

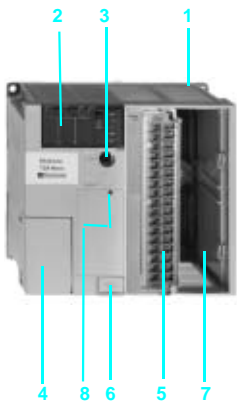
Presentation

The TSX 37 05 PLC comprises a rack which integrates ~ 100/240 V power supply, a processor including a 11 Kword memory (program, data and constants), 1 Flash EPROM backup memory, a TSX DMZ 28DR discrete I/O module (16 inputs and 12 relay outputs) and an available slot.

The available slot can accept:

- 1 standard format discrete I/O module of any type.
- 2 half format discrete I/O, safety, analog I/O or counter modules.

Description



The TSX 37 05 PLC comprises:

- 1 2-slot rack.
- 2 Centralized display block.
- 3 Terminal port (TER) (Uni-Telway master/slave, Modbus RTU slave protocol or characters string).
- 4 Cover for accessing the power supply terminals.
- 5 Discrete module with 16 inputs and 12 outputs, placed in the first slot (positions 1 and 2). Including screw terminal block.
- 6 Cover for accessing optional battery.
- 7 Available slot.
- 8 Reset button.

Selection

Selection of modules to be inserted in addition to the 16-input/12-output module present at rack no. 1

Type of module to be inserted		Max number of modules		Format		Connection	
		1	2	Standard	Half	Connector	Term.blk
Discrete Inputs/Outputs	8 inputs						
	12 inputs						
	32 inputs						
	4 outputs						
	8 outputs						
	32 outputs						
	16 inputs/outputs						
	28 inputs/outputs						
	64 inputs/outputs						
Preventa safety module							
Analogue I/O	4 or 8 inputs						
	2 or 4 outputs						
	4 inputs and 2 outputs						
Counter/positioning channels	1 incremental code channel						
	2 incremental code channels						
	1 absolute encoder channel						

Possible insertion

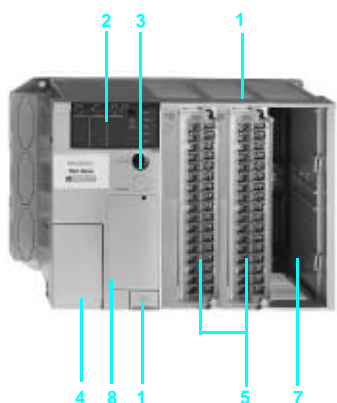
Presentation

The TSX 37 08 PLC comprises a rack which integrates ~ 100/240 V power supply, a processor including a 11 Kword memory (program, data and constants), 1 Flash EPROM backup memory, 2 TSX DMZ 28DR discrete I/O modules (16 inputs and 12 relay outputs) and an available slot.

The available slot can accept:

- 1 standard format discrete I/O module of any type.
- 2 half format discrete I/O, safety, analog I/O or counter modules.

Description



The TSX 37 08 PLC comprises:

- 1 3-slot rack.
- 2 Centralized display block.
- 3 Terminal port (TER) (Uni-Telway master/slave, Modbus RTU slave protocol or characters string).
- 4 Cover for accessing the power supply terminals.
- 5 Two discrete modules with 16 inputs and 12 outputs, placed in the first and second slot (positions 1 to 4). Including screw terminal block.
- 6 Cover for accessing optional battery.
- 7 Available slot.
- 8 Reset button.

Selection

Selection of modules to be inserted in addition to the 16-input/12-output module present at rack no. 1

Type of module to be inserted		Max number of modules		Format		Connection	
		1	2	Standard	Half	Connector	Term.blk
Discrete Inputs/Outputs	8 inputs						
	12 inputs						
	32 inputs						
	4 outputs						
	8 outputs						
	32 outputs						
	16 inputs/outputs						
	28 inputs/outputs						
Preventa safety module	64 inputs/outputs						
	4 or 8 inputs						
	2 or 4 outputs						
Analog I/O	4 inputs and 2 outputs						
	1 incremental code channel						
	2 incremental code channels						
Counter/positioning channels	1 absolute encoder channel						

Possible insertion

Presentation

Compact and modular TSX 37 10 PLCs differ in their supply voltage and the type of discrete I/O module fitted in the first slot.

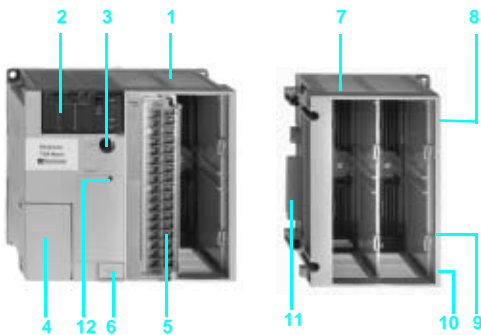
Each TSX 37 10 configuration comprises a rack which integrates a power supply ($\approx 24\text{ V}$ or $\sim 100/240\text{ V}$), a processor including a 14 Kword RAM memory (program, data and constants), a Flash EPROM backup memory, a real-time clock, a discrete I/O module (28 or 64 I/O) and an available slot. A TSX RKZ 02 mini extension rack enables the number of slots to be increased by 2 (4 positions).

Each available slot can accept:

- 1 standard format discrete I/O module of any type.
- 2 half format discrete I/O, safety, analog I/O or counter modules.

Also, TSX 37 10 PLCs can connect to the Ethernet network TCP/IP or to a Modem via the TSX ETZ 410/510 external stand-alone module.

Description



TSX 37 10 PLCs and the TSX RKZ 02 mini extension rack comprise:

- 1 2-slot base rack.
- 2 Centralized display block.
- 3 Terminal port (TER) (Uni-Telway, Modbus RTU master/slave protocol or characters string).
- 4 Cover for accessing the power supply terminals.
- 5 28 or 64 discrete I/O module, placed in the first slot (positions 1 and 2).
- 6 Cover for accessing optional battery.
- 7 Mini extension rack with 2 available slots -(positions 5 to 8).
- 8 LED showing presence of $\approx 24\text{ V}$.
- 9 Power supply terminals protected by removable cover, to connect an auxiliary $\approx 24\text{ V}$ power supply if PLCs are supplied with $\sim 100/240\text{ V}$.
- 10 Earth terminal.
- 11 Connectors to the base PLC.
- 12 Reset button.

Selection

TSX 37 10 base PLC selection

Power supply	I/O module integrated in 1 st slot				Connection		Reference
	Number of inputs		Number of outputs		HE 10 Connector	Screw terminal block	
$\approx 24\text{ V}$	$\approx 24\text{ V}$	$\sim 110/120\text{ V}$	Solid state $\approx 24\text{ V}$	Relay			
$\approx 24\text{ V}$	16		12				TSX 37 10 128DT1
	16		12				TSX 37 10 128DTK1
		16		12			TSX 37 10 128DR1
$\sim 110/240\text{ V}$	32		32				TSX 37 10 164DTK1
		16		12			TSX 37 10 028AR1
	16			12			TSX 37 10 028DR1

Selection of modules to be inserted (3 slots available, that is a maximum of 6 positions)

Type of module to be inserted		Maximum number of modules (1)				Format		Connection	
		1	2	4	6	Stand.	Half	Connect.	Term.blk
Discrete Inputs/Outputs	8 inputs								
	12 inputs								
	32 inputs			(2)					
	4 outputs								
	8 outputs								
	32 outputs			(2)					
Preventa safety module	16 inputs/outputs								
	28 inputs/outputs			(2)					
	64 inputs/outputs		(2)						
AS-Interface bus or I/O extension		(3)							
Analog I/O	4 or 8 inputs								
	2 or 4 outputs								
Counter/positioning channels	1 or 2 incremental encoder channels								
	1 absolute encoder channel								
Communication	Ethernet TCP/IP or external Modem					External module			

Possible selection or insertion

(1) With TSX RKZ 02 mini extension rack.

(2) This includes a standard format module to be inserted in the 1st slot of the PLC.

(3) The remote discrete I/O extension modules and AS-Interface bus modules are installed in position 4 which means that their use is mutually exclusive.

Presentation

Modular TSX 37 21/22 PLCs differ in their supply voltage and/or the possibility of fast counting and analogue functions integrated on the base.

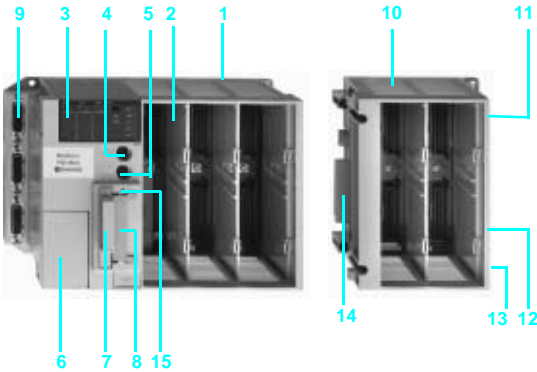
Each PLC comprises: a 3-slot rack which integrates a power supply (± 24 V or $\sim 100/240$ V), a processor including a 20 Kword RAM memory (program, data and constants), 1 Flash EPROM backup memory, 2 slots for a PCMCIA card (1 communication card and 1 memory extension card of 128 Kwords maximum) and a real-time clock. A TSX RKZ 02 mini extension rack enables the number of slots to be increased by 2 (4 positions).

Each available slot can accept:

- 1 standard format discrete I/O module.
- 2 half format discrete I/O, safety, analog I/O or counter modules.

Also, TSX 37 21/22 PLCs can connect to the Ethernet network TCP/IP or to a modem via the TSX ETZ 410/510 external stand-alone module.

Description



TSX 37 21/22 PLCs and the TSX RKZ 02 mini extension rack comprise:

- 1 3-slot base rack (positions 1 to 6).
- 2 Slot reserved for a standard format module.
- 3 Centralized display block.
- 4 Terminal port (TER) (Uni-Telway, Modbus RTU master/slave protocol or characters string).
- 5 Man-machine interface port labeled AUX.
- 6 Cover for accessing the power supply terminals.
- 7 Slot for a PCMCIA memory extension card.
- 8 Slot for a PCMCIA communication card.
- 9 On TSX 37 22, SUB-D connectors type for integrated analogue and counter functions.
- 10 Mini extension rack with 2 available slots (positions 7 to 10).
- 11 LED showing voltage presence of ± 24 V.
- 12 Power supply terminals protected by removable cover, to connect an auxiliary ± 24 V power supply if PLCs are supplied with $\sim 100/240$ V.
- 13 Earth terminal.
- 14 Connectors to the base PLC.
- 15 Reset button.

Selection

Selection of modules to be inserted (5 slots available, that is a maximum of 9 positions)

Type of module to be inserted	Maximum number of modules (1)					Format Stand.	Half	Connection Connect.	Term.blk
	1	3	4	5	9				
Discrete Inputs/ Outputs	8 inputs								
	12 inputs								
	32 inputs				(2)				
	4 outputs					(2)			
	8 outputs					(2)			
	32 outputs				(2)				
	16 inputs/outputs					(2)			
	28 inputs/outputs				(2)				
64 inputs/outputs		(2)							
Preventa safety module									
AS-Interface bus or I/O extension	(3)								
Analog I/O	4 or 8 inputs								
	2 or 4 outputs			(4)					
	2 inputs and 4 outputs			(4)					
Counting/ positioning	1 or 2 incremental encoder channels								
	1 absolute encoder channel								
Communication (PCMCIA card on processor)	Serial link								
	CANopen bus								
	Modbus bus								
	Fipio Agent bus								
	Uni-Telway bus								
	Modbus Plus network								
	Fipway network								
Communication	Ethernet TCP/IP or external Modem					External module			

Possible insertion

(1) With TSX RKZ 02 mini extension rack.

(2) Comprises a standard format module to be placed in 1st slot of the PLC.

(3) The remote discrete I/O extension modules and AS-interface bus modules are installed in position 4 which means that their use is mutually exclusive.

(4) With a maximum of 2 (TSX AMZ 600/ASZ 200) modules in the base.

Modicon TSX Micro automation platform

TSX 37 05/08/10/21/22 PLCs

Functions

Discrete inputs/outputs

The range of in-rack discrete I/O modules offers several possibilities for meeting requirements:

- Cost-effective connection where a 24 V solution is required (mixed I/O modules with HE type 10 connectors for direct connection to pre-actuators in the device using cables with flying leads or direct connection to the TELEFAST2 pre-wired system).
- Connection to the screw terminal block on the front panel of mixed I/O modules.

A set of half format modules enable the PLC configuration to be adapted as closely as possible to the user's requirements in terms of number, range of I/O and type of connection.

For further details, see pages 43051/2 to 43051/13.

The TSX DPZ 10D2A Preventa type safety relay module provides a monitoring function for the emergency stop pushbuttons or limit switches, and is adapted to conform to the safety requirements stipulated in EN 954-1.

For further details, see pages 43308/2 to 43307/5.

Remote discrete I/O extension module

TSX 37 10/21/22 Micro PLCs offer two different possibilities for extending the I/O:

- Either with the TSX STZ 10 remote discrete I/O extension module. The discrete I/O of 4 Nano PLCs can be used at a distance of up to 200m (one of which can be a Nano extension PLC).

These Nano PLCs can be used as remote discrete I/O or local slave PLCs.

For further details, see pages 43056/2 et 43056/3.

- The AS-Interface sensor/actuator bus. TSX Micro PLCs are connected to the AS-Interface bus via an AS-Interface master module. In this case, the PLC becomes the master station on the bus and manages a maximum of 248 I/O over a distance of up to 100 m (200 m with a repeater).

For further details, see pages 42718/2 to 43613/3.

- The CANopen machine bus. The communication of the Micro TSX 37 21/22 PLCs enables the connectivity to the CANopen machine bus. It is appeared as a PCMCIA card equipped with a cable (length 0.5m) and a tap junction (with 9-way SUB-D connector). This TSX CPP 110 kit allows the direct linking to the bus and ensures the role of the master on the CANopen bus. The PCMCIA card is inserted into the reserved slot for communication card, available on the TSX 37 21 and TSX 37 22.

For further details, see pages 43615/2 to 43615/5.

Analogue I/O and process control

TSX Micro PLCs offer several ways of performing analogue processing:

- For data input or commands which do not need a high resolution level, using I/O integrated in TSX 37 22 PLCs.
- For precise measurement and commands, using TSX AEZ/ASZ/AMZ half format analogue I/O modules.
- To locate analog I/O remotely via the TSX STZ 10 rackmaster module with TSX 37 10/21/22 PLCs. The latter enables the use of three TSX AMN 400 analog extensions, each equipped with 3 analogue inputs and one analog output.

For further details, see pages 43053/3 and 43053/4.

TSX Micro PLCs have, as standard, process control functions which can be accessed by the user via the PL7 Micro, PL7 Junior or PL7 Pro programming software.

For further details, see pages 43531/2 to 43531/5.

Counting/positioning

Counter modules TSX Micro PLCs offer several ways of counting:

- Using 500 Hz discrete inputs (2 up/down counter channels with upcounting, downcounting or up/down counting functions, with or without detection of direction of operation).
- 10 kHz counter channels integrated into TSX 37 22 PLC bases (2 10 kHz fast counter channels, with 1 channel having down-counting functions as above).
- Counting/positioning TSX CTZ modules ●A, from 40...500 kHz or TSX CTZ 2B, from 200 kHz...1 MHz. These half format modules are inserted in the available slots in the base rack.

For further details, see pages 43054/2 to 43313/5.

Communication

TSX Micro PLCs offer several possibilities:

- Integrated communication which offers cost-effective dialogue functions via the terminal port for TSX 37 05/08/10 PLCs or via the terminal and man-machine interface ports for TSX 37 21/22 PLCs. These RS 485 type non-isolated links use Uni-Telway master/slave, Modbus RTU slave or character string. Also TSX 37 10/21/22 PLCs integrate Modbus master protocol.
- PCMCIA format communication card for TSX 37 21/22 PLCs. They have a dedicated slot for the PCMCIA format communication card ("Full-duplex" asynchronous serial link, CANopen bus, Fipio bus, Uni-Telway or Modbus, Modbus Plus or Fipway network).
- Ethernet TCP/IP 10/100 MHz external modules. This external module connects to the terminal port of TSX 37 10/21/22 PLCs and has Uni-TE and Modbus messaging. It also allows connection to an external modem using PPP protocol.

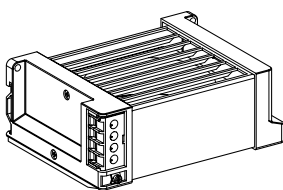
For further details, see pages 43312/2 to 48190/7.

Fan modules

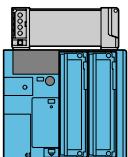
TSX FAN ●●P fan modules installed above TSX Micro PLCs ensure a forced air convection, which creates a uniform ambient temperature within the enclosure and eliminates any hot spots which might exist.

Fan modules are required when the ambient temperature is between 60 °C and 70 °C. Forced ventilation is used to eliminate hot spots (1). Three types of fan module are available: --- 24 V, ~ 110 V and ~ 220 V.

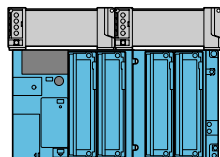
One fan module is required for a TSX 37 05/08/10/21/22 configuration, two fan modules are required for a TSX 37 10/21/22 configuration with the TSX RKZ 02 mini rack.



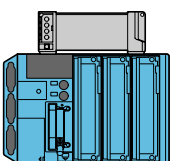
TSX FAN ●●P



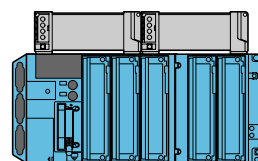
TSX 37 05/08/10



TSX 37 10 + TSX RKZ 02



TSX 37 08/21/22



TSX 37 21/22 + TSX RKZ 02

(1) For an ambient temperature of between 25 °C...60 °C, the use of fan modules increases the MBTF.

Memory structure

The memory structure of TSX Micro PLCs consists of two distinct zones:

- An internal RAM memory designed to receive the application (data, program and constants) of
 - 11 Kwords for TSX 37 05/08 PLCs,
 - 14 Kwords for the TSX 37 10 PLC,
 - 20 Kwords for TSX 37 21/22 PLCs.
- A Flash EPROM memory of:
 - 12 Kwords for TSX 37 05/08 PLCs,
 - 16 Kwords for TSX 37 10/21/22 PLCs
 designed to back up the application program (11 or 14 Kwords maximum) and to back up 1024 %MW internal words in the event of a battery failure or no battery.

For TSX 37 21/22 PLCs, the internal RAM memory can be extended via a 32, 64 or 128 Kwords PCMCIA memory card, either RAM or Flash EPROM. The same memory card incorporated the possibility of contained a storage zone for additional data, e.g. for production data and manufacturing recipes.

PCMCIA memory extension cards for TSX 37 21/22 PLCs

These cards can be used to extend the PLC internal memory for storing the application program and constants.

Two types of memory card are available:

■ Battery-backed RAM type memory card

Used in particular during application program creation and debugging, this card enables all application transfer and modification services in online mode.

The memory is backed up by a removable battery integrated in the memory card.

■ Flash EPROM type memory card

Used when the debugging of the application program is complete, this card enables one global transfer only of the application and avoids the problems of backup via battery.

A third type of card can also be used to store additional data:

■ Battery-backed RAM type memory card or battery-backed RAM and Flash EPROM

Used particularly in association with the Modem link, these are used to extend the processor's internal memory, and also to store recipe or data log for later consultation via a telephone link.

The RAM memory is backed up by a removable battery integrated in the memory card.

Another type of PCMCIA memory card is available:

■ Backup type memory card (for TSX 37 21/22 PLCs)

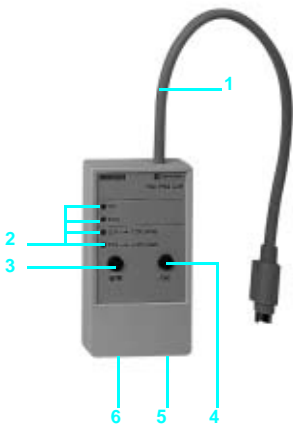
Previously loaded with the application program, this card is used to reload the application program into the internal RAM memory and the internal Flash EPROM memory of the processor, without requiring the use of a programming terminal.

Program loader

The TSX PRG LDR module is designed to simplify duplicating or updating applications on Nano and TSX Micro PLCs without the need for a programming terminal. An application (15 Kwords maximum in internal RAM) can be transferred from a PLC in the TSX PRG LDR module (and saved within it), then transferred from the TSX PRG LDR module to the PLC.

The front panel of the TSX PRG LDR module comprises:

- 1 A cord for connecting to the PLC terminal port.
- 2 Four operation indicator LEDs.
- 3 A W/R button which selects the program transfer direction (PLC → module or module → PLC).
- 4 A GO button to start the transfer.
- 5 A Write Only switch which prevents PLC → module transfer.
- 6 A Program Protect switch which protects the PLC application as read-only after the transfer.



Application memory

The application memory is divided into memory zones, which are physically shared between the internal RAM memory and the PCMCIA memory card (if the TSX 37 21/22 PLC has a memory card):

- The application data zone which is always is the internal RAM memory.
- The application program zone in the internal RAM memory or on the PCMCIA memory card.
- The constants zone in the internal RAM memory or on the PCMCIA memory card.
- The Flash EPROM zone for the application program backup, the constants and 1 K internal words.
- The file storage zone in the PCMCIA memory card.

If the content of the RAM memory is lost (battery fault or no battery) then the content of the Flash EPROM memory (program, constants and 1 K internal words) is automatically transferred to the internal RAM memory. The backup copy of the application in the Flash EPROM memory requires that the PLC does not have a PCMCIA memory extension card and that the size of the program and the constants does not exceed 16 Kwords.

Two types of application memory organization are possible for TSX Micro PLCs depending on whether the PLC is equipped with a memory extension in the form of a PCMCIA card:

Application in the internal RAM

The application is loaded entirely in the battery-backed internal RAM of the processor with a capacity of:

- 11 Kwords for TSX 37 05/08, shared, for example: as 3 Kwords of application data and 8 Kwords of the program and its constants.
- 14 Kwords for TSX 37 10, shared, for example: as 500 words of application data and 13.5 Kwords of the program and its constants.
- 20 Kwords for TSX 37 21/22, shared, for example: as 4 Kwords of application data and 16 Kwords of the program and its constants.

Application in the internal Flash EPROM

The total volume is equal to the application volume in RAM, limited to 11 Kwords or 15 Kwords, to which the backup of the first 1024 data words (%MW) is added.

Application in the PCMCIA card

The PCMCIA memory card contains the program and the constants. The additional data storage zone for 128 Kword data (available according to the PCMCIA card model) can be used for distributed applications, for storing information which can be consulted remotely via Modem. This zone can also be used for storing manufacturing recipes.

Internal RAM data

The data zone can be extended to 20 Kwords, and is only held in the PLC internal RAM.

Data backup

The first 1024 words are backed up by the PLC internal Flash EPROM memory. PL7 Micro/Junior/Pro software aids the application designer in the management of the structure and the occupation of memory space for TSX Micro PLCs.

Application protection

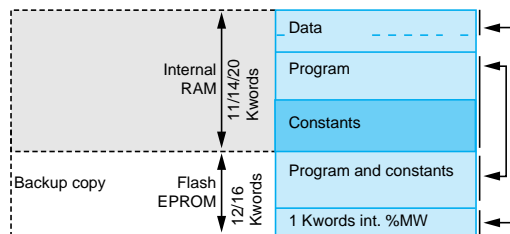
Whatever the PLC's memory structure is: application in internal RAM or on the PCMCIA card, it is possible to protect the structure to prohibit access (reading or program modification) in online mode using PL7 Micro/Junior/Pro software.

Backup application

Micro TSX 37 21/22 PLCs make it possible to save the 32 Kwords maximum application (programs and constants) on a Backup TSX MFP BAK 032P memory card. The internal RAM memory can thus be reloaded with the contents of this Backup memory card.

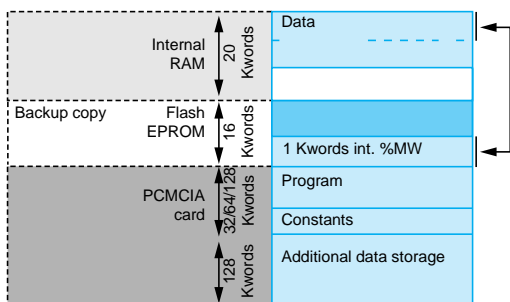
This Backup function is not available if the application runs on a PCMCIA RAM or Flash EPROM memory card.

TSX 37 05/08/10/21/22 (without PCMCIA card)



- 1 Application data (17.5 Kwords maximum).
- 2 Descriptor and executable code for tasks.
- 3 Constant words, initial values and configuration.

TSX 37 21/22 (with a PCMCIA card)



- 1 Application data (17.5 Kwords maximum).
- 2 Descriptor and executable code for tasks.
- 3 Constant words, initial values and configuration.
- 4 According to the PCMCIA card model.

Centralized display

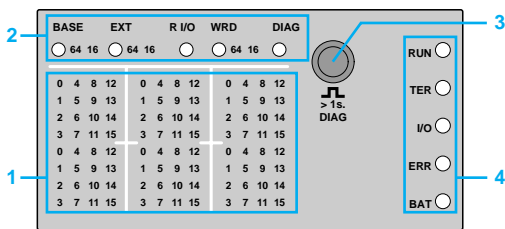
TSX Micro PLCs are equipped with a display block which groups together centrally all the data required for the control, diagnostics and maintenance of the PLC and all its modules, as well as simple man-machine interface functions.

The centralized display provides:

- Display of the local or remote I/O channel states (I/O of Nano PLCs).
- Display of devices on the AS-Interface bus and AS-Interface bus diagnostics (see 4/26).
- Display of diagnostics of faulty channels or modules.
- Display of internal data:
 - bits,
 - bit strings,
 - word strings,
 - program variables (active steps, application information, etc).
- 4-digit multiple digital display.

Description

The centralized display block comprises:



- 1 Three blocks of 32 LEDs representing the slots in which the modules are installed in the base rack or mini extension rack.
- 2 An information line consisting of LEDs which show the display operating modes.
- 3 A command push button which provides access to the various display operating modes.
- 4 Five LEDs:
 - RUN, PLC run/stop,
 - TER, traffic on the terminal port,
 - I/O, I/O fault,
 - ERR, processor or application fault,
 - BAT, battery fault or no battery.

Characteristics

TSX Micro PLCs have been developed to conform to the national and international standards concerning electronic devices for industrial control systems:

- Specific requirements for programmable controllers: functional characteristics, resistance, robustness, safety, etc. IEC 61131-2, CSA 22-2, UL 508.
- Merchant navy requirements from the main European bodies: BV, DNV, GL, GOST, LR, RRS.
- European directives (low voltage, electromagnetic compatibility), CE marking.
- Electrical qualities and self-extinguishing capacity of insulating materials: UL 746C, UL 94, etc. See page 43311/2.

Environmental characteristics (characteristics common to all TSX Micro PLC components)

Temperature	Operation	°C	0...+ 60 (+ 5...+ 55 conforming to IEC 61131-2), 0...+ 70 with TSX FAN ventilation modules
	Storage	°C	- 25...+ 70 (conforming to IEC 61131-2)
Relative humidity	Operation		10 %...95 %, without condensation
	Storage		5 %...95 % conforming to IEC 61131/2 without condensation
Altitude		m	0...2000
Mechanical withstand	Resistant to vibrations		Conforming to IEC 68-2-6, Fc test
	Resistant to shocks		Conforming to IEC 68-2-27, Ea test
Resistant to electrostatic discharge	Withstand to electrostatic discharge		Conforming to IEC 1000-4-2, level 3 (1)
Resistance to HF interference	Resistant to electromagnetic fields		Conforming to IEC 1000-4-3, level 3 (1)
	Resistant to rapid transient bursts		Conforming to IEC 1000-4-4, level 3 (1)
	Resistant to shock waves		Conforming to IEC 1000-4-5
	Resistant to damped oscillatory waves		Conforming to IEC 1000-4-12
Resistance to LF interference			Conforming to IEC 61131-2

Power supply characteristics

Type of power supply				Power supply ~	Power supply ≡
Primary	Voltage	Nominal	V	~ 100...240	≡ 24
		Limit (including ripple)	V	~ 90...264	≡ 19.2...30V possible up to 34 V for 1 hr per 24 hrs
	Frequency	Nominal (limit)	Hz	50-60 (47-63)	-
	Current	Nominal input	A	≤ 0.7 (~ 100 V), ≤ 0.3 (~ 240 V)	2
		Inrush (2)	A	≤ 60	≤ 60
	Micro-breaks	Accepted duration		≤ 1/2 period, repetition ≥ 1 s	≤ 10 ms, repetition ≥ 1 s
Secondary	Power	Total useful (typical)	W	24 (32 peak)	16 (18 peak)
	Output currents	≡ 5 V output	A	2.8 (3.2 peak)	2.8 (3.2 peak)
		Output ≡ 24 VR (for relay outputs)	A	0.5 (0.6 peak)	-
		≡ 24 V output sensors	A	0.4 (0.6 peak)	-
	Protection integrated on the outputs against	Overloads		Yes	Yes
Short-circuits			Yes	Yes	
Isolation	Dielectric resistance	Primary/secondary	V rms	2000 - 50/60 Hz	No isolation, 0 V internal connected to the PLC ground

(1) Minimum level in the test conditions defined by the standards.

(2) Values to be taken into account when starting up several devices at the same time or when sizing protection devices.

Modicon TSX Micro automation platform

TSX 37 05/08/10/21/22 PLCs

Processor characteristics				TSX 37 05	TSX 37 08	TSX 37 10	TSX 37 21	TSX 37 22	
Type of PLC									
No. of slots	Basic			2	3	2	3		
	With extension rack, 2 slots			–		4	5		
Functions (Max.no.)	Discrete I/O (1)	Screw terminal block		60 (28 I/O)	88 (56 I/O)	124 (28 I/O)	160 (–)		
		HE10 connector		92	120	184 (28 or 64 I/O)	248 (–)		
		64 channel modules		1		2	3		
	Analog I/O	Integrated		–					8 I et 1 O
		Modules		2			4		
		Type of modules		Half format module 4 or 8 I, 2 or 4 O, 4 I/O					
		Regulation		The number of loops is limited by the number of analogue modules and by the size of memory					
	Counting channels (2)	Integrated		–					2 channel 10 kHz
		Modules		2		2 (3)	4 (3)		
		Type of modules		Half format module 1 or 2 channel 40/500 kHz, 1 channel SSI 1 MHz					
Integrated connections	Discrete I/O		2 channels 500 Hz						
	Serial link		1 link with 1 connector (TER) 19.2 Kbit/s				1 link with 2 connectors (TER and AUX) 19,2 Kbit/s		
	Type of links		Uni-Telway master/slave						
Networks and bus connections	Ethernet TCP/IP		–		1 (Ethernet TCP/IP external module or RS 232 Modem)				
	Fipway network, Modbus Plus		–		1 (4)				
	AS-Interface bus		–		1 Half format module (profil M2) (5)				
	CANopen bus		–		1 (4)				
	Modbus bus, Uni-Telway, Characters string		–		1 (4)	1 (4)			
	Extension by Nano base and Nano extension (200 m maxi)		–		1 half-format module (5) for 96 discrete I/O or 12 analogue I/O (4 Nano bases 24 I/O or 3 analogue extensions 3 I/1 O)				
Real time clock				–					
Memory	Max. capacity	Internal RAM which can be backed up	Keywords	11		14	20		
		Program and constants	Keywords	–		128 with PCMCIA card			
		Data storage	Keywords	–		128			
	Max. data storage size	Internal bits %Mi	bits	256					
		Internal words %MWi	Keywords	1 (6)		1 (6), 17,5 with PCMCIA card			
	Constants words %KWw	Words	128 (6)						
Application structure									
	Master task			1					
	Fast task			1					
	Event processing			8			16 (where 1 has priority)		
Execution time for 1 instruction	Without PCMCIA card	Boolean	μ s	0,25			0,13		
		On word or fixed-point arithmetic	μ s	4,81			4,50		
	With PCMCIA card	Boolean	μ s	–			0,19		
		On word or fixed-point arithmetic	μ s	–			4,50		
No. of K instructions executed by ms	Without PCMCIA card	100 % boolean	Kinst/ms	3,03			5,88		
		65 % boolean and 35 % numerical	Kinst/ms	0,25			0,27		
	With PCMCIA card	100 % boolean	Kinst/ms	–			4,00		
		65 % boolean and 35 % numerical	Kinst/ms	–			0,266		
Overhead système									
	Master task		ms	1,9			1,6	2,3	

- (1) The value in bracket and in italics corresponds to number of I/O providing with the basic PLC configuration.
- (2) Maximum number of counting/positioning channels, see page 43054/2.
- (3) TSX CTZ●● counting/positioning modules, only in the TSX Micro base.
- (4) PCMCIA to insert in the communication card slot
- (5) The remote discrete I/O extension modules and AS-Interface bus modules are installed in position 4 which means that their use is mutually exclusive.
- (6) Default size, can be extended, but will have an adverse effect on the size of the application program.

Modicon TSX Micro automation platform

TSX 37 05/08/10/21/22 PLCs



TSX 37 05/10 ●28●●1

Basic TSX 37 05/08 PLC configurations (1 slot available)

Power supply	Integrated memories		Integrated memory Discrete I/ O modules		Reference	Weight kg
	RAM	Flash EPROM	Type	Connection		
~ 100...240 V	11 Kwords	12 Kwords	1 modules with 16 I = 24 V, 12 O relay	Via screw terminal block (supplied)	TSX 37 05 028DR1	2.370
			2 modules with 16 I = 24 V, 12 O relay	Via screw terminal block (supplied)	TSX 37 08 056DR1	2.720



TSX 37 08 056 DR1

Basic TSX 37 10 PLC configurations (1 slot available)

Power supply	Integrated memories		Integrated memory Discrete I/ O modules		Reference	Weight kg
	RAM	Flash EPROM	Type	Connection		
= 24 V	14 Kwords	15 Kwords	1 module with 16 I = 24 V 12 Solid state O	Via screw terminal block (supplied)	TSX 37 10 128DT1	1.870
			1 module with 16 I = 24 V 12 O relay	Via screw terminal block (supplied)	TSX 37 10 128DR1	1.900
			1 module with 16 I = 24 V 12 Solid state O	Via HE 10 type connector	TSX 37 10 128DTK1	1.740
			1 module with 32 I = 24 V 32 Solid state O	Via HE 10 type connector	TSX 37 10 164DTK1	1.820
~ 100...240 V	14 Kwords	15 Kwords	1 module with 16 I ~ 115 V 12 O relay	Via screw terminal block (supplied)	TSX 37 10 028AR1	1.910
			1 module with 16 I = 24 V 12 O relay	Via screw terminal block (supplied)	TSX 37 10 028DR1	1.910



TSX 37 10 164DTK1

Basic TSX 37 21/22 PLC configurations (3 slots available)

Power supply	Integrated memories		Integrated functions	Reference	Weight kg
	RAM	Flash EPROM			
= 24 V	20 Kwords	5 Kwords	–	TSX 37 21 101	1.720
			8 analog inputs 0-10 V 1 analog output 0-10 V 1 Up/down counter 10 kHz 1 counter 10 kHz	TSX 37 22 101	1.750
~ 100...240 V	20 Kwords	15 Kwords	–	TSX 37 21 001	1.720
			8 analog inputs 0-10 V 1 analog output 0-10 V 1 Up/down counter 10 kHz 1 counter 10 kHz	TSX 37 22 001	1.750



TSX 37 22 ●01



TSX RKZ 02

Mini extension rack

Capacity	Use	Number maximum	Reference	Weight kg
2 slots (possibility of 4 positions)	PLCs TSX 37 10/21/22	1 mini rack per PLC	TSX RKZ 02	0.630

Documentation

TSX Micro base and module installation manual	See page 43901/2	–
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Modicon TSX Micro automation platform

TSX 37 05/08/10/21/22 PLCs



TSX MRP ●●●P

References (continued)

Extension for application memory

Use	Memory size		Reference	Weight kg
	Application	Data storage		
TSX 37 21/22	32 Kwords	–	TSX MRP 032P	0.060
		128 Kwords	TSX MRP 232P	0.060
	64 Kwords	–	TSX MRP 064P	0.060
		128 Kwords	TSX MRP 264P	0.060
	128 Kwords	–	TSX MRP 0128P	0.060
		128 Kwords	TSX MRP 2128P	0.060

Extension Flash EPROM PCMCIA memory

Use	Memory size		Reference	Weight kg
	Application	Data storage		
TSX 37 21/22	32 Kwords	–	TSX MFP 032P	0.060
		128 Kwords	TSX MFP 232P	0.060
	64 Kwords	–	TSX MFP 064P	0.060
		128 Kwords	TSX MFP 264P	0.060
	128 Kwords	–	TSX MFP 0128P	0.060
		128 Kwords	–	TSX MFP 0128P

Backup card (1)

Use	Memory size		Reference	Weight kg
	Application	Data storage		
TSX 37 05/08/10	32 Kwords	–	TSX MFP BAK 032P	0.060

Fan modules

Description	Quantity to be used	Supply	Reference	Weight kg
Fan modules (2)	1 for TSX 37 05/08/10/21/22	≐ 24 V	TSX FAN D2P	0.500
	2 for TSX 37 10/21/22 with TSX RKZ 02	~ 100...120 V	TSX FAN A4P	0.500
		~ 200...240 V	TSX FAN A5P	0.500

Separate parts

Description	Use	Quantity	Unity reference	Weight kg
Program loader with terminal port conn. cable	Simplifies duplication, updating or backup of 15 Kwords applications (program) and constants in internal RAM (length: 0.3m)		TSX PRG LDR	0.150
Connection accessories	Discrete I/O		See page 43051/10	–
	Discrete I/O with Telefast 2		See pages 14025/2 and 14025/3	–
	Integrated analog I/O		See page 43053/7	–
	Integrated counter channels		See page 43054/5	–
Backup batteries	TSX 37 05/08/10/21/22	–	TSX PLP 01	0.030
	internal RAM	Pack of 10	TSX PLP 101	0.320
	RAM type PCMCIA memory card	–	TSX BAT M01	0.010
Cover for empty slot	TSX 37 05/08/10/21/22 PLCs	Pack of 10	TSX RAZ 01	0.010
Gripper	Memory extension card (PCMCIA type 1)		TSX P CAP	0.030



TSX FAN ●●P



TSX PRG LDR

(1) Card previously loaded to enable the TSX Micro application program to be updated without needing a programming terminal (the program must be entirely contained in the internal RAM).

(2) One fan module for a TSX 37 05/08/10/21/22 configuration, two fan modules for a TSX 37 10/21/22 configuration with mini rack TSX RKZ 02. Required for an ambient temperature between 60 °C and 70 °C.

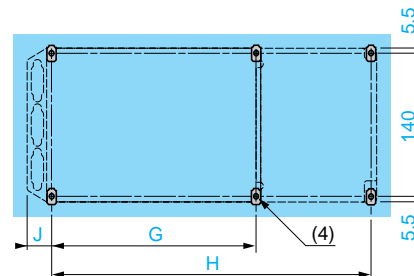
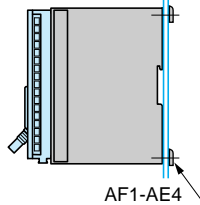
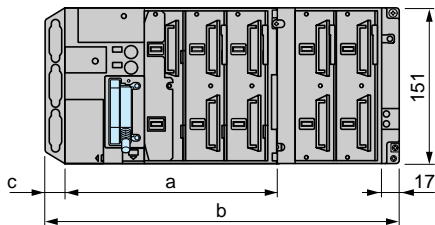
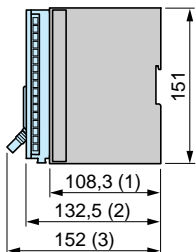
(3) Cover to be mounted in positions which do not hold a module to obtain IP 20 level of protection.

Dimensions, mounting

Side view

Front view

Mounting



TSX 37	a	b	c
05 028DR1	170.3	-	-
08 056DR1	227.9	-	19
10 028/128/164●●1	170.3	282.7	-
21/22 ●01	227.9	341.4	19

TSX 37	G	H	J
05 028DR1	159.2	-	5
08 056DR1	198.9	-	24
10 028/128/164●●1	159.2	271.7	5
21/22 ●01	198.9	311.4	24

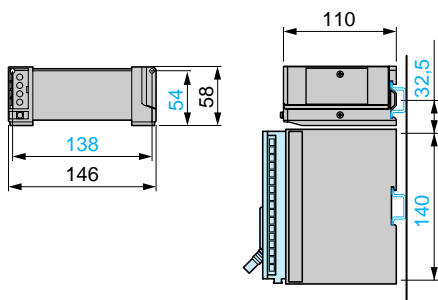
(1) Empty PLC

(2) With screw terminal block

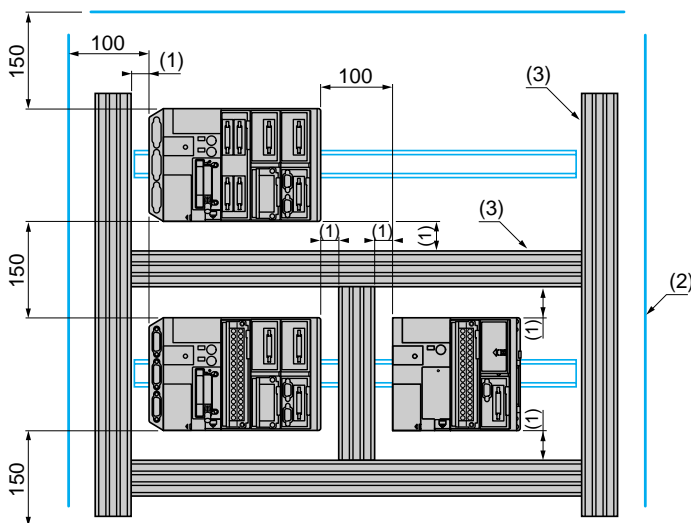
(3) With HE 10 type or SUB-D connectors

(4) Fixing holes for M4 screws

Mounting for TSX FAN ●●P modules



Installation regulations



(1) ≥ 50 mm

(2) Switch gear or enclosure

(3) Cable ducting or wiring clip