errors when accessing the I/O from one of the two slaves.

Failure to follow this precaution can result in death, serious injury, or equipment damage.

5.7 AS-i V2 Certification

AS-i V2 Certification

Description

Header:

Vendor:	
Product name:	TSX SAY 1000
Order No. :	
Release:	
Master profile:	
Date:	

List of implemented functions:

No.	List of implemented functions	Mark/ Profile	Remark/ implemented by
A	**Functions or calls at host interface**		
1	Image, Status = Read_IDI ()	*	TSX SAY 1000
2	Status = Write_OD (Image)	*	TSX SAY 1000
3	Status = Set_Permanent_Parameter (S_Addr, S_Param)	*	TSX SAY 1000
4	S_Param, Status = Get_Permanent_Parameter (S_Addr)	*	TSX SAY 1000
5	Status, RS_Param = Write_Parameter (S_Addr, S_Param)	*	TSX SAY 1000
6	Status, S_Param = Read_Parameter (S_Addr)	*	TSX SAY 1000
7	Status = Store_Actual_Parameters	*	TSX SAY 1000
8	Status = Set_Permanent_Configuration (S_Addr,S_ Config)	*	TSX SAY 1000
9	S_Param, Status = Get_Permanent_Parameter (S_Addr)	-	
10	Status = Store_Actual_Configuration ()	-	
11	Status, S_Config = Read_Actual_Configuration (S_Addr)	*	TSX SAY 1000
12	Status = Set_LPS (S_List)	*	TSX SAY 1000
13	Status, S_List = Get_LPS ()	*	TSX SAY 1000
14	Status, S_List = Get_LAS ()	*	TSX SAY 1000
15	Status, S_List = Get_LDS ()	*	TSX SAY 1000
16.0	Status, Flags = Get_Flags ()	*	TSX SAY 1000
16.1	Status, Flag = Get_Flag_Config_OK ()	*	TSX SAY 1000
16.2	Status, Flag = Get_Flag_LDS.0 ()	*	TSX SAY 1000

No.	List of implemented functions	Mark/ Profile	Remark/ implemented by
16.3	Status, Flag = Get_Flag_Auto_Address_Assign ()	*	TSX SAY 1000
16.4	Status, Flag = Get_Flag_Auto_Prog_Available ()	*	TSX SAY 1000
16.5	Status, Flag = Get_Flag_Configuration_Active ()	*	TSX SAY 1000
16.6	Status, Flag = Get_Flag_Normal_Operation_Active ()	*	TSX SAY 1000
16.7	Status, Flag = Get_Flag_APF ()	*	TSX SAY 1000
16.8	Status, Flag = Get_Flag_Offline_Ready ()	*	TSX SAY 1000
16.9	Status, Flag = Get_Flag_Periphery_OK ()	*	TSX SAY 1000
17	Status = Set_Operation_Mode (Mode)	*	TSX SAY 1000
18	Status = Set_Offline_Mode (Mode)	*	TSX SAY 1000
19	Status = Activate_Data_Exchange (Mode)	*	TSX SAY 1000
20	Status = Change_Slave_Address (S_Addr1, S_Addr2)	*	TSX SAY 1000
21.1	Status = Set_Auto_Adress_Enable (Mode)	*	TSX SAY 1000
21.2	Mode = Get_Auto_Adress_Enable ()	*	TSX SAY 1000
22.1	Status, Resp = Cmd_Reset_AS-i_Slave (S_Addr, RESET)	-	
22.2	Status, Resp = Cmd_Read_IO_Configuration (S_Addr, CONF)	-	
22.3	Status, Resp = Cmd_Read_Identification_Code(S_Addr, IDCOD)	-	
22.4	Status, Resp = Cmd_Read_Status (S_Addr, STAT)	-	
22.5	* Status, Resp = Cmd_Read_Reset_Status (S_Addr,STATRES)	-	
22.6	Status, Resp = Cmd_Read_Ext_ID-Code_1 (S_Addr, IDCOD1)	-	
22.7	Status, Resp = Cmd_Read_Ext_ID-Code_2 (S_Addr, IDCOD2)	-	
23	Status, S_List = Get_ List of Periphery Faults ()	*	TSX SAY 1000
24	Status = Write_Extended_ID-Code_1(S_Ext_ID-Code_1)	*	TSX SAY 1000
B	**Integrated support of slave profiles**		
1	Analog slave profile S7.3 support integrated	*	TSX SAY 1000
2	Analog slave profile S7.4 support integrated	-	

(-) = not implemented functions
(*) = implemented functions

Communication:
TSX SCY 11601/21601 modules and PCMCIA cards

V

At a Glance

Aim of this Part

This Part deals with installing hardware for **TSX SCY 11601/21601** communication modules and PCMCIA communication cards.

What's in this Part?

This part contains the following chapters:

At a Glance

6

At a Glance

Subject of this Chapter

This chapter deals with the general features on **TSX SCY11601/ 21601** modules and PCMCIA communication cards.

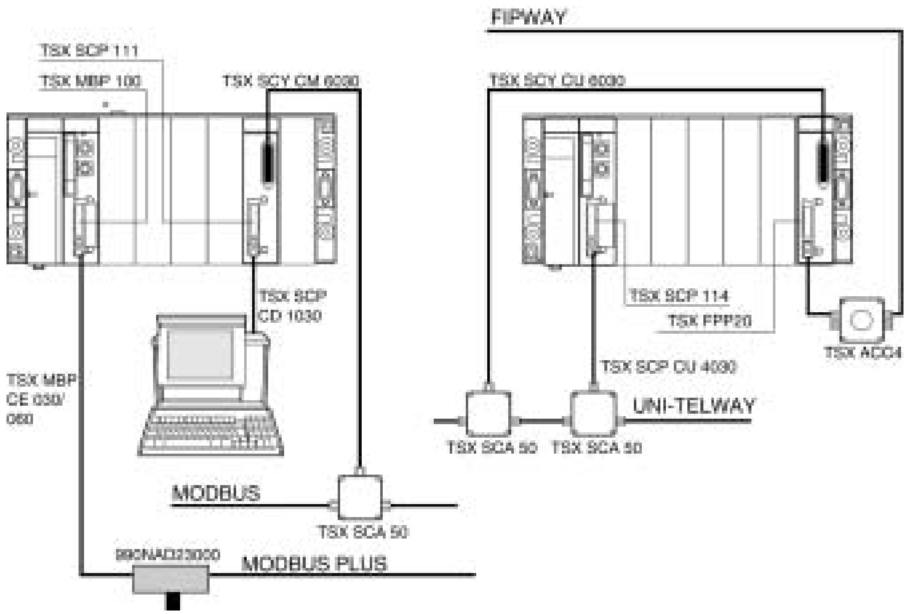
What's in this Chapter?

This chapter contains the following topics:

General communication architecture

General

Illustration:



Operating standards

General

TSX SCY 11601/21601 modules and **PCMCIA** communication cards comply with the following international norms and standards:

- US Standards: UL508, IEC 1131-2
- CANADA Standards: CSA C22.2/1 42
- Compliance with regulation: FCC-B
- EC labeling
- PCMCIA mechanical standard type III E
- PCMCIA 2.01

The built-in link of the **TSX SCY 11601** module complies with communication standards:

- Modbus/Jbus
- XWAY

The built-in link of the **TSX SCY 21601** module complies with communication standards:

- UNI-TELWAY
- Modbus/Jbus
- XWAY

The **TSX FPP 20** PCMCIA FIPWAY card and **TSX FFP 10** FIPIO agent comply with communication standards:

- FIP protocol (link, network management)
- PCMCIA
- XWAY

TSX SCP 111, **112** and **114** PCMCIA cards comply with communication standards:

- UNI-TELWAY, Modbus/Jbus protocols
- PCMCIA
- XWAY

Installing TSX SCY 11601/21601 modules

7

At a Glance

Subject of this Chapter

This chapter deals with the hardware installation of **TSX SCY 11601/21601** modules.

What's in this Chapter?

This chapter contains the following sections:

7.1 At a Glance

At a Glance

TSX SCY 11601: General

The **TSX SCY11601** communication module is used to communicate via a JBUS/MODBUS link.
It comprises a communication channel, channel 0, mono-protocol, isolated RS485 asynchronous serial link supporting the JBUS/MODBUS protocol.

TSX SCY 21601: General

The **TSX SCY 21601** communication module is used to host PCMCIA communication cards.
It comprises two communication channels:

- A multi-protocol built-in channel (channel 0), isolated RS485 asynchronous serial link, supporting UNI-TELWAY, Jbus/Modbus or Character Mode protocols.
- A PCMCIA host channel (channel 1) which supports the following protocols:
  - UNI-TELWAY, Jbus/Modbus and Character Mode on an RS 232-D, Current Loop, or RS 485 link, corresponding to cards **TSX SCP 111**, **112** and **114**.
  - FIPWAY cell network corresponding to the **TSX FPP 20**card.

Notes for the two modules

Note: Important: The built-in channel on **TSX SCY 11601/21601** modules is only compatible with a two wire RS 485 link.

Note: The **TSX SCY 11601/21601** communication modules are only compatible with SV software version ≥3.0 Premium/Atrium processors (as indicated on the side label of the processor module).

7.2 Description

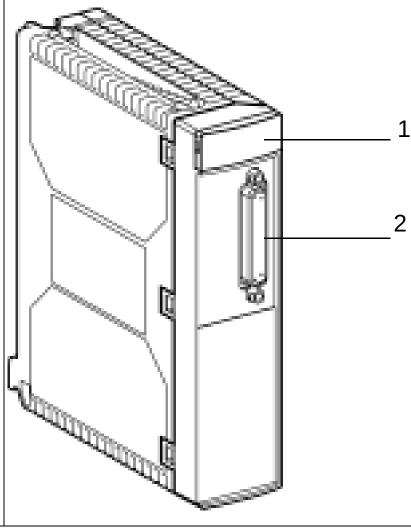
Description

TSX SCY 11601 module: General

The **TSX SCY 11601** module is a standard format module which can be inserted into one of the slots on a Premium/Atrium PLC station rack.

> **Note:** The X bus remote is not authorized for this module.

The **TSX SCY 11601** module is made up of the following components:

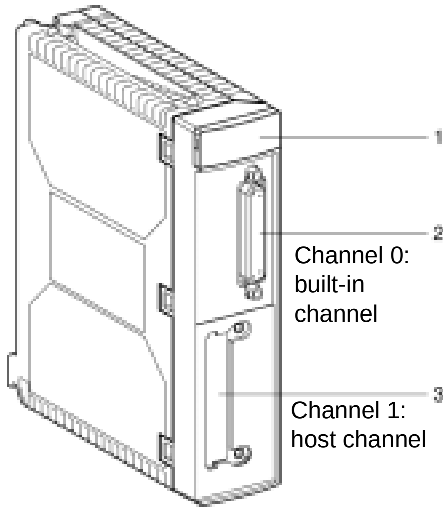
1. Three indicator LEDs on the front of the module: ● RUN and ERR show the module's status. ● CH0 displays the status of the built-in serial link channel (channel 0) communication. **2.** Built-in channel (Channel 0) equipped with a 25 pin SUB-D female connector, half duplex mode (channel 0) RS 485 base link: ● Jbus/Modbus	Illustration: 

TSX SCY 21601 module: General

The **TSX SCY 21601** module is a standard format module which can be inserted into one of the slots on a Premium/Atrium PLC station rack.

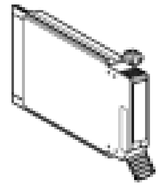
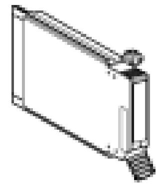
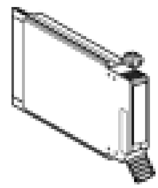
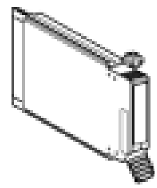
> **Note:** The X bus remote is not authorized for this module.

The **TSX SCY 21601** module is made up of the following components:

1. Three indicator LEDs on the front of the module: ● RUN and ERR show the module's status. ● CH0 displays the status of the built-in serial link channel (channel 0) communication. **2.** Built-in channel equipped with a 25 pin SUB-D female connector, half duplex mode (channel 0) RS 485 base link: ● UNI-TELWAY ● Jbus/Modbus ● Character Mode **3.** PCMCIA type III (channel 1) card host channel.	Illustration: 

Insertable cards (TSX SCY 21601)

Different types of communication cards which can be built into the **TSX SCY 21601** module's host channel:

Type	Description	Illustration
TSX SCP 111	Multiprotocol card (UNI-TELWAY, Modbus/Jbus, Character Mode), RS 232 D, 9 non-isolated signals.	
TSX SCP 112	Multiprotocol card (UNI-TELWAY, Modbus/Jbus, Character Mode), current loop (BC 20 mA).	
TSX SCP 114	Multiprotocol card (UNI-TELWAY, Modbus/Jbus, Character Mode), RS 485, RS 422 compatible isolated.	
TSX FPP 20	FIPWAY network cards	

7.3 Built-in Channel Specifications

Built-in Channel Specifications

General

The built-in channel of **TSX SCY 11601/21601** modules includes:
- An RS 485 Physical Interface.
- A twisted double pair medium.
- The **TSX SCY 11601** includes: Modbus/Jbus protocol,
- The **TSX SCY 21601** includes: UNI-TELWAY, Modbus/Jbus and Character Mode protocols.

Specifications

Specifications of the built-in link for the following 3 protocols:

	UNI-TELWAY (21601)	**Modbus/Jbus**	**Character Mode (21601)**
Type	Master-Slave	Master-Slave	Half duplex
Flow	9600 bits/sec. Parameters can be set from 1200 to 19200 bits/sec.	9600 bits/sec. Parameters can be set from 1200 to 19200 bits/sec.	9600 bits/sec. Parameters can be set from 1200 to 19200 bits/sec.
Number of devices	28	32	-
Number of slave addresses	98	98 for the 21601, 247 for the 11601,	-
Length of bus without branching	1000 m	1,300 m	1,000 m
Message Size	240 bytes	256 bytes	4 Kb
Utilities	UNI-TE Master-slave, Slave-slave, Messaging Requests	Word/bit Reading Word/bit Writing Diagnostics	Character string Send, Character string Receive

7.4 TSX SCY 21601 module's host channel compatibility

TSX SCY 21601 Host Channel Compatibility

General

The cards supported by the host channel are:

- PCMCIA cards: **TSX SCP 111**, **112**, **114** which communicate with Premium/ Atrium, 1000 Series and Modicon PLCs and other UNI-TELWAY, Jbus/Modbus and Character Mode compatible products. PCMCIA cards are also Jbus/Modbus compatible with 1000 Series PLCs
- The **TSX FPP 20** card is compatible with the following FIPWAY devices:
  - Model 40 PLCs (**TSX 47-455**, **TSX 67-455**, etc) in versions later than 5.0.
  - TSX 17 PLCs
  - PC compatibles connected with **TSX FPC10** and **TSX FPC 20**cards.

Note: The **TSX FPP 10** card is not supported by the host channel.

7.5 Installation

Installation

General

The **TSX SCY 11601/21601** modules can be installed in a Premium/Atrium PLC station rack.
They are part of an X-WAY network architecture based on Series 7, Micro, Premium and Atrium PLCs.

The **TSX SCY 11601** communication module brings the following to a PLC station:
- A JBUS/MODBUS isolated mono-protocol RS 485 communication channel.

The **TSX SCY 21601** communication module brings the following to a PLC station:
- A multi-protocol isolated RS 485 communication channel.
- A standard PCMCIA communication card slot.

The **TSX SCY 11601/21601** modules can be installed in any available slot in a Premium/Atrium PLC station rack.

Maximum number of modules

A **TSX SCY 11601** module supports up to a maximum of 1 application-specific communication channel, namely the RS 485 channel built into the module.

A **TSX SCY 21601** module can support a maximum of 2 application-specific communication channels, a built-in RS 485 channel and a channel from the PCMCIA card which can be integrated into the module.

Since the maximum number of application-specific channels managed by a PLC station depends on the type of processor installed, the number of **TSX SCY 11601 or TSX SCY 21601** modules in a station will therefore rely on:
- The type of processor installed.
- The number of application-specific channels already used, other than communication channels.

Consequently, the user must perform an evaluation on his/her PLC station to find out how many application-specific channels are already in use, and thus determine the number of **TSX SCY 11601 or TSX SCY 21601** modules which may be used.

> **Note:** Application-specific channel recognition is defined in the Installation Manual for Premium TSX DM 57 PLCs_Volume 1.

A reminder of the number of application-specific channels managed by each type of processor:

Processors	**Number of application-specific channels**
TSX P57103/TSX P57153	8
TSX P57203 / TSX P57253 / TSX P572623 / TSX P572823 - PCX 57203	24
TSX P57303/TSX P57353 - PCX 57353 / TSX P573623	32
TSX P57453 / TSX P574823	64

Connection/ Disconnection

TSX SCY 11601/21601 modules can be **connected or disconnected whilst the power is on**. These devices **do not have** a memory save function.
When one of the two modules is disconnected from the rack, its internal memory is erased. The module goes through an initialization phase once it is reconnected.
A **TSX SCY 21601** module which has a PCMCIA card installed may be disconnected when the power is on.

Note: However, PCMCIA cards, used in TSX SCY 21601 may not **be disconnected** while the power is on.

7.6 Operation

Operation

TSX SCY 11601 module: General

The **TSX SCY 11601** module manages a communication channel (channel 0):

- channel 0: Jbus/Modbus protocol on an RS 485 half duplex isolated, standardized physical link, with a speed limited to 19200 bits per second.

TSX SCY 21601: General

The **TSX SCY 21601** module manages two independent communication channels which each have their own functions:

- channel 0 processes UNI-TELWAY, Jbus/Modbus and Character Mode protocols on an RS 485 half duplex isolated, standardized physical link, with a speed limited to 19200 bits per second.
- channel 1 can take one of the following PCMCIA communication cards:
  - Field Bus: **TSX SCP 111** (RS232), **TSX SCP 112** (current loop), **TSX SCP 114** (RS 422/RS 485) UNI-TELWAY, Jbus/Modbus and Character mode cards.
  - Cell network: **TSX FPP 20** FIPWAY card.

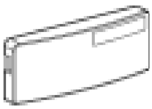
The choice of PCMCIA card and protocol is made when the **TSX SCY 21601** module's communication channels are configured using PL7 Junior and PL7 Pro software.

7.7 Module Visual Diagnostics

Module Visual Diagnostics

General

Three LEDs are located on the front panel of **TSX SCY 11601/21601** modules. These LEDs provide information on the **operating status of the module** and on the **communication status** of the **built-in** serial link channel.
Illustration:



The communication status of the host channel is determined using the ERR and COM LEDs in the PCMCIA cards on the serial or FIPWAY link (See *Visual diagnostics of PCMCIA cards, p. 190*)

Meaning of the LEDs:

RUN	ERR	CH0	Comments
○	(1)	(1)	Module powered-down or module failure
●	○	○	No communication on the built-in channel
●	○	(2) ●	Communication on the built-in channel
●	●	(1)	Serious fault on the built-in channel
●	◐	○	Configuration fault. No device OK on the channel
●	◐	◐	Faulty device on the built-in channel (for TSX SCY 21601 only)
◐	◐	◐	Autotests in progress

○ **Off** ● **On** ◐ **Flashing**

- **(1) = Indifferent state,**
- **(2) = Line activity.**

7.8 Built-in Channel Connection

At a Glance

Aim of this Section

This section describes the different ways to connect the built-in channel of **TSX SCY 11601/21601**modules.

What's in this Section?

This section contains the following topics:

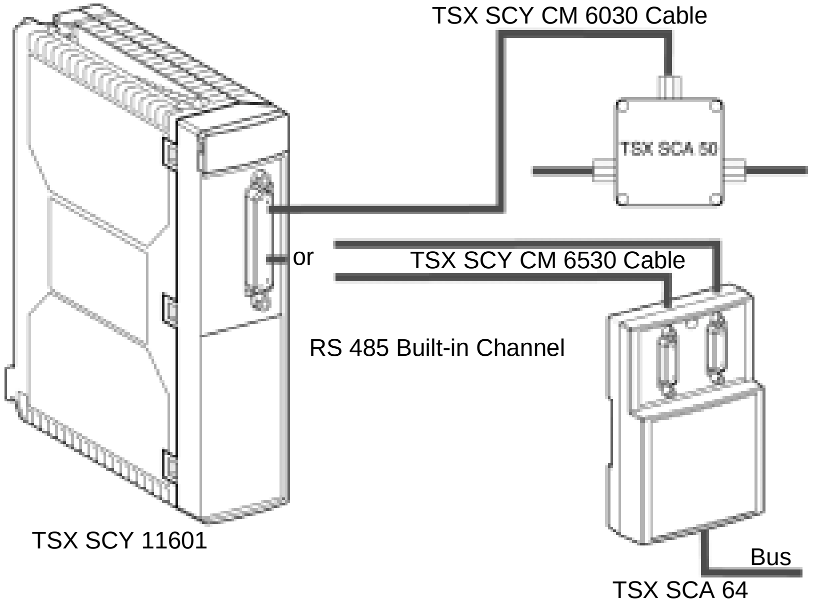
At a Glance

TSX SCY 11601 module: General

Cabling accessories designed to connect the **TSX SCY 11601** module's RS 485 base link allow the following connection:

- Connection to the Jbus/Modbus network via a **TSX SCA 50** unit through the **TSX SCY CM 6030** cable or a **TSX SCA 64** unit through the **TSX SCY CM 6530** cable.

Illustration:

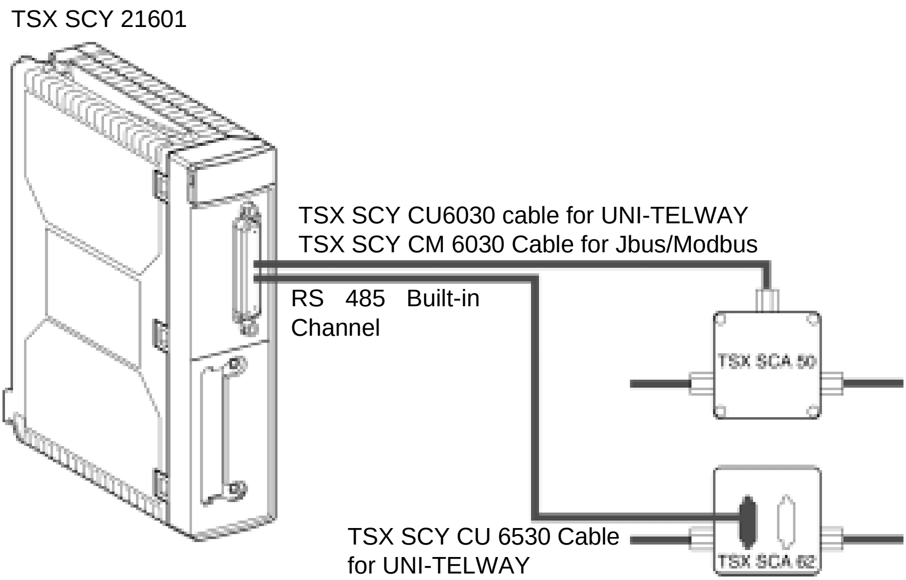


TSX SCY 21601 module: General

Cabling accessories designed to connect the **TSX SCY 21601** module's RS 485 base link allow the following connections:

- Connection to the UNI-TELWAY network via a **TSX SCA 50** unit through the **TSX SCY CU6030** cable or a **TSX SCA 62** unit through the **TSX SCY CU 6530**cable.
- Connection to the Jbus/Modbus network via a **TSX SCA 50** or **TSX SCA 64** unit through the **TSX SCY CM 6530** cable.
- Connection to standard RS 485 devices using a connector adapted to the link via the **TSX SCY CU 6030** or **TSX SCY CM 6030**cable.

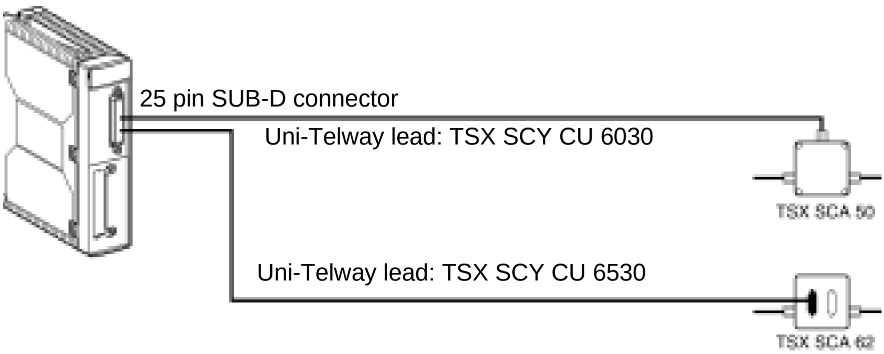
Illustration:



Connection of TSX SCY 21601 to Uni-Telway field bus

General

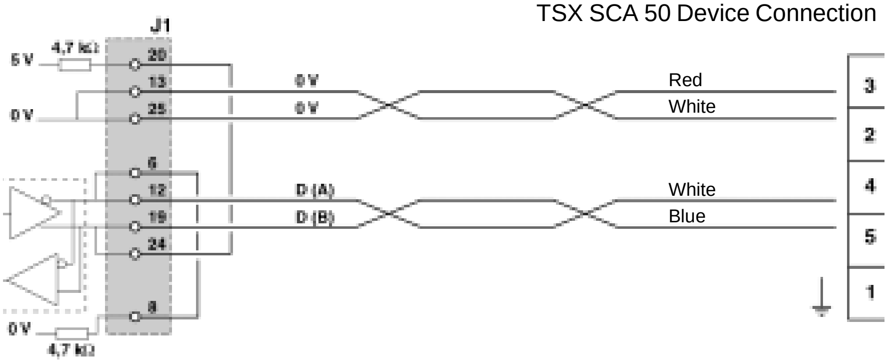
The module's built-in communication channel is connected to the Uni-Telway field bus by the **TSX SCY CU 6030** connection cable, via the **TSX SCA 50** connection device.
Illustration:



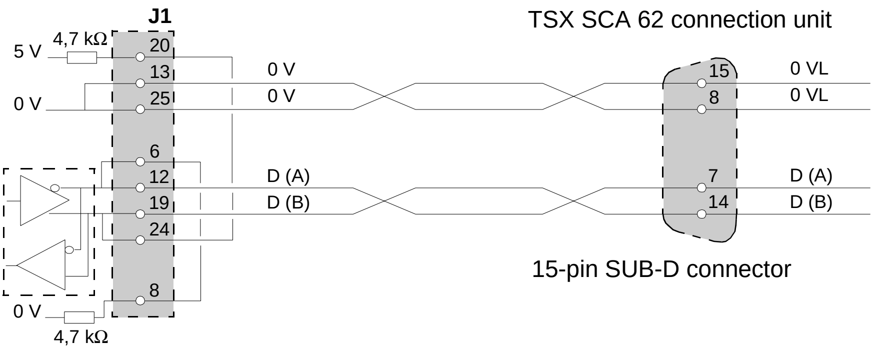
Description of leads

Lead TSX SCY CU 6030:

TSX SCA 50 Device Connection



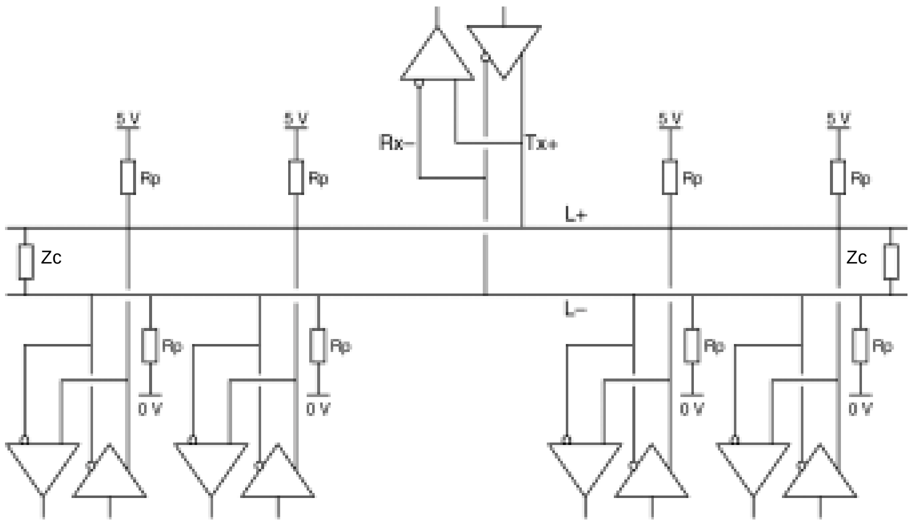
Lead TSX SCY CU 6530:



Reminder on adapting RS 485 distributed line for the TSX SCY 21601

General

This adaptation is used for Uni-Telway networks.
Diagram of normal Uni-Telway network architecture:



Connection of network units

The network is made up of one shielded twisted pair. The connection of the network's different units is carried out as follows:

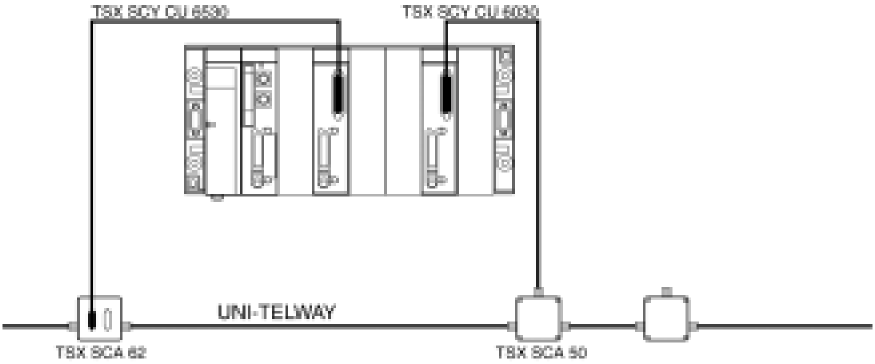
1	Link all outputs labeled + (Tx+, Rx+) to the network wire labeled: L+.
2	Link all outputs labeled - (Tx-, Rx-) to the network wire labeled: L-
3	Adapt the network's impedance using two adaptation nodes (Zc) located on the two end stations of the network.
4	For of distributed polarization of the network, link the L+ 5 V wire to the L- 0 V wire via two polarization resistors (Pr = 4,7 KΩ). Do this for each station. This polarization will keep the network stable while not in use.

Integral Characteristics

Integral characteristics are:
- Up to 32 stations
- Maximum range: about 1300 m
- Bus Topology
- ≤ 15 m Branching
- 2 wire half duplex
- Adapting the line end on end units
- Adapting the Pr = 4.7 KΩ distributed line

Example of Uni-Telway architecture

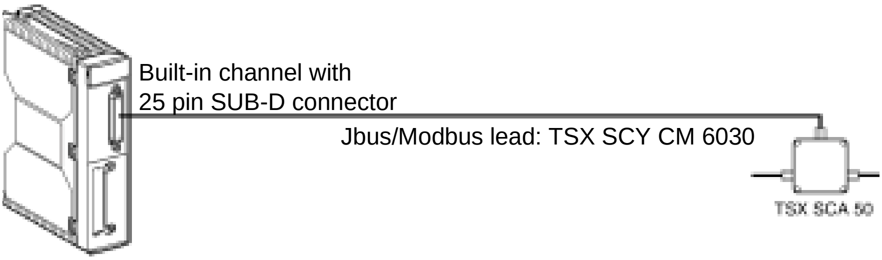
Example



Connection of TSX SCY 11601/21601 modules to the Jbus/Modbus field bus

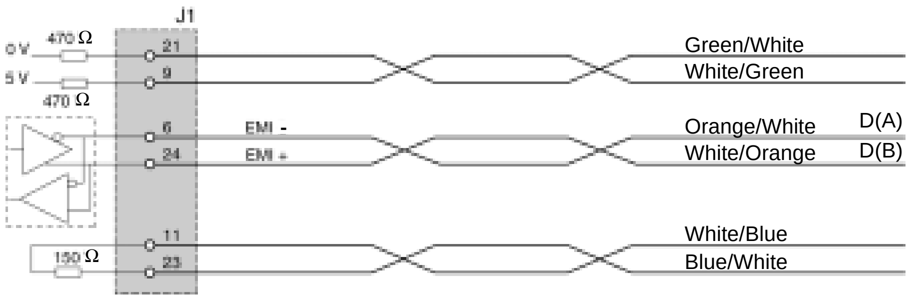
General

The built-in channel is linked to the bus via the **TSX SCA 50** device through the **TSX SCY CM 6030** connection cable.
Illustration of **TSX SCY 21601**:



Lead description

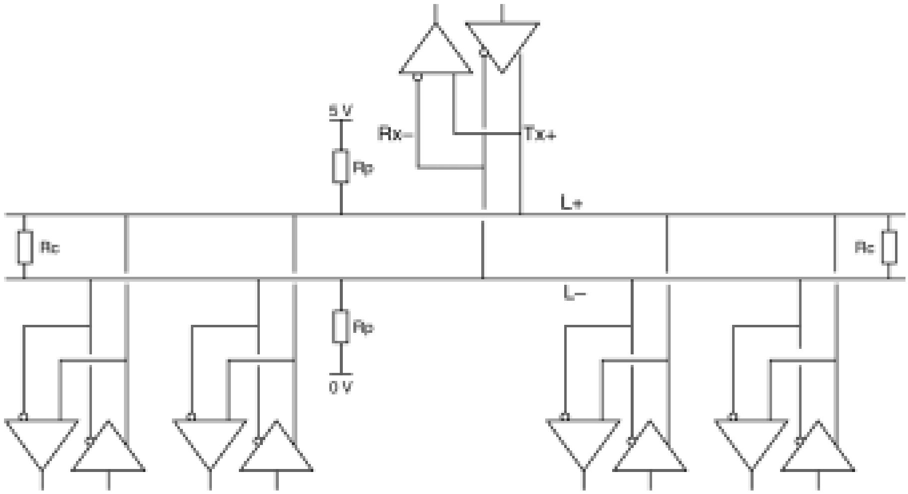
TSX SCY CM 6030 lead description



Reminder on single line polarization in RS 485

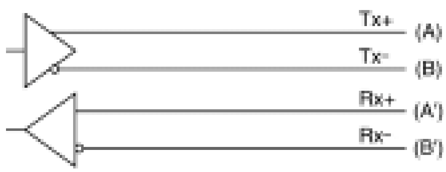
General

Single line polarization is the polarization used for Modbus type networks.
General architecture diagram of a RS 485 network:



The senders are symbolized by:

The receivers are symbolized by:



Connection of network stations

The network is made up of one shielded twisted pair. The different stations of the network are connected as follows:

1	Link all outputs labeled + (Tx+, Rx+) to the network wire labeled: L+.
2	Link all outputs labeled - (Tx-, Rx-) to the network wire labeled: L-
3	Adapt the impedance of the network to the average of the two adaptation elements (Rc) located on the two end stations of the network.
4	For distributed polarization of the network, connect the wire L+ to 5 V and the wire L- to 0 V via the two polarization resistors (Rp = 470 Ω). This polarization continuously circulates a current in the network. The adaptation can be made anywhere in the network (in practice it is generally made at master level). There must be single polarization for the entire network, whatever its range.

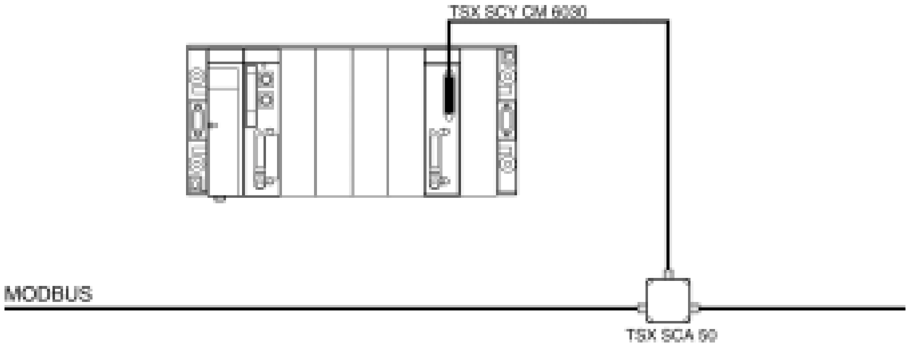
Integral Characteristics

Integral characteristics are:

- Up to 32 stations
- Maximum range: about 1,300 m
- Bus Topology
- $\leq$ 15 m Branching
- 2 wire half duplex
- Line end adaptation at the end stations
- Adaptation of distributed line Rp = 470 Ω

Example of Modbus architecture

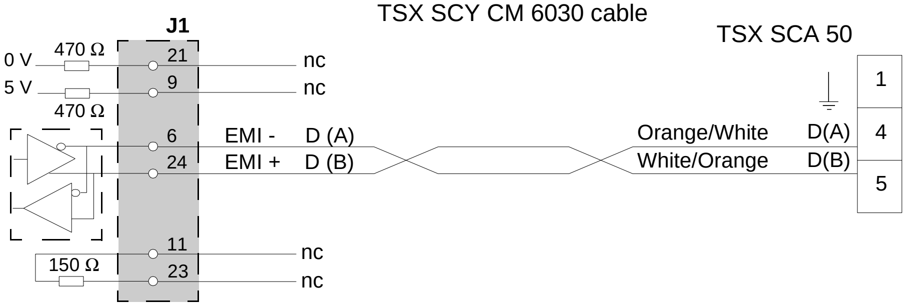
Example



Connecting the TSX SCA 50 unit

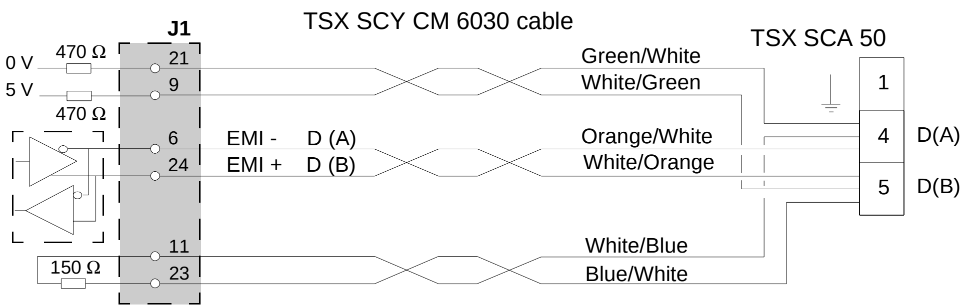
Modbus without line adaptation

Illustration:



Modbus with line adaptation and polarization

Illustration:



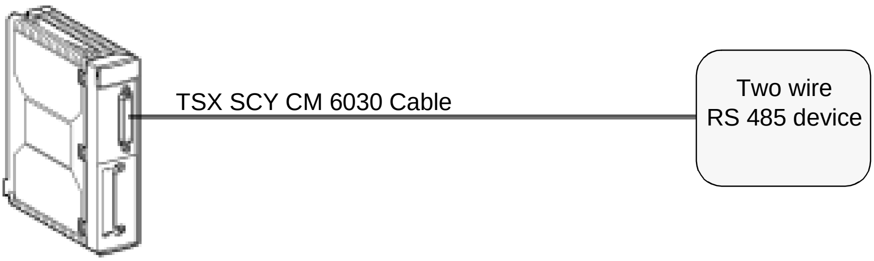
Character Mode connection for TSX SCY 21601

General

The **TSX SCY CM 6030** cable should be used to connect the **TSX SCY 21601** module with an RS 485 standard device.

Users should connect the Character Mode **TSX SCY 21601** to a Half duplex RS 485 standard device using the **TSX SCY CM 6030** connection cable, adding a connector adapted for the intended device to the end of the cable, and linking the necessary signals (see lead connection in *Connecting the TSX SCA 50 unit, p. 173*).

Illustration:



Consumption of TSX SCY 11601/21601 modules

Values

This table shows the consumption of **TSX SCY 11601** and **TSX SCY 21601** modules without a PCMCIA card (for 21601) or connection to the built-in channel:

Voltage	Typical Current	Maximum Current	Power dissipation
5 Volts	350 mA	420 mA	2.1 W max.

Installing PCMCIA cards

8

At a Glance

Aim of this Chapter

This Chapter deals with the hardware installation of PCMCIA communication cards onto Premium/Atrium PLCs.

What's in this Chapter?

This chapter contains the following sections:

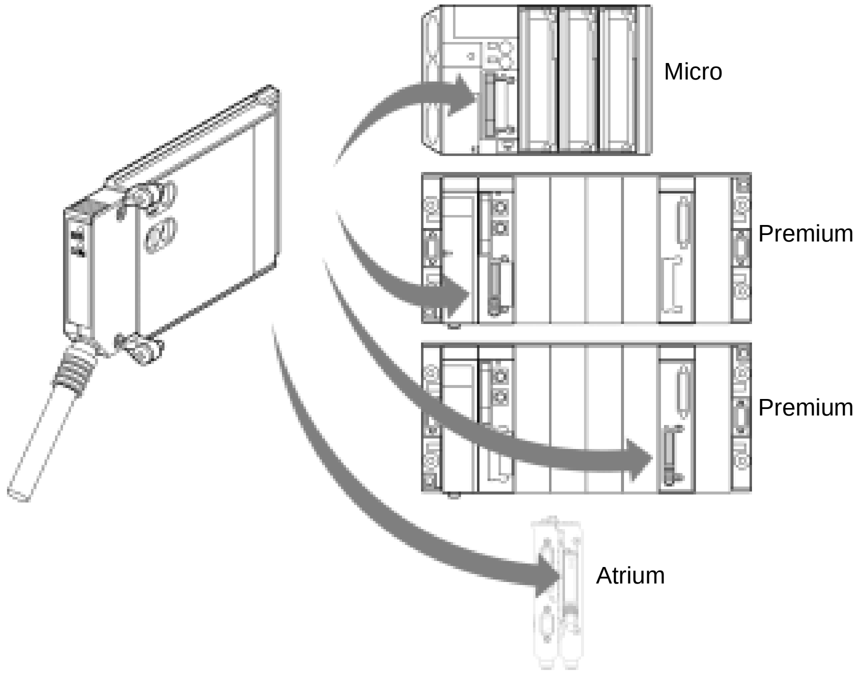
8.1 At a Glance

At a Glance

General

Premium/Atrium PLC stations connect to communication networks, buses and links through PCMCIA communication cards.
The card to be connected is a metal device whose dimensions comply with PCMCIA extended type III.
PCMCIA cards are installed in the reception slot of the processor and/or **TSX SCY 21601** module in PLCs from the Premium family.
PCMCIA cards can also be used in devices which have type III reception, such as **CCX 17**, **FT 2100** terminals or PC-compatible third-party devices, for example.

Illustration:



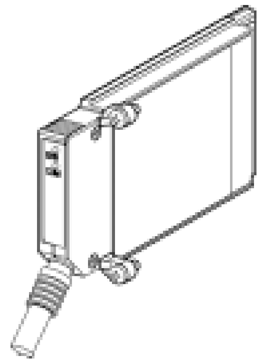
Note: It is prohibited to connect PCMCIA cards when the power is switched on.

PCMCIA cards are installed, operated and maintained using PL7 Junior/PL7 Pro programming and operation software for all PLCs in the Premium family.

TSX SCP 11 cards.

Series link PCMCIA cards.

Each TSX **SCP 111**, **112**, **114** PCMCIA card supports a different physical layer. This family comprises three products:

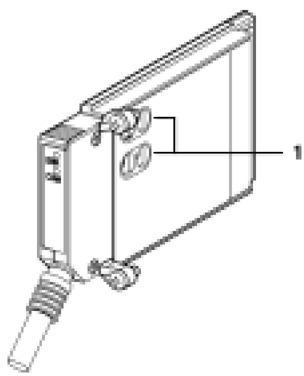
Product reference	Physical layer	Illustration
TSX SCP 111	RS 232-D link.	
TSX SCP 112	Current loop link (20 mA).	
TSX SCP 114	RS 485 link (RS 422 compatible)	

All three cards, **TSX SCP 111**, **112** and **114**, support the following communication protocols:

- Modbus/Jbus protocol
- UNI-TELWAY protocol
- Character Mode asynchronous link

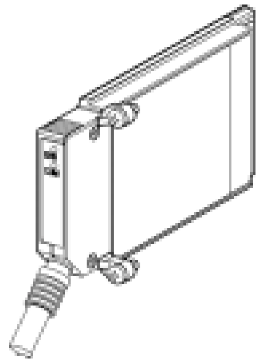
TSX FFP 20 card

FIPWAY network PCMCIA card:

Functions	Illustration
The **TSX FPP 20** PCMCIA card supports the FIP physical layer. It is used to connect a Premium/ Atrium station to a FIPWAY network, as well as to connect to devices of manufacturers who wish to connect their products to the FIPWAY network. The card is fitted with four rotary switches (marked "1" in the illustration) which make it possible to encode the network number and station.	

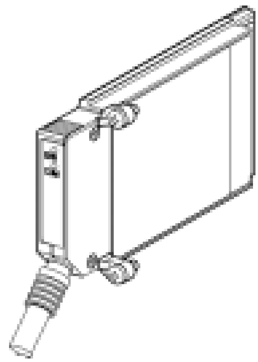
TSX MBP 100 card

Modbus + network PCMCIA card:

Functions	Illustration
The **TSX MBP 100** PCMCIA card is used to connect a Premium/Atrium PLC station to the Modbus+ network.	

TSX FPP 10 card

FIPIO bus agent PCMCIA card:

Functions	Illustration
The **TSX FPP 10** PCMCIA card is used to connect a Premium/Atrium PLC station to a FIPIO bus. It ensures the link with TSX 47-107 PLCs and April 5000	

8.2 Description

Description

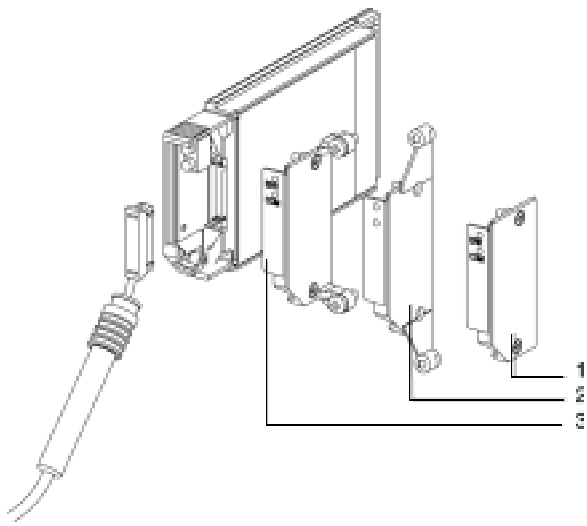
General

PCMCIA type III (extended) communication cards are built into a metal device with the following dimensions:
- Length: 85.5 mm
- Width: 51 mm
- Height: 10 mm

The front of the card is designed to display the functioning of communications as well as the physical connection to the network.

Mechanical configuration

The mechanical configuration of the card must be adapted by mounting a removable cover, depending on the type of installation desired:

Type of installation	Configuration	Illustration
Installation on a Premium type processor or on a **TSX SCY 21601** communication module.	Removable cover with wings. Screws are provided to fix it to the reception module (marked 3 on illustration)	
Installation on an Atrium type processor.	Removable cover with wings. Screws are provided to fix it to the Atrium processor (marked 2 on illustration).	
Installation onto a PC compatible device.	Removable cover (marked 1 on illustration).	

Note: The covers with wings, mounted on PCMCIA cards, prevent any accidental removal when switched on and guarantee that the card remains in good working order.
The two covers (1) and (3) are provided with the PCMCIA card. Cover (2) is provided with the Atrium processor.

Connection to the network is achieved by connecting the linking cable to the front of the card. A guidance system is used to prevent anything being mounted incorrectly. The product reference label informs the user of the type of physical layer supported by the card.

8.3 Connecting the PCMCIA card reception channel

At a Glance

Aim of this Section

This Section describes the installation of PCMCIA cards in the reception channel of the **TSX SCY 21601** module.

What's in this Section?

This section contains the following topics:

Precautions when connecting PCMCIA

General

CAUTION

The PCMCIA card **must be handled with the power switched off**

Failure to follow this precaution can result in injury or equipment damage.

When removing or inserting the card, the unit is not guaranteed to be operational. There is no procedure for a warm start between the PCMCIA card and the **TSX SCY 21601** reception device.
In the event that the operating environment does not allow the application to be stopped by switching off the PLC processor, you are recommended to remove the **TSX SCY 21601** module with the PCMCIA card.
The PCMCIA card must be equipped with a PLC version cover and be screwed in the **TSX SCY 21601** reception module before the unit is switched on (see *Mechanical configuration, p. 181*).

Connecting PCMCIA cards

General

Connecting PCMCIA cards requires specific cables and connection devices, depending on the type of models.

Series link cards

Product references of cables and branch devices to be used with series link PCMCIA cards according to the different protocols:

PCMCIA card	UNI-TELWAY	Jbus/Modbus	Character Mode
TSX SCP 111 (RS 232)	**TSX SCP CD 1030/1100** in point to point mode	**TSX SCP CD 1030/1100** in point to point mode	**TSX SCP CD 1030/1100**
	TSX SCP CC 1030 in multidrop mode via a modem	**TSX SCP CC 1030** in multidrop mode via a modem	
TSX SCP 112 (Current Loop)	**TSX SCP CX 2030**	**TSX SCP CX 2030**	**TSX SCP CX 2030**
TSX SCP 114 (RS 422/RS 485)	**TSX SCP CU 4030** and **TSX SCA 50**	**TSX SCP CM 4030** and **TSX SCA 50**	**TSX SCP CU 4030** and **TSX SCP CM 4030**

FIPWAY network card

The **TSX FPP 20** FIPWAY card is connected via the reception channel using a **TSX FPCG 10** or **TSX FPCG 30** cable.

Modbus+ Card

The **TSX MBP 100** Modbus+ card is connected via the reception channel using a **TSX MBP CE 030** (3 m) or **TSX MBP CE 060** (6 m).

Product references for PCMCIA cards and installation

Installation

Table showing options for installing PCMCIA cards in processor reception channels and in the TSX SCY 21601 module:

Product references	Processor reception channel	TSX SCY 21601 reception channel
TSX SCP 111	Yes	Yes
TSX SCP 112	Yes	Yes
TSX SCP 114	Yes	Yes
TSX FPP 10	Yes	No
TSX FPP 20	Yes	Yes
TSX MBP 100	Yes	No

Application-specific channels and network connections

Table showing the number of application-specific channels or network connections used by PCMCIA cards:

Product references	Number of application-specific channels		Number of Network Connections
	Card in the processor	Card in the TSX SCY 21601 module	
TSX SCP 111	0	1	-
TSX SCP 112	0	1	-
TSX SCP 114	0	1	-
TSX FPP 10	0	-	-
TSX FPP 20	-	-	1
TSX MBP 100	-	-	1

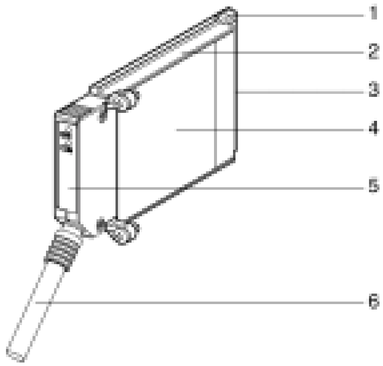
Reminder of the number of application-specific channels and network connections managed by the type of processor:

Processors	Application-specific channels	Network connections
TSX P57103/TSX P57153	8	2
TSX P57203 / TSX P57253 / TSX P572623 / TSX P572823 - PCX 57203	24	4
TSX P303 / TSX P57353/ TSX P573623 - PCX 57353	32	8
TSX P57453 / TSX P574823	64	8

Mounting cards and cables

Details about PCMCIA cards

Illustration:

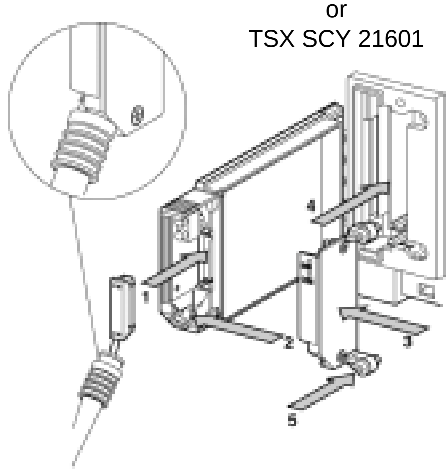


PCMCIA cards are made up of the following elements:

Number	Designation	Comments
1	Equipped card	Receives electronic components.
2	Body made of zamac	-
3	PCMCIA connector	Connector with 20 connection points.
4	Upper cover	Houses the product reference label which shows the type of PCMCIA card
5	Removable cover	Ensures the card is displayed in its slot. The names of the two LEDs are printed on the front of the removable cover. This cover is also used to fix the PCMCIA card on the processor or on the **TSX SCY 21601** module.
6	Linking cable with ferule	The ferule placed on the end of the PCMCIA card cable side prevents the cable being pinched by the removable cover. This ferule also eliminates the risk of causing a bending radius which can damage the quality of the link.

Assembly

To assemble the transmission support for the card first remove the cover which is screwed on the device then follow the instructions below:

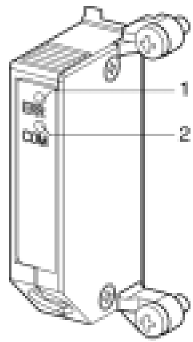
Step	Instruction	Illustration
1	Connect the cable	
2	Place the appropriate cover on the device, taking care to insert the ferule in the slot provided in order to fix the cable to the card.	
3	Screw on the cover	
4	Insert the card in the slot provided in the host device.	
5	Screw in the card to stop it being moved when switched on, and to ensure it functions effectively.	

PCMCIA card operation display

General

Two diagnostics LEDs are located on the front of the card. They inform the user on how exchanges between the device supporting the PCMCIA card and the related device are functioning.

Illustration

Number	Description	Diagram
1	Error "ERR" LED (normally off) displays errors. This is red	
2	The "COM" communication LED displays the line activity. This LED is: ● Yellow on the **TSX SCP 111-112-114**, **TSX FPP 10** and **TSX FPP 20** cards. ● Green on the **TSX MBP 100** card.	

Visual diagnostics of PCMCIA cards

General

Depending on their state, LEDs of the PCMCIA card indicate the operating mode for communication, as well as the card diagnostics.

Cards TSX SCP 111/ 112/114 and TSX FPP 10/20

State of LEDs:

ERR	COM	Meaning	Corrective actions
○	○	Device switched off No dialog	Check supply, Card inoperational
○	◐	Operating normally	-
●	(1)	Serious error	Change the card
◐	○	Functional error	Check the configuration and the connection to the communication bus
◐	◐	Functional error	Check the configuration
Key: ○ **Off** ● **On** ◐ **Flashing** **(1) = Indifferent state**			

Note: The "ERR" LED of the card **TSX FPP 20**, when flashing, indicates that an external error has appeared. These errors are:
- Line error
- Station already present on the network
- Incorrect station-network address coding (rotary switch coding)

TSX MBP 100 cards

State of LEDs:

ERR	COM	Meaning	Corrective actions
○	○	Device switched off No dialog	Check supply, Card inoperational
○	◍ (1)	Operating normally	-
●	(2)	Serious error	Change the card
◍	○	Functional error: Card not configured, communication cannot start on the network.	Configure the card using: PL7 Junior or PL7 Pro
◍	◍	Functional error	Check the configuration and the connection to the Modbus+ network. The way the COM LED flashes indicates the type of problem (see below)

○ **Off** ● **On** ◍ **Flashing**

(1) = The way the COM LED flashes indicates the operating state of the network (see below) - (2) = Indifferent state

Meaning of COM LED flashing:

State of COM LED	Meaning
6 flashes/second	Node is functioning normally It receives and transmits the network token. All the nodes on a network which are functioning flash in this way.
1 flash/second	The node is off-line just after power up or after leaving the 4 flashes/sec. mode. In this state, the node monitors the network and establishes a table of active nodes. After remaining in this state for 5 seconds, the node attempts to switch to a normal operating state, indicated by 6 flashes per second.
2 flashes, followed by a 2 second pause	The node detects the token transmitted among the other nodes, but never receives the token. Check if there is an open circuit or a faulty terminator on the network.

State of COM LED	Meaning
3 flashes, followed by a 1.7 second pause	The node does not detect any token transmitted among the other nodes. It regularly searches for the token but cannot find another node to pass the token to it. Check if there is an open circuit or a faulty terminator on the network.
4 flashes, followed by a 1.4 second pause	The node has detected a valid node message using a network address identical to its own address. The node remains in this state for as long as it continues to detect the duplicated address. If the duplicated address has not been detected within 5 seconds, the node changes mode and flashes once per second.

8.4 Connection of TSX SCP 111 card

At a Glance

Aim of this Section

This Section deals with installing hardware for **TSX SCP 111** PCMCIA cards.

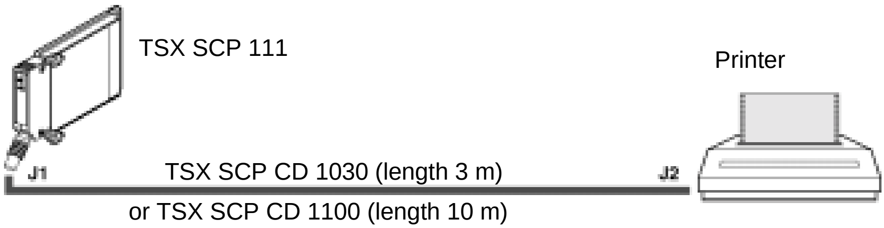
What's in this Section?

This section contains the following topics:

Point to point connection in Character Mode (DTE <==> DTE)

General

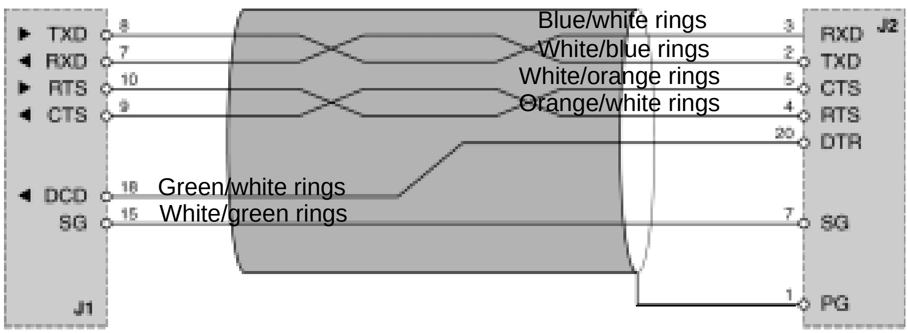
The **TSX SCP 111** RS 232 D physical support card is inserted either in the processor or in the **TSX SCY 21601** module. It is connected to the related device with the **TSX SCP CD 1030/1100** cable.
The devices to be connected are DTE to DTE (Data Terminal Equipment). For example: terminal, printer, etc.
Illustration:



Description of TSX SCP CD 1030 cable

Illustration:

The PCMCIA 20-pin mini-connector supports the signals:

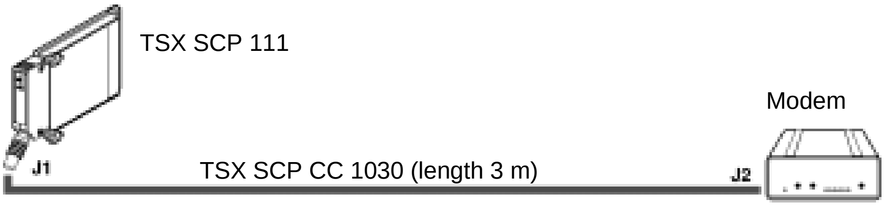


Uni-Telway, Modbus or Character Mode via Modem

General

The PCMCIA card is connected to a Uni-Telway, Modbus or Character Mode bus, via a modem and a telephone link (DTE/DCE type), using a **TSX SCP CC 1030** cable.
The connected devices are DCE type, for example a modem or a converter.

Illustration:



Description of the TSX SCP CC 1030 cable

Illustration:

The PCMCIA 20-pin mini-connector supports the signals:

Connector SUB-D 25M

8.5 Connection of the TSX SCP 112 card

At a Glance

Aim of this Section

This Section deals with the hardware installation for **TSX SCP 112** PCMCIA cards.

What's in this Section?

This section contains the following topics:

Connection of the TSX SCP 112 card

General

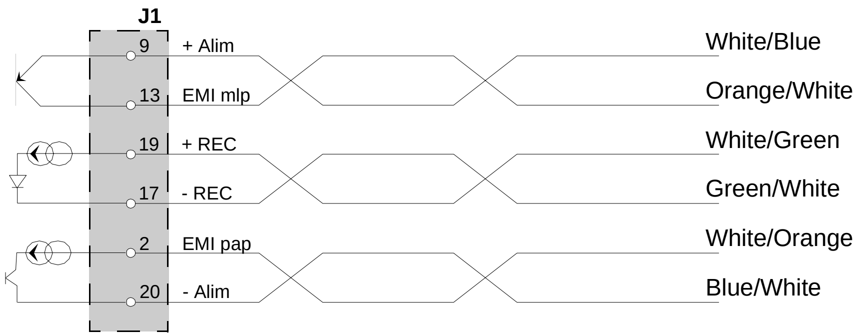
The **PCMCIA TSX SCP 112** card is used to connect a Premium/Atrium PLC station to a loop link with a current of 20 mA in point to point or multidrop.

Note: In all cases the power supply is: 24 V ± 20%, external to the TSX SCP 112 card, and must provide the current required for the current loop supply .

The **TSX SCP CX 2030** cable is used for this type of connection (length 3 m).

Description of the TSX SCP CX 2030 cable:

The PCMCIA 20-pin mini-connector supports the signals:

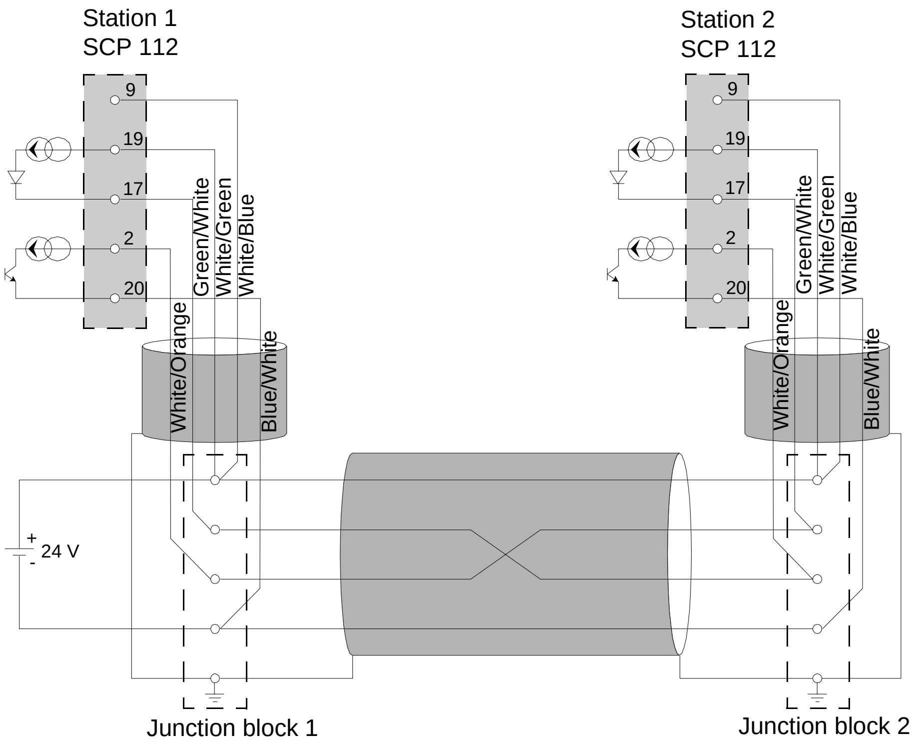


Note: A screw terminal block needs to be installed to connect the **TSX SCP 112** card.

Connecting in point to point mode

General

The diagram below describes the wiring principles for **TSX SCP 112** loop current PCMCIA cards in point to point. Point to point is only carried out according to 20 mA mode when idle.
Illustration:



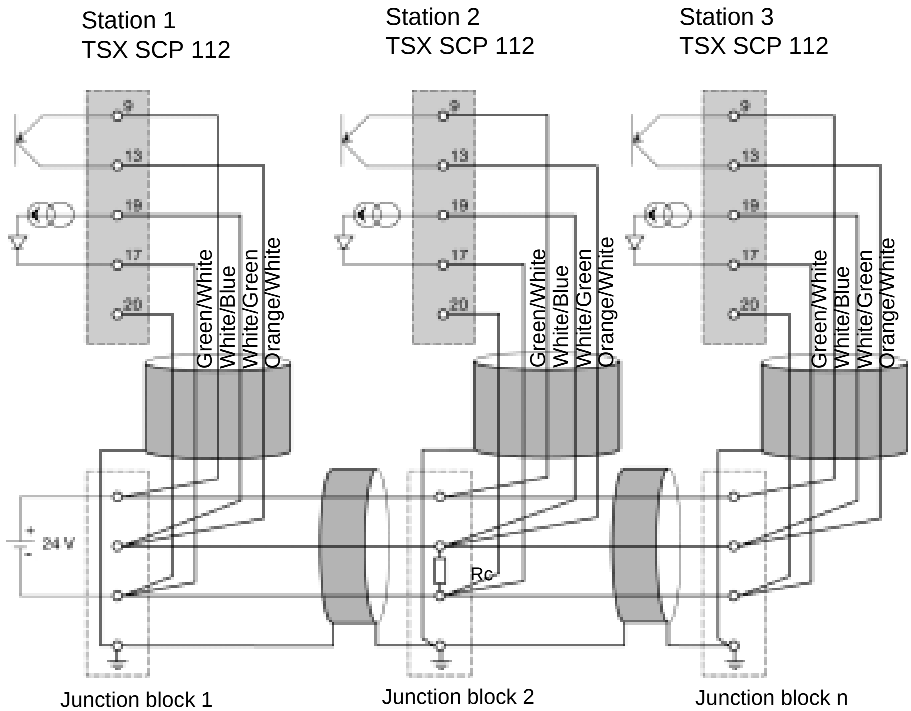
Note: Important: the cable shielding must be connected at the shortest point in the junction blocks.

Multidrop connection

General

Multidrop is only carried out in 0 mA idle mode. The send cable and receive cable are set in parallel. The master is set by the software.

Example of connection of n TSX SCP 112 cards:



Rc = resistance of optional load

> **Note: Important:** the cable shielding must be connected at the shortest point in the junction blocks.

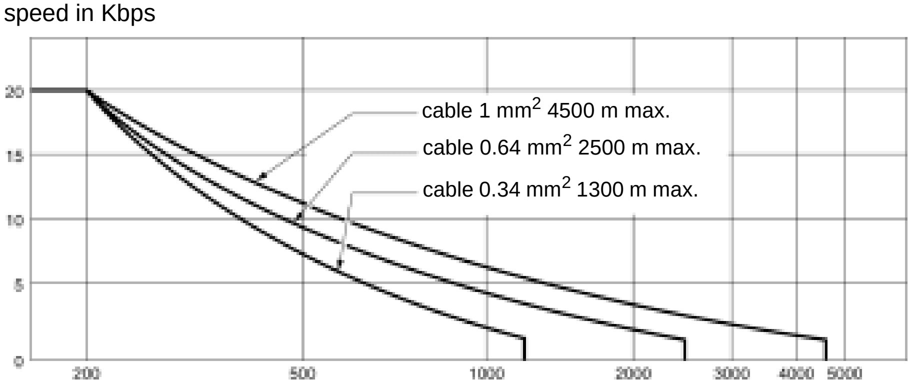
Dynamic performance

General

The flow of a current loop link is limited by the cross-section and the length or the cable used.
The user should refer to the two charts below to evaluate the performance which can be obtained using this application.

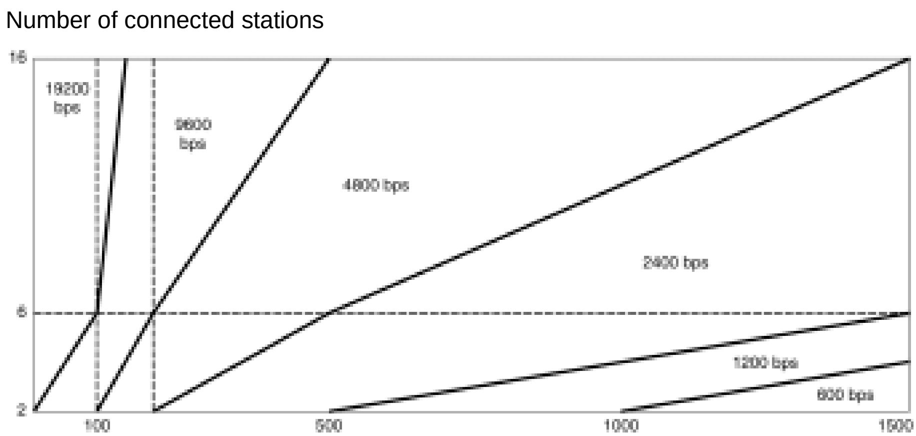
Point to point

These curves are given for a shielded two pair cable (send through one pair, reception through the other) while observing all the precautions of use.



Multidrop

The chart below is given for a shielded cable with a conductor cross-section of 0.34 mm^2. The connection is made according to the parallel multidrop diagram below. Using conductors with a larger cross-section improves the quality of the signals transmitted:



Multidrop link performance is optimized when there are more connected stations. The line is busier, which improves the quality of the transmitted signal.
When the connection is made according to the diagram above (See *General, p. 199*), the number of stations can be increased artificially (to a maximum of 16 stations) by loading the line at one of its ends.
This can be carried out by incorporating a load resistance.
This load resistance can be connected to any junction block providing it is between pins 17 and 19 of cards **TSX SCP 112**.
The value of Lr resistance simulating the load of "N" stations is determined by the formula:

$$Rc = \frac{U}{N \times 20}$$

R in KΩ
U = external supply voltage
N = station number to be simulated

Example:
An installation is physically made up of 6 stations connected in multidrop with an external 24 V supply.
The performance of the line is that of 10 stations, simulating the load of 4 additional stations by a resistance:

$$Rc = \frac{24}{4 \times 20} = 0,3K\Omega$$

Note: The load resistance must not have an inductive effect or there is a risk that it will not operate.
Use a thick layer of resistance.

TSX SCP 112 connection with April 5000/7000 PLCs

General

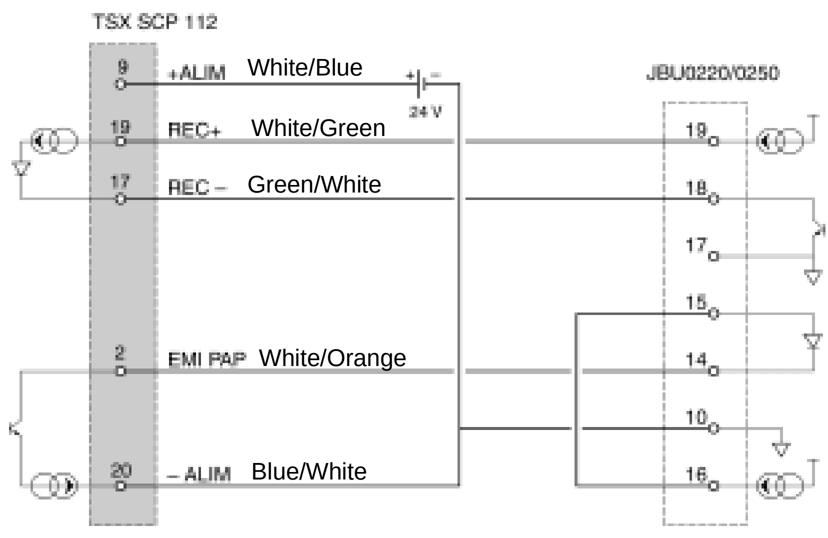
PCMCIA card **TSX SCP 112** 20 mA current loop is used to connect April communication modules **JBU0220** and **JBU0250**. The **multidrop connection** of PCMCIA card **TSX SCP 112** to modules **JBU0220** and **JBU0250** is carried out in **series mode**. To connect April modules refer to reference manual TEM60000E.

Note: Important: You must configure card **TSX SCP 112** in **point to point mode** in the PL7 configuration screen, for both the point to point or the multidrop series.

Note: The current loop authorizes a current of 20 mA when idle, in point to point as well as in multidrop mode.
If a slave is switched off the sender of this slave become active and the line is available.
If the loop supply is offset on one of the slaves, switching this slave off will cause communication to be interrupted.

Point to point link: Module JBU0220 or active JBU0250

Illustration

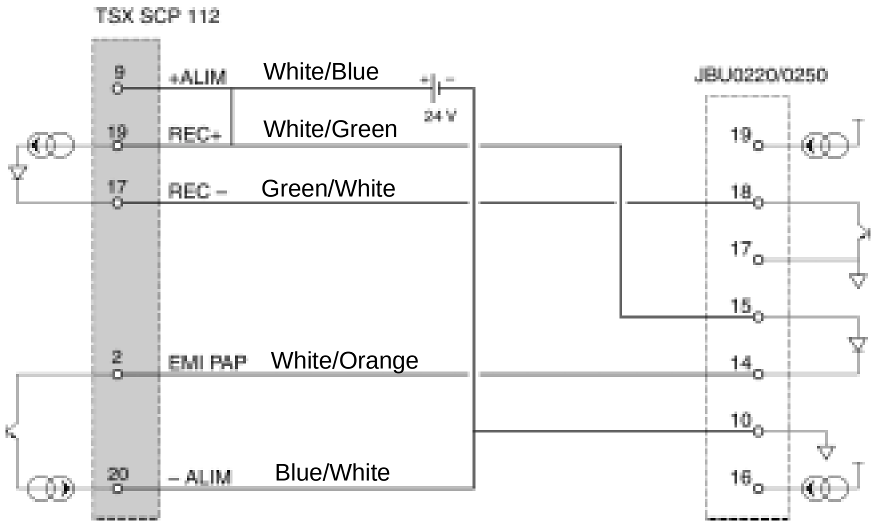


Passive master or slave:

Master or slave **active**

Point to point link: active TSX SCP 112 card

Illustration:

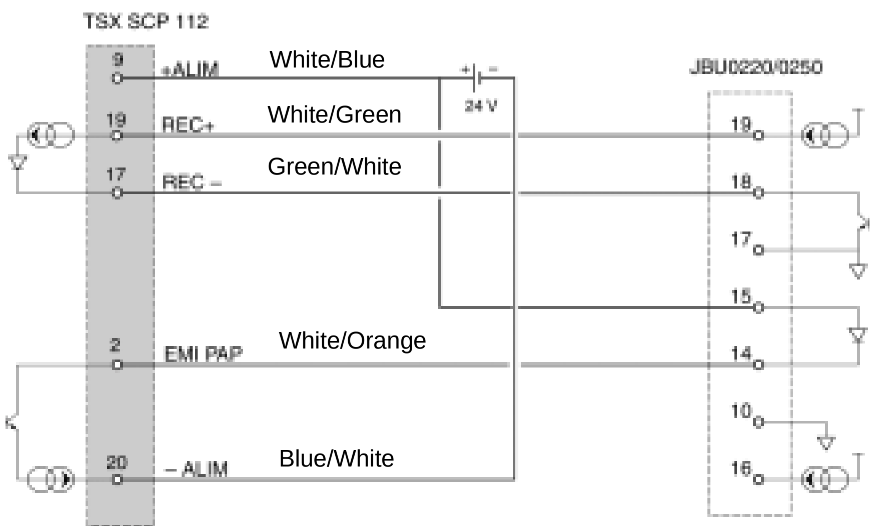


Master or slave **active**

Master or slave passive

Mixed terminal links

Illustration:



Master or slave:
passive receiving
active sending

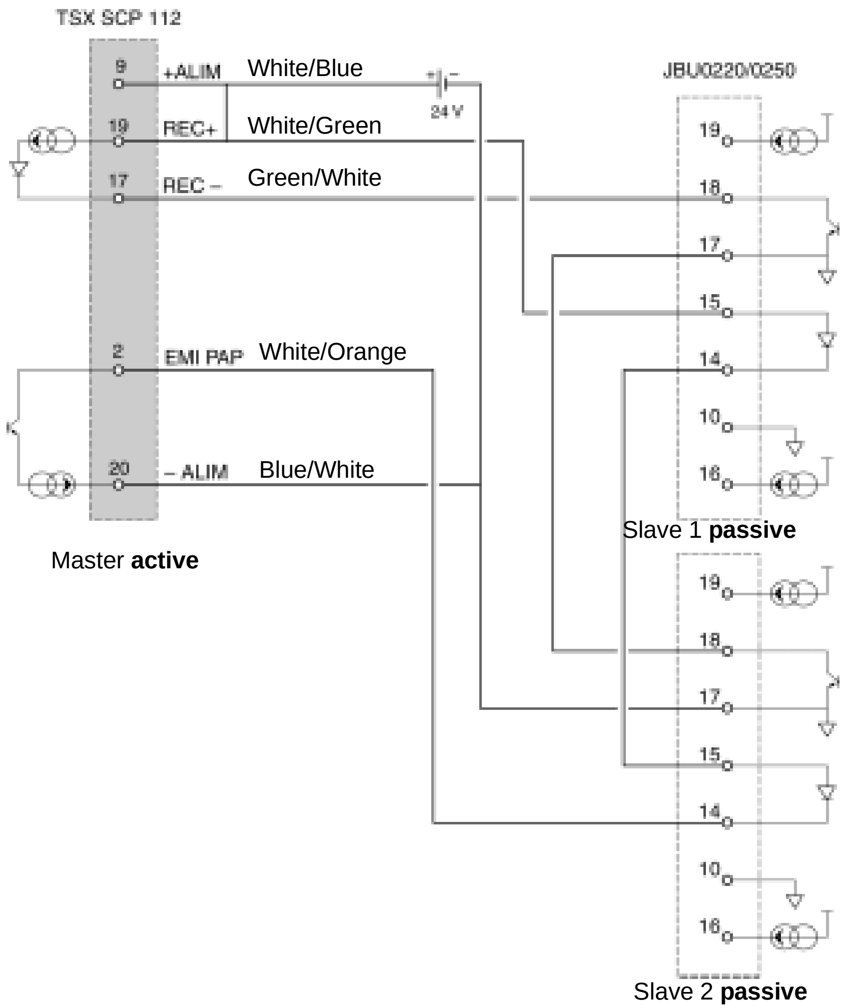
Master or slave:
passive receiving
active sending

Multidrop type link

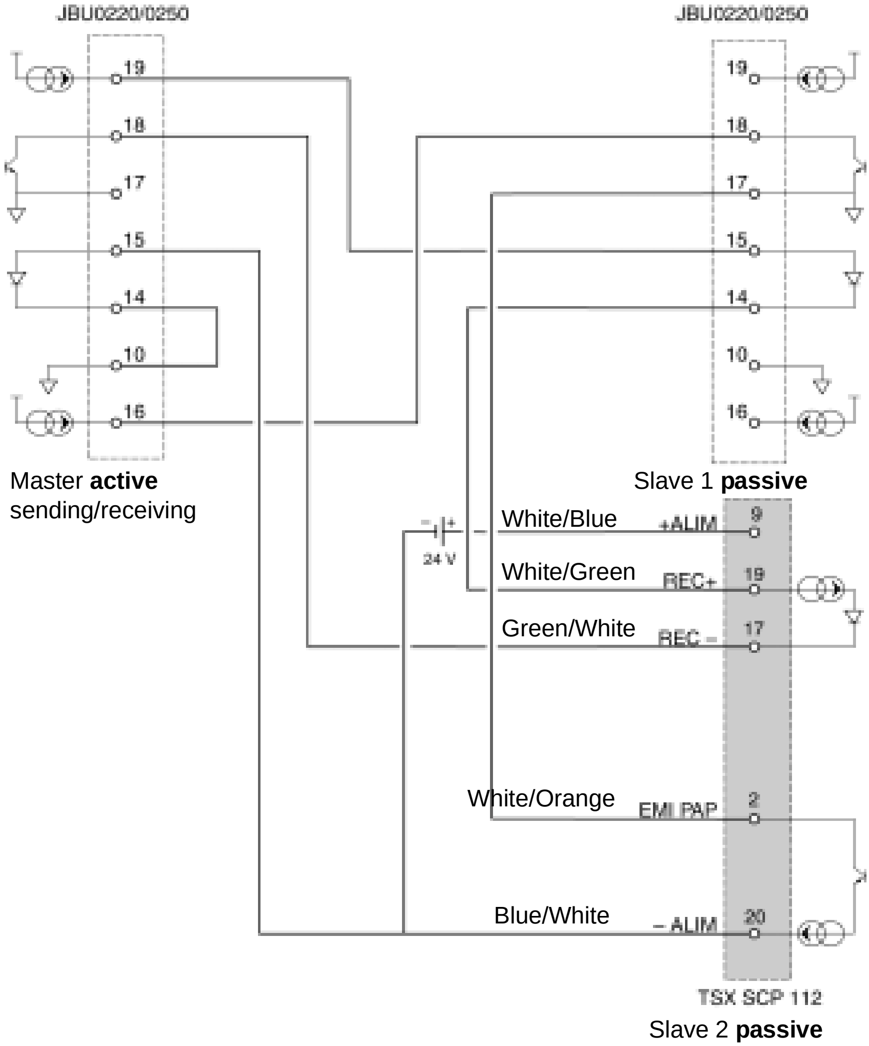
The following examples describe the different wiring possibilities for card **TSX SCP 112** with modules **JBU0220/0250**.

> **Note: Important**: The 24 V supply of each TSX SCP 112 present on the loop must be connected, whether passively or actively, otherwise the link will not function. **These supplies must not have any shared (potential) point between them. Do not connect the -24 V supply to the earth.**

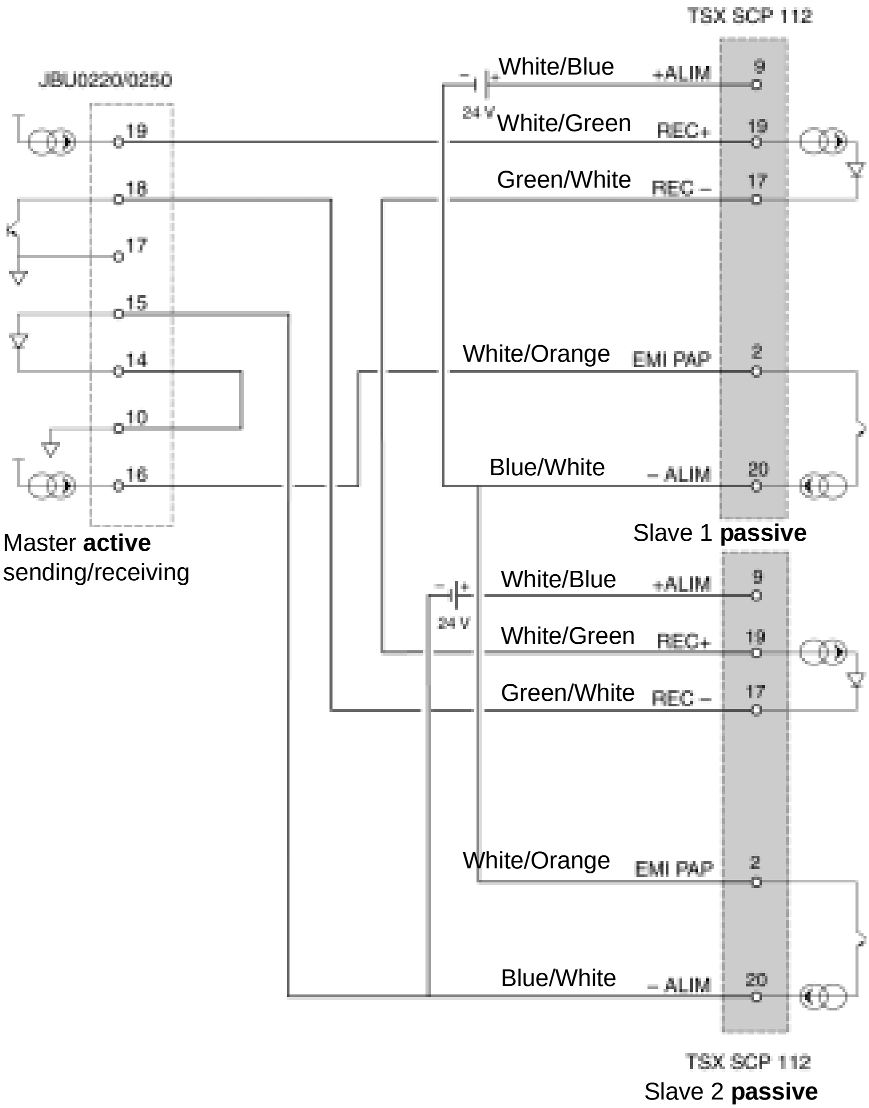
Example 1: Active master TSX SCP 112 multidrop



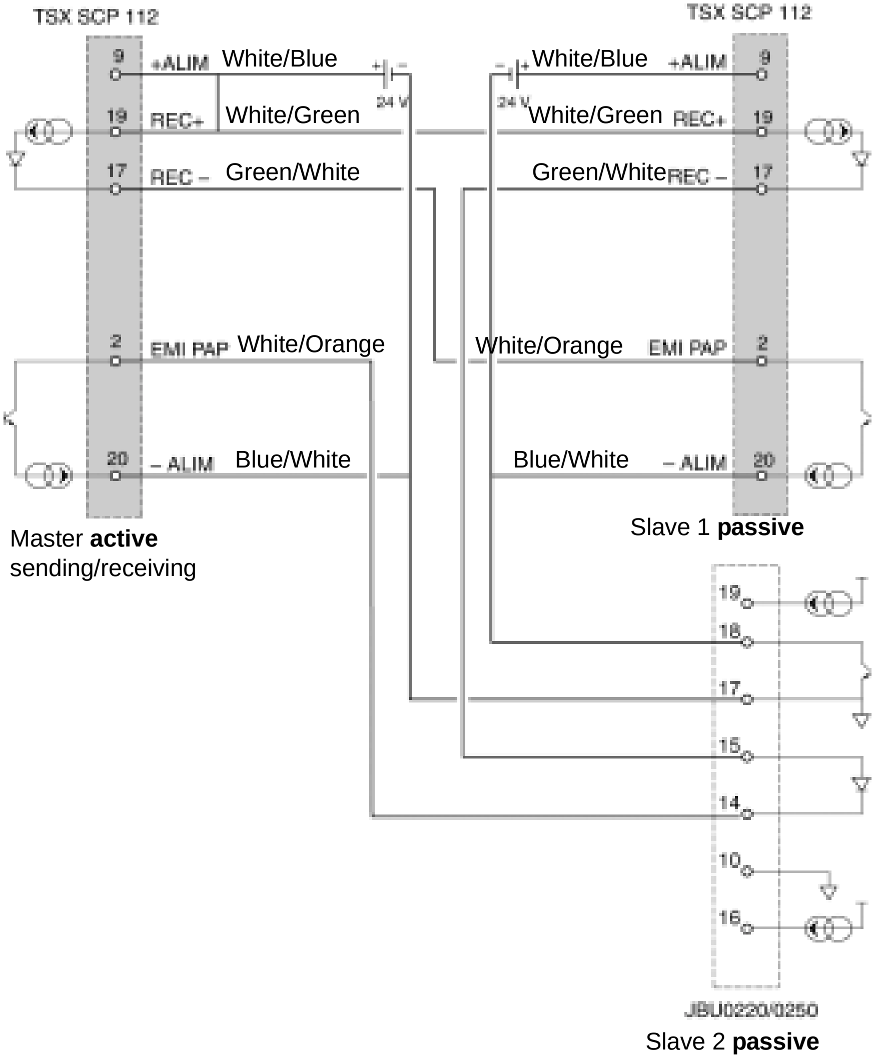
Example 2: active send/receive JBU0220/0250 multidrop



Example 3: Multidrop master JBU0220/0250 active send/receive - slaves TSX SCP 112



Example 4: Multidrop active master TSX SCP 112



8.6 Connection of the TSX SCP 114 card

At a Glance

Aim of this Section

This Section deals with the hardware installation of **TSX SCP 114** PCMCIA cards.

What's in this Section?

This section contains the following topics:

Connection to the UNI-TELWAY network

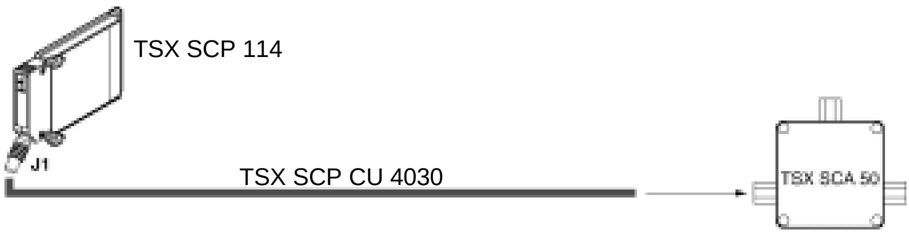
General

Card **TSX SCP 114**, physical support RS 485, connects to the UNI-TELWAY network using cable **TSX SCP CU 4030** via the connection device **TSX SCA 50**, or by cable **TSX SCP CU 4530** (provided with SUB-D 15 pin connector) via device **TSX SCA 62**. The card is inserted in the processor or in module **TSX SCY 21601**.

The **TSX SCA 50** is passive and made up of a printed circuit board fitted with 3 sets of screw terminal blocks. It is used to connect a station by branching on the main section of a UNI-TELWAY bus.
It ensures continuing operation of electrical signals, shielding and end of line adaptation function.

Type of connection

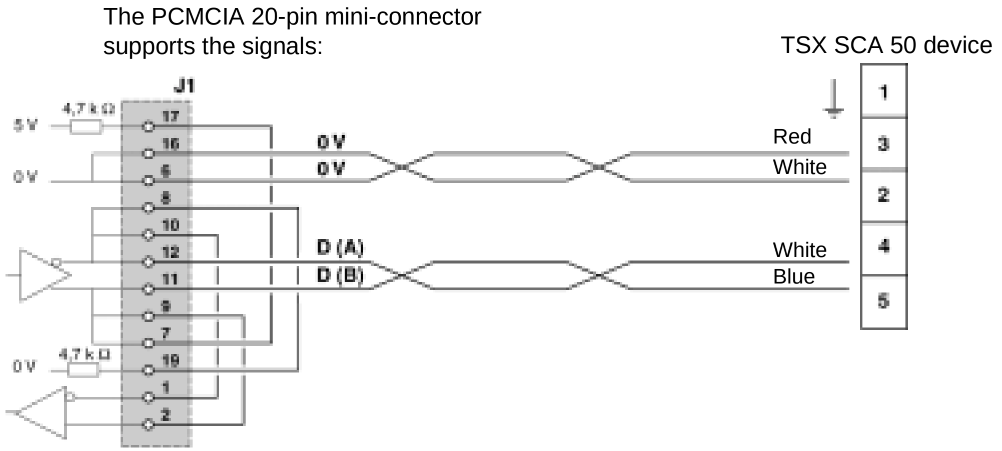
The cable of the PCMCIA card has bare wires at its ends which the user must connect to the terminal located inside the device.
Illustration:



Note: The branching device configures the wiring system of the card and a branching type of connection system.

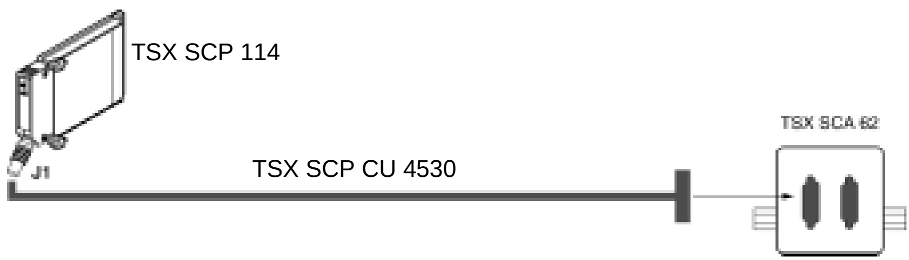
Description of the TSX SCP CU 4030 cable

Illustration:



Connection via a TSX SCA 62 device

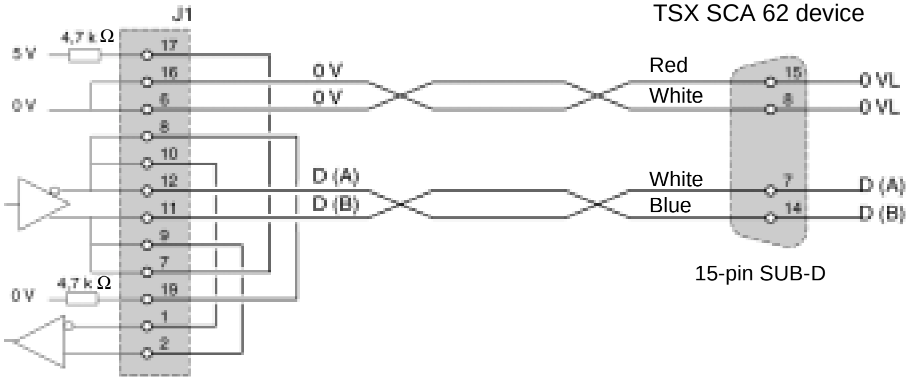
Illustration:



Description of the TSX SCP CU 4530 cable

Illustration:

The PCMCIA 20-pin mini-connector supports the signals:



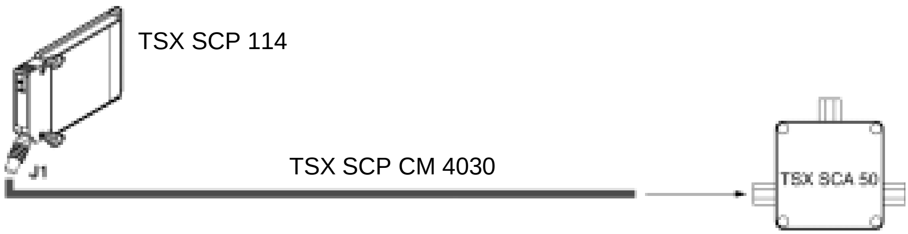
Connecting to the Modbus/Jbus bus

General

The **TSX SCP 114** PCMCIA card is connected to the Modbus bus using the linking cable **TSX SCP CM 4030**. This cable is connected to the branching device **TSX SCA 50**.

Type of connection

The cable of the PCMCIA card has bare wires at its ends which the user must connect to the terminal located inside the device.
Illustration:

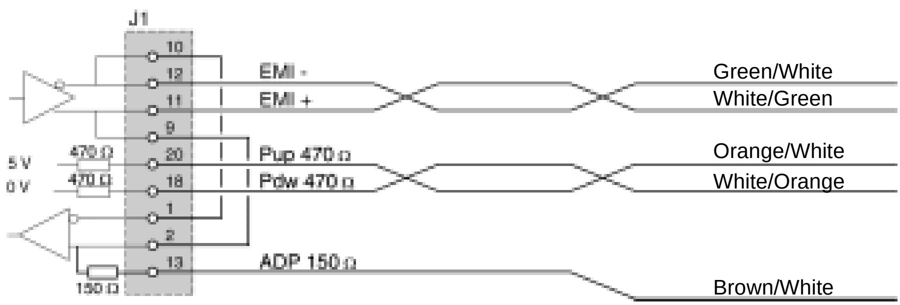


Note: The length of the cable used (3 m), makes it possible to link a device to a **TSX SCA 50** connection device located within a 3 meter radius of the card. This length ensures connection inside a standard cabinet

Description of the TSX SCP CM 4030 cable

Illustration:

The PCMCIA 20-pin mini-connector supports the signals:

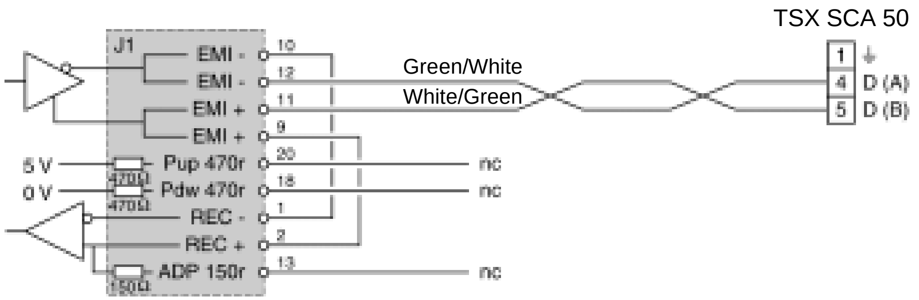


Note: Important: on a Modbus/Jbus bus you must:
- Polarize the line, in general in only one spot (usually on the master device) with 470 Ω resistance. Connect $R_{pull\text{-}down}$ to EMI- (D(A)) and $R_{pull\text{-}up}$ to EMI+ (D(B)).
- Adapt the line on the two end devices with a resistance of 150 Ω between EMI+ and EMI- (EMI+ is already connected internally by the card).

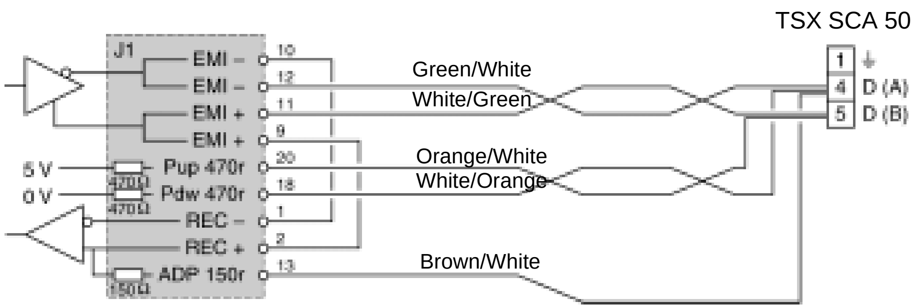
Important: to connect **TSX SCP 114** card to a PLC Series 1000 (S1000), EMI+ must be connected to L-.

Connecting Modbus to TSX SCA 50 device

Connection with no line terminator:



Connection of a SCA 50 with line terminator:



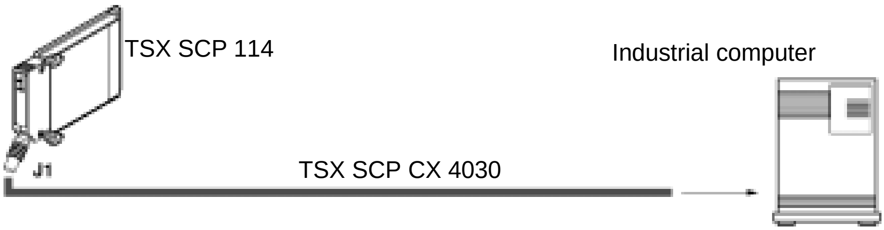
Multi-protocol asynchronous link connection RS 422

General

Connecting the **TSX SCP 114** card in Character Mode does not require any specific accessories.
The product reference for the RS 485/RS 422 PCMCIA card linking cable is **TSX SCP CX 4030**. It is 3 meters in length.

Type of connection

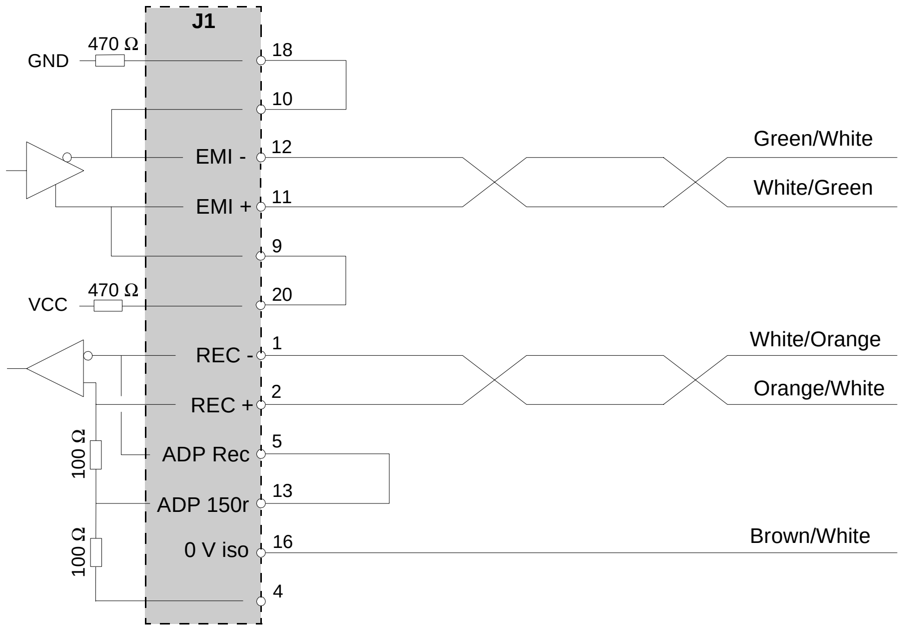
The **TSX SCP 114** PCMCIA card is connected in point to point to an RS 422A standard device VAX station type.
Illustration:



Description of the TSX SCP CX 4030 cable

Illustration:

The PCMCIA 20-pin mini-connector supports the signals:



See also *Character Mode connection for TSX SCY 21601, p. 174* (**TSX SCY 21601** module integrated link)

8.7 Connection of the TSX FPP 20 card

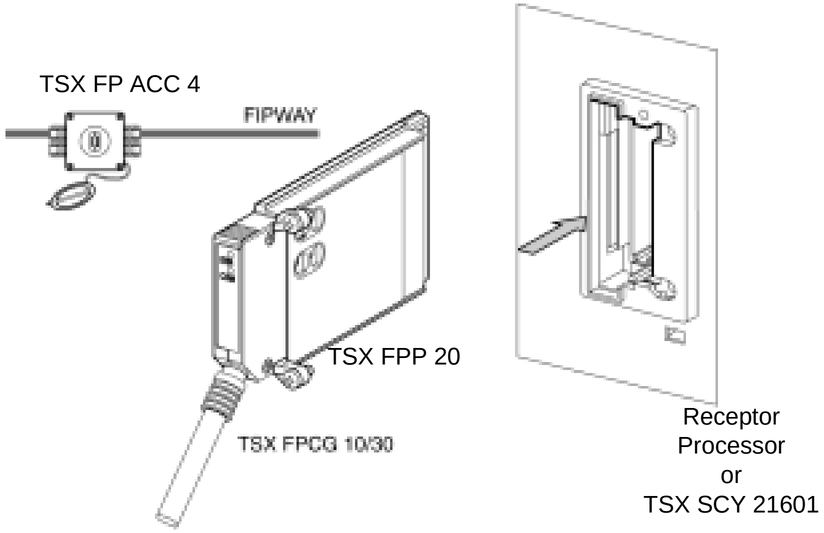
Connecting the TSX FPP 20 card

General

The **TSX FPP 20** PCMCIA card is connected to the Fipway network using a connector such as **TSX FP ACC4** or **TSX FP ACC 12**.
To connect the PCMCIA card to the ACC4/ACC12 connector the user has the choice of:

- Either a 1 m cable, product reference **TSX FP CG 010**.
- Or a 3 m cable, product reference **TSX FP CG 030**.

The elements required for connecting a Premium/Atrium PLC to the Fipway network are:



Note: Important: **TSX FP CG 010/030** cables connect and disconnect from the PCMCIA card only **when power is switched off**.

8.8 Connection of the TSX FPP 10 card

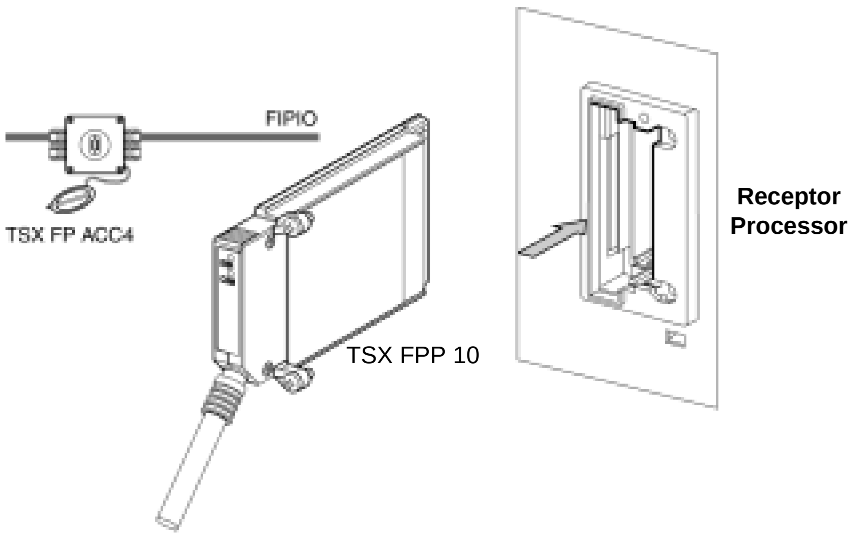
Connecting the TSX FPP 10 card

General

The **TSX FPP 10** PCMCIA card is connected to the FIPWAY bus using a connector such as **TSX FP ACC 4** or **TSX FP ACC 12**.
To connect the PCMCIA card to the ACC4/ACC12 connector the user has the choice of:

- Either a 1 m cable, product reference **TSX FP CG 010**.
- Or a 3 m cable, product reference **TSX FP CG 030**.

Elements required for connecting a Premium/Atrium PLC to the remote inputs/outputs FIPIO bus:



> **Note: Important**: cables (**TSX FP CG 010/030**) are connected and disconnected from the PCMCIA card only **when power is switched off**.

8.9 Connection of the TSX MBP 100 card

At a Glance

Aim of this Section

This Section deals with the hardware installation of **TSX MBP 100** PCMCIA Modbus Plus cards.

What's in this Section?

This section contains the following topics:

Connecting the TSX MBP100 card

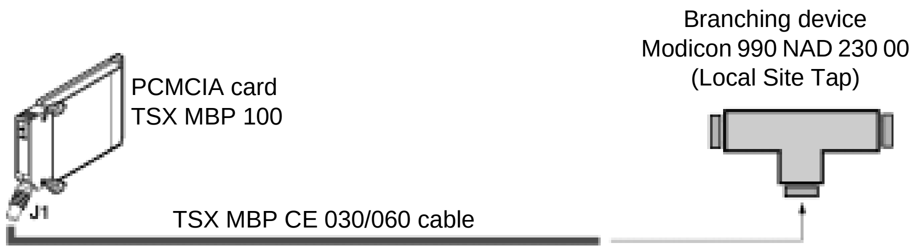
General

The T**SX MBP 100** PCMCIA card is connected to the Modbus Plus network using the **TSX MBP CE 030** branch cable, 3 m long, or the **TSX MBP CE 060**, 3 m long. This cable is connected to Modicon branch device (local site tap) **990NA23000**.
 For information on how to install a Modbus Plus network, see the Modicon Manual " Modbus Plus Network-Installation and Planning Manual" Product Reference 890 USE 100 01".

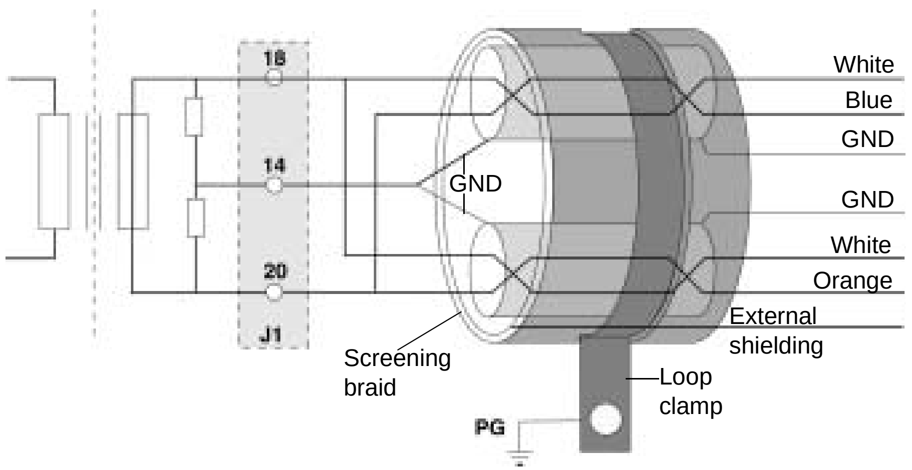
General principle for connecting the PCMCIA card

Principle

Illustration:



Description of the TSX MBP CE 030/060 cable:

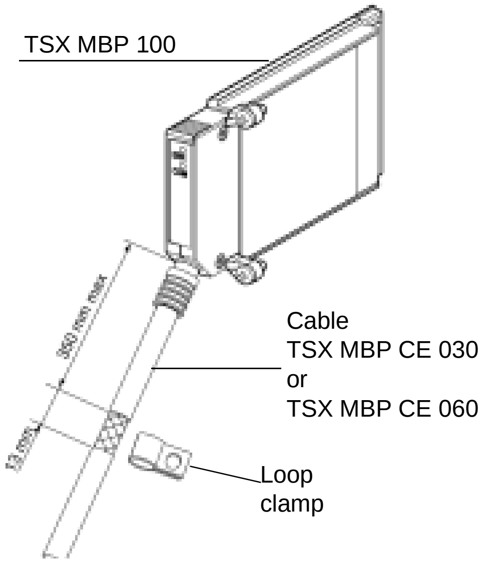
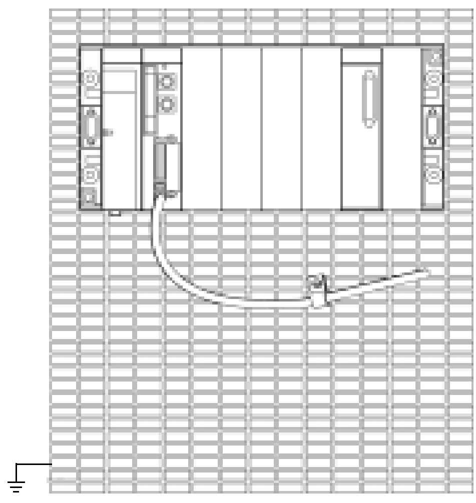


Note: Important: The cable's main shielding is grounded using a metal clamp in contact with the screening braid, which itself is fixed to the frame supporting the rack.
This cable must be grounded, even if there is no PCMCIA card present.

Grounding the TSX MBP CE 030/060 cable

Procedure

The cable connecting the PCMCIA card to the Modicon branching device must be grounded as shown below:

1	Clip the loop clamp onto the cable. This loop clamp is delivered with the Modicon branching device (Local Site Tap), product reference **990 NAD 230 00**.	
2	Fix the clamp + cable unit to the frame. The frame itself is connected to the ground.	

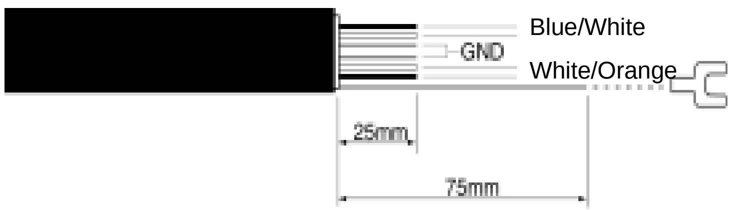
Connecting the TSX MBP CE 030/060 cable to Modicon connection device 990 NAD 230 00

General

TSX MBP CE 030/060 cables are made up of two distinct sets of shielded twisted pair wires and one external shielded ground wire, which makes a total of seven wires.

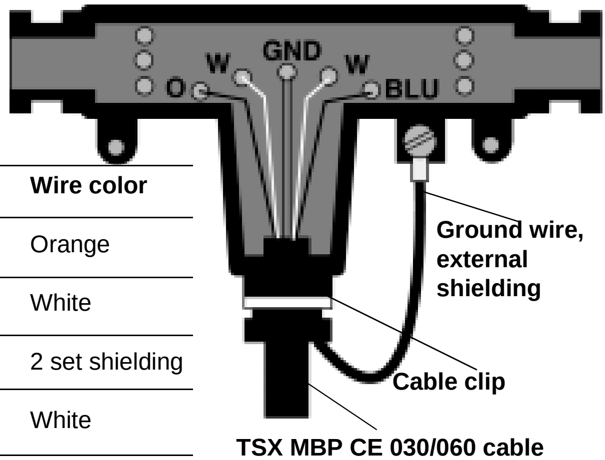
Connection procedure

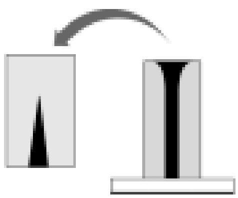
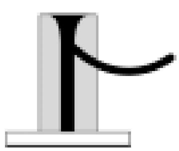
To connect the cable to the Modicon device follow the procedure below:

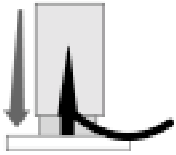
Step	Action
1	Identify the wires: ● A first set of wires marked with the colors White and Orange, with one stripped shielded wire. ● A second set of wires marked with the colors White and Blue, with one stripped shielded wire. ● The external shielded wire Note: It is important to correctly identify the two sets of twisted pairs since the two white wires are not interchangeable
2	Set up the cable according to the dimensions given in the following illustration. Illustration: 
3	Insert the cable in the Modicon device and keep it in place using a clip.

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>4</td><td>Connect the wires to the device, following the diagram below.
Diagram:

Branching device Modicon 990 NAD 230 00



<table>
<tr><th>Terminal</th><th>Wire color</th></tr>
<tr><td>O</td><td>Orange</td></tr>
<tr><td>W</td><td>White</td></tr>
<tr><td>GND</td><td>2 set shielding</td></tr>
<tr><td>W</td><td>White</td></tr>
<tr><td>BLU</td><td>Blue</td></tr>
</table></td></tr>
<tr><td>5</td><td>Remove the plastic hood from the terminal to connect each wire:
</td></tr>
<tr><td>6</td><td>Place each wire in the corresponding terminal slot:
</td></tr>
</table>

Step	Action
7	Replace the hoods, and using a screwdriver press them to engage the wires in their slots: 
8	Finally, fix an open terminal to the external shielding wire either by soldering or crimping, and connect it to the ground screw of the device as shown in stage 4 of the drawing.

8.10 Summary of connection devices

Summary of connection devices

TSX SCP 111 card

Type of cable	Product reference	Designation
Modem cable	TSX SCP CC 1030	Connection cable via Modem DTE/DCE 9 signals RS 232D, L=3 m.
Standard cable	TSX SCP CD 1030 TSX SCP CD 1100	Connection cable DTE/DTE RS 232D, L=3 m or 10 m.

TSX SCP 112 card

Type of cable	Product reference	Designation
Current loop cable	TSX SCP CX 2030	Current loop cable 20 mA, L=3 m.

TSX SCP 114 card

Type of cable	Product reference	Designation
Universal cable	TSX SCP CX 4030	Universal cable type RS 485 and RS 422A, L=3 m.
UNI-TELWAY cable	TSX SCP CU 4030	Cable type RS 485, L=3 m.
Modbus cable	TSX SCP CM 4030	Cable type RS 485, L=3 m.
Connection device	TSX SCA 50	Connection device screwed to bus for RS 485 series link.
Connection device	TSX SCA 62	Connection device via connector to bus for RS 485 series link.
Converter device	TSX SCA 72	RS 232D/RS 485 converter device.

TSX FPP 10 and TSX FPP 20 cards

Type of cable	Product reference	Designation
FIPWAY/FIPIO cable	TSX FP CG 010	Connection cable, L=1 m.
FIPWAY/FIPIO cable	TSX FP CG 030	Connection cable, L=3 m.
Connection device	TSX FP ACC4	FIPWAY/FIPIO connection device.
Connection device	TSX FP ACC12	FIPWAY/FIPIO connection device.

TSX MBP 100 card

Type of cable	Product reference	Designation
Modbus+ cable	TSX MBP CE 030	Connection cable, L=3 m.
Modbus+ cable	TSX MBP CE 060	Connection cable, L=6 m.

8.11 Precautions when connecting PCMCIA cards

Precautions for connecting PCMCIA cards

Important

Cards must be connected or disconnected in the host device (processor or **TSX SCY 21601**) **when the device is switched off**.

The ferule, placed in direct contact with the PCMCIA card device, is used to handle electrical interference carried by the link cable braids.

8.12 Consumption of PCMCIA cards

Consumption of PCMCIA cards

TSX SCP 111

Table of consumption:

Voltage	Typical current	Maximum current	Dissipated power
5 volts	140 mA	300 mA	1.5 W max.

TSX SCP 112

Table of consumption:

Voltage	Typical current	Maximum current	Dissipated power
5 volts	120 mA	300 mA	1.5 W max.

TSX SCP 114

Table of consumption:

Voltage	Typical current	Maximum current	Dissipated power
5 volts	150 mA	300 mA	1.5 W max.

TSX FPP 10 and TSX FPP 20

Table of consumption:

Voltage	Typical current	Maximum current	Dissipated power
5 volts	280 mA	330 mA	1.65 W max.

TSX MBP 100

Table of consumption:

Voltage	Typical current	Maximum current	Dissipated power
5 volts	220 mA	310 mA	1.55 W max.

TSX SCA 64 connection device

9

At a Glance

Aim of this Chapter

This Chapter introduces the functions of the **TSX SCA 64** connection device.

What's in this Chapter?

This chapter contains the following sections:

9.1 General Introduction

General Introduction

General

The **TSX SCA 64** unit is a cabling accessory, which allows a 2 or 4 wire mode communication module to be connected to a Modbus, Jbus or Jnet.

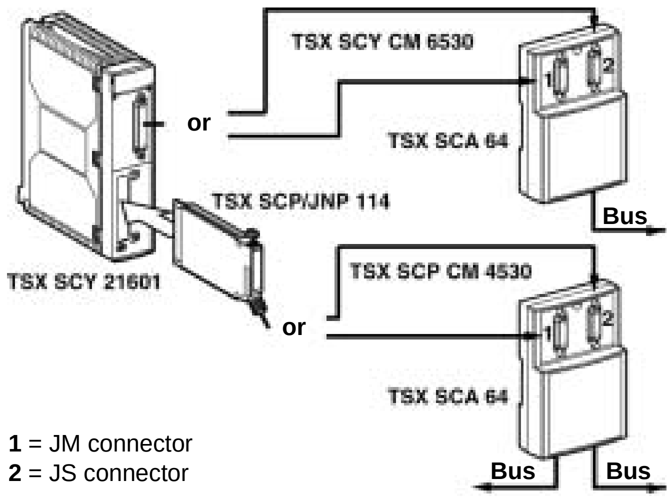
In 2-wire Mode

In this mode, connectable communication interfaces are:
- the built-in channel of the TSX SCY 11601/21601 modules, via a TSX CM 6530 cable,
- the TSX SCP/JNP 114 PCMCIA card, via a TSX SCP CM 6530 cable.

Note: Connection can be made to either the JM or the JS connector, regardless of channel configuration (master or slave).

Illustration

This diagram shows the general principal for connecting in 2-wire mode for a TSX SCY 21601.



In 4-wire Mode

In this mode, the connectable communication interface is:

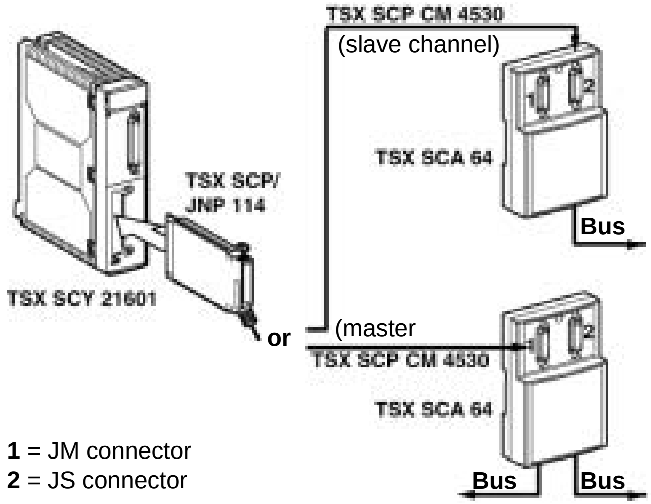
- a PCMCIA TSX SCP/JNP 114 card, via a TSX SCP CM 4530 cable, through a TSX SCP CM 6530 cable.

Connect the TSX SCP CM 6530 cable to the:

- JM connector if the PCMCIA card channel is configured in master mode,
- JS connector if the PCMCIA card channel is configured in slave mode.

Illustration

This diagram shows the general principal for connecting in 4-wire mode.



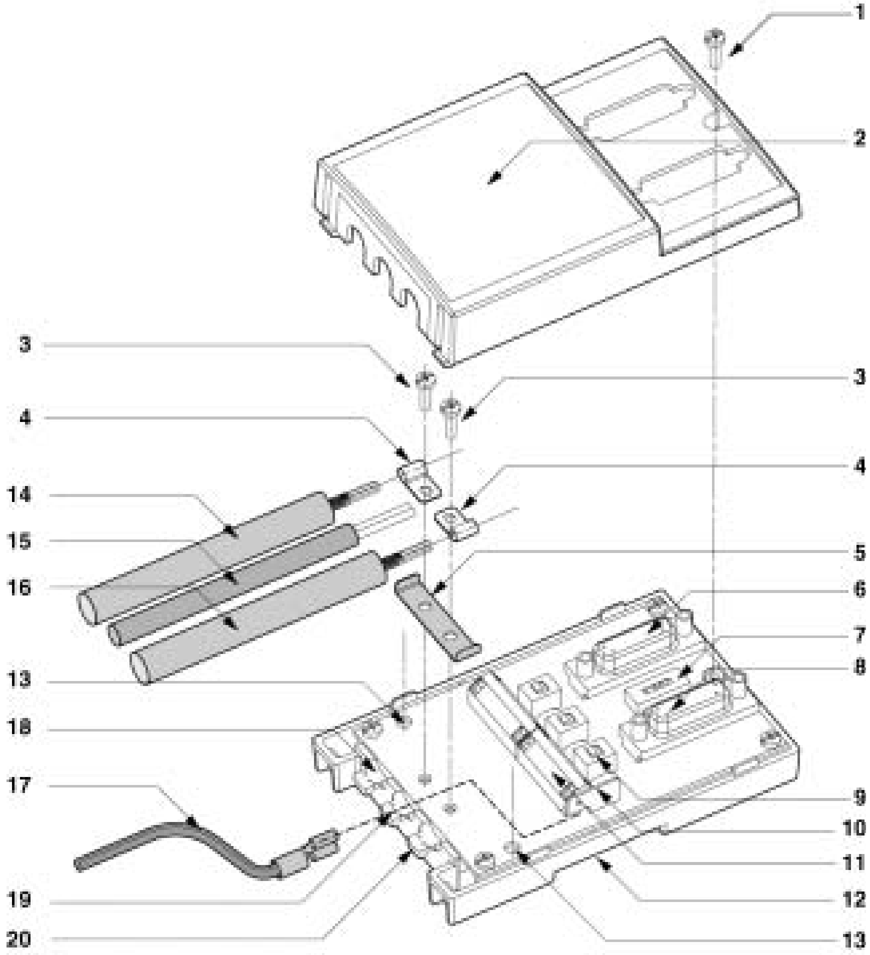
1 = JM connector
2 = JS connector

9.2 Physical Description

Physical Description

Illustration

This diagram shows the assembly plan for the TSX SCA 64 connection device.



Nodes

The following table describes the different nodes, which make up the connection device.

No.	Description
1	Cover screws
2	Device Cover
3	Screws fixing restart ground clamps
4	Restart ground clamps
5	Metallic part guaranteeing ground link between the 2 cables
6	SUB D 15 pin female (JM) connector able to receive: ● in 2-wire mode: the male connector of a TSX SCY CM 6530 or TSX SCP CM 4530 connection cable, whether the channel is master or slave, ● in 4-wire mode: the male connector of a TSX SCP CM 4530 connection cable, if the channel is master, ● or a TSX SCA 10 line terminator if the device is located at the beginning or end of the line, ● or a male analyzer connection cable connector
7	1 micro-switch allowing configuration in 2-or 4-wire operation
8	SUB D 15 pin female (JS) connector able to receive: ● in 2-wire mode: the male connector of a TSX SCY CM 6530 or TSX SCP CM 4530 connection cable, whether the channel is master or slave, ● in 4-wire mode: the male connector of a TSX SCP CM 4530 connection cable, if the channel is slave, ● or a TSX SCA 10 line terminator if the device is located at the beginning or end of the line, ● or a male analyzer connection cable connector
9	3 micro-switches allowing polarization mode to be configured
10	Terminal to connect green/yellow ground wire
11	Connection terminals for the main connection cables assuring continuing operation of the bus
12	Device Connection Base
13	Screw holes (4 diameter) to fix the device to a board or panel (60mm apart)
14	Main 2 or 3 pair cable guaranteeing continuing operation of the bus (max. 10 diameter), for connection to JA
15	5VDC power supply cable (for external polarization if required) for connection to JC
16	Main 2 or 3 pair cable guaranteeing continuing operation of the bus (max. 10 diameter), for connection to JB
17	Green/yellow device grounding cable
18	Main cable with corresponding ground format connected to local ground via a surge suppressor

No.	Description
19	Power supply cable and green/yellow ground wire
20	Main cable with corresponding ground format connected to local ground

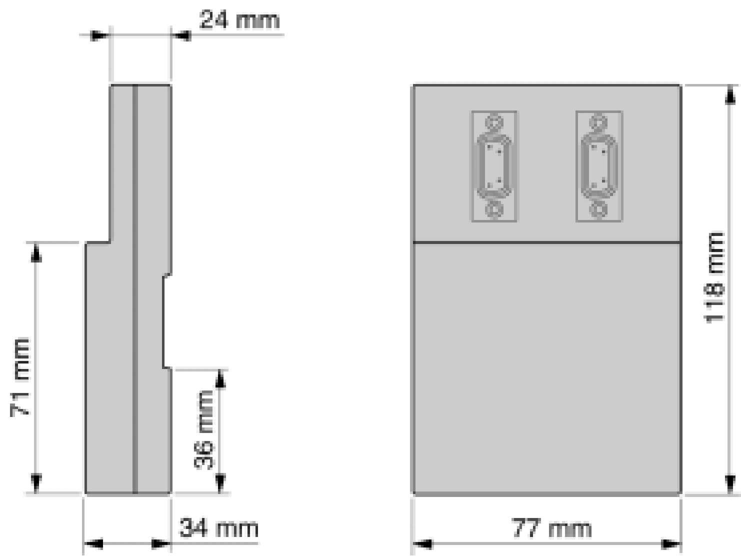
Note: Nodes 14 and 16 are not included with the TSX SCA 64 device.

9.3 Dimensions and Mounting

Dimensions and Mounting

Dimensions

This diagram shows the dimensions of the RSX SCA 64 connection device.



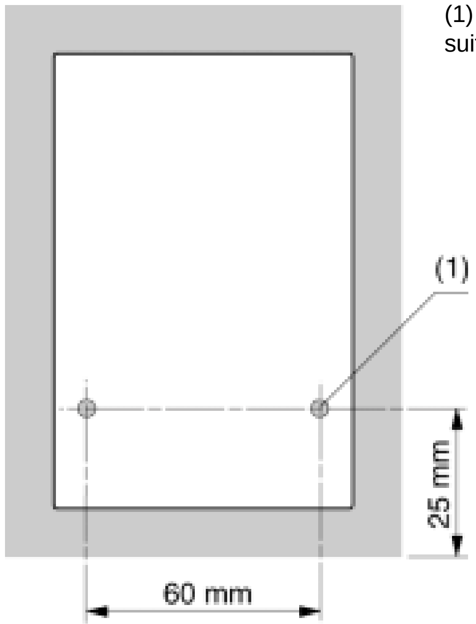
Mounting/Fixing

The device can be mounted either:

- on a board or panel, secured with 2 M4 screws (min. length 20mm),
- on a DIN profile - Refs. AM1-DP 200 or AM1-DE 200 (Schneider catalog references).

Drilling Template

This diagram shows the plan for mounting on a board or panel.



(1) Screw hole diameter must be suitable for M4 screw

9.4 Installation

Installation

Required Hardware

Installing the TSX SCA 64 device requires:
- a 2.5mm wide flat tipped screwdriver,
- a cross tipped screwdriver (PZ01).

Procedure

The labels in the text below correspond with those found in the description of the device.

Step	Action
1	Unscrew screw **1** with a PZ01 screwdriver, open cover **2**.
2	Fix device connection base to its support: ● either a DIN AM1-DP200 or AM1-DE 200 profile, ● or a board or panel, and secure with 2 M4 screws (min. length 20mm).
3	Prepare main cables **14** and **16** according to the connection type selected, as indicated on the following pages.
4	Position the ground clamps **4** onto the cables.
5	Position the ground link **5**, if necessary, according to the type of connection selected, as indicated on the following pages.
6	Connect the main cables (and the power supply cable if necessary) to terminal **11** according to the type of connection selected, as indicated on the following pages. The cable wires should have DZ5-CE005 cable ends (for the main cables) and DZ5-CE007 cable ends (for the power supply cable). Use a 2.5mm wide flat tipped screwdriver. Torque on terminal screw $\leq$ 0.25 N.m.
7	Screw on the ground clamps and link with the screws **3**, using a cross tipped PZ01 screwdriver.
8	Connect the green/yellow ground wire **17** to connection terminal **10**.
9	Secure the cables with nylon clips. (Attach the green/yellow wire to the power supply cable if it is present).
10	Set the micro-switches **7** et **9** to the desired configuration; see configurations on following pages.
11	Break the scored tabs on the cover **2** to make way for the cables.
12	Mount the cover **2** and secure it with the screw **1** using a cross tipped PZ01 screwdriver.

9.5 Wiring the TSX SCP CM 4530

Wiring the TSX SCP CM 4530

Illustration

J1 connector (PCMCIA side)			15-way SUBD connector
12	Tx-	Green/White	7
11	Tx+	White/Green	14
20	Pull down	White/Blue	15
18	Pull up	Blue/White	12
1	Rx-	White/Orange	16
2	Rx+	Orange/White	13
16	0 volt	Brown/White	8

9.6 Bus Cable Shield Cabling

At a Glance

Aim of this Section

This section describes the different local grounding principles for the bus.

What's in this Section?

This section contains the following topics:

Local Grounding the Bus: General

Introduction

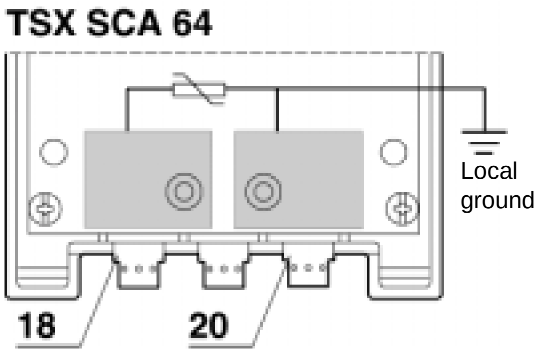
The bus can be grounded in three different ways:
- connecting the shield to the local ground and to the two ends of the cable,
- connecting the shield to the local ground at one end and to the local ground via a surge suppressor at the other end,
- connecting the shielding to the local ground at one end and isolating it from the ground at the other end.

Principle

Opposite each main cable path, a copper pad grounds the cable shields:
- The path shown **20** locally grounds the cable shielding.
- The path shown **18** locally grounds the cable shielding via a surge suppressor.

Illustration

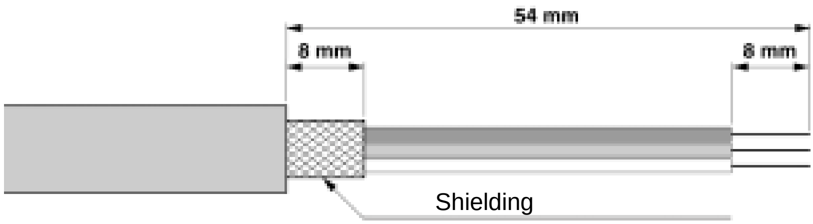
This diagram shows the principle for locally grounding the device as a whole.



Cable Preparation Template: Introduction

Certain precautions must be taken in order to ensure correct placement of the bus cables:
- following the stripping template,
- using the following cable ends:
  - DZ5-CE005 for the main cables,
  - DZ5-CE007 for the power supply cable.

This diagram shows the local grounding principle for the device as a whole.



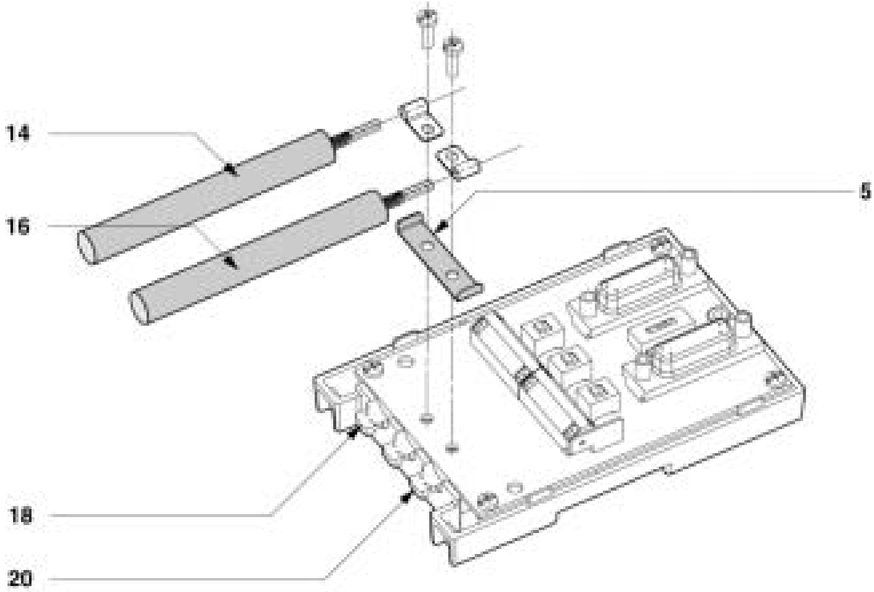
Connecting the shield to the local ground and to the two ends of the cable (recommended cable type)

Principle

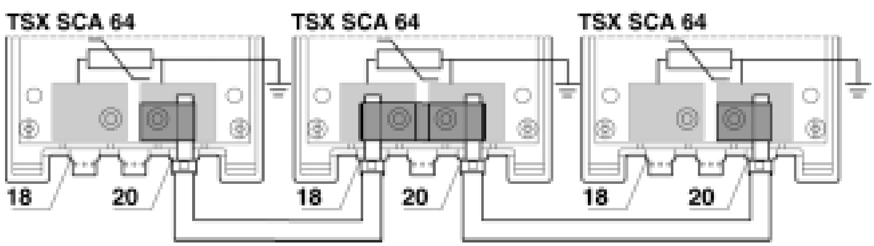
The two grounding tracks should be linked via the ground link **5** shown. End devices differ in that they only have one cable. Where this is the case, the ground link **5** shown is not required as long as the cable is positioned in slot **20** shown in the diagram.

Illustration

This diagram shows the principle for locally grounding the cable.



Connecting several devices together:



Connecting the shield to the local ground at one end of the cable and to the local ground via a surge suppressor at the other end

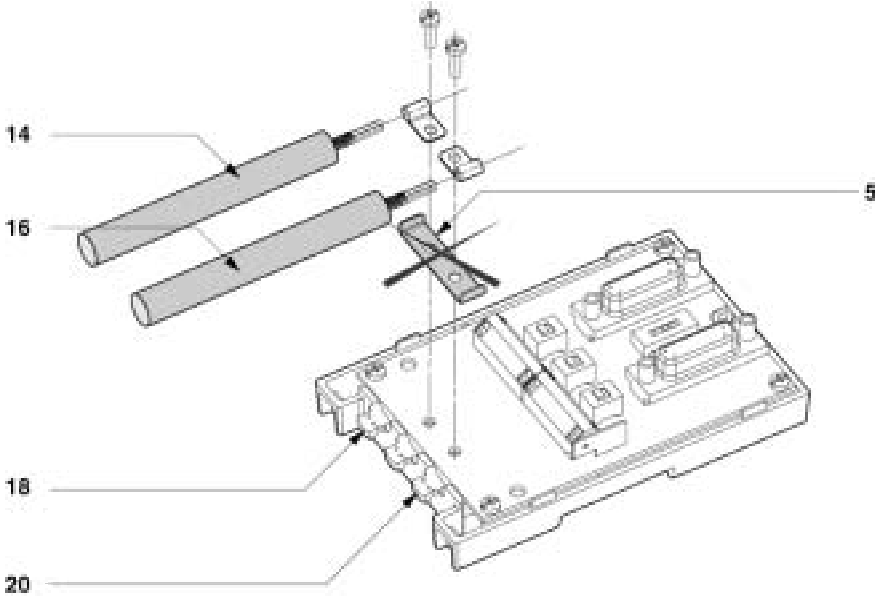
Principle

Only cable **16** shown is connected to the local ground, cable **14** shown is connected to the local ground via a surge suppressor.

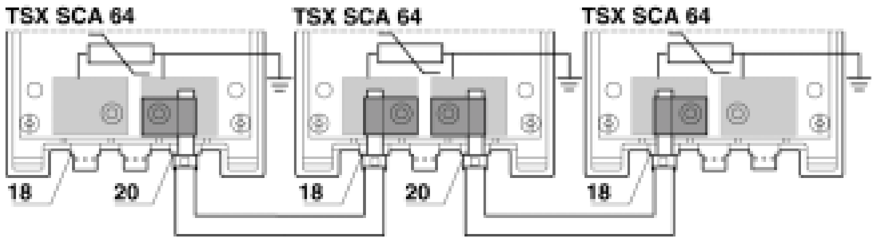
Note: Ground link**5** shown is not used

Illustration

This diagram shows the principle for locally grounding the cable.



Connecting several devices together:



Connecting the shielding to the local ground at one end and isolating it from the ground at the other end.

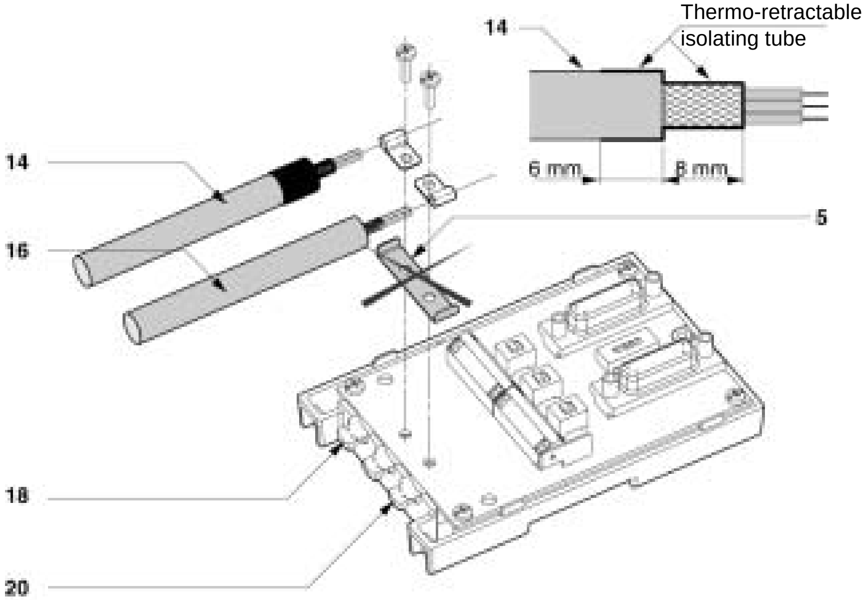
Principle

Only cable **16** shown is connected to the local ground, cable shielding **14** shown is isolated from the ground by a thermo-retractable tube (not included).

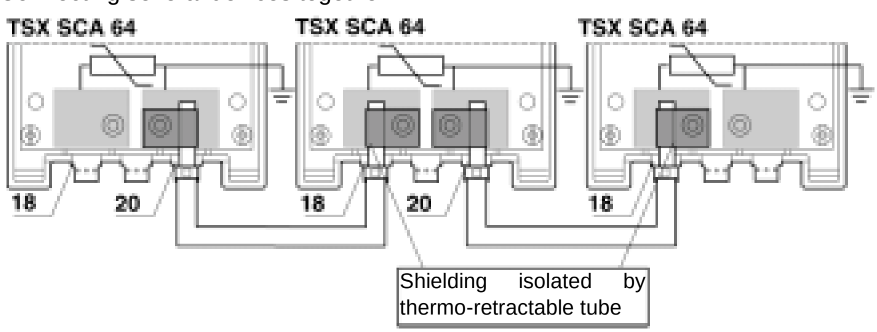
Note: In this case, ground link**5** shown is not used.

Illustration

This diagram shows the principle for locally grounding the cable.



Connecting several devices together:



9.7 Device Configuration and Transmission Pair Polarization

At a Glance

Aim of this Section

This section contains the different configurations of the TSX SCA 64 device.

What's in this Section?

This section contains the following topics:

4-wire Configuration with 2-pair Polarization via External Power Supply

Introduction

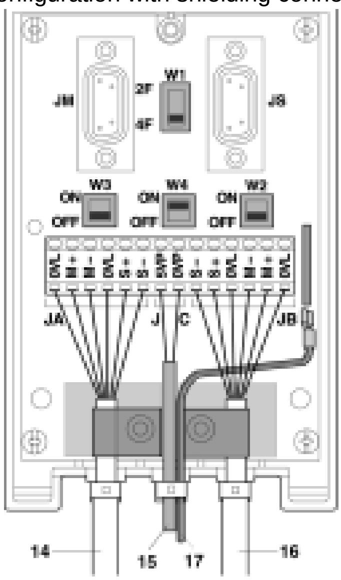
Main cables **14** and **16** are 3-pair cables:
- one M+, M- pair,
- one S+, S- pair,
- one VL, 0VL pair.

Power supply cable **15** is linked to an external 5VDC power supply.
Green/yellow wire **17** is connected to the module's ground terminal.

Note: each pair is only polarized once on the whole bus.

Illustration

This diagram shows a configuration with shielding connection at one end only.



Positioning of Micro-switches

This table shows micro-switch positions.

Micro-switches	**Position on**	
	device receiving power supply	**Other devices**
W1	4F	4F
W2	OFF	OFF
W3	OFF	OFF
W4	ON	ON/OFF

4-wire Configuration with Polarization of One Pair by the Master Station and the Other by a Slave Station

Introduction

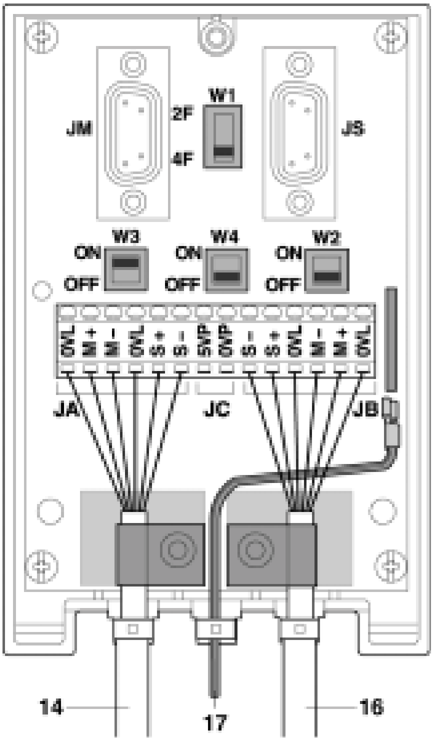
Main cables **14** and **16** are 3-pair cables:
- one M+, M- pair,
- one S+, S- pair,
- one 0VL, OVL pair.

Green/yellow wire **17** is connected to the module's ground terminal.

Note: each pair is only polarized once on the whole bus.

Illustration

This diagram shows a configuration with M+ M- pair polarization by the connected master station.



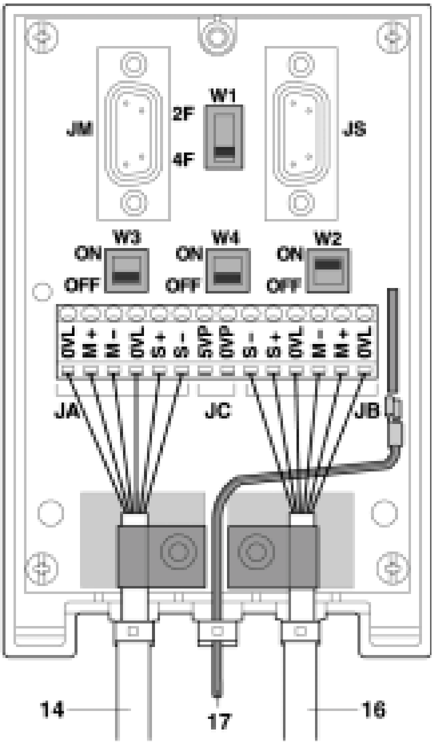
Positioning of Micro-switches

This table shows micro-switch positions

Micro-switches	Positions on
	master station device
W1	4F
W2	OFF
W3	ON
W4	OFF

Illustration

This diagram shows a configuration with S+ S- pair polarization by one of the connected slave stations.



Positioning of Micro-switches

This table shows micro-switch positions.

Micro-switches	**Positions on**	
	one of the slave stations	**other slave stations**
W1	4F	4F
W2	**ON**	OFF
W3	OFF	OFF
W4	OFF	OFF

2-wire Configuration with M+, M- Pair Polarization by the Master Station or a Slave Station

Introduction

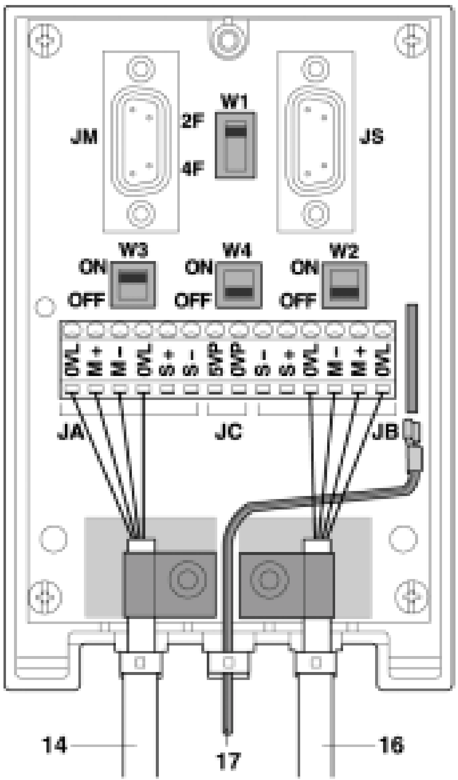
Main cables **14** and **16** are 2-pair cables:
- one M+, M- pair,
- one 0VL, 0VL pair.

Green/yellow wire **17** is connected to the module's ground terminal.

Note: This pair is only polarized once on the whole bus.

Illustration

This diagram shows a configuration with shielding connection at one end only.



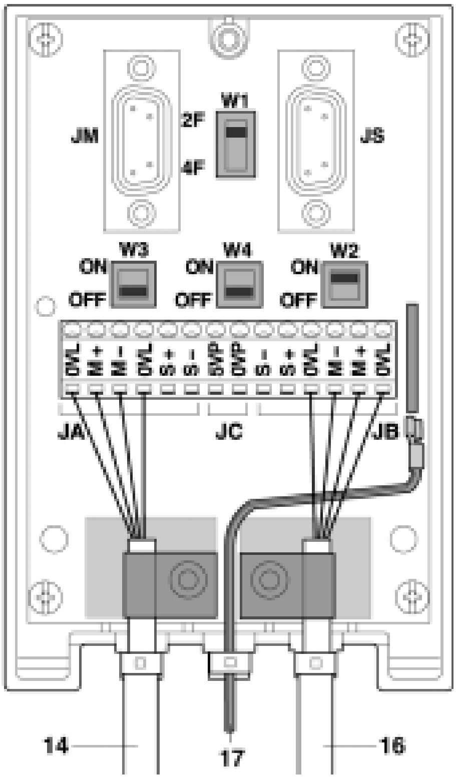
Positioning of Micro-switches

This table shows micro-switch positions.

Micro-switches	Position on	
	master station device	**slave stations**
W1	2F	2F
W2	OFF	OFF
W3	ON	OFF
W4	OFF	OFF

Illustration

This diagram shows a configuration with shielding connection at one end only.



Positioning of Micro-switches

This table shows micro-switch positions.

Micro-switches	**Position on**	
	one of the slave stations	**other stations (master/slaves)**
W1	2F	2F
W2	**ON**	OFF
W3	OFF	OFF
W4	OFF	OFF

9.8 Adapting the Line End

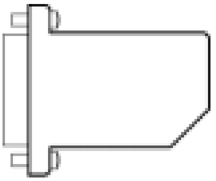
Line End Adaptation

At a Glance

Each end of the bus cable must have a line end jack adaptor. This line end jack adapter can be plugged into free connectors on either JM (master) or JS (slave) on TSX SCA 64 devices, located at the ends of the bus.
A TSX SCA 10 kit consisting of 2 SUB D 15 pin connectors plus accessories (cover, screws, wiring etc.) enables the user to configure and set up the line end jacks.

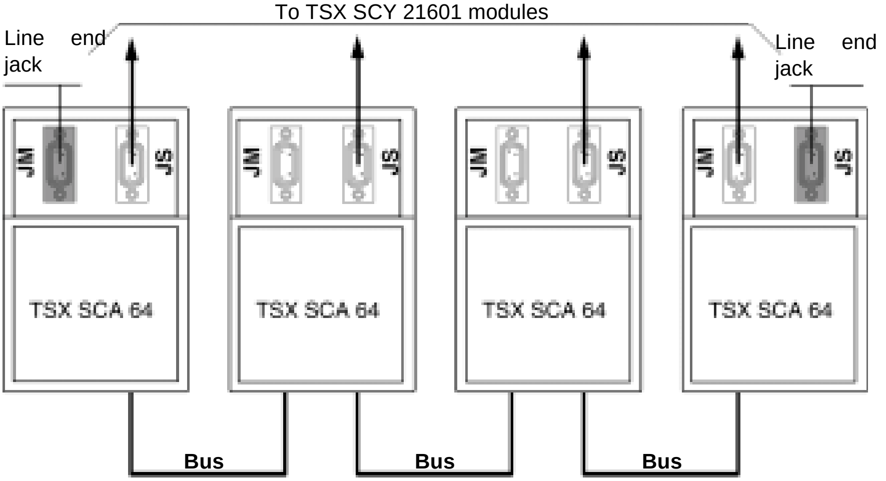
Illustration

This view shows a line end jack.



SCA 64 mounting example

This example shows a communication bus with 4 TSXx SCA 64 connection devices.

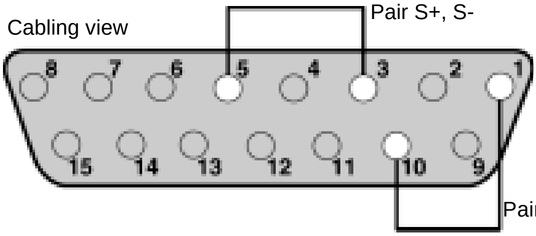


Installing line end jacks: At a Glance

Configurations are attained by plugging each SUB D 15 pin 2-wire connector (supplied) into the sockets, enabling line adaptation. Two types of configuration are possible depending upon the type of stations present on the bus:

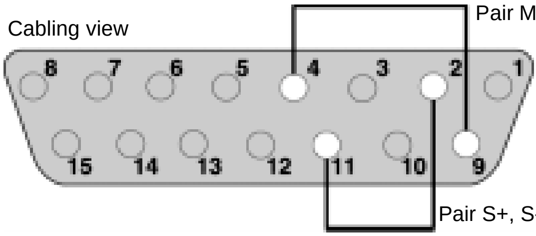
- Configuration 1
  - All stations present on the bus are Modbus stations: if this is the case, the line end jacks should be configured as shown below (resistance-type adaptation).

This diagram shows configuration 1: Modbus stations on the bus.



- Configuration 2
  - Stations present on the bus are Modbus and Uni-Telway stations: if this is the case, the line end jacks should be configured as shown below (resistance-type and series capacity adaptation).

This diagram shows configuration 2: Modbus and Uni-Telway stations on the bus. :



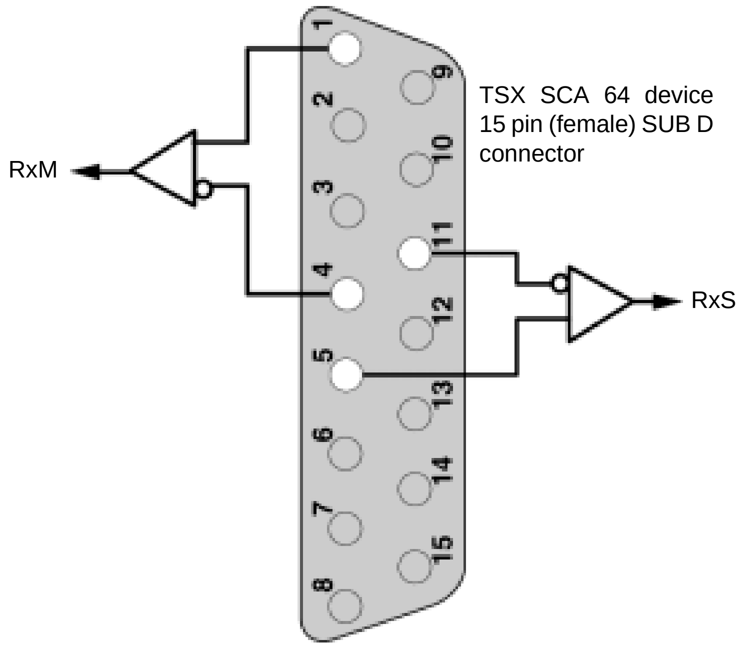
Mounting procedure

Installation

Status	Action
1	Plug the wires supplied into the SUB D 15 pin connectors in accordance with the desired configuration.
2	Put the connector into place in one of the half-covers (the connector can be either way up).
3	Attach the latch screw.
4	Put the sleeve into place.
5	Cover it all with the other half-cover, taking care not to damage the wires.
6	Screw in or clip on the two half-covers (depending upon the type included).
7	Use the blank labels provided to show utilization. **Note:**Cable clamps and/or other accessories should not be used.

Connecting an Analyzer

The JM or JS connectors on the TSX SCA 64 device can support a frame analyzer, which is connected by a SUB D 15 (male) pin connector. Signals relating to each pair are available on the device connectors as indicated in the diagram below. This diagram shows the connections for different pairs of the analyzer cable.



Communication : modules TSX ETY 110/4102/PORT/5102 et et TSW WMY 100

VI

Présentation

Objet de cet intercalaire

Cet intercalaire traite de la mise en oeuvre matérielle des coupleurs réseau ETHERNET **TSX ETY 110**, **TSX ETY 4102/PORT/5102** et **TSX WMY 100**, dans un automate Premium/Atrium.

What's in this Part?

This part contains the following chapters:

Communication: TSX ETY 110 module

10

At a Glance

Aim of this Chapter

This Chapter deals with installing the Ethernet network module **TSX ETY 110**, in a Premium/Atrium PLC.

What's in this Chapter?

This chapter contains the following sections:

10.1 At a Glance

At a Glance

General

Communication module **TSX ETY 110** is used to communicate in an Ethernet architecture. It is made up of a communication channel which offers two types of connections:

- Connection to an ETHWAY network supporting common words and X-WayUNI-TE message-handling services on an ETHWAY profile.
- Connection to a TCP-IP network supporting the X-WayUNI-TE message-handling service.

This module also ensures transparent routing of X-WayUNI-TE messages from a TCP-IP network to an X-Waynetwork, and vice versa.

Please refer to the Ethernet reference manual for wiring an ETHWAY architecture.

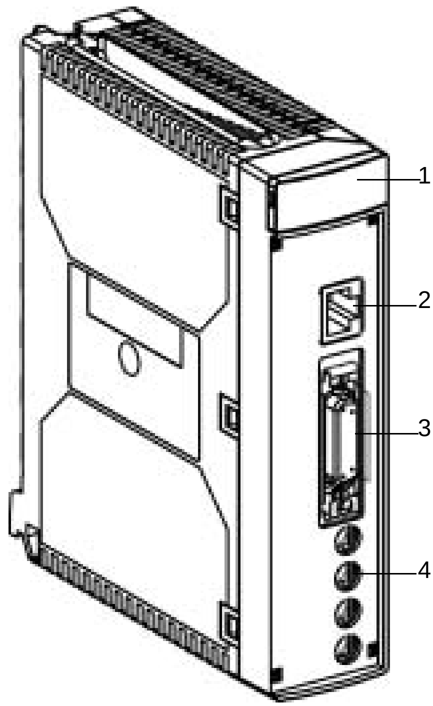
10.2 Description

Description

General

Module **TSX ETY 110** is a single (half size) module which is inserted in a rack slot of a Premium PLC station.

Description:

1. Display panel indicating state of module. **2.** Standard connector for 10baseT (RJ45) interface. **3.** Standard connector for 10base5 (AUI) interface. **4.** Thumbwheel to define station number and network number.	Illustration: 

10.3 Characteristics of the Ethernet channel

Characteristics of Ethernet channel

General

The module is made up of two standard interfaces for connecting to a network:

- One 10baseT interface on front panel of the module, comprising an RJ45 connector, which is used for a point to point link via a linking cable made up of two twisted pairs of impedance 100 Ω ± 15 Ω.
- A 10base5 or AUI interface on front panel of module comprising a SUB-D 15-pin connector, used to link to network by branching. This interface is also used to supply active connection devices (Taps). It complies with the IEC 802 3 standard and is used to connect any device which complies with this standard.

The type of connection is recognized automatically as soon as connection is made to the network.

Services and operations supported by the module:

TCP-IP services	UNI-TE	• Client/server mode. • Synchronous requests of 256 bytes. • Asynchronous requests of 1 Kbyte.
Ethway services	UNI-TE	• Client/server mode. • Synchronous requests of 256 bytes. • Asynchronous requests of 1 Kbyte.
	Common words	• Shared database of 256 words
	Application to application	• Message exchange in point to point 256 bytes max.
Common services		• X-Wayinter-network routing • X-WAY/UNI-TE routing • Module diagnostics

Note: The Ethernet driver supports the Ethernet II and (LCC+SNAP) 802.3 formats on TCP-IP and LCC 802.3 on Ethway.

10.4 Installing the TSX ETY 110 module

At a Glance

Aim of this Section

This Section deals with installing module **TSX ETY 110** in a PLC.

What's in this Section?

This section contains the following topics:

At a Glance

General

The communication module **TSX ETY 110** is mounted in the rack slot of a Premium/ Atrium PLC station. It can be installed in any available slot (except in the offset X Bus racks), on condition that the supply constraints of the rack are observed (see *Electrical characteristics, p. 274*).

Selecting the Type of Processor

Selection Guide

Selecting the processor to control the PLC station will depend on the number of network connections required.

Processors	Number of network connections	Number of ETY 110 modules per station (*)
TSX 57 P 1../2.. **PCX 57 253**	1	1
TSX P 57 3... **PCX 57 353**	3	3
TSX P 57 4..	4	4
(*) on condition of a consumption report on the 5V, compatible with the supply selected.		

Wiring/Unwiring with power switched on

The module

Module **TSX ETY 110** can be wired or unwired with power switched on without disrupting the operation of the station.
The module does not have a RAM internal backup memory function: this will be erased when power is switched off.
The module initializes itself when power is switched on. A communication break can be expected during this intervention.

The link

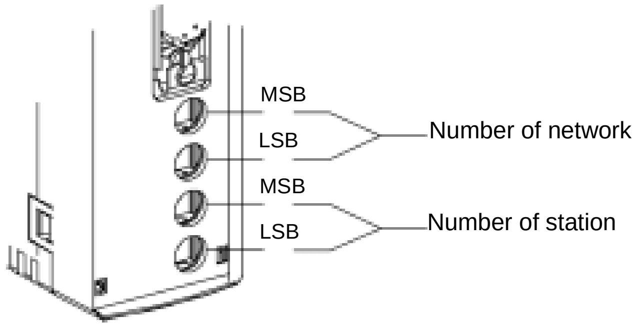
The SUB-D 15-pin connectors of the AUI interface and the RJ45 connector of the 10baseT interface can be connected or disconnected when power is on. A communication break can therefore be expected in the application in progress.

Station address coding

General

Four thumbwheels, which can be accessed from the front panel, are used to encode the network number and the station number.

Illustration:



LSB = least significant bit
MSB = most significant bit

Values of coding possible in hexadecimal:

Network number	Station number
0 to 7F	0 to 3F

Example of coding:
Network 3: 16#03
Station 27: 16#1B

The thumbwheels are to be adjusted as follows:

0	PF
3	Pf
1	PF
B	Pf

Note: Caution: in an Ethernet network, there must only be one MAC address for each station. Before modifying these addresses you must check that they comply with the addressing plan of the carrier.

10.5 Connection via the AUI interface

Connection by AUI interface

General

This interface is used to connect all types of devices which comply with the physical layer defined in the OSI 802.3 standard (10base5, 10base2, FOIRL, etc.) through a transceiver.

Module **TSX ETY 110** can provide a remote power supply for the transceiver through the Sub-D connector with the following characteristics:

- Imax = 0.5 mA
- 12 V-6%<Usupply<15 V+15%

The module is connected to the main cable via a transceiver and by the following branch cables:

- **TSX ETY CB 005** - Length 5 m
- **TSX ETY CB 010** - Length 10 m
- **TSX ETY CB 020** - Length 20 m

The maximum length of a branch may be 50 m. This length can be achieved by connecting several branch cables end to end.

Note: It is essential to use transceivers (TSX ETH ACC2) to connect two modules in point to point.

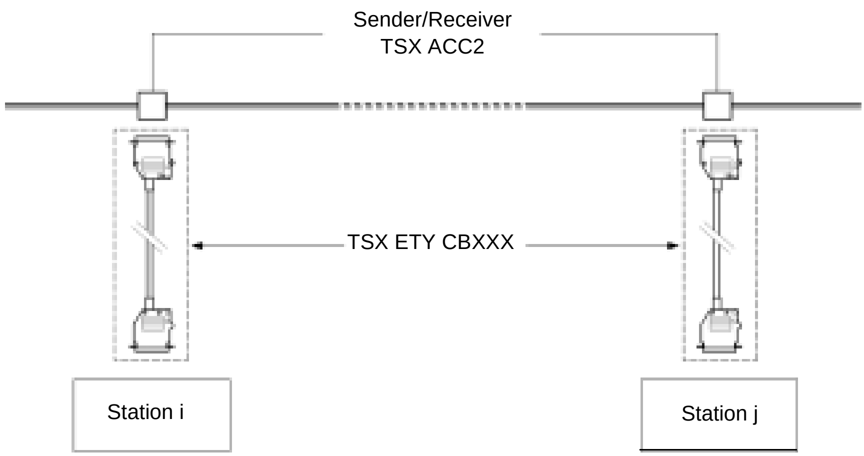
Connector pinouts

Sub-D 15 pins according to the OSI 802.3 standard:

Pin number	Designation according to ISO 802.3	Use
1	CI-S (Control In Shield)	GND
2	CI-A (Control In A)	COLL+
3	DO-A (Data Out A)	TD+
4	DI-S (Data In Shield)	GND
5	DI-A (Data in A)	RD+
6	VC (Voltage Common)	GND
7	not used	
8	not used	
9	CI-B (Control In B)	COLL-
10	DO-B (Data Out B)	TD-
11	DO-S (Data Out Shield)	GND
12	DI-B (Date In B)	RD-
13	VP (Voltage Plus)	12 V
14	VS (Voltage Shield)	GND
15	not used	
Sub-D connector body	PG (Protective Ground)	Protective ground

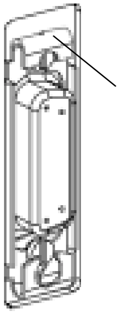
Topology

Illustration:



Locking

The Sub-D connector is equipped with a sliding lock system The connector is locked by sliding the tab to the bottom. To ensure the module works properly in a disturbed environment it is **essential** to carry out the locking procedure.
Illustration:



10.6 10baseT Interface

10baseT interface

General

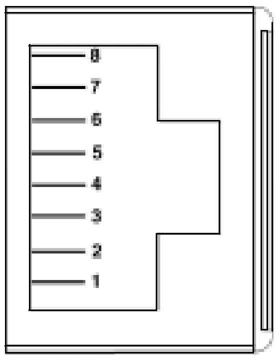
This interface has a standard type RJ45 connector. These connection cables are widely used in business.

In an industrial environment, you must use a cable with the following characteristics:
- Shielded twisted double pair
- Impedance 100 Ω±15 Ω (from 1 to 16 MHz)
- Maximum attenuation 11.5 dB/100 meters
- Maximum length 100 meters

The 10baseT connection is a point to point connection to form a star-shaped network. The stations are connected to concentrators or switches.

Pinouts

Illustration:

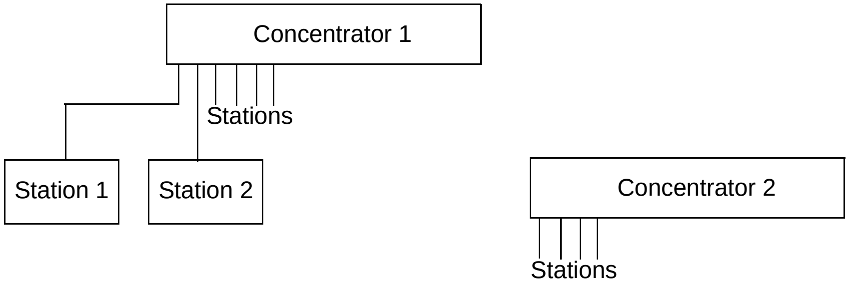


Reminder of pinouts:

Pin	Signal
1	TD+
2	TD-
3	RD+
4	not connected
5	not connected
6	RD-
7	not connected
8	not connected

Topology

This link is used to create a star-shaped network with connections in point to point. The stations are connected to a concentrator (Hub). The concentrators can also be connected in cascade to increase network size.
Illustration:

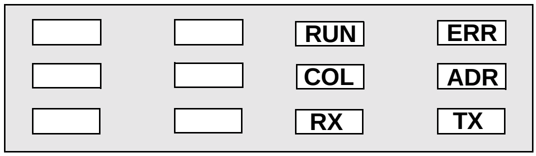


10.7 Display panel, diagnostics

Display panel, diagnostics

General

The display panel complies with the Premium standard



Diagnostics

Meaning of the diagnostics LEDs:

RUN	ERR	COL	ADR	TX	RX	Meaning
O	P	ns	ns	ns	ns	Module not operational.
O	F	O	O	O	O	Module not configured or configuration error.
F	F	O	O	O	O	Module running self-test.
P	O	O	O	F	O	Ethernet communication sending.
P	O	O	O	O	F	Ethernet communication receiving.
P	O	O	O	F	F	Ethernet communication in sending/receiving.
P	O	F	O	F	O	Module has detected collision.
P	O	O	P	O	O	Duplicate MAC address.
O	O	O	P	O	O	Network address beyond limits.
P = Permanently on, F = flashing, O = Off, ns = not significant						

10.8 Electrical features

Electrical characteristics

General

Module **TSX ETY 110** can be inserted in any rack slot of a Premium/Atrium station (except in an X Bus offset rack). The module consumption from the supply depends on the selection made from the transceiver remote power supply option.

Table of consumption:

Voltage	**Current consumed**		**Dissipated power**	
5 volts	Typical	Maximum	Typical	Maximum
with remote power supply (RJ45)	0.8 A	1.2 A	4 W	6 W
with remote power supply (AUI)	1.2 A	2.5 A	6 W	12.5 W

Note: Caution: Modules **TSX ETY 110** on 5 volts have high consumption when the AUI connection is used. Special attention should therefore be given what sort of devices are in the rack before deciding which kind of supply to choose.

Number of **TSX ETY 110** modules which can be connected to a rack:
- 2 modules with AUI connection.
- 4 modules with RJ45 connection.

Communication: Modules TSX ETY 4102/PORT/5102

11

At a Glance

Aim of this Chapter

This Chapter deals with the hardware installation of ETHERNET network modules **TSX ETY 4102/PORT** and **TSX ETY 5102** in a Premium/Atrium PLC.

What's in this Chapter?

This chapter contains the following sections:

11.1 At a Glance

At a Glance

General

Communication modules **TSX ETY 4102/PORT/5102** are used to communicate in an Ethernet architecture. They are made up of a communication channel whose main features are as follows:
- Connection to a TCP/IP network.
- Communication in Half and Full Duplex mode by automatic recognition.
- Transmission speed from 10 or 100 Mbits/s by automatic recognition.
- Connection to network by copper cable via an RJ45 connector.

These modules are used to carry out the following functions:
- X-WAY UNI-TE and Modbus messaging service on TCP/IP.
- I/O Scanner Utility.
- SNMP Service.
- Web server.
- Global Data.

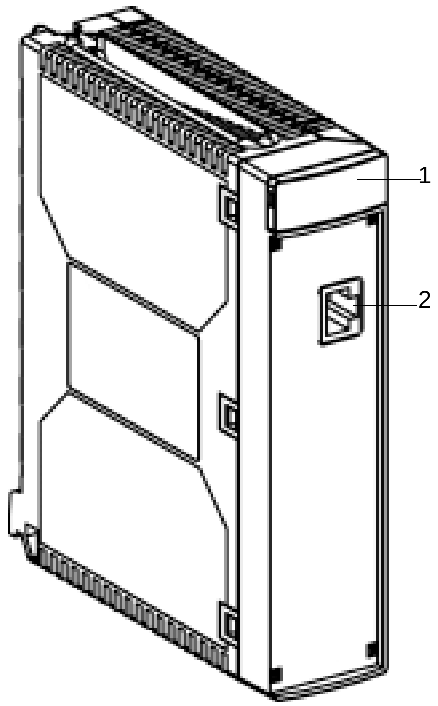
11.2 Description

Description

General

TSX ETY 4102/PORT/5102 modules are standard format modules which are inserted in a slot on the main or extension rack of a Premium PLC station.

Description:

1. Display panel indicating module status: ● One green **RUN** LED. ● Two red LEDs: **ERR** and **COL**. ● Three yellow LEDs: **STS**, **TX** and **RX**. **2.** Standard connector for 10baseT (RJ45) interface.	Illustration: 

11.3 Ethernet Channel Characteristics

Characteristics of the Ethernet Channel

General

The modules have a standard interface for connecting to a 10/100baseT network and on the front panel there is a RJ45 connector for a pin-to-pin link via a link cable comprising two independent twisted pairs.

Utilities and functions supported by the modules:

Support	Utility	Protocol	Functions
TCP-IP Services	Messaging	UNI-TE	• Client/server mode. • Synchronous requests of 256 bytes. • Asynchronous requests of 1 Kbyte.
		Modbus	• Data exchange.
	I/O Scanner	Modbus	• Access to inputs/outputs
	Network management	SNMP	• Agent SNMP, MIB II, MIB Schneider.
	Web	HTTP	• Preset, non-modifiable website on **TSX ETY 4102/PORT**. • Website which can be modified and increased by increments within the limit of 7.5Mb on **TSX ETY 5102**.
	Management of IP addresses	BOOTP/ DHCP	• Client and address server
	Global Data.	UDP	• Exchange of data between stations

11.4 Installation of TSX ETY 4102/PORT/5102 Modules

At a Glance

Aim of this Section

This Section deals with the installation of **TSX ETY 4102/PORT** and **TSX ETY 5102** modules in a PLC.

What's in this Section?

This section contains the following topics:

At a Glance

General

TSX ETY 4102/PORT/5102 communication modules are mounted in the rack slot of a Premium/Atrium PLC station. They can be installed in any available slot (except in an offset X Bus rack), on condition that the supply constraints of the rack are observed (see *Electrical Characteristics, p. 287*).

Selecting the Type of Processor

Selection Guide

Selecting the processor to control the PLC station will depend on the number of network connections required.

Processors	Number of network connections	Number of ETY 4102/PORT/5102 per station (*)
TSX 57 P 1../2.. PCX 57 253	1	1
TSX P 57 3... PCX 57 353	3	3
TSX P 57 4..	4	4
(*) on condition of a consumption report on the 5V, compatible with the supply selected.		

Compatibility

Depending on the software version of the processor, all or some of the functions of the TSK-ETY 4102/PORT/5102 modules will be available. The table below gives the compatibility rules.

Software version of the processor	Supported functions	Type to be configured in PL7
VL < 3.3	Does not accept the modules TSX ETY4•••/5•••	-
3.3 £ VL < 5.1	Functions limited to those of the TSX ETY 410/5101 modules	TSX ETY 410 or 5101
VL 5.1	Supports all the functions of the TSX ETY 4102/PORT/5102 modules	TSX ETY 4102/PORT or 5102

Wiring/Unwiring with Power Switched on

The Module

The **TSX ETY 4102/PORT/5102** modules can be wired or unwired when switched on without disrupting the operation of the station.
The modules do not have an internal RAM backup memory function: this will be erased when power is switched off.
The modules reset when switched on. A communication break can be expected during these interventions.

The link

The 10/100baseT interface RJ45 connector can be connected or disconnected when power is on. A communication break can therefore be expected in the application in progress.

11.5 10/100baseT interface

10/100base T Interface

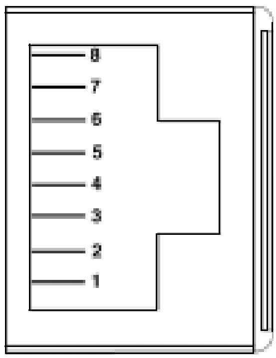
General

This interface has a standard type RJ45 connector.

Refer to the ETHERNET reference manual for the connection accessories that comply with environmental circumstances the PLC requires in an industrial setting.

Pin Assignment

Illustration:



Reminder of pin assignment:

Pin	Signal
1	TD+
2	TD-
3	RD+
4	not connected
5	not connected
6	RD-
7	not connected
8	not connected

Note: If there is a connection via a shielded cable, the connector casing on the module is linked up to the ground connection.

Speed Line

The choice of different speed lines for TSX ETY 4102/PORT/5102 modules are as follows:
- 100 Mb in Half Duplex
- 10 Mb in Half Duplex
- 10 Mb in Half Duplex

Speed Adaptation

The speed line cannot be configured by the user. The process of self adaptation is as follows:

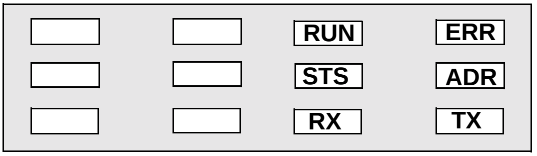
1	Each unit diffuses its possibilities on the line.
2	The chosen speed is the fastest of the entity possibilities on the line. In other words, speed is limited by the slowest entity on the line of which the speed possibility is the weakest.

11.6 Display, Diagnostics

Display panel, Diagnostics

General

The display panel conforms to the Premium standard



The COL, RX and TX LEDs are managed by the line's electronics; they indicate:
- COL: a collision.
- RX: a reception
- TX: a transmission.

Diagnostics

Meaning of the diagnostics LEDs:

RUN	ERR	STS	COL	TX	RX	Meaning
O	O	O	ns	ns	ns	No supply to module.
O	O	P	ns	ns	ns	Module running self-test.
P	O	O	ns	ns	ns	Module ready.
O	P	O	ns	ns	ns	Module not operational.
O	P	P	ns	ns	ns	Software operation error. Temporary state causing module reinitialization.
O	F	P, F	ns	ns	ns	Module not configured or configuration in progress.
P	O	P	ns	ns	ns	Module configured, operational.
ns	ns	F	ns	ns	ns	Module configured. Diagnostics according to how the LEDs are flashing: ● 2 flashes: module has no MAC address. ● 3 flashes: ETHERNET cable not connected on the module or Hub side ● 4 flashes: the module IP address is duplicated by another IP address on the network. Conflicting remote device flashing in the same way. ● 5 flashes: module configured as a BOOTP client and is waiting for a BOOTP server response.
P = Permanently on, F = flashing, O = Off, ns = not significant						

RUN	ERR	STS	COL	TX	RX	Meaning
P	O	P	O	F	O	ETHERNET communication sending.
P	O	P	O	O	F	ETHERNET communication receiving.
P	O	P	O	F	F	ETHERNET communication sending/receiving.
P	O	P	F	F	O	Module has detected collision.
P = Permanently on, F = flashing, O = Off, ns = not significant						

11.7 Electrical Characteristics

Electrical Characteristics

General

TSX ETY 4102/PORT/5102 modules can be inserted in any rack slot of a Premium/ Atrium station (except in the X Bus offset rack).

Table of consumption:

Voltage	**Power consumption**		**Power dissipation**	
5 volts	Typical	Maximum	Typical	Maximum
TSX ETY 4102/PORT/5102	360 mA	400 mA	1.8 W	2.1 W

11.8 Standards

Norms and Standards

Compliance with Standards

The **TSX ETY 4102/PORT** and **TSX ETY 5102** modules comply with the following standards:
- UL 508
- CSA
- IEC 1121-2
- Marine classification

11.9 Operating Conditions

Operating Conditions

Applicable Conditions

- **Configuration software:**
  - **PL7 version < 4.1**: recognizes TSX ETY 4102/5102 modules as TSX ETY 410/510
  - **PL7 version** ≥ **4.1**: recognizes TSX ETY 4102/5102 modules,
  - **PL7 version** ≥ **4.3**: recognizes processors including the TSX ETY PORT module.
- **Conditions of use:**
  - Temperature from 0 to +60° C
  - Relative humidity of 10% to 95% (without condensation) to 60° C
  - Altitude of between 0 and 4500 meters
  - Immunity to vibrations complies with the IEC 68-2-6 standard, Fc test
  - Immunity to shocks complies with the IEC 68-2-27 standard, Ea test
  - Immunity to free fall, hardware dealt with as per the IEC 68-2-32 standard, method 1
  - IP 20 protection index
- **Storage conditions:**
  - Temperature from -40° C to +85° C
  - Relative humidity between 0% and 95% (without condensation) at 60° C

Communication: PCMCIA Modem card

VII

At a Glance

Aim of this Part

This part deals with the **TSX MDM 10** PCMCIA modem card.

What's in this Part?

This part contains the following chapters:

Installing the TSX MDM 10 module

12

At a Glance

Aim of this Chapter

This Chapter describes the hardware installation of the PCMCIA Modem card **TSX MDM 10**.

What's in this Chapter?

This chapter contains the following sections:

12.1 At a Glance

At a Glance

General

The **TSX MDM 10** card is used to connect to the switched telephone network (STN) for accessing remote stations following UNI-TELWAY or character mode protocols.

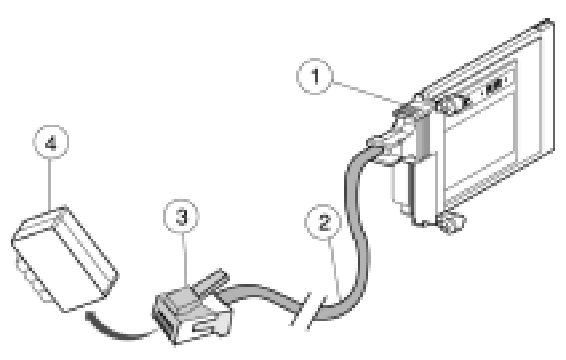
This type of communication is available using the Modem PCMCIA card. It is installed **only** in the PCMCIA reception slot on a Premium processor version V≥3.3.

12.2 Description

Description

General

The **TSX MDM 10** is made up of the following elements:



1. A PCMCIA Modem card
2. A cable for connecting to the dialed-up telephone network
3. An RJ 11 port for connecting to a telephone adapter (4) or directly to a telephone port.
4. A telephone adapter (in line with country of purchase) enabling a link to the telephone network.

12.3 Installation

At a Glance

Aim of this Section

This Section deals with installing a PCMCIA Modem card in a Premium PLC**TSX MDM 10**.

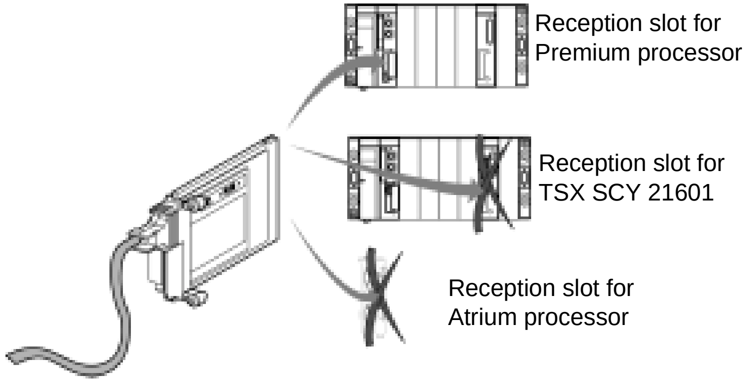
What's in this Section?

This section contains the following topics:

Selecting the type of processor and slot

General

The **TSX MDM 10** card is to be installed **only**in the PCMCIA reception slot of the processor.
Illustration:



Note: Reminder: the TSX MDM 10 card is compatible with all Premium processors version V≥3.3.

Note: Reminder: Atrium processors and communication modules **TSX SCY 21601** do not accept modem card **TSX MDM 10**.

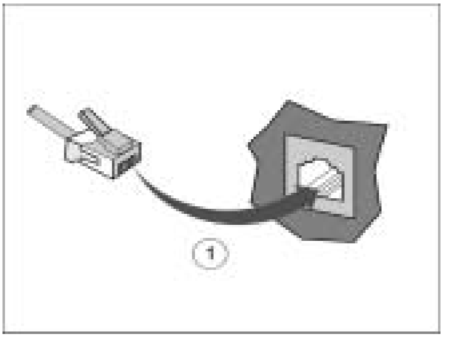
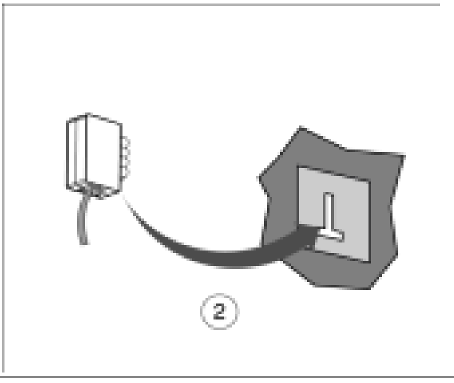
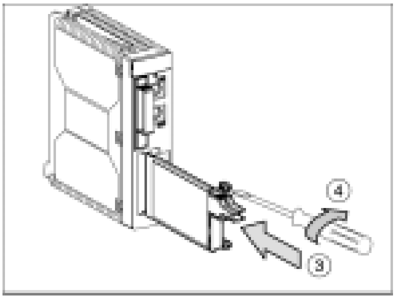
Wiring/Unwiring with power switched on

Precautions

Inserting or removing the **TSX MDM 10** communication card is **forbidden** when the reception module (processor) is switched on.

Connecting to the telephone network

Procedure To connect the modem to the telephone network proceed as follows:

Step	Action	Illustration
1	Connect the RJ 11 port to the telephone adapter if necessary	
2	Plug in the RJ 11 port or adapter of your telephone line. If a device is already connected to this port, unplug it then plug in the telephone adapter instead. Plug in the device to the port panel at the back of the adapter.	
3	Insert the PCMCIA card in the processor slot provided for this purpose. **Caution**: The processor must be switched off while inserting or removing the PCMCIA card	
4	Screw the card into the processor to stop it shifting when power is on.	

12.4 Connecting adapters

Different adapters

At a Glance

The telephone adapters, in line with the country of purchase, are used to ensure connection between an RJ 11 port of PCMCIA card **TSX MDM 10** and the wall socket of the telephone network.
To use the **TSX MDM 10** card in a different country all you need to do is change the telephone adapter.
List of adapter product references according to the country:

Country	Product reference
Germany	**TSX MDM EDT G**
Belgium	**TSX MDM EDT B**
Spain	**TSX MDM EDT S**
France	**TSX MDM EDT F**
Italy	**TSX MDM EDT T**

12.5 Electrical characteristics

Electrical characteristics

Consumption

This table indicates the consumption of a PCMCIA modem card:

Voltage	Typical current
5 volts	195 mA

12.6 Technical specifications

At a Glance

Aim of this Section

This Section deals with the technical specifications for the PCMCIA Modem card **TSX MDM 10**.

What's in this Section?

This section contains the following topics:

Communication protocols

General

The **TSX MDM 10** card supports the various ITU-T V.32 communication protocols.

Operating characteristics

At a Glance

The **TSX MDM 10** card has the following characteristics:

- Sends AT commands
- Half and Full Duplex communication
- Automatic calls and replies
- Calls by pulses or tones

Maximum operating temperature

Values

- Without ventilation module **TSX FAN...** : 50° C max.
- With ventilation module **TSX FAN...** : 60° C max.

EC labeling

General

Card **TSX MDM 10** conforms to the European Telecommunications Directive DTTC 98/13/EC.

Guaranteed level of immunity to electromagnetic fields: 3 V/m.
Communication faults may appear beyond this threshold (in compliance with Directive CEM 89/336/EEC, applicable in residential and business areas, and areas of light industry.)

Card **TSX MDM 10** also complies with the Low Voltage Directive 73/23 EEC, updated by 93/68/EEC.

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