Modicon TSX Premium PLCs

Processors

Characteristics

References :
pages 43511/6 and 43511/7

Modicon TSX Premium PLCs have been developed to conform to the principal national and international standards concerning electronic equipment for industrial automation systems : ● Requirements specific to programmable controllers : functional characteristics, immunity, ruggedness, safety, etc. EN 61131-2 (IEC 1131-2), CSA 22-2, UL 508, ● Merchant navy requirements of the main European bodies : BV, DNV, GL, LROS, RINA, etc, ● Compliance with European Directives (low voltage, electromagnetic compatibility), CE marking, ● Electrical qualities and self-extinguishing capacity of insulating materials : UL 746C, UL 94, etc.

Environment (characteristics common to all Modicon TSX Premium components)

Type of processor				TSX P57 102M	TSX P57 202M
Temperature		Operation	°C	0...+ 60 (+ 5...+ 55 according to IEC 1131-2)	
		Storage	°C	- 25...+ 70 (according to IEC 1131-2)	
Relative humidity		Operation		30 %...95 % without condensation	
		Storage		5 %...95 % according to IEC 1131-2 without condensation	
Altitude			m	0...2000	
Mechanical withstand	Immunity	to vibrations		Conforms to standard IEC 68-2-6, Fc test	
		to shocks		Conforms to standard IEC 68-2-27, Ea test	
Electrostatic discharge withstand	Immunity	to electrostatic discharges		Conforms to standard IEC 1000-4-2, level 3 (1)	
Resistance to HF interference	Immunity	to radiated electromagnetic fields		Conforms to standard IEC 1000-4-3, level 3 (1)	
		to fast transient bursts		Conforms to standard IEC 1000-4-4, level 3 (1)	
		to shock waves		Conforms to standard IEC 1000-4-5, level 3 (1)	
		to damped oscillatory waves		Conforms to standard IEC 1000-4-12, level 3 (1)	
Resistance to LF interference				Conforms to the specifications of standard IEC 1131-2	

Characteristics

Type of processor				TSX P57 102M	TSX P57 202M
Maximum configuration		No. of racks		2/4 (2) (3)	8/16 (2) (3)
		Maximum number of slots for modules		24/32 (2)	96/128 (2)
Functions	Maximum number	of discrete I/O channels		512 (4)	1024 (4)
		of analogue I/O channels		24 (4)	80 (4)
		of application-specific channels		8 (4)	24 (4)
	Maximum number of connections	Uni-Telway integrated (terminal port)		1	1
		Network (Ethway, Fipway, Modbus Plus)		1	1
		Fipio bus manager (integrated)		–	–
		Third-party fieldbus		–	1
		AS-i fieldbus		2	4
	Real-time clock			Yes	Yes
Memory	Maximum capacity	Protected internal RAM	Kwords	32	48
		PCMCIA memory card	Kwords	32/64	32/64/128
	Maximum size of zones (7)	Data (%MWi)	Kwords	30.5	30.5
		Constants (%KWi)	Kwords	32	32
Application structure		Master task		1	1
		Fast task		1	1
		Event processing		32 (of which 1 has priority)	64 (of which 1 has priority)
Execution time		One standard Boolean Instruction	µs	0.58	0.25
		One standard numerical Instruction	µs	0.87	0.37
		One instruction on floating points	µs	88	64
Typical execution time of program code for 1 K instructions	Internal RAM	100 % Boolean	ms	0.72	0.31
		65 % Boolean and 35 % numerical	ms	1.39	0.78
	PCMCIA memory card	100 % Boolean	ms	0.72	0.47
		65 % Boolean and 35 % numerical	ms	1.39	0.98
System overhead	MAST task		ms	2.9	2.0
	FAST task		ms	0.8	0.6

(1) Minimum level in test conditions defined by the standards.
(2) Second value, commercialisation expected 4th quarter 1998.
(3) Maxiumum 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.
(4) The maximum number of discrete I/O, analogue I/O and application-specific channels are cumulative. The number of remote I/O is not counted.

TSX P57 252M	TSX P57 302M	TSX P57 352M	TSX P57 402M	TSX P57 452M
0...+ 60 (+ 5...+ 55 according to IEC 1131-2)				
- 25...+ 70 (according to IEC 1131-2)				
30 %...95 % without condensation				
5 %...95 % according to IEC 1131-2 without condensation				
0…2000				
Conforms to standard IEC 68-2-6, Fc test				
Conforms to standard IEC 68-2-27, Ea test				
Conforms to standard IEC 1000-4-2, level 3 (1)				
Conforms to standard IEC 1000-4-3, level 3 (1)				
Conforms to standard IEC 1000-4-4, level 3 (1)				
Conforms to standard IEC 1000-4-5, level 3 (1)				
Conforms to standard IEC 1000-4-12, level 3 (1)				
Conforms to the specifications of standard IEC 1131-2				

TSX P57 252M	TSX P57 302M	TSX P57 352M	TSX P57 402M	TSX P57 452M
8/16 (2) (3)	8/16 (2) (3)	8/16 (2) (3)	8/16 (2) (3)	8/16 (2) (3)
96/128 (2)	96/128 (2)	96/128 (2)	96/128 (2)	96/128 (2)
1024 (4)	1024 (4)	1024 (4)	2048 (4) (5)	2048 (5)
80 (4)	128 (4)	128 (4)	256 (4) (5)	256 (5)
24 (4)	32 (4)	32 (4)	48 (4) (5)	48 (5)
1	1	1	1	1
1	3	3	4	4
1	–	1	–	1
1	2	2	2 (5)	2 (5)
4	8	8	8 (5)	8 (5)
Yes	Yes	Yes	Yes	Yes
64 Kwords	64 Kwords	80 Kwords	96 Kwords	112 Kwords
32/64/128 Kwords	32/64/128/256 Kwords (6)	32/64/128/256 Kwords (6)	32/64/128/256 Kwords (6)	32/64/128/256 Kwords (6)
30.5	30.5	30.5	30.5	30.5
32	32	32	32	32
1	1	1	1	1
1	1	1	1	1
64 (of which 1 has priority)	64 (of which 1 has priority)	64 (of which 1 has priority)	64 (of which 1 has priority)	64 (of which 1 has priority)
0.25	0.25	0.25	0.25	0.25
0.37	0.37	0.37	0.37	0.37
64	64	64	5	5
0.31	0.31	0.31	0.31	0.31
0.78	0.78	0.78	0.5	0.5
0.47	0.47	0.47	0.47	0.47
0.98	0.98	0.98	0.68	0.68
3.8 (8)	2.0	3.8 (8)	0.6	1.1
0.6	0.6	0.6	0.2	0.2

(5) Non cumulative maximum values. The following formula gives the various capacities : [2 x no. of discrete channels + 15 x no. of analogue channels + 50 x no. of application-specific channels + 150 x no. of channels (AS-i bus + third-party bus + network)] < 10 000.
(6) The 256 Kword extension is managed on 1 page with 128 Kwords of executable code and 1 page with 128 Kwords of graphic data and comments.
(7) The total of the program, data and constants memory zones is limited by the total capacity of the memory.
(8) 3.8 ms if the Fipio integrated link is used, otherwise 2.0 ms.

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	± 10 V, ± 5 V, 0-10 V, 0…5 V, 1…5 V 4-20 mA, 0-20 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…+ 80 mV Thermocouples B, E, J, K, L, N, R, S, T, U	± 10 V, 0…10 V, 0…5 V, 1…5 V 0-20 mA, 4-20 mA
Modularity	4 channels	16 channels	8 channels
Isolation	Between channels : ∿ 2830 V rms. Between bus and channels : ∿ 1780 V rms. Between channels and earth : ∿ 1780 V rms.	Between channels : ± ⎓ 100 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.
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	25-way SUB-D connector	25-way SUB-D connector	20-way screw terminal : TSX BLY 01	25-way SUB-D connector
or via 2 Telefast 2 sub-bases (ABE-7CPA02/03)	or 1 Telefast 2 sub-base (ABE-7CPA02/31)	or 1 Telefast 2 sub-base (ABE-7CPA03/21)		or 1 Telefast 2 sub-base (ABE-7CPA02)
TSX AEY 1600	**TSX AEY 810**	**TSX AEY 420**	**TSX ASY 410**	**TSX ASY 800**
43530/6				

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

Presentation

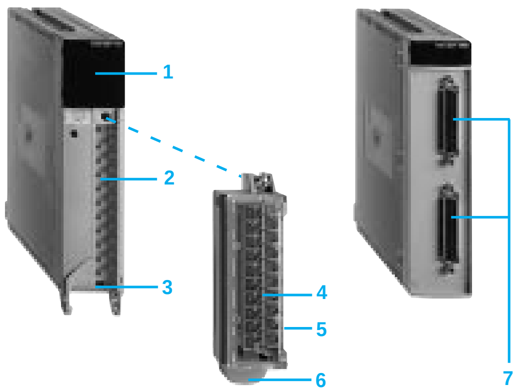
Analogue I/O modules for Premium PLCs are equipped with :
- Either one 25-way SUB-D connector (TSX AEY 420/800/810 and TSX ASY 800)
- Or two 25-way SUB-D connectors (TSX AEY 1600/1614)
- Or a screw terminal block (TSX AEY 414, TSX ASY 410)

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 :



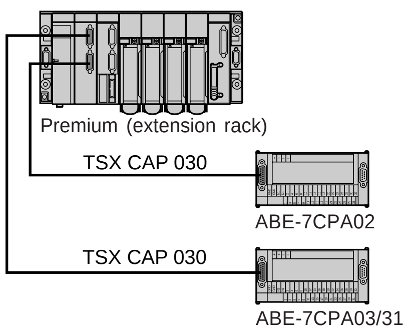
Connection using screw terminal block

Connection using SUB-D connector

1. A display and module diagnostics block
2. A connector for receiving the screw terminal block
3. A rotating support containing the module locating device
4. A removable screw terminal for direct connection of the I/O to the sensors and preactuators **TSX BLY 01** (to be ordered separately)
5. A pivoting cover for accessing the terminal block screws and holding the identification label
6. A screw terminal block encoder
7. A 25-way SUB-D connector for connecting the sensors

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.

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.

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)	–
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			

Max. error			± 10 V 0…10 V	0…5 V 1…5 V	0…20 mA 4…20 mA	± 10 V 0…10 V	0…5 V 1…5 V	0…20 mA 4…20 mA	± 10 V 0…10 V	0…5 V 1…5 V	0…20 mA 4…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

Type of input module			TSX AEY 414	TSX AEY 1614
Number of channels			4	16
Input range			● 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)	● 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	

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

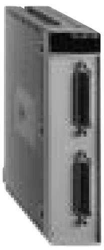
Type of output module		**TSX ASY 410**	**TSX ASY 800**
Number of channels		4	8
Output range		± 10 V, 0…20 mA and 4…20 mA, outputs supplied by PLC (or 24 V SELV external on **TSX ASY 800**, see page 43560/3)	
Analogue/digital conversion		11 bits + sign	13 bits + sign (voltage), 13 bits current
Conversion 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 kΩ 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		⎓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 ≤ 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 ≤ 10). This value is 9.77 µA.

References

Characteristics :
pages 43530/4 and 43530/5

TSX AEY 800/420



TSX AEY 1600/1614

TSX ASY 410/AEY 414

Analogue input modules

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

TSX ASY 800

Analogue output modules

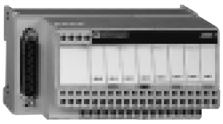
Type of outputs	Output signal range	Resolution	Connection	No. of channels	Reference (1)	Weight kg
Analogue, isolated	± 10 V, 0...20 mA, 4...20 mA	11 bits + sign	Screw terminal block (2)	4 channels	**TSX ASY 410**	0.350
Analogue, with common point	± 10 V, 0...20 mA, 4...20 mA	13 bits + sign	1 x 25-way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

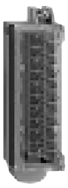
References (continued)

Characteristics :
pages 43530/4 and 43530/5

Connection accessories



ABE-7CPA0●



TSX BLY 01

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-7CPA●● 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**	0.500
			2 m	**ABF-Y25S200**	0.560
			3 m	**ABF-Y25S300**	0.740
			5 m	**ABF-Y25S500**	0.920
Screw terminal 20-way	TSX AEY 414 TSX ASY 410	To be ordered separately with 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

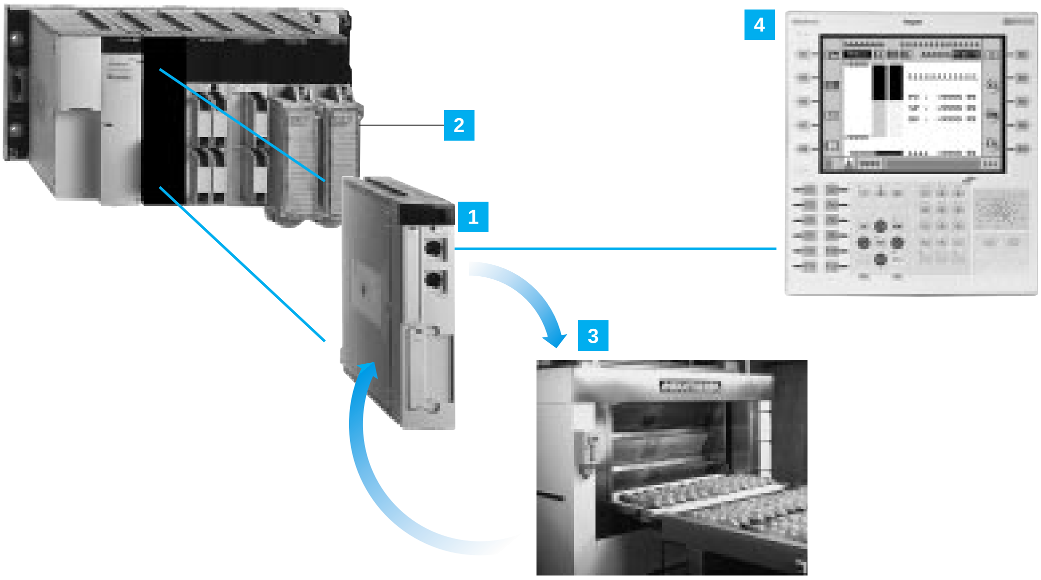
(1) Product supplied with a bilingual quick reference guide : French and English.
(2) If the TSX AEY 810 module is used with the ABE-7CPA02 sub-base, the module channels cannot be isolated.
(3) Can be used with TSX AEY 420 module.
(4) Can be used with TSX ASY 410 module by using the ABF-Y25S●●0● cables.
(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.

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

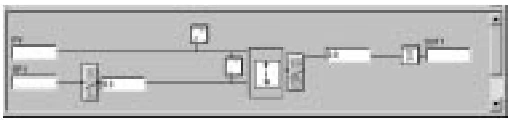
Since the channels are independent, configuration of 10 channels can be used to obtain :
- 30 simple loops
- 5 setpoint programmers, each one associated with 5 control loops
- 2 setpoint programmers and 8 process loops

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

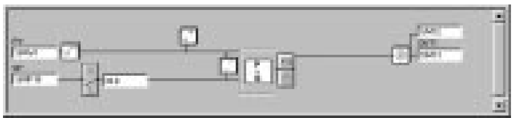
Types of control loop

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

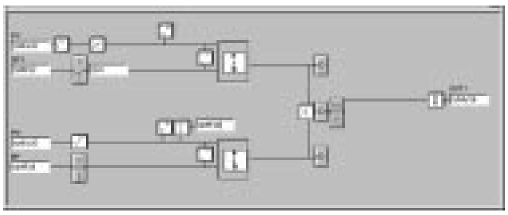
Process loop



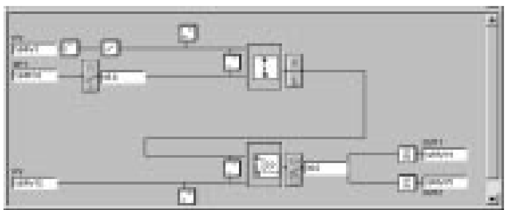
Simple loop



Autoselective loop



Cascaded loop



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

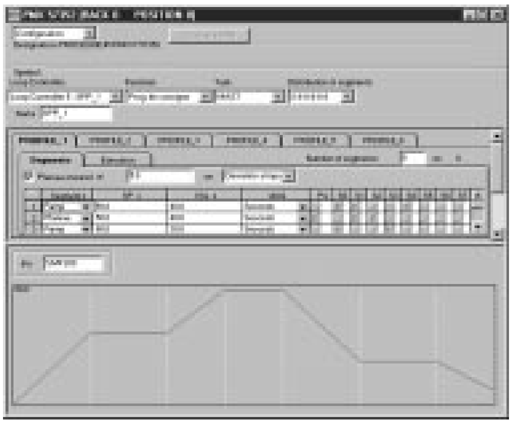
There are 6 different types of loop controller to choose from : autotuning PID, controller in discrete mode with 2 or 3 states, hot/cool controller (PID or autotuning model) or Split Range controller (PID or autotuning model).

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

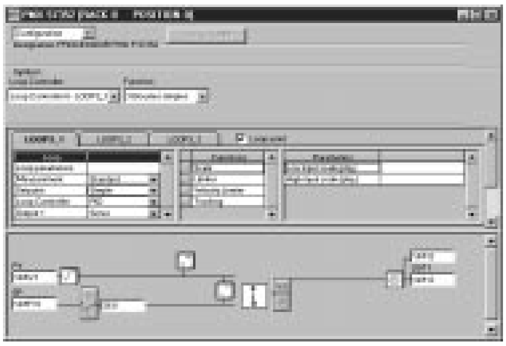
Process control

Functions (continued)

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

Configuration of control channels

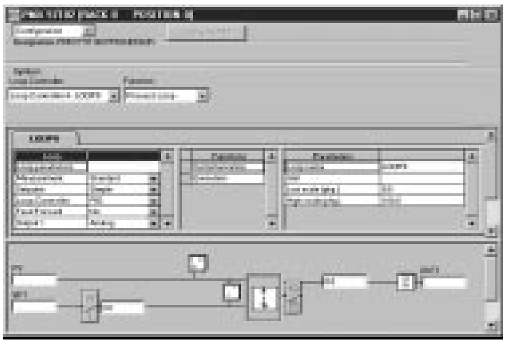
Special screens, accessible using PL7 Junior/Pro software, enable the configuration of control loops.



Configuration of control channels
By simply selecting from the menus, the “Loops” interface on PMX process control processors enables the following to be configured :

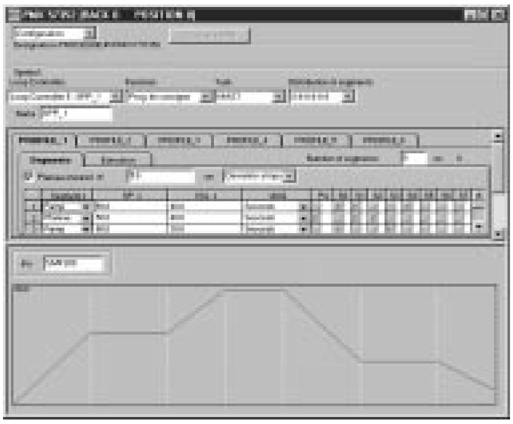
- The type of loop (out of the 5 existing ones)
- The choice of functions used in the 5 processing branches
- Parameters linked to each function
- Assignment of PLC variables to different loop branches (memory words, input words or output words depending on the processing branch)
- Automatic presymbolization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

Process control

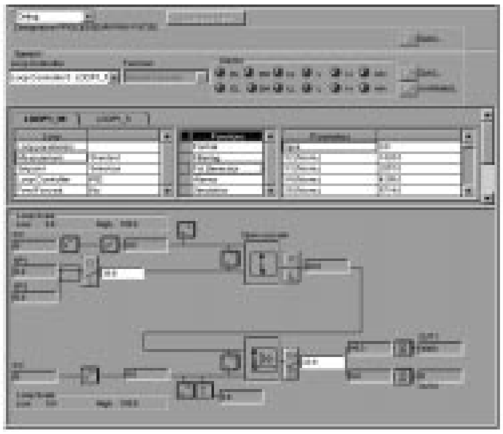
Functions (continued)

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

Debug functions

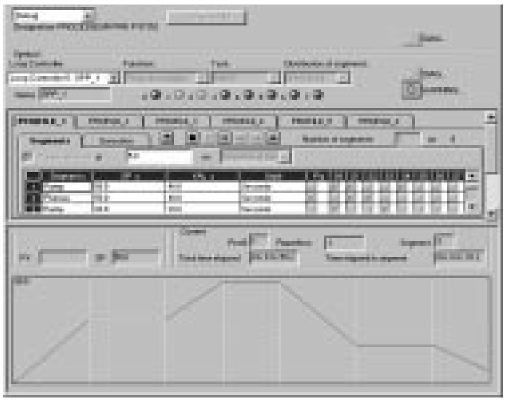
Adjustment and debugging of control loops is performed in a simple and user-friendly way using the loop configuration application-specific screen which, when online, can access the following functions :
- Display and animation of the loop algorithm diagram
- Display of alarms linked to the process and 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 (Kp, Ti, Td or Ks, T1, 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.



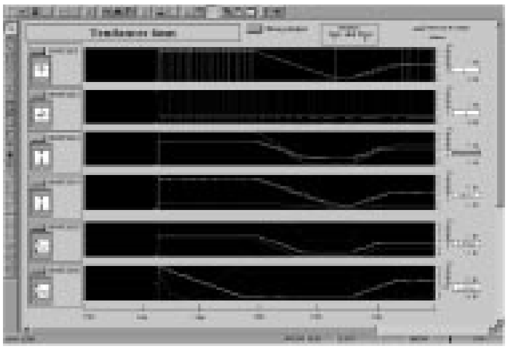
Loop debugging
The debugging screen :
- Displays the values of variables linked to the loop dynamically
- Shows the parameters chosen (or can even modify them)
- Displays alarms

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.

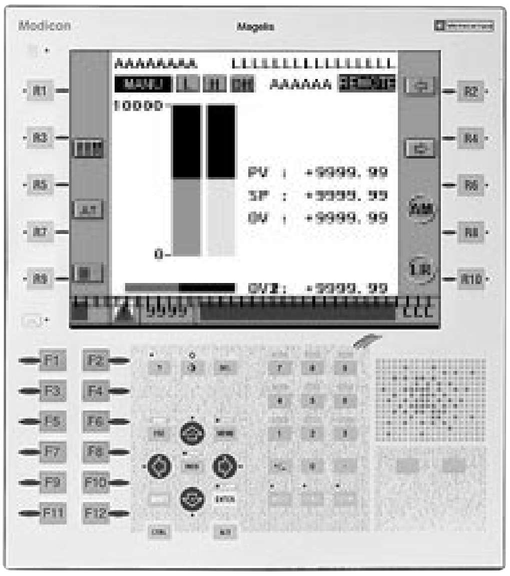
Front panel views and trending views
Predefined controller front panel views provide the user with the traditional appearance of controller front panels. The user only enters the variables used by the loop being dealt with in the various fields in this view.
Similarly, trending views display changes in loop parameters in graph form as well as useful operating information : operating mode, alarms, etc.

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.

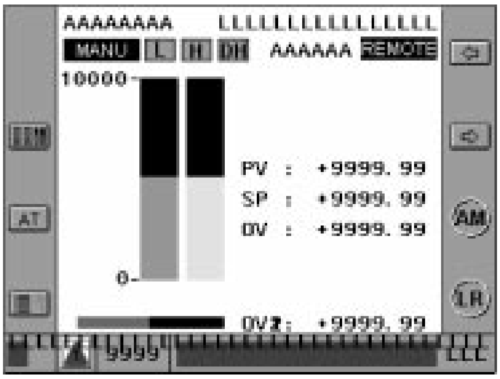
Process control

Function (continued)

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

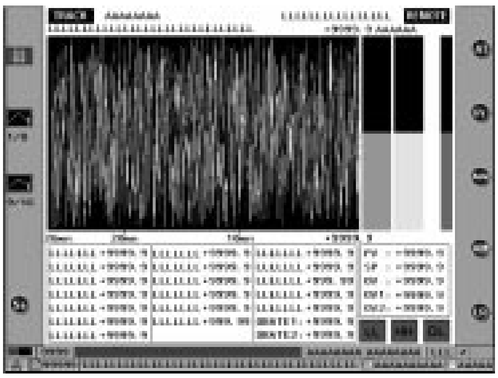
Presentation of views (continued)

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

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	**Kwords**	48/64 depending on model	64/80 or 80/96 depending on model (3)	96/176 (3)
Capacity on PCMCIA card	**Kwords**	160	384	512
Memory occupation	**Kwords**	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.

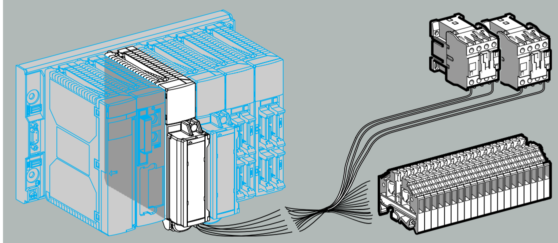
Premium automation platform

Discrete I/O modules

Discrete input and I/O selection guide

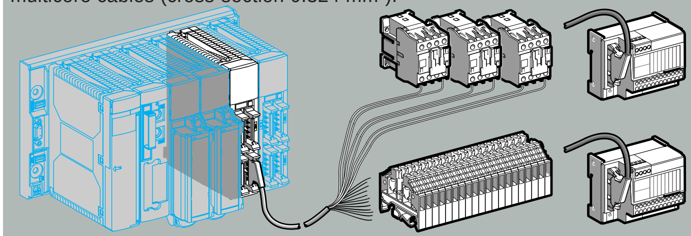
Applications

Connecting inputs to screw terminal blocks for bare wires or wires fitted with either cable ends or open/closed cable tags (minimum cross-section 0.28 mm², maximum 1.5 mm²)

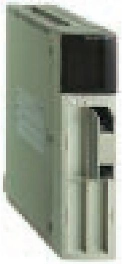
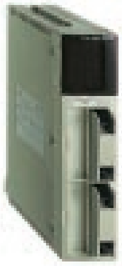
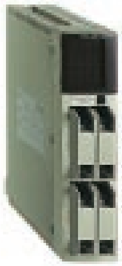


Type	⎓	⎓	⎓	⎓ or ~	~	~
Voltage	24 V	24 V	48 V	24 V	48 V	100…120 V
Modularity (number of channels)	8 isolated chan.	16 isolated channels	16 isolated channels	16 isolated channels	16 isolated channels	16 isolated channels
Connection	Via 20-way screw terminals : TSX BLY 01	Via 20-way screw terminals : TSX BLY 01	Via 20-way screw terminals : TSX BLY 01	Via 20-way screw terminals : TSX BLY 01	Via 20-way screw terminals : TSX BLY 01	Via 20-way screw terminals : TSX BLY 01
Compatibility with Telefast 2-sub-bases – **Connection sub-bases**						
Input adaptor sub-bases						
Compatibility with systems – **Tego Dial**						
Tego Power						
Isolated inputs – **IEC 1131-2 conformity**	Type 2	Type 2	Type 2	–	–	–
Logic	Positive	Positive	Positive	Negative	–	–
Proximity sensor compatibility acc. to IEC 947-5-2 standard	2-wire ⎓/~, 3-wire PNP ⎓ any type	2-wire ⎓/~, 3-wire PNP ⎓ any type	2-wire ⎓/~, 3-wire PNP ⎓ any type	2-wire ⎓/~, 3-wire NPN ⎓ any type	2-wire ⎓/~	2-wire ⎓/~
Isolated outputs – **Fallback**						
IEC 1131-2 conformity						
Protection						
Logic						
Type of discrete input and I/O modules	TSX DEY 08D2	TSX DEY 16D2	TSX DEY 16D3	TSX DEY 16A2	TSX DEY 16A3	TSX DEY 16A4
Page	43520/9	43520/9	43520/9	43520/9	43520/9	43520/9

Connecting inputs to HE 10 connectors with preformed cables with flying leads (cross-section 0.324 mm²), rolled ribbon cables (cross-section 0.08 mm²) or multicore cables (cross-section 0.324 mm²).

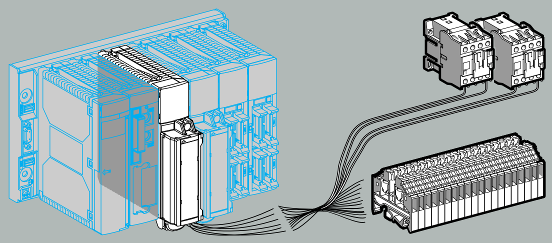


Connecting I/O to HE 10 connectors with preformed cables with flying leads (cross-section 0.324 mm²), rolled ribbon cables (cross-section 0.08 mm²) or multicore cables (cross-section 0.324 mm²).

							
	200…240 V	⎓ 24 V			48 V	24 V	
		16 fast isolated channels	32 isolated chan.	64 isolated chan.	32 isolated chan.	16 isolated inputs and 12 isolated outputs 0.5 A Event-triggered fast inputs	Programmable reflex inputs and outputs
		Via 20-way HE 10 connectors					
		8 or 16 channels, with or without LED, with common or 2 terminals per channel					
		16 channels ⎓ 5 V TTL, ⎓ 24 V, ⎓ 48 V, ∼ 115 V or 230 V, 2 terminals per channel					
		Yes (see pages 15003/2 and 15012/2)					
		Type 1				Type 1	
		Positive					
		2-wire ⎓/∼, 3-wire PNP ⎓ any type					
						Output fallback may be configured, with continuous monitoring of output control and output reset in case of internal fault	
						Yes	
						Protected	
						Positive	
	TSX DEY 16A5	TSX DEY 16FK	TSX DEY 32D2K	TSX DEY 64D2K	TSX DEY 32D3K	TSX DMY 28FK	TSX DMY 28RFK
	43520/9					43520/10	

Discrete output selection guide

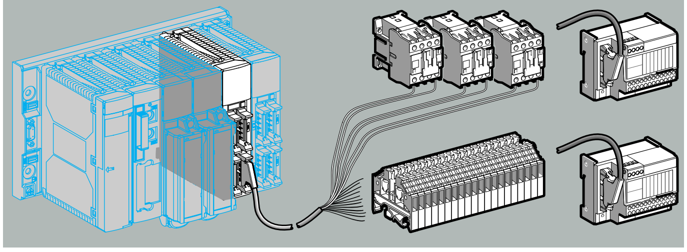
Applications	Connecting outputs to screw terminal blocks for bare wires or wires fitted with either cable ends or open/closed cable tags						



Type	⎓ transistor					⎓ or ~ relay	
Voltage	24 V			48 V		⎓ 24 V, ~ 24...240 V	
Current	0.5 A	2 A	0.5 A	1 A	0.25 A	3 A (Ith)	
Modularity (number of channels)	8 channels, protected		16 channels, protected	8 channels, protected	16 channels, protected	8 channels, not protected	16 channels, not protected
Connection	Via 20-way screw terminals : TSX BLY 01						
Compatibility with Telefast 2 sub-bases – **Connection sub-bases**							
Output adaptor sub-bases							
Compatibility with systems – **Tego Dial**							
Tego Power							
Isolated outputs – **Fallback**	Output fallback may be configured, with continuous monitoring of output control and output reset in case of internal fault					Output fallback may be configured	
IEC 1131-2 conformity	Yes					Yes	
Protection	Protected					Not protected	
Logic	Positive					–	
Type of discrete output module	TSX DSY 08T2	TSX DSY 08T22	TSX DSY 16T2	TSX DSY 08T31	TSX DSY 16T3	TSX DSY 08R5	TSX DSY 16R5
Page	43520/9						

(minimum cross-section 0.28 mm², maximum 1.5 mm²)

Connecting outputs to HE 10 connectors with preformed cables with flying leads (cross-section 0.324 mm²), rolled ribbon cables (section 0.08 mm²) or multicore cables (cross-section 0.324 mm²).



	⎓ relay	∼ triac			⎓ transistor	
⎓ 24…48 V ∼ 24…240 V	24…120 V	48…240 V		24…120 V	24 V	
5 A (Ith)	5 A (Ith)	2 A per channel	1 A per channel	1 A per channel	0.1 A per channel	
8 channels, protected			16 channels, protected	16 channels, not protected	32 channels, protected	64 channels, protected
					Via 20-way HE 10 connectors	
					8 or 16 channels, with or without LED, with common or 2 terminals per channel	
					8 or 16 relay channels with 1 “N/O”, 1 or 2 “C/O” or transistor, ⎓ 5…48 V, ⎓ 24 V, ∼ 24…240 V, 1 or 2 terminals per channel	
					Yes (see pages 15003/2 and 15012/2)	
		–			Output fallback may be configured, with continuous monitoring of output control and output reset in case of internal fault	
Yes				Yes	Yes	
Protected				Not protected	Protected	
–				–	Positive	
TSX DSY 08R5A	**TSX DSY 08R4D**	**TSX DSY 08S5**	**TSX DSY 16S5**	**TSX DSY 16S4**	**TSX DSY 32T2K**	**TSX DSY 64T2K**
43520/9						

Discrete I/O modules

Connection principle

Characteristics :
pages 43520/5 to 43520/8
References :
pages 43520/9 and 43520/10
Connections :
pages 43520/11 to 43520/13

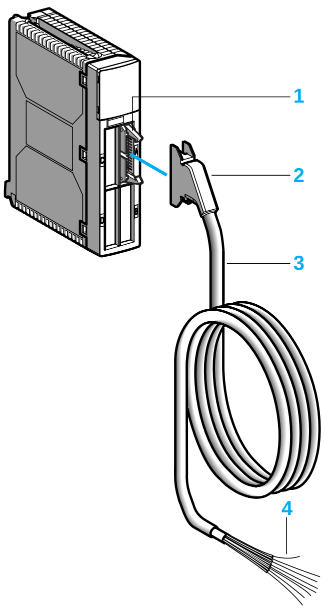
Connecting modules with screw terminal blocks

Discrete I/O module terminal blocks have a device for automatically transferring the coding when first used. This prevents manipulation errors when a module is replaced. This coding ensures electrical compatibility for the type of module.
Each terminal can accept bare wires or wire with cable ends with open tags.
The capacity of each terminal is :

- Minimum : 1 x 0.2 mm² wire (AWG 24) without cable end
- Maximum : 1 x 2 mm² wire (AWG 14) without cable end or 1 x 1.5 mm² wire (AWG 15) with cable end

Screw connection terminal blocks are equipped with captive screws.
The maximum terminal block capacity is 16 x 1 mm² (AWG 17) wires + 4 x 1.5 mm² (AWG 15) wires.

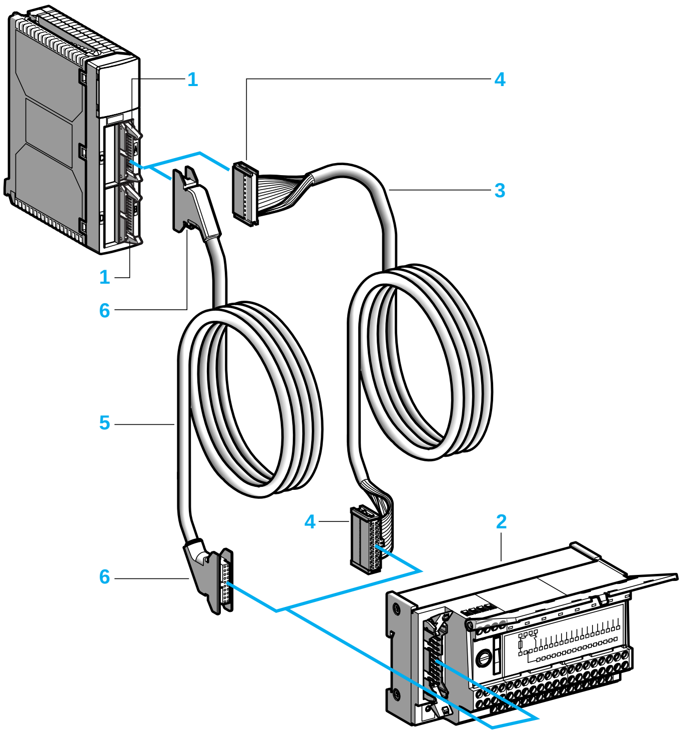
Connecting modules with HE 10 connectors



Preformed cable with 20 wires, 22-gauge (0.324 mm²)
Used for simple and direct wire to wire connection of the I/O of the module with connectors **1** to the sensors, preactuators or terminals.
This preformed cable **3** comprises :

- An insulated HE10 **2** connector at one of the ends, with 20 x 0.34 mm² cross-section sheathed wires.
- At the other end **4**, flying leads differentiated by a colour code conforming to standard DIN 47100.

TSX CDP 301 : 3 metres long
TSX CDP 501 : 5 metres long
TSX CDP 1001 : 10 metres long



Rolled ribbon cable with sheath, 28-gauge (0.08 mm²)
Used for connecting I/O of modules with HE 10 connectors **1** to Telefast 2 fast wiring **2** connection and adaptation interfaces. This cable **3** has 2 HE 10 connectors **4** and a rolled ribbon cable with sheath with 0.08 mm² cross-section wires.
Given the small cross-section of the wires, it is recommended for use with low current I/O only (100 mA maximum per input or output).

TSX CDP 102 : 1 metre long
TSX CDP 202 : 2 metres long
TSX CDP 302 : 3 metres long

Connection cable, 22-gauge (0.324 mm²)
Used for connecting the I/O of modules with HE 10 connectors **1** to Telefast 2 fast wiring **2** connection and adaptation interfaces. This cable **5** has 2 insulated HE 10 connectors **6** and a cable for carrying higher currents (500 mA maximum).

TSX CDP 053 : 0.5 metres long
TSX CDP 103 : 1 metre long
TSX CDP 203 : 2 metres long
TSX CDP 303 : 3 metres long
TSX CDP 503 : 5 metres long

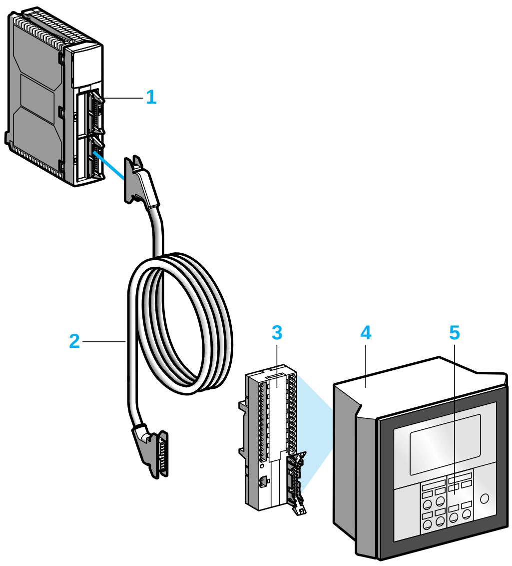
Premium automation platform

Discrete I/O modules

Characteristics :
pages 43520/5 to 43520/8
References :
pages 43520/9 and 43520/10
Connections :
pages 43520/11 to 43520/13

Connection principle (continued), description

Connection to Tego Dial and Tego Power systems



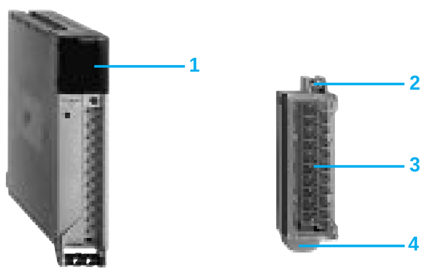
TSX DEY 16FK/32D2K/64D2K input modules and TSX DSY 32T2K/64T2K output modules 1 are specially designed for use in conjunction with Tego Dial and Tego Power systems (1).
The modules are easily connected using a TSX CDP ●●3 connecting cable 2 to the Dialbase sub-base APE-1B24M 3 installed on the Dialpack terminal 4 equipped with a panel 5 which enables operator dialogue.

(1) See pages 15000/2 to 15012/3.

Description

Discrete I/O modules are standard format (1 slot). They have a plastic case which ensures IP 20 protection of the electronics.

Discrete I/O modules with screw terminal connection



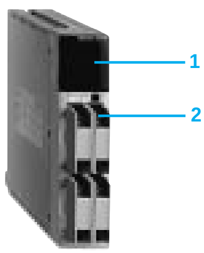
1 A display block for channels and module diagnostics

2 A removable screw terminal for direct connection of the I/O to the sensors and preactuators, TSX BLY 01 (connectors to be ordered separately)

3 A pivoting cover for accessing the terminal block screws and holding the identification label

4 A rotating support containing the module locating device

Discrete I/O modules with connection via HE 10 connector



1 A display block for channels and module diagnostics

2 HE 10 connectors, protected by a cover. They are used to connect the I/O to sensors and preactuators either directly, or via Telefast 2 connection sub-bases.

Discrete I/O modules

Functions

Characteristics :
pages 43520/5 to 43520/8
References :
pages 43520/9 and 43520/10
Connections :
pages 43520/11 to 43520/13

Functions

- **I/O assignment :** each module is functionally organised into groups of 8 channels. Each group of channels can be assigned a specific application task.

- **Reactivation of outputs :** if a fault has caused an output to trip, the output can be reactivated if no other terminal fault is present. The reactivation command, defined during configuration, can be automatic (reactivation every 10 seconds) or controlled via the program. Reactivation is carried out in groups of 8 channels. This function can be accessed on modules with solid state d.c. outputs. For relay and triac output modules protected by fuse, the same type of reactivation (automatic or via program) is necessary after replacement of one or more fuses.

- **RUN/STOP command :** an input can be configured to control the RUN/STOP mode for the PLC.
  The command is accepted on a rising edge. A STOP command via an input takes priority over a change to RUN via the terminal or via a network command.

- **Output fallback :** when an application is placed in STOP mode, outputs can be set to a state which is not harmful to the application. This state, known as the fallback position, is defined for each module when its outputs are configured. This configuration enables the choice between :
  - fallback : channels are set to state 0 or 1 depending on the fallback value entered
  - maintain : outputs retain the state they were in before the PLC stopped

- **Diagnostic functions :**
  - module diagnostics : any exchange fault preventing normal operation of an output module or fast input module is signalled. Similarly, any internal module fault is signalled.
  - process diagnostics : sensor/preactuator voltage check, terminal block presence check, short-circuit and overload check, sensor voltage check, preactuator voltage check.

- **Specific functions of the TSX DEY 16FK and TSX DMY 28 FK module inputs :**
  - latching : accepts particularly short pulses with a duration of less than the PLC scan time
  - event input : enables events to be accepted and ensures their immediate processing (processing on interrupt). These inputs are associated with event processing (EVTi) and defined in configuration mode where :
  i = 0 to 31 for TSX P57 1●3M processors, i = 0 to 63 for TSX P57 2●3M/3●3M/453M and T PCX 57 203M/353M processors.
  Event processing can be triggered on a rising edge (0→1) or falling edge (1→0) of the associated input. A Masking/Unmasking function for TSX DEY 16FK/DMY 28FK inputs is available in online mode.
  - programmable input filtering : inputs are equipped with filtering which can be configured for each channel. Inputs are filtered by a fixed analogue filter which ensures a maximum immunity of 0.1 ms for filtering line interference and by a digital filter which can be configured from 0.1 to 7.5 ms in increments of 0.5 ms.

- **Reflex and timer functions for the TSX DMY 28RFK module :** can be used to create applications which require a faster response time than the FAST task or event processing (< 500 µs). These control system functions are executed in the module and are independent of the PLC task. They are programmed using PL7 Junior/Pro software in configuration mode.

- **Removal when powered up :** due to their integrated devices, I/O modules (including application-specific modules) can be removed and connected while powered up.

2/3 wire compatibility

Type of input	**⎓ 24 V type 1 positive logic**	**⎓ 24/48 V type 2 positive logic**	**⎓ 24 V negative logic**	**∼ 24/48 V ∼ 100…120 V type 2**	**∼ 200…240 V type 2**
Type of sensor					
All 3 wire ⎓ sensors, PNP	■	■			
All 3 wire ⎓ sensors, NPN			■		
Telemecanique 2-wire ⎓ sensor or others with the following characteristics : - residual voltage, closed ≤ 7 V - minimum switching current ≤ 2.5 mA - residual current, open ≤ 1.5 mA	■	■	■		
2-wire ⎓/∼ sensor		■		■	■ (1)
2-wire ∼ sensor				■	■ (1)

(1) In nominal voltage range ∼ 220…240 V.
■ Compatible

References :
pages 43520/9 and 43520/10
Connections :
pages 43520/11 to 43520/13

Environment

Conformity to standards		NFC 63-850, IEC 664, IEC 1131-2, UL 508, UL7 46C, CSA 22-2 No. 142
Temperature derating		Characteristics at 60 °C are ensured for 60 % of inputs and 60 % of outputs at state 1

Characteristics of input modules ⎓ 24/48 V

Type of module			**TSX DEY 08D2/16D2**	**TSX DEY 16D3**	**TSX DEY 16A2**	**TSX DEY 16FK**	**TSX DEY 32D2K**	**TSX DEY 64D2K**	**TSX DEY 32D3K**
Number of inputs			8/16	16	16	16	32	64	32
Connections			Screw terminal	Screw terminal	Screw terminal	HE 10 connector	HE 10 connector	HE 10 connector	HE 10 connector
Nominal input values	Voltage	**V**	⎓ 24 (pos. logic)	⎓ 48 (pos. logic)	⎓ 24 (neg. logic)	⎓ 24 (pos. logic) Fast inputs	⎓ 24 (pos. logic)	⎓ 24 (pos. logic)	⎓ 48 (pos. logic)
	Current	**mA**	7	7	16	3.5	3.5	3.5	7
	Sensor supply (ripple included)	**V**	19…30	38…60	19…30	19…30	19…30	19…30	38…60
Input limit values At state 1	Voltage	**V**	≥ 11	≥ 30	≤ Ual-14 V	≥ 11	≥ 11	≥ 11	≥ 30
	Current	**mA**	≥ 6.5	≥ 6.5	≥ 6.5	≥ 3	≥ 3	≥ 3	≥ 6.5 (for V = 30 V)
At state 0	Voltage	**V**	≤ 5	≤ 10	≥ Ual-5	≤ 5	≤ 5	≤ 5	≤ 10
	Current	**mA**	≤ 2	≤ 2	≤ 2	≤ 1.5	≤ 1.5	≤ 1.5	≤ 2
Input impedance at state 1		**KΩ**	4	7	1.6	6.3	6.3	6.3	4
Response time	Typical	**ms**	4	4	10	Configurable from 0.1 to 7.5	4	4	4
	Maximum	**ms**	7	7	20		7	7	7
IEC 1131-2 conformity			Type 2	Type 2	Type 2	Type 1	Type 1	Type 1	Type 2
Compatibility 2-wire/3-wire prox. sensor			IEC 947-5-2	IEC 947-5-2	IEC 947-5-2	See table on page 43520/4			IEC 947-5-2
Isolation resistance		**MΩ**	>10 at ⎓ 500 V						
Dielectric strength			1500 V rms - 50/60 Hz for 1 minute						
Type of input			Current sink		Resistive	Current sink			
Consumption			See page 43605/2						
Dissipated power No. = No. of channels		**W**	1 + 0.15 Nb	1 + 0.3 Nb	1 + 0.4 Nb	1.2 + 0.1 Nb	1 + 0.1 Nb	1.5 + 0.1 Nb	2 + 0.1 Nb

Characteristics of a.c. input modules

Type of module			**TSX DEY 16A2**	**TSX DEY 16A3**	**TSX DEY 16A4**	**TSX DEY 16A5**
Number of inputs			16	16	16	16
Nominal input values	Voltage	**V**	∿ 24	∿ 48	∿ 110	∿ 220
	Current	**mA**	15	16	12	15
	Frequency	**Hz**	47…63	47…63	47…63	47…63
	Sensor supply	**V**	20…26	40…52	85…132	170…264
Input limit values At state 1	Voltage	**V**	10	29	74	159
	Current	**mA**	6	6	6	6
At state 0	Voltage	**V**	5	10	20	40
	Current	**mA**	4	4	4	4
Input impedance at state 1 for 24 V		**KΩ**	1.6	3.2	9.2	20
Response time	Typical	**ms**	15	10	10	10
	Maximum	**ms**	20	20	20	20
IEC 1131-2 conformity			Type 2	Type 2	Type 2	Type 2
Compatibility 2-wire/3-wire prox. sensor			IEC 947-5-2			
Isolation resistance		**MΩ**	> 10 at ⎓ 500 V			
Dielectric strength			1500 V rms - 50/60 Hz for 1 minute			
Type of input			Resistive	Capacitive		
Consumption			See page 43600/2			
Dissipated power		**W**	0.89	0.86	0.83	0.9

Discrete I/O modules

Characteristics (continued)

References :
pages 43520/9 and 43520/10
Connections :
pages 43520/11 to 43520/13

Characteristics of solid state modules with terminal block

Type of module		TSX DSY 08T2/16T2	TSX DSY 08T22	TSX DSY 08T31	TSX DSY 16T3
Output nominal values					
Voltage	V	⎓ 24	⎓ 24	⎓ 48	⎓ 48
Current	A	0.5	2	1	0.250
Output limit values					
Voltage	V	19…30	19…30	38…60	38…60
Current/channel	A	0.625	2.5	1.25	0.31
Current/module	A	4/7	14	7	4
Leakage current					
At state 0	mA	< 0.5	<1	<1	
Residual voltage	V	< 1.2	< 0.5	< 1	< 0.5
Min. load impedance	Ω	48	12	48	192
Response time		1.2 ms	200 µs	200 µs	1.2 ms
Switching frequency on inductive load	Hz	$0.5/LI^2$			
Built-in protection					
Against overvoltages		Yes, by Transil diode			
Against inversions		Yes, by reverse mounted diode, use a fuse on the + 24 V or + 48 V of the preactuators			
Against short-circuits and overloads		Electronic tripping on reactivation (automatic or via program)			
Preactuator voltage detection threshold	V	16		34	
Isolation resistance	MΩ	> 10 at ⎓ 500 V			
Dielectric strength		1500 V rms - 50/60 Hz for 1 minute			
Consumption		See page 43605/2			
Nominal power					
Dissipated	W	1/1.1	1.3	2.2	2.4
Per output x module current		+ (0.75 W)	+ (0.2 W)	+ (0.55 W)	+ (0.85 W)

Characteristics of 50 VA relay output modules

Type of module				TSX DSY 08R5/16R5			
Nominal/limit operating voltage							
	a.c.		V	∿ 24…240/20…264			
	d.c.		V	⎓ 12…24/10…34			
Thermal current			A	3			
a.c. load	AC-12 duty, resistive	Voltage	V	24	48	110	220
		Power	VA	50 (5)	50 (6) 110 (4)	110 (6) 220 (4)	220 (6)
	AC-14 and AC-15 duty, inductive	Voltage	V	24	48	110	220
		Power	VA	24 (4)	10 (10) 24 (8)	10 (11) 50 (7) 110 (2)	10 (11) 50 (9) 110 (6) 220 (1)
d.c. load	DC-12 duty, resistive	Voltage	V	24			
		Power	W	24 (6) 40 (3)			
	DC-13 duty, inductive	Voltage	V	24			
		Power	W	10 (8) 24 (6)			
Response time							
Activation			ms	< 8			
Deactivation			ms	< 10			
Type of contact				Normally open			
Built-in protection							
Against overloads and short-circuits				None, each channel or group of channels must have a fast blow fuse			
Against a.c. inductive overvoltages				None, an RC circuit MOV (ZNO) peak limiter circuit appropriate to the voltage must be mounted in parallel across the terminals of each preactuator			
Against d.c. inductive overvoltages				None, a discharge diode must be fitted across the terminals of each preactuator			
Isolation resistance			MΩ	> 10 at ⎓ 500 V			
Dielectric strength				2000 V rms - 50/60 Hz for 1 minute			
Consumption				See page 43600/2			
Dissipated nominal power			W	0.25 W + (0.2 W x No. of outputs at 1)			

(1) For 0.1 x 10^6 operating cycles.
(2) For 0.15 x 10^6 operating cycles.
(3) For 0.3 x 10^6 operating cycles.
(4) For 0.5 x 10^6 operating cycles.
(5) For 0.7 x 10^6 operating cycles.
(6) For 1 x 10^6 operating cycles.
(7) For 1.5 x 10^6 operating cycles.
(8) For 2 x 10^6 operating cycles.
(9) For 3 x 10^6 operating cycles.
(10) For 5 x 10^6 operating cycles.
(11) For 10 x 10^6 operating cycles.

Discrete I/O modules

Characteristics (continued)

References :
pages 43520/9 and 43520/10
Connections :
pages 43520/11 to 43520/13

Characteristics of 100 VA relay output modules

Type of module				TSX DSY 08R4D			TSX DSY 08R5A			
Operating voltage										
	a.c.	Nominal	V	–			∿ 24…240			
		Limit	V	–			∿ 20…264			
	d.c.	Nominal	V	⎓ 24…130			⎓ 24…48			
		Limit	V	⎓ 19…143			⎓ 19…60			
Thermal current			A	5			5			
a.c. load	DC-12 duty, resistive	Voltage	V	–			24	48	100…120	220…240
		Power	VA	–			100 (5)	100 (6) 200 (4)	220 (6) 440 (4)	440 (6)
	AC-14 and AC-15 duty, inductive	Voltage	V	–			24	48	100…120	220…240
		Power	VA	–			50 (4)	20 (10) 50 (8)	20 (11) 110 (7) 220 (2)	20 (11) 110 (9) 220 (6) 440 (1)
d.c. load	DC-12 duty, resistive	Voltage	V	24	48	100…130	24	48		
		Power	W	50 (6) 100 (3)	100 (6) 200 (3)	220 (6) 440 (3)	24 (6) 50 (3)	50 (6) 100 (3)		
	DC-3 duty, inductive	Voltage	V	24	48	100…130	24	48		
		Power	W	20 (8) 50 (6)	50 (8) 100 (6)	110 (8) 220 (6)	10 (8) 24 (6)	24 (8) 50 (6)		
Response time	Activation		ms	< 10						
	Deactivation		ms	< 15						
Type of contacts				2 x 2 "C/O", 2 x 2 "N/O"						
Built-in protection	Against overloads and short-circuits			Interchangeable 6.3 A fast blow fuse per common						
	Against overvoltages			RC circuit and Ge-Mov						
Isolation resistance			MΩ	> 10 at ⎓ 500 V						
Dielectric strength				2000 V rms - 50/60 Hz						
Consumption				See page 43605/2						
Dissipated nominal power	No. : number of outputs at 1		W	0.25 + 0.24 NO.						

Characteristics of triac output modules

Type of module				TSX DSY 08S5	TSX DSY 16S5	TSX DSY 16S4
Operating voltage						
	a.c.	Nominal	V	∿ 48…240		∿ 24…120
		Limit	V	∿ 41…264		∿ 20…132
Permissible current			A	2 A/channel- 12 A/module	1 A/channel- 12 A/module	1 A/channel- 12 A/module
Response time	Activation		ms	≤ 10		
	Deactivation		ms	≤ 10		
Built-in protection	Against overvoltages			Ge-Mov		
	Against overloads and short-circuits			Fast blow fuse per common ≤ 5 A		Non interchangeable fireproof protection per common, 10 A
Isolation resistance			MΩ	> 10 at ⎓ 500 V		
Dielectric strength				2000 V rms - 50/60 Hz		
Consumption				See page 43605/2		See page 43605/2
Dissipated power				0.5 W + 1 W/A per output	0.85 W + 1 W/A per output	0.85 W + 1 W/A per output

(1) For 0.1 x 10^6 operating cycles.
(2) For 0.15 x 10^6 operating cycles.
(3) For 0.3 x 10^6 operating cycles.
(4) For 0.5 x 10^6 operating cycles.
(5) For 0.7 x 10^6 operating cycles.
(6) For 1 x 10^6 operating cycles.
(7) For 1.5 x 10^6 operating cycles.
(8) For 2 x 10^6 operating cycles.
(9) For 3 x 10^6 operating cycles.
(10) For 5 x 10^6 operating cycles.
(11) For 10 x 10^6 operating cycles.

Discrete I/O modules

Characteristics (continued)

References :
pages 43520/9 and 43520/10
Connections :
pages 43520/11 to 43520/13

Characteristics of solid state output modules with connector

Type of module				TSX DSY 32T2K	TSX DSY 64T2K
Logic				Positive	
Operating voltage (ripple included)	Direct current	Nominal	V	⎓ 24	
		Limit	V	⎓ 19…30, possible up to 34 V, limited to 1 hr per 24 hr period	
Permissible current			A	0.1 A/channel, - 3.2 A/module	0.1 A/channel, - 5 A/module
Filament lamp max power			W	1.2	
Residual voltage			V	< 1.5 for I = 0.1 A	
Response time			ms	1.2	
Paralleling of outputs				Yes : 3 max	
Leakage current			mA	< 0.1 for U = 30 V	
Compatibility with d.c. inputs				IEC 1 and 2	
Built-in protection	Against overvoltages			Yes, transil diode	
	Against overloads and short-circuits			Automatic trip after 15 ms	
	Against polarity inversion			Reverse diode (place a 3 A fuse on the 24 V)	
Load impedance	At state 1		Ω	> 220	
Isolation resistance			MΩ	>10 at ⎓ 500 V	
Dielectric strength				1500 V rms - 50/60 Hz for 1 minute	
Consumption				See page 43605/2	
Dissipated power			W	1.6 W + 0.1 W/output	2.4 W + 0.1 W/output

Characteristics of I/O mixed modules with connector

Type of module				TSX DMY 28FK/TSX DMY 28RFK	
				Fast inputs ⎓ 24 V	**Solid state outputs ⎓ 24 V**
Nominal values	Voltage		V	⎓ 24	⎓ 24
	Current		mA	3.5	500
Filament lamp max power			W	–	6
Input limit values	At state 1	Voltage	V	≥ 11	–
		Current	mA	≥ 3	–
	At state 0	Voltage	V	≤ 5	–
		Current	mA	≤ 1.5	–
	Sensor power supply (ripple included)		V	19…30 (possible up to 30 V, limited to 1 in every 24 hours)	–
Output limit values	Voltage		V	–	19…30 (1)
	Current/channel			A	– 0.5
	Current/module		A	–	4
Leakage current	At state 0		mA	–	< 1
Residual voltage	At state 1		V	–	< 1.2
Minimum load impedance			Ω	–	48
Filter time	Default		ms	4	–
	Configurable		ms	0.1….7.5 (at intervals of 0.5)	–
Response time (2)			ms	–	0.6
Type of input				Current sink	–
Paralleling of inputs (3)				Yes	–
Switching frequency on inductive load			Hz	–	0.5/LF
IEC 1131-2 conformity				Yes type 1	–
Built-in protection	Against overvoltages			–	Yes, by transil diode
	Against inversions			–	Yes, by inverted diode. Fuse required on + 24 V of preactuators
	Against short-circuits and overloads		ms	–	15
Compatibility	2-wire proximity sensor			Yes (Telemecanique sensor and < 1.5 mA leakage current)	–
	3-wire proximity sensor			Yes	–
Preactuator voltage detection threshold			V	–	16
Isolation resistance			MΩ	> 10 at ⎓ 500 V	
Dielectric strength				1500 V rms - 50/60 Hz for 1 minute	
Consumption 5 V				See page 43605/2	
Consumption 24 V	Sensor	Typical	mA	20	–
		Maximum	mA	30	–
	Preactuators		mA	–	See page 43605/2
Dissipated power			W	1.2 + 0.1 x no. of inputs at 1	–
Nominal power	Dissipated		W	–	1
	Per output x module current		W	–	+ (0.75)
Temperature derating	Characteristics at 60 °C			Ensured for 60 % of inputs at state 1	Ensured for 60 % of the maximum current of the module

(1) 34 V possible for 1 hour in every 24 hour period
(2) All outputs are equipped with an electro-magnet rapid demagnetisation circuit. Discharge time for electro-magnets < L/R
(3) This characteristic enables several inputs to be wired in parallel on the same module, or on different modules for input redundancy

Discrete I/O modules

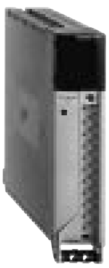
References

Characteristics :
pages 43520/5 to 43520/8
Connections :
pages 43520/11 to 43520/13

TSX DEY 08D2

TSX DEY 16FK

TSX DEY 32D3K



TSX DSY 16T2

TSX DSY 64T2K

Discrete input modules (screw terminal block not supplied)

Type of current	Input voltage	Connection (1)	IEC 1131-2 conformity	Modularity (no. of channels)	Reference (2)	Weight kg
⎓	24 V (pos. log.)	Screw terminal block	Type 2	8 isolated inputs	**TSX DEY 08D2**	0.300
				16 isolated inputs	**TSX DEY 16D2**	0.300
	48 V (pos. log.)	Screw terminal block	Type 2	16 isolated inputs	**TSX DEY 16D3**	0.300
	24 V (pos. log.)	HE 10 connector	Type 1	16 isolated fast inputs (3)	**TSX DEY 16FK**	0.300
				32 isolated inputs	**TSX DEY 32D2K**	0.300
				64 isolated inputs	**TSX DEY 64D2K**	0.370
	24 V (neg. log.)	Screw terminal block	Type 2	16 isolated inputs	**TSX DEY 16A2**	0.310
	48 V (pos. log.)	HE 10 connector	Type 2	32 isolated inputs	**TSX DEY 32D3K**	0.310
∼ **50/60 Hz**	24V	Screw terminal block	Type 2	16 isolated inputs	**TSX DEY 16A2**	0.310
	48 V	Screw terminal block	Type 2	16 isolated inputs	**TSX DEY 16A3**	0.320
	100…120 V	Screw terminal block	Type 2	16 isolated inputs	**TSX DEY 16A4**	0.320
	200…240 V	Screw terminal block	Type 2	16 isolated inputs	**TSX DEY 16A5**	0.360

Discrete output modules (screw terminal block not supplied)

Type of current	Output voltage	Connection (1)	IEC 1131-2 conformity	Modularity (no. of channels)	Reference (2)	Weight kg
⎓ **solid state**	24 V/0.5 A (pos. log.)	Screw terminal block	Yes	8 protected outputs	**TSX DSY 08T2**	0.320
	24 V/2 A (pos. log.)	Screw terminal block	Yes	8 protected outputs	**TSX DSY 08T22**	0.410
	24 V/0.5 A (pos. log.)	Screw terminal block	Yes	16 protected outputs	**TSX DSY 16T2**	0.340
	48 V/1 A (pos. log.)	Screw terminal block	Yes	8 protected outputs	**TSX DSY 08T31**	0.320
	48 V/0.25 A (pos. log.)	Screw terminal block	Yes	16 protected outputs	**TSX DSY 16T3**	0.340
	24 V 0.1 A/chan. (pos. log.)	HE 10 connector	Yes	32 protected outputs	**TSX DSY 32T2K**	0.300
				64 protected outputs	**TSX DSY 64T2K**	0.360
⎓ **or** ∼ **relay**	⎓ 24 V 3 A. ∼ 24 to 240 V/3 A	Screw terminal block	Yes	8 outputs, not protected	**TSX DSY 08R5**	0.330
				16 outputs, not protected	**TSX DSY 16R5**	0.380
	⎓ 24 to 48 V/5 A, ∼ 24 to 240 V/5 A	Screw terminal block	Yes	8 protected outputs	**TSX DSY 08R5A**	0.420
⎓ **relay**	24...120 V 5 A	Screw terminal block	Yes	8 protected outputs	**TSX DSY 08R4D**	0.370
∼ **triac**	24...120 V 1 A/channel	Screw terminal block	Yes	16 outputs, not protected	**TSX DSY 16S4**	0.380
	48...240 V 1 A/channel	Screw terminal block	Yes	16 protected outputs	**TSX DSY 16S5**	0.310
	48...240 V 2 A/channel	Screw terminal block	Yes	8 protected outputs	**TSX DSY 08S5**	0.340

(1) By connector : module supplied with cover. By screw terminal block : module supplied without connection block.
(2) Multilingual Discrete I/O Quick Reference Guide included with each **TSX P57 ●0M** processor. **TSX DM 57●** installation manual to be ordered separately (see page 43900/2).
(3) Module with isolated fast inputs (filtering from 0.1 to 7.5 ms) which can activate the event task.

Premium automation platform

Discrete I/O modules

References (continued)

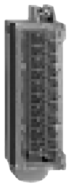
Characteristics :
pages 43520/5 to 43520/8
Connections :
pages 43520/11 to 43520/13

Discrete I/O modules


TSX DMY 28FK/28RFK

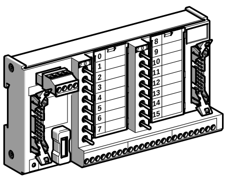
Number of I/O	Connection (1)	No. and type of inputs	No. and type of outputs	IEC 1131-2 conformity	Reference (2)	Weight kg
28	HE 10 connector	16 fast ⎓ 24 V (pos.log.) (3)	12, solid state ⎓ 24 V/0.5A protected	Input, type 1 Output, yes	**TSX DMY 28FK**	0.320
			12 reflex or time-delayed ⎓ 24 V/0.5 A protected	Input, type 1	**TSX DMY 28RFK**	0.350

Connection terminal block


TSX BLY 01

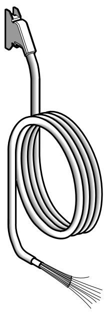
Description	Use	Reference	Weight kg
Screw connection terminal block 20-way	To be ordered separately with each I/O module with screw terminal block connection	**TSX BLY 01**	0.100

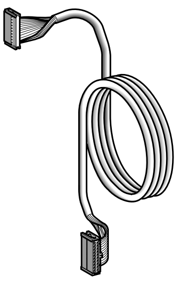
Simulator sub-base

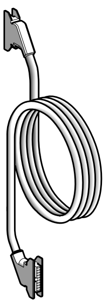

ABE-7TES160

Description	Use	Reference	Weight kg
16-channel Telefast 2 simulator sub-base for discrete I/O	Comprises 2 HE 10 connectors which allow it to be inserted between the PLC I/O module and the Telefast I/O sub-base ABE-7H/P/R/S. Enables display, forcing, inhibiting or continuity of discrete I/O	**ABE-7TES160**	0.350

Connecting cables for I/O modules fitted with HE 10 connectors


TSX CDP ●01


TSX CDP ●02


TSX CDP ●03

Description	Constitution Use	Length	Section	Reference	Weight kg
20-wire pre-formed cable	1 HE 10 connector with colour coded flying leads	3 m	0.324 mm²	**TSX CDP 301**	0.400
		5 m	0.324 mm²	**TSX CDP 501**	0.660
		10 m	0.324 mm²	**TSX CDP 1001**	1.210
Rolled ribbon connecting cable	2 HE 10 connectors for Telefast 2 system	1 m	0.08 mm²	**TSX CDP 102**	0.090
		2 m	0.08 mm²	**TSX CDP 202**	0.170
		3 m	0.08 mm²	**TSX CDP 302**	0.250
Connecting cables	2 HE 10 connectors for Telefast 2 system	0.5 m	0.324 mm²	**TSX CDP 053**	0.085
		1 m	0.324 mm²	**TSX CDP 103**	0.150
		2 m	0.324 mm²	**TSX CDP 203**	0.280
		3 m	0.324 mm²	**TSX CDP 303**	0.410
		5 m	0.324 mm²	**TSX CDP 503**	0.670

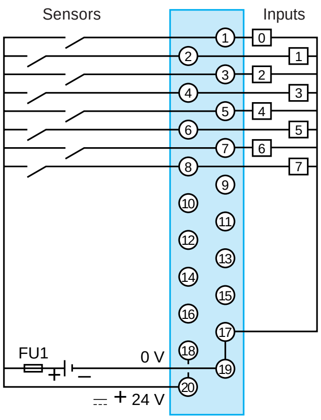
(1) By connector : module supplied with cover.
(2) Multilingual discrete I/O Quick Reference Guide included with each Premium processor. TSX DM 57 2● installation manual to be ordered separately (see page 43900/2).
(3) Module with isolated fast inputs (filtering from 0.1 to 7.5 ms) which can activate the event task.

Discrete I/O modules

Connections

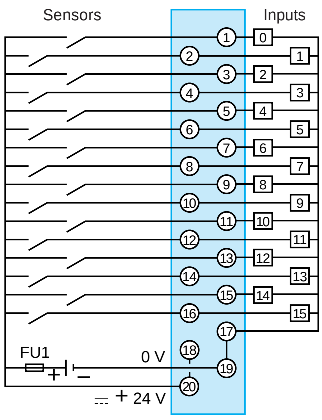
Characteristics :
pages 43520/5 to 43520/8
References :
pages 43520/9 and 43520/10

TSX DEY 08D2



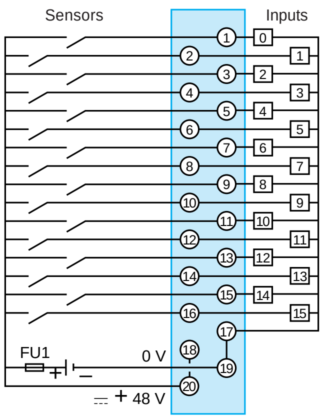
FU1 : 0.5 A fast-blow fuse

TSX DEY 16D2



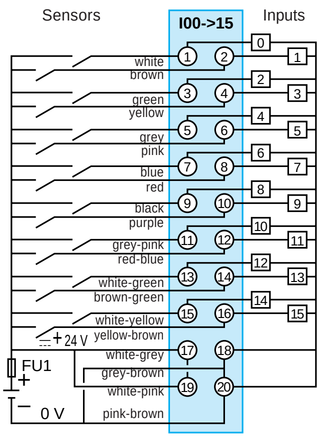
FU1 : 0.5 A fast-blow fuse

TSX DEY 16D3



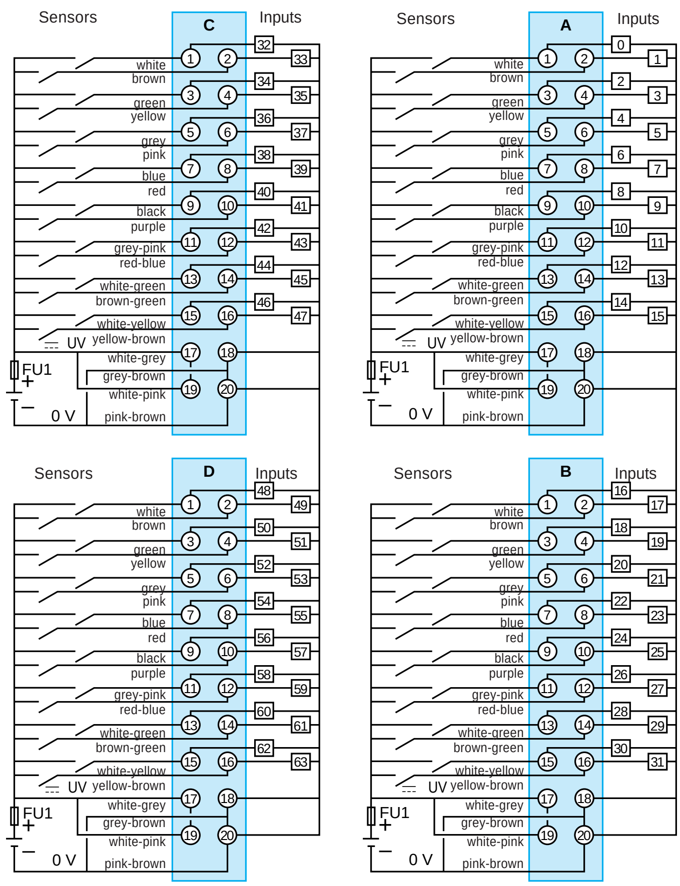
FU1 : 0.5 A fast-blow fuse

TSX DEY 16FK



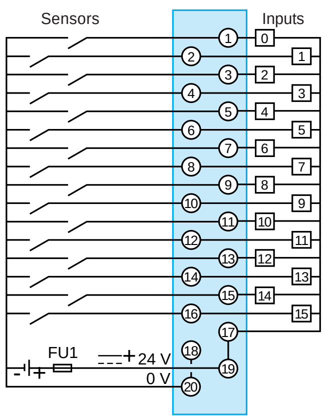
FU1 : 0.5 A fast-blow fuse

TSX DEY 32D2K/64D2K/32D3K



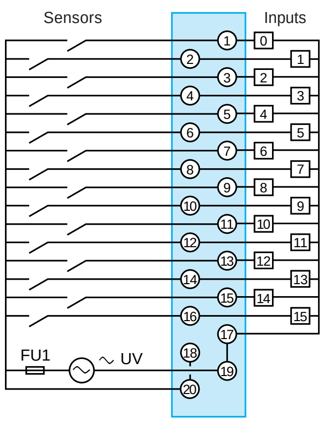
FU1 : 0.5 A fast-blow fuse

TSX DEY 16A2 (negative logic)



FU1 : 0.5 A fast-blow fuse

TSX DEY 16A2/16A3/16A4/16A5



UV : ~ 24 V for TSX DEY 16A2
~ 48 V for TSX DEY 16A3
~ 110 V for TSX DEY 16A4
~ 220 V for TSX DEY 16A5
FU1 : 0.5 A fast-blow fuse

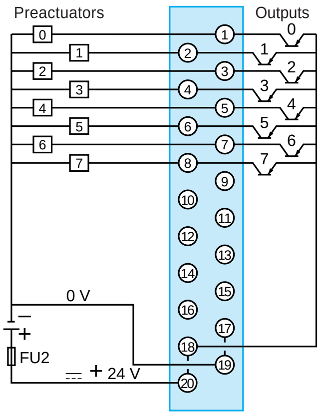
	UV	A	B	C	D
TSX DEY 32D2K	⎓ 24V	I00 ➜ 15	I16 ➜ 31	–	–
TSX DEY 32D3K	⎓ 48V	I00 ➜ 15	–	I32 ➜ 47	–
TSX DEY 64D2K	⎓ 24V	I00 ➜ 15	I16 ➜ 31	I32 ➜ 47	I48 ➜ 63

Discrete I/O modules

Connections (continued)

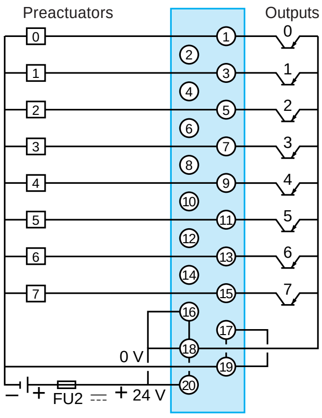
Characteristics :
pages 43520/5 to 43520/8
References :
pages 43520/9 and 43520/10

TSX DSY 08T2



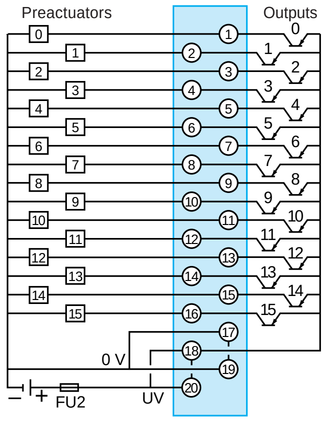
FU2 : 6.3 A fast-blow fuse

TSX DSY 08T22



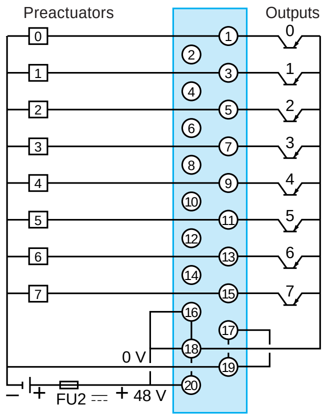
FU2 : 16 A fast-blow fuse

TSX DSY 16T2/16T3



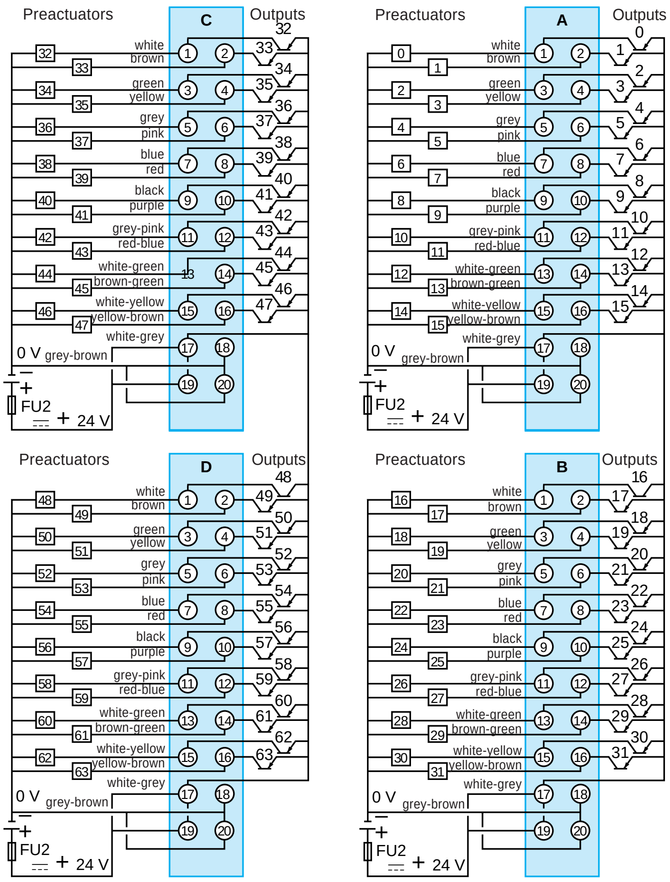
UV : ⎓ 24 V for TSX DSY 16T2
⎓ 48 V for TSX DSY 16T3
FU2 : fast-blow fuse
6.3 A for TSX DSY 16T2
10 A for TSX DSY 16T3

TSX DSY 08T31



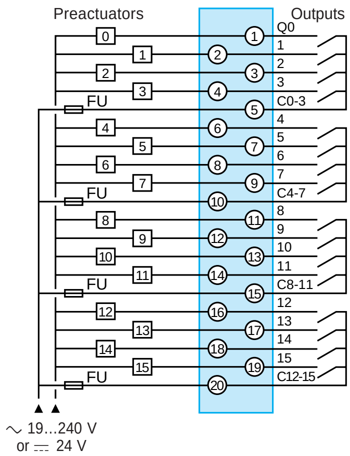
FU2 : 10 A fast-blow fuse

TSX DSY 32T2/64T2K



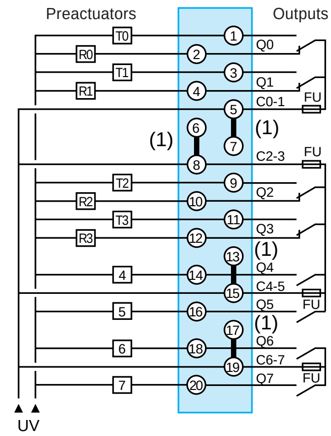
FU2 : 2 A fast-blow fuse

TSX DSY 08R5/16T5



FU : fuse to be rated according to load
For protection of integrated outputs, see page 43520/5

TSX DSY 08R5/08R4D



UV : ~ 19…240 V or ⎓ 19…60 V
for TSX DSY 08R5A
⎓ 24…130 V for TSX DSY 08R4D
FU : 6.3 A fast-blow fuse
(1) Connection must be made for
⎓ 24 V or ~ 24 V power supply

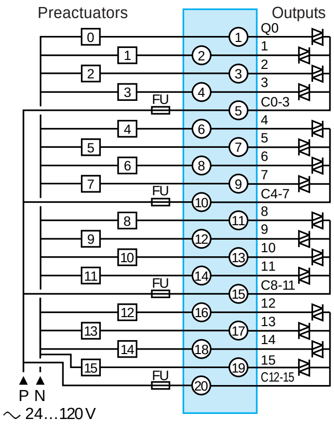
	A	B	C	D
TSX DSY 32T2K	Q00 → 15	Q16 → 31	–	–
TSX DSY 64T2K	Q00 → 15	Q16 → 31	Q32 → 47	Q48 → 63

Discrete I/O modules

Connections (continued)

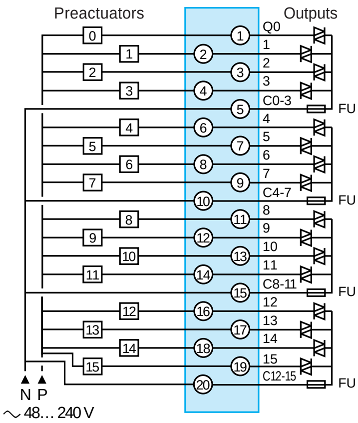
Characteristics :
pages 43520/5 to 43520/8
References :
pages 43520/9 and 43520/10

TSX DSY 16S4



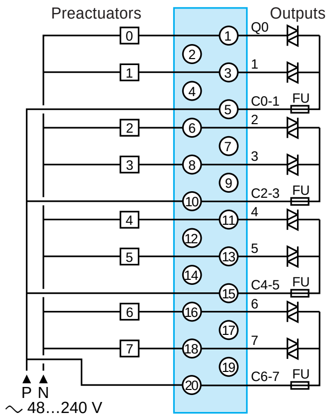
FU : 6.3 A fast-blow fuse

TSX DSY 16S5



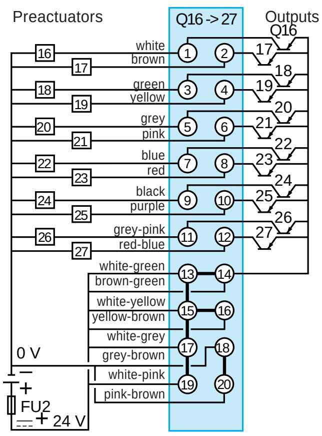
FU : interchangeable 5A fast-blow fuse

TSX DSY 08S5

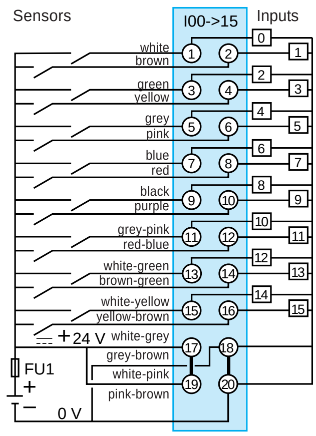


FU : interchangeable 5A fast-blow fuse

TSX DMY 28FK/28RFK



FU2 : 2A fast-blow fuse



FU1 : 0.5A fast-blow fuse