

4 Application-specific modules and solutions

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Premium automation platform

Analogue I/O modules

Selection guide

Applications

Analogue inputs



Type of I/O

Low level isolated inputs, thermocouples, temperature probes

Thermocouple inputs

High level inputs with common point

Type

Multirange

Multirange

Voltage/current

Range

$\pm 10\text{ V}$, $\pm 5\text{ V}$, $0\text{-}10\text{ V}$, $0\text{...}5\text{ V}$, $1\text{...}5\text{ V}$
 $4\text{-}20\text{ mA}$, $0\text{-}20\text{ mA}$, external shunt supplied, B, E, J, K, L, N, R, S, T, U thermocouples
 Pt 100, Pt 1000 thermal probes, Ni 1000 2 or 4-wire

$-80\text{...}+80\text{ mV}$
 Thermocouples
 B, E, J, K, L, N, R, S, T, U

$\pm 10\text{ V}$, $0\text{...}10\text{ V}$, $0\text{...}5\text{ V}$, $1\text{...}5\text{ V}$
 $0\text{-}20\text{ mA}$,
 $4\text{-}20\text{ mA}$

Modularity

4 channels

16 channels

8 channels

Isolation

Between channels : $\sim 2830\text{ V rms}$.
 Between bus and channels :
 $\sim 1780\text{ V rms}$.
 Between channels and earth :
 $\sim 1780\text{ V rms}$.

Between channels : $\pm 100\text{ V}$
 Between bus and channels :
 $\sim 1000\text{ V rms}$.
 Between channels and earth :
 $\sim 1000\text{ V rms}$.

Between channels : common point
 Between bus and channels :
 $\sim 1000\text{ V rms}$.
 Between channels and earth :
 $\sim 1000\text{ V rms}$.

Read time

550 ms

1120 ms (normal scan)
 70 ms/channel used (fast scan)

27 ms (normal scan)
 3 ms/channel used (fast scan)

Response time

User-definable filtering 0 to 68.5 s

User-definable filtering 0.04 Te to 0.012 Te (Te : module scan time)

User-definable filtering 0 to 3.44 s

Resolution

16 bits

16 bits

12 bits

Connection

20-way screw terminal :
 TSX BLY 01

Two 25-way SUB-D connectors
 or 2 Telefast 2 sub-bases
 (ABE-7CPA12)

25-way SUB-D connector
 or 1 Telefast 2 sub-base
 (ABE-7CPA02/03)

Type of module

TSX AEY 414

TSX AEY 1614

TSX AEY 800

Page

43530/6

Analogue outputs



High level isolated inputs between channels

High level input with common point

Isolated outputs between channels

Outputs with common point

Voltage/current

± 10 V
0-20 mA,
4-20 mA

16 channels

8 channels

4 channels

8 channels

Between channels : common point
Between bus and channels :
~ 1000 V rms.
Between channels and earth :
~ 1000 V rms.

Between channels : ± 200 V
Between bus and channels :
~ 1000 V rms.
Between channels and earth :
~ 1000 V rms.

Between channels : common point
Between bus and channels :
~ 1000 V rms.
Between channels and earth :
~ 1000 V rms.

Between channels : ~ 1500 V rms.
Between bus and channels :
~ 1500 V rms.
Between channels and earth :
~ 1000 V rms.

Between channels : common point
Between bus and channels :
~ 1000 V rms.
Between channels and earth :
~ 1000 V rms.

51 ms (normal scan)
3 ms/channel used
(fast scan)

126.4 ms (normal scan)
3.3 ms/channel used
(fast scan)

1 ms

–

–

User-definable filtering
0 to 6.50 s

User-definable filtering
0 to 3.82 s

–

2.5 ms

5 ms

12 bits

16 bits

11 bits + sign

13 bits + sign for voltage
13 bits for current

Two 25-way SUB-D connectors
or via 2 Telefast 2 sub-bases
(ABE-7CPA02/03)

25-way SUB-D connector
or 1 Telefast 2 sub-base
(ABE-7CPA02/31)

25-way SUB-D connector
or 1 Telefast 2 sub-base
(ABE-7CPA03/21)

20-way screw terminal :
TSX BLY 01

25-way SUB-D connector
or 1 Telefast 2 sub-base
(ABE-7CPA02)

TSX AEY 1600

TSX AEY 810

TSX AEY 420

TSX ASY 410

TSX ASY 800

Premium automation platform

Analogue I/O modules

Presentation, description

Characteristics :
pages 43530/4 and 43530/5
References :
pages 43530/6 and 43530/7

Presentation

Analogue I/O modules for Premium PLCs are equipped with :

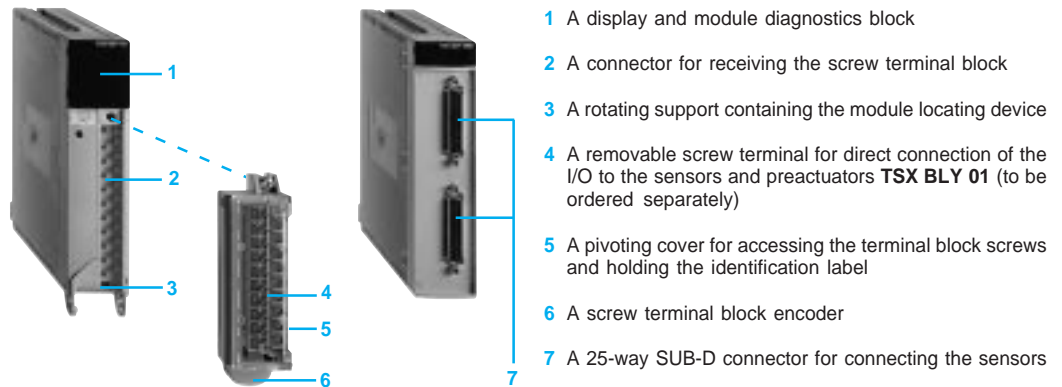
- Either one 25-way SUB-D connector (TSX AEY 420/800/810 and TSX ASY 800)
- Or two 25-way SUB-D connectors (TSX AEY 1600/1614)
- Or a screw terminal block (TSX AEY 414, TSX ASY 410)

They can be installed in any position in TSX RKY ●●● racks except for the positions reserved for power supply modules. Analogue I/O modules can be removed while the PLC is powered up.

The maximum number of analogue channels in a Premium configuration depends on the processor used, see pages 43511/8, 43513/5 and 43620/9.

Description

The front panels of TSX AEY/ASY analogue I/O modules comprise :



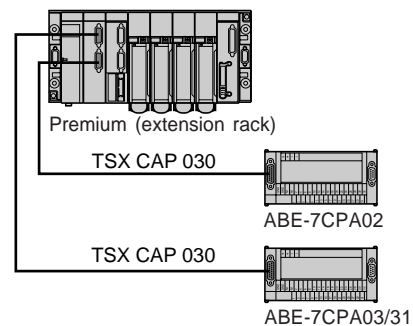
Connection using
screw terminal block

Connection
using SUB-D
connector

Connection principle for TSX AEY/ASY modules with SUB-D connector

The Telefast 2 pre-wired system simplifies the installation of modules by providing access to the inputs (or outputs) at the screw terminals.

Connection is via a TSX CAP 030 3 metre shielded cable equipped with SUB-D connectors at either end.



- The Telefast ABE-7CPA02 sub-base enables 8 channels to be connected
- The Telefast ABE-7CPA03/31 sub-base enables the connection of 8 channels and :
 - provides channel by channel supply for 2 and 4-wire sensors with ± 24 V (for sub-base ABE-7CPA03)
 - channel by channel isolated supply for 2 and 4-wire 24 V sensors (for sub-base ABE-7CPA31)
 - ensures continuity of current loops when the SUB-D connector is removed
 - protects the current shunt within the modules against overvoltages
- The Telefast ABE-7CPA12 sub-base enables 16 thermocouples to be connected. The terminal block is fitted with a temperature probe for cold junction compensation.

Premium automation platform

Analogue I/O modules

Functions

Characteristics :
pages 43530/4 and 43530/5
References :
pages 43530/6 and 43530/7

TSX AEY 420, TSX AEY 800/810, TSX AEY 1600 analogue input modules

TSX AEY ●●● modules are high level analog input modules with 4 inputs for the TSX AEY 420 module, 8 inputs for TSX AEY 800/810 modules and 16 inputs for the TSX AEY 1600 module. Used with sensors or transmitters, they perform monitoring, measurement and process control functions for continuous processes.

Depending on the choice made during configuration, TSX AEY 420/800/810/1600 modules offer the following ranges for each of their inputs ± 10 V, 0...10 V, 0...5 V, 1...5 V, 0...20 mA, 4...20 mA.

Functions

- Scanning of input channels, protection against overvoltages, adaptation of signals by analogue filtering, scanning by solid state multiplexing.
 - Adaptation to input signals : gain selection, drift compensation.
 - Digitisation of signals : 12-bit analogue/digital conversion for TSX AEY 800/1600 and 16 bit analogue/digital conversion for TSX AEY 420/810.
 - Converting input measurements to user format: recalibration coefficient, filtering, scaling.
 - Module monitoring : conversion circuit test, range overshoot test, terminal block presence test, "watchdog" test.
 - Isolation of input channels on TSX AEY 810.
 - Fast processing of inputs (1 ms) on TSX AEY 420.
-

TSX AEY 414, TSX AEY 1614 analogue input modules

The TSX AEY 414 module is a multirange input module with 4 channels **isolated from each other**.

Depending on the choice made during configuration, the following ranges are available for each of its inputs :

- thermocouples B, E, J, K, N, R, S, T, U or - 13...+ 63 mV electrical range.
- 2 or 4-wire Pt 100, Pt 1000, Ni 1000 temperature probe, or ohmic range: 0...400 ohms, 0...3850 ohms.
- High level ± 10 V, 0...10 V, ± 5 V, 0...5 V (0...20 mA with external shunt) or 1...5 V, 4...20 mA (4...20 mA with external shunt).

The TSX AEY 1614 module is an analogue input module with 16 thermocouple inputs. Depending on the selections made during configuration, the following range is available for each of the input channels (supporting a common mode between them of ≈ 250 V or ~ 280 V) :

- Thermocouples B, E, J, K, L, N, R, S, T or U, or electrical range - 80 mV...+ 80 mV.
-

Functions

- Scanning of input channels, gain selection according to input signals, multiplexing.
 - Digitisation of input signals.
 - Converting input measurements to user format: recalibration coefficient, linearisation, cold junction compensation, filtering, scaling.
 - Module monitoring : conversion circuit test, range overshoot test, terminal block presence test, sensor link test, "watchdog" test.
-

TSX ASY 410, TSX ASY 800 analogue output modules

The TSX ASY 410 module has 4 analogue outputs **isolated from each other**, and the TSX ASY 800 module has 8 outputs with common point.

Depending on the choice made during configuration, the modules offer the following range for each of its inputs : ± 10 V, 0...20 mA and 4...20 mA without external supply.

Functions

- Protection of the module against overvoltages.
- Adaptation to the different actuators : voltage or current output.
- Conversion of digital signals to analogue signals (11 bits + sign for TSX ASY 410 and 13 bits + sign for TSX ASY 800).
- Transforming application data into data which can be used by the digital/analogue converter.
- Module monitoring and fault indication to the application: converter test, range overshoot test, terminal block presence test, "watchdog" test.

PL7 Junior software performs configuration and debugging functions :

- Choice of modules used.
 - Configuration of channels according to the type of module: scanning (normal or fast), cold junction compensation (internal or external), range, filtering, display format, task (MAST or FAST), detection of terminal block presence, wiring check.
 - Debugging, access to certain parameter settings, module/channel diagnostics, forcing, calibration.
-

Premium automation platform

Analogue I/O modules

Characteristics

References :
pages 43530/6 and 43530/7

Characteristics of analogue input modules

Type of input module		TSX AEY 800	TSX AEY 1600	TSX AEY 810	TSX AEY 420						
Number of channels		8	16	8	4						
Input range		± 10 V, 0...10 V, 0...5 V, 1...5 V, 0...20 mA, 4...20 mA									
Analogue/digital conversion		12 bits		16 bits							
Read Time	Normal scan	ms	27	51	29.7	1					
	Fast scan	ms	3 x (no. of channels used + 1)		3.3 x (no. of channels used + 1)						
Max. error			± 10 V	0...5 V	0...20 mA	± 10 V	0...5 V	0...20 mA	± 10 V	0...5 V	0...20 mA
	at 25 °C	%FS	0.19	0.15	0.25	0.244	0.13	0.142	0.1	0.2	0.2
	0...60 °C	%FS	0.22	0.22	0.41	0.305	0.191	0.12	0.2	0.4	0.4
Isolation	Betw. ch. and bus	V rms	1000								
	Betw. ch. and earth	V rms	1000								
	Betw. channels	≡ V	Common point		± 200	Common point					
Common mode betw. channels			None		± 200	None					
Max. overvoltage/overcurrent on the inputs			± 30 V voltage ± 30 mA current								
Standards			IEC 1131								
Consumption	mA		See page 43605/2								

Type of input module		TSX AEY 414	TSX AEY 1614	
Number of channels		4	16	
Input range		<ul style="list-style-type: none"> ● B, E, J, K, L, N, R, S, T, U thermocouples or electrical range : - 13...+ 63 mV ● Pt 100, Pt 1000, Ni 1000 2 or 4-wire temperature probes, or ohmic range : 0...400 Ω, 0...3850 Ω ● ± 10 V, 0...10 V, ± 5 V, 0...5 V (0...20 mA with external shunt) or 1...5 V, 4...20 mA (4...20 mA with external shunt) 	<ul style="list-style-type: none"> ● B, E, J, K, L, N, R, S, T, U thermocouples or electrical range : - 80...+ 80 mV 	
Analogue/digital conversion		16 bits	16 bits	
Read time	Normal scan	ms	550	70 ms/channel
	Fast scan	ms	-	-
Max. error	at 25 °C	%FS	See page 43530/5	See page 43530/5
	0...60 °C	%FS	See page 43530/5	See page 43530/5
Isolation	Betw. ch. and bus	V rms	1780	1000
	Betw. ch. and earth	V rms	1780	1000
	Betw. channels	V rms	2830	-
Common mode	V	~ 240 or ≡ 100 between channels and earth ~ 415 or ≡ 200 between channels	≡ 250 betw. channels and earth ≡ 250 betw. channels or ~ 280	
Max. overvoltage/overcurrent on the inputs		± 30 V powered up without 250 Ω external resistance ± 15 V powered down without 250 Ω external resistance ± 25 mA powered up/down with 250 Ω external shunt	≡ ± 30 V in differential mode	
Standards		Sensor : IEC 584, IEC 751, DIN 43760, DIN 43710, NFC 42-330 PLC : IEC 1131		
Consumption	mA	See page 43605/2		

Premium automation platform

Analogue I/O modules

Characteristics (continued)

References :
pages 43530/6 and 43530/7

Input range for TSX AEY 414

Voltage/current range		± 10 V	0...10 V	± 5 V	0...5 V	1...5 V	0...20 mA	4...20 mA	13...63 mV	0...4000 Ω	0...3850 Ω
Max. error at 25 °C	%FS (1)	0.27	0.16	0.27	0.22	0.27	0.36	0.45	0.19	0.13	0.22
Max. error at 0...60 °C	%FS (1)	0.50	0.39	0.50	0.45	0.56	0.69	0.86	0.44	0.27	0.48
Temperature probe range		Pt 100		Pt 1000		Ni 1000					
Max. error at 25 °C	°C	1.2		2.5		1					
Max. error at 0...60 °C	°C	2.4		5		2					
Thermocouple range		B	E	J	K	L	N	R	S	T	U
Max. error at 25 °C	IC (2) °C	3.5	6.1	7.3	7.8	7.5	6	6	6.6	6.6	5.4
	EC (3) °C	1.5	1.5	1.8	2.3	2	2	3.2	3.4	1.5	1.5
Max. error at 0...60 °C	IC (2) °C	8.1	8.1	9.5	10.5	9.8	8.7	11	12	8.8	7.3
	EC (3) °C	3.5	3.2	3.8	4.7	4.1	4.3	7.7	8.5	3.2	3.1

Input range for TSX AEY 1614

Thermocouple range		B	E	J	K	L	N	R	S	T	U
Max. error at 25 °C (4)	°C	2.5	0.8	0.9	1	0.9	1.1	2.1	2.2	1	1
Max. error at 0...60 °C (4)	°C	4	1.2	1.4	1.6	1.4	1.7	2.4	3.7	1.3	1.3

Characteristics of analogue output modules

Type of output module		TSX ASY 410	TSX ASY 800
Number of channels		4	8
Output range		± 10 V, 0...20 mA and 4...20 mA, outputs supplied by PLC (or 24 V SELV external on TSX ASY 800 , see page 43560/3)	
Analogue/digital conversion		11 bits + sign	13 bits + sign (voltage), 13 bits current
Conversion time ms		2.5	5
Maximum resolution		Voltage output 5.12 mV (5), current output 10.25 μ A (6)	Voltage output 1.28 mV, current output 2.56 μ A
Output load		Voltage output, impedance > 1 k Ω , load < 0.1 μ F, current output, impedance < 600 Ω , load < 300 μ H	
Measurement error as a % of FS			
Voltage output, FS = 10 V	%FS	0.45 to 25 °C, 0.75 from 0 to 60 °C	± 0.14 to 25 °C, ± 0.28 from 0 to 60 °C
Current output, FS = 20 mA	%FS	0.52 to 25 °C, 0.98 from 0 to 60 °C	± 0.21 to 25 °C, ± 0.52 from 0 to 60 °C
Isolation between channels and bus	V rms	1500	1000
Isolation between channels and earth		\approx 500 V	1000 V rms
Isolation between channels	V rms	1500	Common point
Type of protection		Short-circuits and overload	
Max. voltage without damage	V	± 30	
Standards		IEC 1131	
Consumption	mA	See page 43605/2	

(1) %FS : error as a % of full scale.

(2) IC : with internal cold junction compensation.

(3) EC : with external cold junction compensation (with class A Pt 100 probe on channel 0).

(4) Max. errors, regardless of type of internal or external cold junction compensation (via Telefast sub-base or with class A Pt 100 probe).

(5) Value given for TSX ASY 410 (software version : II > 10), for TSX ASY 410 (software version : II \leq 10). This value is 4.88 mV.

(6) Value given for TSX ASY 410 (software version : II > 10), for TSX ASY 410 (software version : II \leq 10). This value is 9.77 μ A.

Premium automation platform

Analogue I/O modules

References

Characteristics :
pages 43530/4 and 43530/5

Analogue input modules



TSX AEY 800/420



TSX AEY 1600/1614



TSX ASY 410/AEY 414

Type of inputs	Input signal range	Resolution	Connection	No. of channels	Reference (1)	Weight kg
Analogue, high level with common point	± 10 V, 0...10 V, 0...5 V, 1...5 V, 0...20 mA, 4...20 mA	16 bits	1 x 25-way SUB-D connector	4 fast channels	TSX AEY 420	0.330
Analogue, low level isolated	± 10 V, 0...10 V, 0...5 V, 1...5 V, ± 5 V, 0...20 mA, 4...20 mA, -13...+63 mV, 0...400 Ω , 0...3850 Ω , temperature probe, thermocouple	16 bits	Screw terminal block (2)	4 channels	TSX AEY 414	0.320
Analogue, high level with common point	± 10 V, 0...10 V, 0...5 V, 1...5 V, 0...20 mA, 4...20 mA	12 bits	1 x 25-way SUB-D connector	8 channels	TSX AEY 800	0.310
			2 x 25-way SUB-D connectors	16 channels	TSX AEY 1600	0.340
Analogue, high level isolated	± 10 V, 0...10 V, 0...5 V, 1...5 V, 0...20 mA, 4...20 mA	16 bits	1 x 25-way SUB-D connector	8 channels	TSX AEY 810	0.330
Thermo-couple	± 63 mV, (B, E, J, K, L, N, R, S, T, U)	16 bits	2 x 25-way SUB-D connectors	16 channels	TSX AEY 1614	0.350

Analogue output modules



TSX ASY 800

Type of outputs	Output signal range	Resolution	Connection	No. of channels	Reference (1)	Weight kg
Analogue, isolated	± 10 V, 0...20 mA, 4...20 mA	11 bits + sign	Screw terminal block (2)	4 channels	TSX ASY 410	0.350
Analogue, with common point	± 10 V, 0...20 mA, 4...20 mA	13 bits + sign	1 x 25-way SUB-D connector	8 channels	TSX ASY 800 (3)	–

1) Product supplied with a bilingual Quick Reference Guide : English and French.

(2) TSX BLY 01 screw terminal block not supplied. To be ordered separately.

(3) The number of TSX ASY 800 modules is limited to 2 per rack with double format power supply (when this supplies the ≈ 24 V voltage required by outputs). See power supply modules selection page 43605/3.

Premium automation platform

Analogue I/O modules

References (continued)

Characteristics :
pages 43530/4 and 43530/5



ABE-7CPA00

Connection accessories

Description	Compatible with module	Use	Reference (1)	Weight kg	
Telefast 2 sub-bases	TSX AEY 800 TSX AEY 810 (2) TSX AEY 1600 TSX ASY 800 (3)	Distribution of 8 channels on screw terminals	ABE-7CPA02	0.290	
	TSX AEY 420/800 TSX AEY 1600	Distribution of 8 channels with common point on screw terminals, protected sensor supply, continuity of current loops during disconnection, protection against overvoltages	ABE-7CPA03	0.330	
	TSX AEY 810	Distribution of 8 isolated channels on screw terminals, channel by channel sensor supply (without common point), protection against overvoltages	ABE-7CPA31	0.410	
	TSX AEY 1614	Distribution of 16 channels on screw terminals, integrates temperature probe for external cold junction compensation	ABE-7CPA12	0.360	
	TSX AEY 420 (4)	Distribution of 4 channels on screw terminals	ABE-7CPA21	0.200	
Connection cables	TSX AEY 420/800 TSX AEY 810/1600 TSX AEY 1614 (5) TSX ASY 800	Link between 25-way SUB-D connectors of analogue I/O modules and ABE-7CPA00 sub-bases Length 3 m	TSX CAP 030	0.670	
	TSX ASY 410	Link between module and ABE-7CPA21 sub-bases (6)	1.5 m ABF-Y25S150 2 m ABF-Y25S200 3 m ABF-Y25S300 5 m ABF-Y25S500	0.500 0.560 0.740 0.920	
	Screw terminal 20-way	TSX AEY 414 TSX ASY 410	To be ordered separately with each I/O module for connection via screw terminal block	TSX BLY 01	0.100
Set of 4 resistors	TSX AEY 414	Adaptation for current range (supplied with TSX AEY 414)	TSX AAK2	0.020	



TSX BLY 01

(1) Product supplied with a bilingual quick reference guide : French and English.
 (2) If the TSX AEY 810 module is used with the ABE-7CPA02 sub-base, the module channels cannot be isolated.
 (3) Can be used with TSX AEY 420 module.
 (4) Can be used with TSX ASY 410 module by using the ABF-Y25S000 cables.
 (5) Necessity to use two TSX CAP 030 cables to connect the ABE-7CPA12 sub-base.
 (6) Includes the TSX BLY 01 20-way screw terminal block.

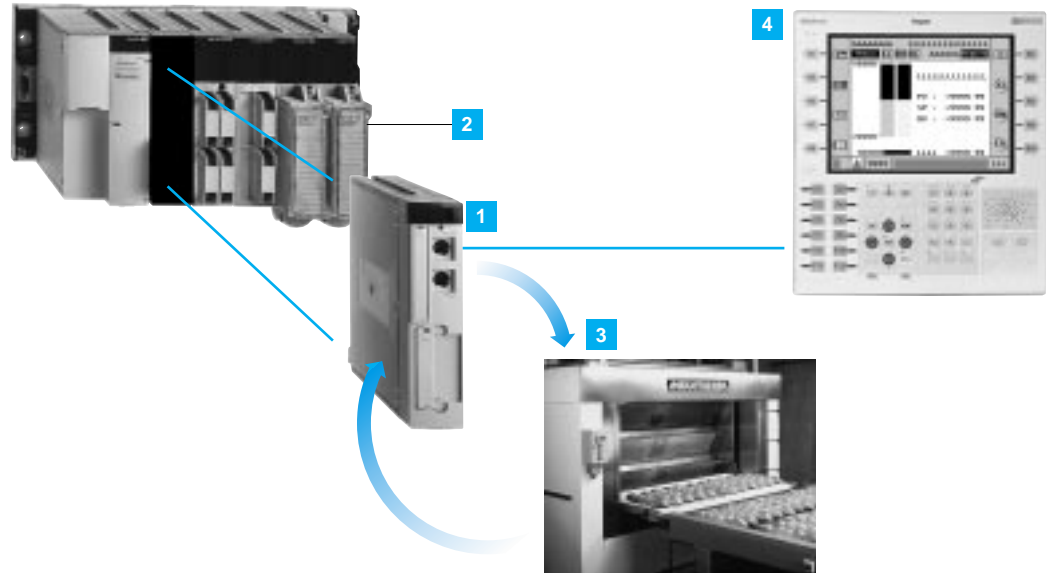
Premium automation platform

Process control

Presentation

References :
pages 43511/8 and 43513/5
Characteristics :
page 43620/9

The process control range integrated as standard in Premium platforms enables the setup and debugging of process control loops specifically designed for machine control



1 User-definable process control functions

TSX P57 2●3/3●3/453M processors and T PCX 57 203/353M coprocessors can be used, depending on the model, to manage 10 to 20 control channels (of 3 loops each). These channels can be configured in order to execute algorithms used in industrial processes :

- Cascaded loop
- Process loop
- Autoselective loop
- Setpoint programmer
- Controller with three simple loops

2 I/O

TSX P57 2●3/3●3/453M processors and TPCX 57 203/353M coprocessors manage an entire station consisting of racks connected on Bus X. The I/O interfaces necessary for process control processing are analogue or discrete module channels in :

- In-rack I/O modules
- TBX or Momentum distributed I/O modules

3 Control loops

The software setup of control loops is performed by entering parameters (Plug and Play technology) when configuring the TSX P57/T PCX 57 processor or coprocessor. The user completes predefined loop diagrams which also integrate management of the operating mode and the link with the I/O.

4 Operator dialogue and control

XBT-F and T XBT-F operator dialogue terminals have preconfigured screens dedicated to process control which simplify loop operation and control. These screens show the controller front panels as well as trending views and monitoring views.

Premium automation platform

Process control

Presentation, functions

References :
pages 43511/8 and 43513/5
Characteristics :
page 43620/9

Presentation

TSX P57 2●3/3●3/453M processors and T PCX 57 ●●3M coprocessors can be used to configure 10, 15 or 20 continuous or semi-continuous process control channels.

The control functions of these processors are particularly suitable for :

- Sequential processing requiring auxiliary control functions such as packaging machines, surface treatment machines, presses, etc.
- Simple processes such as metal processing furnaces, ceramic furnaces, refrigeration units, etc.
- Feedback or mechanical control where sampling time is critical, eg torque control, speed control, etc.

Premium processors have, amongst others, the following characteristics :

- Each configurable control channel can be used to manage 1 to 3 loops depending on the type of loop chosen.
- Process control processors can be inserted in the overall architecture of a site as the PLC can be integrated in various communication networks.
- Calculations related to process control are performed in floating point mode, expressed as physical units.

Description : TSX P57 ●●3M processors, see page 43511/3; TPCX 57 ●●3M coprocessors, see page 43513/3. Characteristics and performance, see page 43620/9.

Functions

Control loops

Premium processors can be used to set up 10 to 20 control channels, each one adopting one of the following 5 loop profiles :

- **Process loop** : loop with a single controller
- Controller with **3 simple loops** : controller which can increase the capacity of the number of loops
- **Autoselective loop** also known as **secondary** : comprises 2 loops in parallel with an output selection algorithm
- **Cascaded loop** : comprises 2 dependent loops (the master loop output is the slave loop setpoint)
- **Setpoint programmer** : comprises a maximum of 6 compound profiles with a total of 48 segments

Since the channels are independent, configuration of 10 channels can be used to obtain :

- 30 simple loops
- 5 setpoint programmers, each one associated with 5 control loops
- 2 setpoint programmers and 8 process loops

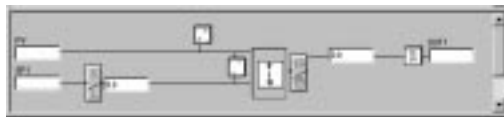
The various loops are characterised by :

- Their different algorithms
- 5 processing branches (process value, setpoint, Feed Forward, loop controller and output processing)
- Calculation functions (gain, filtering, square root, etc) defined using parameters

Types of control loop

Predefined algorithms, whose parameters can be defined by the user, are shown below :

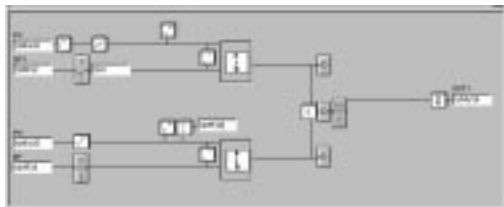
Process loop



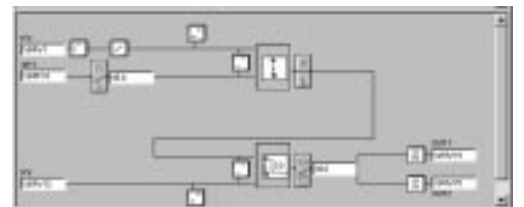
Simple loop



Autoselective loop



Cascaded loop



Premium automation platform

Process control

Functions (continued)

References :
pages 43511/8 and 43513/5
Characteristics :
page 43620/9

Processing branches

Parameter definition (choice of functions to be used) of control loop profiles enables the algorithm to be adapted to the process to be controlled.

Process value processing

Process value processing can be performed either in standard fashion or externally.

- Standard processing, the user has the following functions at his disposal : filtering, process value between limits, function generator with scaling, alarm management on threshold overrun, totalizer and simulation of the measured value.
- External processing is used to obtain, at the loop controller input, a process value, PV, which was processed outside the control loop. This solution is useful if measurement calculation of the process value requires specific or customised functions.

Setpoint processing

Depending on the type of loop chosen, it is possible to opt for one of the following 4 setpoints : ratio setpoint, selection setpoint, simple setpoint (remote with scaling) or setpoint programmer.

When using the controller with 3 single loops or the secondary loop (in an autoselective loop), only the simple setpoint and the setpoint programmer can be used.

Feed Forward processing

Feed Forward processing corrects a measurable disturbance as soon as it appears. This open loop processing anticipates the effect of the disturbance. It has the Leading function (phase lead/lag).

Loop controller and command processing

There are 6 different types of loop controller to choose from : autotuning PID, controller in discrete mode with 2 or 3 states, hot/cool controller (PID or autotuning model) or Split Range controller (PID or autotuning model).

Output processing

There are 3 types of output processing : analogue output, servomotor output or PWM output. Whatever the type of output, the control calculated by the controller crosses a ramp limiter and a limiter where the lower and higher limits can be used to define the output variation range.

Setpoint programmer

The setpoint programmer offers a maximum of 6 profiles with a total of 48 segments. It is therefore possible to create a 48-segment programmer, six 8-segment programmers or one 24-segment programmer with one 16-segment programmer and one 8-segment programmer, etc



Each segment is configured as a ramp or dwell time. It is characterised by :

- The setpoint to be reached
- Duration of the segment or gradient of the segment (if a ramp)

A profile can be executed once, a certain number of times or continually looped back. Moreover, due to the concept of guaranteed dwell time, the time will only need to be downcounted if the process value is actually in the specified range.

Premium automation platform

Process control

Functions (continued)

References :
pages 43511/8 and 43513/5
Characteristics :
page 43620/9

Configuration of control channels

Special screens, accessible using PL7 Junior/Pro software, enable the configuration of control loops.



Configuration of control channels

By simply selecting from the menus, the "Loops" interface on PMX process control processors enables the following to be configured :

- The type of loop (out of the 5 existing ones)
- The choice of functions used in the 5 processing branches
- Parameters linked to each function
- Assignment of PLC variables to different loop branches (memory words, input words or output words depending on the processing branch)
- Automatic presymbolization of variables used in the loops

Configuration of process, single, autoselective and cascaded loops proposes parameter entry by default. The various functions integrated in the algorithms (square root, function generator, etc) and the initial value of each parameter are predefined.



Example : configuration of a process loop

Once the type of loop has been chosen, parameter entry is performed by selecting or deselecting options in the processing branches. No programming is therefore necessary, loop diagrams are enhanced or simplified as parameters are validated.

The screen opposite shows how selecting the PID controller can display the various parameters valid for this type of controller (KP, TI, TD, etc).

For the setpoint programmer, configuration of the various profiles (6 maximum) is done using a table defining each segment.



Once the type of segment has been chosen (ramp or dwell time), configuration consists of defining the setpoint to be reached (for the ramp) and duration (for the ramp or dwell time).

While making selections, the lower part of the screen shows the profile display with the setpoint limit values.

This screen also allows the cycles of this profile to be defined : execution once, a certain number of times or continually looped back (32,767 times maximum).

Execution of control channels

The loop sampling period is predefined at 300 ms. This defines the loop controller processing period in automatic mode. It is possible to modify this period in the loop configuration screen.

The user can access all the I/O and parameters for the various configured control channels via the program or by using the various PL7 Junior/Pro software tools (in particular language editors and animation tables).

Premium automation platform

Process control

Functions (continued)

References :
pages 43511/8 and 43513/5
Characteristics :
page 43620/9

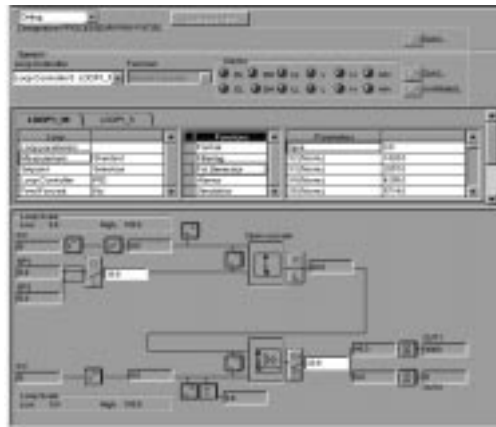
Debug functions

Adjustment and debugging of control loops is performed in a simple and user-friendly way using the loop configuration application-specific screen which, when online, can access the following functions :

- Display and animation of the loop algorithm diagram
- Display of alarms linked to the process and channel faults
- Simulation of input interface values : for example when they are not connected (process value, Feed Forward)
- Addition, removal or replacement of calculation functions in online mode
- Modification of adjustment parameters for each function
- Modification of loop controller operating modes and manual control

With the controllers integrated in control loops, it is possible to use the autotuning function which calculates a set of adjustment parameters (K_p , T_i , T_d or K_s , T_1 , T-delay) upon request.

Once the loop has been debugged, it is possible to save the current test values as the initial loop parameter values. Hence, on restarting the loop, it will contain the correct values.

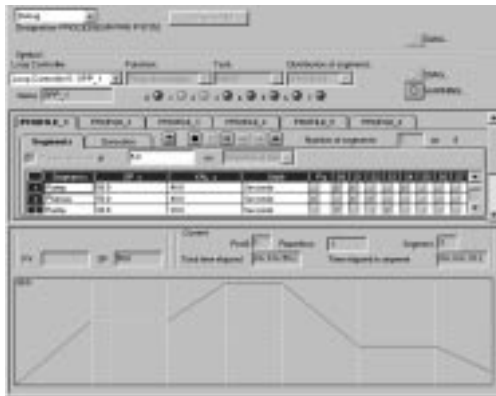


Loop debugging

The debugging screen :

- Displays the values of variables linked to the loop dynamically
- Shows the parameters chosen (or can even modify them)
- Displays alarms

The menus enable manual control of the loop, autotuning, parameter backup, etc

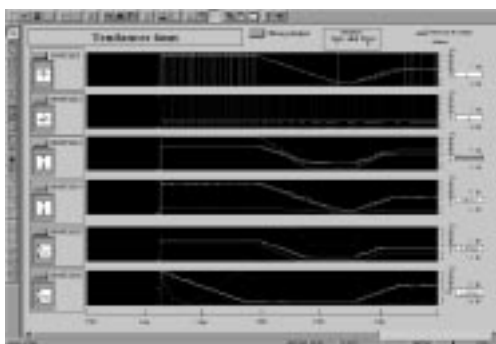


Setpoint programmer debugging

Setpoint programmer channels have their own debugging screen which displays :

- The number of the current segment and the iteration number
- Execution time of the current segment
- Overall execution time

Runtime screens



The runtime screen tool available in PL7 Pro/Pro-Dyn software integrates front panel views and trending views in its object library which can be used to adjust and operate control loops.

Front panel views and trending views

Predefined controller front panel views provide the user with the traditional appearance of controller front panels. The user only enters the variables used by the loop being dealt with in the various fields in this view.

Similarly, trending views display changes in loop parameters in graph form as well as useful operating information : operating mode, alarms, etc.

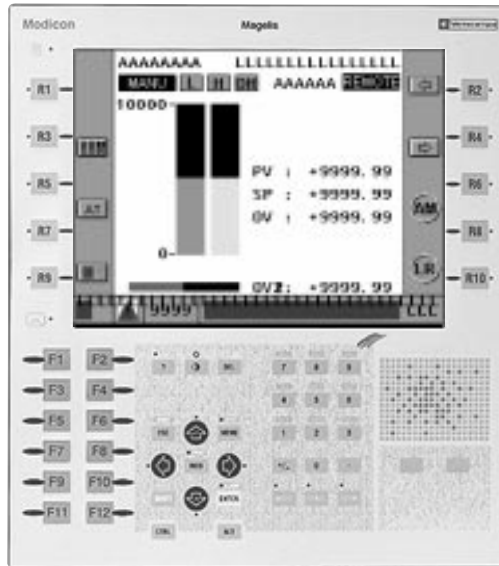
Premium automation platform

Process control

Functions (continued)

References :
pages 43511/8 and 43513/5
Characteristics :
page 43620/9

Control and operation



Tools integrated in PL7 software (loop debugging screens, runtime screens, etc) which are associated with XBT-F and TXBT-F Magelis graphic screen terminals offer screens dedicated to the control and operation of control loops.

Setup

These predefined screens offer runtime and control views whose characteristics depend on the type of terminal used :

- XBT-F : Magelis graphic screen terminals
- TXBT-F02 : Magelis graphic stations under Windows operating system

As standard, PL7 Junior/Pro software contains the application developed with XBT-L1003/L1004 development software, which comprises predefined runtime and control views. When using this dialogue application, animation of runtime and control views is automatic.

Presentation of views

Each control loop is associated with a certain number of views depending on the size of the Magelis terminal screen.

- With 5" screen terminals, the user has 7 views at his disposal :
 - monitoring view
 - front panel (bar chart)
 - supervisory control view (trending)
 - adjustment view
 - autotuning view
 - setpoint programmer view
 - alarm view

With this type of terminal, it is possible to operate 8 loops.

- With 10" screen terminals, the user has 5 views at his disposal :
 - monitoring view
 - front panel view integrating the display of the front panel, loop adjustment and autotuning
 - supervisory control view
 - setpoint programmer view
 - alarm view

With this type of terminal, it is possible to operate 16 loops.

All runtime pages are based on the same presentation module :

- An alarm zone is positioned at the bottom of the screen. It shows the last active alarm
- Dynamic function keys execute one and only one function (access to the adjustment page, starting autotuning, navigation between the various pages, selecting a loop, etc.)

It is of course possible for the user to customise the screens to suit his requirements.

Premium automation platform

Process control

Function (continued)

References :
pages 43511/8 and 43513/5
Characteristics :
page 43620/9

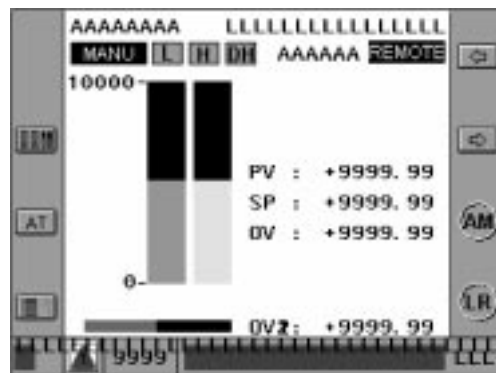
Presentation of views (continued)



Monitoring view

This view is the control application entry point. It gives an overall view of all loops being operated on a single screen. For each loop, this view displays the loop name, measurement/setpoint deviation, operating mode, alarms and the execution of autotuning if applicable.

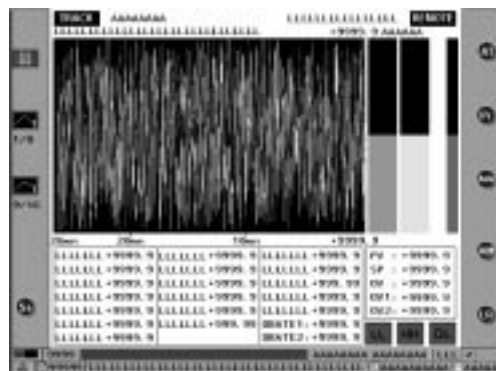
The user can select a loop and access the front panel for example.



Front panel view

The front panel view uses the traditional format of controller front panels with the process value, the setpoint and the deviation between the 2. This view also integrates the operating mode as well as any alarms on the loop.

Function keys allow navigation between pages as well as control of loop operating modes.



Adjustment view

This view is used to adjust the loop controller. This function must be executed by qualified personnel. All the adjustment parameters are therefore write protected by a password. However, this view is always accessible in read mode.

The password applies to the whole man-machine interface.

Supervisory control view

This view displays the same information as the front panel view and also shows the 3 trends which are characteristic of the loop. The most recent trend history is recorded.

Function keys allow navigation between pages as well as control of the loop operating modes.

Setpoint programmer adjustment view

Two views specific to setpoint programmers are supplied. One is used to display the various profile names and to select one of them, the other is used to follow a given profile.

The second view is used to :

- Display the setpoint profile
- Modify the segments, ramps and dwell time
- Access the given profile
- Track the process value
- Control the profile

Premium automation platform

Process control

Characteristics

References :
pages 43511/8 and 43513/5

Characteristics

The table below summarises the main characteristics of Premium processors and coprocessors presented in pages 43511/6, 43511/7 and 43513/4.

Type of processor	TSX P57 2●3M/T PCX 57 203M	TSX P57 3●3M/T PCX 57 353M	TSX P57 453M
Number of racks	16 (1)	16 (1)	16 (1)
Number of discrete I/O (2)	1024	1024	2048
Number of analogue channels (2)	80	128	256
Number of app.-specific channels (2)	24	32	64
Number of control channels	10	15	20
Process control functions	Process loop 3 simple loops Cascaded loop Autoselective loop Setpoint programmer		
Network connections	1	3	4
Fipio bus manager connection	1 (integrated with model TSX P57 253M)	1 (integrated with model TSX/T PCX 57 353M)	1 (integrated)
Third-party bus connections	1	2	2
AS-i bus connections	4	8	8
Memory Internal RAM	Keywords 48/64 depending on model	64/80 or 80/96 depending on model (3)	96/176 (3)
Capacity on PCMCIA card	Keywords 160	384	512
Memory occupation	Keywords 5 per type of loop + 0.5 per control channel	5 per type of loop + 0.5 per control channel	5 per type of loop + 0.5 per control channel

(1) Maximum number of TSX RKY racks. Using the TSX RKY 12EX rack (12 slots) is the same as using 2 racks with 4, 6 or 8 slots.


(2) The maximum numbers of discrete I/O, analogue I/O and application-specific channels are cumulative. The number of remote I/O is not counted.

(3) The second value corresponds to the capacity of the integrated memory when the processor is fitted with a PCMCIA memory card.

Premium automation platform

Counter and electronic cam modules

Selection guide

Applications	Counter modules						
							
Number of channels Frequency per channel Module cycle time	<table border="1"> <tr> <td>2 channels</td> <td>4 channels</td> </tr> <tr> <td>40 kHz</td> <td>40 kHz</td> </tr> <tr> <td>5 ms</td> <td>10 ms</td> </tr> </table>	2 channels	4 channels	40 kHz	40 kHz	5 ms	10 ms
2 channels	4 channels						
40 kHz	40 kHz						
5 ms	10 ms						
Counter/ measurement inputs Counting pulses \approx 24 V Incremental encoder Absolute encoder	Up to 40 kHz : - proximity sensor type 2 - mechanical contacts Up to 40 kHz : - \approx 10...30 V, - \approx 5 V RS 422 with zero marker -						
Reflex I/O	Per channel : - 3 inputs \approx 24 V : enable, preset and read, 1 input \approx 24 V line check, incremental encoder power supply - 2 reflex outputs \approx 24 V						
Counting capacity	24 bits + sign (0 to + 16 777 215 points or \pm 16 777 215 points)						
Functions	Downcounting with preset input, upcounting with reset to zero input Up/down counting with preset input, configurable upcounter input : - 1 upcounter input/1 downcounter input - 1 up/down counter input and 1 direction input - Incremental encoder with phase-shifted signals						
Processing	Inputs : Counter enable, counter preset, read current value Comparison : Downcounting : to value 0. Upcounting : 2 thresholds and 1 setpoint. Up/down counting : 2 thresholds and 2 setpoints. Reflex outputs : Downcounting function : 1 passage through zero output. Upcounting function : 1 passage through setpoint value output. Up/down counting function : 2 user-definable outputs.						
Events	User-definable activation of the event-triggered task (threshold crossing, setpoint crossing, preset or reset, enable, capture)						
Connection	- 15-way SUB-D connectors (1 per counter channel, direct or TSX TAP S15 accessory) - HE 10 connector for auxiliary I/O and power supply - Telefast 2 system (ABE-7CPA01, ABE-7H08R10/16R20)						
Type of module	<table border="1"> <tr> <td>TSX CTY 2A</td> <td>TSX CTY 4A</td> </tr> </table>	TSX CTY 2A	TSX CTY 4A				
TSX CTY 2A	TSX CTY 4A						
Page	<table border="1"> <tr> <td>43540/5</td> <td>43540/5</td> </tr> </table>	43540/5	43540/5				
43540/5	43540/5						

Fast counter and measurement module



Electronic cam module



2 channels
500 kHz
1 ms

1 channel

Up to 1 MHz :
- proximity sensor type 2
- mechanical contacts

500 kHz in multiplication by 1, 250 kHz in multiplication by 4 :
- 10...30 V,
- 5 V RS 422 with zero marker

Power supply 5 V or 10...30 V :
- SSI absolute encoder up to 25 bits
- parallel absolute encoder up to 24 bits (with Telefast ABE-7CPA11 sub-base)

Per channel :
- 2 inputs 24 V : preset and read
- 1 enable input or 24 V output, configurable
- 2 reflex outputs 24 V
- 1 programmable frequency output 24 V
- 1 encoder power supply input 5 V/24 V

- 3 proximity sensor compatible inputs 24 V type I
- 24 track outputs 24 V/0.5 A protected

24 bits + sign (0 to + 16 777 215, upcounting) or
24 bits + sign (- 16 777 215 to + 16 777 215, downcounting,
up/down counting). Up to 25 bits for SSI absolute encoder

256 to 32 768 points per cycle and from 1 to 32 768 cycles
(absorbs play on reverse)

Up/down counting with preset input, configurable counter input :
- 1 upcounter input/1 downcounter input
- 1 up/down counter input and 1 direction input
- incremental encoder with phase-shifted signals
Measurement 2 :
- SSI absolute encoder
- parallel output absolute encoder with ABE-7CPA11 sub-base

Processing of 128 cams/32 tracks (of which 24 with direct output)
Output update cycle :
- 50 µs for 16 cams, 100 µs for 64 cams, 200 µs for 128 cams
- 1 parts counter
- 2 capture registers
- control/recalibration of axis slip

Inputs :
Counter enable, counter preset, read current value
Comparison :
2 thresholds
Reflex outputs : 2 user-definable outputs
Speed monitoring
Special functions

Cam profiles :
3 basic types (position, monostable, brake)
Associated functions :
- elimination of axis backlash, position recalibration
- measurement capture
- switching feedforward
- parts counter

User-definable activation of the event-triggered task (crossing of thresholds
or modulo value, preset, enable, capture)

User-definable activation of the event-triggered task (cams, track, adjustment,
read, etc.)

- 15 way SUB-D connectors (1 per counter channel, direct or TSX TAP S15 accessory)
- HE 10 connector for reflex I/O and power supply
- Telefast 2 system (ABE-7CPA01, ABE-7H16R20, ABE-7CPA11)

TSX CTY 2C

TSX CCY 1128

43541/5

43542/4

Premium automation platform

Motion control modules

Selection guide

Applications

Motion control modules for servomotors. Compatible with Lexium servodrives with analog setpoint and Altivar 58



Number of axes

2 axes

4 axes

2 axes

4 axes

Frequency per axis

Counter : 500 kHz with incremental encoder. Acquisition : 200 kHz with SSI serial absolute encoder or parallel output

Counter input

Per axis :
 - Incremental encoder \pm 5 V, RS 422/RS 485 or Totem pole,
 - SSI serial absolute encoder 16 to 25 bits \pm 10...30 V
 - Parallel output absolute encoder 16 to 24 bits \pm 5/10/30 V with Telefast 2 conversion sub-base (ABE-7CPA11)

Per axis :
 - Incremental encoder \pm 5 V, RS 422/RS 485
 - SSI serial absolute encoder 12 to 25 bits
 - Parallel output absolute encoder 12 to 24 bits conversion sub-base (ABE-7CPA11)

Control outputs

Per axis :
 - 1 analog output \pm 10 V, 13 bits + sign servodrive setpoint

Auxiliary I/O

Per axis :
 - 4 discrete I/O \pm 24 V (homing cam, event, recalibration, emergency stop)
 - 1 input/1 output for servodrive control
 - 1 reflex output \pm 24 V

Counter capacity

Functions

Servo Control on individual linear axis

Servo Control on individual infinite axis
 Follower axes (dynamic ratio)
 Realtime correction of servodrive offset

Processing

Positioning of a moving part on an axis according to motion control functions supplied by the PLC processor

Axis parameter setting, adjustment and debugging using PL7 Junior/Pro software

Events

User-definable activation of the event-triggered task

Connection

- 9 and 15-way SUB-D connectors for encoder input (direct or via TSX TAP S15 accessory), speed reference
 - HE 10 connector for auxiliary inputs
 - Telefast 2 system (ABE-7CPA01, ABE-7H16R20, ABE-7CPA11)
 - Specific accessories (TSX TAP MAS)

Type of module

TSX CAY 21

TSX CAY 41

TSX CAY 22

TSX CAY 42

Page

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43550/5

ATV-58F variable speed drives



3 axes

absolute encoder

or Totem pole

≡ 5/10/30 V with Telefast 2

Servo Control on individual linear or infinite axis
Linear interpolation on 2 or 3 axes
Realtime correction of servodrive offset

TSX CAY 33

43550/5

Motion control modules for servomotors.
Compatible with Lexium MHDS servodrives with
SERCOS® digital link



8 axes

SERCOS® ring : 4 M bauds/s

Per SERCOS® digital link

Per SERCOS® digital link

Per SERCOS® digital link

Individual linear or infinite axis
Linear interpolation on 2 to 8 axes
Follower axes (6 slaves) by gearing or camming

Communication with the servodrives via SERCOS®
digital link (adjustment, diagnostics)

- 2 SMA type connectors for plastic (or glass) fiber
optic cable

TSX CSY 84

43555/4

Motion control modules for stepper motor



1 axis

2 axes

187 kHz

Per axis, translator inputs ≡ 5 V, negative logic
(translator loss of step checks)

Per axis, RS 422 translator outputs, TTL 5 V
compatible (+/- pulses, boost, enable, reset loss
of step check)

Per axis :
- 6 discrete inputs ≡ 24 V
- 1 output ≡ 24 V (brake control)

24 bits + sign (± 16,777,215 points)

Open loop control of the position of a moving part
on a limited linear axis according to motion control
functions supplied by the PLC processor

Axis parameter setting, adjustment and debugging
using PL7 Junior/Pro software

- 15-way SUB-D connector for translator
- 20-way HE 10 connector for auxiliary I/O
- Telefast 2 system (ABE-7H16R20)

TSX CFY 11

TSX CFY 21

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43551/5

Premium automation platform

TSX CTY 2A/4A counter modules

Presentation, description, operation

Characteristics :
[page 43540/3](#)
 Connections :
[page 43540/4](#)
 References :
[page 43540/5](#)

Presentation

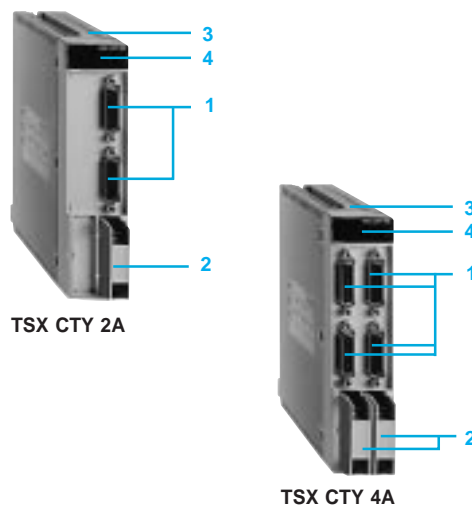
Counting functions are required for counting parts or events, grouping objects, incoming or outgoing flow control, and measuring the length or the position of elements.

Premium PLCs perform these functions using TSX CTY 2A/4A counter modules which have a counting frequency of 40 kHz maximum. In a Premium PLC configuration, the number of TSX CTY counter modules is added to the number of other application-specific modules (communication, motion control and weighing). See pages 43511/8 and 43513/5. They can be disconnected while powered up. Counter modules are characterised by the number of channels :

- 2 channels with downcounting, upcounting and up/down counting functions for the TSX CTY 2A module
- 4 channels with downcounting, upcounting and up/down counting functions for the TSX CTY 4A module

The parameters of these functions are set by software configuration. The modules accept ± 5 V or ± 10 to 30 V solid state output sensors (incremental encoders, proximity sensors, photoelectric detectors) and mechanical contact output sensors (in this case the counting frequency is limited to 100 Hz).

Description



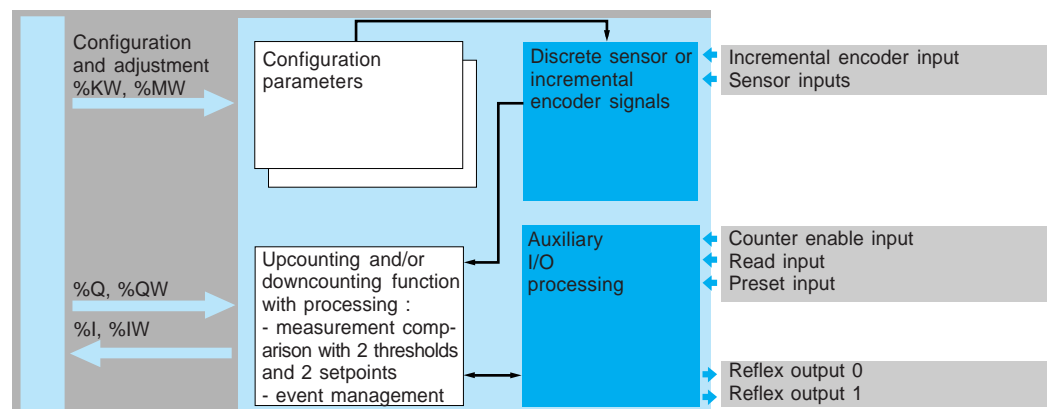
The front panel of TSX CTY 2A (2-channel) and TSX CTY 4A (4-channel) counter modules comprises :

- 1 One 15-way SUB-D type connector per channel for connecting :
 - Counting sensors or incremental encoder
 - Sensor power supply
 - Encoder supply feedback for checking it is correctly supplied
- 2 One 20-way HE10 type connector for 2 channels for connecting on each channel :
 - Auxiliary inputs : preset, enable
 - Reflex outputs
 - Power supplies for auxiliary I/O and incremental encoders
- 3 Rigid casing which :
 - Holds the electronic card
 - Locates and locks the module in its slot, etc
- 4 Module diagnostic LEDs :
 - Module diagnostics :
 - green RUN LED : module operating
 - red ERR LED : internal fault, module failure
 - red I/O LED : external fault
 - Channel diagnostics :
 - green CH● LED : channel diagnostics available



Operation block diagram

Block diagram of a channel



Counter modules are set up using PL7 Junior/Pro software (see page 43100/2).

Premium automation platform

TSX CTY 2A/4A counter modules

Characteristics

References :
page 43540/5
Connections :
page 43540/4

Electrical characteristics

Type of module		TSX CTY 2A	TSX CTY 4A
Modularity		2 channels	4 channels
Frequency on counter inputs	kHz	40 maximum	40 maximum
Consumption	mA	See page 43605/2	See page 43605/2
Dissipated power	W	4.5 typical (6 maximum)	8 typical (11.5 maximum)
Sensor power supply check		Yes	Yes
Module cycle time	ms	5	10
Event processing response time	ms	Acceptance of event-triggered input (enable/read/preset) and positioning of : - reflex output on TSX CTY 2A/4A : 1 ms - discrete module output; TSX DSY 8T22 : 2.1 ms; TSX DSY 32T2K : 3.2 ms	

Input characteristics

Type of input		Counter inputs (IA/IB/IZ)		Auxiliary inputs (preset, enable, read)
Nominal values	Voltage	V	5	24
	Current	mA	18	7
Limit values	Voltage	V	≤ 5.5	19...30 (up to 34 V possible, limit 1 hr per 24 hr period)
	At state 1	Voltage	V	≥ 2.4
	Current	mA	> 3.7 (for U = 2.4 V)	≥ 11
	At state 0	Voltage	V	≤ 1.2
	Current	mA	< 1 (for U = 1.2 V)	≤ 5
Logic			Positive	Positive
Sensor voltage check	At loss of 24 V	ms	–	< 2.5
response time	At return of 24 V	ms	–	< 10
Input impedance for nominal U		Ω	400	1400
Input impedance for U = 2.4 V (RS 422 compatibility)		Ω	> 270	–
Response time			Maximum permissible frequency 40 kHz with incremental encoder Immunity 1.6 ms with mechanical contact	< 250 μs
Type of input			Resistive	Resistive
IEC 1131 conformity			–	Type 2
2-wire proximity sensor compatibility			–	2-wire/3-wire

Output characteristics

Type of output		Auxiliary outputs (2 per channel)
Nominal voltage	V	≈ 24
Voltage limits	V	19...30 (up to 34 V possible, limit 1 hr per 24 hr period)
Nominal current	mA	500
Maximum voltage drop when ON	V	< 0.5
Leakage current	mA	< 0.1
Switching time	μs	< 250
Electrostatic discharge time	s	L/R
Switching frequency on inductive load	Hz	$F < 0.6 / (LI^2)$
Compatibility with d.c. inputs		All positive logic inputs with input resistance < 15 kΩ
IEC 1131-2 compatibility		Yes
Protections against overloads and short-circuits		Current limiter and thermal tripping (reactivated via program or automatically)
Protection against channel overvoltages		Zener diode between outputs and + 24 V
Protection against polarity inversions		Diode reverse-mounted on supply

Premium automation platform

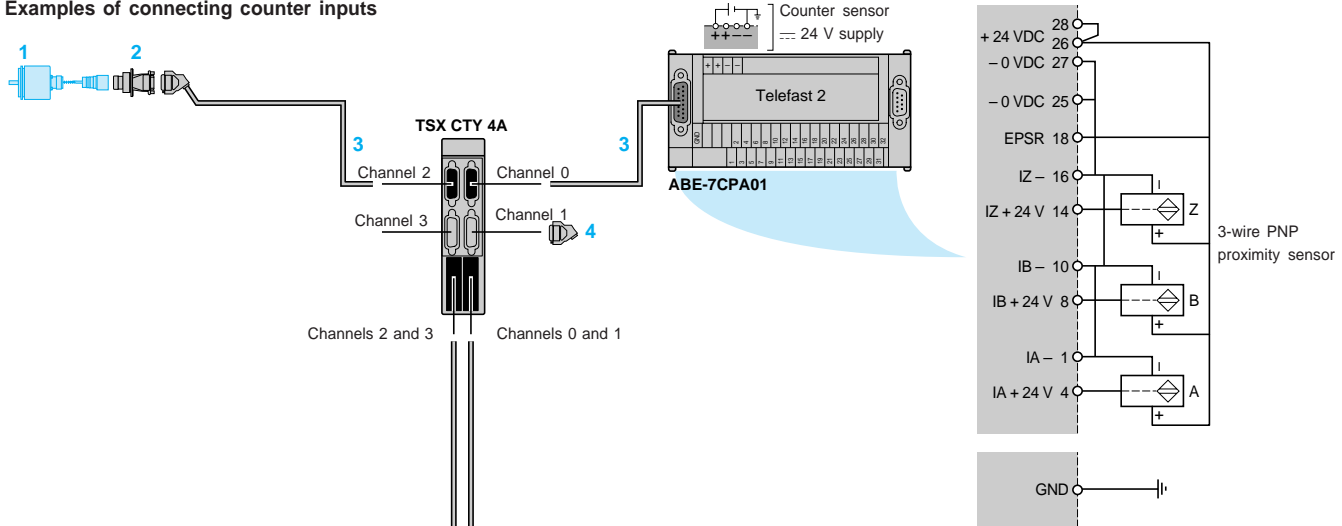
TSX CTY 2A/4A counter modules

Connections, dimensions

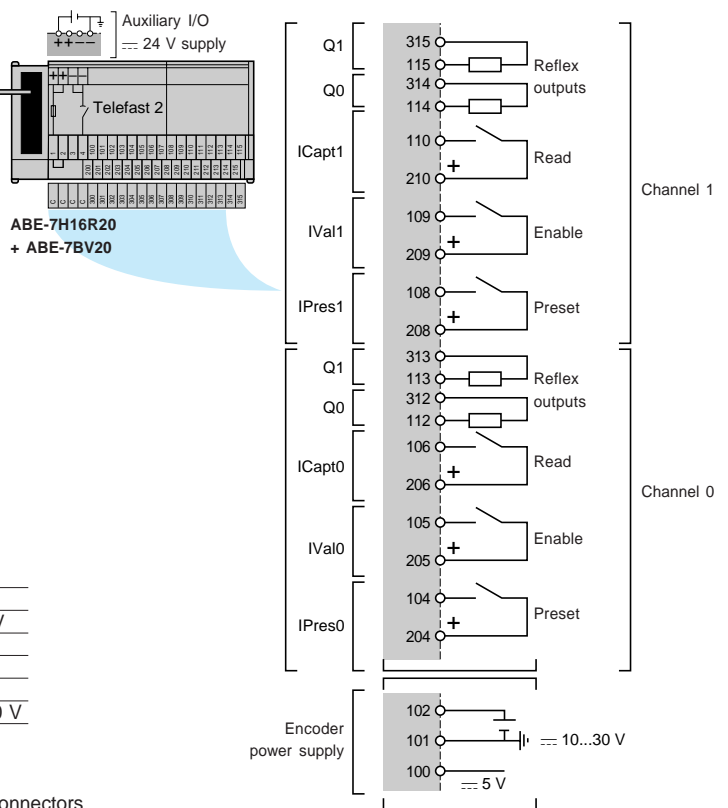
Characteristics :
page 43540/3
References :
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Connections

Examples of connecting counter inputs



Examples of connecting auxiliary I/O



1 Incremental encoder

2 TSX TAP S15 05/24 connector

TSX TAP S15 05

1	IB -	7	NC
2	Power ret.	8	IB + 5 V
3	IZ + 5V	9	NC
4	IZ -	10	0 V
5	IA + 5 V	11	NC
6	IA -	12	+ 5 V

TSX TAP S15 24

1	NC	7	NC
2	NC	8	IB + 24 V
3	IZ + 24 V	9	NC
4	NC	10	0 V
5	IA + 24 V	11	NC
6	NC	12	+ 10...30 V

3 TSX CCP S15 cable with connector

4 TSX CAP S15 connector

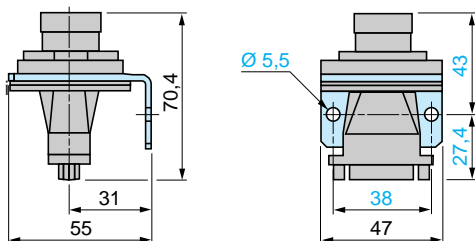
5 TSX CDP ●●1 preformed cable with connector and flying leads

6 TSX CDP ●●2 or TSX CDP ●●3 rolled ribbon or preformed cable with connectors

Dimensions

Connection interface for incremental encoder

TSX TAP S15 05/24



Mounting through enclosure (dust and damp proof)

- cut-out Ø 37

- maximum panel thickness 5 mm

Premium automation platform

TSX CTY 2A/4A counter modules

References

Characteristics :
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Counter modules



TSX CTY 2A

TSX CTY 4A

Type of input	Characteristics	No. of chan.	Reference (1)	Weight kg
2/3-wire prox. sensors PNP/NPN, \equiv 24 V, Incremental encoders, \equiv 5 V RS 422, \equiv 10...30 V Totem Pole	Counting 40 kHz Cycle time 5 ms	2	TSX CTY 2A	0.320
	Counting 40 kHz Cycle time 10 ms	4	TSX CTY 4A	0.430

Connection accessories

Description	For connecting	Connector type on TSX CTY ●●	Unit reference	Weight kg
SUB-D connectors (sold in lots of 2)	Counter sensors or incremental encoder	SUB-D, 15-way	TSX CAP S15	0.050
Telefast 2 connection sub-bases	Counter sensors and \equiv 24 V power supply	SUB-D, 15-way	ABE-7CPA01	0.300
	Auxiliary inputs, \equiv 24 V power supply and \equiv 5 V/10...30 V encoder power supply	HE 10, 20-way (for 2 channels)	ABE-7H16R20	0.300
Additional terminal block	20 shunted terminals for ABE-7H16R20 sub-base	(Sold in lots of 5)	ABE-7BV20	0.030
Connection interfaces for incremental encoder	Encoder \equiv 5 V RS 422	SUB-D, 15-way	TSX TAP S15 05	0.260
	Encoder \equiv 10...30 V Totem Pole	SUB-D, 15-way	TSX TAP S15 24	0.260



ABE-7CPA01



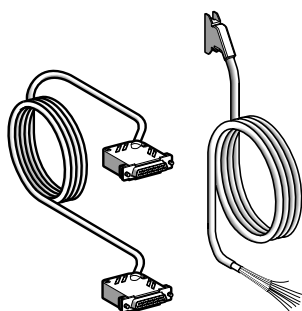
ABE-7H16R20



TSX TAP S15 ●●

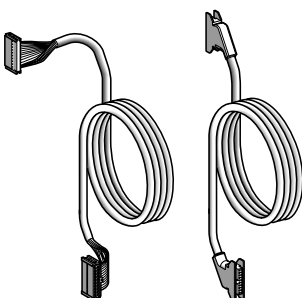
Connecting cables

Description	From TSX CTY ●● module	To	Length	Reference	Weight kg
Cables (cross-section 0.205 mm ²)	15-way SUB-D connector	ABE-7CPA01/ ABE-CPA11 sub-bases or TSX TAP S15●● accessory (15-way SUB-D connector)	0.5 m	TSX CCP S15 050	0.110
			1 m	TSX CCP S15 100	0.160
			2.5 m	TSX CCP S15	0.300
20-wire preformed cables (500 mA max.)	Auxiliary inputs, \equiv 24 V power supply and \equiv 5 V/10...30 V encoder power supply (HE 10, 20-way moulded connector)	Free end with colour-coded wires	3 m	TSX CDP 301	0.400
			5 m	TSX CDP 501	0.660
			10 m	TSX CDP 1001	1.210
Rolled ribbon cable (100 mA max.)	Auxiliary inputs, \equiv 24 V power supply and \equiv 5 V/10...30 V encoder power supply (HE 10, 20-way connector)	ABE-7H16R20 Telefast 2 sub-base (HE 10, 20-way connector)	1 m	TSX CDP 102	0.090
			2 m	TSX CDP 202	0.170
			3 m	TSX CDP 302	0.250
Connecting cables (500 mA max.)	Auxiliary inputs, \equiv 24 V power supply and \equiv 5 V/10...30 V encoder power supply (HE 10, 20-way connector)	ABE-7H16R20 Telefast 2 sub-base (HE 10, 20-way connector)	0.5 m	TSX CDP 053	0.085
			1 m	TSX CDP 103	0.150
			2 m	TSX CDP 203	0.280
			3 m	TSX CDP 303	0.410
			5 m	TSX CDP 503	0.670



TSX CCP S15 ●●●

TSX CDP ●01



TSX CDP ●02

TSX CDP ●03

(1) Product supplied with a bilingual Quick Reference Guide : English and French

Premium automation platform

TSX CTY 2C measurement and counter module

Presentation, description, operation

Characteristics :
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Presentation

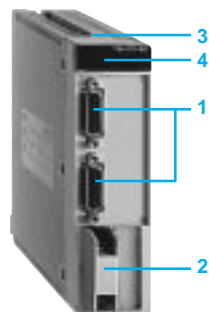
The TSX CTY 2C measurement and counter module is used with fast machines requiring precise measurements with short cycle times and high input frequencies (timber machines, packing machines, etc).

The TSX CTY 2C measurement and counter module provides the standard functions (speed monitoring, reflex outputs, etc) enabling a simple position control function to be performed by the application program.

The TSX CTY 2C measurement and counter module also enables special functions to be managed.

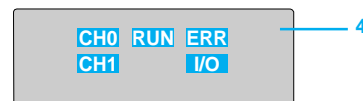
Description

The front panel of a TSX CTY 2C measurement and counter module comprises :



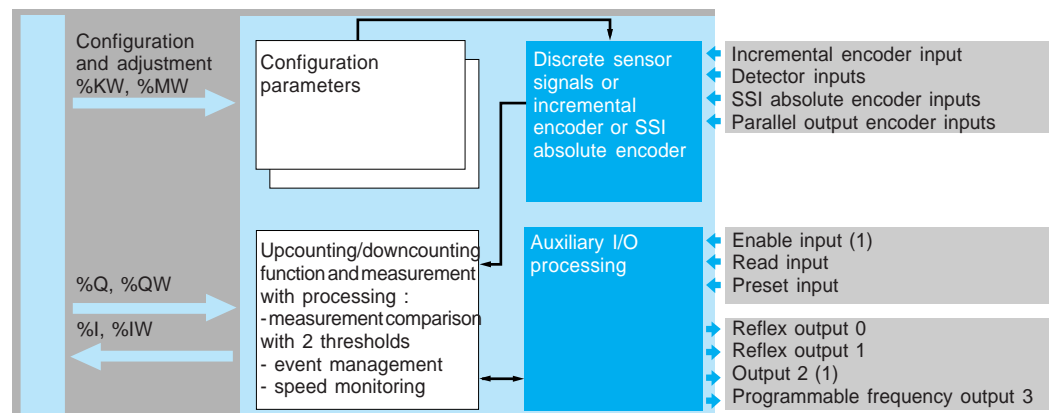
TSX CTY 2C

- 1 One 15-way SUB-D connector per channel for connecting :
 - Counting sensors or incremental encoder
 - SSI absolute encoder or parallel output encoder with ABE-7CPA11 sub-base
 - Sensor power supply
 - Encoder power supply feedback for checking it is correctly supplied
- 2 One 20-way HE10 connector for connecting on each channel :
 - Auxiliary inputs : preset, enable and read
 - Reflex outputs
 - Programmable frequency output
 - Power supplies for auxiliary I/O and encoders
- 3 Rigid casing which :
 - Holds the electronic card
 - Locates and locks the module in its slot, etc
- 4 Module diagnostic lamps :
 - Module diagnostics :
 - green RUN lamp : module operating
 - red ERR lamp : internal fault, module failure
 - red I/O lamp : external fault
 - Channel diagnostics :
 - green CH● lamp : channel diagnostics available



Operation block diagram

Block diagram of a channel :



Counter modules are set up using PL7 Junior/Pro software (see page 43100/2). This requires the use of TSX P/PCX 57●●2/3M processors.

(1) The enable input and output 2 cannot be used simultaneously.

Premium automation platform

TSX CTY 2C measurement and counter module

Characteristics

References :
page 43541/5

Electrical characteristics

Type of module		TSX CTY 2C
Modularity		2 channels
Frequency on counter inputs		Counting : 1 MHz. With phase-shifted signal encoder : multiplication by 1 : 500 kHz, multiplication by 4 : 250 kHz.
Consumption	mA	See page 43605/2
Dissipated power	W	7 typical (10 max)
Sensor power supply check		Yes
Module cycle time	ms	1 (for 2 channels)
Event processing response time	ms	Acceptance of event-triggered input (enable/read/preset) and positioning of : - a reflex output : 1 ms - discrete output modules TSX DSY 8T22 : 2.1 ms ; TSX DSY 32T2K : 3.2 ms

Input characteristics

Type of input			Counter inputs (IA/IB/IZ or SSI absolute encoder)	(IA/IB/IZ)	Auxiliary inputs (preset, enable, read)
Nominal values	Voltage	V	5	24	24
	Current	mA	18	16	8
Limit values	Voltage	V	≤ 5.5	19...30 (up to 34 V possible, limited to 1 hr per 24 hr period)	19...30 (up to 34 V possible, limited to 1 hr per 24 hr period)
	At state 1 Voltage	V	≥ 2.4	≥ 11	≥ 11
	Current	mA	> 3.6 (for U = 2.4 V)	> 6 (for U = 11 V)	> 6 (for U = 11 V)
	At state 0 Voltage	V	≤ 1.2	≤ 5	≤ 5
	Current	mA	< 1 (for U = 1.2 V)	< 2 (for U = 5 V)	< 2 (for U = 5 V)
Logic			Positive	Positive	Positive
Sensor voltage check response time					
	At loss of 24 V	ms	–	–	< 2.5
	At return of 24 V	ms	–	–	< 10
Input impedance for nominal U		Ω	400	1500	3400
Input impedance for U = 2.4 V (RS 422 compatibility)		Ω	> 270	–	–
Response time		μs	–	–	< 50
Type of input			Resistive	Resistive	Current sink
IEC 1131 conformity			–	Type 2	Type 2
Proximity sensor compatibility			–	2-wire/3-wire	2-wire/3-wire

Output characteristics

Type of output		Auxiliary outputs (2 per channel)
Nominal voltage	V	± 24
Voltage limits	V	19...30 (up to 34 V possible, limited to 1 hour per 24 hour period)
Nominal current	mA	500
Maximum voltage drop when ON	V	< 0.5
Leakage current	mA	< 0.1
Switching time	μs	< 250
Electrostatic discharge time	s	L/R
Switching frequency on inductive load	Hz	$F < 0.6 / (LI^2)$
Compatibility with d.c. inputs		All positive logic inputs with input resistance < 15 kΩ
IEC 1131-2 compatibility		Yes
Protection against overloads and short-circuits		Current limiter and thermal tripping (reactivation via program or automatically)
Protection against channel overvoltages		Zener diode between outputs and + 24 V
Protection against polarity inversions		Diode reverse-mounted on supply

Premium automation platform

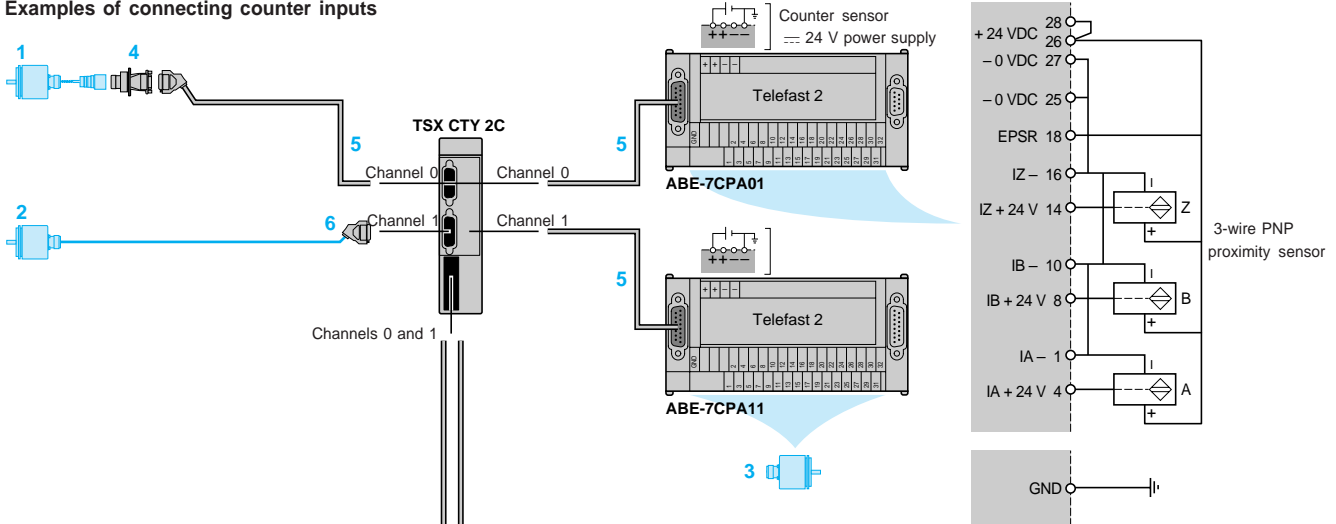
TSX CTY 2C measurement and counter module

Connections, dimensions

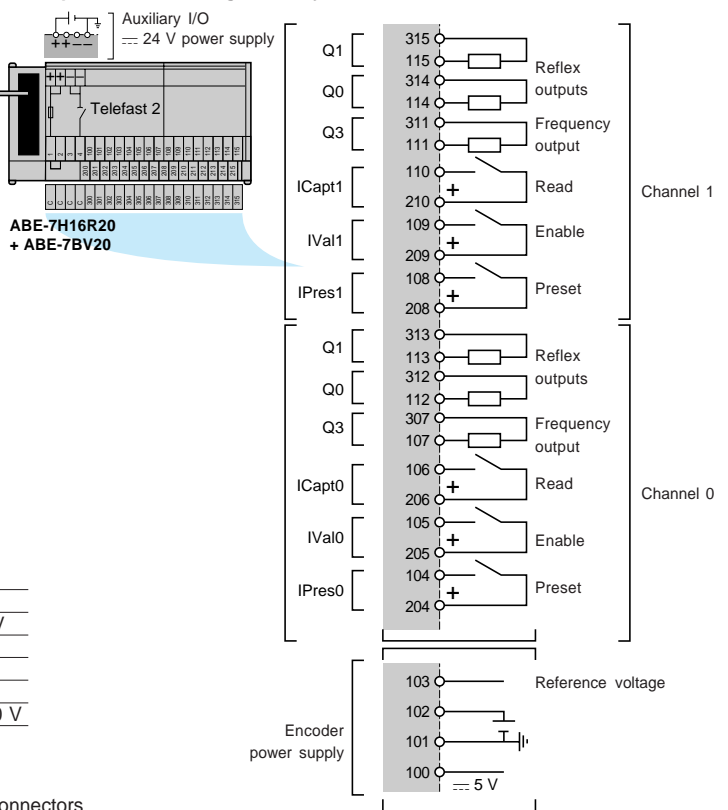
Characteristics :
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References :
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Connections

Examples of connecting counter inputs



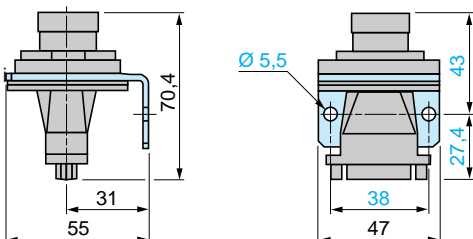
Examples of connecting auxiliary I/O



- 1 Incremental encoder
 - 2 SSI serial absolute encoder fitted with its cable
 - 3 Parallel output absolute encoder
 - 4 TSX TAP S15 05/24 connector
- | TSX TAP S15 05 | | | TSX TAP S15 24 | | |
|----------------|------------|------------|----------------|-----------|----------------|
| 1 | IB - | 7 NC | 1 | NC | 7 NC |
| 2 | Power ret. | 8 IB + 5 V | 2 | NC | 8 IB + 24 V |
| 3 | IZ + 5V | 9 NC | 3 | IZ + 24 V | 9 NC |
| 4 | IZ - | 10 0 V | 4 | NC | 10 0 V |
| 5 | IA + 5 V | 11 NC | 5 | IA + 24 V | 11 NC |
| 6 | IA - | 12 + 5 V | 6 | NC | 12 + 10...30 V |
- 5 TSX CCP S15 cable with connectors
 - 6 TSX CAP S15 connector
 - 7 TSX CDP cable with connectors
 - 8 TSX CDP rolled ribbon or preformed cable with connectors

Dimensions

TSX TAP S15 05/24



Mounting through enclosure (dust and damp proof)
- cut-out \varnothing 37
- maximum panel thickness 5 mm

Premium automation platform

TSX CTY 2C measurement and counter module

References

Characteristics :
page 43541/3

Measurement and counter module



TSX CTY 2C



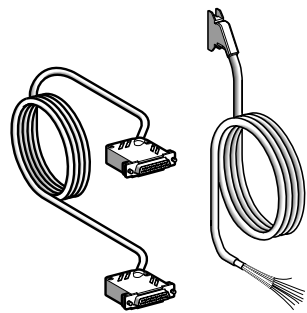
ABE-7CPA01



ABE-7H16R20



TSX TAP S15 ●●



TSX CCP S15 ●●●

TSX CDP ●01



TSX CDP ●02

TSX CDP ●03

Type of input	Characteristics	No. of chan.	Reference (1)	Weight kg	
2/3-wire prox. sensors PNP/NPN, \pm 24 V, Incremental encoders, \pm 5 V RS 422, \pm 10...30 V Totem Pole	Counting Cycle time 1 ms	2	TSX CTY 2C	0.340	
SSI serial or parallel output absolute encoders with ABE-7CPA11 sub-base	Cycle time 1 ms	2	TSX CTY 2C	0.340	
Connection accessories					
Description	For connecting	Connector type on TSX CTY 2C	Unit reference	Weight kg	
SUB-D connector (Sold in lots of 2)	Counter sensors or incremental encoder	SUB-D, 15-way	TSX CAP S15	0.050	
Telefast 2 connection sub-bases	Counter sensors and \pm 24 V power supply	SUB-D, 15-way	ABE-7CPA01	0.300	
	Auxiliary inputs, supply \pm 24 V and encoder supply \pm 5 V/10...30 V	HE 10, 20-way (for 2 channels)	ABE-7H16R20	0.300	
Additional terminal block	20 shunted terminals for ABE-7H16R20 sub-base	(Order in multiples of 5)	ABE-7BV20	0.030	
Adaptor sub-base for TSX CTY 2C module (2)	Parallel output absolute encoders \pm 5 V, \pm 10...30 V	SUB-D, 15-way	ABE-7CPA11	0.300	
Connection interfaces for incremental encoder	Encoder \pm 5 V RS 422	SUB-D, 15-way	TSX TAP S15 05	0.260	
	Encoder \pm 10...30 V Totem Pole	SUB-D, 15-way	TSX TAP S15 24	0.260	
Connecting cables					
Description	From TSX CTY 2C module	To	Length	Reference	Weight kg
Cables (cross-section 0.205 mm ²)	15-way, SUB-D connector	ABE-7CPA01/ ABE-CPA11 sub-bases or TSX TAP S15●● accessory (15-way, SUB-D connector)	0.5 m	TSX CCP S15 050	0.110
			1 m	TSX CCP S15 100	0.160
			2.5 m	TSX CCP S15	0.300
20-wire preformed cables (500 mA max)	Auxiliary inputs supply \pm 24 V and encoder supply \pm 5 V/10...30 V (20-way, HE 10 moulded connector)	Free end with flying leads	3 m	TSX CDP 301	0.400
			5 m	TSX CDP 501	0.660
			10 m	TSX CDP 1001	1.210
Rolled ribbon cables (100 mA max)	Auxiliary inputs supply \pm 24 V and encoder supply \pm 5 V/10...30 V (20-way, HE 10 connector)	ABE-7H16R20 Telefast 2 sub-base (20-way, HE 10 connector)	1 m	TSX CDP 102	0.090
			2 m	TSX CDP 202	0.170
			3 m	TSX CDP 302	0.250
Connecting cables (500 mA max)	Auxiliary inputs supply \pm 24 V and encoder supply \pm 5 V/10...30 V (20-way, HE 10 moulded connector)	ABE-7H16R20 Telefast 2 sub-base (20-way, HE 10 connector)	0.5 m	TSX CDP 053	0.085
			1 m	TSX CDP 103	0.150
			2 m	TSX CDP 203	0.280
			3 m	TSX CDP 303	0.410
			5 m	TSX CDP 503	0.670

(1) Product supplied with a bilingual Quick Reference Guide : English and French.

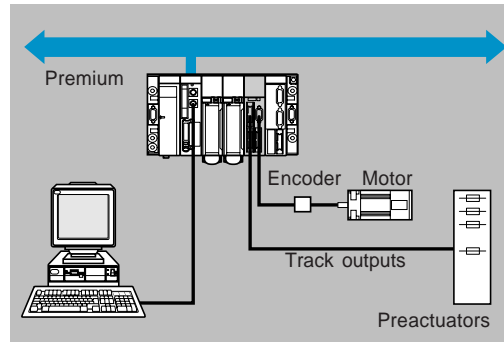
(2) Enables multiplexing of 2 absolute encoders on the same channel (up to 4 absolute encoders when using 2 ABE-7CPA11 adaptor sub-bases).

Premium automation platform

TSX CCY 1128 electronic cam module

Characteristics :
 page 43542/3
 References :
 page 43542/4
 Connections, dimensions:
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Description, operation



The TSX CCY 1128 module performs the “electronic cam” function for an animated axis of a rotary movement in a single direction, alternating, cyclical (with periodic arrival of parts for processing) or endless (with random arrival of parts for processing). The axis is managed by an incremental or absolute encoder.

The TSX CCY 1128 electronic cam module manages, independently, up to 128 cams which may be spread over a maximum of 32 tracks to which 24 discrete physical outputs and 8 logic outputs may be assigned.

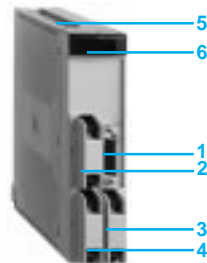
Processing is structured in 4 groups of 8 tracks each, with groups 0 and 1 associated with the module connector 0 and groups 2 and 3 with connector 1.

The TSX CCY 1128 module can be used for the following functions : elimination of axis backlash, position recalibration, capturing measurements (part length, number of points per revolution, angle of arrival of parts, slip, etc), anticipation of switching, parts counter, generating events.

Like all application-specific modules, the TSX CCY 1128 module can be installed in any slot of a Premium PLC, except those dedicated to the power supply and the processor.

Description

The front panel of the TSX CCY 1128 electronic cam module comprises :



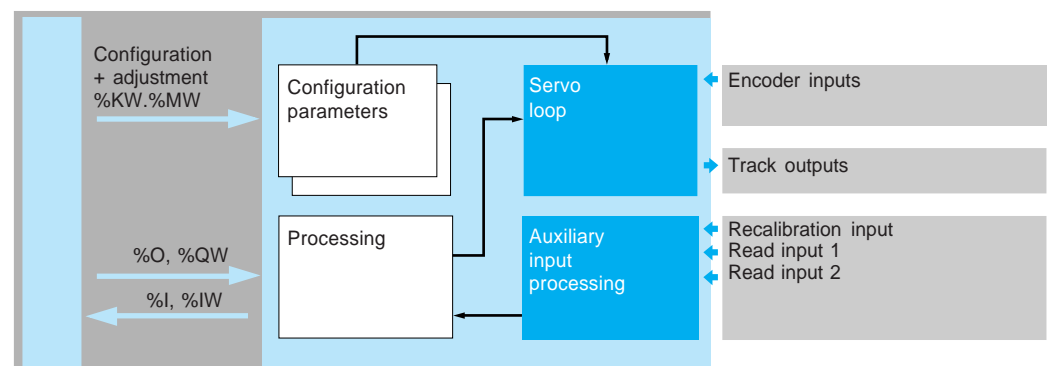
TSX CCY 1128

- 1 One 15-way SUB-D connector for connecting the incremental or absolute encoder
- 2 One 20-way HE 10 connector for connecting the track outputs on groups 0 and 1 (connector 0)
- 3 One 20-way HE 10 connector for connecting the track outputs on groups 2 and 3 (connector 1)
- 4 One 20-way HE 10 connector for connecting the auxiliary inputs and the encoder power supply
- 5 Rigid casing for the following functions :
 - Holding the electronic cards
 - Attaching and locking the module in its slot
- 6 Module diagnostic indicator lights :
 - Module diagnostics :
 - green RUN indicator lamp : module on
 - red ERR indicator lamp : internal fault, module defective
 - red I/O indicator lamp : external or application fault
 - Channel diagnostics :
 - green CH0 indicator lamps : channel diagnostics operative



Operation

Channel mimic diagram :



The electronic cam module is set up using PL7 Junior/Pro (version ≥ 3.4) and requires the use of processors with software version ≥ 3.3.

Premium automation platform

TSX CCY 1128 electronic cam module

Characteristics

References :
[page 43542/4](#)
[Connections, dimensions:](#)
[page 43542/5](#)

Operating characteristics

Number of cams	128 position, monostable, brake type
Number of tracks	32 (24 directly associated with the 24 physical outputs, 8 logic)
Position encoder inputs	Incremental with RS 422/485 line emitter or Totem Pole output Absolute with SSI serial link Absolute with parallel outputs (via ABE-7CPA11 adaptor sub-base)
Controlled outputs	24 discrete outputs 24 V, 0.5 A
Associated functions	Elimination of axis backlash, position recalibration, measurement capture, switching feedforward, parts counter, generation of events

Electrical characteristics

Modularity			1 axis
Max. frequency on encoder input			
SSI absolute encoder 8 to 25 bits	CLK transmission frequency	kHz	200
Incremental encoder	x 1	kHz	500
	x 4	kHz	250
Current drawn by the module (typical)	On internal 5 V with internal module fan during operation	mA	660
	On 24 V sensors/preactuators (auxiliary inputs and track outputs)	mA	15
	On 10...30 V (use of an SSI encoder and single 24 V power supply)	mA	11
Power dissipated in the module (typical)		W	7
Monitoring of sensor/preactuator power supplies			Yes
Output refresh cycle		µs	50 (up to 16 cams), 100 (up to 32 cams), 200 (up to 128 cams)

Input characteristics

Type of input			Encoder inputs (IA/IB/IZ)		Auxiliary inputs (recalibration, capture 0, capture 1)	
			with RS 422	with 10...30 V		
Logic			Differential inputs	Positive or negative	Positive	
Nominal values	Voltage	V	–	24	24	
	Current	mA	10	15.5	8	
	Sensor power supply	V	≤ 5.5	19...30 (possible up to 34 V limited to 1 hr in 24 hrs)		
Limit values	At state 1	Voltage	V	> 3	≥ 11	≥ 11
		Current	mA	> 5.8	> 5	> 3
	At state 0	Voltage	V	≤ - 3	< 5	< 5
		Current	mA	≤ - 5.8	< 2	< 1.5
Input impedance for nominal U		Ω	–	1500	3000	
Type of input			Resistive	Resistive	Resistive	
Response time		µs	–	–	< 100	
Conformity with IEC 1131		–	–	Type 1		
Compatibility w. 2-wire sensors		–	–	–	Yes (with 24 V)	
Compatibility w. 3-wire sensors		–	–	–	Yes (with 24 V)	

Output characteristics

Type of output			Track outputs	
Nominal values	Voltage	V	24	
	Current	mA	500	
	Voltage	V	19...30 (possible up to 34 V, limited to 1 hr in 24 hrs)	
Limit values	Max. current	Per output for U _{nom} = 30 or 34 V	mA	600
		Per connector	A	≤ 6
		Per module	A	≤ 12
Maximum power for tungsten filament lamp		W	10	
Switching frequency on an inductive load		Hz	< 0.6/LI ²	
Electro. discharge time		s	< L/R	
Preactuator voltage monitoring threshold	OK	V	> 18	
	Fault	V	< 14	
Compatibility with d.c. inputs			All positive logic inputs whose input resistance is < 15 kΩ	
Protection	against overloads and short-circuits		By current limiter and thermal circuit-breaker	
	against overvoltages on outputs		By Zener diode between the outputs and the + 24 V	
	against polarity inversions		By reverse diode on the power supply	
Conformity with IEC 1131-2			Yes	

Premium automation platform

TSX CCY 1128 electronic cam module

References

Characteristics :
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Connections, dimensions :
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Electronic cam module



TSX CCY 1128



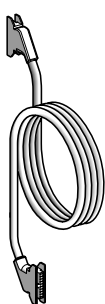
TSX TAP S15



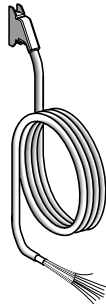
ABE-7CPA11



ABE-7H16R20



TSX CDP 003



TSX CDP 001



TSX CCP S15

Type of input	Characteristics	No. of axes	Reference (1)	Weight kg		
Incremental encoder Supplied with 5 V or 10...30 V, with RS 422/485, or 5 V Totem Pole (2) outputs	500 kHz counting w. incremental encoder	1	TSX CCY 1128	0.480		
Absolute encoder RS 485 serial or parallel (3)	Acquisition 200 kHz with serial absolute encoder					
Connection accessories						
Description	For connection of	Type of connectors on TSX CCY 1128	Ref. (4)	Unit reference	Weight kg	
SUB-D connector (sold in lots of 2)	SSI absolute/incremental encoder	15-way SUB-D	4	TSX CAP S15	0.050	
Connection interfaces for incremental encoder	5 V RS 422/RS 485 encoder	15-way SUB-D	6	TSX TAP S15 05	0.260	
	10...30 V Totem Pole encoder	15-way SUB-D	6	TSX TAP S15 24	0.260	
Telefast 2 connection sub-base	Auxiliary inputs, 5...24 V encoder power supply	20-way HE 10 (1 per module)	–	ABE-7H16R20	0.300	
	Track outputs	20-way HE 10 (1 for 2 groups)	–	ABE-7H16R20	0.300	
Adaptor sub-base	Absolute encoder with parallel outputs (16 to 24 bits) 5 V, 10...30 V	15-way SUB-D	–	ABE-7CPA11	0.300	
Connection cables						
Description	From	To	Ref. (4)	Length	Unit reference	Weight kg
Cables with connectors	TSX CCY 1128 module, 15-way SUB-D connector	TSX TAP S15 connector or ABE-7CPA11 adaptor sub-base (15-way SUB-D connector)	5	0.5 m	TSX CCP S15 050	0.110
				1 m	TSX CCP S15 100	0.160
				2.5 m	TSX CCP S15	0.220
Connection cables (500 mA max.)	TSX CCY 1128 module, 20-way insulated HE 10 connector	ABE-7H16R20 sub-base (20-way HE 10 connector)	7, 9	0.5	TSX CDP 053	0.085
				1	TSX CDP 103	0.150
				2	TSX CDP 203	0.280
				3	TSX CDP 303	0.410
				5	TSX CDP 503	0.670
Preformed cables with flying leads (500 mA max.)	TSX CCY 1128 module, 20-way insulated HE 10 connector	Auxiliary inputs, power supply signals (free end)	8	3	TSX CDP 301	0.400
				5	TSX CDP 501	0.660

- (1) Product supplied with a bilingual Quick Reference Guide : English and French.
 (2) Totem Pole encoder with complementary Push/Pull outputs.
 (3) Absolute encoders with parallel outputs with ABE-7CPA11 adaptor interface.
 (4) Diagram references (see page 43542/5).

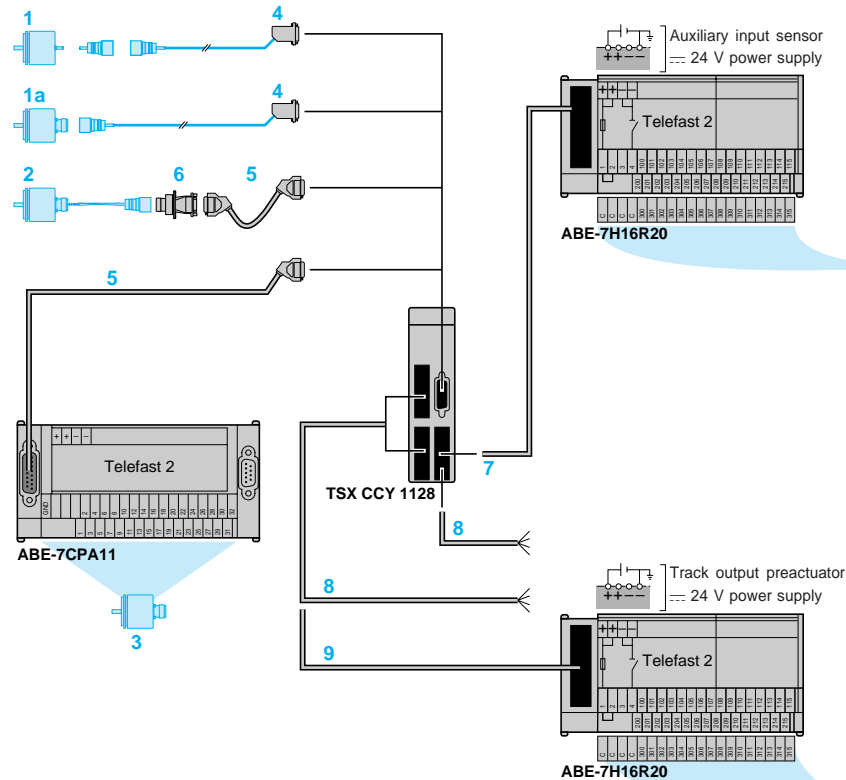
Premium automation platform

TSX CCY 1128 electronic cam module

Connections

Characteristics :
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References :
page 43542/4

Examples of encoder connections



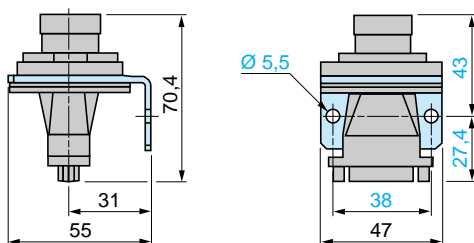
- 1 Incremental or absolute encoder
- 1a Incremental or absolute encoder with 12-way DIN connector output
- 2 5 V RS 422/485 Totem Pole incremental encoder
- 3 Absolute encoder with parallel outputs
- 4 TSX CAP S15 connector
- 5 TSX CCP S15 ●●● cable with connectors
- 6 TSX TAP S15 05/24 connector

TSX TAP S15 05				TSX TAP S15 24			
1 IB-	7 NC	1 NC	7 NC				
2 Sup. Ret.	8 IB + 5 V	2 NC	8 IB + 5 V				
3 IZ + 5 V	9 NC	3 IZ + 24 V	9 NC				
4 IZ -	10 0 V	4 NC	10 0 V				
5 IA + 5 V	11 NC	5 IA + 24 V	11 NC				
6 IA -	12 + 5 V	6 NC	12 + 10...30 V?				

- 7 TSX CDP ●●3 cable with connectors
- 8 TSX CDP ●01 preformed cable with flying leads
- 9 TSX CDP ●03 cable with connectors

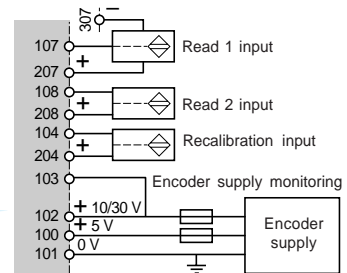
Dimensions

Connection interface for TSX TAP S15 05/24 incremental encoder

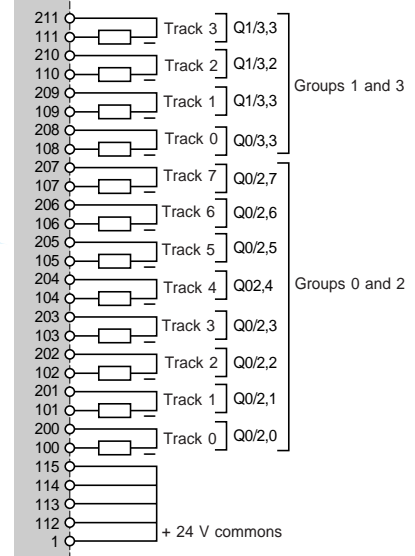


Enclosure feedthrough mounting (dust and damp proof)
- cut-out Ø 37
- maximum panel thickness 5 mm

Examples of auxiliary input connections



Example of track output preactuator connection

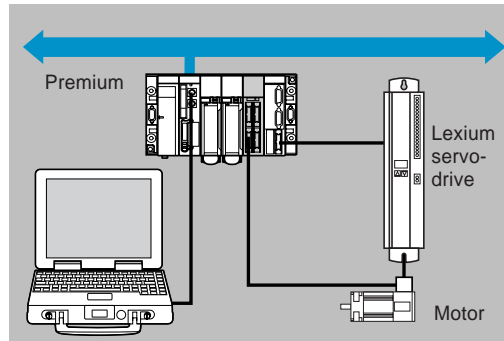


Premium automation platform

Characteristics :
 pages 43550/3 and 43550/4
 References :
 pages 43550/5 and 43550/6
 Connections :
 pages 43550/7 to 43550/10
 Dimensions :
 page 43550/11

TSX CAY motion control modules for servomotors

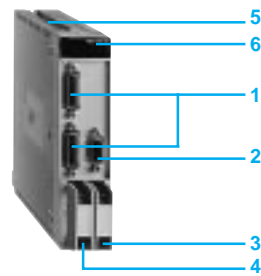
Description



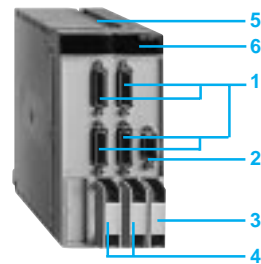
The TSX CAY ●● servo loop positioning axis control range is intended for machines which require simultaneous high-performance motion control together with sequential control by programmable controller.
 TSX CAY 21/22 modules control 2 individual axes (axes 0 and 1). The TSX CAY 41/42 modules control up to 4 axes (axes 0 to 3). The TSX CAY 33 module controls 3 interpolated linear axes. They can be used with servodrives with analog inputs ± 10 V such as Lexium 17D servodrives, reference MHDA 10●●N00.
 TSX CAY ●● modules can be installed, like all application-specific modules, in any position on a Premium PLC.

Description

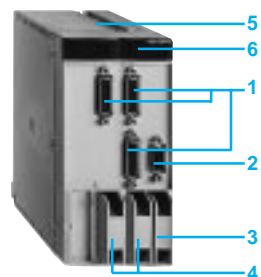
The front panel of TSX CAY ●● axis control modules comprises :



TSX CAY 21/22



TSX CAY 41/42



TSX CAY 33



- One 15-way SUB-D connector per axis for connecting an incremental or absolute encoder
- One 9-way SUB-D connector for all axes for connecting :
 - 1 "speed reference" analog output for each axis
- One 20-way HE 10 connector for all channels for connecting :
 - Auxiliary inputs for servodrive control
 - External power supply for servodrive I/O
- One 20-way HE 10 connector for 2 axes (0/1 or 2/3) for connecting :
 - Auxiliary inputs : homing cam, emergency stop, event, recalibration
 - Reflex outputs
 - External power supplies for sensors and preactuators
- Rigid casing which :
 - Holds the electronic card
 - Locates and locks the module in its slot
- Module diagnostic lamps :
 - Module diagnostics :
 - green RUN lamp : module operating
 - red ERR lamp : internal fault, module failure
 - red I/O lamp : external fault
 - Axis diagnostics :
 - green CH● lamps : axis diagnostics available

Premium automation platform

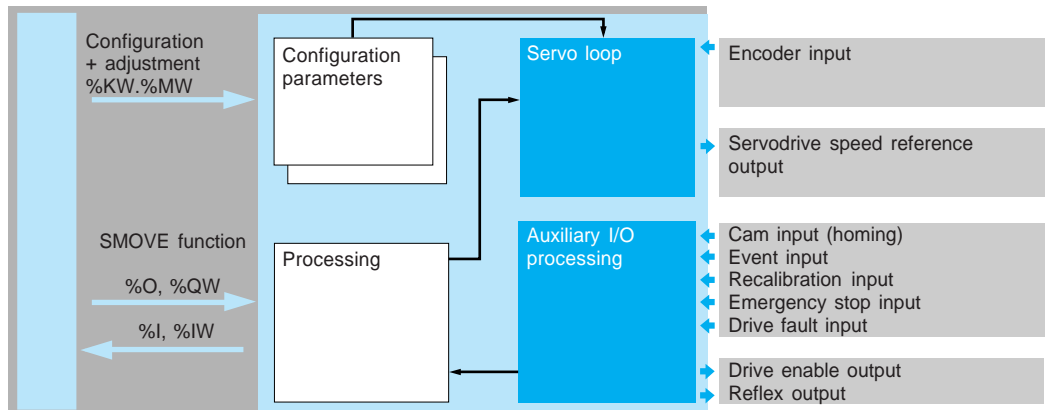
TSX CAY motion control modules for servomotors

References :
 pages 43550/5 and 43550/6
 Connections :
 pages 43550/7 to 43550/10
 Dimensions :
 page 43550/11

Operation, characteristics

Operation

Block diagram of an axis



Axis control modules are set up using PL7 Junior/Pro software (see page 43553/2).

Operating characteristics

Type of module		TSX CAY 21/22	TSX CAY 41/42	TSX CAY 33
Servo loop		Proportional with feedforward and gain switching		
		2 ms period	4 ms period	
Paths	Speed profile	Trapezoidal or parabolic		
Resolution	Minimum	0.5 position unit per point		
	Maximum	1000 position units per point		
Length of axis	Minimum	TSX CAY 21 : 32,000 points TSX CAY 22 : 256 points	TSX CAY 41 : 32,000 points TSX CAY 42 : 256 points	TSX CAY 33 : 256 points
	Maximum	32,000,000 points		
Speed	Minimum	54,000 points/min		
	Maximum	270,000 points/min		
Acceleration (from 0 to VMAX)	Minimum	s	10	
	Maximum	ms	8	16
Operating modes	OFF	Measurement mode, inhibition of servo loop The module operates in current speed and position acquisition mode		
	DIR DRIVE	Direct drive mode, inhibition of servo loop The module operates in analog output mode only		
	MAN	Motion controlled by operator - visual control of movement - incremental movement		
	AUTO	Movement sequence controlled by PLC program. Movements are described using a syntax similar to that of ISO language. Movements can be expressed in absolute or relative terms (either in relation to current position, or in relation to a home point). Operation is possible in "step by step" mode, by motion stop/start, by speed correction		
	FOLLOWER	The n axis of the module is governed by : - either the 0 axis of the same module - or a command profile transmitted by the application program		
Checks	Environment	Encoder link, drive present, emergency stop		
	Motion	Check correct execution of movements (following error, in-position band, software position limits)		
	Commands	Check consistency of commands		
	Parameters	Check validity of parameters		

Functions

Type of module		TSX CAY 21	TSX CAY 22	TSX CAY 41	TSX CAY 42	TSX CAY 33
Linear interpolation, 2/3 axes		-	-	-	-	Yes
Limited axes		Yes	Yes	Yes	Yes	Yes
Infinite axes		-	Yes	-	Yes	Yes
Follower axes	Static ratio	Yes	-	Yes	-	-
	Dynamic ratio	-	Yes	-	Yes	-
Correction of servodrive offset		-	Yes	-	Yes	Yes

Premium automation platform

TSX CAY motion control modules for servomotors

References :
pages 43550/5 and 43550/6
Connections :
pages 43550/7 to 43550/10
Dimensions :
page 43550/11

Characteristics (continued)

Electrical characteristics

Type of module		TSX CAY 21	TSX CAY 22	TSX CAY 41	TSX CAY 42	TSX CAY 33
Modularity		2 axes	2 axes	4 axes	4 axes	3 axes
Maximum frequency at counter inputs						
SSI absolute encoder		16 to 25 bits	12 to 25 bits	16 to 25 bits	12 to 25 bits	12 to 25 bits
CLK transmission frequency	kHz	200				
Incremental encoder x 1	kHz	500				
x 4	kHz	250 kHz as input or 1 MHz as counter				
Consumption		--- 5 V - 1100 mA --- 24 V - 15 mA		--- 5 V - 1500 mA --- 24 V - 30 mA		--- 5 V - 1500 mA --- 24 V - 30 mA
Current drawn by the module on the 10/30 V encoder at 24 V (24 V absolute encoder) Typical	mA	11 (20 max)		22 (40 max)		
Power dissipated in the module Typical	W	7.2 (11.5 max)		10 (17 max)		
Sensor power supply check		Yes		Yes		

Input characteristics

Type of input		Counter inputs --- 5 V (IA/IB/IZ)	Servodrive check inputs (1 per axis)	Auxiliary inputs (homing, event, recalibration, emergency stop)
Logic		Positive	Positive	Positive
Nominal values				
Voltage	V	5	24	24
Current	mA	18	8	8
Limit values				
Voltage	V	≤ 5.5	19...30 (up to 34 V possible, limited to 1 hr per 24 hr period)	19...30 (up to 34 V possible, limited to 1 hr per 24 hr period)
At state 1 Voltage	V	≥ 2.4	≥ 11 (OK state)	≥ 11
Current	mA	> 3.7 (for U = 2.4 V)	> 3.5 (for U = 11 V)	> 6 (for U = 11 V)
At state 0 Voltage	V	≤ 1.2	≤ 5 (fault state)	≤ 5
Current	mA	< 1 (for U = 1.2 V)	< 1.5 (for U = 5 V)	< 2 (for U = 5 V)
Voltage/encoder feedback check		Presence check	–	–
Input impedance for nominal U	Ω	270	3000	3000
Type of inputs		Resistive	Resistive	Current sink
IEC 1131 conformity		–	Type 1	Type 2
2-wire proximity sensor compatibility		–	–	Yes (all prox. sens. 24 V)
3-wire proximity sensor compatibility		–	–	Yes (all prox. sens. 24 V)

Output characteristics

Type of output		Analog outputs (1 per axis)	Drive enable (1 relay output per axis)	Reflex outputs (1 per axis)
Range	V	± 10.24	–	–
Resolution		13 bits + sign	–	–
Value of LSB	mV	1.25	–	–
Nominal voltage	V	–	--- 24	--- 24
Voltage limit	V	–	5...30	19...30 (up to 34 V possible, limited to 1 hr per 24 hr period)
Current	mA	–	–	500 nominal
Maximum current	mA	1.5	200 (resistive load at 30 V)	625 (for U = 30 or 34 V)
Minimum permitted load		–	1 V/1 mA	–
Maximum voltage drop when ON	V	–	–	< 1
Leakage current	mA	–	–	< 0.3
Switching time		–	< 5 ms	< 500 μs
Compatibility with d.c. inputs		–	–	All positive logic inputs with input resistance < 15 kΩ
IEC 1131 conformity		–	–	Yes
Protection against overloads and short-circuits		–	–	Current limiter and thermal tripping
Protection against channel overvoltage		–	–	Zener diode between outputs and + 24 V supply
Protection against polarity inversions		–	–	Reverse-mounted diode on supply

Premium automation platform

TSX CAY motion control modules for servomotors

Characteristics :
pages 43550/3 and 43550/4
Connections :
pages 43550/7 to 43550/10
Dimensions :
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References

Motion control modules for servomotors



TSX CAY 2●

TSX CAY 4●



TSX CAY 33



TSX TAP S15



TSX TAP MAS



ABE-7CPA01



ABE-7H16R20

Type of input	Characteristics	Functions	No. of axes (1)	Reference (2)	Weight kg
Incremental encoders --- 5 V RS 422 --- 10...30 V Totem Pole (3)	500 kHz counter with incremental encoder Acquisition	Servo control on independent linear axis	2	TSX CAY 21	0.480
			4	TSX CAY 41	0.610
Absolute encoders RS 485 serial or parallel (4)	200 kHz with serial absolute encoder	- Servo control on independent infinite axis - Follower axes - Realtime correction of servodrive offset	2	TSX CAY 22	0.480
			4	TSX CAY 42	0.610
		- Servo control on linear or infinite axis - Linear interpolation on 2 or 3 limited axes - Realtime correction of servodrive offset	3	TSX CAY 33	0.610

Connection accessories

Description	Connection	Type of connector on TSX CAY ●● module	No. (5)	Reference	Weight kg
SUB-D connectors (Sold in lots of 2)	Incremental/SSI absolute encoder	SUB-D, 15-way (1 per axis)	4	TSX CAP S15	0.050
	Speed references	SUB-D, 9-way (1 per TSX CAY module)	7	TSX CAP S9	0.050
Connection interface for incremental encoder	Incremental encoder --- 5V RS 422/RS 485	SUB-D, 15-way (1 per axis)	6	TSX TAP S15 05	0.260
Splitter block	Speed references to servodrives	SUB-D, 9-way (1 per TSX CAY module)	-	TSX TAP MAS	0.590
Telefast 2 connection sub-bases	Speed references	SUB-D, 9-way (1 per TSX CAY module)	-	ABE-7CPA01	0.300
	Auxiliary inputs, reflex outputs, I/O power supply --- 24 V encoder power supplies --- 5/24 V	HE 10, 20-way (1 for 2 axes)	-	ABE-7H16R20	0.300
	Control signals, servodrive I/O power supply --- 24 V	HE 10, 20-way (1 per TSX CAY module)	-	ABE-7H16R20	0.300
Adaptor sub-base	Parallel output absolute encoders (16 to 24 bits) --- 5 V, --- 10...30 V	SUB-D, 15-way	-	ABE-7CPA11	0.300

(1) TSX CAY 41/42/43 modules, double format.

(2) Product supplied with a bilingual Quick Reference Guide : English and French.

(3) Totem Pole encoder with complementary Push/Pull outputs.

(4) Parallel output absolute encoders with ABE-7CPA11 adaptor interface.

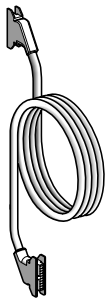
(5) See pages 43550/7 to 43550/10 for key.

Premium automation platform

TSX CAY motion control modules for servomotors

Characteristics :
pages 43550/3 and 43550/4
Connections :
pages 43550/7 to 43550/10
Dimensions :
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References (continued)



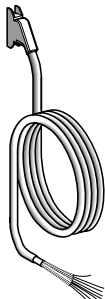
TSX CDP 003

Connecting cables						
Description	From	To	No. (1)	Length	Reference	Weight kg
Cables with connector	TSX CAY ●● module, 15-way SUB-D connector	TSX TAP S15 05 interface, or ABE-7CPA11 adaptor sub-base (15-way SUB-D connector)	5	0.5 m	TSX CCP S15 050	0.110
				1 m	TSX CCP S15 100	0.160
				2.5 m	TSX CCP S15	0.220
	TSX CAY ●● module, 9-way SUB-D connector (speed reference)	ABE-7CPA01 sub-base or TSX TAP MAS block (15-way SUB-D connector)	8	2.5 m	TSX CXP 213	0.270
				6 m	TSX CXP 613	0.580

Preformed cables (cross-section 0.205 mm ²)	TSX CAY ●● module, or TSX TAP MAS block (2)	Speed reference on Lexium MHDA servodrive and other speed drives (free end on drive side)	9	6 m	TSX CDP 611	0.790
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Connecting cables (500 mA max)	TSX CAY ●● module, (HE 10 20-way moulded connector)	ABE-7H16R20 sub-base (20-way HE 10 connector)	10	0.5 m	TSX CDP 053	0.085
				1 m	TSX CDP 103	0.150
				2 m	TSX CDP 203	0.280
				3 m	TSX CDP 303	0.410
				5 m	TSX CDP 503	0.670

Preformed cables 20-wire (500 mA max)	TSX CAY ●● module, (HE 10 20-way moulded connector)	Auxiliary inputs, reflex output, control signals, power supplies (free end)	11	3 m	TSX CDP 301	0.400
				5 m	TSX CDP 501	0.660



TSX CDP 001

Connecting cables for Lexium MHDA servodrive						
Description	From	To	No. (1)	Length	Reference	Weight kg
Cables fitted with connectors for Lexium MHDA servodrive	TSX CAY ●● module, 15-way SUB-D connector (encoder input)	Simulated incremental encoder feedback (9-way SUB-D connector)	12	2 m	TSX CXP 235	0.210
				6 m	TSX CXP 635	0.470
		Simulated absolute encoder feedback (9-way SUB-D connector)	13	2 m	TSX CXP 245	0.210
				6 m	TSX CXP 645	0.470

Connection accessories for servodrives						
Description	From	To	No. (1)	Cable length	Reference	Weight kg
Cables fitted with connectors NUM MDLA speed drive (2)	TSX CAY ●● module, 15-way SUB-D connector (encoder input)	NUM MDLA modular speed drive (15-way, high density, SUB-D connector)	14	2.5 m	TSX CXP 233	0.220
				6 m	TSX CXP 633	0.470
		TSX TAP MAS block, (9-way SUB-D connector)	Speed reference on NUM MDLA modular speed drive (25-way SUB-D connector)	15	2.5 m	TSX CXP 223
Block	Block	Speed reference	15	2.5 m	TSX CXP 223	0.340

Cables fitted with splitter block for ATV-58F speed drive	TSX CAY ●● module	Speed reference for Altivar 58 ATV-58F asynchronous motors	16	1 m	VY1-X411CA15	0.400
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(1) See pages 43550/7 to 43550/10 for key.
(2) See page A0000/3.

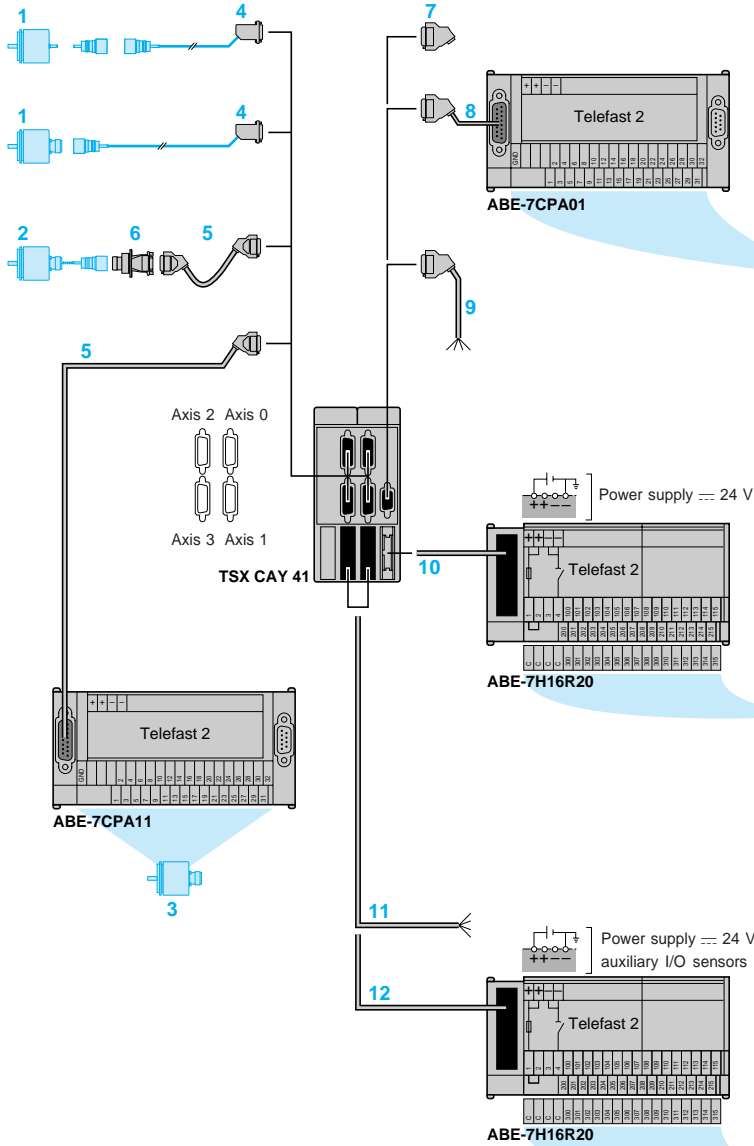
Premium automation platform

TSX CAY motion control modules for servomotors

Characteristics :
 pages 43550/3 and 43550/4
 References :
 pages 43550/5 and 43550/6
 Dimensions :
 page 43550/11

Connections

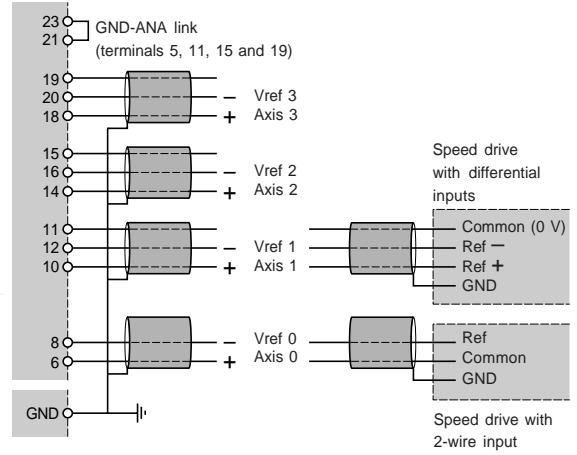
Examples of encoder connections



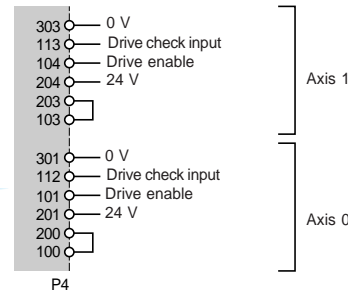
- 1 Incremental or absolute encoder
- 2 5 V RS 422 incremental encoder
- 3 Parallel output absolute encoder
- 4 TSX CAP S15 connector
- 5 TSX CCP S15 ●●● cable with connectors
- 6 TSX TAP S15 05 connector

1 IB-	7 NC
2 Sup. Ret.	8 IB + 5 V
3 IZ + 5 V	9 NC
4 IZ -	10 0 V
5 IA + 5 V	11 NC
6 IA -	12 + 5 V
- 7 TSX CAP S9 connector
- 8 TSX CXP 213/613 cable with connector
- 9 TSX CDP 611 preformed cable with connector
- 10 TSX CDP ●●3 cable with connector
- 11 TSX CDP ●01 preformed cable with connector
- 12 TSX CDP ●●3 cable with connector

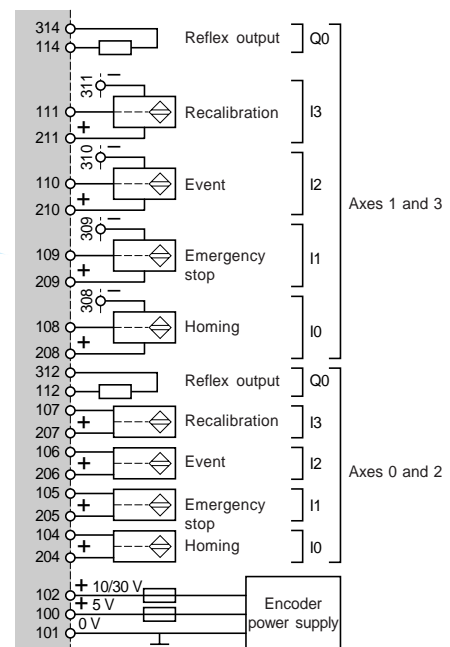
Examples of speed reference signal connections



Example of speed drive connection (auxiliary I/O)



Example of auxiliary I/O connection



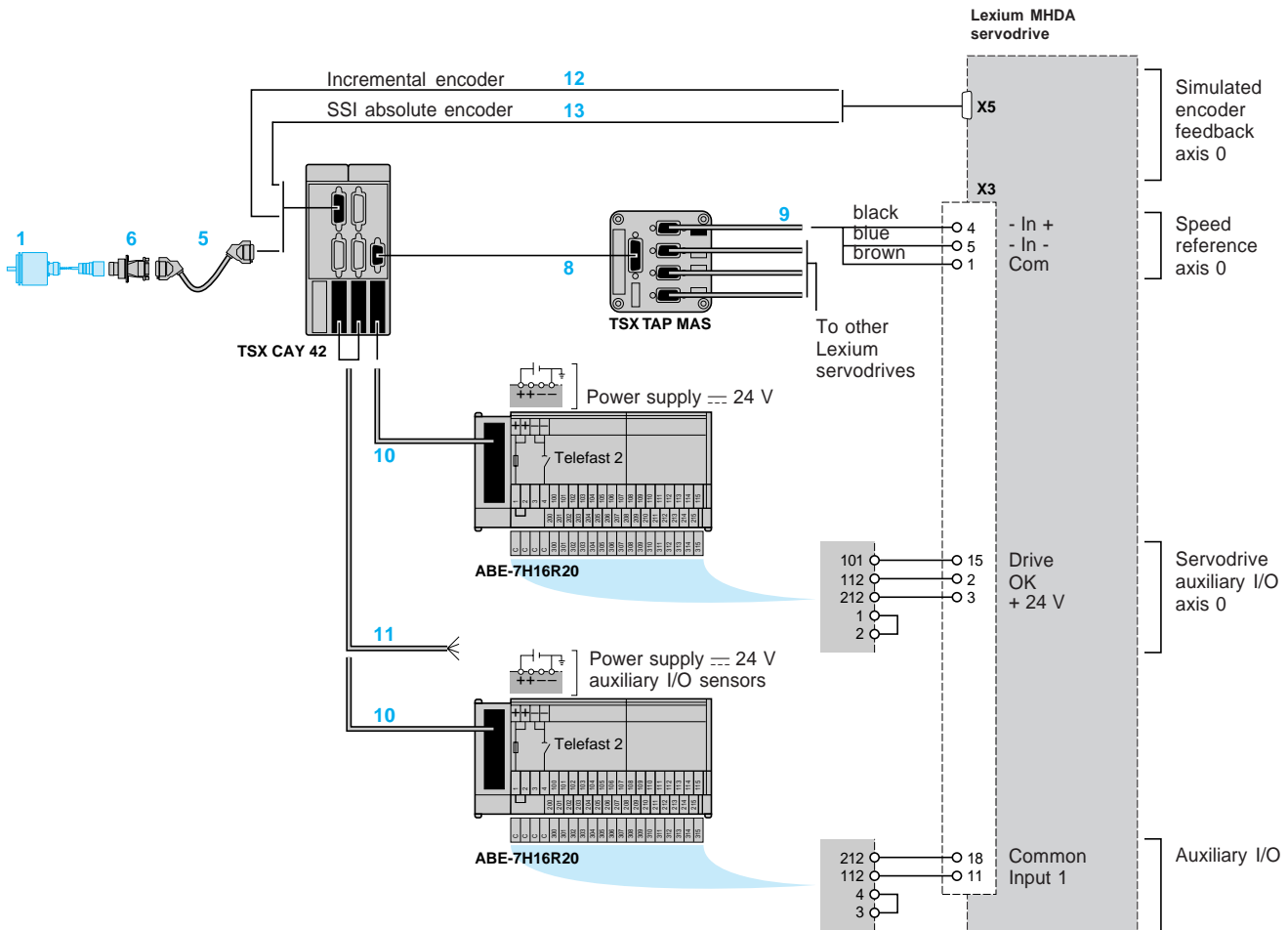
Premium automation platform

TSX CAY motion control modules for servomotors

Characteristics :
pages 43550/3 and 43550/4
References :
pages 43550/5 and 43550/6
Dimensions :
page 43550/11

Connections (continued)

Connection example for Lexium MHDA servodrives



- 1 Incremental or absolute encoder
- 5 TSX CCP S15 ●●● cable with connector (encoder feedback)
- 6 TSX TAP S15 05 connector
- 8 TSX CXP 213/613 cable with connector
- 9 TSX CDP 611 preformed cable with connector
- 10 TSX CDP ●●3 cable with connector
- 11 TSX CDP ●01 preformed cable with connector
- 12 TSX CXP 235/635 cable with connector (simulated incremental encoder feedback)
- 13 TSX CXP 245/645 cable with connector (simulated SSI absolute encoder feedback)

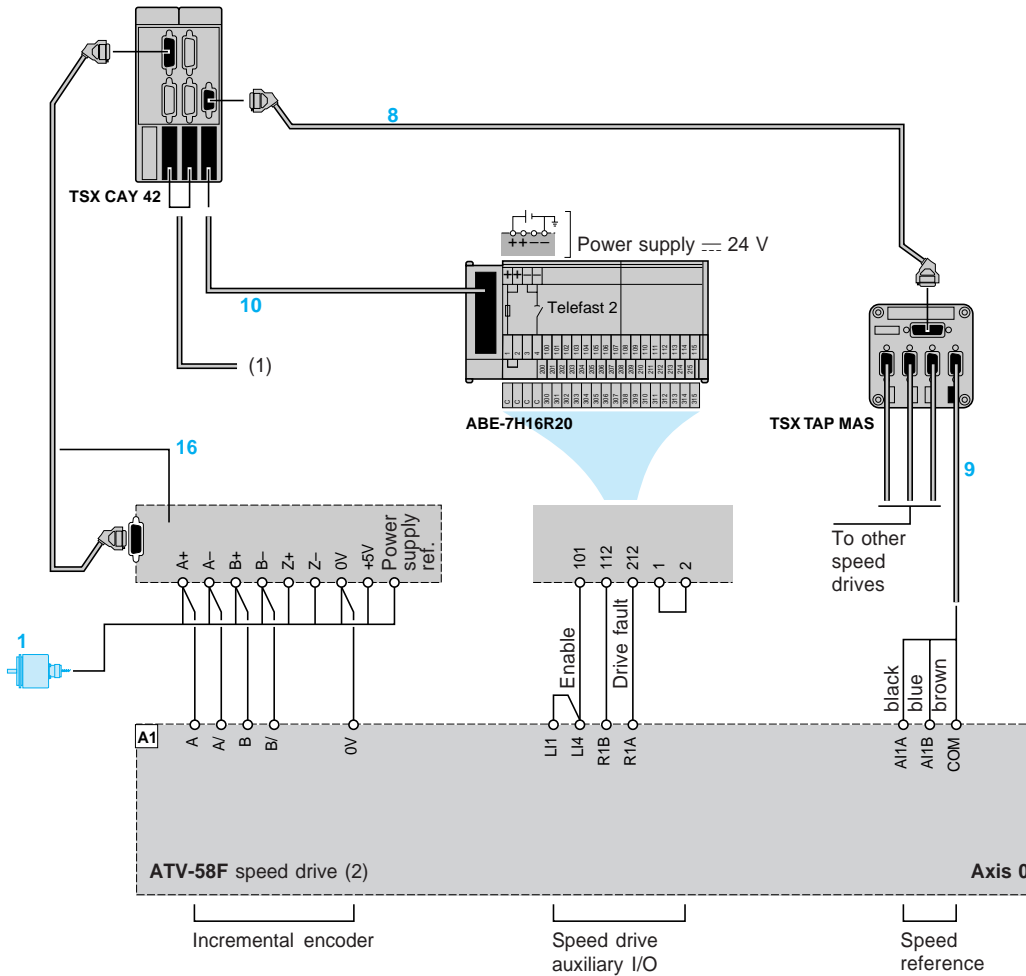
Premium automation platform

TSX CAY motion control modules for servomotors

Characteristics :
 pages 43550/3 and 43550/4
 References :
 pages 43550/5 and 43550/6
 Dimensions :
 page 43550/11

Connections (continued)

Connection example for Altivar ATV-58F speed drive (asynchronous motors)



- 1 Incremental encoder
- 8 TSX CXP 213/613 cable with connector
- 9 TSX CDP 611 preformed cable with connector
- 10 TSX CDP ●●3 cable with connector
- 16 VY1-X411CA15 cable with connector and adapter sub-base

(1) For auxiliary I/O connections (for example : emergency stop, homing, etc), see the connections on page 43550/7.

(2) The speed drive must be programmed as "Macro configuration General use". For other ATV-58F speed drive connections, please see our specialist catalog.

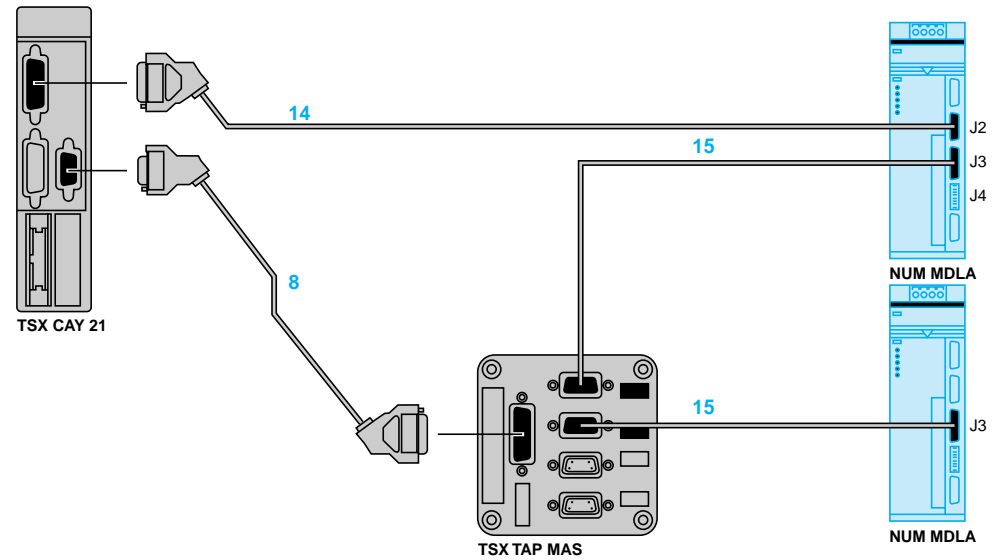
Premium automation platform

TSX CAY motion control modules for servomotors

Connections (continued)

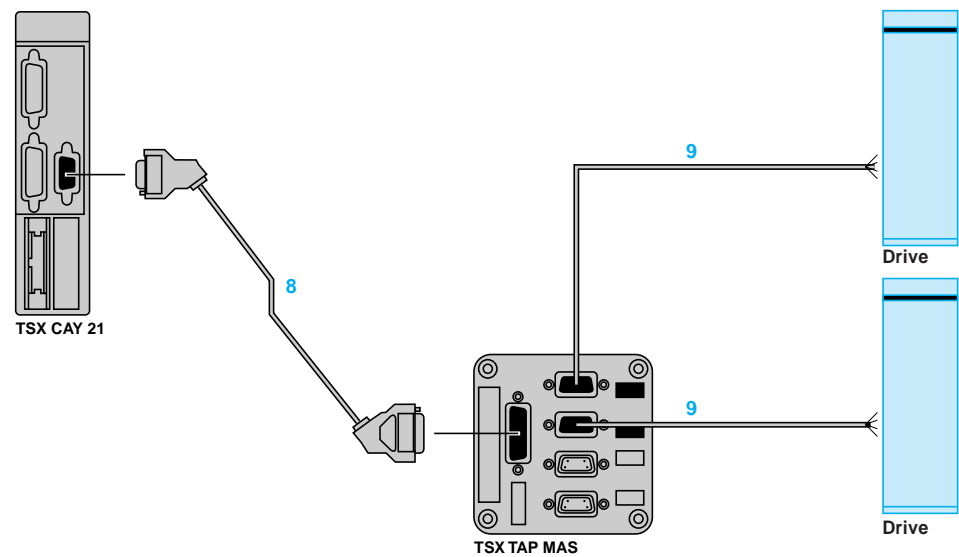
Characteristics :
pages 43550/3 and 43550/4
References :
pages 43550/5 and 43550/6

Connection example for NUM MDLA modular speed drives



- 8 TSX CXP 213/613 cable with connector
- 14 TSX CXP 233/633 cable with connector
- 15 TSX CXP 223 cable with connector

Connection example for distribution of speed references for speed drives



- 8 TSX CXP 213/613 cable with connector
- 9 TSX CDP 611 preformed cable with connector

Premium automation platform

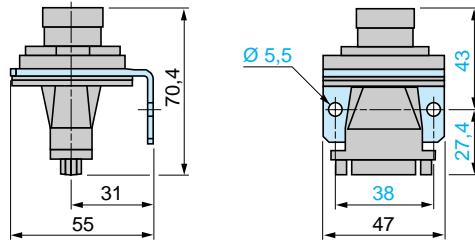
TSX CAY motion control modules for servomotors

Dimensions

Characteristics :
pages 43550/3 and 43550/4
References :
pages 43550/5 and 43550/6

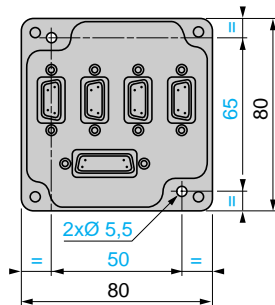
Dimensions

TSX TAP S15 05 connection interface for incremental encoder



Mounting in enclosure feedthrough (dust and damp proof)
- Ø 37 cut-out
- panel thickness 5 mm maximum

TSX TAP MAS speed reference splitter block for speed drives



Mounting on DIN rail with LA9-DC9976 accessory

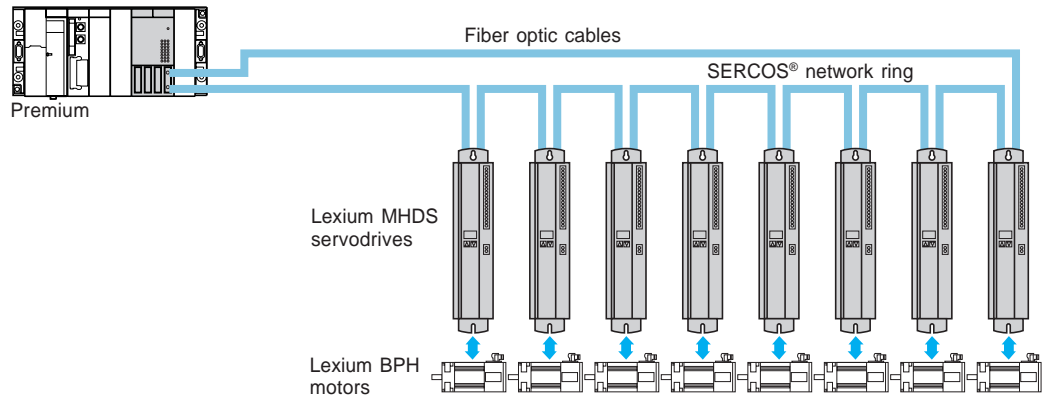
Premium automation platform

SERCOS® TSX CSY 84 Premium motion control module

SERCOS® architecture, block diagrams

Characteristics :
[page 43555/4](#)
 References :
[page 43555/5](#)
 Connections :
[page 43555/5](#)

SERCOS® architecture



SERCOS® (SERial COMmunication System) is a communication standard which defines the digital link (exchange protocol and medium) between a motion control module and intelligent servodrives. It is defined in the European standard EN 61491.

Using the SERCOS® distributed architecture allows application I/O (position encoder, emergency stop etc.) to be connected directly to the intelligent servodrives, reducing the cost of connection. The fiber optic digital link permits high speed exchanges (2 or 4 Mbauds/s) while ensuring a high level of immunity in disturbed industrial environments.

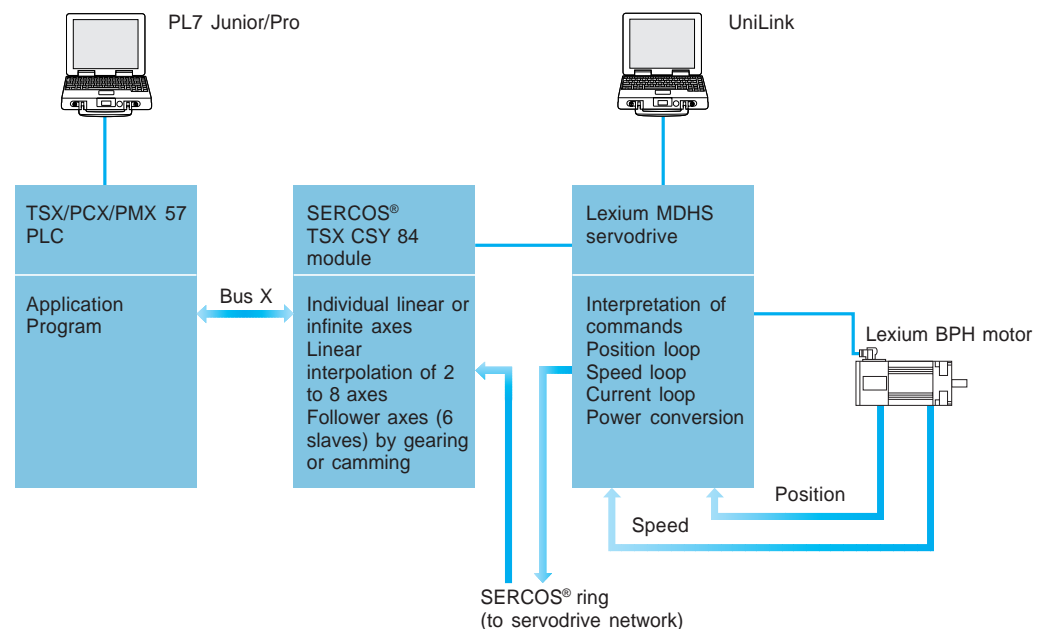
The SERCOS® range in the Premium control system platform comprises :

- An axis control module TSX CSY 84 which can control up to 8 servodrives via a SERCOS® ring. The module calculates the path and interpolation for several axes.
- Lexium servodrives 1.5 A to 20 A with digital link. These manage the position loop, the speed loop and the torque loop and ensure the power conversion to control the motor. The encoder feedback information is sent to the servodrive (current position, current speed).
- BPH brushless axis motors. Samarium cobalt magnets enable greatly increased power, excellent dynamic speed response and reduced size.

The SERCOS® range offers all the accessories required (filter choke, braking resistor, etc) and a set of connectors.

Block diagrams

The block diagrams show the functions performed by the various components which comprise the multi-axis control system.



Premium automation platform

SERCOS® TSX CSY 84 Premium motion control module

Characteristics :
page 43555/4
References :
page 43555/5
Connections :
page 43555/5

Block diagram (continued), description

Block diagram (continued)

PL7 Junior/Pro software via the Premium platform terminal port can :

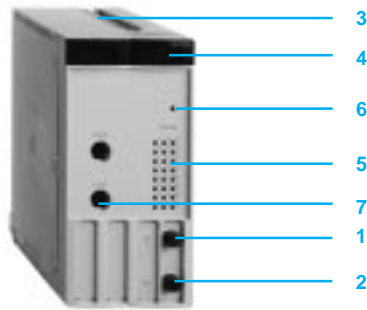
- Declare TSX CSY 84 SERCOS® module in the PLC configuration
- Configure the functions and define the parameters for the axes used
- Program the movements in the PLC application
- Adjust the parameters via the operating codes (parameters, TSX CSY 84 module and Lexium MHDS servodrives)
- Test and debug the application

UniLink software, via the Lexium MHDS servodrive PC port, can :

- Define the Lexium MHDS servodrive and Lexium motor
- Adjust the Lexium MHDS servodrive parameters and back them up to EEPROM memory in the drive

Description

The SERCOS® TSX CSY 84 axis control module comprises :



- 1 An SMA type connector, marked Tx, for connecting the servodrives using the SERCOS® ring fiber optic transmission cable
- 2 An SMA type connector, marked Rx, for connecting the servodrives using the SERCOS® ring fiber optic reception cable
- 3 Rigid cases, double format, in order to :
 - Support the electronic card
 - Attach and lock the module in its slot
- 4 Module diagnostic lamps :
 - RUN lamp (green) : lit, module operating correctly
 - SER lamp (yellow) : flashing, data transmission and reception on the SERCOS® network
 - ERR lamp (red) :
 - lit, internal module fault,
 - flashing, module starting, communication fault, incompatible configuration or application missing
 - I/O lamp (red) : lit, module wiring fault
 - INI lamp (yellow) : flashing, module reinitializing
- 5 Channel diagnostic lamps (green) : lit, axis operating normally; off, configuration fault; flashing, serious error on axis :
 - 1 to 8 : display of 8 real axes
 - 9 to 12 : display of 4 imaginary axes
 - 13 to 16 : display of 4 remote axes
 - 17 to 20 : display of 4 coordinated sets
 - 21 to 24 : display of 4 follower sets
- 6 A pencil point button to initialize the module
- 7 Two mini DIN type 8-way connectors (COM1 and COM2) for Schneider Electric use

Premium automation platform

SERCOS® TSX CSY 84 Premium motion control module

Characteristics

References :
page 43555/5
Connections :
page 43555/5

TSX CSY 84 module operating characteristics

Number of channels		32 configurable (0 to 31) channel 0 used for SERCOS® ring configuration
Type of axis		
Real axes (connected to a servodrive)		8 (channels 1 to 8)
Imaginary axes		4 (channels 9 to 12)
Set of axes		4 coordinated (channels 17 to 20). Each set allows linear interpolation of 2 to 8 axes 4 follower (channels 21 to 24). Each set can comprise a maximum of 7 axes : 1 Master/6 Slaves in gearing or camming
Cam profile		7 (channels 25 to 31). Used to create the electronic cams with linear or cubic interpolation between profile points
Remote axes		4 (channels 13 to 16). Follow the external position from an encoder connected to the auxiliary position input of the servodrive

Main functions

Programming		
Movements		Homing, absolute, relative or continuous Immediate movement, or queued, to a given position Speed override possible
Special functions		Following and synchronization of axes (phasing a Slave in relation to the Master) Measurement of dimensions by resolver or external encoder Rotary blade cut
Stops/restarts		Fast stop, stop on configured deceleration profile Temporary stop Restart of stopped movement
Configuration/Adjustment		
SERCOS® ring		Bus cycle time, traffic on the bus, optical power on the fiber, SERCOS® loop diagnostics
Acceleration/deceleration		Ramp values, ramp type (rectangular, triangular and trapezoid), choice of units, maximum acceleration adjustment
Speed		Speed units, default speed, maximum speed, speed override
Other settings		In-band position, rollover, software position limits
Set of follower axes		Following the master axis by gearing or camming (cam profile), threshold position of master triggers following, Bias value when synchronizing an axis, monitoring of Master/Slave position, master offset for follower axis
Set of coordinated axes		Type of interpolation : linear
Cam profile		Value of an existing point of a cam profile, number of points (5000 max.), type of interpolation, table addresses
State of a movement or axis		Moving, accelerating, decelerating, homing, in position, faulty, etc
Diagnostics		Drive fault, axis currently reading data, following error, overvoltage, undervoltage, overcurrent, power supply failure

Electrical characteristics of the TSX CSY 84 module

SERCOS® network		
Type		Industrial medium conforming to standard EN 61491
Topology		Ring
Medium		Fiber optic cable
Baud rate	M bauds/s	4
Cycle time	ms	2 or 4 per configuration
Number of segments		9 max with TSX CSY 84 module
Segment length	m	38 max with plastic fiber optic cable, 150 max with glass fiber optic cable
Bus X Distance	m	100 max (1) between TSX CSY 84 axis control module and the Premium processor
Consumption	mA	1800 at --- 5 V
Power dissipated in the module	W	9 (typical)

(1) Without the use of a TSX REY 200 Bus X remote module.

Premium automation platform

SERCOS® TSX CSY 84 Premium motion control module

References, connections

Characteristics :
page 43555/4



TSX CSY 84

References

The TSX CSY 84 multi-axis control module has 32 application-specific channels which are only counted when they are configured in the Premium application (using PL7 Junior/Pro software). The maximum number of application-specific channels allowed depends on the type of processor :

Type of processor	TSX P57 103M TSX P57 153M	TSX P57 203M TSX P57 253M T PCX 57 203M	TSX P57 303M TSX P57 353M T PCX P57 353M	TSX P57 453M
Maximum number of application-specific channels	8	24	32	64
Description	Functions	No. of axes	Reference	Weight kg

Multiaxis control module	Control of SERCOS® digital servodrives	8 real axes 4 imaginary axes	TSX CSY 84	0.520
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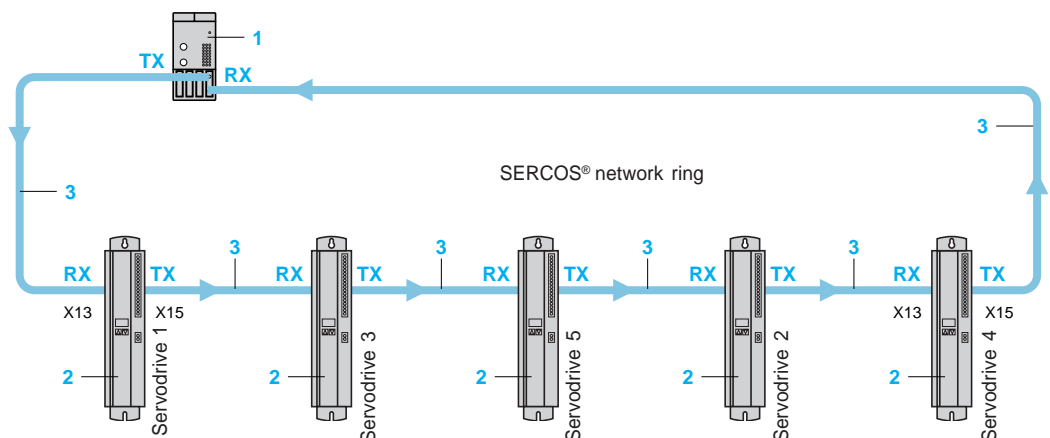
Connection accessories

Description	Connection	Length	Reference	Weight kg
Plastic fiber optic cables fitted with SMA type connectors (radius curvature : 25 mm min)	Lexium MHDS 10●●N00 servodrives	0.3 m	990 MCO 000 01	0.050
		0.9 m	990 MCO 000 03	0.180
		1.5 m	990 MCO 000 05	0.260
		4.5 m	990 MCO 000 15	0.770
		16.5 m	990 MCO 000 55	2.830
		22.5 m	990 MCO 000 75	4.070
		37.5 m	990 MCO 000 125	5.940

Sets of plastic fiber optic connections

Description	Composition	Reference	Weight kg
Set of fiber optic cables and SMA connectors	12 SMA type connectors 12 insulating sleeves plastic fiber optic cable, length 30 m	990 MCO KIT 01	–
Fiber optic cable installation tool	Tools for making up cables to required length from a kit (990 MCO KIT 01) Includes stripping tool, crimping pliers, 25 W soldering iron and Quick Reference Guide	990 MCO KIT 00	–

Connection



- 1 TSX CSY 84 : multi-axis control module for Premium
- 2 MHDS 10●●N00 : Lexium servodrives for Lexium BPH motor
- 3 990 MCO 000 ●● : plastic fiber optic cables fitted with SMA type connectors
- TX** Fiber optic transmission
- RX** Fiber optic reception

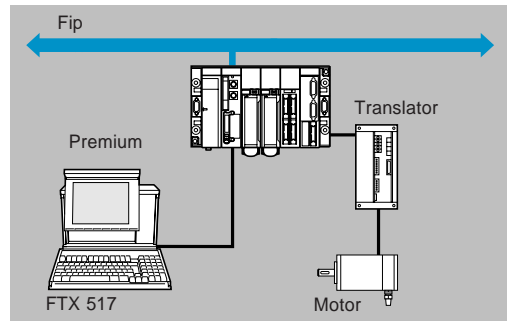
Premium automation platform

TSX CFY 11/21 motion control modules for stepper motors

Presentation, description, operation

Characteristics :
pages 43551/3 and 43551/4
References :
page 43551/5

Presentation



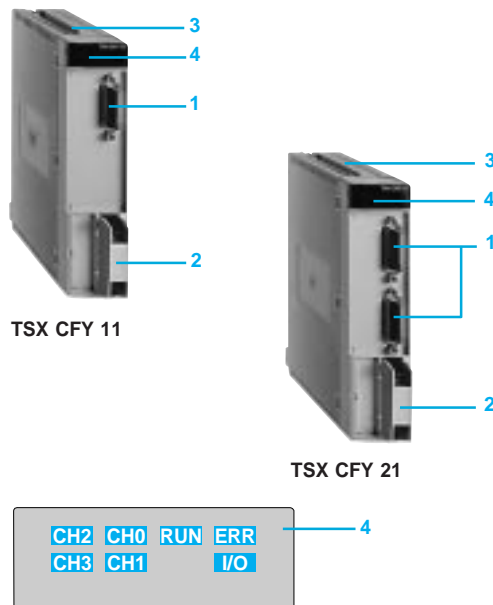
The TSX CFY 11/21 stepper motor axis control range is intended for machines which simultaneously require motion control by stepper motor associated with sequential control by programmable controller.

The TSX CFY 11 module controls, via a translator, 1 axis (channel 0). The TSX CFY 21 module controls 2 axes (channels 0 and 1). They accept translators with :

- RS 422 or TTL 5 V inputs (negative logic)
- RS 422 or $\bar{5}$ V NPN open collector output

In a Premium PLC configuration, the number of TSX CFY motion control modules should be added to the other application-specific modules (communication, counting, axis control and weighing). See pages 43511/8 and 43513/5.

Description

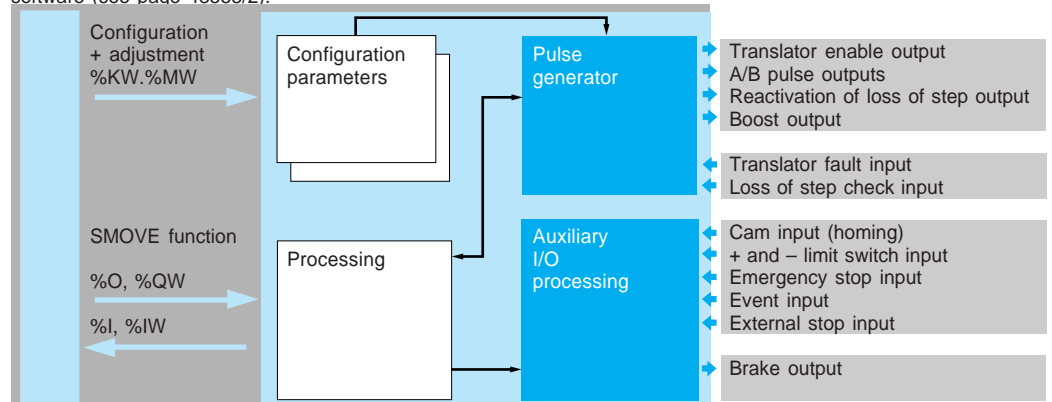


The front panel of TSX CFY 11/21 stepper control modules comprises :

- 1 One 15-way SUB-D connector per channel for connecting :
 - Translator inputs
 - Translator outputs
 - Translator input power supply
- 2 One 20-way HE10 connector for connecting :
 - Auxiliary inputs : per axis, homing cam, emergency stop, limit switches (+ and -), event, external stop
 - Brake outputs (1 per axis)
 - External power supplies for sensors and preactuators
- 3 Rigid casing which :
 - Holds the electronic card
 - Locates and locks the module in its slot
- 4 Module diagnostic lamps :
 - Module diagnostics :
 - green RUN lamp : module operating
 - red ERR lamp : internal fault, module failure
 - red I/O lamp : external fault
 - Axis diagnostics :
 - 2 green CH● lamp : axis diagnostics available

Operation block diagram

Operating characteristics are described on page 43551/4. Stepper control modules are set up using PL7 Junior/Pro software (see page 43553/2).



Premium automation platform

TSX CFY 11/21 motion control modules for stepper motors

Characteristics

References :
page 43551/5

Electrical characteristics

Type of module		TSX CFY 11	TSX CFY 21
Modularity		1 axis	2 axes
Maximum pulse frequency	kHz	187.316	187.316
Consumption	mA	\approx 5 V 510	\approx 5 V 650
		\approx 24 V 50	\approx 24 V 100
Power dissipated in the module	W	3.8	5.6
Sensor power supply check		Yes	Yes

Input characteristics

Inputs		Translator inputs	Auxiliary inputs
Logic		Negative	Positive
Nominal values	Voltage	V 5	24
	Current	mA 4.5	7
Limit values	Voltage	V –	19...30 (up to 34 V possible, limit 1 hr per 24 hr period)
	At state 1	Voltage V < 2	≥ 11
		Current mA –	> 6 (for U = 11 V)
	At state 0	Voltage V > 3.6	< 5
		Current mA –	< 2 (for U = 5 V)
Input impedance for nominal U	kΩ	–	3.4
Input immunity	μs	Loss of step input 15 to 30 μs	–
	μs	–	Homing cam and event inputs < 250 μs
	ms	Translator fault input 3 to 16 ms	Limit switch, emergency stop and external stop inputs 3 to 10 ms
Monitoring of external power supply for sensors and preactuators	Voltage for OK state	V –	> 18
	Voltage for fault state	V –	< 14
	Immunity OK → fault	ms –	> 1
	Immunity fault → OK	ms –	< 30
Type of input		Resistive	Current sink
IEC 1131 conformity		–	Type 2
Proximity sensor compatibility		–	2-wire/3-wire

Output characteristics

Outputs		Translator outputs	Brake outputs (1 per axis)
Type of output		RS 422, TTL 5 V open collector NPN compatible	Open collector, PNP
Output differential voltage	V	± 2 (load resistance ≤ 100 Ω)	–
Short-circuit current	mA	< 150	–
Permissible common mode voltage	V	≤ 7	–
Permissible differential voltage	V	≤ 12	–
Voltage	Nominal	V –	\approx 24
	Limit	V –	19...30 (up to 34 V possible, limit 1 hr per 24 hr period)
Current	Nominal	mA –	500
	Leakage	mA –	< 0.3
	Max	mA –	625 (for U = 30 or 34 V)
Maximum voltage drop when ON	V	–	\approx < 1
Switching time	μs	–	< 250
Compatibility with d.c. inputs		–	All positive logic inputs with input resistance < 15 kΩ
IEC 1131-2 conformity		–	Yes
Protection against overloads and short-circuits		–	Via current limiter and thermal tripping (reactivated via program or automatically)
Short-circuit check on each channel		–	One signalling bit per channel
Protection against channel overvoltages		–	Zener diode between outputs and \approx + 24 V
Protection against polarity inversions		–	By diode reverse-mounted on supply

Premium automation platform

TSX CFY 11/21 motion control modules for stepper motors

Characteristics (continued), connections

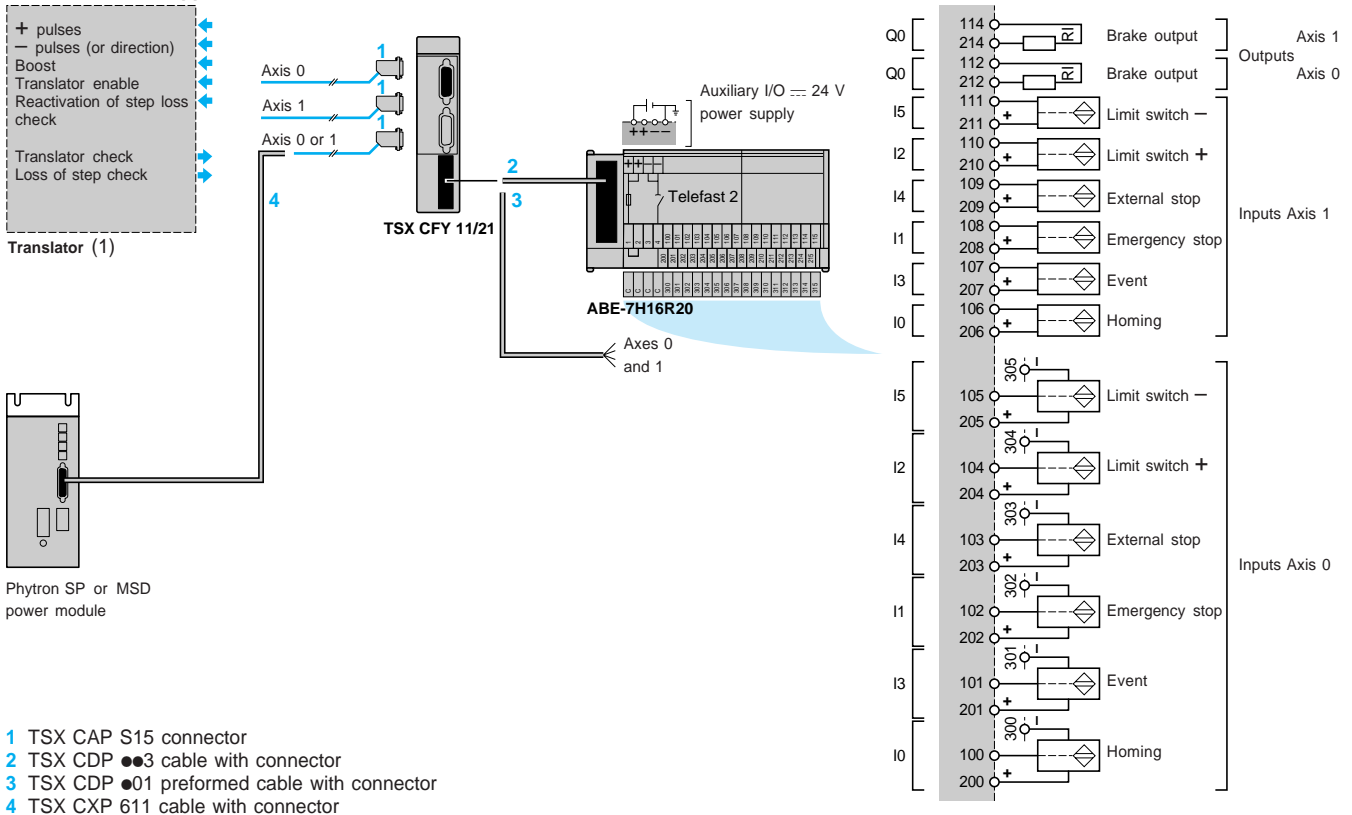
Characteristics :
[page 43551/3](#)
 References :
[page 43551/5](#)

Operating characteristics

Control		Pulse, frequency from 0 to 187 kHz
		+ and - outputs or +/- outputs and direction
Paths		Trapezoid speed profile with minimum movement frequency
Operating modes	OFF	Module inactive
	DIR DRIVE	Module operating as pulse generator
	MAN	Motion controlled by operator - visual control of movement - incremental movement
	AUTO	Movement sequence controlled by PLC program. Movements are described using a syntax similar to that of ISO language. Movements may be expressed in absolute or relative terms (in relation to either the current position or a home point). Operation is possible in "step-by-step" mode.
Checks	Environment	Translator, limit switches, emergency stop
	Motion	Check correct execution by software position limits, loss of step
	Control	Check consistency of commands
	Parameters	Check validity of parameters
Optional commands		Boost, brake

Connections

TSX CFY 11/21 stepper control module connections



(1) Type of translator

- With RS 422 interface :
 - RS 422 compatible inputs
 - RS 422 outputs
- With open collector, NPN interface :
 - TTL/5 V source compatible inputs
 - open collector, NPN outputs (5 V power supply from TSX CFY 11/21 module)

Premium automation platform

TSX CFY 11/21 motion control modules for stepper motors

References

Characteristics :
page 43551/3

Motion control modules for stepper motors



TSX CFY 11

Description	To control	Connections		No. of axes	Reference (1)	Weight kg
		SUB-D, 15-way	HE 10, 20-way			
Motion control modules for stepper motor	Translator with - RS 422 I/O, - ⎓ 5 V TTL input, - ⎓ 5 V output with open collector	Translator I/O	Auxiliary I/O, power supply ⎓ 24 V	1	TSX CFY 11	0.440
				2	TSX CFY 21	0.480



TSX CFY 21

Connection accessories

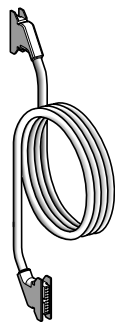
Description	TSX CFY●1 connector	Type of connector on TSX CFY●1 module	Unit reference	Weight kg
SUB-D connector	Translator	SUB-D, 15-way (1 per axis) (Order in multiples of 2)	TSX CAP S15	0.050
Telefast 2 connection sub-base	Auxiliary I/O axes 0/1, power supply ⎓ 24 V	HE 10, 20-way (1 for 2 axes)	ABE-7H16R20	0.300
Additional terminal block	20 shunted terminals for ABE-7H16R20 sub-base	(Order in multiples of 5)	ABE-7BV20	0.030



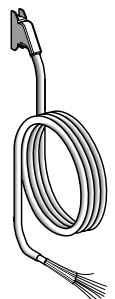
ABE-7H16R20

Connecting cables

Description	From TSXCFY●1 To module	Length	Reference	Weight kg	
Cables (cross-section 0.324 mm ²)	HE 10 connector, 20-way	ABE-7H16R20 sub-base (HE 10 connector, 20-way)	0.5 m	TSX CDP 053	0.085
			1 m	TSX CDP 103	0.150
			2 m	TSX CDP 203	0.280
			3 m	TSX CDP 303	0.410
			5 m	TSX CDP 503	0.670
Cables (cross-section 0.324 mm ²)	HE 10 connector, 20-way	Auxiliary I/O axes 0/1, power supply ⎓ 24 V (flying leads at I/O end)	3 m	TSX CDP 301	0.400
			5 m	TSX CDP 501	0.660



TSX CDP ●03



TSX CDP ●01

Connecting cable for Phytron power module for stepper motor

Description	From	To	Length	Reference	Weight kg
Cable for Phytron power module	TSX CFY●1 (15-way SUB-D connector) (2)	SP or MSD power module (25-way SUB-D connector)	6 m	TSX CXP 611	-

(1) Includes a bilingual Quick Reference Guide : English and French
(2) See addresses page.

Premium automation Premium

Motion control modules

TSX CAY/CFY module software setup

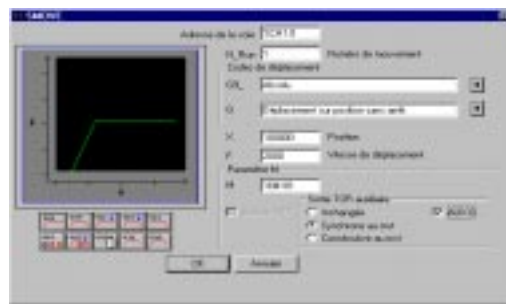
PL7 Junior/Pro setup software provides :

- SMOVE and XMOVE motion control functions for programming movements. These functions can be used in Ladder language, Instruction list language or Structured Text language
- Specialized screens for configuring, adjusting and debugging axes

Programming movements



A movement on an independent axis is initiated by executing an SMOVE control function in the application program. Example : go to the absolute position 10 000 000 µm, at a speed of 200 mm/min, without stopping. A screen enables the assisted entry of parameters in the SMOVE function in an operation block.



The XMOVE command enables movement to be initialized on interpolated axes (TSX CAY 33 only).

Instruction codes

The characteristics of movements are described using a syntax similar to that for a numerical controller program block written in ISO language.

TSX CAY and TSX CFY motion control modules use the following instructions :

Code and type of instruction	Individual axes (SMOVE)		Interpol. axes (XMOVE)	
	TSX CAY 21/41	22/42/33	TSX CFY 11/21	TSX CAY 33
09 Move to the position and stop				
01 Move to the position without stopping				
10 Move until an event is detected and stop				
11 Move until an event is detected without stopping				
14 Homing				
04 Stop command				
05 Await an event				
07 Memorize the current position when an event occurs				
62 Forced homing				
30/32 Simple machining				
92 Initialization of memorized positions				
21 Move without stopping, with homing on the fly				

Instruction possible

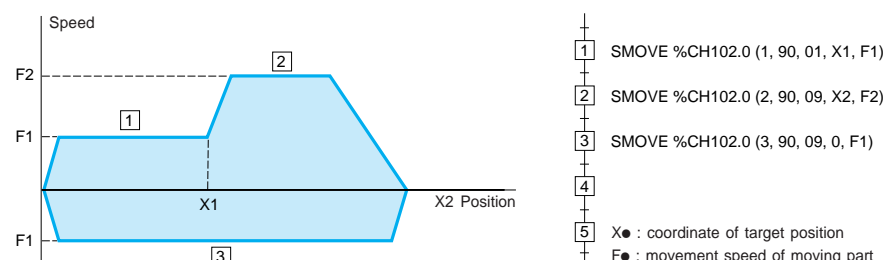
These instruction codes can be represented as symbols by the user in G code (for example : 09 can be represented by G09).

The instruction codes are preceded by another code indicating the type of target position :

- 90 : if the target position is absolute
- 91 : if the target position is relative to the current position
- 98 : if the target position is relative to a memorized position (index)
- 60 : if the target position is absolute and movement direction is fixed (TSX CAY 22/42/33 only)
- 68 : if the target position is relative to a memorized position and movement direction is fixed (TSX CAY 22/42/33 only)

Programming a path

A complete path can be programmed by means of a series of SMOVE or XMOVE elementary motion control functions. Grafcet language is ideal for this type of programming. An elementary movement is associated with each step.



Premium automation platform

Motion control modules

TSX CAY/CFY module software setup (continued)

When setting up application-specific functions, screens specific to axis control and stepper control functions can be accessed via PL7 Junior/Pro software for configuration, adjustment, debugging and documentation of applications. These services are performed by editors which can be directly accessed from the basic screen using icons in the tool bars. Windows relating to the editors can be simultaneously displayed on one screen (example : it is possible to simultaneously program using the program editor and define the symbols in the variables editor).



Declaring the axis control modules and stepper control modules

Parameter entry screens for application-specific functions can be accessed via the configuration screen by clicking on the slot.

Example : modules TSX CAY 21 and TSX CFY 21 in which the module has been defined.



Configuring the modules

The configuration editor provides assistance with entering and modifying the values of the various axis configuration parameters. These parameters enable the operation of the axis control module (module TSX CAY 21 for example) to be adapted to the machine which is to be controlled.

Axis configuration parameters are :

- Units of measurement
- Resolution
- Type of encoder
- Maximum and minimum limits
- Maximum speed
- Etc

This data relates to the machine and cannot be modified by the program.



Adjusting the modules

These parameters are associated with operation of the axes. They generally require the operations on and movements of the moving part to be known. These parameters are adjusted in online mode (they are initialized during configuration, in offline mode).

They concern :

- Encoder offset
- Resolution
- Servo control parameters
- Etc



Debugging the modules

In online mode, the configuration editor also provides the user with a control panel screen, giving him a quick visual display which he can use to control and observe the behaviour of the axis.

The control panel provides different information and commands according to the selected operating mode :

- Automatic mode (Auto)
- Manual mode (Manu)
- Direct mode (Dir_Cde)
- Off mode (Off)

Motion control

Motion control offer

Presentation

Motion control offer

The axis control offer is intended for machines which simultaneously require high performance servo motion control, associated with PLC sequential control.



Position control system

Premium and Quantum automation platforms offer among their range of interfaces, axis control modules providing a position control function.

These modules are :

- Analogue output modules :
 - TSX CAY, multi-axis control (2 to 4 axes) for Premium
 - 140 MSB/MSC, single-axis control for Quantum
- SERCOS® digital link modules :
 - TSX CSY, controls up to 8 drives for Premium
 - 141 MMS, controls up to 22 drives for Quantum

Lexium MHDA/MHDS servodrives

Lexium servodrives provide solid state switching, current (or torque) regulation and speed control.

Two types of servodrive, each available in 5 current ratings (1.5, 3, 6, 10, 20 A permanent rms), are offered :

- MHDA : servodrives with analogue setpoint
- MHDS : servodrives with SERCOS® digital link

Lexium BPH brushless axis motors

Lexium BPH brushless axis motors are synchronous, 3-phase motors. Their design, with samarium cobalt permanent magnet, ensures perfect rotation even at low speed.

They are equipped with a built-in sensor which can be a resolver or a SinCos absolute encoder.

Depending on the model, they have :

- Failsafe parking brake
- Shaft end (smooth or with a key)
- IP 65 or IP 67 dust and damp protection

Configuration and installation

Unilink user software, in association with Lexium servodrives, provides configuration and adjustment of the parameters for these drives.

Motion control applications are designed and installed using PL7 Junior/Pro (for Premium PLCs) or Concept (for Quantum PLCs) software.

Motion control

Motion control offer

Axis motor and servodrive compatibility

Lexium MHDA/MHDS servodrives



MHDA/MHDS	1004N	1008N	1017N	1028N	1056N
Permanent rms current	1.5 A	3 A	6 A	10 A	20 A

Lexium BPH axis motors



Type	Nominal torque on stopping	Maximum mechanical speed	Maximum continuous power	1004N	1008N	1017N	1028N	1056N
BPH 0751 N	0.9 Nm	6000 rpm	0.542 kW	■				
	1.3 Nm	6000 rpm	0.542 kW		■			
BPH 0752 N	1.3 Nm	6000 rpm	0.794 kW	■				
	2.3 Nm	6000 rpm	0.794 kW		■			
BPH 0952 N	3.7 Nm	6000 rpm	1.42 kW		■			
	4.3 Nm	6000 rpm	1.42 kW			■		
BPH 0953 N	6.0 Nm	6000 rpm	1.94 kW			■		
	6.0 Nm	6000 rpm	1.94 kW				■	
BPH 1152 N	7.4 Nm	6000 rpm	2.36 kW			■		
	7.4 Nm	6000 rpm	2.36 kW				■	
BPH 1153 N	6.8 Nm	6000 rpm	3.14 kW			■		
	10.5 Nm	6000 rpm	3.14 kW				■	
BPH 1422 N	11.4 Nm	4000 rpm	3.05 kW				■	
	12.0 Nm	4000 rpm	3.05 kW					■
BPH 1423 N	14.5 Nm	4000 rpm	4.05 kW				■	
	17.0 Nm	4000 rpm	4.05 kW					■
BPH 1902 N	25.0 Nm	4000 rpm	6.15 kW					■
BPH 1903 K	36.0 Nm	4000 rpm	7.4 kW					■
BPH 1904 K	46.0 Nm	4000 rpm	9.1 kW					■

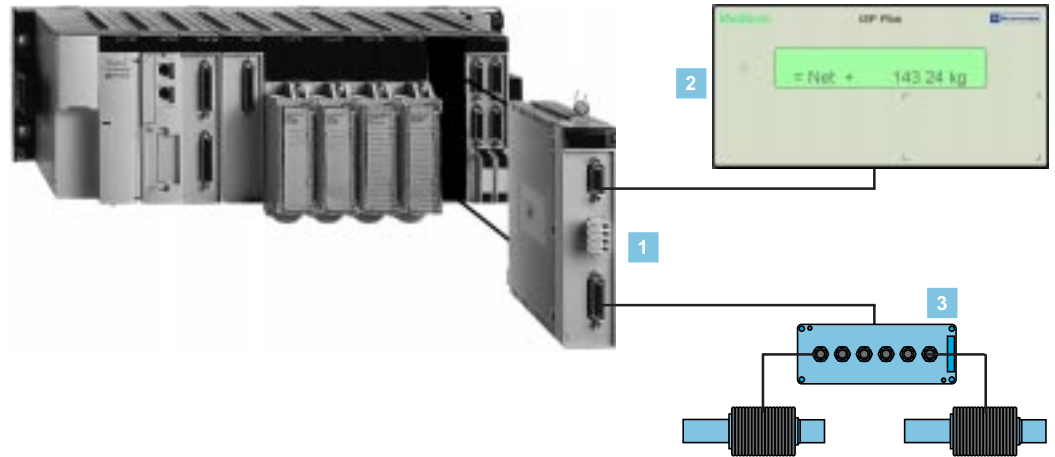
Premium automation platform

ISP *Plus* integrated weighing system

Presentation

Characteristics :
page 43552/6
References :
page 43552/7

The ISP *Plus* weighing range, when used with the Premium PLC, enables the automation of machines combined with weighers or installations



1 Weighing module

The TSX ISP Y100 standard format weighing module is the central part of the weighing system.

It has :

- A measurement input which will take up to 8 sensors
- A sealable link for the display unit
- Two discrete reflex outputs for weigher doser applications

The weighing module can be supplied factory calibrated.

2 Weight indicator

The TSX XBT H100 remote display unit displays the measured weight with no prior configuration. When the link to the weighing module is sealed, this display unit then becomes the main display unit for commercial transactions.

The TSX ISP Y100 module/display unit assembly conforms to OIML recommendations and is C€ approved for class III weighers (6000 scale divisions) and for class IIIII weighers (1000 scale divisions).

3 Load cells

Designed for harsh environmental conditions, strain gauge load cells are the third part of the weighing system.

These load cells can be supplied pre-calibrated at the factory or by using a press.

For load cells, accessories (enclosures, cables, simulators, etc), and weighing platform, please consult our specialist catalogue.

Premium automation platform

ISP *Plus* integrated weighing system

Application solutions

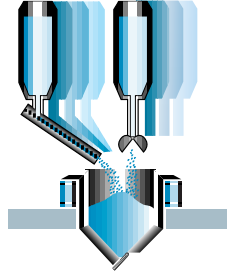
Characteristics :
page 43552/6
References :
page 43552/7

Solutions for installing automatic weighing applications

Please consult our specialist catalogue

Multiproduct batching

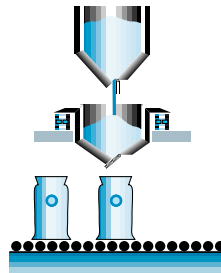
Batching 1 to 12 products from 32 stored in 16 silos : SP7-SA10



- 99 recipes.
- Batching at 2 flow rates.
- Assignment of silos/products.
- Tolerance checking.
- Automatic correction of in-flight error.
- Programmable order of product batching.
- Various weighing modes, batching in percentages.
- Printing of results.
- Management of totals by product and by recipe.

Weigher doser

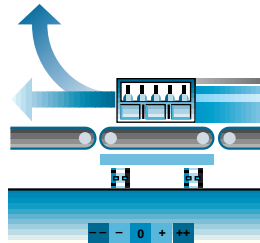
Dosing set quantities into a container or an intermediate hopper : SP7 S●50



- 99 recipes.
- Automatic correction of the dose values.
- Alternating adjustment and production cycles.
- Automatic correction of in-flight error at end of adjustment cycle.
- Optimization of the production rate at each cycle.
- Adaptable reset frequency.
- Calculation of the average value and typical deviation, at the end of the adjustment cycle.
- Printing of results during adjustment cycles.

Weigher sorter

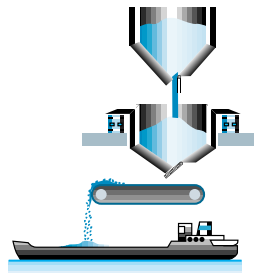
Checking and sorting objects by weight : SP7 S●60



- 99 recipes.
- Sorting in relation to a setpoint and 2 tolerance values.
- Insertion of the sorting setpoint by scaling or on the basis of results.
- Calculation of the average value and typical deviation of a batch.
- Calculation of the number per category.
- Classification according to the weight deviation in relation to the setpoint.
- Continuous automatic tare except during sorting.
- Printing of results.

Discontinuous totalizer

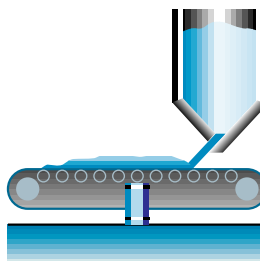
Totalising successive weighing operations when receiving or dispatching materials in bulk: SP7 S●40



- 99 recipes.
- Receipt or dispatch operation.
- Filling at one or two flow rates.
- Ability to add further material.
- Automatic correction of in-flight error.
- Emptying of remainder.
- Selection of the reset frequency.
- Printing of results.

Control of flow rate on conveyor belt and continuous totalizer

Control of flow rate on conveyor belt by weight or speed : SP7-SA85



- Adjustable PID controller.
- Analogue outputs for flow rate control and setpoint.
- Vibrator control output.
- Totalling of weight of product which has travelled along belt (one continuous totalizer and four partial totalizers).
- Output for mechanical totalizer.
- Semi-automatic tare.
- Digital calibration.
- Speed read by proximity sensor.
- Printing of results.

Premium automation platform

ISP *Plus* integrated weighing system

Description

Characteristics :
page 43552/6
References :
page 43552/7

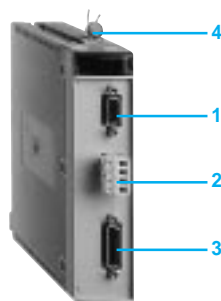
The integration of TSX ISP Y100 weighing modules with the Premium PLC enables the user to go beyond simple weighing applications. The PLC controls the whole environment of the weighers as well as all the machines or industrial processes around the weighing system.

In a Premium PLC configuration, the number of TSX ISP Y100 weighing modules has to be added to the number of other application-specific modules (TSX SCY communication, TSX CTY counting, TSX CAY axis control and TSX CFY motion control). See pages 43511/6 and 43513/4.

Note : the weighing module counts as 2 application-specific channels.

Description

Weighing module



The front panel of the TSX ISP Y100 weighing module consists of :

- 1 A 9-way female SUB-D connector for the RS 485 serial link to the display unit.
- 2 A screw terminal block for connecting the 2 discrete reflex outputs (outputs positioned on thresholds).
- 3 A 15-way female SUB-D connector for the measurement input channel (50 measurements per second, from 1 to 8 load cells).
- 4 Device for optional sealing of the module.

The TSX ISP Y100 module and its SF2/SF3/SM1/SM2 load cells can be supplied pre-calibrated (at the factory or by using a press).

Display unit

The weighing operations are displayed on a TSX XBT H100 display unit (supplied with the TSX ISP Y110). The display device is preconfigured.



Its front panel consists of :

- 1 A back-lit LCD display screen with 1 line of 20 characters (height 9 mm).
- 2 An area for affixing the instrument's identification plate.

On the rear panel it has:

- A removable screw terminal block for \pm 24 V power supply
- A 25-way female SUB-D connector for the link to the TSX ISP Y100 weighing module (30 metres maximum)

Strain gauge load cells and connection accessories (please consult our specialist catalogue)

Measurements are detected using strain gauge load cells designed to operate in harsh environmental conditions (severe temperatures, dust, damp, corrosive atmosphere). The strain gauge load cells with their associated cable connectors and cables can be integrated, using mechanical kits, in all types of weighing receptacles : tray, hopper, silo, tank, overhead crane, conveyor belt, etc.

Application solutions (please consult our specialist catalogue)

Special-purpose software for weighing applications simplifies the creation of the overall control system application program, without the designer having to have any special knowledge of this type of application.

Application solutions can be supplied as follows :

- An application disk (weighing and MMI) with installation and operation manual.
- A kit comprising:
 - the Premium PLC fitted with only those I/O modules required for the weighing application
 - the display unit or terminal suitable for man-machine interface
 - the Premium PCMCIA memory cartridge supporting the weighing application software

Premium automation platform

ISP *Plus* integrated weighing system

Functions, installation

Characteristics :
page 43552/6
References :
page 43552/7

Functions

The weighing module used with its display unit is a true weight indicator. A large number of specific weighing functions are integrated in this module :

- Continuous measurement of weight (in g, kg, t, lb, oz, etc) and calculation of flow rate (variation in weight)
- Filtering of measurements according to several methods (19 filtering options)
- Tare device and preset tare
- Automatic zero reset
- Measurement stability check
- Threshold check with extrapolation of cutoff point: setting local discrete outputs to the nearest millisecond
- Assisted calibration : the module calculates the zero and the gradient
- Saving of calibration parameters to the module (EEPROM) and in the Premium processor
- Forced calibration : rapid replacement of a faulty module and restart with the calibration parameters of the previous module
- Locking of the configuration, sealing of the module and its links to the load cells and display unit
- Continuous formatting and transmission of measurements to the PLC
- Transmission of measurement validity data (validity, stability, net/gross, etc)
- Transmission of diagnostic data on the module and its connections
- Configuration, calibration and debugging via PL7 screens
- Most of the operating parameters can be modified and most of the functions can be executed via the PLC program

Installing the weighing module

The PL7 software is used for the complete installation of the weighing system (configuration, calibration and debugging).



Configuration, covering :

- Metrological data on the weigher
- Filtering of measurements
- Flow rate calculation mode
- Tare
- Data format
- Stability criteria and zero management mode
- Checking of thresholds for positioning the discrete outputs

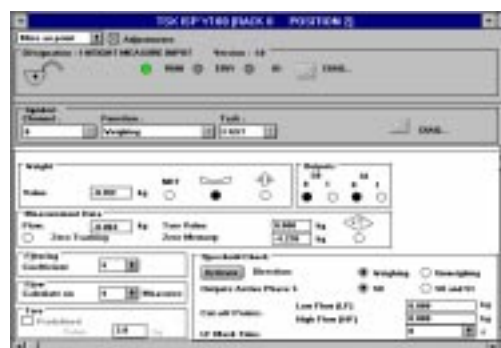


Calibrating the weigher. The module itself calculates the gain and the offset to be applied to the measurement electronics.

Calibration is performed in two stages :

- Measurement of the zero load
- Measurement of a calibrated load

Forced calibration enables the system to be restarted immediately in the event of a module fault. The new module is automatically configured.



Debugging. The weighing application screen dynamically displays :

- The current measurement
- The operating status of the module

It also enables fast modification of the adjustment parameters (filter, flow rate, threshold values, etc).

Commands and parameters which can be modified via the program, which is implicitly transmitted to the weighing module, are used to operate the module in the language appropriate to the weighing application.

These parameters and commands can be controlled from an MMI type device and/or a supervision device connected to the Premium PLC.

Premium automation platform

ISP *Plus* integrated weighing system

Characteristics

References :
page 43552/7

Electrical characteristics of the TSX ISP Y100 weighing module

Measurement input		
1 weigher per module		1 measurement input
Resolution		1 048 576 points (20 bits)
Measurement rate		50 measurements per second
Input impedance	MΩ	> 1
Input load cells		
No. which can be connected		8 x 350 Ω load cells maximum, mounted in parallel
Supply voltage	V	≐ 10
Type of power supply		d.c.
Length of cable	m	300 (no loss of precision with 4 load cells)
Discrete reflex outputs		
Number		2 positive logic transistor outputs, for weigher doser applications
Nominal voltage	V	≐ 24
Nominal current	mA	500
Response time		1 ms discrimination. The crossing point of the thresholds between 2 measurements is calculated by interpolation to the nearest millisecond
Display output		
Physical interface		RS 485 not isolated
Data rate	K bits/s	9.6
Distance from module	m	30 (maximum)
Consumption	mA	See page 43605/2
Environment		See page 43511/4
Metrology		The weighing module and display unit together conform to OIML recommendations. It meets è approval for class III weighers (up to 6000 scale divisions), and for class IIII weighers (up to 1000 scale divisions) conforming to European circular 90-384 dated 20 June 1990.
CE Certification		SDM n° 97-06 dated 28 th July 1997

Characteristics of the TSX XBT H100 display unit

Display		
Type of screen		Back-lit LCD
Number of lines		1 line used in weighing application
Number of characters		20 per line
Character size	mm	9
Power supply		
Nominal voltage	V	≐ 24 not isolated
Voltage limits	V	≐ 18...30
Consumption	W	10
Environment		
Conformity to standards		IEC 1131-2, EN 61131-2, UL 508, CSA C22-2 n° 14
Temperatures		Operating : 0...50 °C, storage : - 20...+ 60 °C
Degree of protection		Front panel : IP 65. Rear panel : IP 20, conforming to IEC 529 and NF C 20-010
Function		
Signalling		1 indicator lamp

Premium automation platform

ISP *Plus* integrated weighing system

References, dimensions

Characteristics :
page 43552/6



TSX ISP Y100



TSX XBT H100

References

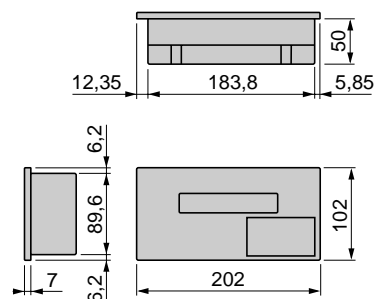
Description	Composition	Reference (1)	Weight kg
ISP <i>Plus</i> weighing module (1 weigher per module) (2)	Standard load format module (sealable) - Load cell input 50 measurements/s (for 1 to 8 cells), - 2 reflex discrete outputs (positioned on thresholds), - RS 485 output (for display unit)	TSX ISP Y100	0.420
ISP <i>Plus</i> weighing module and display unit assembly (1 weigher per module) (2)	- TSX ISP Y100 module, - TSX XBT H100 display unit (back-lit LCD, preconfigured display), - Module/display unit connection cable (length 3 m)	TSX ISP Y110	1.020
ISP <i>Plus</i> weighing applications	- One PL7 Junior program - One XBT L1000 program (for operator interface) - One manual For : Multiproduct batching, Weigher doser Weigher sorter, Discontinuous totaliser, Continuous totaliser, Flow rate controller	Please consult our specialist catalogue	-
Factory calibration	Calibration in factory (0...15 tonnes) or by using a press (20...50 tonnes) To be ordered with the TSX ISP Y1●0 module and the load cells	Please consult our specialist catalogue	-
Load cells, accessories (connectors, cables, simulators, etc) weighing platform		Please consult our specialist catalogue	-

(1) Includes a bilingual Quick Reference Guide as standard : English and French.

(2) The weighing module counts as 2 application-specific channels.

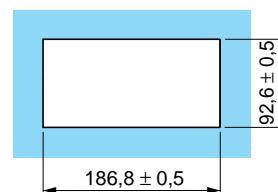
Dimensions

TSX XBT H100 display unit



Flush mounting

fixed using 4 or 6 bolts (supplied)
pressure mounted (on panel 1 to 6 mm thick)



Premium automation platform

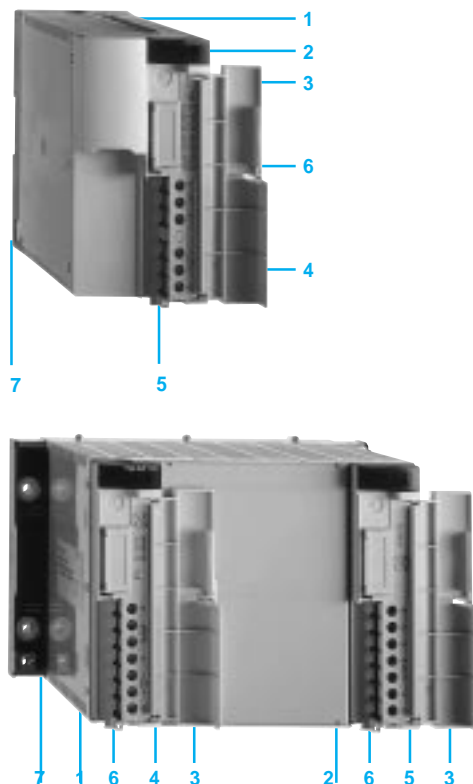
Process power supply units and modules

Description, specifications

References :
page 43560/3
Dimensions :
page 43560/3

TBX SUP 10 and TSX SUP 1●●1 power supply units and modules are designed to provide \sim 24 V power to control system peripherals (sensors, preactuators, encoders, MMI terminals, regulators, indicator lamps, pushbuttons, pneumatic cylinders, mini PLC extension rack, etc). These supplies are connected to a \sim 100...240 V, 50/60 - 400Hz a.c. supply or \sim 125 V d.c. supply, see characteristics below.

The power supply provided ranges from 24 W (24 V/1 A) to 240 W (24 V/10 A). The TSX SUP 1●●1 power supply outputs are safety extra low voltage (SELV) and can be wired in parallel with a device for optimising the power. TSX SUP 1011/1021 models can operate in redundant mode thus ensuring greater availability of safety control systems. These power supplies conform to PLC standards IEC 1131-2 for immunity and resistance to interference and EN 50081-2 for radiated interference.



TSX SUP 1011/1021/1051 process power supply modules

These comprise :

- 1 A support plate for fixing the module
- 2 A display block comprising a 24 V (green) indicator lamp which is on if the internal and output voltages are correct, and an LSH power optimization mode (orange) indicator lamp for TSX SUP 1011/1021 power supply modules only
- 3 A cover for protecting the terminal block
- 4 A screw terminal block for connection :
- to the mains supply
- of the \sim 24 V output
- 5 A space for the insertion of the cable clamp
- 6 A 110/220 V voltage selector (TSX SUP 1021/1051 modules only)
- 7 A NOR/LSH switch located at the rear of the module for controlling the power optimization device (TSX SUP 1011/1021 power supply modules only)

TSX SUP 1101 process power supply unit

The front panel comprises :

- 1 A display block comprising an ON (orange) indicator lamp which is on if the module is powered up
- 2 A display block comprising a 24 V (green) indicator lamp which is on if the \sim 24 V output voltage is present and correct
- 3 A cover for protecting the terminal block
- 4 A screw terminal block for connection to the a.c. supply
- 5 A screw terminal block for connection to the \sim 24 V output voltage
- 6 A space for the insertion of the cable clamp
- 7 Four holes for fixing the module

Characteristics

Type of power supply module		TBX SUP 10	TSX SUP 1011	TSX SUP 1021	TSX SUP 1051	TSX SUP 1101
Nominal input voltage	V	\sim 100...240 or \sim 125		\sim 100...120/200...240		
Input voltage limit	V	\sim 90...264 or \sim 88...156	\sim 85...264 or \sim 105...150	\sim 85...132/170...264		
Accepted micro-break period (1)	ms	\leq 10 for \sim , \leq 1 for \sim		\leq 10		
Mains supply frequency	Hz	47...63	47...63/360...440			
Nominal input current	A	0.4		0.8	2	3.5
Maximum inrush current (2) at 240 V	A	30	75	38	75	
Maximum I ² t value (2) at 240 V	A ² S	2	2.6	2	3.9	8.5
Power factor		0.6				
Efficiency at full load	%	> 75			> 80	
Useful power (3)	W	24	26 (30)	53 (60)	120	240
Nominal output current at 60 °C	A	1	1.1	2.2	5	10
Output voltage (0 to 60 °C)	V	24 \pm 5 %	24 \pm 3 %			
Protection against short-circuits		Continuous/automatic resetting	Fallback to 0 and automatic reset on disappearance of fault		Current limit	
Protection against overvoltages	V	Peak limiting U > 36			Peak limiting U > 32	
Prim./second. dielectric withstand		1500 V rms 50/60 Hz-1 min	3500 V rms 50/60 Hz-1 min (user safety SELV conforming to EN 60950 and IEC 1131-2)			
Electromagnetic interference		Class A in accordance with EN 55022 and conforming to FCC 15-A				
Degree of protection		IP 205	IP 205, terminal block IP 215			
Cooling		By natural convection				
Parallel connection		No	Yes with power optimization (2 maximum)			
Series connection		No	Yes (2 maximum)			

(1) Nominal voltage for a repetition period of 1 Hz.

(2) 25 °C on initial power up. These values must be taken into account when starting in order to size the protective devices.

(3) For an ambient temperature of 60 °C. Useful power given in () for a fan-cooled enclosure or a temperature range of 0 to 40 °C.

Premium automation platform

Process power supply units and modules

References, dimensions, mounting

Characteristics:
page 43560/2



TBX SUP 10



TSX SUP 1011 TSX SUP 1021/1051



TSX SUP 1101

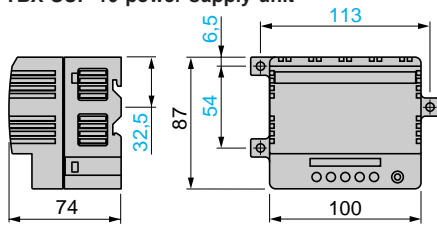
Description	Output voltage V	Rating A	Parallel connection	Reference	Weight kg
Unit \sim 100...240 V, 50/60 Hz and \equiv 125 V	\equiv 24	1	No	TBX SUP 10	0.290
Module \sim 100...240 V, 50/60 - 400 Hz and \equiv 125 V SELV	\equiv 24 SELV	1.1	Yes	TSX SUP 1011 (1) (2)	0.720
Modules \sim 100...120 V and \sim 200...240 V, 50/60 - 400 Hz	\equiv 24 SELV	2.2	Yes	TSX SUP 1021 (1) (2)	1.090
		5	Yes	TSX SUP 1051 (1) (2)	1.120
Unit \sim 100...120 V and \sim 200...240 V, 50/60 - 400 Hz	\equiv 24 SELV	10	Yes	TSX SUP 1101 (1)	2.100

(1) Product supplied as standard with a bilingual quick reference guide : English and French.

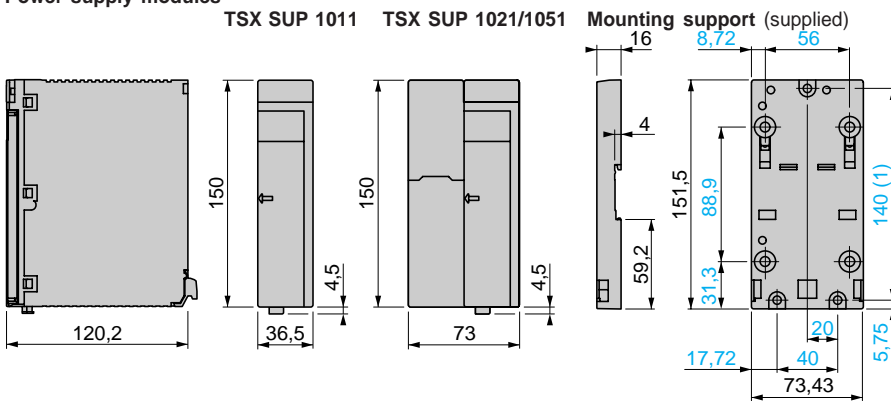
(2) Mounted in TSX RKY 6/8/12/6E/8E/12E racks (any slot except the slot for TSX PSY●●0M power supply modules), on AM1-DE200/DP200 rails or on AM1-PA mounting plate.

Dimensions, mounting

TBX SUP 10 power supply unit

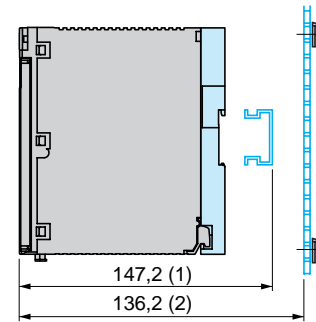


Power supply modules



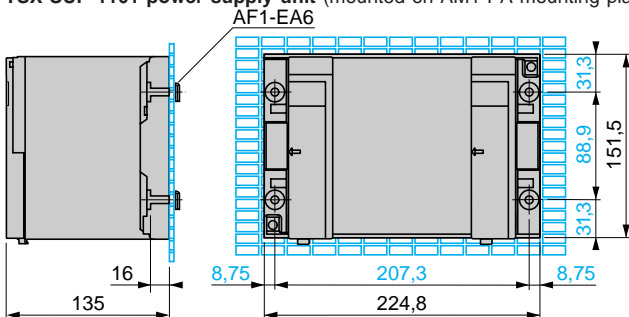
(1) Distance between centres compatible with Micro PLC

Mounted on AM1-DE200 or AM1-DP200 rail or on AM1-PA mounting plate



(1) 139.7 mm with AM1-DP200 rail
(2) Mounted on AM1-PA mounting plate

TSX SUP 1101 power supply unit (mounted on AM1-PA mounting plate)



Premium automation platform

Premium Warm Standby redundancy

Presentation

References :
page 43566/6
Connections :
page 43566/7

Presentation

The Premium Warm Standby redundancy offer ensures continuity of operation for a control system based on a Premium platform in the event of failure of :

- Central processing and communication functions
- All or part of the I/O system

It is based on the "Normal/Backup" redundancy principle with complete redundancy of the main processing and communication functions, the use of simple I/O shared on a Fipio bus and/or redundancy of in-rack I/O.

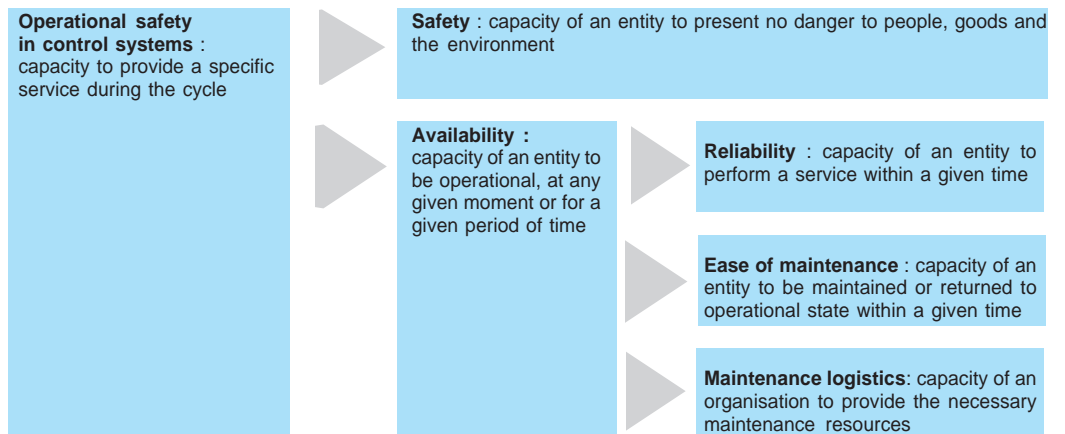
It covers all availability requirements when the purpose of the PLC is to monitor an installation in continuous operation, signal incidents to a control station, and transmit command instructions from the supervision manager to various locations on an extensive site. It is aimed at processes which can tolerate a lack of control on the part of the PLC lasting 1 to 2 s (average time for changeover from the "Normal" to the "Backup" unit).

Areas of application :

- In the commercial sector :
 - centralised technical management of a public facility (tunnel, airport, etc)
 - control/monitoring of a water treatment or distribution station
 - electrical technical management
- In the industrial sector :
 - food and beverage processing
 - slow chemical processes
 - level/temperature monitoring, etc

Operational safety and availability

The Warm Standby architecture ensures that the control system functions are available, irrespective of the failure of any system component.



Premium automation platform

Premium Warm Standby redundancy

References :
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Connections :
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Principle

Principle

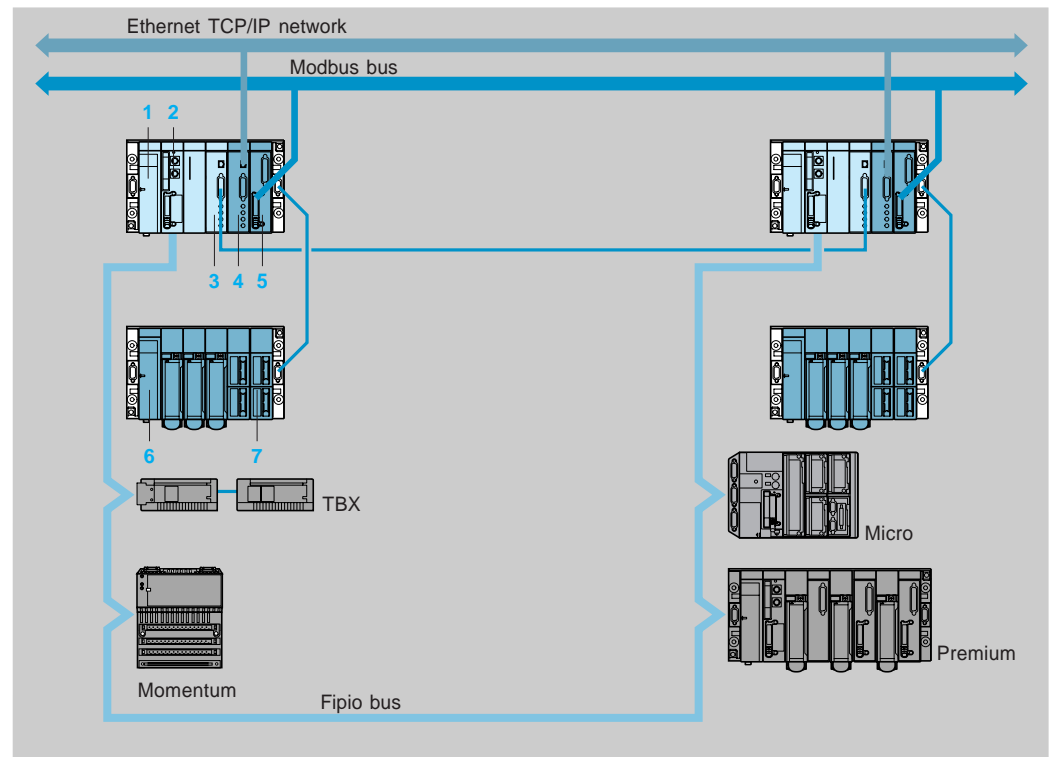
The Premium Warm Standby architecture combines physical redundancy of the PLC with "Normal/Backup" type operation.

Only the "Normal" PLC processes the application and generates the outputs. The "Backup" PLC applies the outputs generated by the "Normal" PLC, performs self-diagnostics and permanently diagnoses the "Normal" PLC.

In event of a malfunction on the "Normal" PLC, the "Backup" PLC takes control and then becomes the "Normal" PLC (the faulty PLC, previously "Normal", becomes the "Backup").

Optimum availability of the application is ensured by :

- Automatic or manual "Normal/Backup" changeover
- Smooth changeover on the actuators
- Updating of the "Backup" PLC on each cycle
- Signalling of the faulty component
- Online repair
- Transparent supervision (SCADA)



Essential elements for redundancy

- 1 TSX PSY power supply
- 2 TSX P57 353M/453M processor
- 3 TSX ETY 110 Ethernet TCP/IP communication module

Optional elements for redundancy

- 4 TSX ETY 210 Ethernet TCP/IP communication module
- 5 TSX SCY 21601 communication module with TSX SCP 114 Modbus protocol PCMCIA card
- 6 TSX PSY power supply
- 7 TSX D●Y discrete I/O modules, or TSX A●Y analogue I/O modules

Shared elements on the Fipio bus

Elements which can be redundant are :

- The main rack
- The main rack power supply
- The processor

Possibly accompanied by :

- Discrete and analogue input modules
- Discrete and analogue output modules
- One or more extendable racks with their power supply
- One or more Ethernet TCP/IP network or Modbus bus communication modules

Elements of the Fipio bus shared between the "Normal" and "Backup" PLCs are :

- Discrete or analogue input modules (Momentum or TBX)
- Discrete or analogue output modules (Momentum or TBX)
- One or more Micro/Premium agent PLCs (these can support the entire range of I/O : discrete, analogue or application-specific)

Premium automation platform

Premium Warm Standby redundancy

Functions

References :
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Connections :
page 43566/7

Functions

“Normal” and “Backup” PLC functions

The “Normal” and “Backup” PLCs are physically and functionally identical, but their role is differentiated according to their status : “Normal” or “Backup”.

The “Normal” Premium PLC :

- Executes the application
- Updates the outputs and inputs (in-rack and on the Fipio bus)
- Provides communication functions with peripheral devices
- Sends its database to the “Backup” PLC
- Recovers diagnostic information from the “Backup” PLC
- Generates its own diagnostic information as well as that of the Premium Warm Standby architecture

The “Backup” Premium PLC :

- Executes part of the application
- Reads the state of the in-rack inputs
- Updates its in-rack and Fipio outputs according to the state of those of the “Normal” PLC
- Provides communication functions with peripheral devices
- Recovers diagnostic information from the “Normal” PLC
- Generates its own diagnostic information as well as that of the Premium Warm Standby architecture

Management of shared I/O on Fipio bus

The Fipio bus manages I/O exchanges on Fipio devices. The “Normal” PLC is an arbitrator for the active Fipio bus while the “Backup” PLC is an arbitrator for the passive Fipio network.

Due to the characteristics of the Fipio bus, only the “Normal” PLC reads the physical inputs on the Fipio bus and controls the physical outputs on the Fipio bus. The “Backup” PLC does not access the Fipio bus.

During each cycle, the “Backup” PLC receives the values of the I/O on the Fipio bus from the “Normal” PLC via the inter-PLC Ethway link (TSX ETY 110 module) and applies them to its own outputs. **This updating of the memory enables smooth “Normal/Backup” changeover** by maintaining the state of the I/O during changeover.

Management of “Normal/Backup” states

Malfunction of one of the following elements automatically causes a “Normal/Backup” changeover :

- Main rack power supply
- PLC processor
- TSX ETY 210 communication module
- Fipio bus connected to the integrated processor port

For all other elements, “Normal/Backup” changeover can be customised (manual changeover).

Management of optional redundant I/O

For redundant inputs, the sensor information is transmitted simultaneously to the “Normal” and “Backup” PLCs via the 2 input modules placed in each PLC. Two Telefast 2 16-channel sub-bases, ABE-7ACC10 with redundant inputs and ABE-7ACC11 with redundant outputs, can be used to perform this double wiring easily using preformed HE 10 connector connection cables, (see page 43566/7, refs. [14](#), [15](#), [20](#) and [21](#)).

The output values are only generated by the application processing of the “Normal” PLC. This sends its commands to the corresponding output modules.

During each cycle, the “Backup” PLC receives the “Normal” PLC output values via the inter-PLC Ethway link (TSX ETY 110 module) and applies them to its own outputs. **This updating enables smooth “Normal/Backup” changeover** by maintaining the state of the outputs during changeover.

Management of supervision transparency (SCADA)

Transparent communication with level 2 (supervisor, third-party device, etc) during changeover of the PLC in “Normal” mode to the PLC in “Backup” mode is provided by the TSX ETY 210 Ethernet TCP/IP modules, using a unique IP address. Communication with a redundant architecture is therefore similar to that for a simple architecture.

This transparency is identical in Modbus with the use of the TSX SCP 114 PCMCIA card (Modbus protocol in RS 485) installed in the TSX SCY 21601 communication module.

Premium automation platform

Premium Warm Standby redundancy

References :
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Connections :
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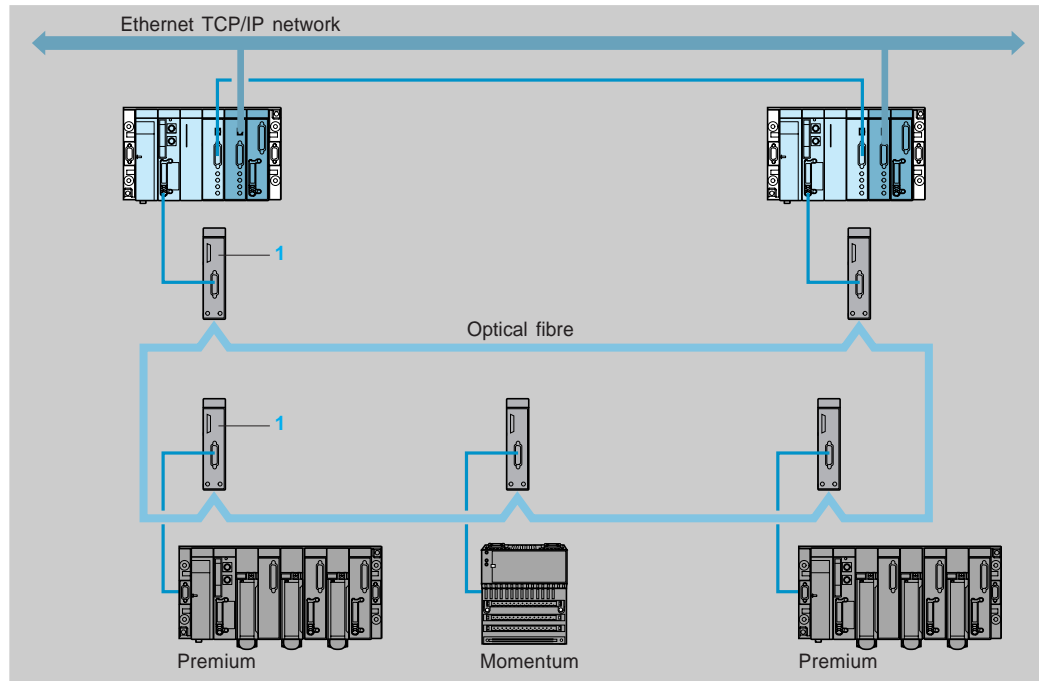
Functions (continued), software setup

Functions

Ring topology for shared equipment on the Fipio bus

To improve the availability of shared equipment on the Fipio bus, it is possible to create a Fipio redundant ring using fibre optics. The fibre optic ring can then be used to :

- Maintain normal operation in the event of a break at some point on the fibre optic medium
- Increase the immunity of the Fipio bus in environments with high levels of electromagnetic interference



1 OZD FIP G3 fibre optic transmitter (see page 43590/3)

Software setup

A Premium Warm Standby redundant architecture is set up using PL7 Junior/Pro software, in exactly the same way as a standard non-redundant process is set up. It is, however, necessary to apply the rule that the application program of both the "Normal" and "Backup" PLCs must be completely identical.

Redundancy entails certain special features which, if taken into account at the start of the development task, are very simple to set up using the additional Premium Warm Standby application design software TLX CD/CD3 WSBY P40E.

This software can perform the following functions :

- Taking account of Normal/Backup states during program execution
- Sharing the database between the 2 PLCs via DFB user function blocks and EF elementary function blocks.
- Management of redundant in-rack I/O
- Management of shared I/O on the Fipio bus

Premium automation platform

Premium Warm Standby redundancy

References

Connections :
page 43566/7

References

Description	Type	Reference (1)	Weight kg
Software packages for setting up a Warm Standby redundant architecture on Premium	Equipment with 1 station	TLX CD WSBY P40E	–
	Equipment with 3 stations	TLX CD3 WSBY P40E	–
Description	Functions	Reference	Weight kg
Ethernet TCP/IP communication module for Premium Warm Standby architecture	Identical to those of the TSX ETY 110 module (see p. 43601/13) For the Warm Standby architecture, this module also provides : - transparent addressing during changeover - diagnostics of the architecture (self-tests, state of the Ethernet link and of the TSX ETY 210 dual module) - maintenance with access to the "Backup" PLC	TSX ETY 210	0.270

(1) Product supplied with setup manual in English.

Additional compatible elements

The Warm Standby architecture presented on page 43566/3 shows, among other things, the essential elements for redundancy. Compatible standard modules can be added to this minimum configuration according to the requirements of the process being automated.

Elements for redundancy (sold in lots of 2)

- **Bus X remote system**
 - **TSX REY 200** Bus X remote module, for increasing the length of Bus X to 2 x 350 m.
- **Communication**
 - **TSX ETY 210** Ethernet TCP/IP communication module, for communication with level 3
 - **TSX SCP 114** Modbus communication PCMCIA card, for Modbus Slave communication with transparent addressing for third-party devices. This card should be inserted in the slot in the TSX SCY 21601 communication module.
- **Discrete and analogue I/O**
 - **TSX DEY ●●K** discrete input modules with HE 10 connectors with **ABE-7ACC11** Telefast 2 redundant sub-bases
 - **TSX DSY ●●K** discrete output modules with HE 10 connectors with **ABE-7ACC10** Telefast 2 redundant sub-bases
 - **TSX DMY ●●K** discrete mixed I/O modules with HE 10 connectors with **ABE-7ACC11/10** Telefast 2 redundant sub-bases
 - **TSX AEY/ASY** analogue I/O modules (compatible under certain wiring conditions)
 - **TSX CTY/CCY** counter, **TSX CAY/CSY/CFY** axis control and **TSX ISP** weighing modules. These modules cannot be used as elements for redundancy, but can be used as elements shared via the Fipio agent Premium PLCs.

Shared elements on the Fipio bus

- **TBX distributed I/O modules :**
 - **TBX LEP 030** Fipio communication module for base units
 - **TBX DES/DSS/DMS** discrete I/O base units
 - **TBX AES/ASS/AMS** analogue I/O base units
 - **TSX EEF/ESF/EMF** dust and damp proof discrete I/O base units
- **Momentum I/O modules :**
 - **170 FTN 110 01** Fipio communication module
 - **170 ADI/ADO/ADM** discrete I/O base units
 - **170 AAI/AAO/AMM** analogue I/O base units
- **Fipio agent PLCs :**
 - Premium PLC, can take all I/O and application-specific modules
 - Micro PLC, can take all I/O and application-specific modules
- **Other shared elements :**
 - **OZF FIP G3** fibre optic transmitter, can be used to create a Fipio bus fibre optic ring
 - **TSX FP ACC 6** Fipio electrical repeater, increases the length of the bus by the creation of segments, each 1000 m maximum

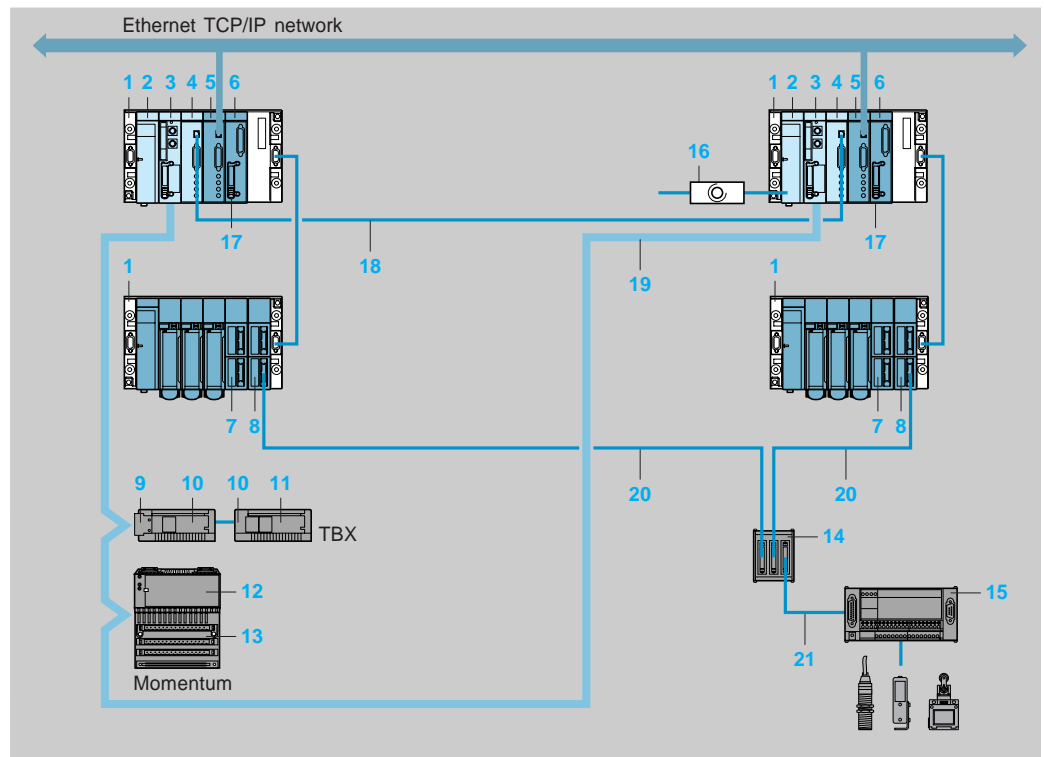
Premium automation platform

Premium Warm Standby redundancy

Connections

References :
page 43566/6

Example of architecture with redundant I/O and shared I/O on Fipio bus



- 1 TSX RKY ●EX : Premium extendable rack
- 2 TSX PSY ●●●M : power supply module
- 3 TSX P57 353M/453M : Premium processor with integrated Fipio link
- 4 TSX ETY 110 : Ethernet TCP/IP network module
- 5 TSX ETY 210 : Ethway/Ethernet TCP/IP network module
- 6 TSX SCY 21601 : communication module for type III PCMCIA card
- 7 TSX DSY ●●K : discrete output modules, for redundancy
- 8 TSX DEY ●●K : discrete input modules, for redundancy
- 9 TSX LEP 030 : Fipio communication module for TBX base units with TSX BLP 01 connector
- 10 TBX DES 16●● : distributed discrete output TBX base units, shared
- 11 TBX DSS 16●● : distributed discrete output TBX base units, shared with TBX CBS 010 cache/cable
- 12 170 FNT 110 00 : Fipio communication module for Momentum base unit with TSX FPP ACC2 connector
- 13 170 ADI/AAI/ADM ●●● : discrete or analogue I/O Momentum base unit
- 14 ABE-7ACC11/10 : Telefast 2 sub-bases for redundant I/O
- 15 ABE-7 ●16●●● : Telefast 2 connection sub-bases
- 16 LA4-DT2U : time-delay relay designed to desynchronise starting of the "Normal" PLC and the "Backup" PLC during simultaneous power-up
- 17 TSX SCP 114 : type III PCMCIA card for Modbus Slave communication
- 18 490 NTW 000●● : preformed connection cable with RJ 45 connector, for interconnecting TSX ETY 110 modules (shielded twisted pair)
- 19 TSX FP CA ●00 : Fipio bus trunk cable, shielded twisted pair
- 20 TSX GDP ●53 : preformed connection cable with HE 10 connector (length = 0.5, 1, 2, 3, or 5 m)
- 21 ABF-H20H008 : preformed connection cable with HE 10 connector (length = 0.08 m)

8 Communication


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X-Way communication architecture		pages 43609/2 to 43301/11
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Ethernet TCP/IP modules	TSX ETH●	page 43601/13
Transparent Factory Ethernet wiring system : 10baseT and 100baseTX	499 N●●	page 48190/7
Ethernet wiring system : 10base5	TSX ETH ●	page 43616/3
Fipway network	TSX FPP 20	page 43592/3
Modbus Plus network	TSX MBP 100	page 43599/5
Fipio bus manager	TSX P57●	page 43589/5
Fipio bus Agent function	TSX FPP10●	page 43593/3
Wiring system : Fipio bus and Fipway network	TSX FP●	pages 43597/6 and 43597/7
Fipio bus and Fipway network on fibre optic cables	OZD FIP	page 43590/3
Modem module	TSX MDM●	page 43598/3
Uni-Telway bus	TSX SCP	pages 43594/6 and 43594/7
Modbus/Jbus bus	TSX SCP	pages 43595/4 and 43595/5
Asynchronous serial links	TSX SCP	page 43596/3
Connecting cables for PCMCIA cards and TER/AUX ports	TSX SC●	pages 43606/2 and 43606/3
Jnet network	TSX JNP●	page 43603/3
InterBus-S bus	TSX IBY 100 TSX IBX 100	page 43602/5
Profibus DP bus	TSX PBY 100	page 43607/3
CANopen bus	TSX CPP 100	page 43615/3

Premium automation platform

Network modules

Selection guide

Applications Network type	Ethernet TCP/IP heterogeneous industrial local area network			
				
Network type	Ethernet TCP/IP		Ethernet TCP/IP with integrated Web server	
Structure				
Physical interface	10base5 (AUI), 10baseT (RJ45)		10baseT (RJ45)	
Method of access	CSMA - CD		CSMA - CD	
Data rate	10 Mbps		10/100 Mbps	
Medium	Triaxial cable Double twisted pair Fibre optic (via Transparent Factory Hubs, Switches or Transceiver)		Double twisted pair Fibre optic (via Transparent Factory Hubs, Switches or Transceiver)	
Configuration				
Max. no. of devices	64			
Max. length	500 to 2800 m (depending on medium used)			
No. of links/stations	1 to 4 (depending on processor or coprocessor used : 1 with TSX P57 153M/2●3M and T PCX 57 2●3M, 3 with TSX P57 3●3M and T PCX 57 353M, 4 with TSX P57 453M			
Services				
Message handling	Ethway : Uni-TE, COM, application-to-application			
	TCP/IP : X-Way/Uni-TE message handling or Modbus message handling			
Integrated Web server	Integrated Web server : diagnostic, Web user page (1.4 Mb)		Integrated Web server : diagnostic	Integrated Web server : diagnostic Web user page (7.5 Mb)
Other	TCP Open function		I/O Scanning I/O exchanges (64 devices)	
Type of processor	All types of Premium processor			
Type of module	Standard format			
Type of intelligent module	TSX ETY 110	TSX ETY 110 WS	TSX ETY 410	TSX ETY 5101
Page	43601/13			

Industrial local area network conforming to the Fip standard	Industrial local area network conforming to the Modbus Plus standard	Jnet proprietary industrial local area network
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Fipway	Modbus Plus	Jnet
Fip standard	Modbus Plus standard	Isolated RS 485 20 mA CL
Bus managed by bus arbitrator	Rotating token	Rotating token
1 Mbps	1 Mbps	19.2 Kbps
Shielded twisted pair Fibre optic	Twisted pair Fibre optic	Twisted shielded pair
32 per segment 128 on all segments	32 per segment 64 on all segments	32 (16 if SMC PLC in the network)
1000 m per electrical segment 5000 m max.	450 m per segment 1800 m with 3 repeaters	1300 m 200 m depends on the network topology
	1 max.	3 max.
- Uni-TE - COM/shared table - Application-to-application - Telegram	Modbus message handling : - read/write variables - global database - Peer Cop service	Shared table 128 words in total (64 words if SMC PLC in the network)
-	-	-

Type III PCMCIA card on processor	Type III PCMCIA card on TSX SCY 21601 module
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TSX FPP 20	TSX MBP 100	TSX JNP 112	TSX JNP 114
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43592/3	43599/5	43603/3
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Premium automation platform

Bus modules

Selection guide

Applications Bus type	Open industrial fieldbus conforming to the Fip standard	Multi-component industrial bus		
				
Bus type (1)	Fipio (Agent)	Fipio (bus manager)	Uni-Telway character mode	Uni-Telway,
Structure Physical interface	Fip standard		Non isolated RS 485	Isolated RS 485
Method of access	Bus managed by bus arbitrator		Master/Slave	
Data rate	1 Mbps		1.2...19.2 Kbps	
Medium	Twisted pair Fibre optic		Double shielded twisted pair	
Configuration Max. no. of devices	32 per segment 128 on all segments (limited to 64 with TSX P57 1●3M processor)		5	28
Max. length	1000 m to 15 000 m (according to medium used)		10 m	1000 m
No. of links/station	1 max.		1 max.	According to consumption
Services	<ul style="list-style-type: none"> - Uni-TE - Periodic data exchanges (Agent function) - Application-to-application - Transparency of remote I/O exchanges 		Uni-Telway : <ul style="list-style-type: none"> - Uni-TE message handling, 128 bytes (Client/Server) - Application-to-application, 128 bytes - Transparency for any device in an X-Way architecture via a master 	
Type of processor	All types of Premium processor	TSX P57 ●53M T PCX 57 353M	All types of Premium processor	
Type of module	Type III PCMCIA card on processor	Integrated link on processor	Integrated Uni-Telway link	Standard format module
Type of intelligent module	TSX FPP 10	1 Integrated link	1 Integrated link AUX terminal port	TSX SCY 21601
Page	43593/3	43589/5	43594/6	43591/3

(1) InterBus-S bus, see page 43602/5, Profibus-DP bus, see page 43607/3, CAN open bus, see page 43615/3.

			Modem link	Open industrial fieldbus conforming to the AS-i standard
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character mode, Modbus/Jbus			Uni-Telway/ASCII	AS-i
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RS 232 D	Isolated RS 485	20 mA CL
Master/Slave		
0.3...19.2 Kbps		
Double shielded twisted pair		

RTC link
Master/Slave
V 32 - 9.6 Kbps
Telephone line

AS-i standard
Master/Slave
167 Kbps
2-wire AS-i cable

Point-to-point or via Modem	28	16
15 m	1000 m	1300 m

Point-to-point
Unlimited

31 sensor/actuator devices
100 m 200 m with repeater

table			1 max.	8 max.
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Uni-Telway : - Uni-TE message handling, 240 bytes (Client/Server) - Application-to-application 240 bytes - Transparency for any device in an X-Way architecture via a master Modbus/Jbus : - Master/Slave RTU or ASCII - 13 Modbus functions	-	
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Transparent exchanges with sensor/actuator devices
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Type III PCMCIA card Slot on processor and/or on TSX SCY 21601 module		
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Type III PCMCIA card on processor

Standard format module

TSX SCP 111	TSX SCP 114	TSX SCP 112
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TSX MDM 10

TSX SAY 100

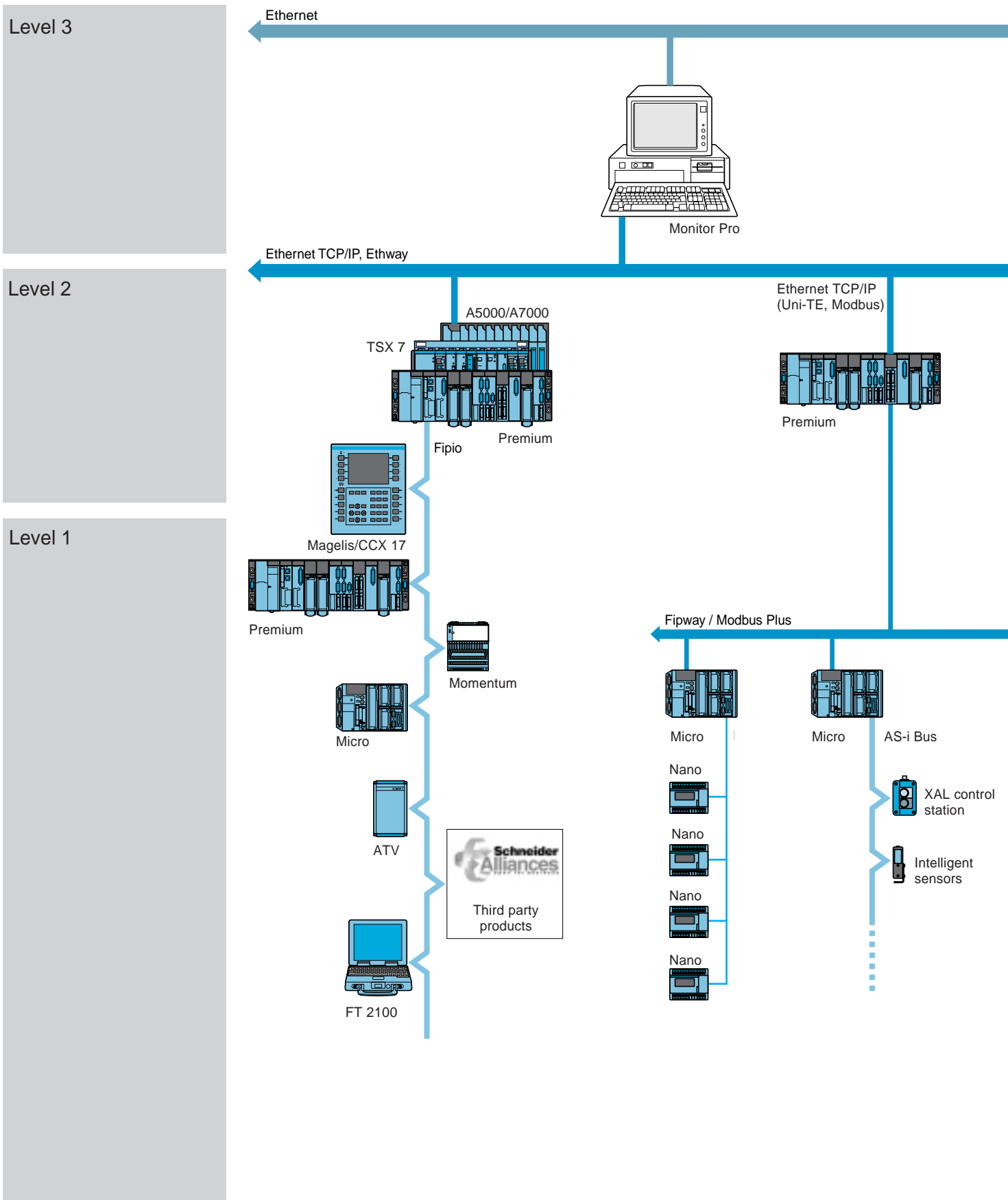
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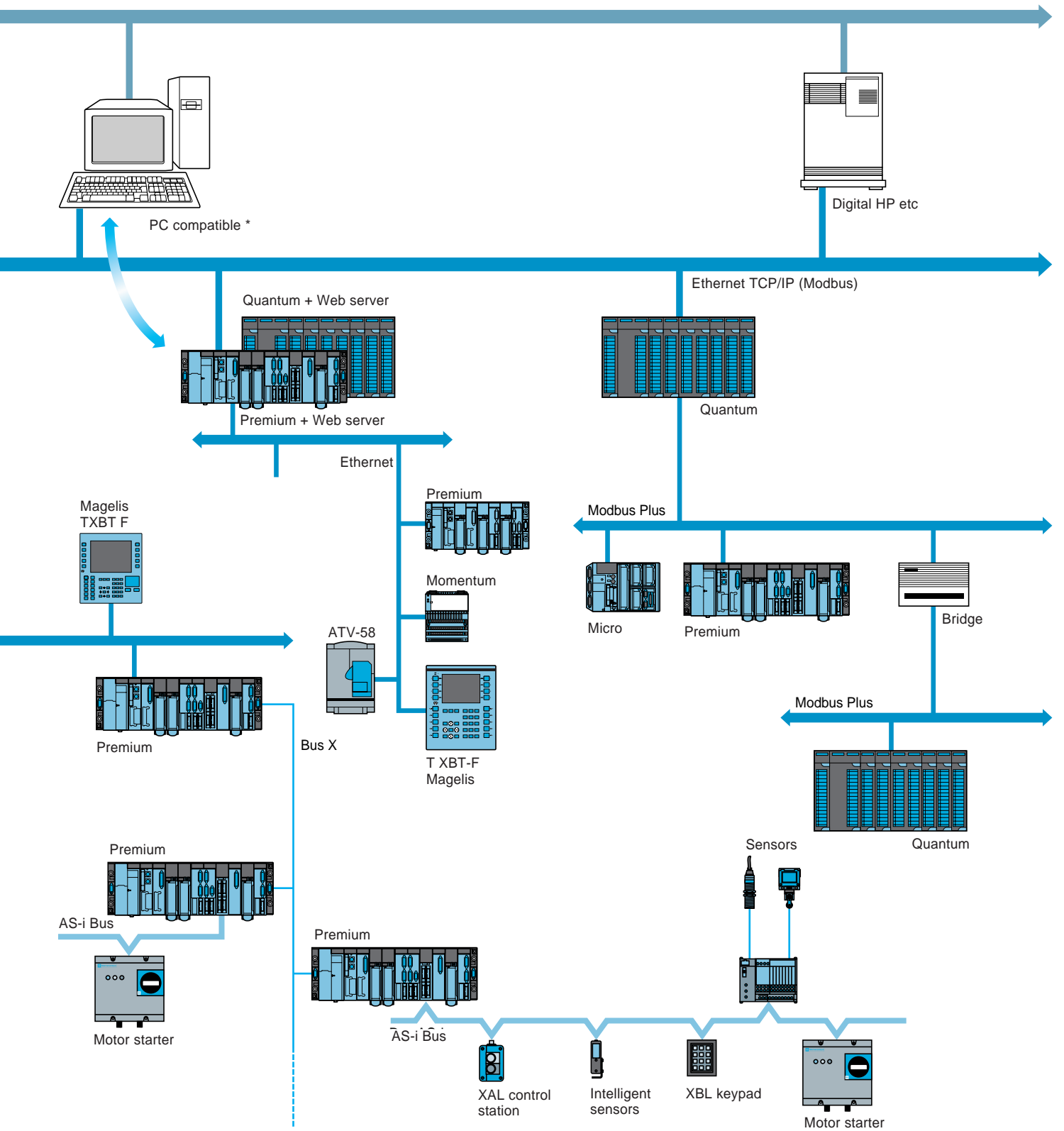
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Premium automation platform

Communication architecture





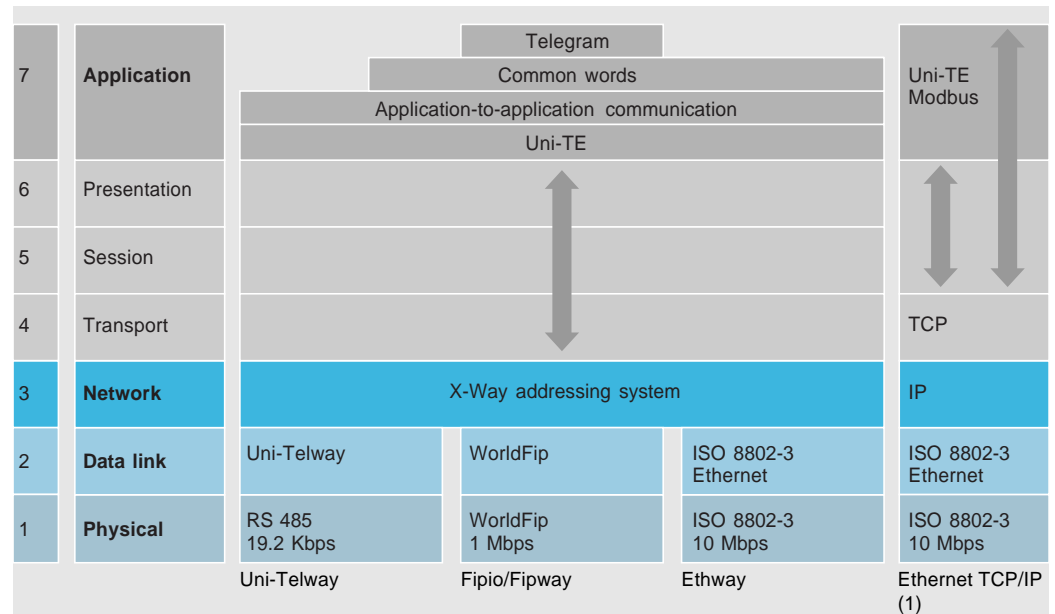
* "Thin Client" PC compatible : PC having only Windows and an Internet browser, see page 43601/6.

Premium automation platform

X-Way communication

X-Way and the OSI model

The "International Standards Organisation" (ISO) has put forward a reference model for communication structures, divided into seven essential functions. Entitled OSI (Open Systems Interconnect), it enables open systems to be interconnected, thus ensuring that products will operate together. The communication architecture of the Micro/ Premium PLCs, like that of TSX 17 or TSX model 40 PLCs, conforms to the OSI model.



Physical layer

- Enables the physical transmission of data signals between 2 systems via a medium.
- Uni-Telway is an isolated bus conforming to the RS 485 standard, with a standard data rate of 19.2 Kbps
 - Fipway conforms to the WorldFip standard, and is a 1 Mbps baseband bus
 - Fipio conforms to the WorldFip standard, and is a 1 Mbps baseband bus
 - Ethway/Ethernet TCP/IP conforms to the 8802-3 standard, and is a 10 Mbps baseband bus (1)

Data link layer

- Undertakes data transfer organized between two adjacent systems with error detection and correction.
- Uni-Telway : a fixed master manages access to the multidrop bus
 - Fipway conforms to the WorldFip standard, with access via bus arbitrator
 - Fipio conforms to the WorldFip standard, with access via bus arbitrator
 - Ethway conforms to the ISO 8802-2/8802-3 standards for the CSMA/CD bus (Carrier Sense Multiple Access with Detection Collision), better known as Ethernet

Network layer

Undertakes the routing of data and the selection of a path between 2 devices. The addressing mechanism enables the transfer of data between products and ensures automatic and totally transparent routing of messages.

Application layer

- Concerns application programs, data exchange and cooperation conventions.
- Uni-TE message handling system : standard on all Schneider equipment, this service enables read and write access to variables, program transfers, management of device operating modes, link and device diagnostics and transmission of unsolicited data
 - COM distributed database : set of words shared between several devices and updated cyclically. This service is used to exchange data between TSX 17, Micro, Premium and TSX model 40 PLCs
 - Shared Table service (2) : set of words shared between several Micro and Premium PLCs and updated cyclically
 - Exchange of periodic data : data updated cyclically between the bus manager PLC (TSX model 40, April 5000/7000 or Premium) and the Agent device. This service is available on the Fipio bus (see page 43593/2)
 - Application-to-application communication : suitable for data table exchanges
 - Telegram : priority application-to-application communication for short, high-priority data exchanges

(1) Not available on Micro.

(2) Available on Fipway network. The COM distributed database service and the Shared Table service are mutually exclusive.

Premium automation platform

X-Way communication

Application services

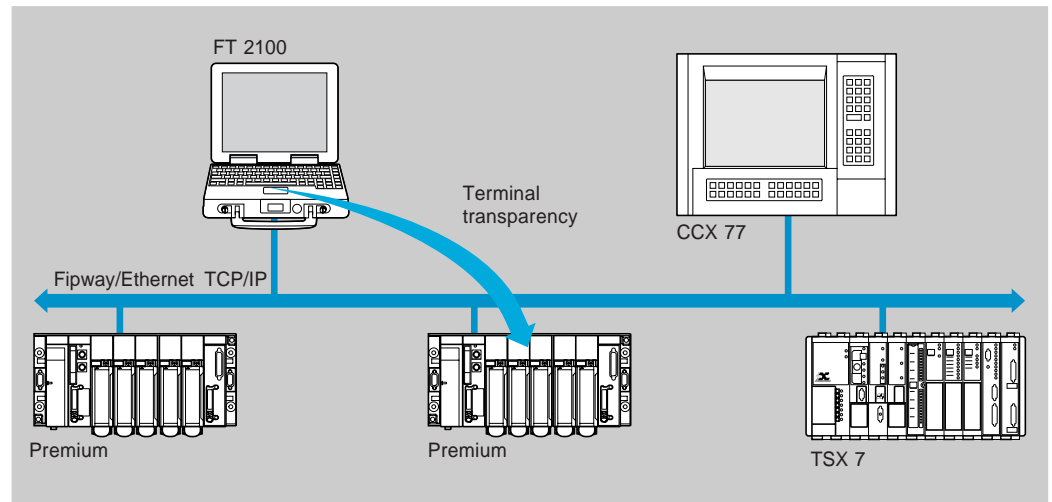
Uni-TE services

The Uni-TE protocol is the industrial message handling system supported by the X-Way communication architecture. It operates on the question/answer or request/confirmation principle.

A device which supports the Uni-TE protocol can be a :

- Client : this device initiates communication. It asks a question (reads), transmits data (writes) or sends an instruction (Run, Stop, etc)
- Server : this device executes the service requested by the client and sends a confirmation after execution

The services provided depend on the type of device (PLC, numerical controller, programming terminal, supervision station, etc). Depending on its function, each device can be Client and/or Server.



A Client device can access the system functions of a PLC (Server), even if there is no application program, to read/write language objects (bits, words, etc) upload/download programs, stop or start, etc.

A Client PLC can access other devices on the architecture via its application program. It can read/write objects on another PLC or numerical controller, select programs on a numerical controller, etc.

Uni-TE requests are sent using :

- Communication function library for Micro/Premium PLCs
- TXT text function blocks or OFB function blocks for TSX model 40 and TSX 17-20 PLCs

The Uni-TE request is transmitted at the end of the master task, and is received by the Client PLC at the start of the master task.

The Uni-TE service is particularly suitable for supervision, diagnostic and control functions.

Uni-TE service	Ethway, Ethernet TCP/IP	Fipway	Fipio	Uni-Telway
Request size	256 bytes or 1 Kbyte (1)	128 bytes	128 bytes	240 bytes (2)

Note :

The Uni-TE service can be used between stations connected on different Ethernet TCP/IP, Fipway, Fipio or Uni-Telway segments of the same multinet architecture (please consult our specialist catalogue).

Terminal transparency

FT 2100 programming terminals and PC compatible supervisors are Uni-TE clients. A terminal connected to any network station, or connected directly to the Fipway/Ethernet TCP/IP network, can communicate with any other station on the network (all the exchanges are transparent to the user) as though the terminal were physically connected to the PLC with which it establishes communication.

Terminal transparency can be used between stations connected on different Ethernet TCP/IP, Fipway or Fipio segments of the same multinet architecture.

(1) 256 bytes for synchronous requests and 1 Kbyte for requests processed in the background. Ethway, Ethernet TCP/IP not available on Micro PLC.

(2) Size limited to 128 bytes on Micro/Premium terminal port and TSX model 40 PLCs, and to 32 bytes on TSX 17-20 and TSX 47-20/25.

Premium automation platform

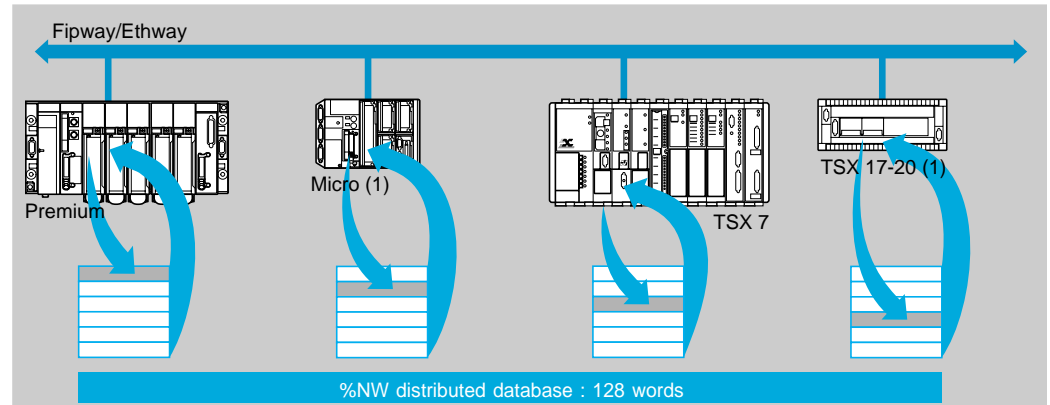
X-way communication

Application services (continued)

COM service : Distributed database

The COM service, available on the Fipway/Ethway (1) network, consists of a set of dedicated words known as common words (%NW on Micro/Premium PLCs and COM i, j, k on TSX 17-20 and TSX model 40 PLCs). Depending on its software configuration, each network station may or may not access the database (in read only or read/write mode).

All PLC stations exchanging common words (maximum 32 stations) are allocated, in a dedicated 128-word database, a write zone which is set at 4 words per Micro/Premium station (2) for the Fipway/Ethway network.



The COM words in a PLC are updated automatically during each scan of the general sequential program (master task) without the intervention of the application program : at the start of the scan for reading and at the end of the scan for writing. The user program consists simply of assigning or reading these common words (%NW). As the COM service has a zone of dedicated and preconfigured words, there is absolutely no risk of conflict of data between or within PLCs.

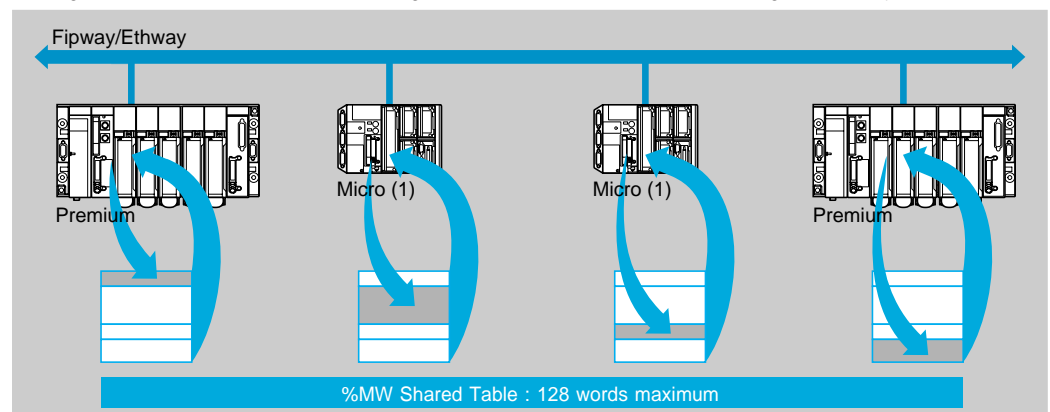
Shared Table service

This service exchanges a table of %MW internal words divided into as many zones as there are Micro/Premium PLCs which comprise the Fipway network. The exchange principle is based on the broadcasting, by each PLC, of a word memory zone (broadcast zone) to the other PLCs on the network.

Each network station is allocated an exchange table comprising %MW internal words.

The maximum characteristics of the exchange table are :

- 128 %MW internal words for 32 PLCs sharing the Shared Table service on the network
- Broadcast zone assigned to each PLC : variable from 1 to 32 %MW internal words (the size of the broadcast zone assigned to PLC n should be the same length in all the PLCs on the network sharing this service)



The exchange table in each PLC is updated automatically and independently of the program scan cycle. The user program consists of simply assigning or reading %MW words in the broadcast zone. The user must take care, when configuring and assigning broadcast zones, not to create memory conflicts between or within PLCs.

COM service and Shared Table service

These services are mutually exclusive and are recommended for the periodic broadcasting of status variables without loading the application program. For transmission of events, application-to-application communication with confirmation is more suitable.

Note :

The COM service or Shared Table service remains local to a Fipway network. Each network has its own distributed database. The Shared Table service is only available on Micro and Premium PLCs.

(1) Ethway not available on Micro and TSX 17-20.

(2) 0 or 4 common words for TSX model 40 stations with address 0 to 31 or for TSX 17-20 stations with address 0 to 15.

Premium automation platform

X-way communication

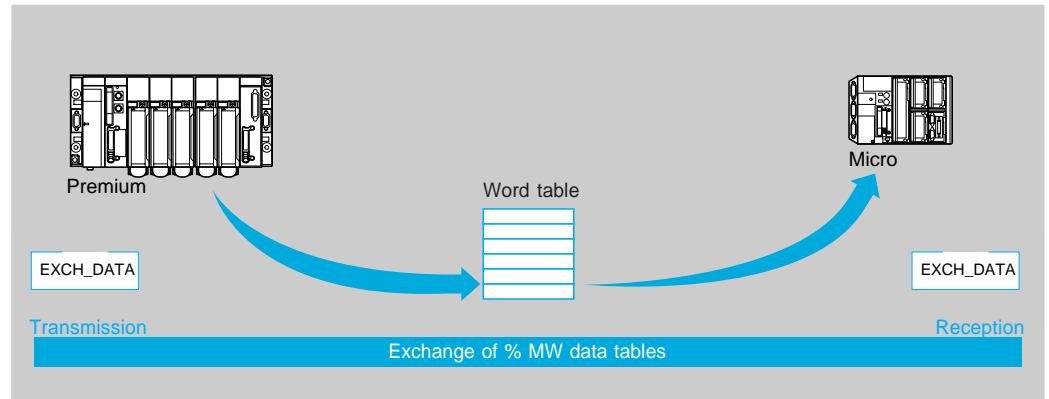
Application services (continued)

Application-to-application communication

This consists of sending word tables between 2 devices via the user application program.

For the following types of PLC :

- Micro/Premium, transmission and/or reception is via the DATA_EXCH text type data exchange function
- TSX 17 and TSX model 40, transmission and/or reception is via a TXT text block or a Uni-TE OFB function block



The application-to-application communication service is particularly suitable for :

- Sending alarm messages from a PLC to a supervision station
- Exchanging data tables between two PLCs controlled by the application programs of the transmission and destination device
- Sending broadcast messages to all stations and devices

Service	Ethway, Ethernet TCP/IP (1)	Fipway	Fipio	Uni-Telway
Size of application/ application messages	256 bytes	128 bytes	128 bytes	240 bytes (2)

Note :

This service can be used between stations connected on different Ethway, Ethernet TCP/IP, Fipway, Fipio or Uni-Telway networks on the same multinet architecture.

Telegram

The telegram service available on Fipway is a special case of application-to-application messages. It enables short messages to be sent and received on a priority basis. The maximum size of messages transmitted by telegram is 16 characters.

A telegram from a Micro/Premium PLC is sent immediately by the SEND_TLG transmission function (without waiting for the end of the scan). A telegram is received by a Micro/Premium PLC using the RECEIVE_TLG reception function in :

- The event-triggered task (processed as soon as the message arrives in the network card)
- The fast task or master task (when scanning the RECEIVE_TLG function)

A PLC can only process one telegram at a time.

The telegram service is suitable for short, high-priority messages.

Service	Ethway, Ethernet TCP/IP (1)	Fipway	Fipio	Uni-Telway
Telegram	-	16 bytes	-	-

Note :

The telegram service remains local to a network. It can be inhibited.

(1) Ethway, Ethernet TCP/IP not available on Micro PLCs.

(2) Size limited to 128 bytes on Micro/Premium terminal port, TSX model 40 PLCs and to 32 bytes on TSX 17-20 and TSX 47-20/25.

Premium automation platform

X-Way communication

Multinetwork uses

The X-Way addressing mechanism (network layer), enables several Ethway, Ethernet TCP/IP and/or Fipway networks or segments to be interconnected.

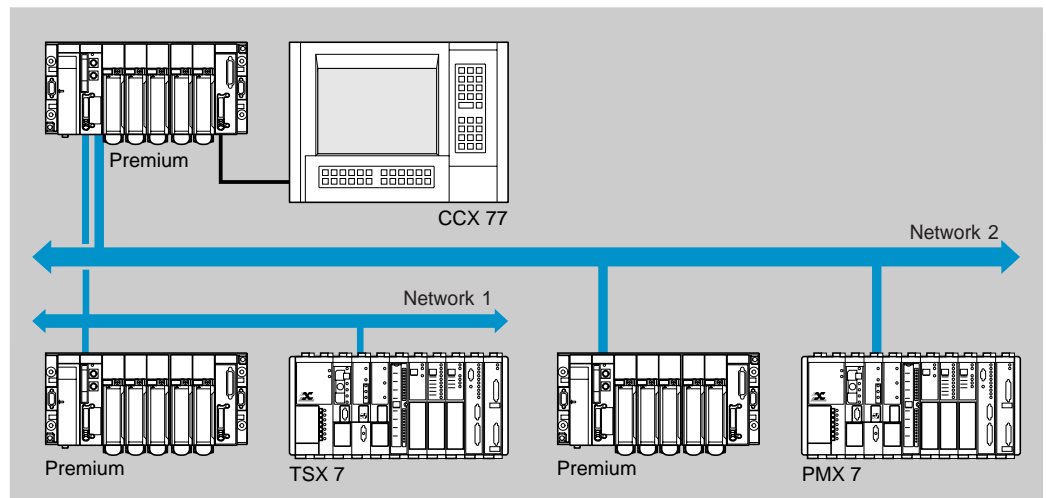
The X-Way communication architecture is designed to cover multinetwork applications capable of dealing with problems of concentration, redundancy and inter-network communication.

Concentration

This architecture can be selected when no inter-network exchange is possible. It is particularly suitable for feedback of supervision data to a higher level. The PLC in this case acts as a data concentrator.

This architecture allows the possibility of working on an assembly line without affecting production of the other lines.

The concentrator station collects and exchanges data with each network separately, but does not automatically route one network to another.



This is a multi-module architecture where several segments are present but no communication between these different segments is offered by the communication system.

In this case, the concentrator station belongs to the category of multi-module station and undertakes all single-network services on the various network segments. The routing function between the various network connections is not available.

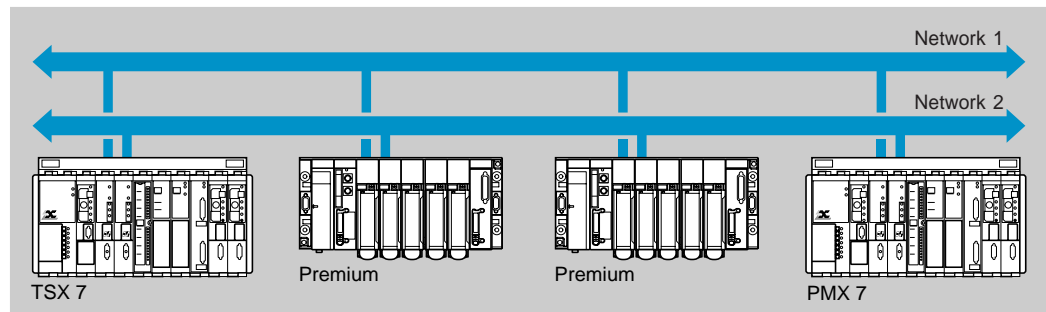
Network access redundancy

All stations are connected to 2 different Ethway, Fipway or Ethernet TCP/IP networks : Network 1 and Network 2 via 2 network communication modules. Each station will therefore have 2 addresses, one on each network. PLC application programs will share, for example, traffic on both networks : Network 1 and Network 2.

Each PLC will monitor correct operation of both networks. If one of the networks should fail, all traffic could be transferred to the valid network.

The traffic on both networks should be managed by the user program.

This structure increases safety and availability, as a malfunctioning network does not affect the operation of the control system.

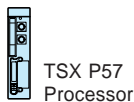
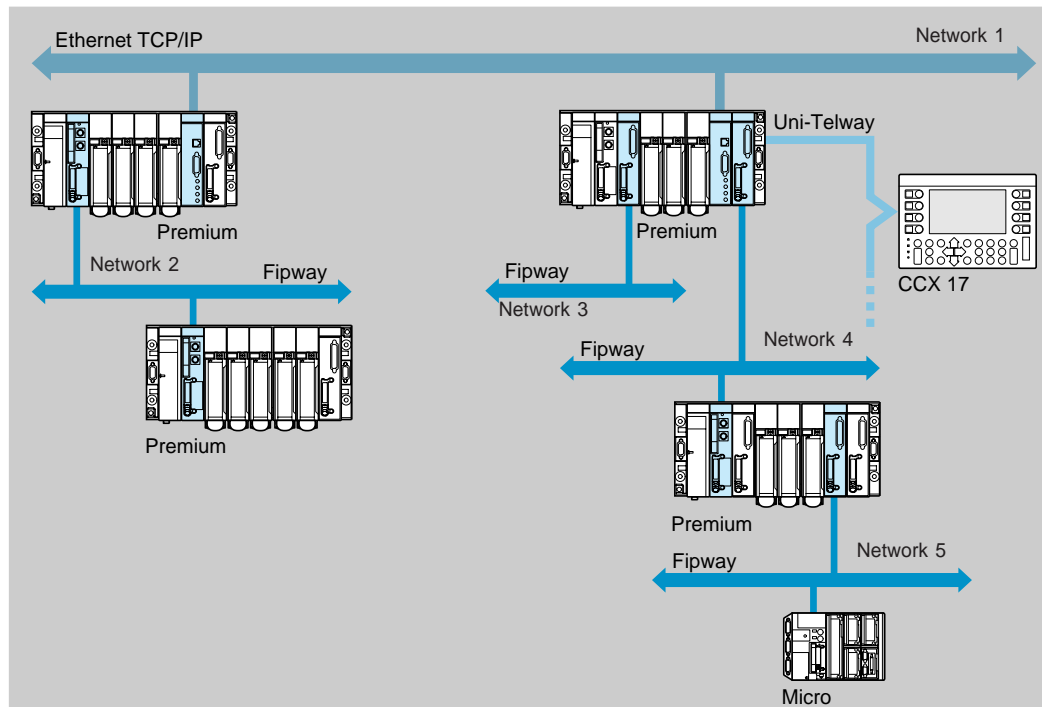


Premium automation platform

X-Way communication

Multinetwork uses

Inter-network communication



These architectures comprise several network segments which are interconnected by "bridge PLC" stations. Transparent communication is then offered between all devices present in this type of architecture.

These "bridge PLC" stations provide the same services as multi-module stations and ensure transparency of communication between the different network connections.

These architectures are particularly useful for applications which comprise a large number of devices. By linking functional organization to the amount of traffic, they enable both an increase in the surface area of the installation and an improvement in communication performance.

Ideally, architectures should have a hierarchical tree structure with a maximum of three network levels : a backbone segment (factory floor level) assigned to zone segments to which machine level segments could eventually be connected. For reasons of efficiency, inter-segment traffic should not exceed 10 to 20 % of the internal traffic of the segment.

Communication between X-Way networks is carried out by dedicated "bridge PLCs" which can support three or four network connections (1) depending on the model of PLC processor :

- **TSX 57-30** : 3 network connections (Ethway, Ethernet TCP/IP, Fipway, Modbus Plus)
- **TSX 57-40** : 4 network connections (Ethway, Ethernet TCP/IP, Fipway, Modbus Plus)

"Bridge PLC" modules are configured to receive all information necessary for routing. When routing occurs directly from module to module, no programming constraint is imposed, except when the communication module is integrated in the processor (possible in Fipway). In the latter case, the "bridge PLC" routing capacity will be inversely proportional to its scan time. It is therefore advisable to minimise the sequential processing to be performed by the PLC.

(1) The Modbus Plus module counts as one network connection but is not recognised as an X-Way module. It is therefore not capable of routing messages transparently to or from a Fipway, Ethway or Ethernet TCP/IP network.

Premium automation platform

X-Way communication

Performance

Selecting the communication architecture

When selecting an architecture, it is advisable to take performance into account at the earliest possible stage.

For this, the designer must :

- Have a clear idea of his needs :
 - quantity and type of devices to be interconnected
 - volume and type of exchanges
 - expected response times
 - environment
- Compare his needs with the characteristics of the offers available and be aware that the precise performance level between any 2 points on an architecture is dependent on the weakest link in the chain, which can be :
 - a function of the hardware
 - but also a function of the applications (size, architecture, OS, machine power, etc) which are often poorly defined at this stage of the project
- Select the most suitable architecture

The objective of the following pages is to answer the second point by explaining the performance of the different components which constitute an X-Way architecture, concentrating on the following 2 aspects :

- **Processing capacity in terms of volume** (see pages 43301/9 and 43301/10)
- **Application response time** (see page 43301/11)

Introduction

As in any communication system, the performance of an X-Way architecture is linked to numerous parameters which depend on the :

- Hardware used :
 - network passband
 - module resources
 - processor resources (PLC, PC or other CPUs)
- Application services used :
 - Uni-TE service, industrial message handling
 - application-to-application communication
 - COM service, distributed database (common words)
 - telegram service
 - inter-network routing on multinet architectures

The difficulty in determining the correct size of an architecture is due to the fact that the majority of these parameters are linked.

Notes

- For purposes of simplification, the values shown in the tables which follow have been reduced. If these are adhered to, correct operation of the architecture is ensured. If the performance levels obtained are not sufficient, please consult our Regional Sales Office for a more detailed study.
- The performance levels indicated depend relatively little on the size of messages. Limiting factors have much more to do with the number of messages. It is therefore necessary to group as much useful information as possible within the same message using the most suitable Uni-TE request.
This is particularly the case for Ethernet (Ethway or Uni-TE profile on TCP/IP) where the Uni-TE request processing capacity has been increased to 1 Kbyte and where these requests are processed in the background task, hence independently of the "conventional" processing of requests which remain synchronous with the PLC cycle.

Premium automation platform

X-Way communication

Performance

Processing capacity in terms of volume of exchanges

The methodology presented below in 4 steps can be used to determine the message processing capacity as a function of the physical support.

Step 1 : calculation of exchanges necessary for the application

Using the tables below, calculate the exchanges necessary for the application, ie for each station on the architecture and for each service used, the number of messages to be transmitted and received per second.

Uni-TE service (Client/Server message handling) (1)

Messages transmitted per second from	Station A	Station B	Station N	Total number of messages received per station
Messages per second	Station A			R1
	Station B			R2
destined for	Station N			Ri
Total number of messages transmitted per station	E1	E2	Ei	Network load $Cru = \sum [R1...Ri, E1...Ei]$

Application-to-application communication


Messages transmitted per second from	Station A	Station B	Station N	Total number of messages received per station
Messages per second	Station A			R3
	Station B			R4
destined for	Station N			Rj
Total number of messages transmitted per station	E4	E5	Ej	Network load $Cra = \sum [R3...Rj, E4...Ej]$

Multinetwork architecture

In a multinetwork architecture, it is necessary to take into account messages transmitted or those destined for stations on other networks on the architecture (for the Uni-TE service and application-to-application communication). Use the type of table below for each service and for each network which make up the architecture.

Messages transmitted per second from	Network 1 Station A	Station B	Station N	Total number of messages received per station
Messages per second	Network 1			
	Station A			R11
destined for	Station B			R12
	Station N			R1i
	Network 2			
	Station A			R13
	Station B			R14
	Station N			R1k
Total number of messages transmitted per station	E11	E12	E1i	Network load 1 (2)

Messages transmitted per second from	Network 2 Station A	Station B	Station N	Total number of messages received per station
Messages per second	Network 1			
	Station A			R21
destined for	Station B			R22
	Station N			R2i
	Network 2			
	Station A			R23
	Station B			R24
	Station N			R2k
Total number of messages transmitted per station	E21	E22	E2k	Network load 2 (3)

 Total number of messages to be compared with stages 2, 3 and 4

 Number of messages transmitted between stations

 Not applicable

(1) An identical table must be drawn up for the 1 Kb Uni-TE message handling available on Ethernet TCP/IP.

(2) Network load 1 : $\sum [R11...R1i, R21...R2i, E11...E1i]$.

(3) Network load 2 : $\sum [R13...R1k, R23...R2k, E21...E2k]$.

Premium automation platform

X-Way communication

Performance (continued)

Step 2 : station processor processing capacity

Using the table below, compare the total number of messages received via the Uni-TE service for each station (value R1, R2 or Ri) with the station processor processing capacity. If the result of this initial calculation is positive, go to step 3.

	Messages being received	Messages being transmitted
Uni-TE service	4 mes/cyc with TSX 57-10	
≤ 256 bytes (1)	8 mes/cyc with TSX 57-20	
	12 mes/cyc with TSX 57-30	
	16 mes/cyc with TSX 57-40	
≤ 1 Kbyte	30 mes/s	
Application-to-application		

Does not constitute a limiting factor

(1) On some PLC cycles a temporary overload, due for example to an adjustment terminal is permissible.
 mes/cyc : number of messages being received per cycle from the PLC master task (typical cycle from 50 to 100 ms).
 mes/s : number of messages transmitted and received per second.

Step 3 : bus or network module processing capacity

For each station, compare the total number of messages received (Σ [values Ri, Rj]) and the total number of messages transmitted (Σ [values Ti, Tj]) for station N for example) with the bus or network module processing capacity shown below. If the result of this second calculation is positive, go to step 4.

Uni-TE service and application-to-application	Ethernet TCP/IP		Fipway address		Fipio manager	Fipio address		Uni-Telway Modbus
	ETY 110/210	ETY 410/5101	< 32	≥ 32	address 0	# 63	= 63	Serial link
PLC module	60 (3)	400 (2) (3)	2T/2R (4)	1T/1R (4)	2T/2R (4)	2T/2 R (4)	2 T/2 R (4)	1T/1R (4)
PC compatible module			10 to 20 (3)	10 to 20 (3)			10 (3)	5 to 10 (3)

Bridge PLC

For bridge PLCs there are two different cases :

- Routing performed via Fipway/CPU : 2 messages/cycle being transmitted and 2 messages/cycle being received.
- For all other cases routing is performed directly from module to module : 30 messages/cycle capacity.

Does not constitute a limiting factor
 Not applicable

(2) 350 messages per second if using I/O Scanning function

(3) messages/second : number of messages transmitted and received per second

(4) messages/cycle : number of messages transmitted and number of messages received per cycle from the PLC master task (typical cycle from 50 to 100 ms).

Step 4 : network load

Compare the network load for each of the networks which make up the architecture (Σ [values Cru, CRa]) with the values in the table below. Where this is not possible, it is necessary to modify the architecture (or even the application) and to repeat the exercise until it conforms with the limits defined in the tables for steps 2 to 4.

Uni-TE service and application-to-application	Ethernet TCP/IP	Fipway	Fipio	Uni-Telway Modbus Serial link
Total messages		200 to 400 (3)	30 (3)	15 (3)

Does not constitute a limiting factor

messages/second : number of messages transmitted and received per second.

COM service and Telegram service

The system resources (PLC processors, modules and networks) are sufficient to perform the following exchanges

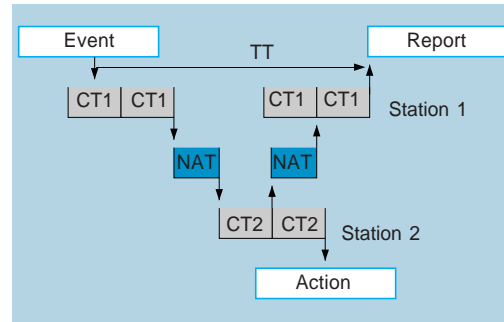
- Common words and updating (transmission and reception) at each PLC scan, provided that the total capacity of the network module is not exceeded :
 - Fipway not limited
- Telegram, transmission of one telegram and/or reception of one telegram per PLC scan and per module (function available only on Fipway card on processor)

Premium automation platform

X-Way communication

Performance (continued)

Application response time



PLC-module processor exchanges are, with the exception of telegrams (TLG), synchronous with the PLC cycle time, in the same way as I/O exchanges. When an event appears (input state 1 for example), a message can only be transmitted after this input has been taken into consideration (start of the following cycle) and the PLC program has been executed, ie approximately 1.5 cycles after the event has appeared.

TT = Transaction time
 CT1 = Device 1 cycle time
 NAT = Network access time
 CT2 = Device 2 cycle time

Network access time (NAT) shown in the table below as ms, totals the module transit time and the delay before the message can be transmitted across the network.

	Ethernet TCP/IP		Fipway	Fipio manager	Fipio agent	Uni-Telway
	ETY 110	ETY 410/5101				
Uni-TE service application to application	25 ms	< 10 ms	40 to 80 ms	5 ms	20 ms	300 ms
Telegrams			10 ms			
COM common words	25 ms		40 ms			

Service not available

Transaction time TT includes the delay between the transmission of a message from a client station 1, its reception by a server station 2, processing the request, sending back the response and its acceptance by station 1 (update of an output for example).

As the block diagram above shows, the duration of the transaction will be between :

- $TT_{min} = 2 \times CT1 + 2 \times NAT$ minimum
- $TT_{max} = 4 \times CT1 + CT2 + 2 \times NAT$ maximum

Average duration is :

- $TT = 3 \times CT1 + 0.5 \times CT2 + 2 \times NAT$

Note on 1 Kbyte message handling : average transaction time is identical.

Instead of processing the 1 Kbyte request cycle at the beginning of the cycle, processing is carried out at the end. In both cases, this depends similarly on the PLC server cycle time.

Multinetwork architecture

Where one or more "bridge PLCs" are spanned, it is necessary to add the transit time of the bridge(s), plus the access time to each of the networks.

If a bridge uses a Fipway card on a processor, the transit time is normally $1.5 \times BCT$, where BCT is defined as the PLC bridge cycle time.

For all other cases, routing is carried out directly from module to module. The bridge transit time is approximately 10 ms.

Premium automation platform

Communication module

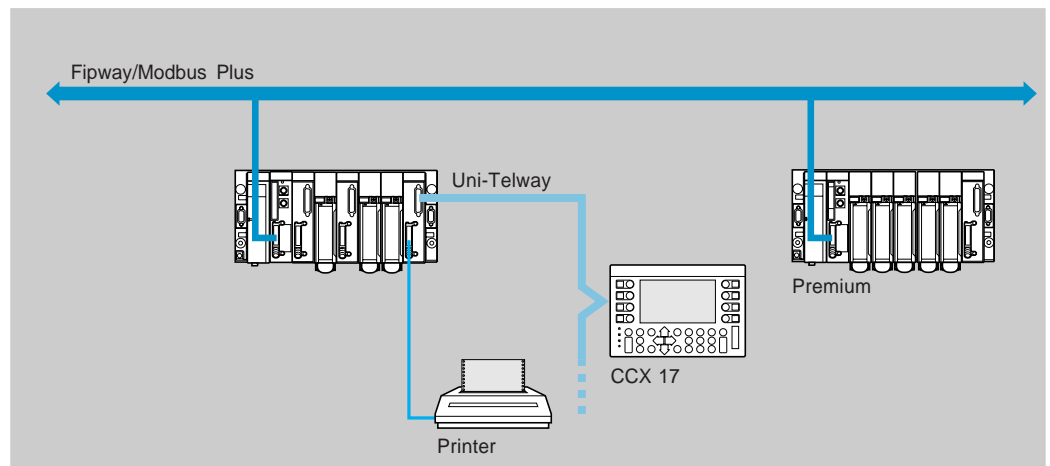
Presentation, characteristics

References :
page 43591/3

Presentation

The TSX SCY 21601 communication module increases the communication possibilities of Premium PLCs. The module has :

- An integrated channel, isolated RS 485 asynchronous serial link, half duplex with Uni-Telway, Modbus/Jbus and Character mode protocols.
- A PCMCIA host channel; supporting the following protocols :
 - Uni-Telway bus, Modbus/Jbus, character mode on RS 232 D link, current loop or RS 485
 - Jnet network
 - Fipway network



Selecting PCMCIA communication cards

Protocol	Multiprotocol : Uni-Telway Modbus/Jbus, Character mode		
Physical layer	RS 232 D (9 signals)	RS 485/RS 422	20 mA CL
PCMCIA card	TSX SCP 111	TSX SCP 114	TSX SCP 112

Protocol	Fipway	Jnet	Jnet
Physical layer	–	20 mA CL	RS 485
PCMCIA card	TSX FPP 20	TSX JNP 112	TSX JNP 114

When configuring Premium PLCs, the number of TSX SCY 21601 communication module channels must be added to the number of application-specific channels (TSX CTY counter, TSX CAY/CSY/CFY axis control and TSX ISP weighing modules). See pages 43511/5, 43513/5 .

The TSX SCY 21601 communication module counts as 2 application-specific channels.

Characteristics of the module integrated channel

Structure	Protocol	Uni-Telway	Modbus/Jbus	Character mode (ASCII)
	Type	Heterogenous industrial bus		Asynchronous serial link
	Physical interface	Isolated RS 485		
	Access mode	Master/Slave		Half duplex, Full duplex with RS 422
Transmission	Binary speed	1.2 to 19.2 K bits/s		
	Medium	Double twisted shielded pair		Twisted shielded pair
Configuration	Number of devices	28 devices maximum 98 link addresses maximum		1 device (point-to-point) to 32 devices maximum
	Length of bus	1000 m excluding tap link		
	Tap links	20 m maximum	15 m maximum	
Services		See page 43594/2	See page 43595/3	See page 43596/2

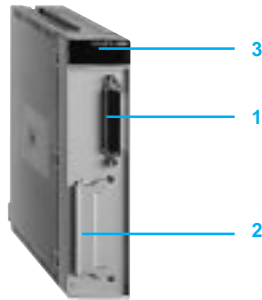
Premium automation platform

Communication module

Description, references

Characteristics :
page 43591/2

Description



The front panel of the TSX SCY 21601 communication module has :

- 1 A 25-way SUB-D connector for connecting the isolated RS 485 integrated channel
- 2 A slot for a PCMCIA type III communication card, which can take :
 - a TSX SCP 111/112/114 multiprotocol card
 - a TSX JNP 112/114 Jnet card
 - a TSX FPP 20 Fipway card
- 3 A display panel consisting of 3 LEDs :
 - RUN lamp : module operating
 - ERR lamp : module fault
 - CH0 lamp : integrated channel transmitting or receiving data (lamp refers to the PCMCIA card channel opposite indicated by the COM lamp)

References

Communication module

Description	Integrated link		Slot PCMCIA type III	Reference (1)	Weight kg
	Protocol	Physical layer			
Communication module (2)	Uni-Telway Modbus/Jbus Char. mode.	RS4852-wire isolated (half duplex) (3)	- TSX SCP 11● 20 mA CL and RS 485/232D serial link - TSX JNP 114/112 20 mA CL and RS 485 Jnet network - TSX FPP 20 Fipway network	TSX SCY 21601	0.360



TSX SCY 21601

Connecting cables for integrated channel

Description	Device to be connected	Physical link	Protocol	Length	Reference	Weight kg
Cables for integrated link (1)	TSX SCA 50 passive junction box (2)	RS 485 (2-wire, isolated)	Uni-Telway	3 m	TSX SCY CU 6030	0.180
			Modbus/Jbus	3 m	TSX SCY CM 6030	0.180
	TSX SCA 62 passive subscriber socket (3)	RS 485 (2-wire, isolated)	Uni-Telway	3 m	TSX SCY CU 6530	0.200
	Terminal RS 485 (2)	RS 485 (2-wire, isolated)	Character mode	3 m	TSX SCY CM 6030	0.180

End of connection cable fitted with :

- 1 25-way SUB-D male connector
- 2 Flying leads
- 3 15-way SUB-D male connector

(1) Product supplied with a multilingual instruction booklet : English and French.

(2) The maximum number of TSX SCY 21601 modules depends on the total number of application-specific channels allowed by the processor (see pages 43511/8 and 43513/5). Number of application-specific channels of the TSX SCY 21601 module : 2.

(3) Full duplex operation with RS 422.

Premium automation platform

Ethernet TCP/IP network

Presentation

Characteristics :
pages 43601/11 and 43601/12
References :
page 43601/13

Premium platforms connect to the Ethernet TCP/IP network via 4 modules :

- TSX ETY 110, which includes 2 communication profiles; Ethway and TCP/IP on Ethernet 10 Mbps
- TSX ETY 110 WS, which includes the same 2 profiles plus the integrated Web server function
- TSX ETY 410, which includes the TCP/IP profile with the I/O Scanning function on Ethernet 10/100 Mbps and reduced Web server
- TSX ETY 5101, which includes the same profile as the TSX ETY 410 module plus the integrated Web server function

Ethway and TCP/IP profiles

Notes on the OSI architecture

	OSI model	Ethway profile	Ethernet TCP/IP profile
7	Application	Uni-TE COM	Uni-TE/X-Way Modbus
6	Presentation	↑ ↓	↑ ↓
5	Session		
4	Transfer		
3	Network	X-Way addressing	IP
2	Link	LLC IEEE 802.2 MAC IEEE 802.3	Ethernet II or LLC IEEE 802.2 MAC IEEE 802.3
1	Physical	CSMA-CD IEEE 802.3	CSMA-CD IEEE 802.3

Nowadays, applications for distributed control systems can use a single communication network which meets not only the demands for realtime performance on the factory floor but also the need for open access to control/monitoring software based on products using standard communication protocols or applications using Internet technology.

Ethernet responds to these different needs in terms of data rate, capacity for open access on TCP/IP and flexibility in terms of topology.

All these criteria are reinforced by the capacity of the Schneider offer to provide high-level services which enable the user to reduce his development and operating costs.

These services are :

- Ethway, which incorporates all the mechanisms of the X-Way communication architecture (X-Way addressing system, Uni-TE message handling, COM distributed database), but on a proprietary protocol
- Standard TCP/IP protocol for communication with :
 - the entire X-Way architecture using X-Way/Uni-TE message handling
 - Quantum devices using Modbus message handling
 - M1 processors on Momentum I/O base units using Modbus message handling
 - I/O type peripheral devices, by simple configuration, I/O Scanning I/O exchange function
 - a PC terminal supporting an Internet browser
 - third-party products using any protocol on TCP/IP courtesy of the TCP Open function
- The SNMP V1 network agent function. All Ethernet modules integrate the standard MIB II (Management Information Base RFC 1213) and are compatible with the main commercially available network administration software programs.

Communication services common to all X-Way networks, Uni-TE message handling, application to application communication or common words, which are available on Ethway or TCP/IP, are detailed on pages 43301/2 to 43301/7 of this section.

The following pages describe only those services specific to Ethernet TCP/IP :

- The I/O Scanning I/O exchange function, see page 43601/5
- The integrated WEB server function, see page 43601/6
- Open access to third-party protocols with the TCP Open function, see page 43601/8

Premium automation platform

Ethernet TCP/IP network

Functions

Characteristics :
pages 43601/11 and 43601/12
References :
page 43601/13

Module selection

Module types	TSX ETY 110	TSX ETY 110 WS	TSX ETY 410	TSX ETY 5101
Ethernet connection				
AUI port for direct Ethernet 10base5 connection				
RJ45 SFTP port for 10baseT connection				
RJ45 SFTP port for 100baseTX connection				
Inter-PLC communication				
Ethway for communication with TSX Series 7 or Series 1000 PLCs				
TCP/IP with Modbus or Uni-TE protocol				
Network management				
SNMP agent				
I/O exchanges				
I/O Scanning function				
Internet access				
Integrated Web server Diagnostic				
Web user page				
Performance				
Data rate				
Processing capacity				
Integrated Web application size				

Functions offered by the module

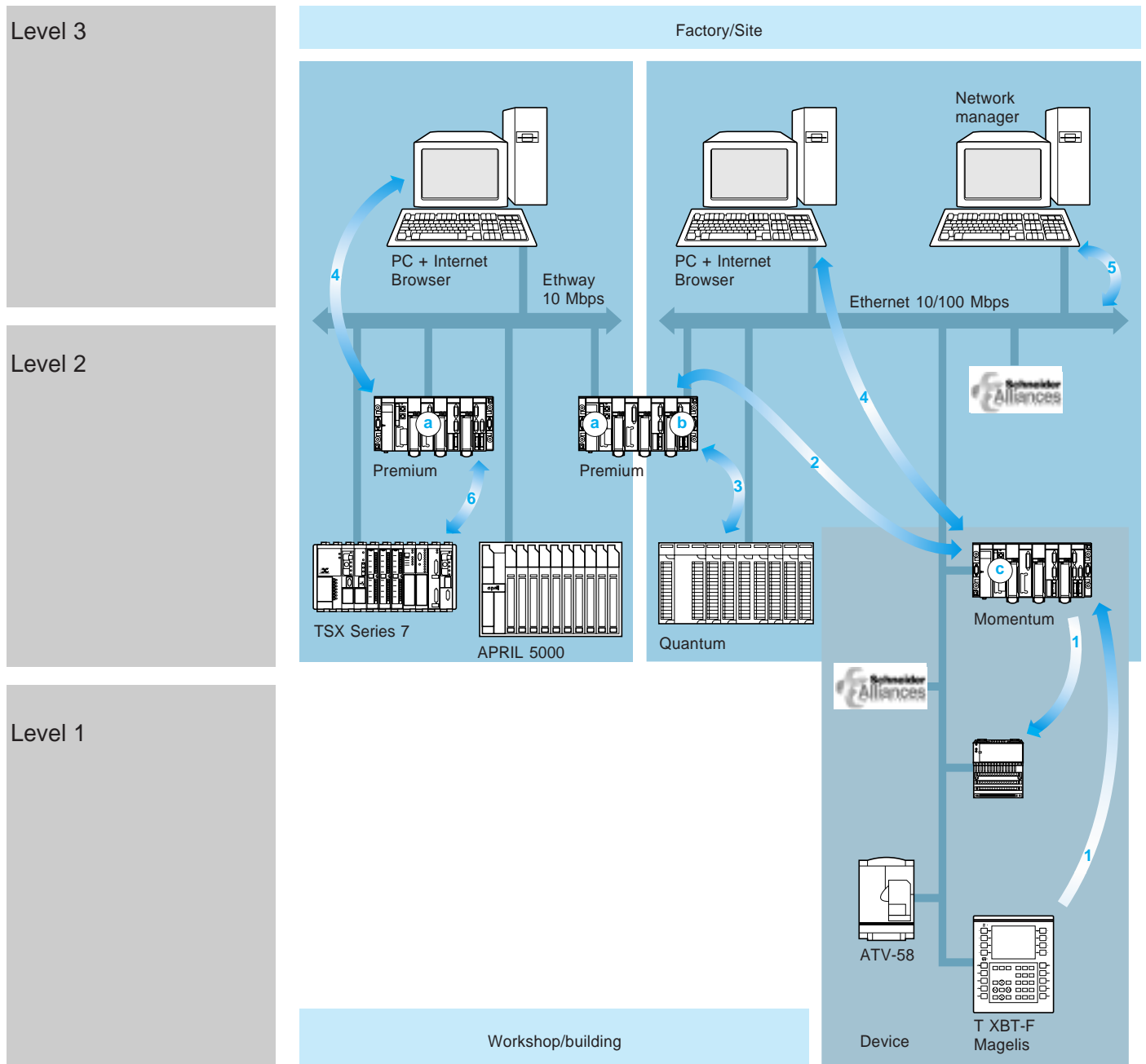
Premium automation platform

Ethernet TCP/IP network

Functions

Characteristics :
pages 43601/11 and 43601/12
References :
page 43601/13

Presentation



- 1 I/O Scanning service
- 2 TCP/IP Uni-TE message handling
- 3 TCP/IP Modbus message handling
- 4 Integrated Web server access
- 5 SNMP
- 6 Ethway service

- a TSX ETY 110 WS Ethernet module
- b TSX ETY 410 Ethernet module
- c TSX ETY 5101 Ethernet module

Note : The TSX ETY 110/110 WS, TSX ETY 410/5101 Ethernet modules for Premium PLCs ensure transparent routing of X-Way and Uni-TE messages from a TCP/IP network to an X-Way network and vice-versa.

Premium automation platform

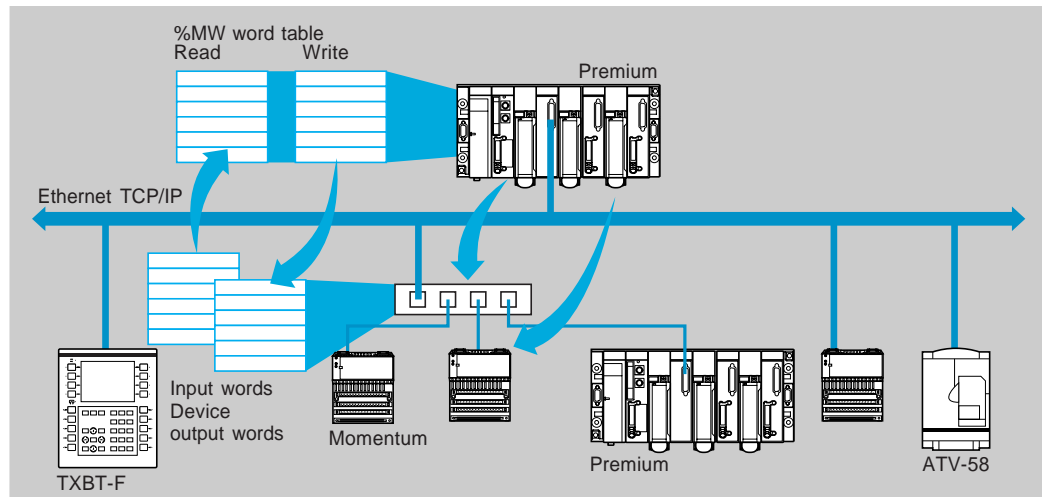
Ethernet TCP/IP network

Functions (continued)

Characteristics :
pages 43601/11 and 43601/12
References :
page 43601/13

I/O Scanning service (available on TSX ETY 410/5101 modules)

Schematic diagram



TSX ETY 410/5101 modules can be used to exchange distributed I/O on the Ethernet network after a simple configuration operation, with no need for special programming.

The I/O are scanned transparently by means of read/write requests according to the Modbus Master/Slave protocol on the TCP/IP profile. This principle of scanning via a standard protocol enables communication with any device which supports a Modbus server on TCP/IP.

This service can be used to define :

- An %MW word zone reserved for reading inputs
- An %MW word zone reserved for writing outputs
- Refresh periods independent of the PLC scan

During operation, the module :

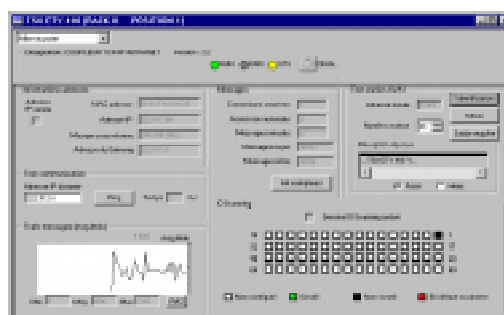
- Manages the TCP/IP connections with each of the distributed devices
- Scans the devices and copies the I/O into the configured %MW word zone
- Feeds back status words so that correct operation of the service can be monitored from the PLC application
- Applies the preconfigured fallback values in the event of a communication problem

Within the framework of the Schneider Alliances partnership program (see pages 43601/9), Schneider Electric has developed an offer of hardware and software products which enable the I/O Scanning protocol to be implemented on any type of product which can be connected to the Ethernet network (please consult your Regional Sales Office).

I/O Scanning service configuration

The I/O Scanning function configuration screen in PL7 can be used to fill in the IP addresses of the peripheral devices, their scan period (fast, normal or slow), the fallback positions in the event of a fault, the addresses of the %MW words used to interface with the devices whose I/O are exchanged, as well as a comment.

I/O Scanning diagnostics



The PL7 debug screen associated with TSX ETY 410/5101 modules can be used to display the state of each distributed device in real time.

A graphic representation of the Ethernet network enables instantaneous diagnostics of the configured, scanned or faulty I/O devices.

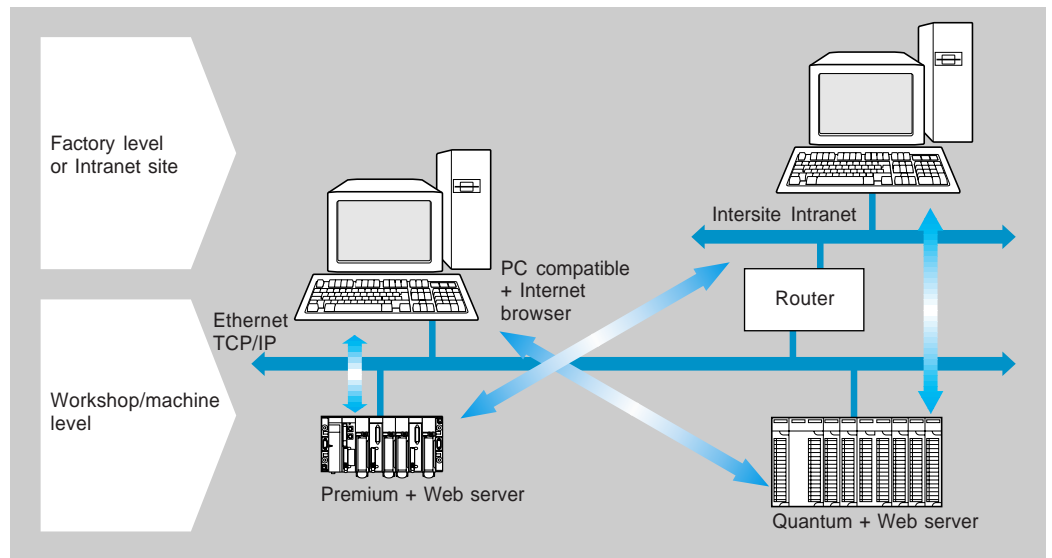
Premium automation platform

Ethernet TCP/IP network

Functions (continued)

Characteristics :
pages 43601/11 and 43601/12
References :
page 43601/13

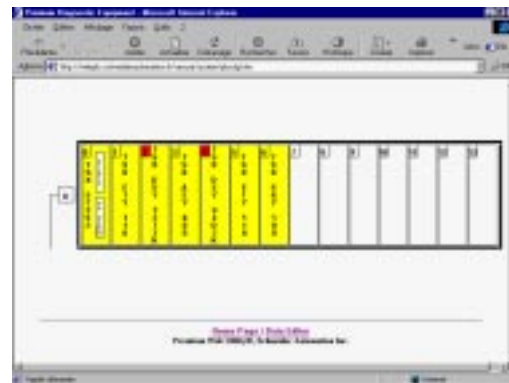
Integrated Web server



TSX ETY 110 WS/410/5101 Ethernet modules also include the integrated Web server function. This server is a PLC real-time data server. All the data from the Premium processor supporting one of these modules is presented in the form of Web standard pages in HTML format and can therefore be accessed by any Internet browser on the market which is capable of executing integrated Java code.

None of the functions provided by the Web server require any configuration or programming of either the Premium PLC or the PC compatible supporting the Internet browser. Moreover, this module can be used in an existing configuration without any modification of the resident program.

PLC system diagnostics function (available on TSX ETY 110 WS/410/5101 modules)



The PLC system diagnostics function is a predefined secure function (accessed by password) which displays in real time, from an Internet browser:

- The Premium platform configuration
- Detailed diagnostics of each module belonging to that configuration, whether the modules are local or remote
- The state of the I/O

Access function for PLC variables and data (available on TSX ETY 110 WS/410/5101 modules)



The variables access function is a predefined secure function (accessed by password) which accesses all the PLC data in read or write mode.

The variables to be displayed can be entered and displayed either with symbolic addresses (S_Pump 234) or identifier (%MW99). These variables can only be accessed in write mode if they have been "authorised" using the Web Utility configuration (supplied with the module). To write a value in a variable, a second password must be entered and confirmed.

Animation tables, containing certain application variables to be monitored or modified, can be created by the user and saved in the module supporting the Web server function.

Premium automation platform

Ethernet TCP/IP network

Functions (continued)

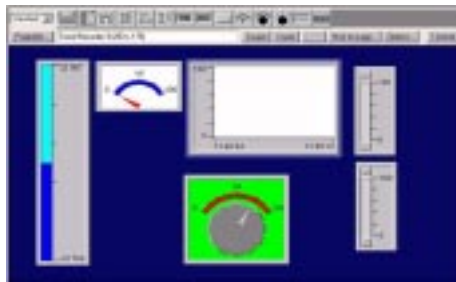
Characteristics :
pages 43601/11 and 43601/12
References :
page 43601/13

Alarm display function (available on TSX ETY 110 WS/5101 modules)



The alarm display function is a predefined secure function (password-protected). Available with Premium PLCs, it can be used to process alarms (display, acknowledgment and clear) managed at PLC level using monitoring function blocks known as Diagnostic DFBs. These alarms are processed in exactly the same way as those for the "viewer" screens included in PL7 Pro and Monitor Pro software, CCX 17 operator panels or Magelis XBT-F/T XBT-F terminals (see page 43106/3).

Graphic object editor function (available on TSX ETY 110 WS/5101 modules)



The graphic object editor function can be used to create graphic views which include animated graphic objects relating to PLC variables. These customisable views can be used in user Web pages (see "Displaying predefined Web pages" below). These views are created by means of simple copy/paste operations, and the object parameters are defined according to the user's requirements (colour, PLC variables, name, etc). Views created in this way can be saved transparently to TSX ETY 110 WS/5101 Ethernet modules.

Displaying predefined Web pages (available on TSX ETY 110 WS/5101 modules)



TSX ETY 110 WS/5101 Ethernet modules with integrated Web server have an accessible Flash EPROM (1) memory zone, which is like a hard disk and receives (hosts) Web pages defined by the user.

These Web pages can be created with any standard tool which creates and edits in HTML format (FrontPage, Word 97, PowerPoint, etc). Web pages created in this way can, amongst others :

- Display all PLC variables in real time
- Execute hyper links to external servers (documentation, suppliers, etc)

This function is particularly suitable for creating graphics and images intended for :

- Display, monitoring, diagnostics
- Drawing up reports on real-time production
- Maintenance assistance
- User manuals
- etc

Integrated Web server configuration tool (available on TSX ETY 110 WS/5101 modules)



The FactoryCast software, supplied on a CD-ROM with the TSX ETY 110 WS/5101 modules, is the tool which configures and administers the integrated Web server in this module. It is common to the Premium and Quantum automation platforms and is compatible with Windows 95/98 and Windows NT.

It provides the following functions :

- Definition of User names and associated passwords
- Definition of access to PLC variables which have modification authorisation
- Save/restore a complete Web site
- Transfer Web pages created locally by the user on his PC compatible workstation to the TSX ETY 110 WS/511 module and vice versa

(1) Memory immune to power breaks and PLC resets.

Premium automation platform

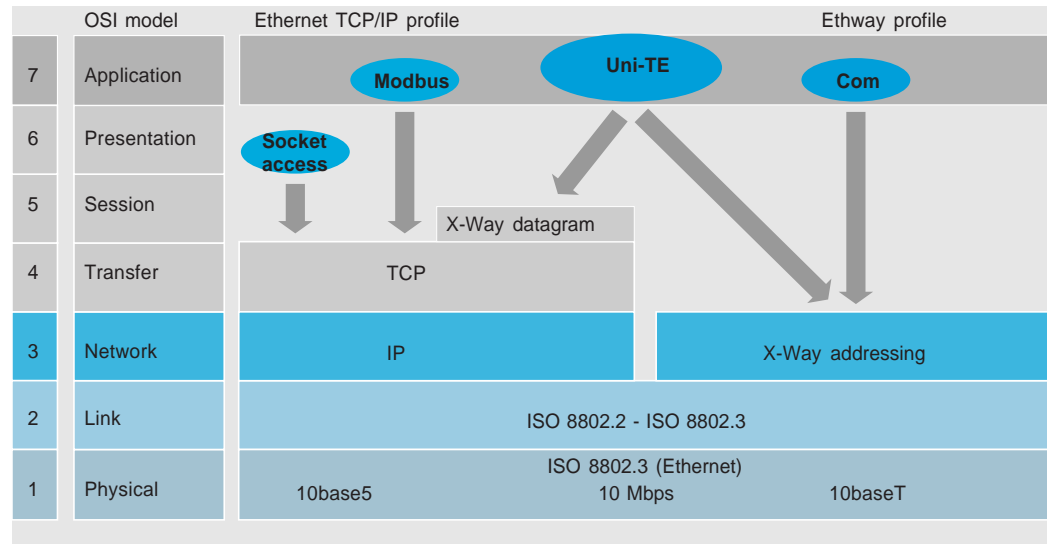
Ethernet TCP/IP network

Functions (continued)

Characteristics :
pages 43601/11 and 43601/12
References :
page 43601/13

TCP Open open access (available on TSX ETY 110 WS modules)

Schematic diagram



The Premium platform Ethernet modules support a number of communication protocols based on the TCP/IP standard. Among these, the Modbus protocol has public specifications and its simplicity recommends it for the needs of communication with third-party devices (see Schneider Alliances partnership programme). However, for certain applications, it may prove necessary to use other protocols. This is the case when, for example, users wish to integrate Premium platforms into existing architectures which use a particular communication protocol, possibly a proprietary one.

To meet these needs for open access, 2 interface levels are included in the Schneider offer :

- A library of basic functions, which can be used in C language, enables direct access to the socket interface on TCP. The user can thus create his own communication functions using SDKC development software and take advantage of the ease of use which this program offers in terms of development and debugging. Once generated, these function blocks are used in the application like any standard PL7 programming software function block.
- A library of basic function blocks known as EFs, which can be used directly in the application programs with PL7 language. These are the same as functions developed in C language seen earlier, but are designed for use by non-computer specialists. These EF function blocks are not modifiable.

Functions

Operating in TCP connection client/server mode, the basic functions on the Berkeley socket interface enable :

- Management of 16 connections on the Open profile out of a maximum of 32
- Creation of sockets and their attachment to any TCP port
- Passage of these sockets to "listen for a connection request from a remote client" mode
- Opening of a connection
- Transmission and reception of data on these connections (240 bytes max.)
- Closing this connection

Premium automation platform

Ethernet TCP/IP network

Functions (continued)

Characteristics :
pages 43601/11 and 43601/12
References :
page 43601/13

TCP Open open access (available on TSX ETY 110 WS modules)

Description

The TCP Open offer consists of a CD-ROM containing the TCP/IP function libraries. Open access on TCP is only possible via the TSX ETY 110 WS Ethernet module (1). With open access on TCP, all the basic functions of TSX ETY 110 WS modules can be used.

The TCP/IP TLX CD TCPA 33 E function library comprises :

- The SDK C program enhancement library provides access to the module TCP/IP socket functions
- The user's manual in English (no printed version)
- EF elementary communication function blocks (Socket/Bind/Listen/Accept/Shutdown/Close/Send/Receive/Select/Set_Socket_Option/Connect) for installation using PL7 software (version \geq V3.3)
- Higher level EF function blocks, provided by way of example, which can perform more advanced functions such as the complete sequence for establishing or closing a connection, or sending or receiving data. The source files for all these EF blocks are also supplied.
- An example of a PL7 application communicating with a TELNET application on a PC

If dedicated function blocks need to be created, the SDKC program for C language function development, version \geq V3.3 should be installed on the development station (see page 43101/3).

Setup precautions

The development of C language functions requires compliance with certain setup precautions :

- To set up these services, the user should be familiar with the TCP/IP profile.
- In addition, since the SDK-C program enables access to all the PLC internal resources, all the necessary precautions should be taken when developing EF communication blocks to avoid endangering the PL7 application, especially on the commonly fragile operating modes such as cold/warm restarts, response to a fault, etc.
- The user should also take care to maintain the requests from the different communication profiles at a level compatible with the performance required by the application.
- Finally, it is the responsibility of the client application software (PL7 or C program) to manage the operating modes for communication which may be specific to the application, for example the behaviour if a remote device fails to respond or in the event of a break in connection.

For these different reasons, **we recommend that you consult your Regional Sales Office to ensure that your TCP protocol open access project is feasible.**

(1) Open access on TCP requires TSX ETY 110 WS modules version \geq PV 03 and SV 2.9. In addition, it should be integrated in a configuration with a TSX P57 ●●3 processor (or TSX P57 ●●2 version \geq V3.3).

Premium automation platform

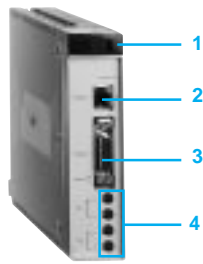
Ethernet TCP/IP network

Description of Ethernet TSX ETY modules

Characteristics :
pages 43601/11 and 43601/12
References :
page 43601/13

Description of TSX ETY 110/110 WS modules

The TSX ETY 110/110 WS modules are single format modules which are installed in a rack slot of a Premium PLC station.



The front panel on the TSX ETY 110/110 WS module comprises :

- 1 A display block indicating the state of the module
- 2 A standard connector for 10baseT interface (RJ45)
- 3 A standard connector for 10base5 interface (AUI)
- 4 Four thumbwheels for defining the station number and network number

The maximum number of modules permitted (1 to 4) per configuration depends on the type of processor, see page 43601/13.

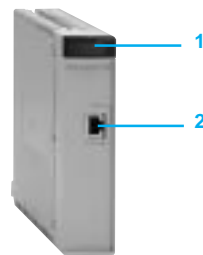
Connection of TSX ETY 110/110 WS modules

TSX ETY 110/110 WS modules can be connected in two ways :

- By a 10base5 interface (AUI), see page 43616/3 or accessories and connection cables
- By a 10baseT interface (RJ45), see page 48190/7 for accessories and connection cables

Description of TSX ETY 410/5101 modules

TSX ETY 410/5101 modules are single format modules which are installed in a rack slot of a Premium PLC station.



The front panel on the TSX ETY 410/5101 module comprises :

- 1 A display block indicating the state of the module
- 2 A standard connector for 10baseT interface (RJ45)

The maximum number of modules permitted (1 to 4) per configuration depends on the type of processor, see page 43601/13.

Connection of TSX ETY 410/5101 modules

TSX ETY 410/5101 modules can be connected by a 10base T interface (RJ45), see page 48190/7 for accessories and connection cables.

Premium automation platform

Ethernet TCP/IP network

Characteristics

References :
page 43601/13

Characteristics of TSX ETY 110/110 WS modules

Structure	Type	Heterogeneous industrial local area network conforming to IEEE 802.3 standard
	Topology	Bus with active tap links (for 10base5 medium) Star network (for 10baseT medium)
	Method of access	Direct access with collision detection according to IEEE 802.3 (CSMA-CD) standard
Transmission	Mode	Manchester base band (10base5 or 10baseT)
	Data rate	10 Mbps
	Medium	Triaxial cable 50 Ω for 10base5 Double twisted pair impedance 100 Ω ± 15 Ω for 10baseT
Configuration (10base5)	Number of stations	64 max. per network
	Length of network	500 m maximum for electrical link between 2 end stations on one segment
		1500 m max. total length for electrical link (3 segments connected by 2 repeaters)
		2800 m max. total length for mixed electrical/fibre optic link (3 electrical segments and 1 x 1000 m fibre optic segment connected by 1 repeater and 2 electrical/fibre optic half-repeaters)
	Tap links	4 shielded twisted pairs 50 m maximum, AUI interface (Attachment Unit Interface)
Multinetwork	Possibility of interconnecting 127 X-Way networks	
Configuration (10baseT)	Number of stations	Point-to-point connection (via RJ45 standard connector) enabling the formation of a star network (the stations are connected to concentrators or switches) 64 stations maximum per network
	Length	100 m max. between concentrator and terminal device

Module services and functions

TCP/IP services	Uni-TE	- client/server mode - client/server requests of 256 bytes (synchronous mode) - client/server requests of 1 K byte (asynchronous mode)
	Modbus	- client/server mode - synchronous requests of 256 bytes
Ethway services	Uni-TE	- client/server mode - client/server requests of 256 bytes (synchronous mode) - client/server requests of 1 K byte (asynchronous mode)
	Common words	Shared database of 256 words
	Application-to-application	Priority exchange of point-to-point messages of 256 bytes maximum
Common services		- X-Way inter-network routing - X-Way/Uni-TE routing - module diagnostics
TCP Open function	Services (1)	- library of C functions which can be used with SDKC development software - PL7 EF function blocks for access to the TCP layer - example of use
Integrated Web server function	Services (1) (2)	- alarm display (with Premium PLC only) - graphic objects editor - system diagnostics - access to PLC variables - Web pages defined by the user (1.4 Mb available) - Java development kit

(1) Services available on TSX ETY 110 WS modules.

(2) An Internet browser (Internet Explorer version 4, Netscape version 4.05 or other) is required on the PC station, capable of executing Java code.

Premium automation platform

Ethernet TCP/IP network

Characteristics (continued)

References :
page 43601/13

Characteristics of TSX ETY 410/5101 modules

Structure	Type	Heterogeneous industrial local area network conforming to IEEE 802.3 standard
	Topology	Star network
	Method of access	Direct access with collision detection according to IEEE 802.3 (CSMA-CD) standard
Transmission	Mode	Manchester base band
	Data rate	10/100 Mbps with automatic recognition
	Medium	Double twisted pair impedance 100 $\Omega \pm 15 \Omega$ for 10baseT
Configuration (10baseT)	Number of stations	Point-to-point connection (via RJ45 standard connector) enabling the formation of a star network (the stations are connected to Transparent Factory hubs or switches) 64 stations maximum per network
	Length	100 m max. between concentrator and terminal device

Module services and functions

TCP/IP services	Uni-TE	- client/server mode - client/server requests of 256 bytes (synchronous mode) - client/server requests of 1 K byte (asynchronous mode)
	Modbus	- client/server mode - synchronous requests of 256 bytes
I/O Scanning services	Number of stations	64
	User interface	2 K %MW as inputs / 2 K %MW as outputs in the "scanner" PLC 120 words maximum per "scanned" device
Common services		- X-Way inter-network routing - X-Way/Uni-TE routing - module diagnostics
Integrated Web server function	Services (1)	- alarm display (with Premium PLC only) (2) - graphic objects editor (2) - system diagnostics - access to PLC variables - Web pages defined by the user (7.5 Mb available) (2) - Java development kit

(1) An Internet browser (Internet Explorer version 4, Netscape version 4.05 or other) is required on the PC station, capable of executing Java code.

(2) Services available on TSX ETY 5101 modules.

Premium automation platform

Ethernet TCP/IP network

References

Characteristics :
pages 43601/11 and 43601/12

Ethernet TCP/IP network modules



TSX ETY 110/110 WS



TSX ETY 410/5101



TSX ETH PC 101M

Description per PLC	No. of modules profile	Communication	Integrated Diagnostic	Web server Web user page	Reference	Weight kg
Network modules for Premium PLCs	1 for 57-10/20	Ethway	-	-	TSX ETY 110	0.370
	3 for 57-30	Uni-TE on TCP/IP				
	4 for 57-40	Modbus on TCP/IP				
			Yes	1.4 Mb available	TSX ETY 110 WS (1)	0.370
		Uni-TE on TCP/IP Modbus on TCP/IP I/O Scanning	Yes	-	TSX ETY 410	0.340
			Yes	7.5 Mb available	TSX ETY 5101 (1)	0.340

Description	Use	Supplied with	Reference	Weight kg
Network module for ISA bus PC compatible	Extension slot Short format	Drivers for DOS 6, OS/2 2.2, Windows 95 and Windows NT	TSX ETH PC 101M	0.720
PC drivers	Ethway protocol and Uni-TE on TCP/IP	Drivers for Windows 98/2000 (also includes the OS/2 2.2, Windows 95 and Windows NT drivers)	TLX CD DRV M	-

Accessories and connection cables

Description	Reference (2)	Weight kg
For 10baseT interface (RJ45)	See page 48190/7	-
For 10base5 interface (AUI)	See page 43616/3	-

(1) Supplied with a CD-ROM including the FactoryCast configuration software for the integrated Web server function and documentation in English.

Premium automation platform

Ethernet TCP/IP network,
connection by 10baseT/100baseTX interface

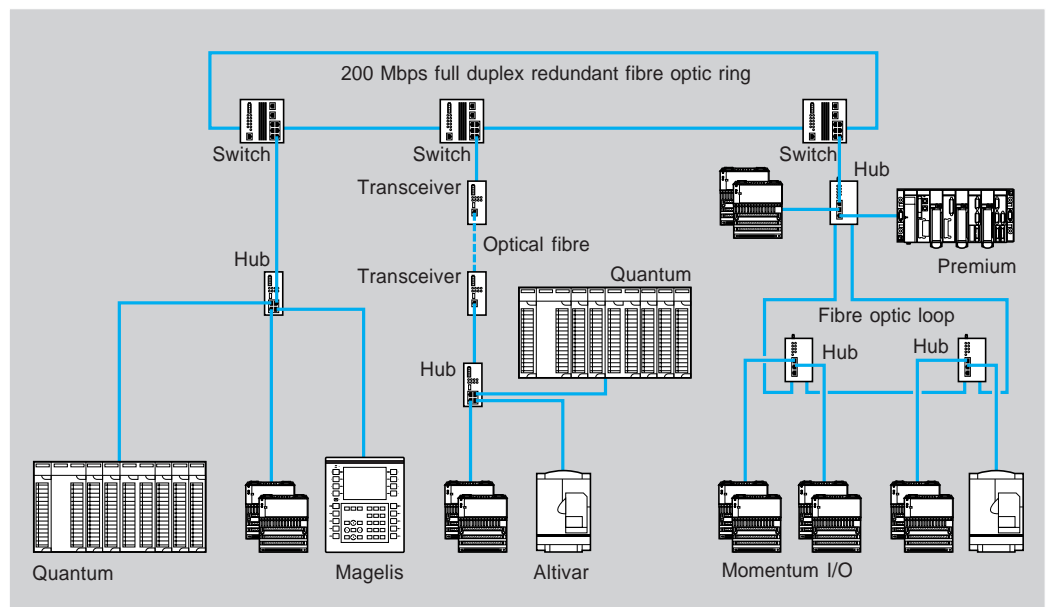
References :
page 48190/7
Characteristics :
pages 48190/3 to 48190/6

Presentation

Presentation

As part of its Transparent Factory family of products, Schneider Electric offers a range of industrially hardened network hubs, switches, transceivers, bridges, and cables. These Ethernet-standard communication components enable you to integrate Ethernet solutions from the device level to the control network, and beyond to the corporate intranet. Each product in the Ethernet cabling system is designed with compliance to Ethernet standards, and with third-party compatibility in mind.

- **Transparent Factory Hubs** connect segments to supply shared communication among PLCs. TF Hubs are low-cost solutions which enable communications with devices, such as Momentum I/O, to Ethernet networks.
- **Transparent Factory Switches** segment the application in different zones, groups, or cells/machines. The proper placement of switches can increase network performance by relieving network congestion. TF switches implement SNMP protocol, allowing standard network management tools to monitor and diagnose the network, and thus are a key architectural component for real-time and deterministic network communication.
- **Transparent Factory Transceivers** provide connections to fiber optic networks in order to secure transmissions in areas of high electromagnetic interference. The use of multiple transceivers enables long distances between islands.
- **Transparent Factory Bridges** enable Modbus to Ethernet and Modbus Plus to Ethernet communications, with multiple ports allowing flexibility among network components.
- **Transparent Factory Cables** connect each device (such as PLC, I/O, PC, etc.) to the attached hub, switch, transceiver, patch panel, or to cascade hubs and switches. TF cables are available in fiber optic and twisted pair options, with a wide variety of connectors and cable lengths.



All the TF components of the Ethernet wiring system are designed to operate in severe environments. TF switches and TF hubs include mechanisms designed to ensure high levels of resilience. With their open-ended redundant functions, from a single ring structure to a double ring structure, it is easy to create a fault-tolerant Ethernet network which meets the specific demands of your industrial environment.

Premium automation platform

Ethernet TCP/IP network,
connection by 10baseT/100baseTX interface

Characteristics

References :
page 48190/7

Characteristics of TF hubs

Mechanical characteristics

Models		499 NEH 004 10	499 NEH 041 00	499 NOH 005 10
Operating temperature	° C	0 to 60		
Relative humidity		10...90% (without condensation)		
Dimensions L x H x D	mm	40 x 125 x 80		80 x 140 x 80
Degree of protection		IP 30		
Approvals and conformity		UL, CE, CUL 1950, FCC part B, CSA 22-2.142, CSA 22-2.213M class 1 Div. 2 (certification pending)		

Electrical characteristics

Models		499 NEH 004 10	499 NEH 041 00	499 NOH 005 10
Types		Ethernet 10 Mbps	Ethernet 100 Mbps	Ethernet 10 Mbps
Interfaces		4 10baseT ports with RJ45 shielded connectors	4 100baseTX ports with RJ45 shielded connectors	- 3 10baseT ports with RJ45 shielded connectors - 2 10baseFL ports with BFOC connectors
Medium		Twisted pair cables		Twisted pair cables or redundant fibre optic ring
Connectors		1 x 5-way		
Operating voltage	~ V	18...32, safety low voltage	9.6...57.6, safety low voltage	18...32, safety low voltage
Redundancy		Power supply		Power supply and fibre optic ring
Consumption at ~ 24 V	mA	80 typical 130 max.	200 typical 270 max.	160 typical 350 max.
Line length	m	100 max. with twisted pairs		Fibre optic, 3100 max.(max 10,000) Twisted pairs, 100 max.(max 330)
Number of TF hubs in cascade		4 max.		11 max.
in a ring		-		11 max.
Alarm relay		Power supply fault, Ethernet network fault or communication port fault (volt-free contact 1 A max. at ~ 24 V)		
Indicator lights		Power supply, data exchange, collision and line status via communication port		

Premium automation platform

Ethernet TCP/IP network,
connection by 10baseT/100baseTX interface

Characteristics (continued)

References :
page 48190/7

Characteristics of TF switches

Mechanical characteristics

Models		499 NES 071 00	499 NOS 071 00
Operating temperature	° C	0 to 50	
Relative humidity		10...90% (without condensation)	
Dimensions L x H x D	mm	105 x 130 x 105	
Degree of protection		IP 20	
Approvals and conformity		UL, CE, CUL 1950, FCC part B, CSA 22-2.142, CSA 22-2.213M class 1 Div. 2 (certification pending)	

Electrical characteristics

Models		499 NES 071 00	499 NOS 071 00
Types		Ethernet 10 Mbps and Ethernet 100 Mbps	
Interfaces		- 5 10baseT/100baseTX ports with shielded RJ45 connectors - 2 100baseTX ports with RJ45 connectors	- 5 10baseT/100baseTX ports with shielded RJ45 connectors - 2 100baseFX ports with SC connectors
Medium		Twisted pair cables	Twisted pair cables or redundant fibre optic ring
Connectors		1 x 5-way	
Operating voltage	~ V	18...32, safety low voltage	
Redundancy		- Power supply - Ring structure and/or twisted pair - Switching time < 0.3 s - Redundancy manager	
Consumption at ~ 24 V	mA	800 max.	
Line length	m	100 max. with twisted pairs	Fibre optic, 3100 max. Twisted pairs, 100 max.
Number of TF switches in cascade		50 max.	
in a ring		4 max. at 10 Mbps 50 max. at 100 Mbps	
Alarm relay		Power supply fault, Ethernet network fault or communication port fault (volt-free contact 1 A max. at ~ 24 V)	
Indicator lights		Power supply, data exchange, collision and line status via communication port	

Premium automation platform

Ethernet TCP/IP network,
connection by 10baseT/100baseTX interface

Characteristics (continued)

References :
page 48190/7

Characteristics of TF transceivers

Mechanical characteristics

Models		499 NTR 000 10	499 NTR 001 00
Operating temperature	° C	0 to 60	
Relative humidity		10...90% (without condensation)	
Dimensions L x H x D	mm	40 x 140 x 80	
Degree of protection		IP 30	
Approvals and conformity		UL, CE, CUL 1950, FCC part B, CSA 22-2.142, CSA 22-2.213M class 1 Div. 2 (certification pending)	

Electrical characteristics

Models		499 NTR 000 10	499 NTR 001 00
Types		Ethernet 10 Mbps	Ethernet 100 Mbps
Interfaces		- 1 10baseT port with RJ45 shielded connector - 1 10baseFL port with BFOC connector	- 1 100baseTX port with RJ45 shielded connectors - 1 100baseFX port with SC connectors
Medium		Twisted pair cables or fibre optic cable	
Connectors		1 x 5-way	
Operating voltage	~ V	18...32, safety low voltage	9.6...57.6, safety low voltage
Redundancy		Power supply	
Consumption at ~ 24 V	mA	80 typical 100 max.	160 typical 190 max.
Line length	m	Twisted pair 100 max. Fibre optic 62.5/125 µm, 3100 max.	
Max. link attenuation	dB	11 with fibre optic cable 50/125 µm 14 with fibre optic cable 62.5/125 µm	
Indicator lights		Power supply, data exchange, collision and line status via communication port	

Premium automation platform

Ethernet TCP/IP network,
connection by 10baseT/100baseTX interface

Characteristics (continued)

References :
page 48190/7

Characteristics of TF bridges

Types of bridge		174 CEV 200 30	174 CEV 300 10
Network interconnection		Modbus Plus/Ethernet	Modbus/Ethernet
Operating voltage	V	~ 110...120 automatic detection	Nominal = 12...24 Limit = 9...30
Ethernet ports		- 1 Ethernet 10baseT (RJ45 type), 10base2 (BNC type), 10base5 (AUI type) - 1 Modbus Plus double/single pair cable	1 RJ45 port for 10baseT cable
Mounting		Vertical panel or horizontal plane	On DIN rail
Dimensions L x H x D	mm	122 x 229 x 248	35 x 95 x 60

Characteristics of electrical cables

Types of cable		499 NTW 000 ●●	499 NTC 000 ●●
Type		Shielded twisted pair cables	Crossed shielded twisted pair cables
Length	m	2, 5, 12, 40 or 80	5, 15, 40 or 80
Preformed connectors		Type RJ45 (at each end)	
Approvals and conformity		UL, CSA 22-1 and NFPA 70 approval indicated by the letter U at the end of the reference (for example : 490 NTW 000 40U) ; Category 5 of the EIA/TIA-568 international wiring standard, class D of IEC 11801/EN50173 ; Fireproof (LSZH), product flame-retarded according to NFC32 070 #1 (C2) and IEC 322/1	

Characteristics of fibre optic cables

Types of cable		490 NOC 000 05	490 NOT 000 05	490 NOR 000 05
Type		Standard glass fibre optic		
Length	m	5		
Preformed connectors		MT/RJ-SC duplex	MT/RJ-ST	MT/RJ-MT/RJ
Susceptibility to radiation		No radiation along the cable length		

Premium automation platform

Ethernet TCP/IP network,
connection by 10baseT/100baseTX interface

References

Characteristics :
pages 48190/3 to 48190/6



499 NEH 004 10



499 NOH 005 10



499 NEH 041 00



499 NES 071 00



174 CEV 300 10

Description	Type of Ethernet network	Available ports	Reference	Weight kg
TF hubs	10 Mbps	4 10baseT ports	499 NEH 004 10	0.520
		3 10baseT ports 2 10baseFL ports	499 NOH 005 10	0.900
	100 Mbps	4 100baseTX ports	499 NEH 041 00	0.520
TF switches	10/100 Mbps	5 10baseT/100baseTX ports 2 100baseTX ports	499 NES 071 00	1.450
		5 100baseTX ports 2 100baseFX ports	499 NOS 071 00	1.450
TF transceivers	10 Mbps	1 10baseT port 1 10baseFL port	499 NTR 000 10	0.520
	100 Mbps	1 100baseTX port 1 100baseFX port	499 NTR 001 00	0.520
Description	Type of interconnection	Ethernet ports available	Reference	Weight kg
TF bridges	Modbus Plus/Ethernet (Modbus single/double pair)	1 10baseT (RJ 45 type) or 10base2 (BNC type) or 10base5 (AUI type) port	174 CEV 200 30	4.260
	Modbus/Ethernet	1 10baseT port (RJ 45 type)	174 CEV 300 10	0.500

Connection cables

Description	Preformed at each end	Length	Reference	Weight kg
Shielded twisted pair cables	RJ45 type connector	2 m	490 NTW 000 02	–
		5 m	490 NTW 000 05	–
		12 m	490 NTW 000 12	–
		40 m	490 NTW 000 40	–
		80 m	490 NTW 000 80	–
Crossed shielded twisted pair cables	RJ45 connector	5 m	490 NTC 000 05	–
		15 m	490 NTC 000 15	–
		40 m	490 NTC 000 40	–
		80 m	490 NTC 000 80	–
Fibre optic cables	MT/RJ-SC duplex connector	5 m	490 NOC 000 05	–
	MT/RJ-ST connector	5 m	490 NOT 000 05	–
	MT/RJ-MT/RJ connector	5 m	490 NOR 000 05	–

Connection accessories

Description	Use	Ethernet ports available	Reference	Weight kg
Mini transceiver	For connecting a 10base5 interface device (1) to a 10baseT Ethernet network segment (twisted pair)	1 10base5 port (AUI type) 1 10baseT port (RJ45 type)	TSX ETH NTR1	–

(1) For example, a TSX Series 7 PLC equipped with a TSX ETH 107 Ethernet module.

Premium automation platform

Ethernet TCP/IP network, connection by 10base5 interface (AUI)

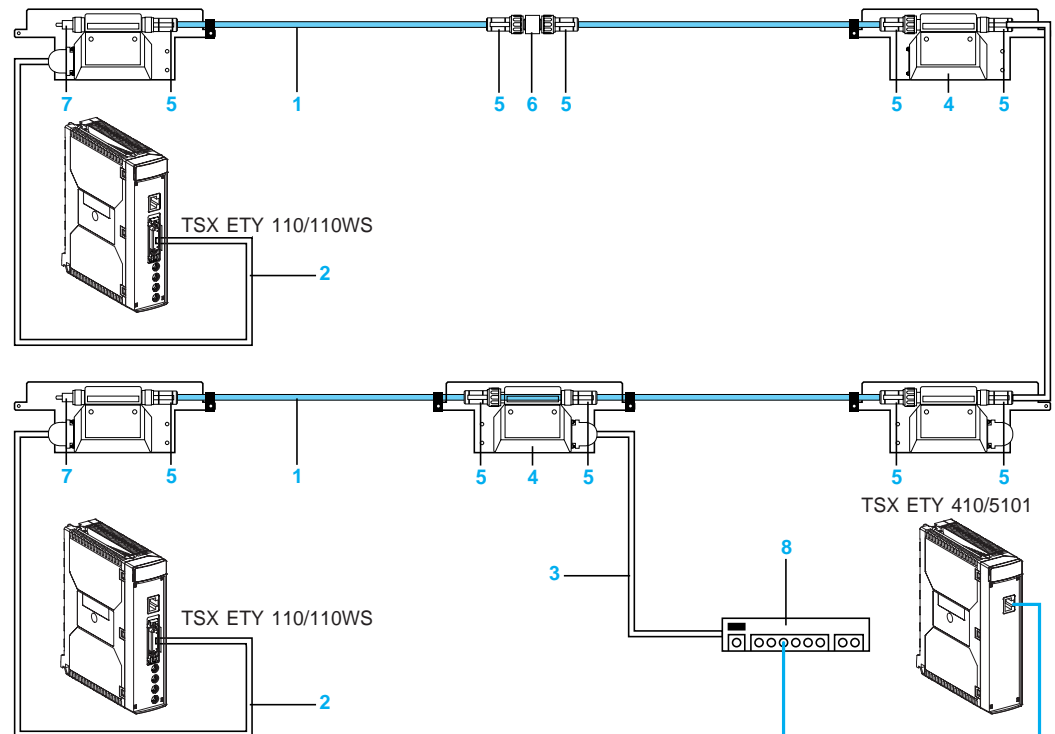
Wiring system

References :
page 43616/3

Wiring system

TSX ETY 110/110 WS modules can take an AUI connector which enables direct connection to an Ethernet 10base5 segment with the accessories and cables described below.

Connection by 10base5 interface (AUI)



- 1 **TSX ETH CA 000** trunk cable, triaxial cable (50 Ω coaxial with shielding) 1 male N type connector to be fitted to each end
TSX ETH CD 025 trunk cable, triaxial cable equipped with N type connectors, length 2.5 m. Corresponds to minimum length between 2 TSX ETH ACC 2 transceivers
- 2 **TSX ETY CB 000** drop cable, 4 shielded twisted pair cable, AUI interface (a straight connector and an elbow connector)
- 3 **TSX ETY CC 000** drop cable, 4 shielded twisted pair cable, AUI interface (two straight connectors)
- 4 **TSX ETH ACC 2** transceiver, AUI interface. Enables a device to be connected to the Ethway network (obligatory when connecting two modules in point-to-point)
- 5 **TSX ETH ACC 3** male N type connector for trunk cable
- 6 **TSX ETH ACC 4** female/female adaptor for extension of trunk cable
- 7 **TSX ETH ACC 5** (50 Ω) line terminator (includes an isolated terminator and a non isolated terminator which must be connected to the installation grounding network. One assembly per segment is required)

Mixed 10base5 (AUI) / 10baseT (RJ45) connection

- 8 Hubs with 8 RJ45 ports / 1 AUI port. TSX ETH 410/5101 Ethernet modules have only one RJ45 connector. They can, however, be connected to an Ethernet 10base5 network (twisted pair) by using the hub accessory **TSX ETH NEH 8** which has eight 10baseT ports (RJ45) and one 10base5 port (AUI) connected to a transceiver 2 TSX ETH ACC 2.

Premium automation platform

Ethernet TCP/IP network, connection by 10base5 interface (AUI)

References



TSX ETH ACC 2

AUI interface accessories for connecting to the Ethernet network

Description	Use	Order in multiples of	Unit reference	Weight kg
Ethernet transceiver	Access point to any network	1	TSX ETH ACC 2	0.765
Hub	Can be used to connect 8 twisted pair (RJ45) Ethernet stations on a 10base5 (AUI) network	1	TSX ETH NEH 8	–
Connector for trunk cable	Must be fitted to both ends of cable segment on trunk cables	10	TSX ETH ACC 3	0.050
Female/female adaptor	Extension of 2 cable segments on trunk cable	10	TSX ETH ACC 4	0.050
Line terminator kit	Impedance adaptor	1	TSX ETH ACC 5	0.070

Ethernet network connecting cables

Description	Connectors	Length	Reference	Weight kg
Trunk cables (radius curvature min. 500 mm)	2 type N	2.5 m	TSX ETH CD 025	0.840
	To be equipped with 2 TSX ETH ACC 3 male N type connectors	23.4 m	TSX ETH CA 020	1.650
		117 m	TSX ETH CA 100	5.600
		210.6 m	TSX ETH CA 200	8.300
Drop cables (radius curvature min. 65 mm)	15-way, SUB-D 1 straight, 1 elbow (module side)	5 m	TSX ETY CB 005	0.510
		10 m	TSX ETY CB 010	0.980
		20 m	TSX ETY CB 020	1.820
	15-way, SUB-D 2 straight (for FTX 517 or PC compatible connection)	5 m	TSX ETH CC 005	0.510
		10 m	TSX ETH CC 010	0.980
		20 m	TSX ETH CC 020	1.820
Description	Use	Reference (1)	Weight kg	
Ethernet 10base5 installation kit	Fitting TSX ETH ACC 3 on trunk cable	TSX ETH ACC 10M	4.800	

(1) The letter **M** at the end of a reference indicates that the product is supplied with documentation in English and in French.

Premium automation platform

Fipway network

Presentation, performance

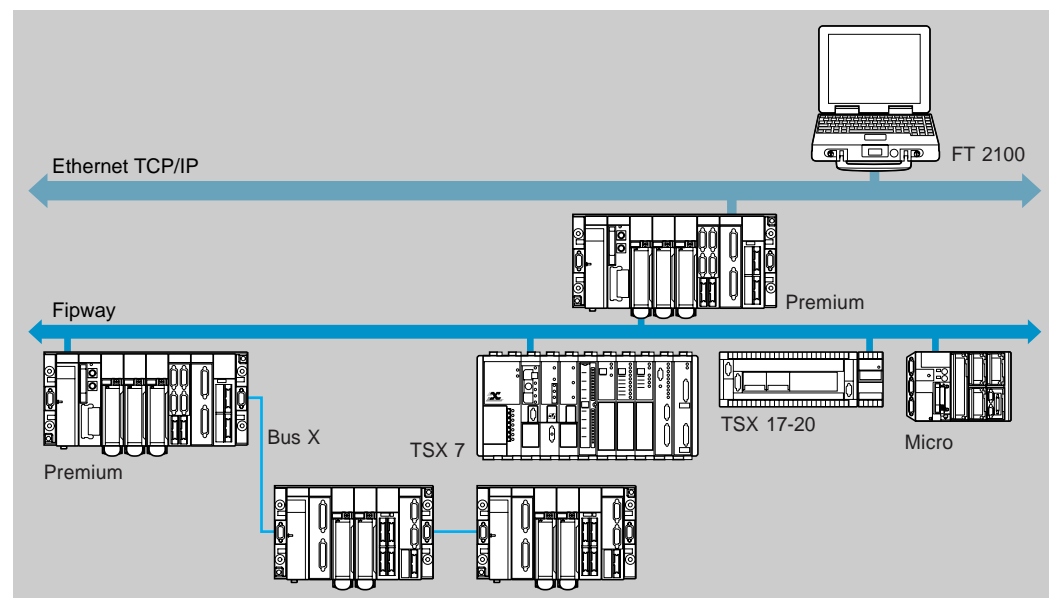
References :
page 43592/3

Presentation

The Fipway network is an open local area network for communication between the various Micro, Premium and TSX Series 7 PLCs using the X-Way services. Communication conforms to the FIP standard with access via a bus arbitrator.

Micro (TSX 37-21/22) and Premium PLCs can be connected to a Fipway network using a Fipway PCMCIA card which is inserted in each processor or into the TSX SCY 21601 (Premium) communication module. Supported X-Way services (see pages 43301/3 to 43301/5) are:

- Uni-TE services
- Distributed database (COM) or Shared Table
- Telegram (service only available when the PCMCIA card is inserted in the processor)
- Application-to-application communication



For characteristics, Fipway network wiring system and connection accessories, see pages 43597/2 to 43597/5.

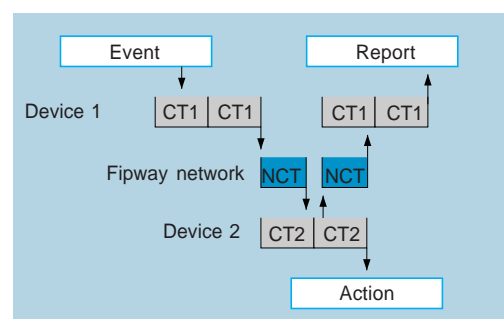
Performance

The operating principle of a Fipway network gives ensured, constant network cycle times whatever the traffic and number of stations (2 to 64). This enables the Fipway network to be updated (addition or removal of stations) without changing the performance.

Maximum transmission time

- Telegram (TLG) : priority application messages are transmitted in less than 10 ms (one telegram per station).
- Common words (COM) : the database of common words is updated every 40 ms.
- Shared Table : the exchange table is updated every 40 ms.
- Uni-TE message handling system : Uni-TE or standard application-to-application messages are normally transmitted in less than 80 ms (40 ms for stations with addresses below 32). Where there is a large amount of traffic, some messages can wait for several cycles before being transmitted. The network characteristics enable a maximum of 210 messages of 128 bytes per second to be transmitted.

The performance can be improved by inhibiting the Telegram service in the network.



With such network characteristics, the response time at application level depends almost exclusively on the processing capacity of the devices which are connected. For example, the remote loading of a 50 K word program takes less than two minutes on a network with normal load.

CT1 = Cycle time of device 1
NCT = Cycle time of Fipway network
CT2 = Cycle time of device 2

The response time must be evaluated by the designer of each application in relation to the devices connected. The processing time of a device can vary from one to two cycle times as a function of asynchronous operation.

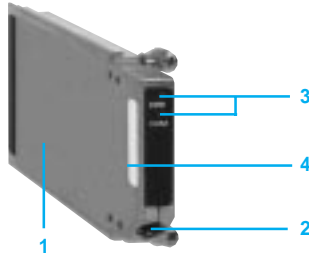
Premium automation platform

Fipway network

Devices which can be connected, references

Micro/Premium PLCs

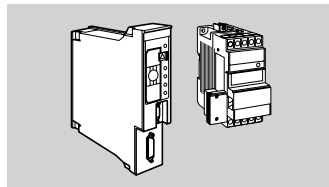
Micro/Premium PLCs have a slot on the processor for a type III PCMCIA communication card. This can be fitted with the TSX FPP 20 fipway network connection card, which is also inserted into the TSX SCY 21601 communication module slot.



The TSX FPP 20 card comprises :

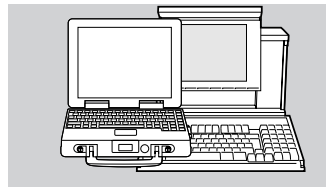
- 1 Protective cover
 - 2 Removable cover with fixing screws for access to the 20-way miniature connector
 - 3 Two indicator lamps :
 - ERR lamp : card fault, link fault
 - COM lamp : data transmission or reception
- Connector to be ordered separately :
- 4 TSX FP CG 010/030, 1 or 3 m cable for connection to the TSX FP ACC 3/ACC 4 T-junction box (on 9-way SUB-D connector).

TSX 7 PLCs



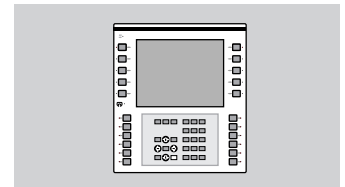
Connection via Fipio/Fipway integrated link or via the TSX FPM 100 module of TSX/PMX model 40 PLCs.
Connection via the TSX FPG 10 module of TSX 17-20 micro-PLCs.

FT 2100 terminals, PC compatibles



Equipped with :
- TSX FPP 20 for FT 2100 (PCMCIA card)
- TSX FPC 10M for PC compatible (ISA bus), they access all devices in the X-Way architecture. The various X-Way drivers are available on CD-ROM TLX CD DRV M.

Magelis dialogue terminals



Connection via the TSX FPP 20 PCMCIA card.

References

Description	Number per Premium PLC	Use	Composition	Reference	Weight
				(1)	kg
Fipway card	1 with 57-10 1 with 57-20 3 with 57-30 4 with 57-40	Type III slot on - Micro/Premium processor - TPCX 57-10/30 coprocessor - TSX SCY 21601 module	1 type III PCMCIA card	TSX FPP 20	0.110
Communication module	See page 43592/3	For Premium PLC - 1 isolated 2-wire RS 485 integrated channel (Half-duplex) - 1 slot for type III PCMCIA card	-	TSX SCY 21601	0.360
Set of X-Way drivers for PC compatible	Includes all X-Way drivers : - Uni-Telway/Fipway/Fipio/Ethway under Windows 3.1/95/98/NT/2000 - XIP/ISAWay under DOS and Windows 3.1/95/98/NT/2000 - Uni-Telway for TSX SCP 114 card under Windows 95/98/NT/2000 - Terminal port under OS/2		1 CD-ROM	TLX CD DRV M	-



TSX FPP 20



TSX SCY 21601



TSX FP CG 010/030

Connection cables and accessories (2)

Description	Use	Length	Reference	Weight	
	From To			kg	
Cables for PCMCIA	TSX FPP 20 card (miniature connector)	TSX FP ACC 4 T-junction (9-way SUB-D connector)	1 m 3 m	TSX FP CG 010 TSX FP CG 030	0.210 0.410

(1) Product supplied with bilingual Quick Reference Guide : English and French.

(2) For other Fipway network accessories and connection cables, see pages 43597/6 and 43597/7.

Premium automation platform

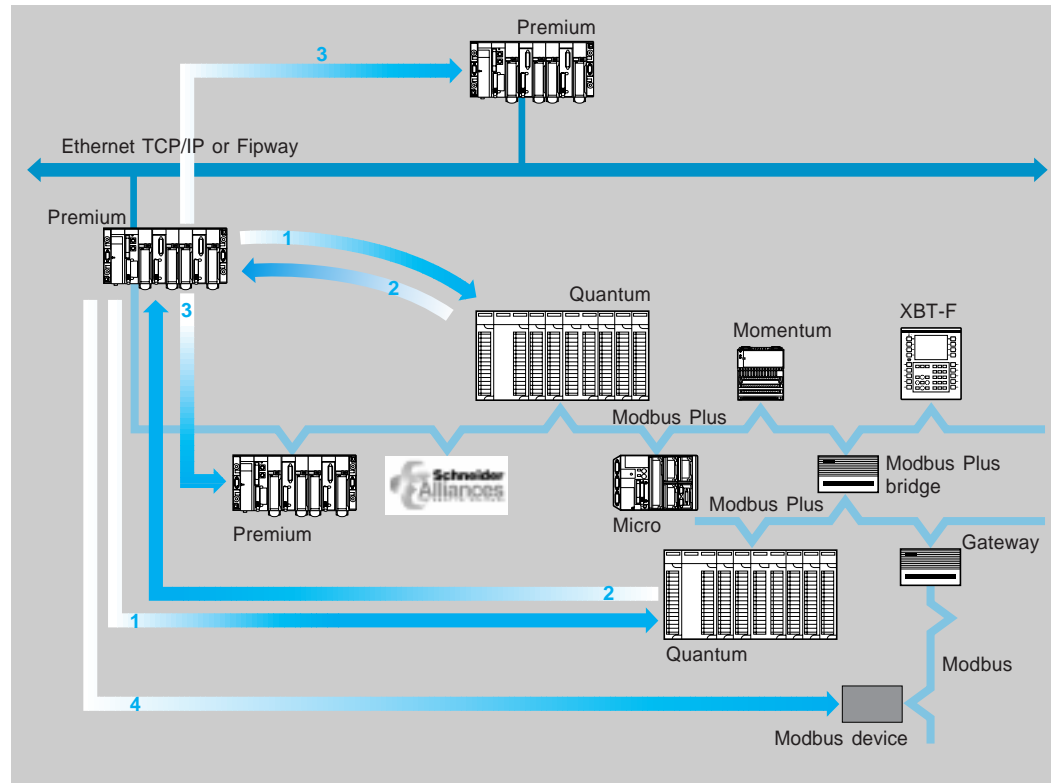
Modbus Plus network

Characteristics :
page 43599/3
Connections :
page 43599/4
References :
page 43599/5

Presentation

Presentation

The Modbus Plus network is a high-performance industrial local network which can respond to Client/Server type extended architectures, combining a high data rate (1 Mbps), simple and economical transmission support and several message handling services.



The main data exchange functions between all devices connected to the network are :

- The message exchange function according to the Modbus protocol
 - The "global database" function (Shared Table service, periodic, controlled by the application : a station with the token can send 32 words to a maximum of 63 other stations connected on the network)
- 1 The Premium (or Micro) client communicates with the Quantum server on the Modbus Plus network.
 - 2 The Quantum client communicates with the Premium server on the Modbus Plus network via MSTR function blocks.
 - 3 A Premium (or Micro) client connected to the Ethernet TCP/IP or Fipway network can communicate in read/write mode with a Modbus Plus station (the Premium PLC therefore acts as a gateway).
 - 4 A Premium (or Micro) client connected to the Modbus Plus network can access a remote station via the Modbus Plus/Modbus gateway.

Premium automation platform

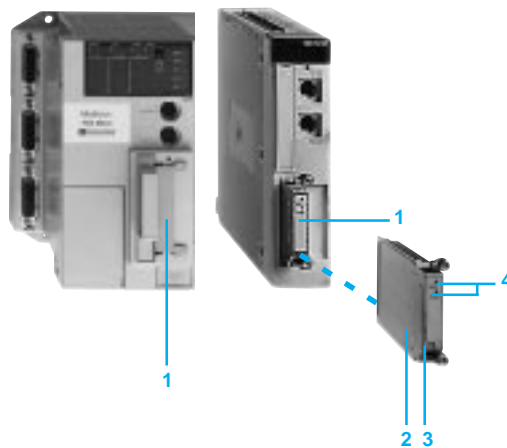
Modbus Plus network

Description, characteristics

Connections :
page 43599/4
References :
page 43599/5

Description

Premium/Micro PLCs are connected to the Modbus Plus network using a TSX MBP 100 type III PCMCIA card. This card is installed in the slot reserved for processors or coprocessors :



- 1 A host slot on processors or coprocessors
- 2 A protective cover with fixing screw (access to miniature 20-way connector)
- 3 A removable cover
- 4 Two indicator lamps :
 - ERR : card or link fault
 - COM : activity on the line

Connectors to be ordered separately :
TSX MBP CE 0●● tap-off cables

Characteristics

Structure	Type	Industrial bus
	Physical interface	RS 485
	Method of access	Token bus
Transmission	Mode	Synchronous HDLC
	Data rate	1 Mbps
	Medium	Twisted pair, fibre optic
Configuration	Number of devices	64 maximum on 1800 m twisted pair, 32 per segment
	Number of addresses	64 devices maximum per segment
	Length of bus	450 m maximum per segment, 1800 m maximum with 3 repeaters
	Number of segments	Cascaded : 5 maximum using Modbus Plus BP85 bridges
Services	Global database	- 4096 byte common database - cyclical exchange of 32 broadcast words
	"Peer to peer" dialogue	Read/write services (amount of requests : 100 registers per transaction)
	Peer Cop	Cyclical exchange service (on Premium only) : 500 words per station (broadcast or point-to-point)

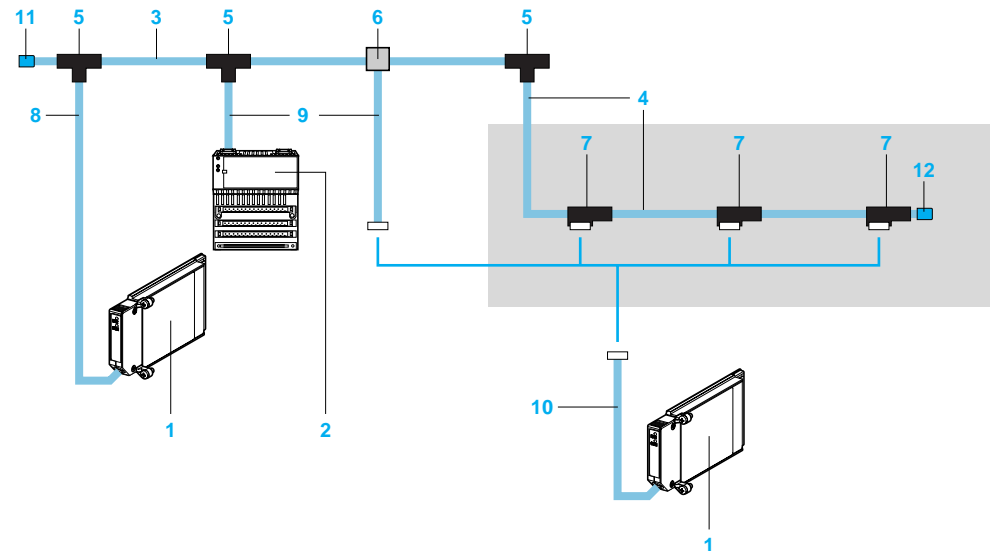
Premium automation platform

Modbus Plus network

Connections

Characteristics :
page 43599/3
References :
page 43599/5

Wiring system



- 1 **TSX MBP 100** : Modbus Plus PCMCIA card, for type III processor slot on Micro or Premium platforms.
- 2 **170 PNT 110 20** : communication module for Momentum I/O base unit.
- 3 **490 NAA 271 0●** : trunk cable, shielded twisted pair with shielding drain (flying leads). In lengths of 30, 150, 300, 450 or 1500 m.
- 4 **170 MCI 020/021 ●●** : drop cable equipped at each end with an RJ 45 connector (interface baseT). In lengths of 0.25, 0.75, 3 or 10 m.
- 5 **990 NAD 230 00** : IP 20 local site tap, provides a tap link from the trunk cable for connecting 1 device (connection of conductors requires wiring tool 043 509 383).
- 6 **990 NAD 230 10** : IP 65 zamac local site tap, provides a tap link from the trunk cable for connecting 1 device (screw terminal connection). It also has an RJ 45 connector for connecting a programming and maintenance terminal.
- 7 **170 XTS 020 00** : IP 20 tee, provides a tap link from the Modbus Plus cable (cable with connectors at each end of an RJ 45 connector). It has a 9-way SUB-D connector for connecting the device.
- 8 **TSX MBP CE 030/060** : drop cable for Modbus Plus PCMCIA card, equipped on the PCMCIA side with a 20-way miniature connector and with flying leads on the 990 NAD 230 00/010 local site tap side. In lengths of 3 or 6 m.
- 9 **990 NAD 211 10/30** : drop cable equipped on the device side with a 9-way SUB-D connector and with flying leads on the 990 NAD 230 00/010 local site tap side. In lengths of 2, 4 or 6 m.
- 10 **TSX MBP CE 002** : drop cable for Modbus Plus PCMCIA card, equipped on the PCMCIA side with a 20-way miniature connector and on the network side with a 9-way SUB-D connector. Can be used as an extension for cable 990 NAD 211 10/30. In lengths of 0.2 m.
- 11 **AS MBKT 185** : set of 2 line terminators (impedance adaptor) for IP 20 local site tap 990 NAD 230 00, to be placed at each end of the segment. **990 NAD 230 11** : set of 2 line terminators (impedance adaptor) for IP 65 local site tap 990 NAD 230 10, to be placed at each end of the segment.
- 12 **170 XTS 021 00** : set of 2 line terminators (impedance adaptor) for tee 170 XTS 020 00, to be placed at each end of the segment.

Premium automation platform

Modbus Plus network

References

Characteristics :
page 43599/3
Connections :
page 43599/4



TSX MBP 100



170 PNT 110 20



TSX MBP CE 030/060

References

Description	Number per PLC	Use	Ref. no.	Composition	Reference (1)	Weight kg
Modbus Plus PCMCIA card	1 with Micro TSX 37-21/22 1 with Premium TSX/PCX	Type III slot on - TSX 37-21/22 PLC - TSX 57-10/20/30/40 processor - T PCX 57-20/30 coprocessor	1	1 type III PCMCIA card	TSX MBP 100	0.110

Description	Connection	Ref. no.	Reference (1)	Weight kg
Communication module for Momentum I/O base units	Modbus Plus network on Momentum I/O base units	2	170 PNT 110 20	0.110

Connection accessories (2)

Description	Use	Ref. no.	Reference	Weight kg
Modbus Plus local site taps	IP 20 tap for tap link connection (tee)	5	990 NAD 230 00	0.230
	IP 65 tap for tap link connection (tee), supports 1 RJ 45 connector on front panel	6	990 NAD 230 10	0.650
	IP 20 tee with 2 RJ 45 connectors for Modbus Plus cable and 1 9-way SUB-D connector for tap link devices	7	170 XTS 020 00	0.260
Line terminators (sold in lots of 2)	2 impedance adaptors for local site tap (IP 20) 990 NAD 230 00	11	AS MBKT 185	-
	2 impedance adaptors for local site tap (IP 65) 990 NAD 230 10	11	990 NAD 230 11	-
	2 impedance adaptors for tee (IP 20) 170 XTS 020 00	12	170 XTS 021 00	-
Fixing kit for IP 65 local site tap	For fixing on DIN rail for tap 990 NAD 230 10	-	990 NAD 230 12	-
Wiring tool	For fitting trunk cables and drop cables in local site tap	-	043 509 383	-

Connecting cables (2)

Description	Use		Ref.	Length	Reference	Weight kg
	From	To				
Modbus Plus trunk cables	Local site tap	Local site tap 990 NAD 230 00/10	3	30 m	490 NAA 271 01	-
				150 m	490 NAA 271 02	-
				300 m	490 NAA 271 03	-
				450 m	490 NAA 271 04	-
				1500 m	490 NAA 271 06	-
Drop cables	IP 20 tee 170 XTS 020 00	IP 20 tee 170 XTS 020 00	4	0.25 m	170 MCI 020 10	-
				1 m	170 MCI 020 36	-
				3 m	170 MCI 021 20	-
				10 m	170 MCI 020 80	-
				TSX MBP 100 PCMCIA card (miniature connector)	Drop cable with male 9-way SUB-D connector	10
Local site tap 990 NAD 230 00/10	3 m	TSX MBP CE 030	0.340			
	6 m	TSX MBP CE 060	0.530			
Communication module for Momentum I/O sub-bases	Junction box 990 NAD 230 00/10	9	2.4 m	990 NAD 211 10	0.530	
			6 m	990 NAD 211 30	0.530	

(1) Product supplied with bilingual Quick Reference Guide : English and French.

(2) For other Modbus Plus network connecting cables and accessories, please consult your Regional Sales Office.

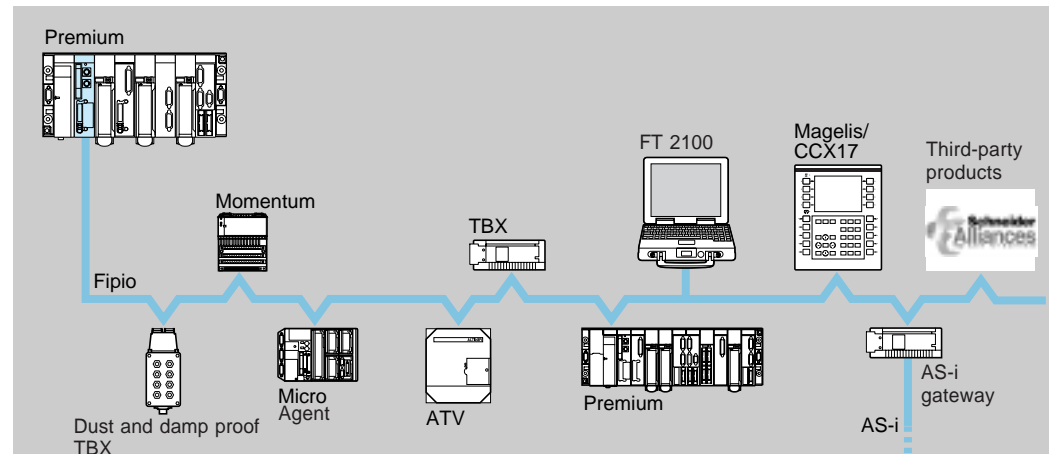
Premium automation platform

Fipio bus manager function

Presentation, connectable devices

References :
page 43589/5

Presentation



The Fipio fieldbus is a standard means of communication between different control system components. It enables 127 devices to be connected at the connection point integrated in the processor. This fieldbus conforms to the WorldFip standard based on producer/consumer mechanisms. It is designed for remote location of I/O up to 15 km away and enables a third-party Schneider Alliances device to be installed.

The bus arbitrator (manager) can be a Premium PLC (TSX, PMX or PCX) or TSX/PMX model 40 or April 5000. For characteristics, Fipio bus wiring system and connection accessories, see pages 43597/2 to 43590/3.

Connectable devices

Schneider Electric devices which can be connected on the Fipio bus include :

- Micro/Premium Agent function PLCs (via PCMCIA TSX FPP 10 card version 1.8 minimum)
- CCX 17 operator panel (version ≥ 2.4) (via PCMCIA TSX FPP 10 card version 1.8 minimum)
- Magelis XBT-F graphic screen terminal (via PCMCIA TSX FPP 10 card version 1.8 minimum) and Magelis TXBT-F graphic station via PCMCIA TSX FPP 20 card
- Momentum distributed discrete, analogue or application-specific I/O (with 170 FNT 110 01 communication module V1.0 minimum)
- TBX distributed discrete (1) or analogue I/O (IP 20) with TBX LEP 030 communication module version ≥ 1.2
- TBX distributed discrete dust and damp proof I/O (IP 65) (2)
- ATV-16/58/66 variable speed drives
- TBX SAP 10 Fipio/AS-i gateway (2)
- FT 2100 terminal (via TSX FPP 20 card)

Schneider Alliances partner products (see below).

Schneider Alliances : Fipio bus openness



Schneider Alliances is an industrial and commercial programme of cooperation between Schneider Electric and its partners, offering automation products (hardware and software), system integration and other services to complement the Schneider Electric offer.

The programme was established to improve the connection of devices from other control system suppliers on the Fipio bus. Connection of a wide variety of different brands of sensors and actuators offers the end user a choice of global, high-performance and low-cost control system solutions.

Schneider Electric has integrated specific WorldFip mechanisms into its PLCs and software in order to make them accessible to any automation system engineer without any particular expertise in this area. Schneider Electric products and partner products connected on Fipio then automatically reap the following benefits : simplified description of architectures and configuration of equipment, and also simple control system development and programming, operation and maintenance.

Within the Schneider Alliances programme, Schneider Electric has developed a range of products and services destined to facilitate the connection and integration of products and partner equipment on Fipio. Please consult our specialist catalogue and the Schneider Alliances documentation (see pages 43614/2 to 43614/11).

(1) WorldFip mode is only supported by TBX discrete I/O modules version ≥ 1.4 . (TBX LEP 020).
(2) WorldFip mode is only supported by modules version ≥ 2.0 .

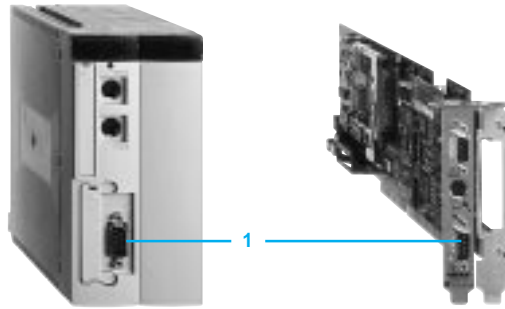
Premium automation platform

Fipio bus manager function

Description, software setup

References :
page 43589/5

Description



TSX P57 ●53 M (1) processors and the T PCX P57 353 coprocessor have on the front panel :

- 1 A 9-way SUB-D connector for connection to the bus via the TSX FP ACC 2/12 connector.

(1) The TSX P57 153M processor is a single format module.

Software setup

Configuration



PL7 Junior/Pro software offer configuration screens which enable the declaration and immediate and intuitive configuration of the remote devices connected on the Fipio bus.

- 1 Each circle represents one connection point.
- 2 Clicking on a circle accesses the catalogue of devices which can be connected.
- 3 Once confirmed, the Fipio bus configuration will appear.

Processors fitted with the integrated Fipio link can manage 128 connection points on the bus (addresses 0 to 127). See page 43589/4 for the table detailing limitations according to processor and type of device.

Diagnostics



The diagnostic functions of the Fipio bus, integrated in the PL7 Junior/Pro software, very quickly identify a fault on :

- The bus medium
 - Remote devices
- 1 A graphic representation of the architecture displays the defective devices in red.
 - 2 More detailed diagnostics can be accessed by double-clicking.
 - 3 In addition, special screens display an overview of all the faults appearing on the bus or on any device. On request, these faults can be recorded for later analysis.

Premium automation platform

Fipio bus manager function

Maximum configuration

References :
page 43589/5

Maximum configuration

The Fipio bus enables a maximum of 128 devices to be connected. This limit can, in certain cases, be restricted depending on the type of bus manager processor and on the devices which are connected on the bus.

The maximum number of devices which can be connected depends on :

- The maximum size of memory space available for Fipio data which is 95744 bytes for TSX P57 153/253/353 processors and the T PCX 57 353 coprocessor and 214528 bytes for the TSX P 57-453 processors.
- The total number of bytes consumed by each device (see table below).

Product family	References	Base size (bytes)	Extension size (bytes)	Maximum number of connection points		
				TSX P57 153M	253/353M	453M
Max. number (1) of Fipio devices				63	127	127
ATV-16/58/66	All	1952		48	48	62
CCX 17	All	1952		4	4	4
Momentum 170	AD1●●●/ADO●●●	832		62	98	98
	ADM 350 10/11	832		62	98	98
	ADM 390 30/690 51/370 10	832		62	98	98
	ARM 370 30/390 10			62	98	98
	AMM 090 00/AAI 030 00, AAO 120 00/921 00	1808		52	52	98
	ANR 120 90			62	98	98
	AAI 520 40			52	52	98
	AAI 140 00	2304		40	40	92
TBX (2) (3)	AES 200/ASS 400/AMS 620 (4)	1332	272	62	70	126
	AMS 620 (4)	1332	528	59 59 126 (for 8 channels)		
				50 50 114 (for 10 or 12 channels)		
	CEP 1622/CSP 1622/CSP 1625	1152		31	31	31
	DES ●●●/DMS ●●●/DSS ●●● (5)	1152	144	62	81	126
	SAP 10	1808		52	52	117
IP 67 TSX I/O	EEF 08D2/EEF 16D2	832		62	98	98
	ESF 08T22/EMF 16DT2	1808		52	52	98
Micro/Premium Agent	TSX FPP 10	1424		62	62	62
FipConnect profile	FRD C2	832		62	113	126
	FSD C8	896		62	105	126
	FSD C8P	1808		52	52	117
	FSD M8	1040		62	90	126
	FSD M8P	1952		48	48	109
	FED C32	1280		62	73	126
	FED C32P	2304		40	40	92
	FED M32	1424		62	66	126
	FED M32P	2448		38	38	87

Not applicable

(1) Address 63 is reserved for the programming and diagnostic terminal.

(2) Sharing the same device for several PL7 tasks is not allowed.

(3) Do not mix discrete and analogue base units on the same Fipio connection point.

(4) The number of analogue channels for TBX base units of the same type (AES, ASS or AMS) is limited to 1008.

(5) The number of channels for TBX base units of the same type (DES, DMS or DSS) is limited to 2048.

Premium automation platform

Fipio bus manager function

Application services, references

Application services

When using the bus manager function, the application services supported by the Premium PLCs are :

- Remote I/O**
 Remote I/O modules are addressed by the PL7 application program as "In rack" I/O, with which they can of course coexist. This service enables the exchange of I/O status variables and output command variables. These exchanges are carried out in a cyclical and deterministic manner and without intervention from the application program. The manager also manages remote devices (configuration) in an aperiodic manner, without intervention from the application program.
- Uni-TE service**
 X-Way industrial message handling service suitable for MMI, diagnostics and control functions (requests of 128 bytes maximum).
- Application-to-application service**
 This service consists of sending tables between 2 devices under the control of their respective application programs (requests of 128 bytes maximum).
- Terminal transparency**
 Terminals connected on a higher level X-way network or on the manager PLC terminal port communicate with the devices on the bus. This is also the case when the terminal is connected at the priority address 63.

Processors and coprocessor

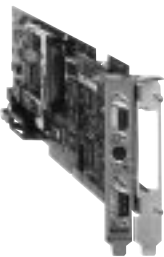
Type and max. no. of racks (2)	Memory capacity		I/O capacity (3)	Control channel capacity	Bus/network module capacity	Reference (1)	Weight kg
	Integrated in processor	PCMCIA extension					
TSX 57-10 4 racks	32 Kwords	64 Kwords maximum	512 discr. 24 analog. 8 app-spec. channels	0	1 integ. Fipio 1 network 2 AS-i bus 0 third-party bus	TSX P57 153M	0.520
TSX 57-20 16 racks	64 Kwords	160 Kwords maximum	1024 discr. 80 analog. 24 app-spec. channels	10	1 integ. Fipio 1 network 4 AS-i bus 1 third-party bus	TSX P57 253M	0.380
TSX 57-30 16 racks	80 Kwords	384 Kwords maximum	1024 discr. 128 analog. 32 app-spec. channels	15	1 integ. Fipio 3 network 8 AS-i bus 2 third-party bus	TSX P57 353M	0.380
TSX 57-40 16 racks	96/176 Kwords (4)	512 Kwords maximum	2048 discr. 256 analog. 64 app-spec. channels	20	1 integ. Fipio 4 network 8 AS-i bus 2 third-party bus	TSX P57 453M	0.520
PCX 57-30 16 racks	80/96 Kwords (4)	160 Kwords maximum	1024 discr. 128 analog. 32 app-spec. channels	15	1 integ. Fipio 3 network 8 AS-i bus 2 third-party bus	T PCX 57 353M	0.320



TSX P57 153M



TSX P57 253/353/453M



T PCX 57 353M



TSX FP ACC 12

Accessories and connecting cables (5)

Description	Use	Material	Reference	Weight kg
	From			
Female connectors (9-way SUB-D)	Processors and coprocessors with Fipio integrated link	Polycarbonate black (IP 20)	TSX FP ACC 12	0.040
		Zamac	TSX FP ACC 2	0.080

(1) Product supplied with multilingual Quick Reference Guide (processors and discrete I/O) : English, French, German, Spanish and Italian.

(2) Maximum number of TSX RKY 4EX/6EX/8EX racks (4, 6 or 8 slots). Using the TSX RKY 12 EX rack (12 slots) is the same as using 2 racks with 4, 6 or 8 slots.

(3) Cumulative maximum values : the I/O on Fipio are not counted.

(4) The second value corresponds to the capacity of the integrated RAM when the application program is supported by the extension memory.

(5) For other accessories and Fipio bus connecting cables, see pages 43597/6 and 43590/3.

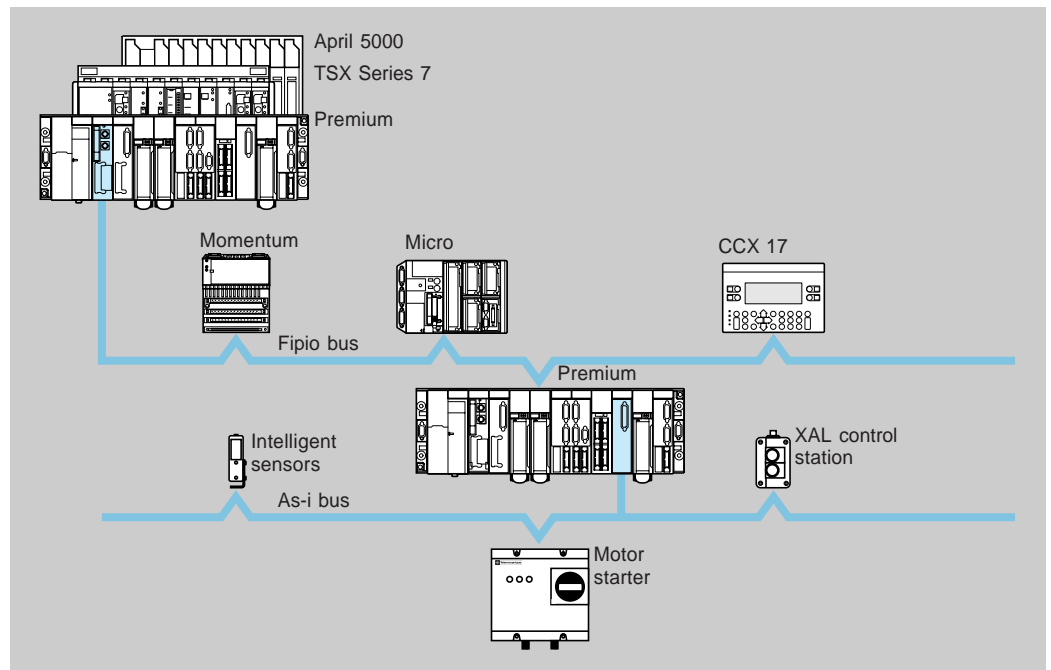
Premium automation platform

Fipio bus Agent function

Presentation, application services, software setup

References :
page 43593/3

Presentation



Micro (TSX 37-21/22) or Premium PLCs, fitted with a TSX FPP 10 PCMCIA card on their integrated communication channel, are agents on the Fipio bus. The bus manager is a TSX P 57 153/253/353/453, T PCX 57 203/353, TSX Series 7 model 40 or April 5000 PLC.

The Fipio bus enables I/O to be remotely located close to the devices to be controlled (Momentum, Altivar, etc). The Agent function enables offline processing, by locating a Micro PLC close to the machine.

In addition to the standard Fipio services (see pages 43301/3 to 43301/5), Micro (TSX 37-21/22) and Premium PLCs allow exchanges of input and output variables with the bus manager PLC. These exchanges are performed cyclically, automatically and without the involvement of the application program at the same rate as the task for which the agent PLC has been configured.

For characteristics, Fipio bus wiring system and connection accessories, see pages 43597/2 to 43597/7.

Application services

The application services supported by Micro (TSX 37-21/22) and Premium Agent function PLCs are :

- Uni-TE service, X-Way industrial message handling service suitable for operator dialogue, diagnostics and control functions (requests of up to 128 bytes)
- Application-to-application communication service, which consists of the transmission of tables between 2 devices controlled by their respective application programs (messages of up to 128 bytes)
- New periodic data exchange service for exchanging a 64 word table between the bus manager PLC and the Premium Agent PLC

Software setup



Each Micro/Premium PLC Fipio Agent uses 64 %MW consecutive internal words to exchange periodic data. The first 32 words are reserved for sending data to the manager, and the remaining 32 are reserved for receiving data from the manager.

PL7 Micro/Junior/Pro application-specific screens allow the configuration of the Fipio Agent PCMCIA card. This consists of :

- Indicating the connection point number (1 to 127)
- Indicating the address at the beginning of the 64 %MW word table reserved for sending data to and receiving data from the manager

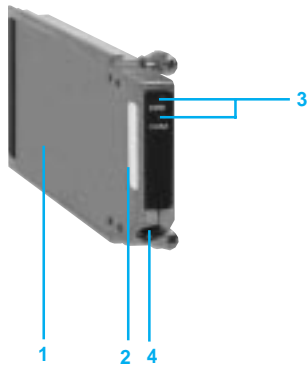
Premium automation platform

Fipio bus Agent function

Description, references

Description

Micro (TSX 37-21/22)/Premium PLCs have a slot in the processor for a type III PCMCIA communication card. This can be fitted with a TSX FPP 10 Fipio bus connection card.



The TSX FPP 10 card comprises :

- 1 A protective cover
- 2 A removable cover with fixing screws giving access to the 20-way miniature connector
- 3 Two indicator lamps :
 - ERR lamp: card fault, link fault
 - COM lamp: transmission or reception of data

Connector to be ordered separately :

- 4 TSX FP CG 010/030, 1 or 3 m cable for connecting the TSX FP ACC 4 tap junction (on 9-way SUB-D connector)

References



TSX FPP 10



170 FNT 110 01



TSX FP ACC 3



TSX FP ACC 4



TSX FP CG 010/030

Fipio bus connection component

Description	Composition	Reference	Weight kg
Fipio Agent function card (1)	1 type III PCMCIA card Version V1.8	TSX FPP 10	0.110

Description	Connection	Reference (1)	Weight kg
Communication module for Momentum I/O base units	Fipio Bus on Momentum I/O base units	170 FNT 110 01	0.110

Fipio bus connection accessories (2)

Description	Use	Reference	Weight kg
Insulated bus cable connector (in black polycarbonate, IP 20)	Trunk cable tap link, supports 2 x 9-way female SUB-D connectors (for TSX FP CG 010/030 PCMCIA card cable), for connection of TBX dust and damp proof module --- 24 V supply	TSX FP ACC 3	0.090

Dust and damp proof bus cable connector	Trunk cable tap link	TSX FP ACC 4	0.660
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Fipio bus connection cables (2)

Description	Use		Length	Reference	Weight kg
	From	To			
Cables for PCMCIA card	TSX FPP 10 card (miniature connector)	TSX FP ACC 4 cable connector (9-way SUB-D connector)	1 m	TSX FP CG 010	0.210
			3 m	TSX FP CG 030	0.410

(1)The TSX FPP 10 card is only supported by Micro TSX 37-21/22/Premium processors. Product supplied with bilingual Quick Reference Guide: English and French.

(2) For other Fipio bus accessories and connection cables, see pages 43597/6 and 43597/7.

Premium automation platform

Fipio bus and Fipway network

Characteristics

References :
pages 43597/6 and 43597/7
Dimensions :
page 43597/7

Characteristics

The Fipio industrial fieldbus and Fipway local inter-PLC network are standard means of communication between various control system components. They conform to the WorldFip standard.

Type of bus/network		Fipio bus	Fipway network
Structure	Type	Open industrial fieldbus conforming to WorldFip standard	
	Topology	Devices linked by daisy-chaining or tap link connections	
	Maximum length	15 000 m	5000 m
	Access method	Producer/consumer principle Management by fixed arbitrator	Producer/consumer principle Management by automatically elected arbitrator
Transmission	Mode	Physical layer in baseband on shielded twisted pair, conforming to NF C 46-604 standard	
	Data rate	1 Mbps	
	Medium	150 Ω shielded twisted pair. 62.5/125 or 50/125 fibre optic cable using electrical/fibre optic repeaters	
Configuration	No. of devices Per segment	32 connection points per segment	32 stations per segment
	Maximum	128 on all segments	64 stations
	Segments Number	Unlimited	
	Length	1000 m maximum for an electrical segment 3000 m for a fibre optic segment	
Services	COM (1)	–	Distributed database : 128 words maximum 0 or 4 %NWi words for Micro and Premium stations with addresses 0 to 31
	Shared Table (1)	–	Shared table of internal words : 128 words maximum 1 to 32 %MWi words per Micro and Premium station with addresses 0 to 31 (2)
	I/O exchanges	Periodic and deterministic exchanges of variables with discrete I/O of configured devices	–
	Uni-TE	Point-to-point requests with confirmation report : 128 bytes maximum, can be used by all devices connected to the same X-Way architecture (access by the Client device to the Server device system functions)	
	Application-to-application	Point-to-point messages : 128 bytes maximum between 2 devices, can be used by all Micro/Premium/TSX Series 7 PLC devices.	
	Telegram	–	Point-to-point priority messages : 16 bytes maximum between 2 Premium (3) or TSX Series 7 stations with addresses 0 to 15
	Security	Control characters in each frame and acknowledgement of point-to-point messages conforming to standard NF C 46-603	
	Surveillance	Bus diagnostics accessible via FT 2100/FTX 517 terminal equipped with PL7 or SYSDIAG software	Network diagnostics accessible via FT 2100/FTX 517 terminal equipped with NETDIAG software (please consult our specialist catalogue)

(1) The COM and Shared Table service are mutually exclusive.

(2) Service reserved for Micro and Premium PLCs.

(3) Service only available when Fipway PCMCIA card is installed in the processor.

Premium automation platform

Fipio bus and Fipway network

Connectable devices

Characteristics :
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Connections :
pages 43597/4 and 43597/5

Connectable devices

Devices to be connected on Fipio		Boxes				Connectors				
		TSX FP ACC 4	TSX FP ACC 14	TSX FP ACC 3	TSX EF ACC 99	TSX FP ACC 2	TSX FP ACC 12	TBX BLP 01	TSX LES 65	-
Premium Fipio Agent	DC									
	TL									
Premium bus manager	DC									
	TL									
Micro Fipio Agent	DC									
	TL									
ATV-16	DC									
	TL									
CCX 17	DC									
	TL									
FT 2100 PC compatible	DC									
	TL									
PC compatible	DC									
	TL									
XBT-F, TXBT-F Magelis terminals	DC									
	TL									
Momentum	DC									
	TL									
TBX (IP 20)	DC									
	TL									
IP 67 I/O	DC									
	TL									
TBX SAP 10 AS-i gateway	DC									
	TL									

Devices to be connected on Fipway		Boxes				Connectors				
		TSX FP ACC 4	TSX FP ACC 14	TSX FP ACC 3	TSX EF ACC 99	TSX FP ACC 2	TSX FP ACC 12	TBX BLP 01	TSX LES 65	-
Premium	DC									
	TL									
Micro	DC									
	TL									
TSX Series 7 model 40 (integrated link)	DC									
	TL									
TSX Series 7 model 40 (PCMCIA)	DC									
	TL									
TSX 17-20	DC									
	TL									
FT 2100 PC compatible	DC									
	TL									
PC compatible	DC									
	TL									
XBT-F, TXBT-F Magelis terminals	DC									
	TL									

DC : daisy chaining
TL : tap link

 Recommended

 Possible

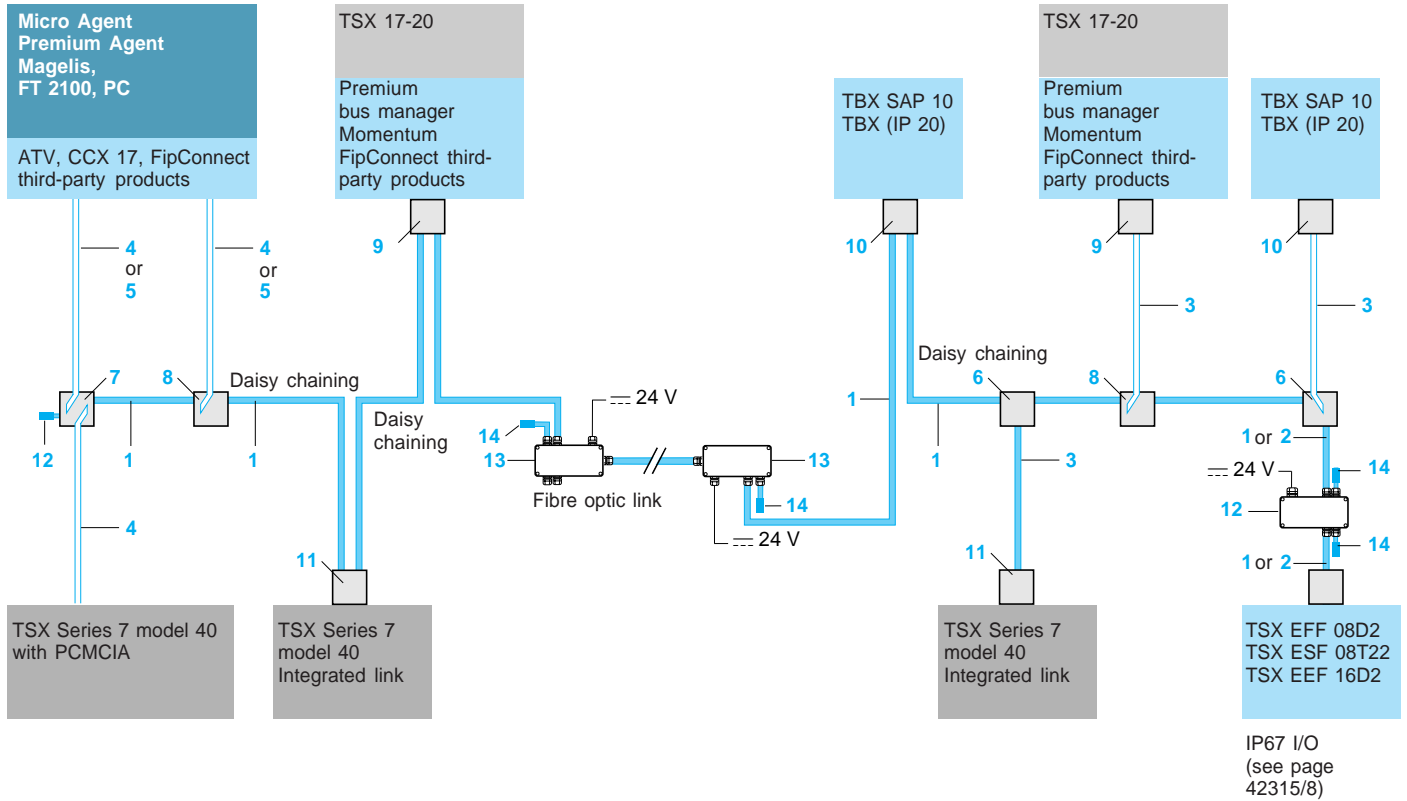
Premium automation platform

Fipio bus and Fipway network

Connections

Characteristics :
 page 43597/2
 References :
 pages 43597/6 and 43597/7
 Dimensions :
 page 43597/7

Fipio bus and Fipway network wiring system



- Connection to Fipway network and Fipio bus
- Connection to Fipio bus
- Suitable for Fipway network, not applicable on Fipio bus

Premium automation platform

Fipio bus and Fipway network

Characteristics :
page 43597/2
References :
pages 43597/6 and 43597/7
Dimensions :
page 43597/7

Connections (continued)

Cables

- 1 **TSX FP CA ●●** : trunk cable, shielded twisted pair 150 Ω (8 mm diameter) for normal environments and use inside buildings.
- 2 **TSX FP CR ●●** : trunk cable, shielded twisted pair 150 Ω (8 mm diameter) for harsh environments and use outside buildings.
- 3 **TSX FP CC ●●** : tap link cable, shielded twisted pair 150 Ω (8 mm diameter) for normal environments and use inside buildings.
- 4 **TSX FP CG ●●** : tap link connecting cable for PCMCIA TSX FPP 10/20 communication card for Micro/Premium/TSX Series 7 PLCs, FT 2100 terminals and PC compatibles. Connection to the bus is via a 9-way SUB-D connector on the TSX FP ACC 3/ACC 4 junction box.
- 5 **TSX FP CE 030** : tap link connecting cable for TSX FPC 10 or FCP FPC 10 PC communication card (ISA bus) for FTX 517, CCX 77/87 terminals and PC compatibles. Connection to the bus is via a 9-way SUB-D connector on the TSX FP ACC 3/ACC 4 junction box.

Connection boxes

- 6 **TSX FP ACC 14** : Polycarbonate IP 20 junction box : provides tap link from the trunk cable to connect 1 device via TSX FP CC ●● tap link cable or several devices in a daisy chain.
- 7 **TSX FP ACC 3** : IP 20 box for connecting 2 PC or PCMCIA cards (TSX FPP 10, TSX FPC 10, TSX FPP 20/200, FCP FPP 10) on a 9-way SUB-D connector.
- 8 **TSX FP ACC 4** : IP 65 junction box. It also has a 9-way female SUB-D connector for any device which is connected to the bus via a PCMCIA card (in this case, the box is IP 20).

Connectors

- 9 **TSX FP ACC 2** and **TSX FP ACC 12** : 9-way female SUB-D connector for Fipway/Fipio connection (TSX FP ACC 2 connector for TSX 17-20 micro-PLC for example). Used for daisy chain or tap link connection (90° output high or low, 45° output high or low).
 - 10 **TBX BLP 01** : connector for TBX I/O modules (IP 20).
 - 11 **TSX LES 65** : connecting cable for TSX/PMX model 40 PLCs. Used for address coding.
 - 12 **TSX FP ACC 6** : electrical repeater : used to increase the number of stations (max 64) and the length of the network by creating an additional segment of up to 1000 m (a maximum of 4 repeaters in cascade giving a network length of 5000 m).
- TSX EF C● ●●** : dust and damp proof connectors for IP67 I/O modules, see page 42315/9.

Other elements

- 13 **TSX FP ACC 8M** : fibre optic/electrical repeater : used to connect electrical segments via a fibre optic link (particularly suitable for zones with a high level of interference) or to connect a fibre optic device.
 - 14 **TSX FP ACC 7** : Line terminator, to be installed at both ends of a segment.
- TSX FP ACC 9** : network wiring test tool. This is used for testing the continuity of segments, the connections of the various devices and the installation of line terminators.
- TSX FP JF 020** : fibre optic jumper (length 2 m). For fibre optic connection of the TSX FP ACC 8M repeater to a patch panel. The maximum length of the fibre optic cable (62.5/125) between 2 repeaters is 3000 m.
- TSX EF ACC 7** : line terminator, to be installed at both ends of a segment requiring IP67 protection, see page 42315/9.










Premium automation platform

Fipio bus and Fipway network

References

Characteristics :
page 43597/2
Dimensions :
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Fipway network/Fipio bus connection accessories (1)

	Description	Use	Reference	Weight kg
 TSX FP ACC 12	Female connector for TSX FPG 10● module (TSX 17 micro-PLCs)	Connection by daisy chaining or tap link Zamac material	TSX FP ACC 2	0.080
 TSX FP ACC 14	Female isolating connector for devices with 9-way SUB-D connectors	Connection by daisy chaining or tap link Black polycarbonate material IP 20	TSX FP ACC 12	0.040
 TSX FP ACC 3	Insulated bus connection box (black polycarbonate, IP 20)	Trunk cable tap link (for connecting the --- 24 V power supply of TBX dust and damp proof modules)	TSX FP ACC 14	0.120
 TSX FP ACC 4	Dust and damp proof bus connection box (zamac material, IP 65)	Trunk cable tap link supports 2 x 9-way SUB-D female connectors (for PCMCIA card cable TSX FP CG 010/030) For connecting --- 24 V power supply of TBX dust and damp proof modules	TSX FP ACC 3	0.090
 TSX FP ACC 3	Dust and damp proof bus connection box (zamac material, IP 65)	Trunk cable tap link, supports 1 x 9-way female SUB-D connector (for PCMCIA card cable TSX FP CG 010/030)	TSX FP ACC 4	0.660
 TSX FP ACC 4	Electrical repeater (IP 65)	Trunk cable tap link via 2 M23 connectors Remote --- 24 V power distribution via 7/8" connector PC compatible terminal connection via 9-way female SUB-D connector	TSX EF ACC 99	0.715
 TSX FP ACC 4	Line terminators (Sold in lots of 2)	2 impedance adaptors	TSX FP ACC 7	0.020
 TSX FP ACC 4	Electrical repeater (IP 65)	Increases the length of the network or bus by allowing the connection of 2 segments of up to 1000 m each	TSX FP ACC 6	0.520
 TSX EF ACC 99	Electrical/fibre optic repeater (IP 65)	Used to connect (via patch panel) an electrical segment (1000 m max.) and a fibre optic segment (3000 m max.)	TSX FP ACC 8M	0.620
	FIP wiring test tool	Used to test each cable segment of the network	TSX FP ACC 9	0.080

(1) The characteristics and performances of the Fipio bus or Fipway network are dependent on the above TSX FP accessories being used.

Premium automation platform

Fipio bus and Fipway network

References (continued), dimensions

Characteristics :
page 43597/2

Fipway network/Fipio bus connecting cables (1)

Description	Type	Conditions of use	Length	Reference	Weight kg
Trunk cables	8 mm, 1 shielded twisted pair 150 Ω	In normal environment (2) and inside building	100 m	TSX FP CA 100	5.680
			200 m	TSX FP CA 200	10.920
			500 m	TSX FP CA 500	30.000
		In harsh environment (3) outside building or in garland (3)	100 m	TSX FP CR 100	7.680
			200 m	TSX FP CR 200	14.920
			500 m	TSX FP CR 500	40.000
	9.5 mm, 1 shielded twisted pair 150 Ω and 1 x 1.5 mm ² pair for remote supply	I/O IP67	100 m	TSX FP CP 100	7.680
			500 m	TSX FP CP 500	30.000
Tap link cables	8 mm, 2 shielded twisted pairs 150 Ω	In normal environment (2) and inside building	100 m	TSX FP CC 100	5.680
			200 m	TSX FP CC 200	10.920
			500 m	TSX FP CC 500	30.000
Fibre optic jumper	Double fibre optic 62.5/125	For electrical/ fibre optic repeater	2 m	TSX FP JF 020	0.550

(1) The characteristics and performances of the Fipio bus/Fipway network are dependent on the above TSX FP accessories being used.

(2) Normal environment :

- without special environmental restrictions
- operating temperature between + 5 °C and + 60 °C
- fixed installations

(3) Harsh environment :

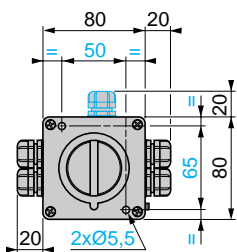
- resistance to hydrocarbons, industrial oils, detergents, solder chips
- up to 100% humidity
- saline environment
- extreme variations in temperature
- operating temperature between - 10 °C and + 70 °C
- mobile installations

Use in garland : radius of curvature = 10 x cable diameter (either 80 or 95 mm).

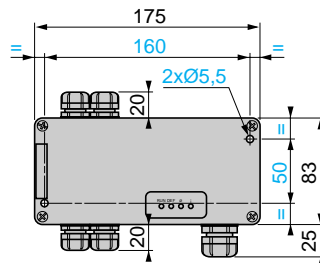
For other special restrictions, please consult your Regional Sales Office.

Dimensions

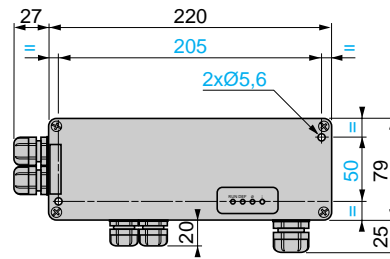
TSX FP ACC 4



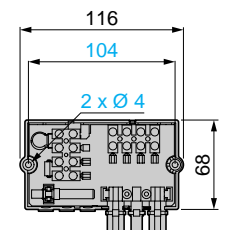
TSX FP ACC 6



TSX FP ACC 8M



TSX FP ACC 14



Premium automation platform

Fipio and Fipway on fibre optic cables

Presentation

Characteristics :
page 43590/3
References :
page 43590/3

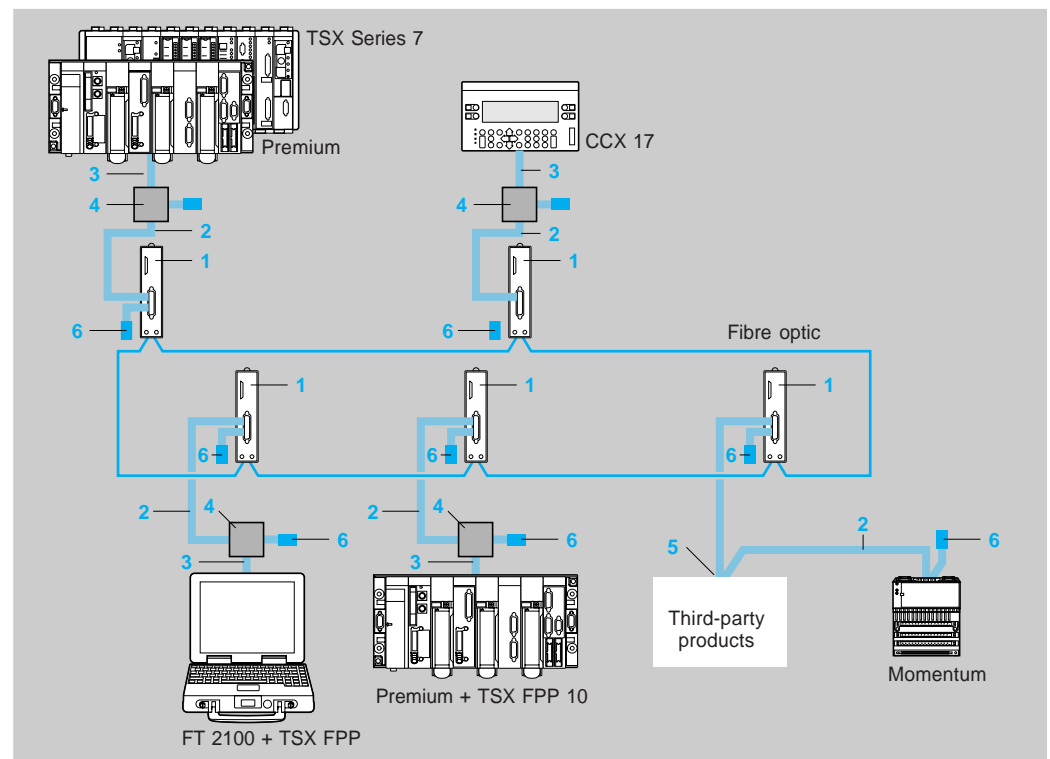
When a high level of withstand to electromagnetic interference is required, two solutions are available for using fibre optic cables on Fipio bus and Fipway network :

- Using TSX FP ACC 8M fibre optic/electrical repeaters
- Using OZD FIP G3 fibre optic transceivers

Depending on requirements, it is preferable to use :

- The OZD FIP G3 fibre optic transceiver if all devices on the network must be protected from electromagnetic interference (1 fibre optic transceiver for 16 stations maximum).
- The TSX FP ACC 8 repeater (fibre optic link on one side, electrical on the other) where an installation zone without devices is subject to high levels of interference or to extend the network (for example between 2 buildings). See pages 43597/4 to 43597/7.
- The OZD FIG G3 fibre optic transceiver to guarantee availability of the installation by using the redundant ring type topology. Operation remains normal even in the event of disconnection at a point on the fibre optic medium.

Wiring system



1 OZD FIP G3 : Hirschmann fibre optic transceiver.

2 TSX FP CA00 : shielded twisted pair trunk cable 150 Ω (diameter 8 mm) for standard environment and inside buildings.

3 TSX FP CG 00 : tap-off connecting cable for TSX FPP 10/20 PCMCIA module card for Micro/Premium PLCs, FT 2100 terminal and PC compatible.

4 TSX FP ACC 3/4 : T-junction box. It also has two 9-way female SUB-D connectors for connecting any device which connects to the bus by a PCMCIA card.

5 TSX FP ACC 12 : 9-way female SUB-D connector for Fipway/Fipio connection (TSX FP ACC 2 for TSX 17-20 for example) daisy chaining or tap link connection.

6 TSX FP ACC 7 : line terminator to be placed at each segment end.

TSX LES 65 : terminal block for TSX Series 7 PLC, which performs the address coding.

Premium automation platform

Fipio and Fipway on fibre optic cables

Presentation (continued), characteristics, references

Performance

Fipio bus operating mode and performance on fibre optics

After configuration in Fipio mode, the processor scans the various application devices according to the software configuration :

- Image variables of the input values and of the output command values of a configured device are scanned as quickly as possible on the bus, whilst respecting the relationship existing between periods of different tasks which use these devices.
- Appearance or disappearance of a configured device is detected on the bus within a maximum time of 200 ms.
- Exchanges occur at the rate defined by the programmer from 10 to 20 Uni-TE messages per second.

The network cycle time is double that of the electrical bus when OZD FIP G3 transceivers are used.

Fipway bus operating mode and performance on fibre optics



The operating principle is identical to that on an electrical network, in that the number of stations is limited to 32 and the transmission time is as follows :

- For the Common words and Shared Table services, updating of the entire database is carried out every 40 ms maximum.
- For Uni-TE message handling, the network characteristics enable transmission of 230 messages maximum of 128 bytes per second.

Characteristics (with OZD FIP G3 fibre optic transceivers)

Type of bus/network		Fipio bus	Fipway network
Structure	Type	Open industrial support conforming to Fip standard	
	Topology (1)	In redundant ring or in a line with simple redundant link	
	Access method	Producer/consumer principle Management by a fixed arbitrator	Producer/consumer principle Management by an automatically elected arbitrator
Transmission	Mode	Multimode (860 nanometres)	
	Data rate	1 Mbps	
	Medium (2) (1)	Fibre optic 50/125 - 17 dBm or 62.5/125 - 15 dBm	
	Inter-repeater distance	2500 m for 50/125 and 2800 m for 62.5/125	
Configuration	No. of connection points (1)	20 fibre optic transceivers (OZD FIP G3 type) maximum	
	No. of devices	2 Fipio devices can be connected to the same fibre optic transceiver	16 stations can be connected to the same fibre optic transceiver but the maximum number of stations is 32
	No. of segments (1)	The loop (or fibre optic line) is similar to a non cascable segment	
	Length (1)	Maximum circumference of the ring (or length of the line) : 20 km	
	Tap links (1)	From OZD FIP G3 fibre optic transceiver, the maximum length of the electrical tap link is 100 m	
Services	Same as page 43597/2 apart from the Telegram service which is not available with OZD FIP G3 fibre optic transceiver.		
(1) Characteristics specific to use of fibre optics.			
(2) Devices connected on electrical tap links are compatible with the WorldFip physical layer.			

References

	Description	No. of transceivers per bus or network	Connectable devices		Reference	Weight kg
			Fipio bus	Fipway network		
 OZD FIP G3	Fipio/Fipway fibre optic transceiver (1)	20 maximum	- Micro/Premium - TBX distr. I/O with TBX LEP 30 - Momentum distr. I/O - CCX 17 panels (version 2.4) - FT 2100/FTX 517, PC compatible	Micro Premium (with TSX FPP 20 PCMCIA card)	OZD FIP G3	0.500
	Micro/Premium PLC connection components (2)					
	Description	Use	Composition	Reference		Weight kg
 TSX FPP 20/10	Fipway card	TSX 37-21/22 PLC, TSX/PMX 57 processor, PCX 57 coprocessor	1 type III PCMCIA card	TSX FPP 200		0.110
	Fipio agent function card	TSX 37-21/22 PLC, TSX/PMX 57 processor, PCX 57 coprocessor	1 type III PCMCIA card	TSX FPP 10		0.110
(1) For TSX FP ACC 8M fibre optic electrical repeater, see page 43597/6.						
(2) For accessories and connecting cables, see pages 43597/5 to 43597/7.						

Premium automation platform

Modem module

Presentation, description

Characteristics :
page 43598/3
References :
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Presentation

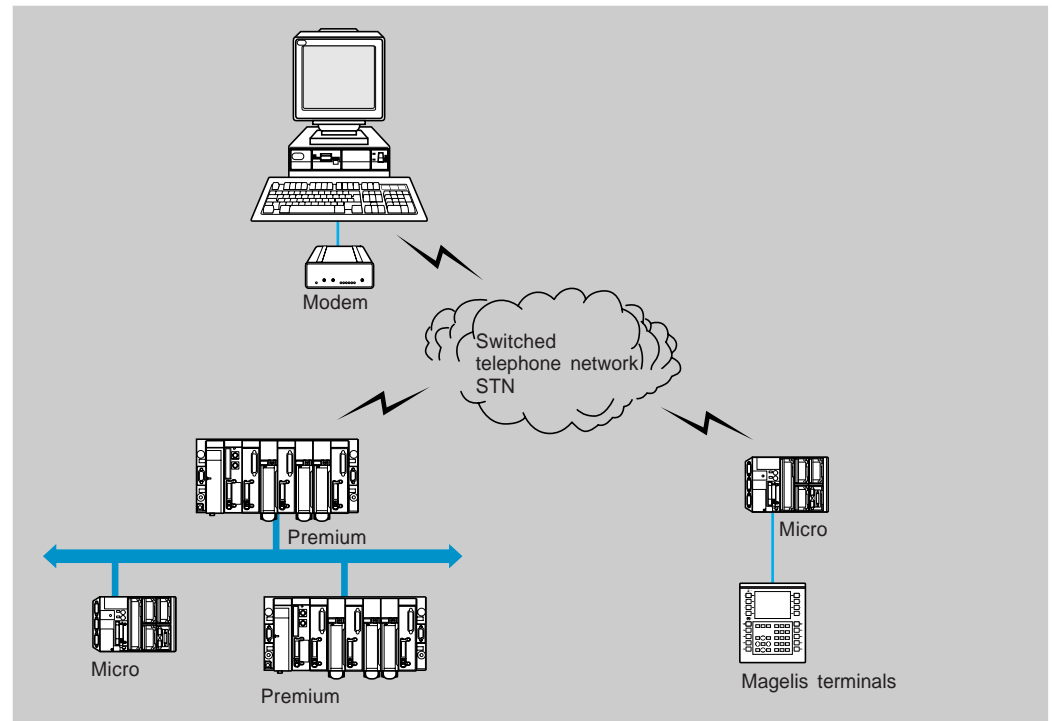
Micro/Premium PLCs offer a Modem connection via the TSX MDM 10 module, which enables them to be integrated into architectures suitable for telemaintenance, telediagnosics, teleadjustment, telealarm or telemonitoring applications via the switched telephone network (STN).

The level of integration allows the user to completely overcome Modem programming constraints. A single PL7 function block can establish or break the telephone connection. A control mechanism by password protects the application against hacking.

The user can, on request, connect from a distance to another PLC or a central station via the Uni-Telway protocol, or even briefly use the ASCII protocol to call a supervisor on a "pager" for example.

When using the Uni-Telway protocol, the characteristics of network transparency via the communication architecture are maintained.

For applications for which the TSX MDM 10 modem module is not suitable, Schneider Electric has performance-tested external modems which can be connected to the PLC terminal port, to the integrated port on the TSX SCY 21601 card or to PCMCIA cards for asynchronous serial links. Suppliers of these products are listed in the directories of partner products, see pages 43614/3 to 43614/11. The list of approved modems can be obtained from your Regional Sales Office, or from the Internet site www.schneideralliances.com.



Description

The modem module is a type III PCMCIA card. This card is installed in the host slot on the processor (Premium or Micro model TSX 37-21/22).



- 1 A host slot on the processor for the Modem module
- 2 PCMCIA Modem card with connector for TSX MDM ADT● cable

Connectors to be ordered separately :
TSX MDM ADT● telephone connection cable (depending on country of use)

The Modem module can also be used in PC compatibles which have a type III PCMCIA slot.

Premium automation platform

Modem module

Characteristics, setup, references

Presentation :
page 43598/2

Environmental characteristics

Temperature	During operation	0...+ 50 °C (0...+ 60 °C with TSX FAN fan modules)
Resistance to radiated electromagnetic fields		Conforms to EMC directive 89/336/EEC applied to residential, commercial and light industrial sites (3V/m)
Country approvals		Conforms to the DTTC telecommunications European directive 98/13/EC Modem approved for Germany, Belgium, Spain, France, Italy (1)

Module characteristics

Structure	Type	Telephone line
	Physical interface	STN link
	Protocol	Uni-Telway/ASCII
Transmission	Mode	Half or full duplex
	Data rate	V32-9600 bps
Configuration	Number of devices	2 (point-to-point connection)
Services	Uni-Telway	Requests in point-to-point with report (question/answer type), 240 bytes maximum from any connected device
		Unsolicited data in point-to-point without report 240 bytes maximum from any connected device
	ASCII	Transmission/reception of a character string 200 bytes maximum

Software setup

The Modem module is configured using PL7 software specific screens.

These screens enable :

- Protocol selection and definition of its characteristics
- Declaration of the Modem configuration
- Passwords to be entered

Call/hang up procedures are carried out using a specific PL7 function block. Once the link has been established, communication uses standard communication function blocks. PL7 language objects can be used to monitor the state of the Modem module from the PL7 application. The Modem function occupies approximately 12.5 Kwords in the application program memory zone.

Debug screens enable :

- Testing of the Modem offline
- Communication diagnostics

References



TSX MDM 10

Description	Characteristics	Protocol	Reference	Weight kg
Type III PCMCIA card for Premium processor, TSX 37-21/22 PLC	- data transmission mode V32 (9.6 K bps max) - STN point-to-point connection - called/caller mode	ASCII Uni-Telway	TSX MDM 10	0.105

Connection accessories

Description	Use	To socket for	Reference	Weight kg
	From			
Connection kit (length 3 m)	TSX MDM 10 PCMCIA card	Belgium	TSX MDM ADT B	0.120
		France	TSX MDM ADT F	0.120
		Germany	TSX MDM ADT G	0.120
		Italy	TSX MDM ADT T	0.120
		Spain	TSX MDM ADT S	0.120
		Other	TSX MDM ADT W	-

(1) For other countries, please consult your Regional Sales Office.

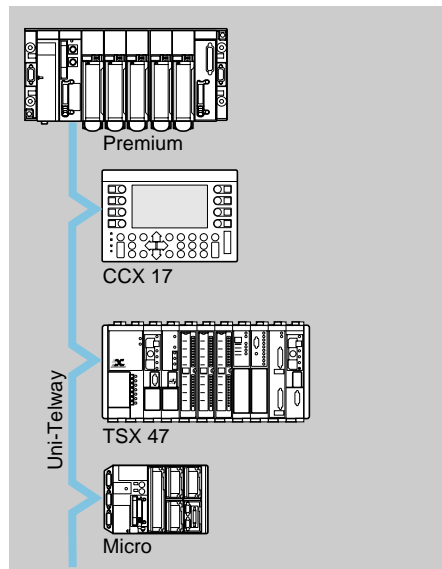
Premium automation platform

Uni-Telway bus

Presentation, characteristics

References :
pages 43594/6 and 43594/7

Presentation



The Uni-Telway bus is a standard means of communication between control system components (PLCs, MMI terminals, supervisors, variable speed drives, numerical controllers, weighing equipment, etc).

It is suitable for architectures designed to pilot control and monitoring devices via a PLC, or architectures used for MMI (supervision, etc).

The Uni-Telway bus requires a master station which manages the allocation of bus access rights to the various connected stations (known as slave stations).

Characteristics

Structure	Type	Heterogeneous industrial bus				
	Physical interface	Programming port RS 485 non isolated (TER/AUX)	Integrated link to TSX SCY 21601 module RS 485 isolated	PCMCIA card RS 485 isolated/ RS 422	PCMCIA card 20 mA CL	PCMCIA card RS 232 D non isolated
	Link	Multidrop				Point-to-point
	Method of access	Master/Slave principle				
Transmission	Mode	Asynchronous transmission in baseband				
	Data rate	1.2...19.2 Kbps				0.3...19.2 Kbps
	Medium	Shielded double twisted pair				
Configuration	Number of devices	5 devices max. 8 datalink addresses max.	28 devices maximum		16 devices max.	2 devices
	Length of bus	10 m max., 1000 m with TSX P ACC 01	1000 m max. excluding tap links			15 m (unlimited via modem)
	Tap links	–	15 m	20 m	15 m	–
Services	Uni-TE	Point-to-point requests with confirmation (question/response), of up to 240 bytes (1) initiated by any connected device				
		Unsolicited point-to-point data, without confirmation, of up to 240 bytes (1) initiated by any connected device				
		Broadcast messages of up to 240 bytes (1) initiated by the master device				
	Other functions	Transparent communication, via the master, with any device in an X-Way architecture				
		Diagnostics, debugging, adjustment and programming of PLCs				
Security	Check character on each frame, acknowledgement and, if required, repetition of messages ensure security of transmission					
Monitoring	Bus status table, transmission error counters and device status can be accessed by program in each device					
	Status of bus and connected devices accessed from the master PLC using PL7 or SYSDIAG software on an FT 2100/FTX 517 terminal or PC compatible.					

(1) Limited to 128 bytes with Micro/Premium PLC programming port. For other limitations, please consult our specialist catalogue.

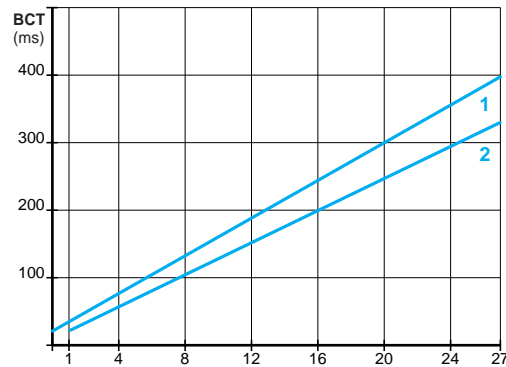
Premium automation platform

Uni-Telway bus

Characteristics (continued)

Characteristics :
 page 43594/2
 References :
 pages 43594/6 and 43594/7

Performances



The Uni-Telway bus cycle time depends on :

- The number of devices polled (datalink addresses)
- The data rate
- The turnaround time of each device
- The number, length and type of messages

BCT = Bus Cycle Time, is the interval between two polls to the same device.

1 = 9.6 Kbps
 2 = 19.2 Kbps

The above curve gives the Uni-Telway cycle time as a function of the number of slaves operating at 9.6 Kbps or 19.2 Kbps, with a typical turnaround time of 5 ms per device (excluding messages).

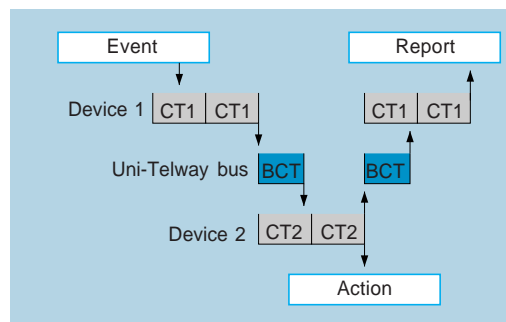
The following table shows the time to be added (in ms) to obtain the true BCT value as a function of the traffic (N = Number of usable characters) :

Exchanges	Time (ms)	
	9.6 Kbps	19.2 Kbps
Master to slave	$24 + 1.2 N (1)$	$17 + 0.6 N (1)$
Slave to master	$19 + 1.2 N (1)$	$12 + 0.6 N (1)$
Slave to slave	$44 + 2.3 N (1)$	$29 + 1.15 N (1)$

(1) N = Number of usable characters corresponding to the messages to be exchanged.

In a distributed control system architecture the application-to-application response time depends not only on the communication system, but also on :

- The processing times of the message source and destination devices
- The degree of asynchronism between the bus and processor cycle times



This response time must be evaluated by the designer of each application according to the devices which are connected.

The processing time of a device may vary from one to two cycle times depending on the degrees of asynchronism.

BCT = Uni-Telway bus cycle time

CT1 = Device 1 bus cycle time

CT2 = Device 2 bus cycle time

Premium automation platform

Uni-Telway bus

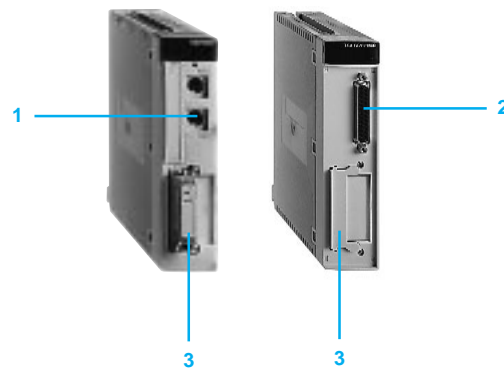
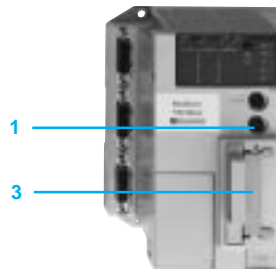
Devices which can be connected

Characteristics :
page 43594/2
References :
pages 43594/6 and 43594/7

Devices which can be connected

Micro/Premium PLCs

Micro/Premium PLCs provide various ways of connecting to the Uni-Telway bus.



1 Via the integrated port on the processor or coprocessor
The AUX (1) port (8-way mini-DIN) has one non-isolated RS 485 serial link channel (maximum distance 10 m).

2 Via the integrated port on the TSX SCY 21601 module
This module has one isolated RS 485 serial link channel. Half-duplex multiprotocol, including Uni-Telway.

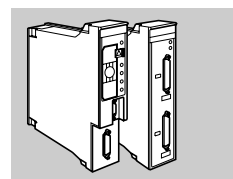
3 Via multiprotocol PCMCIA card
A slot on the processor of TSX 37-21/22/Premium PLCs or on the coprocessor and on the TSX SCY 21601 module accepts the following multiprotocol cards :

- TSX SCP 114 PCMCIA card
Isolated RS 485/RS 422 link. This type of card corresponds to the Uni-Telway standard
- TSX SCP 111 PCMCIA card
Non isolated RS 232 D link. This type of card can be used for direct point-to-point links or via Modem
- TSX SCP 112 PCMCIA card
20 mA current loop link. This type of card is used for a multidrop link (2 to 16 devices) and requires a 24 V external power supply

(1) TER port for TSX 37-05/08/10 PLC

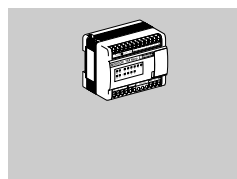
Other devices (please consult our specialist catalogue)

TSX model 40 PLCs



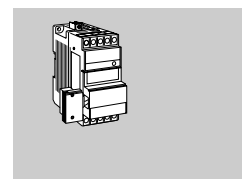
Connection via processor Uni-Telway integrated port or via TSX SCM 2166 communication module.

Nano PLCs



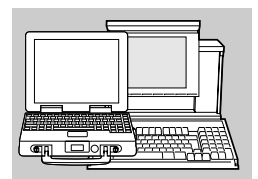
Connection via the terminal port.

TSX 17-20 micro-PLCs



Connection via the TSX SCG 1161 module of TSX 17-20 micro-PLCs fitted with the TSX P17 20 FC2/FD2 PL7-2 micro-software cartridge.

FT 2100/PC compatible terminals



Connection via the terminal integrated ports. These give access to all devices in the X-Way architecture. X-Way drivers, see page 43594/6.

Other devices which can be connected

Description	Device reference	See page or catalogue
Operator panel MMI terminals Identification system	CCX 17-20, CCX 17-30 XBT-H/P/E/HM/PM, XBT-F/FC, T XBT-F XGS-C5	Page 43583/6 Page 0372Q/2 Specialist catalogue
Variable speed drives MASAP servodrive	ATV-16, ATV-66, ATV-58 for asynchronous motors RTV-74, RTV-84 for d.c. motors MSP-62	Specialist catalogue Specialist catalogue Specialist catalogue
Industrial terminals	FT 2100 terminal	Page 43586/4
Data processing equipment	Bull : DPX2/100 computers under SPIX Digital : PDP11 computers under RSX, Micro VAX under VMS Hewlett-Packard : HP9000 computer running under HP-UX IBM : PC micro-computer under DOS and OS/2	— — — —

Premium automation platform

Uni-Telway bus

References

Characteristics :
page 43594/2

Elements for connection to Uni-Telway bus



TSX SCY 21601



TSX SCP 110



TSX P ACC 01



TSX SCA 50



TSX SCA 62



TSX SCA 72

Description	Protocol	Physical layer	PLC	Reference (1)	Weight kg	
Integrated link on processor	Uni-Telway Character mode Modbus/Jbus Slave (2)	RS 485 non isolated	TSX/PCX Premium	See page 0451Q/2	–	
			Micro	Please consult our specialist catalogue	–	
Communication module	Modbus/Jbus Uni-Telway Character mode	- 1 isolated RS 485 integrated 2-wire channel (ch. 0), - 1 type III PCMCIA card slot (channel 1)	TSX/PCX Premium	TSX SCY 21601	0.360	
Type III PCMCIA cards for PMX/PCX Premium processor, TSX 37-21/22 PLC or TSX SCY 21601 module	Modbus/Jbus Uni-Telway Character mode	RS 232 D (9 signals) 0.3...19.2 Kbps		TSX SCP 111	0.105	
				RS 485 (RS 422 compatible) 0.3...19.2 Kbps	TSX SCP 114	0.105
				20 mA CL 0.3...19.2 Kbps	TSX SCP 112	0.105
Set of X-Way drivers for PC compatible	Includes all the X-Way drivers : - Uni-Telway/Fipway/Fipio/Ethway for Windows 3.1/95/98/NT/2000 - XIP/ISaway for DOS and Windows 3.1/95/98/NT/2000 - Uni-Telway for TSX SCP 114 card in Windows 95/98/NT/2000 - Terminal port for OS/2		1 CD-ROM	TLX CD DRV M	–	

Uni-Telway bus connection accessories

Description	Use	Reference	Weight kg
Terminal port connection box (TER) Premium 1 m connecting cable	Isolation of Uni-Telway signals for bus length > 10 m, end of line adaptation, bus cable tap links	TSX P ACC 01	0.690
Passive T-junction box	Tap link and extension of bus cable, end of line adaptation	TSX SCA 50	0.520
2-channel passive subscriber socket	2-channel tap link (15-way female SUB-D connector) and extension of bus cable, address coding and end of line adaptation	TSX SCA 62	0.570
RS 232 C/RS 485 active adaptor unit	Connection of an RS 232 C device (using Uni-Telway protocol), adaptation and isolation of signals, end of line adaptation (no address coding)	TSX SCA 72	0.520
Other connection accessories	Uni-Telway bus	Please consult our specialist catalogue	–

(1) Product supplied with bilingual Quick Reference Guide : English and French.
(2) With Micro PLC.

Premium automation platform

Uni-Telway bus

References

Characteristics :
page 43594/2

Uni-Telway bus connecting cables

Description	Use		Length	Reference	Weight kg
	From	To			
Double shielded twisted pair RS 485 cables	Uni-Telway bus	-	100 m	TSX CSA 100	5.680
			200 m	TSX CSA 200	10.920
			500 m	TSX CSA 500	30.000
Cables for isolated RS 485 tap link	TSX SCP 114 card	TSX SCA 50 T-jun. box	3 m	TSX SCP CU 4030	0.160
			3 m	TSX SCP CU 4530	0.180
			3 m	TSX SCY CU 6030	0.180
	TSX SCY 21601 integrated channel (channel 0)	TSX SCA 50 T-jun. box	3 m	TSX SCY CU 6030	0.180
			3 m	TSX SCY CU 6530	0.200
Cables for non isolated RS 485 tap link	Micro/Premium port, PCX 57 (TER or AUX)	TSX P ACC 01 (AUX) box	2 m	T FTX CB1 020	0.180
			5 m	T FTX CB1 050	0.420
			3 m (1)	TSX PCU 1031	0.140
Other RS 232 D and 20 mA CL connecting cables	-	-	-	See page 43596/3	-

(1) TSX PCU 1031 cable for use with terminal equipped with PL7 software V 4.0, reference TLX ●●● PL7 ● P 40M. For PL7 software V < 4.0, use cable TSX PCU 1030.

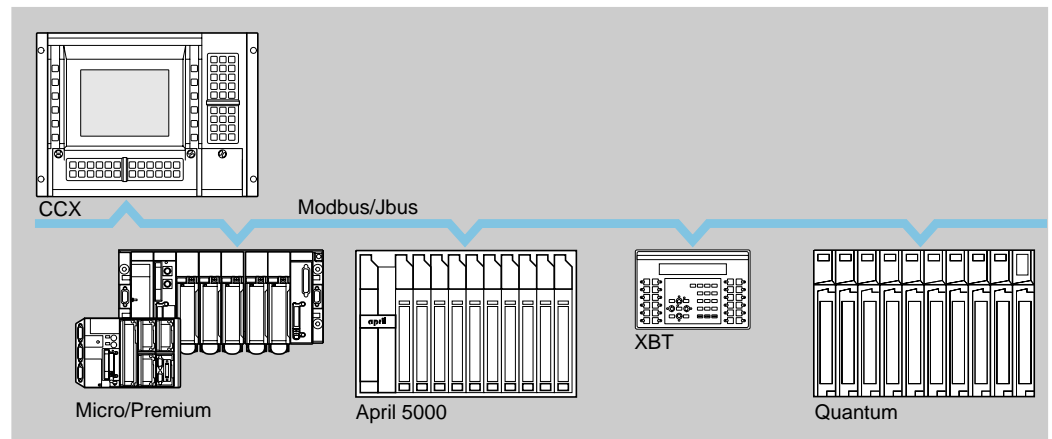
Premium automation platform

Modbus/Jbus bus

Presentation, description

References :
pages 43595/4 and 43595/5

Presentation

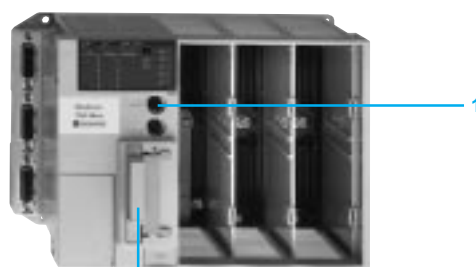


The Modbus/Jbus bus is used for Master/Slave architectures (however it is necessary to check that the Modbus/Jbus services used by the application are implemented on the devices concerned).

The bus comprises one Master station and several Slave stations. Only the Master station can initiate the exchange (direct communication between Slave stations is not possible). Two exchange mechanisms are possible :

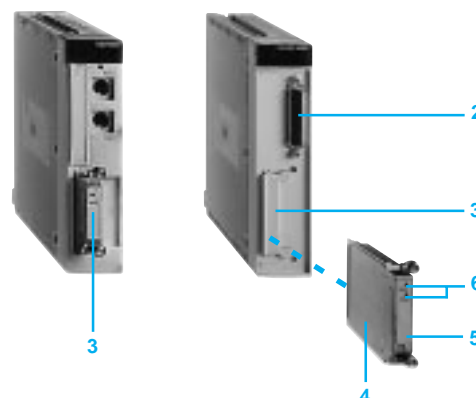
- Question/answer, the requests from the Master are addressed to a given Slave. The master then waits for the response from the Slave which has been interrogated.
- Broadcasting, the Master broadcasts a message to all the Slave stations on the bus, which execute the command without transmitting a response.

Description



Integrated link

- 1 Via integrated port on the Micro processor.
The TER port (8-way mini DIN) also has Modbus/Jbus RTU Slave protocol.
- 2 Via integrated port on the TSX SCY 21601 module.
This module has one isolated RS 485 serial link channel (25-way SUB-D connector), Half-duplex with Modbus/Jbus protocols (see page 43591/2).



TSX SCP 11● multiprotocol PCMCIA cards

- 3 A slot on the processor, the coprocessor and on the TSX SCY 21601 module takes cards which comprise :
- 4 A protective cover
- 5 A removable cover with fixing screws (to access a 20-way miniature connector)
- 6 Two indicator lamps :
 - ERR lamp: card or link fault
 - COM lamp: data transmission or reception

Cable connector to be ordered separately :
TSX SCP/SCY cable.

Premium automation platform

Modbus/Jbus bus

Characteristics

References :
pages 43595/4 and 43595/5

Characteristics (1)

Structure	Type	Heterogeneous industrial bus			
	Physical interface	Terminal port Non-isolated Micro RS 485	PCMCIA card RS 485	20 mA CL	Non-isolated RS 232 D
	Method of access	Slave type	Master/Slave type (only Slave on the Micro PLC integrated port)		
Transmission	Mode	Asynchronous in baseband, RTU/ASCII frame (only RTU on the integrated port)			
	Frame	RTU	RTU/ASCII		
	Data rate	1.2 ...14.2 Kbps	0.3...19.2 Kbps (for TSX SCP 111) 1.2...19.2 Kbps (for TSX SCP 112/114 and for integrated port on TSX SCY 21601 module)		
	Medium	Double shielded twisted pair	Double shielded twisted pair, doubled	Quintuple shielded twisted pair	
Configuration	Number of devices	32 devices maximum	16 devices maximum	2 devices	
		98 datalink addresses maximum (1 device can have several addresses)			
	Length of bus	10 m maximum	1300 m excluding tap links	100 to 1000 m according to rate	15 m maximum
	Tap link	–	15 m maximum	–	–
Services	Requests	Bits : 1920 bits per request Words : 120 words per request			
	Security	One CRC 16 check parameter on each frame			
	Monitoring	No flow control	Diagnostic counters, event counters		
Modbus/Jbus functions (2) available on Premium PLCs	Code	Type			
	01	Read n consecutive output bits			
	02	Read n consecutive input bits			
	03	Read n consecutive output words			
	04	Read n consecutive input words			
	05	Write 1 output bit			
	06	Write 1 output word			
	07	Fast read 8 bits			
	08	Access diagnostic counters			
	11	Read exchange counter			
	12	Read trace buffer			
	15	Write n output bits			
	16	Write n output words			
17	Read identification				

(1) For characteristics of the TSX SCY 21601 communication module integrated channel, see page 43591/2.

(2) The Master PLC station can send all the Modbus/Jbus requests (without transmission and reception monitoring).

Premium automation platform

Modbus/Jbus bus

References

Characteristics :
page 43595/3

Modbus/Jbus connection elements



TSX SCY 21601

Description	Protocol	Physical layer	Reference (1)	Weight kg
Micro PLC integrated link (TER)	Modbus/Jbus (RTU) Uni-Telway Character mode	Non-isolated RS 485	Please consult our specialist catalogue –	
Communication module	Modbus/Jbus Uni-Telway Character mode	- 1 isolated RS 485 integrated channel (channel 0), - 1 type III PCMCIA card slot (channel 1)	TSX SCY 21601	0.360
Type III PCMCIA cards for TSX/PCX Premium processor, TSX 37-21/22 PLC or TSX SCY 21601 module	Modbus/Jbus Uni-Telway Character mode	RS 485 (RS 422 compatible) 1.2...19.2 Kbps	TSX SCP 114	0.105
		RS 232 D (9 signals) 0.3...19.2 Kbps	TSX SCP 111	0.105
		20 mA CL 1.2...19.2 Kbps	TSX SCP 112	0.105



TSX SCP 110

Modbus/Jbus connection accessories



TSX SCA 50

Description	Use	Reference	Weight kg
Passive junction box	Bus tap link and extension, line termination	TSX SCA 50	0.520
2-channel passive subscriber socket (2 or 4-wire) (2)	Tap link of 2 devices with 2 wires Tap link of 1 Master device and/or 1 Slave device with 4 wires Fitted with 2 female 15-way SUB-D connectors	TSX SCA 64	0.570
RS 232 C/RS 485 active adaptor	Connection of an RS 232 C device as RS 485 Isolation of signals and line termination	TSX SCA 72	0.520
Micro PLC TER terminal port cable connector	Bus tap link cable (2 or 4-wire) Isolation of Modbus signals Line termination Supplied with TER port link cable (length 1 m)	TSX P ACC 01	0.690
Line terminators (sold in lots of 2)	Can be connected to the front panel of the TSX SCA 64 subscriber socket	TSX SCA 10	0.030
Other accessories (3)	–	Please consult our specialist catalogue –	



TSX SCA 64

(1) Product supplied with a bilingual quick reference guide : English and French.

(2) 2 or 4-wire cabling, compatible with the TSX SCA 64 subscriber socket requires a Modbus cable with 10 mm maximum external diameter.

(3) For Modbus Plus/multiplexed 4-channel Modbus gateway: please consult your Regional Sales Office.

Premium automation platform

Modbus/Jbus bus

References (continued)

Characteristics :
page 43595/3

Modbus/Jbus connecting cables

Description	Use		Length	Reference	Weight kg
	From	To			
Isolated RS 422/485 tap link cables	TSX SCP 114 card	TSX SCA 50 2-wire box (1)	3 m	TSX SCP CM 4030	0.160
		TSX SCA 64 subscriber sockets, 2/4-wire	3 m	TSX SCP CM 4530	0.180
		Standard Modbus/Jbus device, 4-wire (1) (point-to-point)	3 m	TSX SCP CX 4030	0.160
	TSX SCY 21601 module integrated channel (channel 0)	TSX SCA 50 2-wire box (1)	3 m	TSX SCY CM 6030	0.160
		TSX SCA 64 subscriber sockets, 2-wire	3 m	TSX SCY CM 6530	0.160
RS 232 D tap link cables	TSX SCP 111 card	Communication device (Modem, converter, etc) (DCE) (2)	3 m	TSX SCP CC 1030	0.190
		Point-to-point terminal device (DTE) (2)	3 m	TSX SCP CD 1030	0.190
			10 m	TSX SCP CD 1100	0.620
Tap link cable 20 mA CL	TSX SCP 112 card	Multidrop Modbus (1)	3 m	TSX SCP CX 2030	0.160
Other connecting cables	–	–	–	See page 43606/2	–

(1) End of cable fitted with flying leads.

(2) End of cable fitted with a 25-way male SUB-D connector.

Premium automation platform

Asynchronous serial links

Presentation, description, characteristics

References :
page 43596/3

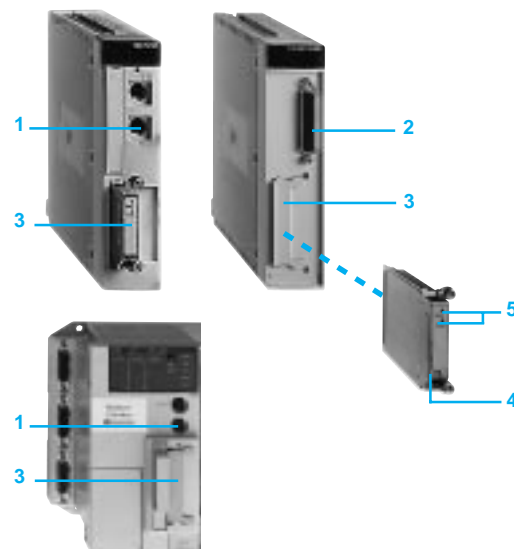
Presentation

Micro/Premium PLCs provide, via their processor, coprocessor or TSX SCY 21601 communication module, several possible ways for exchanging data in character mode with devices equipped with an asynchronous serial link interface :

- RS 485 integrated port
- Type III PCMCIA card with RS 232 D, RS 485 (RS 422 compatible) or 20 mA current loop link

Protocols supported are character mode (ASCII), Uni-Telway and Modbus/Jbus. Other protocols are also available, or can be developed on request, on a RS 485 or RS 232 D link, which enables Micro/Premium PLCs to communicate on third-party architectures. These products are offered within the framework of the Schneider Alliances partnership programme (see page 43614/2). The list of modules available can be obtained from your Regional Sales Office, or from our Internet site www.schneideralliances.com.

Description



Integrated links

- 1 Via integrated port on the processor or coprocessor**
The AUX (1) port (8-way mini-DIN connector) has one non-isolated RS 485 serial link channel (maximum distance 10 m).
- 2 Via integrated port on the TSX SCY 21601 module**
This module for Premium PLCs has one isolated RS 485 serial link channel (25-way SUB-D connector). Half duplex multiprotocol, including Uni-Telway.

TSX SCP 11● multiprotocol PCMCIA cards

- 3** A slot on the processor, coprocessor and on the TSX SCY 21601 module takes cards which comprise :
 - 4** A removable cover with fixing screws for access to the 20-way miniature connector.
 - 5** Two indicator lamps :
 - ERR lamp : card or link fault
 - COM lamp : data transmission or reception
- Connector cable to be ordered separately :
TSX SCP C●●●● cable

(1) TER port for Micro TSX 37-05/08/10 PLC.

Characteristics (1)

Physical layer	Type	Non-isolated RS 485 terminal port	Isolated RS 485 TSX SCY 21601 integrated port	PCMCIA cards RS 232 D	RS 485 RS 422 compatible	20 mA current loop (3)
	Data rate		1.2...19.2 Kbps (2)	1.2...19.2 Kbps	0.3...19.2 Kbps	1.2...19.2 Kbps
Transmission	Size	120 characters		4096 characters max.		
	Data	7 or 8 bits				
	Stop bit	1 or 2 bits				
	Parity bit	Even, odd or none				
	Stop on silence					
Services	Reception echo					
	Repeat 1 st char. echo					
	Auto LF					
	Back space					
	Beep					
	Flow mgmt	by Xon-Xoff				
		by RTS/CTS				
	RTS/CTS delay					
	Stop on reception					
	End of message					
PSR management						

Parameters which can be accessed in configuration mode.

(1) For characteristics of the communication module integrated channel, see page 43591/2.
(2) With the TSX P57 3●3/453 processor, data rate up to 115 Kbps during program uploading.
(3) Point-to-point or multidrop link.

Premium automation platform

Asynchronous serial links

References

Characteristics :
page 43596/2



TSX SCY 21601



TSX SCP 110



TSX P ACC 01

Asynchronous serial link elements (character mode)					
Description	Protocol	Physical layer	PLC	Reference (1)	Weight kg
Integrated link on processor	Character mode Uni-Telway	RS 485 non-isolated	Micro	Please consult our specialist catalogue	–
			TSX/PCX Premium	See page 0451Q/2	–
Communication module	Character mode Uni-Telway Modbus/Jbus	- 1 isolated RS 485 integrated chan. (channel 0), - 1 type III PCMCIA card slot (channel 1)	TSX/PCX Premium	TSX SCY 21601	0.360
Type III PCMCIA cards for TSX 37-21/22 PLC, TSX/PCX Premium processor, or TSX SCY 21601 module	Character mode Uni-Telway Modbus/Jbus	RS 232 D (9 signals) 0.3...19.2 Kbps		TSX SCP 111	0.105
		RS 485 (RS 422 compatible) 0.3...19.2 Kbps		TSX SCP 114	0.105
		20 mA CL 0.3...19.2 Kbps		TSX SCP 112	0.105
Asynchronous serial link connection accessories					
Description	Use			Reference	Weight kg
Terminal port connection box	Isolation of RS 485 signals, end of line adaptation, supplied with cable for connection to PLC (length 1 m)			TSX P ACC 01	0.690
Connecting cables for asynchronous serial links					
Description	Use	Length	Reference	Weight kg	
Cables for isolated RS 485 connection	TSX SCP 114 card	RS 485/RS 422 device (2)	3 m	TSX SCP CX 4030	0.160
	Integrated channel (channel 0) module TSX SCY 21601	RS 485/RS 422 device (3) via TSX SCA 50 box	3 m	TSX SCY CU 6030	0.180
Cable for non-isolated RS 485 connection	Micro/Premium port (TER or AUX) or TSX P ACC01 box	RS 232 D port of a terminal device (DTE) (3)	3 m	TSX PCD 1030	0.170
Cables for RS 232 D connection	TSX SCP 111 card	Communication device : Modem, converter, etc. (DCE) (3)	3 m	TSX SCP CC 1030	0.190
		Point-to-point terminal device (DTE) (3)	3 m	TSX SCP CD 1030	0.190
			10 m	TSX SCP CD 1100	0.620
Cable for 20 mA CL connection	TSX SCP 112 card	Current loop device (2)	3 m	TSX SCP CX 2030	0.160
Other connecting cables	–	–	–	Please consult our specialist catalogue	–

(1) Product supplied with a bilingual Quick Reference Guide : English and French.

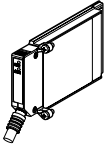


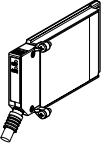



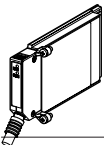
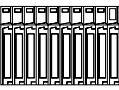
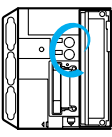



(2) End of cable fitted with flying leads.

(3) End of cable fitted with a 25-way male SUB-D connector.

Premium automation platform

Connecting cables for PCMCIA cards and TER/AUX ports

References

Micro/Premium PLCs	Device to be connected	Physical link	Protocol	Length	Reference	Weight kg
TSX SCP 111 PCMCIA card 1 	DTE terminal 2 	RS 232 D	Character mode	3 m	TSX SCP CD 1030	0.190
				10 m	TSX SCP CD 1100	0.620
	DCE terminal (Modem, etc) 2 	RS 232 D	Character mode Uni-Telway	3 m	TSX SCP CC 1030	0.190
TSX SCP 114 PCMCIA card 1 	TSX SCA 50 T-junction box 3 	RS 485 (2-wire isolated)	Character mode Uni-Telway	3 m	TSX SCP CU 4030	0.160
		RS 422/485 (2-wire)	Character mode Modbus	3 m	TSX SCP CM 4030	0.160
	TSX SCA 62 2-channel subscriber socket 4 	RS 485 (2-wire isolated)	Uni-Telway	3 m	TSX SCP CU 4530	0.160
	DTE terminal 3 	RS 422/485 (4-wire)	Modbus	3 m	TSX SCP CX 4030	0.160
TSX SCP 112 PCMCIA card 1 	Active or passive terminal 3 	20 mA current loop	Character mode Uni-Telway Modbus	3 m	TSX SCP CX 2030	0.160
TER/AUX ports 5 	TSX P ACC 01 junction box 	RS 485	Uni-Telway	1 m	Included with TSX P ACC 01	–
	TSX P ACC 01 junction box for FTX 117 5 	RS 485	Uni-Telway	2 m	T FTX CB1 020	0.100
				5 m	T FTX CB1 050	0.190
	DTE terminal 6 	RS 232	Character mode	3 m	TSX PCD 1030 (1)	0.170

End of connecting cable fitted with:

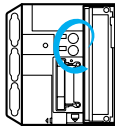









- 1** 25-way male miniature connector.
- 2** 25-way male SUB-D connector.
- 3** Flying leads.
- 4** 15-way male SUB-D connector.
- 5** 8-way female mini-DIN connector.
- 6** 9-way female SUB-D connector.

(1) Point-to-point, supplied with 2 SUB-D adapters : **TSX CTC 07** 9-way male/25-way female and **TSX CTC 08** 9-way male/25-way male.

Premium automation platform

Connecting cables for PCMCIA cards and TER/AUX ports

References (continued)

Micro/Premium PLCs	Device to be connected	Physical link	Protocol	Length	Reference	Weight kg
TER/AUX ports (continued) 1 	DTE terminal (Slave PC) 2 	RS 232	Uni-Telway	2.5 m minimum	TSX PCU 1031 (1) (2)	0.140
	DTE terminal (printer, Slave PC without RTS) 2 	RS 232	Character mode Uni-Telway	3 m	TSX PCX 1030 (3)	0.170
	DCE terminal (Modem M/SI. USA/Europe) 3 	RS 232	Character mode Uni-Telway	3 m	TSX PCX 1130 (4)	0.140
	FT 2100 terminal 2 	RS 485	Uni-Telway	2.5 m minimum	TSX PCU 1031 (2)	0.170
	CCX 17 panel XBT terminal 4 	RS 485	Uni-Telway	2.5 m	XBT-Z968	0.180
TSX SCY 21601 communication module integrated port 4 	TSX SCA 50 T-junction box 5 	RS 485 (2-wire isolated)	Uni-Telway	3 m	TSX SCY CU 6030	0.180
	TSX SCA 62 2-channel subscriber socket 6 	RS 485 (2-wire isolated)	Uni-Telway	3 m	TSX SCY CU 6530	0.200
	RS 485 terminal 5 	RS 485 (2-wire isolated)	Character mode	3 m	TSX SCY CM 6030	0.180

End of connecting cable fitted with :

- | | |
|------------------------------------|-------------------------------|
| 1 8-way female mini-DIN connector. | 4 25-way male SUB-D connector |
| 2 9-way female SUB-D connector. | 5 Flying leads. |
| 3 9-way male SUB-D connector. | 6 15-way male SUB-D connector |

(1) Point-to-point, supplied with 1 SUB-D adapter : **TSX CTC 07** 9-way male/25-way female.

(2) TSX PCU 1031 cable to be used with terminal equipped with PL7 V 4.0 software reference TLX ●●● PL7 ● P 40M. For PL7 V < 4.0 software, use TSX PCU 1030 cable.

(3) Point-to-point, supplied with 2 SUB-D adapters : **TSX CTC 07** 9-way male/25-way female and **TSX CTC 08** 9-way male/25-way male.

(4) Point-to-point, supplied with 1 SUB-D adapter : **TSX CTC 09** 9-way female/25-way male.

Premium automation platform

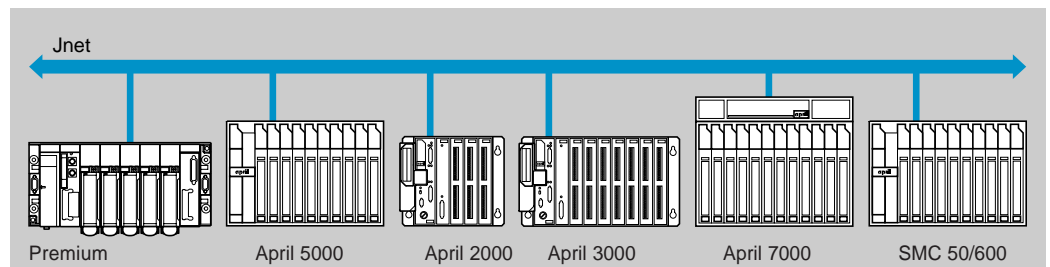
Jnet network

Presentation, description, characteristics

References :
page 43603/3

Presentation

The Jnet network enables an automatic exchange of data between several Series 1000, SMC 50/600 and Premium PLCs, using the shared table service (exchange by each PLC of a memory zone, internal words, broadcast zone, to other PLCs on the network), see page 43301/4.



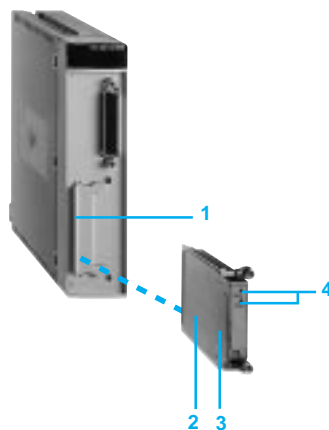
The Jnet network services exchange data between Series 1000, SMC 50/600 and Premium PLCs. The principle is based on broadcasting of a local zone by each PLC (word memory zone), which is automatically copied to other PLCs on the network ; no explicit programming for exchanges is required.

Description

Premium PLCs are connected to the Jnet network using type III PCMCIA communication cards :

- TSX JNP 112 card for which the physical layer is a 20 mA current loop serial link.
- TSX JNP 114 card for which the physical layer is a RS 485 serial link.

These PCMCIA cards are installed in the host slot **1** on the TSX SCY 21601 module.



TSX JNP cards comprise :

- 2 A protective cover
- 3 A removable cover
- 4 Two indicator lamps :
 - ERR : card or link fault
 - COM : activity on the line

Connectors to be ordered separately :

TSX SCP CM 4030/CM 4530/CX 2030 cable

Characteristics

Structure	Type	Inter-PLC network
	Topology	Bus with passive tap links
	Method of access	Circulation by token
	Physical interface	RS 485 2 wire, 20 mA CL
Transmission	Mode	Half duplex on 2 wires
	Format	8 bits, no parity, 1 stop
	Data rate	19.2 Kbps
	Medium	Shielded twisted pair
Configuration	Number of devices	32 (16 if the network includes SMC PLCs)
	Length of bus	1300 m maximum without tap links
	Tap links	15 m maximum
Services	Data exchanged	Distributed database : - 128 16-bit words for a network with 32 stations (Series 1000/Premium), - 64 16-bit words for a network including SMC PLCs.
	Monitoring	Network nominal duty control indicator lamp

Premium automation platform

Jnet network

Software configuration, references

Software configuration

Installation procedures and access to the Jnet module configuration screen are identical to those for any PCMCIA type communication module, using PL7 Junior/Pro software.



Configuration of a Jnet PCMCIA card is accessed using the screen below :

Stations communicate between themselves automatically once they are configured and connected to the same Jnet network.

A debug screen is also linked to the module. It gives the following information :

- Status of each station (RUN/STOP/ABSENT).
- Transmission error counter.

References



TSX JNP 112/114

Connection elements to Jnet network

Description	Number per PLC	Use	Physical layer	Reference (1)	Weight kg
Jnet type III PCMCIA cards	3 maximum	Type III slot on TSX SCY 21601 module	20 mA CL 19.2 Kbps	TSX JNP 112	0.110
			RS 485 19.2 Kbps	TSX JNP 114	0.110

Connection accessories

Description	Use	Power supply	Reference (1)	Weight kg
2-channel subscriber socket (2 or 4 -wire) (2)	Tap link of 2 x 2-wire devices Tap link of 1 Master device and/or 1 x 4-wire Slave device Fitted with 2 x 15-way female SUB-D connectors	–	TSX SCA 64	0.570
Line terminators (sold in lots of 2)	Connection to the front panel of TSX SCA 64 subscriber socket 2/4-wire cabling	–	TSX SCA 10	0.030
T-junction box	Connection to RS 485 via tap link (Tee)	Passive	TSX SCA 50	0.520



TSX SCA 64



TSX SCA 50

Connecting cables

Description	Use		Length	Reference	Weight kg
	From	To			
Cables for isolated RS 422/485 tap link	TSX JNP 114 card	TSX SCA 50 box, 2-wire (3)	3 m	TSX SCP CM 4030	0.160
		TSX SCA 64 subscriber socket, 2/4-wire	3 m	TSX SCP CM 4530	0.180
Cable for 20 mA CL tap link	TSX JNP 112 card	Multidrop Modbus (3)	3 m	TSX SCP CX 2030	0.160

(1) Product supplied with bilingual Quick Reference Guide : English and French.

(2) 2 or 4-wire cabling, compatible with TSX SCA 64 subscriber sockets requires the use of a Modbus cable with an external diameter of 10 mm maximum.

(3) Cable end fitted with flying leads.

Premium automation platform

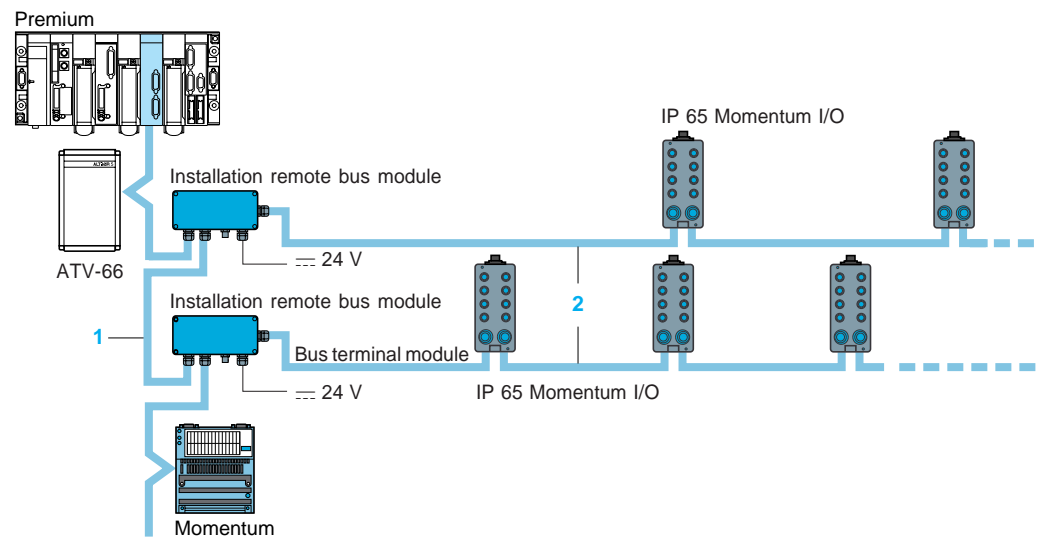
InterBus-S bus

Presentation

Characteristics :
page 43602/4
References :
page 43602/5

Presentation

The InterBus-S bus is a serial link type fieldbus for sensors and actuators which conforms to the requirements of an industrial environment.



The topology of the InterBus-S bus is designed as a ring system with master/slave central access procedure.

It is subdivided into three parts :

- The remote bus **1** (bus devices use RS 485 point-to-point connection).
- The installation remote bus **2** (remote bus tap link via a bus terminal module). Its technology is particularly suitable for IP 65 dust and damp proof systems.
- The local bus with TTL technology is particularly suitable for buses within a control cabinet.

Each bus subscriber comprises a transmitter and a receiver.

The InterBus-S system is like a data ring and has the structure of a shift register distributed on the bus. With its registers, each module constitutes a component of this shift register ring. The InterBus-S master circulates the data in series on this ring.

Premium automation platform

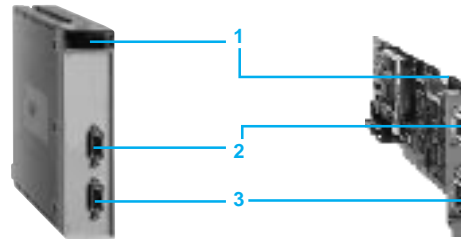
InterBus-S bus

Description, connectable devices

Characteristics :
page 43602/4
References :
page 43602/5

Description

Premium PLCs are connected to the InterBus-S bus via the TSX IBY 100 InterBus-S bus module. The TSX IBX 100 communication coprocessor can be used to connect a PCX 57 coprocessor integrated in a PC compatible to the InterBus-S bus.



The front panel on the TSX IBY 100 module comprises :

- 1 A display block with 6 indicator lamps (on the card for the TSX IBX 100)
- 2 A 9-way female RS 232 SUB-D connector : CMD Tool software support (configuration software)
- 3 A 9-way female RS 232 SUB-D connector : InterBus-S link (this connector integrates an additional power supply for the fibre optic link)

Connectable devices

The TSX IBY 100 or TSX IBX 100 module acts as the master on the InterBus-S bus : other Schneider Electric devices (slaves) which can be connected on the bus are :

- ATV variable speed drives
- XBT-BB operator terminals
- Telefast IP20 I/O interfaces
- Momentum I/O
- AS-i/InterBus-S gateway
- Any third-party device conforming to InterBus-S standard profiles

Premium automation platform

InterBus-S bus

Characteristics, software configuration

References :
page 43602/5

Characteristics of the bus supported by TSX IBY 100 modules or TSX IBX 100 coprocessors

Type of bus	Remote bus	Installation remote bus	Local bus	InterBus loop
Structure				
Type	Industrial bus			
Physical interface	RS 485	RS 485 with \pm 24 V in cable	TTL	Combined interface (vertically mounted signal and \pm 24 V power supply)
Method of access	Master/Slave			
Transmission				
Mode	NRZ			
Data rate	500 kbps			
Medium	- Twisted pair - Fibre optic - Wave guide rail - Infra-red - Rotating collector	Special cable for : - Sensor and I/O module 24V power supply - data transmission	Special cable	2 x 1.5 mm ²
Physical configuration				
Length of a segment	400 m maxi	–	–	200 max. in the loop
Maximum length of cable between :	- Module and the 1st bus terminal module : 400 m - 2 bus term. modules : 400 m	- Bus terminal module and 1st module : 50 m - 2 modules : 50 m	- Bus terminal module and 1st module : 1.5 m - 2 modules : 1.5 m	- Bus terminal module and 1st interface : 20 m - 2 modules : 10 m
	Module and last station on the remote bus : 12.8 km	The bus terminal module and last module : 50 m	Bus terminal module and last module : 10 m	Bus terminal module and last module : 100 m
Number of tap links	16 max.	–	–	1 loop per bus term. module
Number of bus terminal modules	254 max.	–	–	–
Number of slaves	512 max.	Total current of connected modules : 4.5 A max.	8	63
Number of I/O	3872 I/3872 Q max. (4096 I/O in total)	–	–	–
InterBus-S services	Implicit exchange of process data : 242 %IW and 242 %QW - Pre-processing - Logical addressing - Segmentation			

Software configuration

The InterBus-S bus can be configured in 3 modes :

- Auto mode : This mode does not require the use of any special configuration software (I/O images are copied to %IW, %QW implicitly). It facilitates the wiring check.
- Mode PL7 → IBY mode : This mode is used to define and load the configuration to the module (explicit assignment of %IW, %QW). The CMD Tool software (1) is required in order to generate the configuration text file
- CMD → IBY mode : Reserved for configurations > 8 K words, and requires the use of the CMD Tool software.

PMS message handling (usable on PCP devices) is managed via standard OFs (Read-var, Write-var, etc).

The catalogue file which enables Schneider Electric devices to be integrated in the CMD Tool software is available on our Web site :

- Address : www.schneiderautomation.com
- File for downloading : Schneider device catalog for CMD G4

(1) Contact your Phoenix Contact vendor.

Premium automation platform

InterBus-S bus

References

Characteristics :
page 43602/4

References



TSX IBY 100



TSX IBX 100



170 INT 110 00

Interbus-S bus modules

Description	No. of modules per PLC/PC	Communication profile	Services	Reference (1)	Weight kg
InterBus-S module for Premium PLC	0 on TSX 57-10 1 on TSX/PCX 57-20 2 on TSX/PCX 57-30 2 on TSX 57-40	Master/Slave 0.5 M bps	- cyclical variable exchanges - PMS messaging - bus operating modes managemt	TSX IBY 100	0.320

InterBus-S coprocessor for PCX coprocessor	0 on TSX 57-10 1 on TSX/PCX 2 on TSX/PCX 2 on TSX 57-40	Master/Slave 0.5 Mbps	- cyclical variable exchanges - PMS messaging - bus operating modes managemt	TSX IBX 100	0.280
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Converter software

Description	Use	Reference	Weight kg
Symbol converter software	Used to convert CMD symbols into PL7 symbols	TLX LIBS CNVE	-

Bus connection elements

Description	Use	Length	Reference (1)	Weight kg
Momentum communication module	Momentum I/O base units on InterBus-S bus	-	170 INT 110 00	-
Remote bus cables	-	100 m	TSX IBS CA 100	-
		400 m	TSX IBS CA 400	-
Installation remote bus cables	Preformed cables for linking 2 communication modules	0.110 m	170 MCI 007 00	-
		1 m	170 MCI 100 00	-
Connecting cable	TSX IB● to PC connection (with CMD Tool software)	3 m	990 NAA 263 20	-
9-way SUB-D connectors (sold in lots of 2)	Remote bus cables	-	170 XTS 009 00	0.045

(1) Product supplied with multilingual Quick Reference Guide : English and French.

Premium automation platform

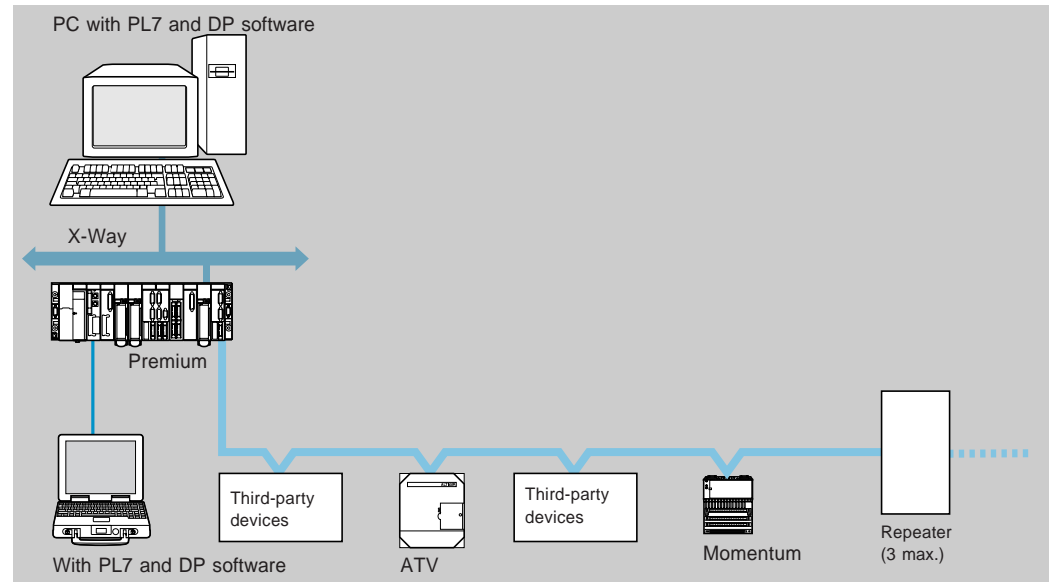
Profibus DP bus

Presentation, description, connectable devices

Characteristics :
page 43607/3
References :
page 43607/3

Presentation

The Profibus DP bus is a high-speed fieldbus which conforms to industrial communication requirements.



The Profibus DP is a linear bus with a centralised access procedure of the Master/Slave type. Only Master stations, also known as active stations, have access rights to the bus. The Slave or passive stations can only respond to prompts. Dialogue between Masters is also possible from some stations by means of a token bus protocol. The physical connection is a single shielded twisted pair, but fibre optic interfaces are available to create tree, star, or ring structures. Compared to the ISO model, only layers 1, 2 are implemented, since access from the user interface is made directly to the link layer via simple mapping of variables.

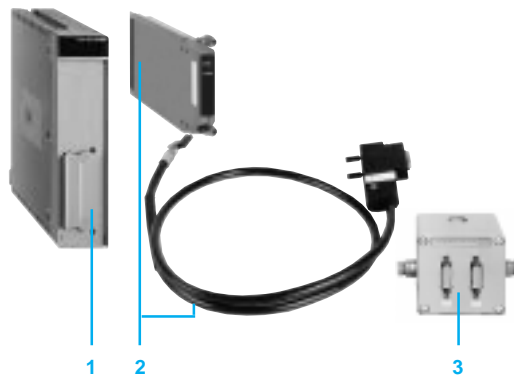
Configuration

The Profibus DP bus should be configured by special software, reference TLX L FBC M, which should be ordered separately.

The DP software can be used to generate an ASCII configuration file which should be imported into the PLC application via PL7 Junior/Pro development software.

Description

Premium PLCs (TSX/PCX 57) are connected to the Profibus DP bus by a TSX PBY 100 module. This module can be installed in any slot in the Premium PLC rack.



It comprises :

- 1 Host module for the PCMCIA card
- 2 Profibus DP PCMCIA card with its integral connecting cable, 0.6 m long
- 3 T-junction box enabling the tap link of the main bus 490 NAE 911 00

Connectable devices

The TSX PBY 100 module acts as the master on the Profibus DP bus. The other Schneider Electric slave devices which may be connected are :

- ATV variable speed drives
- Momentum I/O blocks
- Etc
- Any compatible third-party device with standard Profibus DP profiles

Premium automation platform




Profibus DP bus

Characteristics, references

Characteristics of the bus supported by the module

Type of bus	Profibus DP	
Structure	Type	Industrial bus
	Physical interface	RS 485
	Method of access	Master/Slave
Transmission	Mode	NRZ
	Medium	Shielded twisted pair, fibre optic, infra-red
Physical configuration	Data rate/ segment length	9.6 Kbps/1200 m (4800 m with 3 repeaters) to 12 Mbps/100 m (400 m with 3 repeaters)
	Number of slaves	126
	Number of I/O	3872 inputs/3872 outputs (242 %IW words, 242 %QW words)
Services	Subset of Class 1 Master functions	Read/write DP slave I/O data Transfer slave diagnostic data Set slave parameters (on power-up) Check slave configurations (on power-up)
	Subset of Class 2 Master functions	Manage monitoring requests : Global_CONTROL and Get_Master_Diag Master/Master dialogue is not supported

References

	Description	Communication profile	Services	Reference	Weight kg
	Profibus DP bus module assembly for Premium TSX/PCX PLCs	Master/Slave 12 Mbps	Class 1 and Class 2 Master functions, see characteristics Profibus FMS message handling not supported	TSX PBY 100	0.870
	Profibus DP module configuration software	–	Generates an ASCII configuration file for the module to be imported into the PL7 application	TLX L FBC M	–
	Elements for connection to Profibus DP bus				
	Description		Use	Reference	Weight kg
Momentum communication module			Profibus DP bus on Momentum I/O sub-bases	170 DTN 110 00	–
Connectors for communication module			Line terminator	490 NAD 911 03	–
			Intermediate connection	490 NAD 911 04	–
			Intermediate connection and terminal port	490 NAD 911 05	–
	Description		Length	Reference	Weight kg
	Profibus DP connecting cables		100 m	TSX PBS CA 100	–
			400 m	TSX PBS CA 400	–

TSX PBY 100

490 NAD 911 03

Premium automation platform

CANopen bus

Presentation, description, connectable devices

Characteristics :
page 43615/3
References :
page 43615/3

Presentation

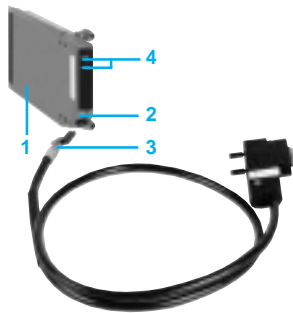
Originally used in the automotive industry, CAN is increasingly used in general industry. Several fieldbuses based on CAN lower layers and components are available. The CANopen bus conforms to the ISO 11898 international standard, promoted by the CAN In Automation association, which consists of users and manufacturers and offers an excellent assurance of open access and interoperability due to its standardised devices and communication profiles.

The CANopen bus is a multimaster bus which ensures reliable deterministic access to realtime data in control system devices. The CSMA/CA protocol is based on broadcast exchanges, sent cyclically or on an event, which ensures optimum use of the passband. A message handling channel can also be used to define slave parameters. The bus uses a double shielded twisted pair, on which 127 devices maximum are connected by simple tap junctions. The variable data rate between 10 Kbps and 1 Mbps depends on the length of the bus (between 30 and 5000 m).

Description

Hardware description

The TSX P57 ●●3M and T PCX 57 ●●3M Premium platforms connect to the CANopen bus by means of the TSX CPP 100 type III PCMCIA card inserted in the processor or coprocessor communication port slot. This card is supplied with a connection cable for the TSX CPP ACC 1 tap junction. This can be used to connect physically 2 CANopen buses, which are seen by the application as a single logic interface. In practice, this feature enables the useful length of the bus to be doubled.



The TSX CPP 100 card comprises :

- 1 A protective cover
- 2 A removable cover (enabling mounting on a Premium processor or coprocessor)
- 3 A connection cable length 0.6 m
- 4 2 diagnostic indicator lights

Connections to be ordered separately :

TSX CPP ACC1 tap junction equipped with one 15-way SUB-D connector for connecting the TSX CPP 100 card cable and two 9-way SUB-D connectors for connecting the 2 CANopen buses. This tap unit has 2 "bus activity" indicator lights on the front panel.

Software description

The CANopen bus is configured using dedicated software, which should be ordered separately, reference TLX L FBC M. This software is used to describe the configuration to be imported into the PLC application via the PL7 Junior/Pro programming software.

If the configuration file is too large in relation to the Premium processor capacity (see characteristics table), it is possible to load the Master configuration directly by inserting the TSX CPP 100 card in a PCMCIA port on the PC compatible.

In PL7, it is possible to configure the CANopen bus card so that the PLC processor/TSX CPP 100 card exchanges are executed at the same rate as the Master task or the fast task. The process data exchanged with the Slaves can be accessed by %MW standard words, the number of which depends on the type of processor and the task in which the module has been declared. PL7 standard function blocks are used to define the device parameters.

Important note :

In addition to supporting the CANopen protocol which uses V2.0A standard CAN identifiers on 11 bits, the card enables direct access to the CAN link layer via CAN V2.0B identifiers on 29 bits, used by the majority of CAN devices. In certain applications this enables simultaneous control of CANopen devices and dedicated CAN products.

Connectable devices

The TSX CPP 100 module performs the role of the Master on the CANopen bus, and other Schneider Electric devices (Slaves) which can be connected on the bus are :

- ATV-58 variable speed drives
- Ultimal motor combinations
- MHD Lexium servodrives
- Any third-party device which conforms to the CANopen standard profiles
- Any CAN device which uses CAN V2.0B identifiers on the ISO 11898 physical layer

Premium automation platform

CANOpen bus



Characteristics, references

Bus characteristics supported by the TSX CPP 100 module

Type of bus	CANOpen								
Structure	Type	Industrial bus							
	Physical interface	ISO 11898							
	Access method	CSMA/CA, multimaster, producer/consumer principle							
Transmission	Data rate	10 Kbps to 1 Mbps							
	Medium	Double shielded twisted pair							
Physical configuration	Length of a segment according to data rate (1)	1 Mbps	800 Kbps	500 Kbps	250 Kbps	125 Kbps	62.5 Kbps	20 Kbps	10 Kbps
		30 m	50 m	100 m	250 m	500 m	1000 m	2500 m	5000 m
	Number of slaves	127 max.							
Software configuration	Maximum number of internal words supported as I/O according to whether module configured as :		TSX P57 2●3M T PCX 57 203M		TSX P57 3●3M T PCX 353M		TSX P57 453M		
	Master task	256 %MW words		512 %MW words		1792 %MW words			
	Fast task	32 %MW words		64 %MW words		128 %MW words			
	Size of file generated by the TLX L FBC M configurator	8 %KW constant words		16 %KW constant words		32 %KW constant words			
	Services	CANopen	<ul style="list-style-type: none"> ● Implicit exchange of Process Data Object via %MW words ● Explicit exchange of Service Data Object by READ_VAR/WRITE_VAR function block ● Compatibility with standardised device and communication profiles on CANopen 						
	CAN	<ul style="list-style-type: none"> ● Explicit exchange of CAN PDU at link level using extended format identifiers on 29 bits (CAN V2.0B standard) by SEND_REQ generic function block. ● Explicit transmission of CAN PDU using identifiers on 11 bits (CAN V2.0A standard) by SEND_REQ generic function block. Reception of this type of identifier is not supported. 							

(1) Possibility of doubling the length by connecting 2 buses on the same TSX CPP 100 PCMCIA card.

References

	Description	Services	No. of modules per PLC/PC	Use	Reference (1)	Weight kg
 TSX CPP 100	CANopen Master PCMCIA card	<ul style="list-style-type: none"> - cyclic exchange (PDO) - CMS message handling (SDO) - management of bus operating modes 	1 on TSX P57 2●3/3●3/453M 1 on T PCX 57 203/353	Processor or coprocessor communication port slot. Supplied with 6 m cable	TSX CPP 100	0.120
	Separate parts					
	Description	Use			Reference	Weight kg
	Tap junction	Tap connection for the TSX CPP 100 card (15-way SUB-D connector) on 1 or 2 CANopen buses (9-way SUB-D connectors)			TSX CPP ACC 1	–
 TSX CPP ACC 1	CANopen module configuration software	Can be used to generate a configuration file for the TSX CPP 100 module, to be imported into the PL7 application			TLX L FBC M	–

9 Services

Contents

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Product reference index page R0028/3

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Community regulations and protective treatment page X0011/3

The Schneider Alliances partnership programme pages 43614/2 to 43614/11

Schneider worldwide pages A0000/2 to A0000/4

Premium automation platform

Documentation

References

PLC products are generally supplied with :

- A B7 format multilingual Quick Reference Guide (128 x 92 mm) for TSX PLC bases and their modules
- A PL7 software installation and start-up guide, A5 format document (210 x 148 mm)

A multilingual online contextual help is integrated in PL7 software. Paper versions of hardware and software installation manuals should be ordered separately.

Documentation on CD-ROM (English and French)

Description	Composition	Sold in lots of	Reference (1)	Weight kg
TSX technical documentation	Includes all documentation for TSX PLCs, TSX/TXT/TLX/PCX software, networks, buses and TSX/CCX terminals	1	TSX CD D MTE 11E	0.080
		25	TSX CD D MTE 2511E	2.000

A5 bound documentation manuals (English)

PLCs

Description	Included with product	Reference (1)	Weight kg
Micro PLC hardware installation : bases, discrete I/O modules, application-specific modules, Telefast 2, process power supplies and AS-i bus	To be ordered separately	TSX DM 37 33E	0.660
Premium PLC hardware installation : bases, discrete I/O modules, application-specific modules, Telefast 2, process power supplies and AS-i bus	To be ordered separately	TSX DM 57 40E	0.740
Nano PLC installation and programming	T FTX 117 071E (FTX 117 terminal)	TLX DM 07 117E	0.265
	TLX L PL7 07●30E (PL7-07 software)	TLX DM 07 DSE	0.320

PL7 software

All PL7 software installation manuals (reference, application-specific functions, communication, converters, runtime screens, diagnostics)	To be ordered separately	TLX DOC PL7 40E	3.210
SMC to PL7 Junior application converter (English and French)	To be ordered separately	TLX DC SMC PL7 J40M	0.080
SDKC software user manual (English and French)	TLX L SDKC PL7 33M	TLX DM SDKC PL7 40M	0.120

(1) Documentation in French, German, Spanish, etc, please consult your Regional Sales Office.

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Documentation

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A5 bound documentation manuals (English)

Terminals			
Description	Included with product	Reference (1)	Weight kg
XBT-H/P/E terminals user's manual	To be ordered separately	XBT-X000EN	0.200
T XBT graphic stations user's manual	T XBT F024●10E	T XBT DM 00E	0.500
CCX 17 application design under Windows	TMX LP M17 XWF 6E	TMX DM M17 W V6E	0.340
Programming and maintenance terminal user's manual	FT 2010 1E	FT 20 DOC 01E	0.180
Buses and networks			
X-Way communication reference manual	To be ordered separately	TSX DR NET E	0.320
Fipway network installation and setup	To be ordered separately	TSX DG FPW E	0.140
Fipio bus reference manual	To be ordered separately	TSX DR FIP E	0.230
Fipio/Fipway fibre optic transceiver setup	To be ordered separately	TSX DM OZD 01E	0.110
Modbus Plus network installation guide	To be ordered separately	890 USE 100 01	0.040
Ethernet network (10base5) reference manual	To be ordered separately	TSX DR ETH E	0.120
Ethernet-Transparent Factory reference manual	To be ordered separately	490 USE 133 01	–
Ethernet-Transparent Factory pre-wired system installation manual	To be ordered separately	490 USE 134 01	–
AS-i sensor/actuator bus reference manual	To be ordered separately	XDOC5511EN	0.220
Uni-Telway bus installation and setup	To be ordered separately	TSX DG UTW E	0.060
Modbus bus user's manual	To be ordered separately	TSX DG MDB E	0.040
InterBus-S module installation manual	To be ordered separately	TSX DM IBY 100E	0.140
Profibus-DP module installation manual	To be ordered separately	TSX DM PBY 100E	0.140
CANopen bus module installation manual	To be ordered separately	TSX DM CPP 100E	–
Jnet network user's manual (English and French)	To be ordered separately	TSX DG JNT M	0.360
Momentum distributed I/O			
Base unit installation manual	To be ordered separately	870 USE 002 01	–
Fipio communicator installation manual	To be ordered separately	870 USE 105 01	–
Modbus Plus communicator installation manual	To be ordered separately	870 USE 103 01	–

(1) Documentation in French, German, Spanish, etc, please consult your Regional Sales Office

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8/16-channel sub-base with electromechanical relays, plug-in terminal blocks	ABE-7R08,16	14025/4	Connecting cables		
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A			- Fipway	TSX FP C 36360/3, 43597/7	
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- power supply modules	TSX PLP	43512/5	- for communication module	TSX SCY 43591/3	
- Telefast 2 sub-bases	ABE-7ACC, 7BV	14040/2	- for industrial operator panels	CCX 17, TSX FP 43583/7	
Adhesive label holder	AR1-SB3	14040/2		XBT-Z 43583/7	
AS-i bus power supply unit	TSX SUP	43612/3	- for measurement and counter module	TSX CCP, CDP 43540/5	
B				and 43541/5	
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- coprocessor	TSX BAT	43513/5		and 43606/3	
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	TSX BLY	43530/7	- Magelis terminals		36360/3
	TSX CAP	43530/7	- Modbus/Jbus	TSX SCP, SCY 43595/5	
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	TSX SCP, SCY	43596/3	- Profibus DP	TSX PBS 43607/3	
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TSX CCY	Electronic cam module	43542/4	TSX MBP	PCMCIA card for Modbus Plus network	43599/5
TSX CCP S	Connecting cables for - counter modules - electronic cam modules - measurement and fast counter modules - motion control modules	43540/5 43542/4 43541/5 43550/6	TSX MBP C	Cables for Modbus Plus network	36360/3, 43599/5
TSX CD D	Documentation on CD-ROM	43900/2	TSX MDM	Kits for connection to Modem module Modem module	43598/3
TSX CDP	Connecting cables for - counter modules - discrete I/O modules - electronic cam modules - measurement and fast counter modules - motion control modules - motion control modules for stepper motor	43540/5 43520/10 43542/4 43541/5 43550/6, 43551/5 43551/5	TSX MFP	Flash EPROM memory extension cards for - CCX 17 industrial operator panels - coprocessors - processors	43583/6 43513/5 43511/9
TSX CFY	Motion control modules for stepper motor	43551/5	TSX MRP	RAM memory extension cards for - CCX 17 industrial operator panels - coprocessors - processors	43583/6 43513/5 43511/9
TSX CPP	CANopen Bus Master PCMCIA card, tap junction	43615/3	TSX P57	TSX 57 processors TSX 57 processors with integrated Fipio link	43511/8 43589/5
TSX CSA	Uni-Telway bus connection accessories	43594/7	TSX PAY	Safety modules	43522/6
TSX CSY	SERCOS motion control module	43555/5	TSX PBS	Profibus DP bus cables	43607/3
TSX CTC	PLC, bus and network connection components for CCX 87 stations	43585/3	TSX PBY	Profibus DP bus module assembly	43607/3
TSX CTY	Counter modules Measurement and counter module	43540/5 43541/5	TSX P ACC	Terminal port connection box	43594/6, 43595/4 and 43596/3
TSX CXP	Connecting cables for - Lexium, NUM servo drives - Phytron translator	43550/6 43551/5	TSX P CAP	Handle for memory cards	
TSX DEY	Discrete input modules	43520/9	TSX PCD	Asynchronous serial link connection accessories Connecting cables for PCMCIA cards and TER/AUX ports	43606/3 43603/2
TSX DG, DM, DR	Installation manuals	43900/2, 43900/3	TSX PCU	Connecting cables for PCMCIA cards and TER/AUX ports Uni-Telway bus connection accessories	43606/3 43594/7
TSX DMY	Discrete I/O modules	43520/10	TSX PCX	Connecting cables for PCMCIA cards and TER/AUX ports	43606/3
TSX DSY	Discrete output modules	43520/9	TSX PLP	Back-up batteries for - CCX 17 panel data - processor RAM memory	43512/5
TSX EEF, EMF, ESF	IP 67 remote I/O modules on Fipio	42315/10	TSX PSY	Power supply modules for racks	43512/5
TSX EF ACC	Dust and damp proof junction box, line terminators	42315/10	TSX REY	Bus X remote module	43514/3
TSX EF ACC 2	Connecting cables for IP 67 I/O modules	42315/10	TSX RKA	Connection accessories for racks	43510/4
TSX EF C	Connectors for IP 67 I/O modules	42315/10	TSX RKY	Extendable and non-extendable racks	43510/4
TSX ETH	- Ethernet TCP/IP network modules - Ethernet TCP/IP network mini transceiver	43566/6, 43601/13 48190/7	TSX SAY	Master module for AS-i bus	43611/3
TSX ETH ACC	Ethernet AUI connection accessories	43616/3	TSX SCA	Connection accessories for - Jnet network - Modbus/Jbus bus - Uni-Telway bus	43603/3 43595/4 43594/6
TSX ETH C, ETY C	Ethernet AUI connecting cables	43616/3	TSX SCP	Connecting cables for - asynchronous serial link - Jnet network - Modbus/Jbus bus - PCMCIA cards - PCMCIA cards and TER/AUX ports - Uni-Telway bus	43596/3 43603/3 43595/5 43594/6, 43595/4, 43596/3 43606/2 43594/7
TSX FAN	Fan modules	43510/4	TSX SCY	Connecting cables for - asynchronous serial link - communication module - Modbus/Jbus bus - PCMCIA cards and TER/AUX ports - Uni-Telway bus	43596/3 43591/3, 43592/3, 43594/6, 43595/4 43595/5 43606/3 43594/7
TSX FP	Connecting cables for CCX 17 industrial operator panels Fipio bus connecting cables and accessories Fipway network/Fipio bus fibre optic connection accessories	43583/7 43589/5, 43593/3, 43597/6 43590/2	TSX SCY C	Connecting cables for integrated channel	43591/3, 43594/7
TSX FP ACC	Fipio bus connection accessories	48236/3, 36360/3, 43589/5, 43593/3, 43597/6	TSX SUP 1	Process power supply units and modules	43560/3
			TSX SUP A	AS-i bus power supply unit and module	43612/3

Product reference index

Reference	Description	Page
	Process power supply units and modules	43560/3
TSX TAP M	Splitter block	43550/5
TSX TAP S	Encoder connection interface for	
	- counter module	43540/5
	- electronic cam module	43542/4
	- measurement and counter module	43541/5
	- motion control module	43550/5
TSX TLY	Bus X line terminators for racks	43510/4, 43514/3
T XBT-F	Graphic stations	36354/3
V		
VY1-X	Cable with splitter block for ATV-58F variable speed drive	43550/6
X		
XBT-E	Terminals with 2 or 4 lines of 40 characters	36337/3
XBT-F	Terminals with graphic screen with touch-sensitive keys and screen	36353/3
XBT-FC	Terminals with touch-sensitive screen	36361/3
XBT-H	Display units with 2 lines of 20 characters	36332/3
XBT-HM	Display units with 8 lines of 40 characters	36351/3
XBT-L	Software for operator dialogue terminals	36359/5
XBT-L1	Downloadable protocols for operator dialogue terminals	36359/5
XBT-MEM	PCMCIA memory cards for terminals with graphic screen	36353/3, 36359/5
XBT-P	Terminals with 2 lines of 20 characters	36336/3
XBT-PM	Terminals with 8 lines of 40 characters	36351/3
XBT-Z	Connecting cables for	
	CCX 17 industrial operator panels	43583/7
	Operator dialogue terminals	36359/5
	PCMCIA cards and TER/AUX ports	43603/3
XZ-CB	AS-i bus ribbon cables	43611/3
XZ-SDE	Connection modules for AS-i bus ribbon cable	43611/3
XZ-SDP	Cover for XZ-SDE connection module	43611/3

Premium automation platform

TSX PSY power supply module selection document (specimen to be photocopied)

The power required to supply each TSX RKY rack depends on the type and number of modules installed. It is therefore necessary to create a power consumption table for each rack in order to define the most suitable TSX PSY power supply module for each rack.

The table below can be used to calculate the consumption on the three different voltages to be supplied (≡ 5V, ≡ 24 V, ≡ 24 VR).

Procedure :

- Check and choose a power supply module corresponding to the power supplies available for the 3 voltages.
- Check that the total power absorbed on these three voltages does not exceed the overall power of the power supply module.
- Values to be entered according to the type of Premium PLC configuration.

Rack no. <input type="text"/>	Reference	Format S : standard D : double	Number <input type="text"/>	Consumption in mA (1)			
				Voltage ≡ 5V Module Total <input type="text"/>	Voltage ≡ 24 VR Module Total <input type="text"/>	Voltage ≡ 24 V Module Total <input type="text"/>	
Processor							
with memory extension card							
	TSX P57 103M	S	<input type="text"/>	440	<input type="text"/>	<input type="text"/>	
	TSX P57 153M	S	<input type="text"/>	530	<input type="text"/>	<input type="text"/>	
	TSX P57 203M	D	<input type="text"/>	750	<input type="text"/>	<input type="text"/>	
	TSX P57 253M	D	<input type="text"/>	820	<input type="text"/>	<input type="text"/>	
	TSX P57 303M	D	<input type="text"/>	1000	<input type="text"/>	<input type="text"/>	
	TSX P57 353M	D	<input type="text"/>	1060	<input type="text"/>	<input type="text"/>	
	TSX P57 453M	D	<input type="text"/>	1080	<input type="text"/>	<input type="text"/>	
Discrete I/O							
	TSX DEY 08D2	S	<input type="text"/>	55	<input type="text"/>	80 <input type="text"/>	
	TSX DEY 16A2	S	<input type="text"/>	80	<input type="text"/>	<input type="text"/>	
	TSX DEY 16A3	S	<input type="text"/>	80	<input type="text"/>	<input type="text"/>	
	TSX DEY 16A4	S	<input type="text"/>	80	<input type="text"/>	<input type="text"/>	
	TSX DEY 16A5	S	<input type="text"/>	80	<input type="text"/>	<input type="text"/>	
	TSX DEY 16D2	S	<input type="text"/>	80	<input type="text"/>	135 <input type="text"/>	
	TSX DEY 16D3	S	<input type="text"/>	80	<input type="text"/>	135 <input type="text"/>	
	TSX DEY 16FK	S	<input type="text"/>	250	<input type="text"/>	75 <input type="text"/>	
	TSX DEY 32D2K	S	<input type="text"/>	135	<input type="text"/>	160 <input type="text"/>	
	TSX DEY 32D3K	S	<input type="text"/>	140	<input type="text"/>	275 <input type="text"/>	
	TSX DEY 64D2K	S	<input type="text"/>	155	<input type="text"/>	315 <input type="text"/>	
	TSX DSY 08R4D	S	<input type="text"/>	55	80 <input type="text"/>	<input type="text"/>	
	TSX DSY 08R5	S	<input type="text"/>	55	70 <input type="text"/>	<input type="text"/>	
	TSX DSY 08R5A	S	<input type="text"/>	55	80 <input type="text"/>	<input type="text"/>	
	TSX DSY 08S5	S	<input type="text"/>	125	<input type="text"/>	<input type="text"/>	
	TSX DSY 08T2	S	<input type="text"/>	55	<input type="text"/>	<input type="text"/>	
	TSY DSY 08T22	S	<input type="text"/>	55	<input type="text"/>	<input type="text"/>	
	TSX DSY 08T31	S	<input type="text"/>	55	<input type="text"/>	<input type="text"/>	
	TSX DSY 16R5	S	<input type="text"/>	80	135 <input type="text"/>	<input type="text"/>	
	TSX DSY 16S4	S	<input type="text"/>	220	<input type="text"/>	<input type="text"/>	
	TSX DSY 16S5	S	<input type="text"/>	220	<input type="text"/>	<input type="text"/>	
	TSX DSY 16T2	S	<input type="text"/>	80	<input type="text"/>	<input type="text"/>	
	TSX DSY 16T3	S	<input type="text"/>	80	<input type="text"/>	<input type="text"/>	
	TSX DSY 32T2K	S	<input type="text"/>	140	<input type="text"/>	<input type="text"/>	
	TSX DSY 64T2K	S	<input type="text"/>	155	<input type="text"/>	<input type="text"/>	
	TSX DMY 28FK	S	<input type="text"/>	300	<input type="text"/>	75 <input type="text"/>	
	TSX DMY 28RFK	S	<input type="text"/>	300	<input type="text"/>	75 <input type="text"/>	
Bus X remote system							
	TSX REY 200	S	<input type="text"/>	500	<input type="text"/>	<input type="text"/>	
Analogue I/O							
	TSX AEY 414	S	<input type="text"/>	660	<input type="text"/>	<input type="text"/>	
	TSX AEY 420	S	<input type="text"/>	500	<input type="text"/>	<input type="text"/>	
	TSX AEY 800	S	<input type="text"/>	270	<input type="text"/>	<input type="text"/>	
	TSX AEY 810	S	<input type="text"/>	475	<input type="text"/>	<input type="text"/>	
	TSX AEY 1600	S	<input type="text"/>	270	<input type="text"/>	<input type="text"/>	
	TSX AEY 1614	S	<input type="text"/>	300	<input type="text"/>	<input type="text"/>	
	TSX ASY 410	S	<input type="text"/>	990	<input type="text"/>	<input type="text"/>	
	TSX ASY 800 (2)	S	<input type="text"/>	200	300 <input type="text"/>	<input type="text"/>	
Safety							
	TSX PAY 262	S	<input type="text"/>	150	<input type="text"/>	200 <input type="text"/>	
	TSX PAY 282	S	<input type="text"/>	150	<input type="text"/>	200 <input type="text"/>	
Counting, motion control, weighing							
	TSX CTY 2A	S	<input type="text"/>	280	<input type="text"/>	30 <input type="text"/>	
	TSX CTY 4A	S	<input type="text"/>	330	<input type="text"/>	36 <input type="text"/>	
	TSX CTY 2C	S	<input type="text"/>	850	<input type="text"/>	15 <input type="text"/>	
	TSX CCY 1128	S	<input type="text"/>	660	<input type="text"/>	15 <input type="text"/>	
	TSX CAY 21	S	<input type="text"/>	1100	<input type="text"/>	15 <input type="text"/>	
	TSX CAY 41	D	<input type="text"/>	1500	<input type="text"/>	30 <input type="text"/>	
	TSX CAY 22	S	<input type="text"/>	1100	<input type="text"/>	15 <input type="text"/>	
	TSX CAY 42	D	<input type="text"/>	1500	<input type="text"/>	30 <input type="text"/>	
	TSX CAY 33	D	<input type="text"/>	1500	<input type="text"/>	30 <input type="text"/>	
	TSX CFY 11	S	<input type="text"/>	510	<input type="text"/>	50 <input type="text"/>	
	TSX CFY 21	S	<input type="text"/>	650	<input type="text"/>	100 <input type="text"/>	
	TSX CSY 84	D	<input type="text"/>	1800	<input type="text"/>	<input type="text"/>	
	TSX ISP Y100	S	<input type="text"/>	150	145 <input type="text"/>	<input type="text"/>	
Total (carry over to page 43605/3)				Current (mA)	<input type="text"/>	<input type="text"/>	<input type="text"/>

(1) Typical value given for 100% of inputs or outputs at state 1.

(2) If using an external ≡ 24 VR power supply, the 300 mA consumption on the internal 24 VR should not be included when selecting the rack power supply.

Premium automation platform

TSX PSY power supply module selection document (continued) (specimen to be photocopied)

Rack no.	Reference	Format S: standard D: double	Number	Consumption in mA (1)								
				Voltage $\overline{\text{---}}$ 5V		Voltage $\overline{\text{---}}$ 24 VR		Voltage $\overline{\text{---}}$ 24 V				
				Module	Total	Module	Total	Module	Total			
Carried forward												
Communication												
	TSX ETY 110/210 (2)	S		800								
	TSX ETY 110/210 (3)	S		1200								
	TSX ETY 110 WS (2)	S		800								
	TSX ETY 110 WS (3)	S		1200								
	TSX ETY 410/5101	S		360								
	TSX IBY 100	S		500								
	TSX PBY 100	S		400								
	TSX SAY 100	S		110								
	TSX SCY 21601	S		350								
	TSX SCP 111	-		140								
	TSX SCP 112	-		120								
	TSX SCP 114	-		150								
	TSX FPP 10	-		330								
	TSX FPP 20	-		330								
	TSX JNP 112	-		120								
	TSX JNP 114	-		150								
	TSX MBP 100	-		220								
	TSX CPP 100	-		60								
	TSX MDM 10	-		195								
	TSX P ACC 01	-		150								
Terminal												
	T FTX 117 ADJ 02	-		310								
Consumption per voltage				Total current (mA)		x 5 V		x 24 VR		x 24 V		Total of the 3 powers =
				Power (mW)				(4)				
						≤		≤		≤		≤
				Power available in mW						Overall		
Choice of power supply module												
	TSX PSY 1610	S		15 000		15 000		-			30 000	
	TSX PSY 2600	S		25 000		15 000		12 000			26 000	
	TSX PSY 3610	D		35 000		19 000		-			50 000	
	TSX PSY 5520	D		35 000		19 000		-			50 000	
	TSX PSY 5500	D		35 000		19 000		19 000			50 000	
	TSX PSY 8500	D		75 000		-		38 000			77 000 (5)	

(1) Typical value given for 100% of inputs or outputs at state 1.

(2) Without remote power supply (RJ 45).

(3) With remote power supply (AUI).

(4) If using an external $\overline{\text{---}}$ 24 V sensor power supply, the consumption on the $\overline{\text{---}}$ 24 V voltage should not be included.

(5) 77,000 mW at 60 °C, 85,000 mW at 55 °C or 100,000 mW at 55 °C when using TSX FAN fan modules.

PremiumAutomation Platform

Automation Product Certifications









Product certifications and marine classification authorities

In some countries, certification of certain electrical components is enforced by law. A standard conformity certificate is then issued by the official organization. Each certified product must carry approval symbols when enforced. Use on board merchant navy vessels generally requires prior approval (= certification) of an electrical device by certain marine classification authorities.

Key	Certification body	Country
CSA	Canadian Standards Association	Canada
C-Tick	Australian Communication Authority	Australia
UL	Underwriters Laboratories	USA

Key	Classification authority	Country
BV	Bureau Veritas	France
DNV	Det Norske Veritas	Norway
GL	Germanischer Lloyd	Germany
GOST	Institut de recherche Scientifique Gost Standardt	C.I.S.
LR	Lloyd's Register	United Kingdom
RINA	Registro Italiano Navale	Italy
RRS	Register of Shipping	C.I.S.

The table below shows the situation as of the 01.06.2000 for certifications obtained or pending from organizations for base PLCs. Further information regarding certified modules can be obtained from your Regional Sales Office.

	Certifications			Marine classification authorities						
		C-Tick					GOST			
	CSA	ACA	UL	BV	DNV	GL	GOST	LR	RINA	RRS
	Canada	Australia	USA	France	Norway	Germany	CIS	Great Britain	Italy	CIS
ABE-7	Certified	Pending certification	Certified	Certified	Certified	Certified		Certified		
CCX 17	Certified		Certified							
FT2100	Certified		Certified							
Lexium MHD servodrives	Certified		Certified							
Lexium BPH motors	Certified		Certified							
Micro	Certified	Pending certification	Certified	Certified	Certified	Certified		Certified	Certified	Certified
Momentum	Certified		Certified							
Nano	Certified	Pending certification	Certified	Certified	Certified	Certified		Certified		
Premium	Certified	Pending certification	Certified	Certified	Certified	Certified		Certified	Certified	
Quantum	Certified		Certified							
TBX	Certified	Pending certification	Certified	Certified	Certified	Certified		Certified		
TSX/PMX 47 to 107	Certified		Certified	Certified	Certified	Certified	Certified			
TSX PRG LDR	Certified		Certified							
TXBT-F	Certified	Pending certification	Certified							
XBT-F/FC	Certified	Pending certification	Certified	Certified	Certified	Certified			Certified	
XBT-H/P/E/HM/PM	Certified		Certified	Certified	Certified	Certified			Certified	

Premium automation platform

Community regulations and protective treatment

Community regulations

European Directives

The opening of European markets implies a harmonization of regulations in the various European Union member states. European Directives are documents used to remove obstacles to the free movement of goods and their application is compulsory in all states of the European Union.

Member states are obliged to transcribe each Directive into their national legislation and, at the same time, to withdraw any conflicting regulations.

The Directives, particularly those of a technical nature with which we are concerned, only set objectives, called "general requirements".

The manufacturer must take all necessary measures to ensure that his products conform to the requirements of each Directive relating to his equipment.

As a general rule, the manufacturer affirms that his product conforms to the necessary requirements of the Directive(s) by applying the CE label to his product.

CE marking is applied to Telemecanique products where relevant.

The significance of CE marking

- CE marking on a product means that the manufacturer certifies that his product conforms to the relevant European Directives ; it is necessary in order that a product which is subject to a Directive(s) can be marketed and freely moved within the European Union.
- CE marking is intended solely for the national authorities responsible for market regulation.

For electrical equipment, only conformity of the product to standards indicates that it is suitable for use, and only a guarantee by a recognised manufacturer can ensure a high level of quality.

One or more Directives, as appropriate, may apply to our products, in particular :

- The Low Voltage Directive 72/23/EEC amended by Directive 93/68/EEC : CE marking under the terms of this Directive could not be applied before 1 January 1995 and is compulsory as of 1 January 1997.
 - The Electromagnetic Compatibility Directive 89/336/EEC, amended by Directives 92/31/EEC and 93/68/EEC : CE marking on the products covered by this Directive has been compulsory since 1 January 1996.
-

Protective treatment of equipment

Premium and Quantum PLCs meet the requirements of "TC" treatment (1).

For installations in industrial production workshops or in an environment which corresponds to "TH" treatment (2), Premium PLCs should be enclosed in casings with a minimum of IP 54 protection as prescribed by standards IEC 664 and NF C 20 040.

Premium and Quantum PLCs are supplied with an IP 20 protection index. They can therefore be installed without enclosure in locations with restricted access which do not exceed pollution degree 2 (control room which does not contain a machine or dust-producing activity).

(1) "TC" treatment : all climate treatment.

(2) "TH" treatment : treatment for hot and humid environments.

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Premium automation platform

Schneider Alliances

Programme overview



www.schneideralliances.com

The **Schneider Alliances** partnership programme is an answer to the many customers who are expecting their preferred vendors to provide much more than simple products : complete integrated and validated automation solutions. **Schneider Alliances** is both an industrial and commercial programme between Schneider and its partners providing hardware or software automation products, system integration or services complementary to the Schneider offer.

The **Schneider Alliances** partnership programme comprises :

- **Product vendors :**

Design and distribute hardware or software automation products complementary to the Schneider offer which are being integrated in Schneider solutions and architectures. This **Schneider Alliances** product offer includes industrial peripheral equipment, network hardware and software, HMI and supervisory software, application software packages, development and test tools.

The design and manufacture of these products may require a transfer of technology from Schneider.

Several hundred partner products, compatible with our various technologies, are available in a wide range of applications : industrial peripheral equipment, communication interfaces and software, human-machine interface, supervisory control software, variable speed drives, electro-pneumatic interfaces, etc.

Please consult our directories :

- Partnership directory, pages 43614/3 to 43614/5.
- Directory of partner products, pages 43614/6 to 43614/11.

- **System integrators :**

Create automation solutions using Schneider products and third-party devices and equipment. They deploy their industry and application expertise to the implementation, installation and management of complete automation projects.

Thanks to **Schneider Alliances**, customers are able to choose the best products on the market with an assurance of full integration within Schneider architectures. They also have access to a network of system integrators specialized in their industry and able to create their automation project in the best conditions of time and cost.

The **Schneider Alliances** partnership network is a win-win association which brings to everyone, product vendor or system integrator, more business and turnover.

Bus X Open program

The Bus X Open program is aimed at **Schneider Alliances** partners who need to expand Premium platform-based solutions by developing specialized application-specific I/O modules (which can be integrated on Bus X in TSX RKY racks like any other module).

This offer, which enables a module to be developed within the framework of a Schneider Alliances partnership agreement, comprises :

- A development kit (software and documentation)
- An industrial kit comprising a set of customizable Bus X hardware cards.

Premium automation platform

Schneider Alliances

Partnership directory

Partner products

<div style="text-align: right; padding-right: 5px;">Product category</div> <div style="text-align: left; padding-left: 5px;">Company</div>	Communication interface boards	Communication software	Communication hardware	HMI/Operator panel	HMI/SCADA	Programming software	Electrical I/O interface	Pneumatic I/O interface	Drive	Motion/axis control	Miscellaneous sensor	Miscellaneous actuator	Automation controller	Services	Miscellaneous software	Miscellaneous hardware
A																
ABB Industrial Systems																
ABB Power T&D Co.,																
ABB Robotic																
ACC Systemes																
Acuity Imaging, Inc.																
AFCON																
Appicom International																
Arc Informatique																
Areal																
Aro																
ARORA Software																
ARTEC Systems																
Asco Joucomatic																
AspenTech																
Atlas Copco																
Automated Mining Systems																
Automated Solutions, Inc.																
Automation & Control Technologies, Inc.																
Automation & Systèmes																
Automation Science, Inc.																
AVG Automation																
B																
Beckwood Services, Inc.																
Bihl & Wiedemann																
Bitronics, Inc.																
BLH Electronics, Inc.																
C																
Cape Software																
Ci Technologies Pty Ltd.																
CimQuest, Inc.- Products Group																
Cimtech																
Codra																
Commercial Timesharing, Inc.																
Control Techniques Drives, Inc.																
ControlSoft, Inc.																
Curry Controls Company																
Cutler-Hammer, Inc.																
CyberLogic Technologies, Inc.																
Cycle Software, Inc.																
D																
Danfoss Electronic Drives																
Data-Linc Group																
Delta Computer Systems, Inc.																
DLRA Projects (Pty) Ltd.																
Doble Engineering																
E																
ELECTRO Industries / Gaugetech																
Endress + Hauser																
Escort Memory Systems																
Etic																
ExperTune, Inc.																

Premium automation platform

Schneider Alliances

Partnership directory

Partner products

<div style="text-align: right; padding-right: 10px;">Product category</div> <div style="text-align: left; padding-left: 10px;">Company</div>	Communication interface boards	Communication software	Communication hardware	HMI/Operator panel	HMI/SCADA	Programming software	Electrical I/O interface	Pneumatic I/O interface	Drive	Motion/axis control	Miscellaneous sensor	Miscellaneous actuator	Automation controller	Services	Miscellaneous software	Miscellaneous hardware
F																
Festo																
Fiber Options, Inc.																
Fisher Rosemount																
FORTH, Inc.																
Foxboro Company																
G																
Gener																
Gensym Corporation																
Georges Renault (GRIN)																
GSE Systems, Inc.																
H																
Hewlett Packard																
Hilco Technologies, Inc.																
Hilscher GmbH																
Hirschmann																
HMS Fieldbus Systems AB																
Honeywell																
Honeywell Industrial Automation																
I																
Iconics, Inc.																
Indramat																
Industrial Systems Monitoring/AdVoTech																
Integrated Control Technology Inc.																
Integrated Industrial Technologies, Inc.																
Intellution																
IPAC Technologies, Inc.																
Itmi Aptor																
K																
Kuka																
M																
Mac Valves, Inc.																
MagneTek, Inc.																
Mauell Corporation																
MDT Software																
Mettler-Toledo, Inc.																
Mitsubishi Electric Automation Inc.																
N																
Nemasoft, Inc.																
NexxCorp Information Systems, Inc.																
Niobrara Research & Development Corp.																
NovaTech, LLC																
P																
Panel-Tec, Inc.																
Parker																
ProSoft Technology, Inc.																
Prosyst																

Premium automation platform

Schneider Alliances

Partnership directory

Partner products

<div style="text-align: right; padding-right: 5px;">Product category</div> <div style="text-align: left; padding-left: 5px;">Company</div>	Communication interface boards	Communication software	Communication hardware	HMI/Operator panel	HMI/SCADA	Programming software	Electrical I/O interface	Pneumatic I/O interface	Drive	Motion/axis control	Miscellaneous sensor	Miscellaneous actuator	Automation controller	Services	Miscellaneous software	Miscellaneous hardware
R																
RACO Manufacturing & Engineering																
Robicon																
S																
SAF Drive Systems Ltd.																
Schweitzer Engineering Lab., Inc.																
Sciaky																
Secheron Ltd.																
Silicomp																
Simulation Sciences																
SISCO, Inc.																
Sofrel Telecontrol																
Spectrum Controls, Inc.																
S-S Technologies Inc.																
Steeplechase Software																
SWAC																
T																
TA Engineering Co., Inc.																
Tasnet, Inc.																
Toshiba																
TR Electronic																
TURCK, Inc.																
W																
Weed Instrument																
Westermo																
Wonderware																
X																
Xycom, Inc.																

Premium automation platform

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Product directory

Company	Tel./Fax/URL	Reference	Category	Technology
ABB Industrial Systems, Inc. 16250 W. Glendale New Berlin, WI 53151 United States	Tel. +1 414-785-3416	CDI 300	Drive	Modbus Plus
	Fax +1 414-785-0397	Advant OCS	Miscellaneous hardware	Modbus Plus
	URL www.abb.com			
ABB Industrial Systems, Inc. 16250 W. Glendale New Berlin, WI 53151 United States	Tel. +1 614-261-2000	ABB DCS 500	Miscellaneous hardware	Modbus
	Fax +1 614-261-2172	Advant OCS	Miscellaneous hardware	Modbus Plus
	URL www.abb.com			
ABB Power T&D Co., Inc. 7036 Snowdrift Road Allentown, PA 18106 United States	Tel. +1 610-395-7333	2000, 2000R series product family	Miscellaneous hardware	Modbus Plus
	Fax +1 610-395-1055	REL 512/506	Miscellaneous hardware	Modbus Plus
	URL www.abb.com/papd	REL 356	Miscellaneous hardware	Modbus Plus
		REL 350/352	Miscellaneous hardware	Modbus Plus
		PRICOMT	HMI/SCADA	Modbus Plus
ABB Robotic 5, chemin de l'Equerre ZI des Bethunes F-95310 Saint Ouen L'Aumône France	Tel. +33 (0)1 34 40 23 49	S4C Robot controller	Motion/axis control	Fipio
	Fax +33 (0)1 34 40 23 80			
	URL www.abb.se/flexible			
ACC Systemes 5 rue des aTel.iers-BP 203 F- 60 202 Compiègne Cedex France	Tel. +33 (0)3 44 38 66 66	CEASAR	HMI/SCADA	Ethway
	Fax +33 (0)3 44 38 66 67			Uni-Tel.way
	URL www.acc.fr			Modbus
Acuity Imaging, Inc. 9 Townsend West Nashua, NH 03063 United States	Tel. +1 603-598-8400	InTel.ligent Visual Sensor (IVS)	Miscellaneous sensor	Modbus Plus
	Fax +1 603-598-4684			
	URL www.acuityimaging.com			
AFCON 1014 East Algonquin Road Schaumburg, IL 60173 United States	Tel. +1 847-397-6900	P-CIM	HMI/SCADA	Ethway
	Fax +1 847-397-6987			Fipway
	URL www.afcon-inc.com			Uni-Tel.way Modbus Plus
Applicom International 43 Rue Mazagran F-76320 Caudebec-les-Elbeufs France	Tel. +33 (0)2 32 96 04 20	PC1000, PCI1000, PC2000, PC4000 and PCI4000	Communication interface boards	Modbus
	Fax +33 (0)2 32 96 04 21			Uni-Tel.way
	URL www.applicom-int.com			Fipway Ethway
Arc Informatique 2 Avenue de la cristallerie F-92310 Sèvres France	Tel. +33 (0)1 41 14 36 00	PCVUE 32, FRONTVUE, DATAVUE	HMI/SCADA	Modbus, Modbus Plus, Fipway, Ethway, Uni-Tel.way, Symax/Synet, Autres
	Fax +33 (0)1 46 23 86 02			
	URL www.arcinfo.com			
Areal 16 Avenue Jean Moulin F-77167 Savigny le Temple France	Tel. +33 (0)1 60 63 07 52	Topkapi	HMI/SCADA	Ethway
	Fax +33 (0)1 64 41 90 15			Fipway
				Uni-Tel.way Modbus
Aro 1 Avenue de Tours F-72500 Château du Loir France	Tel. +33 (0)2 43 44 74 00	Micro 2x16 III welding controller	Miscellaneous actuator	Fipio
	Fax +33 (0)2 43 44 74 01			Uni-Tel.way
	URL www.aronet.com			Modbus
ARORA Software 1755 East Plumb Lane, Suite 159, Reno, NV 89502 United States	Tel. +1 702-348-1816	System 816	HMI/SCADA	Modbus, Modbus Plus
	Fax +1 702-348-7336	Dialer2000	Communication software	Modbus
	URL www.arora@sierra.net			
ARTEC Systems 5530 NE 33rd Avenue Fort Lauderdale, FL 33308 United States	Tel. +1 954-771-9007	Drivers	Communication software	Modbus Plus
	Fax +1 954-771-9524			
	URL www.artec-systems.com			
Asco Joucomatic 32 Avenue Albert 1 ^{er} -BP 312 F-92506 Rueil Malmaison France	Tel. +33 (0)1 47 14 32 00	BUSLINK and BUSLINK ISO pneumatic valves	Pneumatic I/O interface	Fipio
	Fax +33 (0)1 47 08 53 85			
	URL www.ascojoucomatic.fr			
AspenTech 14701 St Mary's Lane Houston, TX 77079-2995 United States	Tel. +1 281-584-1000	SetCim	HMI/SCADA	Modbus Plus
	Fax +1 281-584-4329			
	URL www.aspentech.com			
Atlas Copco En Montillier,4 CH-1303 Penthaz Switzerland	Tel. +41 (0)21 863 63 63	Socapel PAM	Drive	Fipio
	Fax +41 (0)21 863 63 99			
	URL www.atlascopco.com/controls			
Automated Mining Systems 16 Mary Street, Unit 3 Aurora, Ontario L4G 1G2 Canada	Tel. +1 905-713-3700	Broadband Gateway	Communication hardware	Modbus Plus
	Fax +1 905-713-3708			
	URL www.robominer.co			
Automated Solutions, Inc. 1415 Fulton Road, #205 Santa Rosa, CA 95403 United States	Tel. +1 707-578-5882	ASMBPLUS.OCX	Communication software	Modbus Plus
	Fax +1 707-579-5756	ASMBSERIAL		Modbus
	URL www.automatedsolutions.com			
Automation & Control Technologies, Inc. 11838 Borman Dr., Suite 200 St. Louis, MO 63146-4113 United States	Tel. +1 314-993-4080	GEMINI	Miscellaneous software	S800, Quantum
	Fax +1 314-993-7183			
	URL www.act/stl.com			
Automation & Systèmes Domaine de l'Etoile Hameau Topaze F-06610 La Gaude France	Tel. +33 (0)4 93 07 51 07	IN'COM	Communication interface boards	Ethway, Fipway, Uni-Tel.way, Modbus, Modbus Plus
	Fax +33 (0)4 93 07 52 09			
		Software development	Services	Ethway, Fipway, Uni-Tel.way, Modbus, Modbus Plus

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Company	Tel./Fax/URL	Reference	Category	Technology
Automation Science, Inc. 150 Bucksin Drive Weston, MA 02193 United States	Tel. +1 508-358-4186 Fax +1 508-358-4186	OMNIRAMA	HMI/SCADA	Modbus Modbus Plus
AVG Automation 343 St. Paul Boulevard Carol Stream, IL 60188 United States	Tel. +1 630-668-3900 Fax +1 630-668-4676 URL www.AVG.net	Resolver Interface-DeviceNet Scanner Module	Motion/axis control Communication interface boards	Modbus Plus Quantum
Beckwood Services, Inc. P.O. Box 985, 27 Hale Spring Road - Plaistow, NH 03865 United States	Tel. +1 603-382-3840 Fax +1 603-382-3852 URL www.beckwood.com	DeviceNet interface	Miscellaneous hardware	Autres
Bihl & Wiedemann Kaefertaler Str. 164 Mannheim, D-68167 Germany	Tel. +49-621-339-2723 Fax +49-621-339-2239 URL www.bihl-wiedemann.de	AS-i/Modbus Plus Gateway 1090/1091	Communication hardware	Modbus Plus
Bitronics Inc. P.O. Box 22290 261 Brodhead Road Lehigh Valley, PA 18002 United States	Tel. +1 610-865-2444 Fax +1 610-865-2743 URL www.bitronics.com	MultiComm Power Meter & Power Plex Digital Transducer	Miscellaneous sensor	Modbus
BLH Electronics, Inc. 75 Shawmut Road Canton, MA 02021 United States	Tel. +1 781-821-2000 Fax +1 781-828-1451 URL www.blh.com	LCp-100, LCp-200, DXp-40 Weight indicator controllers	Miscellaneous sensor	Modbus Modbus Plus
Cape Software 333 N. Sam Houston Pkwy, Suite 290, Houston, TX 77060 United States	Tel. +1 281-448-5177 Fax +1 281-448-2607 URL www.capesoftware.com	VP Link	Miscellaneous software	Modbus Plus
Ci Technologies Pty Ltd. Pymble NSW 2088 Australia	Tel. + 61 2-9855-1000 Fax + 61 2-9488-9164 URL www.cit.com.au	Citect	HMI/SCADA	Modbus Plus
CimQuest, Inc.- Products Group 518 Kimberton Road, Suite 325 Phoenixville, PA 19460 United States	Tel. +1 610-935-8282 Fax +1 610-935-1902 URL www.cimquest.com	IN-GEAR ActiveX	Communication software	Modbus Modbus Plus
Cimtech 20 rue de l'industrie B-1400 Nivelles Belgium	Tel. +32 (0) 67 88 36 66 Fax +32 (0) 67 88 36 88 URL www.cimview.com	CIMVIEW	HMI/SCADA	Ethway Fipway Uni-Telway Modbus
Codra 10 Avenue de Norvège, Narvik F-91953 Courtaboeuf Cedex France	Tel. +33 (0)1 60 92 34 34 Fax +33 (0)1 60 92 34 35 URL www.codra.fr	Panorama	HMI/SCADA	Ethway Fipway Uni-Telway Modbus, Modbus Plus Autres
Commercial Timesharing, Inc. 2650 South Arlington Road Akron, OH 44319 United States	Tel. +1 330-644-3059 Fax +1 330-644-8110 URL www.comtime.com	SA85 for Windows NT/Unix	Communication software	Modbus Plus
Control Techniques Drives, Inc. 359 Lang Boulevard Grand Island, NY 14072 United States	Tel. +1 716-773-2321 Fax +1 716-774-8327 URL www.ctdrives.com	Unidrive, Mentor II/ Quantum III	Drive	Modbus Plus
ControlSoft, Inc. 14077 Cedar Avenue, Suite 200 Cleveland, OH 44118 United States	Tel. +1 216-397-3900 Fax +1 216-381-5001 URL www.controlsoftinc.com	INTUNE V4 MANTRA NT	Miscellaneous software Miscellaneous software	Modbus Modbus Plus
Curry Controls Company P.O. Box 5408 1019 Pipkin Road Lakeland, FL 33811 United States	Tel. +1 941-646-5781 Fax +1 941-646-3899 URL www.currycontrols.com	Modpac Plus RF Modem	Communication hardware	Modbus Modbus Plus
Cutler-Hammer, Inc. P.O. Box 6166 173 Heatherdown Drive Westerville, OH 43081 United States	Tel. +1 614-882-3282 Fax +1 614-895-7111 URL www.cutlerhammer.com	PanelMate 500 AMI 6000	HMI/operator panel HMI/operator panel	Modbus Plus Modbus Plus
CyberLogic Technologies, Inc. 340 East Big Beaver Rd Suite 208 United States	Tel. +1 248-740-9842 Fax +1 248-740-9821 URL www.cyberlogictech.com	MBX Driver Remote MBX Driver Virtual MBX Driver MBX Bridge	Communication software Communication software Communication software Communication software	Modbus, Modbus Plus Modbus, Modbus Plus Modbus, Modbus Plus Modbus, Modbus Plus
Cycle Software, Inc. 130 Prospect Street, Suite 202 Cambridge, MA 02139 United States	Tel. +1 617-576-6900 Fax +1 617-576-6501 URL www.livedata.com	Live Data Live Data Quantum	Communication software Communication software	Modbus, Modbus Plus Quantum
Danfoss Electronic Drives 2995 Eastrock Drive Rockford, IL 61109 United States	Tel. +1 815-398-2770 Fax +1 815-398-2869 URL www.danfoss.com	VTL Series 5000	Drive	Modbus Plus

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Product directory

Company	Tel./Fax/URL	Reference	Category	Technology
Data-Linc Group 2635 151st PL. NE Redmond, WA 98052 United States	Tel. +1 425-882-2206 Fax +1 425-867-0865 URL www.data-linc.com	FDM7000, MDL500 FSK, LCM100 FSK, SRM6000, DLM4000-DL, DLM4000-LL, CCS9000, LLM1 100 Bell 202 FSK,	Communication hardware	Modbus
		SRM6200E	Communication hardware	Ethway
Delta Computer Systems, Inc. 11719 Northeast 95th Street, Suite D Vancouver, WA 98682 United States	Tel. +1 360-254-8688 Fax +1 360-254-5435 URL www.deltacompsys.com	MMC120 00 2 axis	Motion/axis control	Quantum
		MMC188/40/41 4 axis	Motion/axis control	S800
		RMC100 2/8 axis	Motion/axis control	Modbus Plus
DLRA Projects (Pty) Ltd. P.O. Box 483 - 108 Hendrick Verwoerd Dr., Randburg Pinegowrie 2123 South Africa	Tel. +27 11-886-4704 Fax +27 11-886-5739 URL www.dlra.co.za	Adroit	HMI/SCADA	Modbus Plus
		INSITE	Miscellaneous software	Modbus Plus
Doble Engineering 85 Walnut Street Watertown, MA 02473 United States	Tel. +1 617-926-4900 Fax +1 617-926-0528 URL www.doble.com			
ELECTRO Industries/Gaugetech 1800 Shames Drive Westbury, NY 11590 United States	Tel. +1 516-334-0870 Fax +1 516-338-4741 URL www.electroind.com	Futura+ Series	Miscellaneous sensor	Modbus, Modbus Plus
		DWVA 300	Miscellaneous sensor	Modbus
		DMMS 300+	Miscellaneous sensor	Modbus, Modbus Plus
Endress + Hauser 3 rue du Rhin F-68330 Huningue France	Tel. +33 (0)3 89 69 67 68 Fax +33 (0)3 89 69 48 02 URL www.endress.com	ZA 674 gateway	Communication hardware	Fipio
Escort Memory Systems 3 Victor Square Scotts Valley, CA 95066 United States	Tel. +1 831-438-7000 Fax +1 831-438-5768 URL www.ems-rfid.com	CM900	Communication hardware	Compact
		CM1000	Communication hardware	S800
		CM41/CM42	Communication hardware	Modbus Plus
Etic 13, Chemin du Vieux Chêne ZIRST 4201 38942 Meylan Cedex France	Tel. +33 (0)4 76 04 20 00 Fax +33 (0)4 76 04 20 01 URL www.etictelcom.com	FT300 concentrator	Communication hardware	Uni-Telway
		Modem	Communication hardware	Modbus Plus, Uni-Telway
Expertune, Inc. 4734 Sonseeahray Drive Hubertus, WI 53033 United States	Tel. +1 414-628-0088 Fax +1 414-628-0087 URL www.expertune.com	PID analyser tuner	Communication software	Modbus
Festo 5 Rue Montgolfier F-93116 Rosny sous Bois France	Tel. +33 (0)1 49 35 23 23 Fax +33 (0)1 49 35 23 33 URL www.festo.com	type 02, 03 and 04B (ISO),	Pneumatic I/O interface	Fipio
		type 10 (CPV) and 12 (CPA)	Pneumatic I/O interface	Fipio
Fiber Options, Inc. 80 Orville Drive, Suite 102 Bohemia, NY 11716 United States	Tel. +1 516-567-8320 Fax +1 516-567-8322 URL www.fiberoptions.com	2291M	Communication hardware	Modbus Plus
		2281M	Communication hardware	Autres
Fisher Rosemount 1 Rue Traversière, Silic 125 F-94523 Rungis Cedex France	Tel. +33 (0)1 49 79 73 00 Fax +33 (0)1 49 79 73 99 URL www.frco.com	MG-HRT-WF-002-FR Hart / Fipio gateway	Communication hardware	Fipio
FORTH, Inc. 111 N. Sepulveda Blvd., Suite 300 Manhattan Beach, CA 90266 United States	Tel. +1 310-372-8493 Fax +1 310-318-7130 URL www.forth.com	Express	Miscellaneous software	Modbus Plus
Foxboro Company 33 Commercial Street Foxboro, MA 02035 United States	Tel. +1 508-543-8750 Fax +1 508-549-4800 URL www.foxboro.com	Intelligent Automation Series	Communication interface boards	Modbus Modbus Plus
Gener Z.I de Saint Lambert des Levées BP 163 49414 Saumur cedex France	Tel. +33 (0)2 41 83 13 00 Fax +33 (0)2 41 67 19 20 URL www.gener.fr	Modem	Communication hardware	Modbus Uni-Telway
Gensym Corporation 125 Cambridge Park Drive Cambridge, MA 02140 United States	Tel. +1 617-547-2500 Fax +1 617-547-1962 URL www.gensym.com	G2 Real-time Expert System	Communication software	Modbus Plus
Georges Renault (GRIN) 99 Route de Clisson F-44230 Sebastien sur Loire France	Tel. +33 (0)2 40 80 20 00 Fax +33 (0)2 40 33 27 07	SMA 68000 screwing controller	Miscellaneous actuator	Uni-Telway
GSE Systems, Inc. 9189 Red Branch Road Columbia, MD 02145 United States	Tel. +1 410-772-3500 Fax +1 410-772-3611 URL www.gses.com	SNCC D/3	Miscellaneous hardware	Modbus Plus S800
Hewlett Packard 2, avenue du Lac F- 91040 Evry France	Tel. +33 (0)1 69 82 60 60 Fax +33 (0)1 69 91 84 32 URL www.hp.com	Driver HP UX	Communication software	Ethway

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Hilco Technologies, Inc. 3300 Rider Trail South Suite 300 Earth City, MO 63045-1338 United States	Tel. +1 314-298-9100 Fax +1 314-298-1729 URL www.hilco.com	Monitrol	HMI/SCADA	Modbus Plus
Hilscher GmbH Rheinstrabe 78 Hattersheim, D-65796 Germany	Tel. +49 6190 9907 0 Fax +49 6190 9907 50 URL www.hilscher.com	KPO 104-MBP, PVK 20-MBP CIF 30-MBP, SCA-MBP	Communication interface boards	Modbus Plus
Hirschmann PO Box 1649 D-72606 Nürtingen Germany	Tel. +49 7127 14 1479 Fax +49 7127 14 1495 URL www.hirschmann.com	OZD FIP	Communication hardware	Fipio, Fipway
HMS Fieldbus Systems AB Pilefeltsgatan 73 S-302 50 Halmstad Sweden	Tel. +46 (0)35 168 200 Fax +46 (0)35 168 210 URL www.hms.se	AnyBus AB64 AnyBus Data Transfer	Communication interface boards Communication interface boards	Fipio Modbus Modbus Plus
Honeywell Parc Technologique Bât. Mercury BP 87 F-91193 Gif sur Yvette France	Tel. +33 (0)1 60 19 80 00 Fax +33 (0)1 60 19 81 81 URL www.honeywell.com	Excel 500	Automation controller	Fipway
Honeywell Industrial Automation 16404 N. Black Canyon Highway Phoenix, AZ 85053 United States	Tel. +1 602-313-5000 Fax +1 602-313-4990 URL www.iac.honeywell.com	SCAN 3000	Miscellaneous hardware	Modbus Modbus Plus
Iconics, Inc. 100 Foxborough Boulevard Foxborough, MA 02035 United States	Tel. +1 508-543-8600 Fax +1 508-543-1503 URL www.iconics.com	GENISIS-32	HMI/SCADA	Modbus Plus
Indramat Dr Nebel strasse, 2 D-97816 Lohr am Main Germany	Tel. +49 (0)93 5240 0 Fax +49 (0)93 5240 4885 URL www.indramat.com	MTC 200 CNC	Motion/axis control	Fipway
Industrial Systems Monitoring/AdVoTech 3201 Lorna Road Birmingham, AL 35216 United States	Tel. +1 205-824-0222 Fax +1 205-824-0291 URL www.voicemmi.com	Voice MMI ISM communicator	HMI/operator panel HMI/operator panel	Modbus, Modbus Plus Modbus
Integrated Control Technology Inc. 871 Turnpike Street, Suite 208 North Andover, MA 01845 United States	Tel. +1 978-557-5882 Fax +1 978-557-5884 URL www.ictglobal.com	IBS-802 gateway Interbus-S	Communication hardware	Modbus Plus
Integrated Industrial Technologies, Inc. 221 Seventh Street, Suite 200 Pittsburgh, PA 15238 United States	Tel. +1 412-828-1200 Fax +1 412-828-0320 URL www.i2t-inmotion.com	IFC 020 2-Axis resolver SCM 020/120 Stepper Motor Control	Motion/axis control Motion/axis control	Quantum Quantum Compact
Intellution 1 Edgewater Drive Norwood, MA 02062 United States	Tel. +1 781-769-8878 Fax +1 781-769-1990 URL www.intellution.com	Fix Dmacs	HMI/SCADA	Modbus Plus
IPAC Technologies, Inc. 260 South Campbell Valparaiso, IN 46385 United States	Tel. +1 219-464-7212 Fax +1 219-462-5387 URL www.ipact.com	IPACT SA85 Device Driver IPACT Communication Library	Communication software Communication software	Modbus Plus Modbus Plus
Itmi Aptor 61 Chemin du Vieux Chêne F-38244 Meylan France	Tel. +33 (0)4 76 41 40 00 Fax +33 (0)4 76 41 28 05	CIU communicator	Communication hardware	Ethway Fipway
Kuka 1 Rue Blaise Pascal F-91380 Chilly Mazarin France	Tel. +33 (0)1 69 79 80 00 Fax +33 (0)1 69 79 80 01 URL www.kuka.com	KR C1 robot controller	Motion/axis control	Fipio
Mac Valves, Inc. 30569 Beck Road Wixom, MI 48393-7011 United States	Tel. +1 248-624-7700 Fax +1 248-624-0549 URL www.macvalves.com	Air Valve Interface	Pneumatic I/O interface	Modbus Plus
MagneTek, Inc. 16555 W Ryerson Road New Berlin, WI 53151 United States	Tel. +1 414-782-0200 Fax +1 414-782-1283 URL www.magnetek.com	GPD 515 GPD333AC	Drive Drive	Modbus Plus Modbus Plus
Mauell Corporation 31 Old Cabin Hollow Road Dillsburg, PA 17019-8815 United States	Tel. +1 717-432-8686 Fax +1 717-432-8688 URL www.mauell-us.com	DI64 Plus 99-61-886 DO128 Plus 99-61-P91N	Electrical I/O interface Electrical I/O interface	Modbus Plus Modbus Plus
MDT Software 2520 NorthWinds Parkway Suite 100 Alpharetta GA678/297-1000 United States	Tel. +1 678-297-1050 Fax +1 678-297-1003 URL www.mdtsoft.com	Mass Autosave	Miscellaneous software	Modbus Modbus Plus

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Product directory

Company	Tel./Fax/URL	Reference	Category	Technology
Mettler-Toledo, Inc. 350 West Wilson Bridge Road Worthington, OH 43085 United States	Tel. +1 614-438-4511 Fax +1 614-438-4770 URL www.mt.com	Jaguar Weigh Scale	Miscellaneous sensor	Modbus Plus
Mitsubishi Electric Automation, Inc. 500 Corporate Woods Parkway Vermon Hills IL60061 United States	Tel. +1 847-478-2000 Fax +1 847-478-0327 URL www.meau.ea.com	FR-A500	Drive	Modbus Plus
Nemasoft, Inc. 124 Washington St., Suite 201 Foxboro, MA 02035 United States	Tel. +1 508-698-3611 Fax +1 508-698-3782 URL www.nemasoft.com	Paragon 500/550, AutoNet, PowerVIEW	HMI/SCADA	Modbus Modbus Plus
NexxCorp Information Systems, Inc. 235 Beatty Avenue Oshawa, Ontario L1H 3B4 Canada	Tel. +1 905-433-7566 Fax +1 905-579-5699	ModLINX	Communication software	Modbus Modbus Plus
Niobrara Research & Development Corp. P.O. Box 3418 2400 Tanyard Road Joplin, MO 64803 United States	Tel. +1 417-624-8918 Fax +1 417-624-8920 URL www.niobrara.com	MEB-TCP Bridge PMN Modbus Plus to POWERLOGIC	Communication hardware Communication hardware	Modbus Plus Modbus Plus
NovaTech, LLC 13604 West 107th Street Lenexa, KS 66215 United States	Tel. +1 913-451-1880 Fax +1 913-451-2845 URL www.novatech-llc.com	QSPXM Seriplex Master QUCM Universal Communications MUCM-B	Communication interface boards Communication interface boards Communication interface boards	Quantum Quantum Momentum
NovaTech, LLC 13604 West 107th Street Lenexa, KS 66215 United States	Tel. +1 913-451-1880 Fax +1 913-451-2845 URL www.novatech-llc.com	Modem Micro PLC	Communication interface boards	Autres
Panel-Tec, Inc. P.O. Box 23942607 Leeman Ferry Road, Suite 7 Huntsville, AL 35804 United States	Tel. +1 256-534-8132 Fax +1 256-534-4769 URL www.panel-tec.com	BG-3500 MD-3000	Communication interface boards Communication interface boards	Modbus Plus Modbus Plus
Parker Rue Henri Becquerel F-27031 Evreux France	Tel. +33 (0)2 32 23 34 00 Fax +33 (0)2 32 28 98 07 URL www.parker.com	Valvetronic 164	Pneumatic I/O interface	Fipio
ProSoft Technology, Inc. 9801 Camino Media, # 105 Bakersfield, CA 93311 United States	Tel. +1 805-664-7208 Fax +1 805-664-7233 URL www.prosoft-technology.com	SCANport Communication Adapter 1560-MBP	Communication hardware	Modbus Plus
Prosyst 70 Rue Jean Jaures 59770 - Marly France	Tel. +33 (0)3 20 90 43 33 Fax +33 (0)3 20 90 43 34 URL www.prosyst.fr	SIMAC	Miscellaneous software	Modbus Plus
RACO Manufacturing & Engineering 1400 62nd Street Emeryville, CA 94608 United States	Tel. +1 510-658-6713 Fax +1 510-658-3153 URL www.racoman.com	Verbatim Gateway	HMI/operator panel	Modbus Plus
Robicon 500 Hunt Valley Drive New Kensington, PA 15068 United States	Tel. +1 724-339-9500 Fax +1 724-339-8100 URL www.robicon.com	Clean Power, 454, Perfect Harmony	Drive	Modbus Modbus Plus
SAF Drive Systems Ltd. 88 Ardelt Avenue Kitchener, Ontario N2C 2C9 Canada	Tel. +1 519-743-5491 Fax +1 519-743-3610 URL www.safdrives.com	SAFphire - Programmable Linear Controller	Automation controller	Modbus Modbus Plus Symax/Synet
Schweitzer Engineering Laboratories, Inc. 2350 NE Hopkins Court Pullman, WA 99163-5603 United States	Tel. +1 509-332-1890 Fax +1 509-332-6187 URL www.selinc.com	SEL-2711	Communication interface boards	Modbus Plus
Sciaky 119 Quai Jules Guesde, BP 43 F-94401 Vitry sur Seine France	Tel. +33 (0)1 45 73 43 00 Fax +33 (0)1 46 82 58 80 URL www.sciaky.com	CPS2000 RL2	Miscellaneous actuator	Fipio
Secheron Ltd. 14 Avenue de Secheron Geneva 21 Switzerland	Tel. +41 22 739 4111 Fax +41 22 738 7305 URL www.secheron.com	VMB OZ	Communication interface boards	Modbus Plus
Silicomp 195 Rue Lavoisier F-38330 Montbonnot St Martin France	Tel. +33 (0)4 76 41 66 66 Fax +33 (0)4 76 41 66 67 URL www.silicomp.com	Software development	Services	Fipio Fipway
Simulation Sciences 2500 City West Boulevard, Ste. 1200, Houston, TX 77042 United States	Tel. +1 713-683-1710 Fax +1 713-683-6613 URL www.simsi.com	AIM AIMAT	HMI/SCADA	Modbus Modbus Plus
SISCO, Inc. 6605 19 1/2 Mile Road Sterling Heights, MI 48314-1408 United States	Tel. +1 810-254-0020 Fax +1 810-254-0053 URL www.sisconet.com	AX-S4 MMS	Miscellaneous software	Modbus Modbus Plus

Premium automation platform

Schneider Alliances partner products

Product directory

Company	Tel./Fax/URL	Reference	Category	Technology
Sofrel Telecontrol 2 rue du Plessis F-35770 Vern sur Seiche France	Tel. +33 (0)2 99 04 89 00	SOFREL S50, RTU for technical facilities	HMI/SCADA	Uni-Telway Modbus
	Fax +33 (0)2 99 04 89 01	SOFREL S50 Thermix, RTU for HVAC applications	HMI/SCADA	Uni-Telway Modbus
Spectrum Controls, Inc. P.O. Box 5533 2700 Richards Road, Suite 200 Bellevue, WA 98005 United States	Tel. +1 425-746-9481	140 ACI 051 : 32-Ch analog input	Electrical I/O interface	Quantum
	Fax +1 425-641-9473	SOI-260	HMI/operator panel	S800
	URL www.spectrumctls.com	for HVAC applications		Modbus
S-S Technologies Inc. 50 Northland Road Waterloo, Ontario N2V 1N3 Canada	Tel. +1 519-725-5136	Universal Communication System	Communication interface boards	Modbus
	Fax +1 519-725-1515	Modicon RIO Interface Card	Communication interface boards	S800
	URL www.sstech.on.ca	QNX 4.X Device Administrator	Communication software	Modbus Plus
		PICS Simulation software	Miscellaneous software	Autres
		X-Link	Communication software	Modbus, Modbus Plus
Steeplechase Software 1330 Eisenhower Place Ann Arbor, MI 48108 United States	Tel. +1 734-975-8100	Visual Logic Controller - VLC-PDK	Miscellaneous software	Autres
	Fax +1 734-975-8123			
	URL www.steeplechase.com			
SWAC Odenpullach 1 82041 Oberhaching Germany	Tel. +49 89 316 8660	BTK 16, 32, 64, BT.GDA	HMI/operator panel	Modbus Plus
	Fax +49 89 316 866 80			
	URL www.swac.de			
TA Engineering Co., Inc. 1150 Moraga Way Moraga, CA 94556 United States	Tel. +1 925-376-8500	AIMAX for Windows	HMI/SCADA	Modbus Modbus Plus
	Fax +1 925-376-4977			
	URL www.ta-eng.com			
Tasnet, Inc. 5271 102nd Ave. North Pinellas Park, FL 33782 United States	Tel. +1 727-544-1555	Substation Automation and Communication Software Systems	Communication interface boards	Modbus
	Fax +1 727-545-8975			
	URL www.tasnet.com			
Toshiba 13131 West Little York Rd Houston, TX 77041 United States	Tel. +1 713-466-0277	G3 Inverter	Drive	Modbus Plus
	Fax +1 713-466-8773			
	URL www.toshiba.com			
TR Electronic Eglishalde, 6 D-78647 Trossingen Germany	Tel. +49 (0) 7425 228 0	CE65 absolute rotary encoders	Miscellaneous sensor	Fipio
	Fax +49 (0) 7425 228 33	LA 68K linear absolute coders	Miscellaneous sensor	Fipio
	URL www.trelectronic.com			
TURCK, Inc. 3000 Campus Drive Plymouth, MN 55441 United States	Tel. +1 612-553-7300	Sensoplex MC	Communication interface boards	Modbus Plus
	Fax +1 612-553-0708			
	URL www.turck.com			
Weed Instrument P.O. Box 300 707 Jeffrey Way Round Rock, TX 78680-0300 United States	Tel. +1 512-434-2844	Fiber Optic Modem 6000 EoTec	Communication hardware	Modbus Modbus Plus S800
	Fax +1 512-434-2851			
	URL www.weed_instrument.com			
Westermo Teleindustri AB SE-640 40 Stora Sundby Sweedden	Tel. +46 16 61200	Modem	Communication hardware	Modbus Uni-Telway
	Fax +46 16 61180			
	URL www.westermo.se			
Wonderware 100 Technology Drive Irvine, CA 92718 United States	Tel. +1 949-727-3200	Intouch	HMI/SCADA	Ethway Fipway Uni-Telway Modbus Plus
	Fax +1 949-727-3270			
	URL www.wonderware.com			
Xycom, Inc. 750 North Maple Road Saline Michigan MI 48176 United States	Tel. +1 734-429-4971	34XX	HMI/operator panel	Uni-Telway Modbus Modbus Plus
	Fax +1 734-429-1010			
	URL www.xycom.com			



Country	Address	Country	Address
Algeria	■ Schneider Electric Bureau de Liaison Algérie 04 rue du Berry - El Mouradia 16070 Algiers	Finland	■ Schneider Electric Oy Sinikalliontie 16 02630 Espoo
Argentina	■ Schneider Argentina Viamonte 2850 1678 Caseros (provincia Buenos Aires)	France	■ Schneider Electric SA 5, rue Nadar 92500 Rueil Malmaison
Australia	■ Schneider Electric (Australia) Pty Ltd 2, Solent circuit Norwest Business Park NSW 2153 Baulkham Hill	Germany	■ Schneider Electric GmbH Gothaer Straße 29 D-40880 Ratingen
Austria	■ Schneider Austria Ges.m.b.H. Birostrasse 11 1239 Wien	Greece	■ Schneider Electric AE 14th km - RN Athens-Lamia GR - 14564 Kifissia
Bahrain	■ Schneider Electric Floor 1 - Juma Building Abu Horaira Avenue P.O. Box 355 304 Manama	Guadeloupe	■ Schneider Electric Immeuble Cottrell ZI de la Lézarde 97232 Le Lamentin
Belgium	■ Schneider Electric nv/sa Dieweg 3 1180 Brussels	Hong Kong	■ Schneider Electric (Hong-Kong) Ltd Room 3108-28, 31th Floor, Sun Hung Kai Centre 30 Harbour Road, Wanchai
Brazil	■ Schneider Electric Brasil S.A. Avenida Das Nações Unidas 23223 Jurubatuba CEP 04795-907 São Paulo-SP	Hungary	■ Schneider Electric Hungaria Villamossagi Rt. Fehérvári ut 108 - 112 H-1116 Budapest
Bulgaria	■ Schneider Electric Expo 2000 - Boulevard Vapzarov 1407 Sofia	India	■ Schneider Electric India Pvt Ltd. D-27 South Extension Part II 110 049 New Dehli
Cameroon	■ Schneider Electric SA - Cameroun 16, rue de l'hôtel de ville - BP12087 Douala	Indonesia	■ P.T. Schneider Indonesia Ventura Building 7th Floor Jalan R.A. Kartini - Kav.26 Cilandak 12430 Jakarta
Canada	■ Schneider Canada 19, Waterman Avenue M4 B1Y2 Toronto - Ontario	Iran	■ Telemecanique Iran 1047 Avenue VALI ASSR P.O. Box 15875-3547 15116 Teheran
Chile	■ Schneider Electric Chile S.A. Avda. Presidente Eduardo Frei Montalva, 6115-B Conchali Santiago	Ireland	■ Schneider Electric Ireland Maynooth Road Cellbridge - Co. Kildare
China	■ Schneider Beijing Landmark bldg-Room 1801 8 North Dong Sanhuan Rd, Chaoyang District 100004 Beijing	Italy	■ Schneider Electric S.p.A. Centro Direzionale Colleoni Palazzo Sirio - Viale Colleoni, 7 20041 Agrate Brianza (Mi)
Columbia	■ Schneider de Colombia S.A. Calle 45A#102-45 Santafe de Bogota - Bogota	Japan	■ Schneider Electric Japan Ltd SK Bldg, Sendagaya 4-14-4, Sendagaya Shibuya-Ku - 151 Tokyo
Costa-Rica	■ Schneider Centroamérica Ltda. 1,5 kms Oeste de la Embajada Americana, Apartado 4123 - 1000 San Jose	Kenya	■ Schneider East Africa Power Technics Complex PO Box 46345 - Nairobi
Côte d'Ivoire	■ Schneider Electric Afrique de l'Ouest Sarl 18 B.P.2027 Abidjan 18	Kuwait	■ Schneider Electric Kuwait Al Gaas Tower Sharq 2nd Floor PO Box 20092 - 13 061 Safat
Croatia	■ Schneider Electric SA Fallerovo Setaliste 22 10000 Zagreb	Latvia	■ Schneider Electric Rue Tornia, 4 IIIB, office 203 LV1050 Riga
Cuba	■ Schneider Electric Bureau de Liaison de La Havane Calle 36- N°306-Apto1- Entre 3ra y 5ta Avenida Miramar Playa Habana	Lebanon	■ Schneider Electric Liban SODECO Square Office Tower Bloc B - 13th Floor Rue de Damas Beyrouth
Czech Republic	■ Schneider Electric CZ, s.p.o. Thamova 13 186 00 Praha 8	Lithuania	■ Schneider Electric rue Juozapaviciaus, 11 2600 Vilnius
Denmark	■ Schneider Electric A/S Baltorpbakken 14 DK - 2750 Ballerup	Malaysia	■ Schneider Malaysia Sdn Bhd No.11 Jalan U1/19, Seksyen U1 Hicom-Glenmarie Industrial Park Shah Alam 40150 Selangor Darul Ehsan
Dominican Republic	■ Schneider Electric Calle Jacinto Manon Esq. Federico Geraldino Edificio D'Roca Plaza Suite 402, Ens. Paraiso Santo Domingo	Martinique	■ Schneider Electric Immeuble Cottrell ZI de la Lézarde - 97232 Le Lamentin
Ecuador	■ Schneider Ecuador Av. de los Shyris y Rio Coca Esq. Edificio Eurocentro - Segundo Piso 6466 Quito	Mexico	■ Groupe Schneider Mexico Calz. Rojo Gomez N° 1121 Col. Guadalupe del Moral Mexico 09300
Egypt	■ Schneider Electric Egypt 68, El Tayaran Street Nasr City, 11371 Cairo	Morocco	■ Schneider Electric Maroc 26, rue Ibnou Khalikane Quartier Palmiers 20100 Casablanca



Country	Address	Country	Address
Netherlands	■ Schneider MGTE B.V. Waarderweg 40 - Postbus 836 2003 RV Haarlem		Tel: (31) 23 512 4124 Fax: (31) 23 512 4100 www.schneider-electric.nl
New Zealand	■ Schneider Electric (NZ) Ltd 14 Charann Place - Avondale P.O. Box 15355 New Lynn - Auckland		Tel: (64) 98 20 18 20 Fax: (64) 98 20 18 21
Nigeria	■ Merlin Gerin Nigeria Ltd Plot 25, Sanni Tola Sonolki Close Off Harold Sodipo Crescent PO Box 12 505 Ikeja - Lagos		Tel: (234) 14 93 63 99 Fax: (234) 14 97 45 99
Norway	■ Schneider Electric Norge A/S Solgaard Skog 2 Postboks 128 1501 Moss		Tel: (47) 6924 9700 Fax: (47) 6925 7871
Oman	■ Schneider Electric CA c/o Arab Development Co PO Box 439 113 Muscat		Tel : (968) 77 163 64 Fax : (968) 77 104 49
Pakistan	■ Schneider Electric Pakistan 302 Clifton Center Clifton Block J Karachi 75500		Tel : (92) 21 586 3561 to 3563 Fax : (92) 21 586 3564
Peru	■ Schneider Electric Peru S.A. Francisco Canaval y Moreyra #452 Piso 15, of.2 San Isidro L - 27 Lima		Tel: (511) 221 54 60 Fax: (511) 221 81 84 www.schneider-electric.com.pe
Philippines	■ Schneider Electric Philippines, Inc 1314 Batangas Street Makati City 1234 Metro-Manila		Tel: (63) 28 44 84 18 Fax: (63) 28 16 00 63
Poland	■ Schneider Electric Polska Sp.zo.o. Ul. Domaniewska 41 02-672 - Warszawa		Tel: (48) 22 606 25 00 Fax: (48) 22 606 11 66/58 www.schneider-electric.pl
Portugal	■ Schneider Electric Portugal Av.do Forte, 3 Edificio Suécia II, Piso 3-A CP 2028 Carnaxide 2795 Linda-A-Velha		Tel: (351) 21 416 5800 Fax: (351) 21 416 5857 www.schneiderelectric.pt
Qatar	■ Schneider Electric Qatar Branch c/o Khalifa BinFahred Al Thani Trad. and Co P.O. Box 4484 Doha		Tel: (974) 424 358 Fax: (974) 424 358
Reunion	■ Schneider Electric Immeuble Futura 190, rue des 2 canons - BP 646 97497 Sainte Clothilde		Tel: (262) 28 14 28 Fax: (262) 28 39 37
Romania	■ Schneider Electric Bd Ficusului n° 42 «Apimondia», Corp.A, et.1, Sector 1 Bucuresti		Tel: (40) 1 203 06 50 Fax: (40) 1 232 15 98 www.schneider-electric.ro
Russia-CIS	■ Schneider Electric CEI 80, Leningradsky Prospekt 125178 Moscow		Tel: (7) 502 224 5050 Tel: (7) 502 224 5033/34 Fax: (7) 502 224 5220
Saudi Arabia	■ Schneider Electric Second Industrial City P.O. Box 89249 11682 Riyadh		Tel: (966) 1 265 1515 Fax: (966) 1 265 1860
Senegal	■ Schneider Electric Afrique de l'Ouest BP 15952 Dakar-Fann - Quartier Almadies Dakar		Tel: (221) 820 68 05 Fax: (221) 820 58 50
Singapore	■ Schneider Electric Singapore Pte Ltd 10 Ang Mo Kio Street 65 #02 - 17/20, Tech Point Singapore 569059		Tel: (65) 484 78 77 Fax: (65) 484 78 00 www.schneider-electric.com.sg
Slovak Republic	■ Schneider Electric Slovakia, spol. s.r.o. Borekova 10 SK-821 06 Bratislava		Tel: (421) 7 552 40 10/20 Fax: (421) 7 552 40 00 www.schneider-electric.sk
Slovenia	■ Schneider Electric Techniski Biro - Dunasjka 106 pp 69 61000 Ljubljana		Tel: (386) 61 168 5007 Fax: (386) 61 168 5426
South Africa	■ Schneider Electric South Africa (PTY) Ltd Cnr Bekker & Montrose roads 1685 - Midrand.		Tel : (27) 11 254 6400 Fax : (27) 11 315 8830 www.schneider-electric.co.za
South Korea	■ Schneider Electric Korea 3Floor, Cheil Bldg., 94-46, 7-Ka Youngdeungpodong, Youngdeungpo-ku 150-037 Seoul		Tel: (82) 226 30 97 00 Fax: (82) 226 30 98 00 www.csinfo.co.kr/schneider/
Spain	■ Schneider Electric España, S.A. Pl. Dr. Letamendi, 5-7 08007 Barcelona		Tel: (34) 93 484 3100 Fax: (34) 93 484 3308 www.schneiderelectric.es
Sweden	■ Schneider Electric AB Djupdalsvägen 17/19 19129 Sollentuna		Tel: (46) 8 623 84 00 Fax: (46) 8 623 84 85 www.schneider-electric.se
Switzerland	■ Schneider Electric (Switzerland) S.A. Schermenwaldstrasse 11 - Postfach 3063 Ittigen		Tel: (41) 31 917 3333 Fax: (41) 31 917 3355 www.schneider-electric.ch
Syria	■ Schneider Electric Syria Shakib Arslan Street Abou Roumaneh PO Box 33876 - Damas		Tel: (963) 11 333 10 26 Fax: (963) 11 331 08 67
Taiwan	■ Schneider Electric Taiwan Co Ltd 11F-2, N°51, Keelung Road, Sec.2 110 Taipei		Tel: (886) 2 27 33 14 64 Fax: (886) 2 27 33 64 10 www.schneider-electric.com.tw
Thailand	■ Schneider (Thailand) Ltd 20th Floor Richmond Building 75, Sukhumvit 26 rd, Klongtoey Bangkok 10110		Tel: (662) 261 18 99 Fax: (662) 260 82 35 www.schneider-electric.co.th
Tunisia	■ Schneider Electric Tunisie 2045 Les Berges du Lac Tunis		Tel : (216) 1 960 477 Fax : (216) 1 960 342
Turkey	■ Schneider Elektrik . Sanayi Ve Ticaret A.S Tütüncü Mehmet Efendi Cad.N°:110 Kat: 1-2 81080 Götztepe-Istanbul		Tel: (90) 21 63 86 95 70 Fax: (90) 21 63 86 38 75 www.schneiderelectric.com.tr
Ukraine	■ Schneider Electric Rue Krechtchatik 2 252601 Kiev		Tel: (380) 44 462 04 25 Fax: (380) 44 462 04 24
United Arab Emirates	■ Schneider Electric Abu Dhabi PO Box 29580 - Office Floor 2/Lulu Street Al Marina Plaza Tower Abu Dhabi		Tel: (971) 2 33 94 44 Fax: (971) 2 31 66 06
United Kingdom	■ Schneider Ltd Braywick House East Windsor Road . Maidenhead Berkshire SL6 1 DN		Tel: (44) 01628 508 500 Fax: (44) 01628 508 508 www.schneider.co.uk
United States	■ Schneider Electric North American Division 1415 Roselle Road Palatine - IL 60067		Tel: (1) 847 397 2600 Fax: (1) 847 925 7500 www.squared.com
Uruguay	■ Schneider Electric Uruguay S.A. Gabriela Pereira 30398 CP11300 Montevideo		Tel: (598) 27 07 23 92 Fax: (598) 27 09 17 13
Venezuela	■ Schneider Mg SD TE, S.A. Calle 162 / Piso 2 Edificio Centro Cynamid La Urbina, 1070 75319 Caracas		Tel: (58) 2 241 13 44 Fax: (58) 2 243 60 09 www.schneider-electric.com.ve
Vietnam	■ R.R.O. Of Schneider Electric S.A. Unit 808, 8th Floor Me Linh Point Tower 2 Ngo Duc Ke Street, District 1 Ho Chi Minh City		Tel : (84) 8 829 60 72 Fax : (84) 8 829 60 67
Yugoslav Federation	■ Schneider Electric A.S. Nikole Tesle 3 11181 Beograd		Tel: (381) 11 319 15 03 Fax: (381) 11 319 15 20
Zambia	■ Schneider Zambia Zambia Office c/o Matipi Craft Center Building Plot 1036 Accra Road PO Box 22792 - Kitwe		Tel: (260) 222 22 52 Fax: (260) 222 83 89
Zimbabwe	■ Schneider Electric Zimbabwe Liaison Office 75A Second Street (corner Livingstone Avenue) Harare		Tel: (263) 4 707 179 Tel: (263) 4 707 180 Fax: (263) 4 707 176
NUM SA	21, avenue Marechal Foch - BP 68 95101 Argenteuil Cedex France		Tel: 33 (0)1 3423 6666 Fax: 33 (0)1 3423 678 www.num.com
Partnership company	■ Phyttron Elektronik GmbH Industriestr. 12 D-82194 Gröbenzell Germany		Tel: 49 (0)8142-503 0 Fax:49 (0)8142 503 190 www.phyttron.com

For all the other countries, contacts are ensured by the Regional Divisions (see next page).



Country	Address	
Africa & Middle-East Zone		
Arabic Peninsula	■ Schneider Electric Second Industrial City P.O. Box 89249 11682 Riyadh Saudi Arabia	Tel : (966) 1 265 15 15 Fax: (966)1 265 18 60
Middle-East Région	■ Schneider Elektrik A.S. Sanayi Ve Ticaret A.S. Tütüncü Mehmet Efendi Cad. N°:110 Kat. 1-2 81080 Göztepe-Istanbul Turkey	Tel : (90) 2163 86 95 70 Fax : (90) 21 63 86 38 75 www.schneider-electric.com.tr
North-East Africa Region	■ Schneider Electric Egypt 68, El Tayaran Street Nasr City, 11371 Cairo Egypt	Tel : (20) 24 01 01 19 Fax: (20) 24 01 66 87 www.schneider.com.eg
North-West Africa Region	■ Schneider Electric Maroc 26, rue Ibnou Khalikane Quartier Palmiers 20100 Casablanca Morocco	Tel : (212) 299 08 48 à 57 Fax: (212) 299 08 67 et 69 www.schneider.co.ma
South Africa Region	■ Schneider Electric South Africa (PTY) Ltd Cnr Bekker & Montrose roads 1685 - Midrand. South Africa	Tel : (27) 11 254 6400 Fax: (27) 11 315 8830 www.schneider-electric.co.za
South Asia Region	■ Schneider Electric India Pvt Ltd. D-27 South Extension Part II 110 049 New Dehli India	Tel : (91) 116 25 76 58 Fax: (91) 116 25 80 80 www.schneiderelectric.in.com
Asian Zone		
Great China	■ Schneider Beijing Landmark bldg-Room 1801 8 North Dong Sanhuan Rd, Chaoyang District 100004 Beijing China	Tel : (86) 10 65 90 69 07 Fax: (86) 10 65 90 00 13 www.schneider-electric.com.cn
South-East Asia	■ Schneider South East Asia (HQ) Pte Ltd. 460 Alexandra Road #15-01 PSA building 119963 Singapore	Tel : (65) 270 23 66 Fax: (65) 273 46 10
European Zone		
ECE-CIS Countries	■ Schneider Electric CEI 80, Leningradsky Prospekt 125178 Moscou Russia	Tel : (7) 502 224 5050, 5033 et 5034 Fax: (7) 502 224 5220
Nordic countries	■ Schneider Electric A/S Baltorpbakken 14 DK - 2750 Ballerup Denmark	Tel : (45) 44 73 7888 Fax: (45) 44 68 5255 www.schneider-electric.dk
East Adriatic countries	■ Schneider Electric SA Fallerovo Setaliste 22 10000 Zagreb Croatia	Tel : (385) 1 367 100 Fax: (385) 1 367 111
North-America Zone		
	■ Schneider Electric North American Division 1415 Roselle Road Palatine IL 60067 USA	Tel : (1) 847 397 2600 Fax: (1) 847 925 7500 www.squared.com
South America & Caribbee zone		
	■ Schneider Electric Emp. Partic. Head Office Zone Avenida Brigadeiro Faria Lima 1478 15° A 01451-913 São Paulo-SP Brazil	Tel : (55) 11 816 45 00 Fax: (55) 11 813 09 43 www.schneider.com.br
Pacific Zone		
	■ Schneider Electric (Australia) Pty. Limited 2, Solent Circuit Norwest Business Park NSW 2153 Baulkham Hill Australia	Tel : (61) 298 51 28 00 Fax: (61) 296 29 83 10 www.schneider.com.au