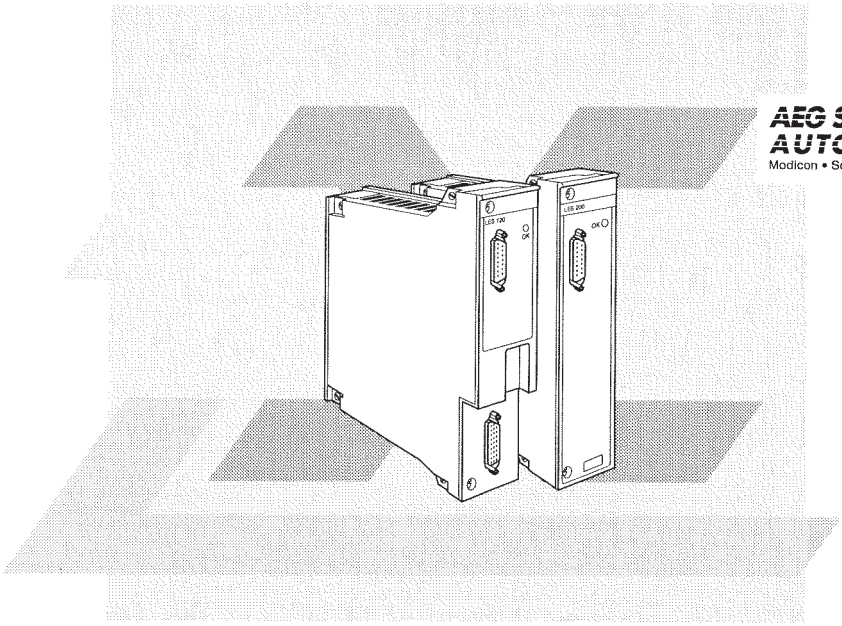
AEG SCHNEIDER AUTOMATION
Modicon • Square D • Telemecanique



TSX LES 120/200

E/S à distance électrique
Remote Electrical I/O
Elektrische dezentrale E/A Erweiterung

Instruction de service
Information Sheet
Begleitblatt

Telemecanique
GROUPE SCHNEIDER

While every precaution has been taken in the preparation of this document, **AEG Schneider Automation** assumes no liability for any errors or omissions it may contain, nor for any damages resulting from the application or use of the information herein.

AEG Schneider Automation reserves the right to change the characteristics of its products and services at any time in order to incorporate the latest technological developments. The information contained in this document is therefore subject to change without notice.

ENGLISH

1.1 Overview

The remote I/O extensions permit communication with racks capable of supporting all types of modules (discrete I/O and analog interfaces, counters and intelligent modules) and located at a considerable distance from the basic PLC.

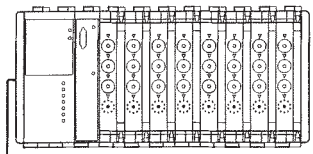
Technology used: **remote bus.**
The maximum distance is **500 meters** (for the main characteristics, see Section 1.6).

ENGLISH

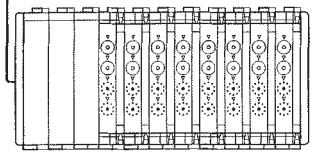
The remote I/O extensions are composed of empty racks in which are installed:

- in the first 2 slots, a power supply module,
- in the third slot, a TSX LES 200 remote rackmaster module,
- in the other slots, discrete I/O, analog and counting modules, and intelligent modules if the rack is equipped with the complete bus.

Remote extension

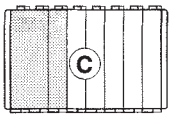


Direct discrete I/O extension

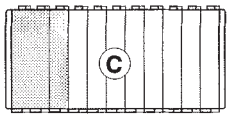


Each remote I/O extension can be extended by one direct I/O rack.
A TSX LES 120 remote adapter module for the base rack interfaces the remote bus with the basic PLC.

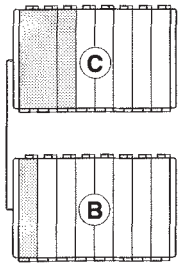
The number of I/O modules that can be controlled depends on the size and type of the racks used.



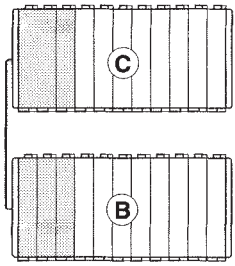
Short rack
5 slots



Standard of 19"
rack 8 slots



Short rack
with extension
12 slots

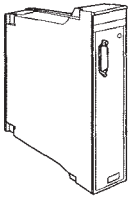


Standard of 19"
rack with direct
extension 16 slots

(B) Direct extension rack
(C) Remote I/O extension rack

1.2 Composition of a Remote I/O Extension

Remote rackmaster module

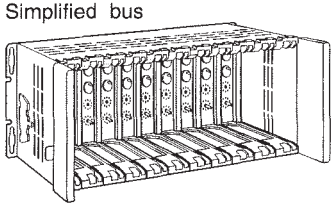


TSX LES 200

+

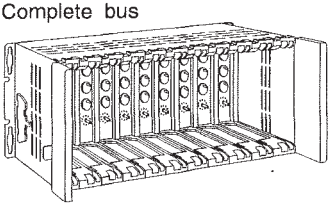
Remote I/O extension rack

Simplified bus



TSX RKS 8/RKS 8W11

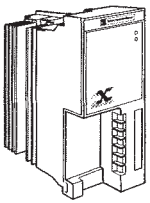
Complete bus



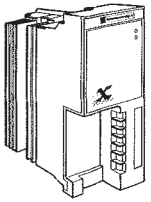
TSX RKN 8F/RKN 8W11/RKN 5

+

Power supply



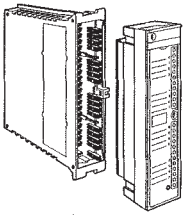
TSX SUP 40/41/42



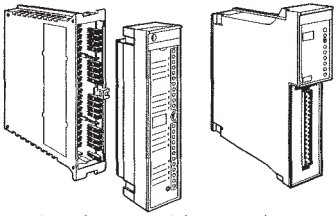
TSX SUP 702/61/62

+

I/O modules and/or couplers



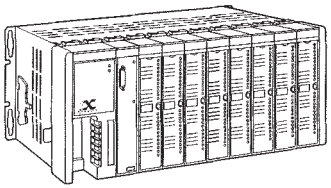
Interfaces



Interfaces and / or couplers

=

Remote I/O extension



1.3 TSX LES 120 and TSX LES 200 Modules

1.3-1 TSX LES 120 Remote Adapter Module for Base Rack

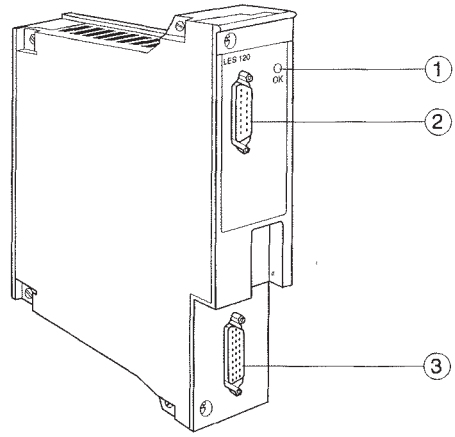
Description

The front panel of the module contains:

① a green OK light indicating the correct operation of the module.

② A 15-socket SUB-D connector for the male connector of the cable from the TSX LES 805 or TSX LES 810 junction box.

③ a 15-socket SUB-D connector for a TSX LES 71 or 70 cable connector permitting electrical connection to the processor.

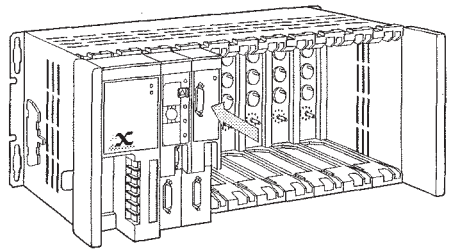


Installation

The TSX LES 120 remote adapter module for the base rack is installed in the basic PLC preferably in the slot beside the processor or, if not, as close as possible to it.

The locating devices on the backplane of the rack must be set to the code number of the module.

Code number: 893



Functions

The module performs the following functions:

- it converts the short distance PLC processor bus into a long distance isolated link,
- it transmits data in RS 485 standard to the remote extension rack(s) via two shielded twisted pairs: one pair is dedicated to transmission and the other to reception.

Each TSX LES 120 module has two remote adapter channels, each of which can control up to 4 remote racks plus the corresponding direct extension racks (within the maximum number of extension racks that the processor can control). Since the basic PLC can accept 2 TSX LES 120 modules, it will therefore be possible to set up 4 remote lines, each up to 500 meters long.

1.3-2 TSX LES 200 Remote Rackmaster Module

Description.

The front panel of this module contains:

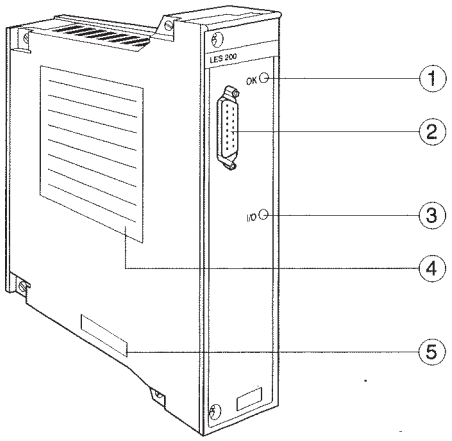
① a green RUN light indicating correct operation of the module.

② a 15-socket SUB-D connector for the male connector of the cable from the TSX LES 805 or TSX LES 810 junction box.

③ a red I/O light indicating a fault in the rack(s) controlled by the module.

④ a label providing addressing help.

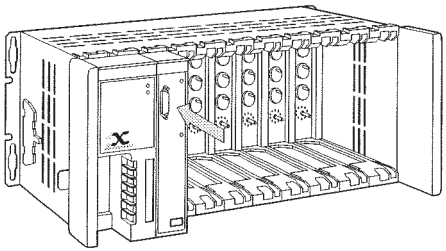
⑤ switches for setting the module address.



Installation

The TSX LES 200 module is installed in the remote I/O extension in the slot marked M beside the power supply module. The locating devices on the backplane of the rack must be set to the code number of the module.

Code number: 894



Functions

This module performs the following functions:

- it converts the remote isolated link into a parallel link,
- it controls data transmission to the basic PLC rack,
- it codes the rack address.

The addresses of the racks controlled by a TSX LES 200 module are configured by the switches on the side of the module (refer to Section 2.3).

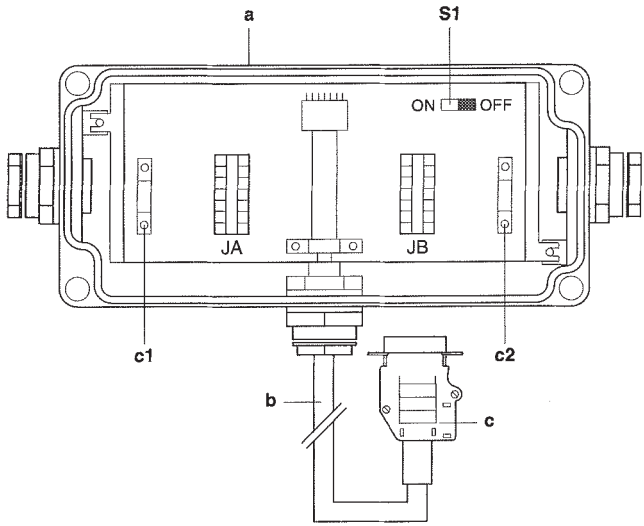
1.4 TSX LES 805 and TSX LES 810 Junction Boxes

The TSX LES 805/810 junction boxes must be used with the remote extension cable system.

The junction boxes consist of:

- a metal case (a) housing:
  - two cable glands for the TSX CB main cable •••.
  - a printed circuit interconnecting the cable from the TSX LES 120/200 module with the main cable carrying the remote data. The printed circuit supports:
    . two connectors JA and JB for connection of the main cable,
    . a switch (S1) for activating/deactivating the end of line adapter. In its initial position, the switch is set to OFF. **When daisy chaining is completed, set the switch to ON .**
    . two clamps (c1) and (c2) for securing the main cable and for grounding its ground braid.
- a factory-assembled cable (b) integral with the case for connection to the TSX LES 120/200 module and the junction box. The cable length varies with the junction box used:
  - **5 meters long for the TSX LES 805, and 10 meters long for the TSX LES 810.**
- a 15-pin SUB-D connector (c) for connection to the TSX LES 120/200 module. The connector must be screwed onto the module to provide electrical continuity.

The junction box must be installed inside the unit or the cabinet containing the basic PLC rack or the extension rack.

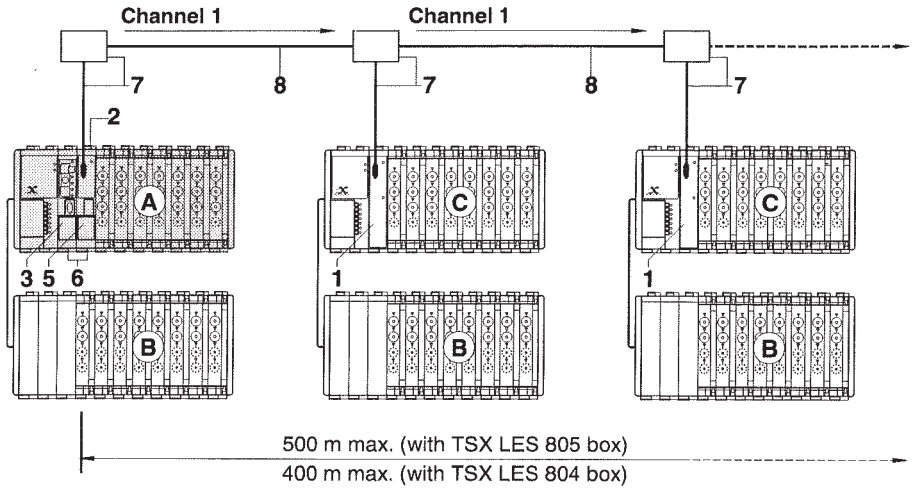


1.5 Layout and Connection Accessories

1.5-1 Bus Layout

A maximum of 4 remote extension racks can be connected to the main cable ⑧ running from the basic PLC. In this case, the cable acts as a bus on which the remote extension racks are connected. Each remote I/O extension rack can itself be extended by a direct I/O extension rack.

Note:
The number of extension racks is limited by the type of processor used (refer to the TSX DM PR40E Installation Manual, Divider A - Section 9)



Ⓐ Basic PLC rack
Ⓑ Direct I/O extension rack
Ⓒ Remote I/O extension rack

Components ① to ⑧ are described in Section 1.5-4.

1.5-2 Star layout

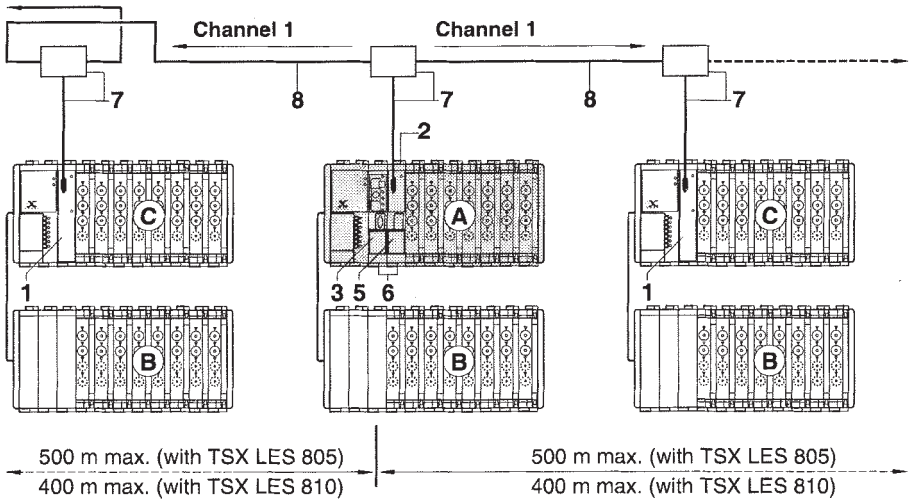
In a star layout, the remote extensions can be arranged so as to branch out from the TSX LES 120 remote adapter module.

As a basic PLC can support 2 TSX LES 120 modules and each module 2 extension channels, it is possible to create up to 4 extension channels running from the basic PLC, each being limited to a maximum of 4 remote I/O extension racks in the bus layout.

Each remote I/O extension rack can itself be extended by a direct I/O extension rack.

Note:
The number of extension racks is limited by the type of processor used (refer to the TSX DM PR40E Installation Manual, Divider A - Section 9)

Example: extension with a TSX LES 120 remote adapter module

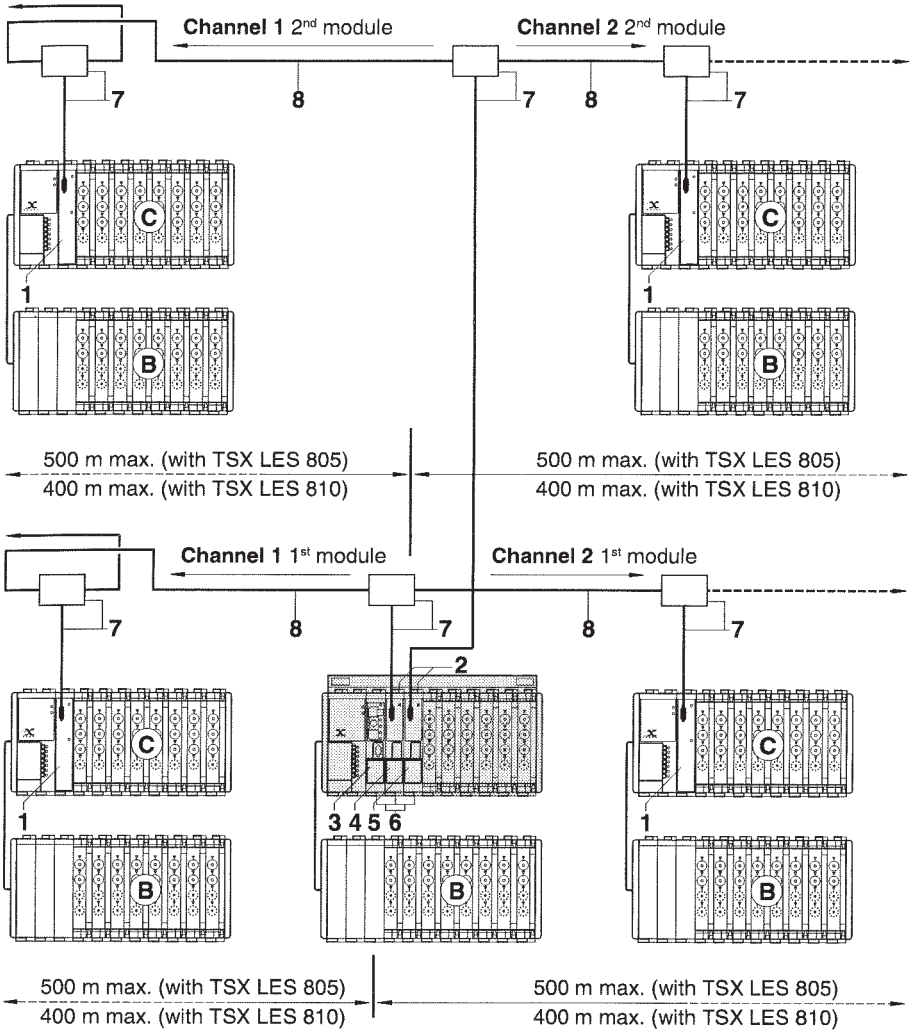


Ⓐ Basic PLC rack
Ⓑ Direct I/O extension rack
Ⓒ Remote I/O extension rack

Components ① to ⑧ are described in Section 1.5-4.

Star Layout (cont'd)

Example: extension with two TSX LES 120 remote adapter modules



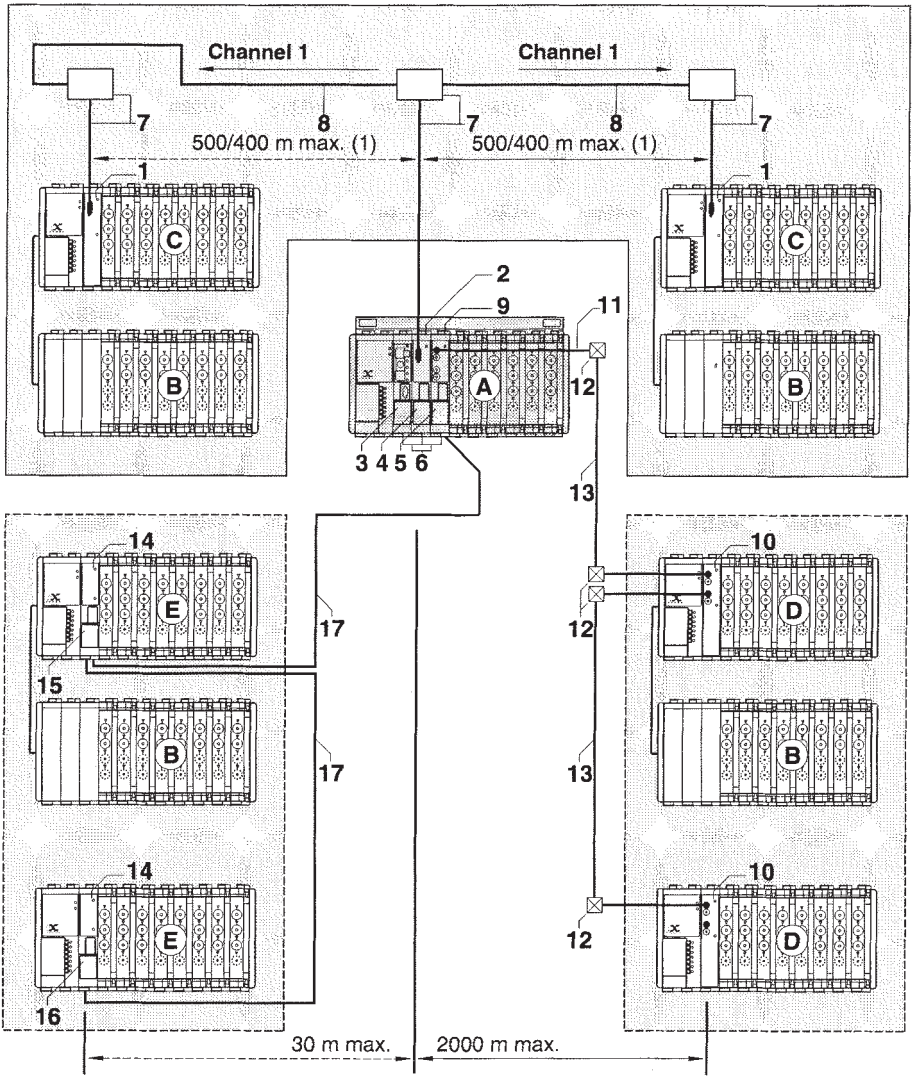
Ⓐ Basic PLC rack

Ⓑ Direct I/O extension rack

Ⓒ Remote I/O extension rack

1.5-3 Mixed layout

Local and remote I/O extensions (electrical and optical) in a mixed bus/star layout.



Ⓐ Basic PLC rack
Ⓑ Direct I/O extension rack
Ⓒ Remote I/O extension rack
Ⓓ FO remote I/O extension
Ⓔ Local I/O extension

(1) 500 m maxi (with TSX LES 805 box), 400 m maxi (with TSX LES 804 box)

1.5-4 Description of the components

① **TSX LES 200 remote rackmaster module.**

② **TSX LES 120 remote adapter module for the base rack.**

③ **TSX LES 74 cable connector**, installed on the basic PLC processor for connecting the PLC to the TSX LES 120 remote adapter module. The connector can also be used for connection to the UNI-TELWAY bus for processors equipped with the integrated UNI-TELWAY link.

④ **TSX LES 71 cable connector**, installed in the TSX LES 120 base rack remote adapter module for connecting it to the processor and to a second base rack (or TSX LFS 120/121 FO) remote adapter module. The connector serves as the intermediate connection when the basic PLC is equipped with a second base rack or FO remote adapter module.

⑤ **TSX LES 70 cable connector**, installed in the last TSX LES 120 remote adapter module or TSX LFS 120/121 FO remote adapter module for its connection:
- to the processor and a TSX LES 20 local rackmaster module if the basic PLC has only one base rack remote adapter module,
- or to the preceding remote adapter module and to a TSX LES 20 local rackmaster module if the basic PLC is equipped with two remote electrical modules.

⑥ **TSX CBC 003 extension cable** (0.35 m long), for connecting the TSX LES 74/71 or 74/70 or 71/70 cable connectors.

⑦ **Junction box,** with cable and 15-pin SUB-D 15 connector for connecting the TSX LES 120/200 module electrically to the main cable. The following two cable assemblies are available:
- **TSX LES 805** with 5 meter long cable,
- **TSX LES 810** with 10 meter long cable,

⑧ **TSX CB 100/200/500 main remote connecting cable.**

⑨ **TSX LFS 120 fiber optic remote adapter module.**

⑩ **TSX LFS 200 fiber optic rackmaster module.**

⑪ **TSX CBD050 (5m) or TSX CBD 300 (30m) pre-equipped FO cable.**

⑫ **FO cable splices.**

⑬ **User supplied FO cable.**

⑭ **TSX LES 20 local rackmaster module.**

⑮ **TSX LES 62 cable connector for intermediate rackmasters.**

⑯ **TSX LES 61 cable connector for end rackmaster.**

⑰ **TSX CBC... extension cable.**

Note:
Refer to the TSX DM PR40E Manual for a detailed description of the remote FO and local I/O extensions.

1.6 Main Characteristics

Remote Electrical Connections

Maximum distance on a given basic PLC/end extension channel	with TSX LES 805	500 m
	with TSX LES 810	400 m
Number of extension channel per TSX LES 120 module		2
Maximum number of extensions per channel		4
Main cable	triple twisted pair for permanent installation in a covered building. TSX CB 100, 100 m long TSX CB 200, 200 m long TSX CB 500, 500 m long In case of set-ups subject to special constraints (outdoor line, mobile cable, etc.), contact our office.	
Performance of electrical link	the data transmission rate of the serial link is such as to make the application completely independent of the layout used.	

TSX LES 120 and TSX LES 200 Modules

References	**Consumption per module in mA (Typical / *maximum*)**			
	+5V	**+12VL**	**+12VP**	**-12V**
TSX LES 120	**340/400**	—	**15/30**	—
TSX LES 200	**430/500**	—	**80/120**	—

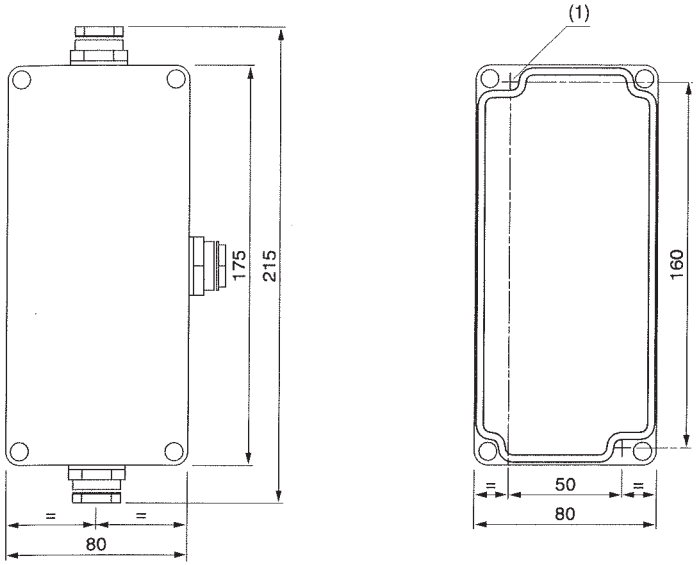
Definition of the typical and maximum consumption

- Typical consumption : average consumption of the module at an operating temperature θ_A = 25° C.
- Maximum consumption : calculated consumption for use of the module throughout its operating temperature range from θ_A = 5° C to 55° C.

θ_A : local air temperature

2.1 Installation of TSX LES 805/810 Junction Boxes

2.1-1 Dimensions and Attachment of Junction Box



(1) 2 plain holes, 5.6 mm dia., 20 mm deep

2.1-2 Installation

The junction box is installed inside the unit or the cabinet and secured to:

- a Telequick AM1 PA.... perforated plate,
- an AM1-DP «top hat» rail, by attaching two LA9-D09976 slot-in plates on the back of the box. The plates are secured by installing M3 x 8 screws in the holes provided on the back of the box. The LA9-D09976 slot-in plates are not supplied with the junction box.

2.2 Connections

In a remote electrical I/O extension, several types of connection must be made:

- Connections to the basic PLC
  - between the processor and the TSX LES 120 remote adapter module,
  - and, if necessary, between the two TSX LES 120 remote adapter modules,
- Basic PLC/extension or extension/extension connection.

2.2-1 Connections to the basic PLC

Electrical connections

① Processor module,

② TSX LES 120 remote adapter module,

③ TSX LES 74 cable connector,

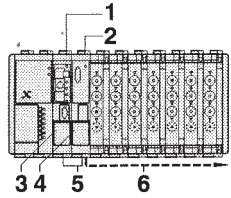
④ TSX LES 70 cable connector,

⑤ TSX CBC 003 extension cable,

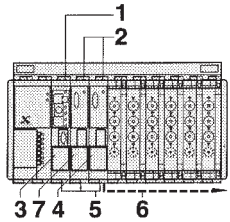
⑥ TSX CBC ... extension cable if there is a local extension,

⑦ TSX LES 71 intermediate cable connector,

Basic PLC with 1 TSX LES 120 module

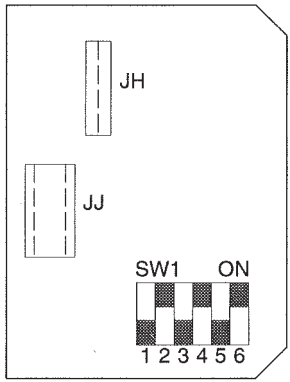


Basic PLC with 2 TSX LES 120 modules

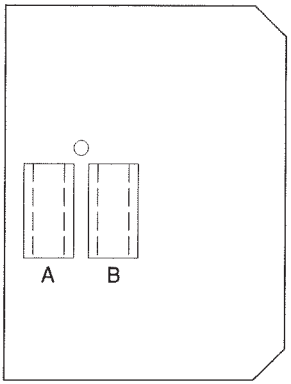


Preparing the TSX LES 74 Cable Connector

- Open the cover.
- Connect one end of the TSX CBC 003 extension cable to the connector marked (JJ) . The second connector is for connection to the UNI-TELWAY bus for processors with the integrated UNI-TELWAY link (refer to Section 4.6 - Divider B).
- Close the cover.
- Install the connector on the 26-point processor connector and identify it.

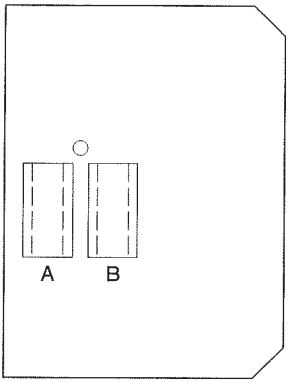


Preparing the TSX LES 71 Intermediate Cable Connector
(when two TSX LES 120 modules are used)



- Open the cover.
- Connect the TSX CBC 003 cable coming from the processor to the connector marked B.
- Connect one end of the second TSX CBC 003 cable to the connector marked A. The other end of this cable is connected to the second remote adapter module.
- Close the cover.
- Install the cable connector on the 15-point connector of the TSX LES 120 remote adapter module and identify the connector.

Preparing the TSX LES 70 Cable Connector

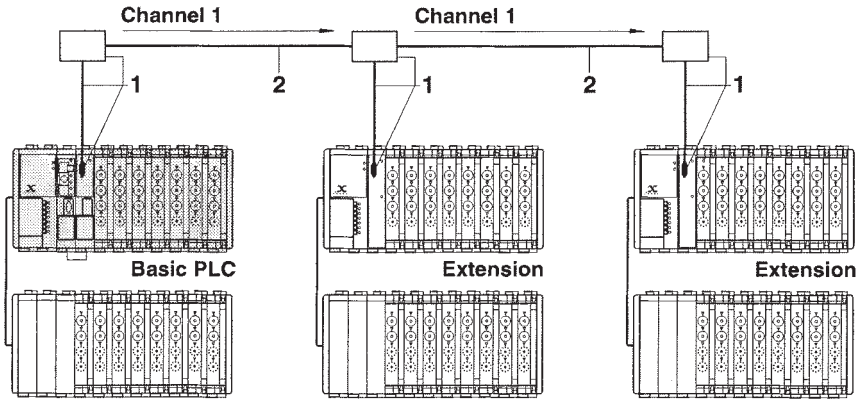


- Open the cover.
- Connector the TSX CBC 003 cable to the connector marked B. This cable comes from:
  - the processor if only one TSX LES 120 remote adapter module is used,
  - or the first adapter module if 2 adapter modules are used.
- If necessary, connect one end of the second (TSXCBC...) cable to the connector marked A for connection to a local extension.
- Close the cover.
- Install the cable connector on the 15-point connector of the TSX LES 120 remote adapter module.

2.2-2 Basic PLC/Extension or Extension/Extension Connection

This connection is made using the following:

- a junction kit ① consisting of a box, a cable and a 15-point SUB-D connector, for connecting to the TSX LES 120 / 200 modules.
  Two cables lengths are proposed:
  - **TSX LES 805** with a 5 m long cable,
  - **TSX LES 810** with a 10 m long cable,
- a main cable ② for connection to the junction box.



Connection of the Junction Boxes

This connection depends on the layout used:

- **Extension Channels from a basic PLC**

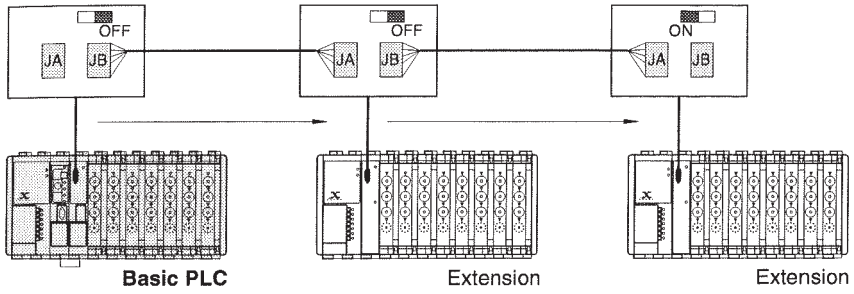
  The junction box permits one extension channel to be connected in the bus layout or two channels in the star layout.
  In the bus layout, the channel passes through connector JB for a rightward line (see example 1) or JA for a leftward line (see example 2). **The switch (S1) must be set to «OFF».**
  In the star layout, one channel passes through connector JB and the other channel through connector JA. **The switch (S1) must be set to «OFF».**

- **T-Junction**

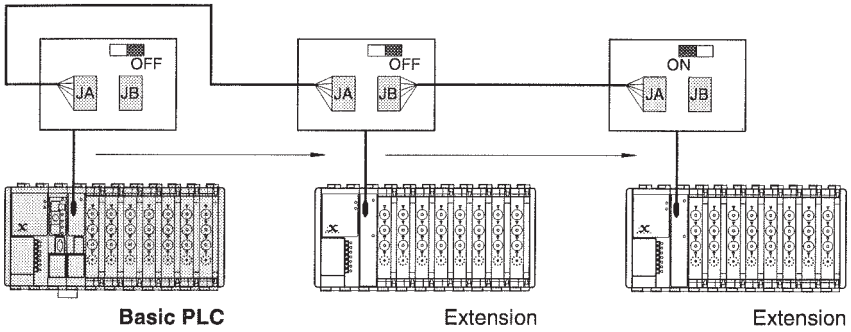
  In this case, the junction box acts as a relay between the preceding and following racks. The connection from the basic PLC rack or the preceding extension must always go through connector **JA** (see examples 1 and 2), whereas the link to the next rack is routed through the other connector **JB** . **The switch must be set to «OFF».**

- **End of Line**
  As the junction box is not coupled to other racks, the link from the preceding rack must be routed via connector JA (see example below). **The switch must be set to «ON».**

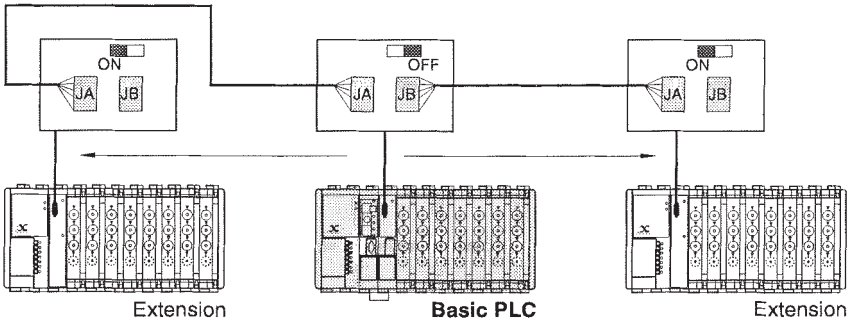
Example 1: Basic PLC with one extension channel via connector JB



Example 2: Basic PLC with one extension channel via connector JA



Example 3: Basic PLC with two extension channels



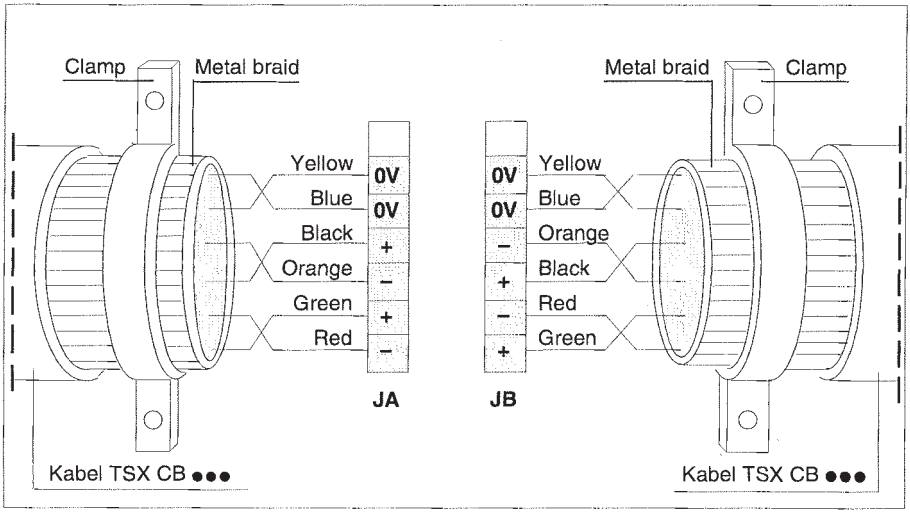
Wiring connections of a junction box

The conductors of the main cable TSX CB ●●● can be easily connected by referring to the printed circuit silk screening and connecting the conductor of the same colour as indicated on the printed circuit.

For electrical continuity, the metal braid of the cable must be carefully inserted underneath the clamp, which grounds the junction box when it is installed.

Note

For further details on the ground wiring, refer to the «Ground Wiring Guide TSX DG GND E».



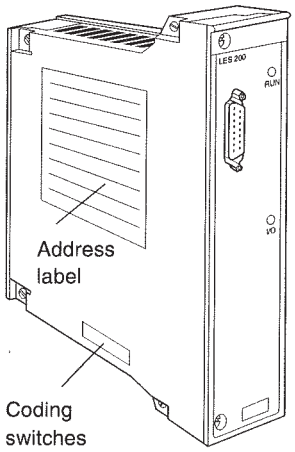
2.3 Addressing of Extension Racks

The address of a remote I/O extension rack (x) is coded by switches on the TSX LES 200 module. The corresponding direct extension rack (x+1) is implicitly addressed.

Rack Addresses

Racks	Addresses						
Basic PLC rack	0/1						
Remote or local I/O extension rack		4	6	8	A	C	E
Corresponding direct I/O racks	2/3	5	7	9	B	D	F

Location of components



Set the switches as shown on the address label

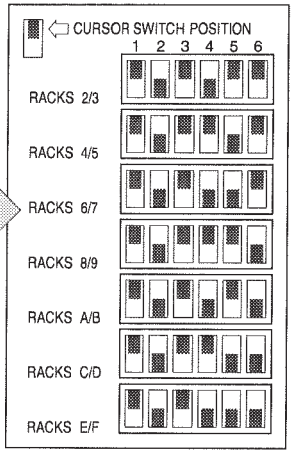
Example:

TSX LES 200
Module in extension rack 6

Switch positions

1 2 3 4 5 6

Address label



Note

There are 6 coding switches(W1 to W6) but switches W1 to W3 are not used to code the addresses and they must mandatorily be set as shown on the label. The address code is set solely by switches W4 to W6, which are weighted as follows: W4 = 2, W5 = 4, W6 = 8.

W9 1329 183 09.01.A01

321806

World Headquarters
Siège Social

AEG Schneider Automation, International S.A.S.
Steinheimer Strasse 117, D-63500 Seligenstadt, Germany
Tel: (49) 6182 81-2401, Fax: (49) 6182 81-2800

AEG SCHNEIDER AUTOMATION
Modicon • Square D • Telemecanique

North America

- *Sales and Service Network*
  Réseaux commerciaux

- Square D
  Executive Plaza
  Palatine, IL 60067
  Tel: (1) 708-397-2600
  Fax: (1) 708-397-8814

- *R&D/Manufacturing Companies*
  Recherche et développement/Production

- AEG Schneider Automation Inc.
  One High Street
  North Andover, MA 01845
  Tel: (1) 508-794-0800
  Fax: (1) 508-975-9010

Germany

- AEG Schneider Automation
  Steinheimer Strasse 117
  D-63500 Seligenstadt
  Tel: (49) 6182 81-2584
  Fax: (49) 6182 81-2860

- AEG Schneider Automation GmbH
  Steinheimer Strasse 117
  D-63500 Seligenstadt
  Tel: (49) 6182 81-2584
  Fax: (49) 6182 81-2860

France

- Telemecanique
  Direction Commerciale France
  5, rue Nadar
  F-92566 Rueil-Malmaison Cedex
  Tel: (33.1) 41 29 82 00
  Fax: (33.1) 47 51 73 84

- AEG Schneider Automation S.A.
  245, Route des Lucioles-BP147
  F-06903 Sophia-Antipolis Cedex
  Tel: (33) 92 96 20 00
  Fax: (33) 93 65 37 15

Other Countries
Autres pays

- Schneider
  European and International Division
  43 Boulevard Franklin Roosevelt
  F-92504 Rueil Malmaison
  Tel: (33.1) 41 29 80 00
  Fax: (33.1) 47 32 99 09

- AEG Schneider Automation
  Steinheimer Strasse 117
  D-63500 Seligenstadt
  Tel: (49) 6182 81-2584
  Fax: (49) 6182 81-2860

JULY 93 (602)