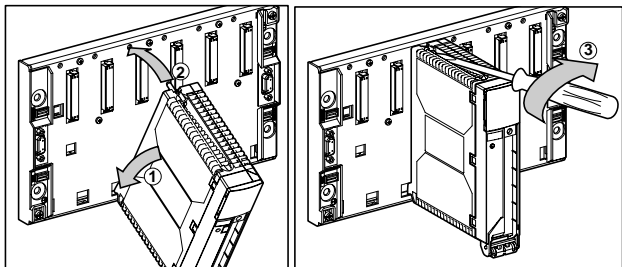


Installing the Module in a PLC Station Rack

• Mounting in the Rack

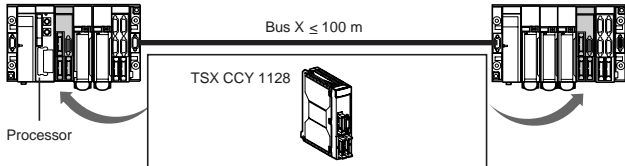
The TSX CCY 1128 module can be mounted in any of the available slots in a TSX RKY •• rack on a TSX57/PMX57/PCX/PCI57 PLC station, except for the slots specifically for the power supply and processor modules. This single format module occupies a slot on the rack. The mounting procedure is identical to that of the Premium range standard format module, as shown in the diagram below.



• Mounting the Module in the PLC Station

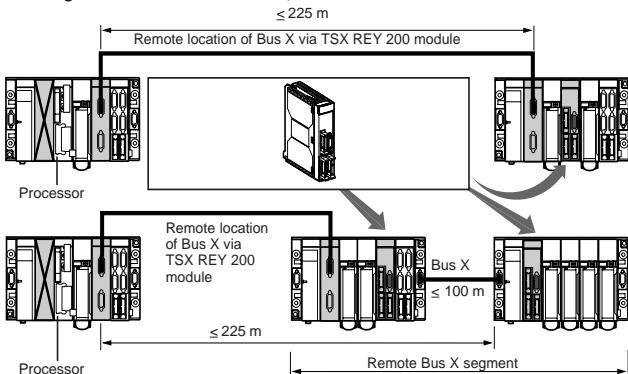
The TSX CCY 1128 module can be installed in any of the racks in a PLC station:

- Installation on a rack belonging to the main Bus X segment (segment on which the rack which supports the processor is installed)



- Installation on a rack belonging to a remote Bus X segment via a TSX REY 200 module (see diagram on next page).

Installing the Module in a PLC Station, continued



Installation Recommendations

- **Inserting and Removing a Module**

A module can be inserted or removed without switching off the rack power supply.

- **Plugging and Unplugging Connectors on the Front Panel of the Module**

It is not advisable to plug or unplug the connectors located on the front panel of the module if the sensor/preactuator power supplies are switched on.

- **Maximum Tightening Torque of the Fixing Screw**

- module fixing screw on the rack: 2.0 N.m maximum
- 15-pin SUB D connector fixing screw: 0.5 N.m

General Wiring Instructions

- **Cross-Section of Wires**

This must be sufficient to prevent any line voltage drops and overheating.

- **Cable Routing**

The connection cables of the encoders, sensors and preactuators must be kept away from any source of radiation caused by the switching of high power electrical circuits which could cause malfunctions.

- **Encoder Signal Connection Cables**

- They must be shielded using good quality shielding.
- They must only carry signals relating to the encoder.
- The cable shielding must be connected to the machine ground on the module side and the encoder side.
- There must be electrical continuity over the whole connection.

Selection and Protection of the Auxiliary Power Supplies

The encoders, sensors and preactuators associated with the module require the use of auxiliary power supplies (5 VDC and/or 24 VDC).

• Type of Power Supply

Only regulated power supplies should be used which have a sufficiently long period of independent operation (≥ 10 ms) to deal with mains supply micro-cuts.

• Protection of Power Supplies

The power supplies must be protected against overloads and short-circuits by fast-blow fuses of the appropriate rating.

• Machine Grounding of the 0V

The 0V of the power supplies must be machine grounded as close as possible to the power supply output.

• Encoder Power Supply

- It must only be used for supplying the encoder.
- It must be placed as close as possible to the TSX CCY 1128 module in order to reduce the coupling capacities as much as possible.

Choice of Encoder

The inputs of TSX CCY 1128 modules can receive signals from an encoder, which may be:

- An incremental encoder.
- An SSI serial output absolute encoder.
- A parallel output absolute encoder. The last type requires the use of a special TELEFAST interface (ABE-7CPA11).

• Encoder Output Interfaces

Type of encoder	Supply voltage	Output voltage	Type of interface
Incremental	5 VDC	5VDC differential	Standard RS 422 line emitter outputs with 2 outputs per signal A+/A-, B+/B-, Z+/Z-
		10...30VDC	Totem Pole outputs with one output per signal A, B, Z
Absolute with SSI outputs	10...30VDC	5VDC differential	Standard RS 422 line emitter outputs for the data signal (SSI data) RS 422 compatible input for the clock signal (SSI CLK)
Absolute with parallel outputs	5VDC or 10...30VDC	5VDC or 10...30VDC	Parallel outputs. Require the use of the ABE-7CPA11 Telefast interface to convert the parallel output signals to serial signals.

Choice of Encoder, continued**Encoder Power Supply**

The design of the module enables the encoder to be supplied with either of the following:

- 5VDC
- 24 VDC, standard voltage in the range 10...30VDC

The choice of supply voltage depends on the supply voltage of the encoder.

5VDC Encoder Power Supply


The line voltage drop must be taken into account. This depends on:

- The length of the cable between the module and the encoder (length in both directions)
- The cross-section of the wire
- The consumption of the encoder

The voltage drop permitted by the encoder is generally 10% of the nominal voltage.

Voltage drop depending on the cross-section and length of wire (loop-back distance)

Wire cross-section	Voltage drop for a 100 meter length wire and an encoder consumption of:			
	50 mA	100 mA	150 mA	200 mA
0.22 mm ² = 24 gauge	0.4V	-	-	-
0.34 mm ² = 22 gauge	0.25V	0.5V	-	-
0.5 mm ²	0.17V	0.34V	0.51V	-
1 mm ²	0.09V	0.17V	0.24V	0.34V

 It is dangerous to increase the encoder supply voltage to compensate for a line voltage drop. If there is a load break, this may result in an overvoltage on the module inputs and damage them.

Electrical Continuity

To ensure correct operation in an environment which is subject to interference, it is essential to do the following:

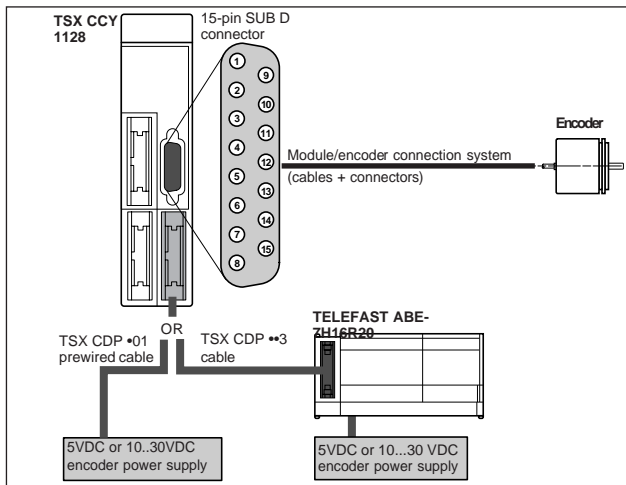
- Select an encoder whose metal casing is referenced to the machine ground of the connected device.
- Ensure that there is electrical continuity between the encoder, the connection cable shielding and the module.

Incremental or SSI Absolute Encoder

The 15-pin SUB D connector, located on the module front panel, connects the module to the encoder. The following pass via this connector:

- All signals from and to the encoder.
- The encoder power supply source, which is itself connected to the HE10 connector:
 - either via an ABE-7H16R20 TELEFAST wiring interface,
 - or directly via a TSX CDP •01 prewired cable.

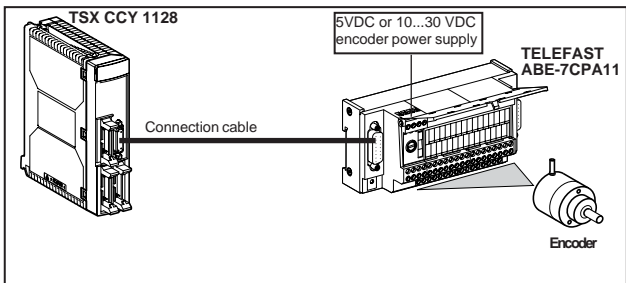
The design of the module enables the encoder to be supplied with either 5VDC or 10...30 VDC.



Absolute Encoder with Parallel Outputs

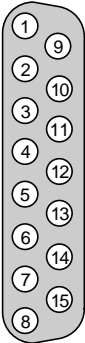
The 15-pin SUB D connector, located on the module front panel connects the module to the encoder via a TELEFAST ABE-7CPA11 sub-base.

- The sub-base receives:
 - All parallel signals from the encoder
 - The 5VDC or 10...30 VDC encoder power supply source
- The sub-base returns to the module:
 - The encoder signals in the form of RS 422 standard serial signals.



Note: As this type of encoder is seldom used, its connection to the TSX CCY 1128 module is only documented in the TSX CCY 1128 module setup manual - reference 35001387 - Chapter 7.

Pinout of the Module 15-pin SUB D Connector

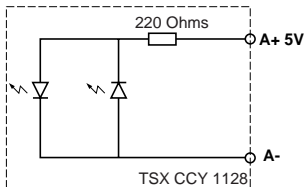
Diagram (view from the front)	Pin no.	Signal	Description
	1	A+5V	Encoder input, pulse A+ (5VDC)
	2	A-	Encoder input, pulse A-
	3	-	-
	4	Z+5V	Encoder input, zero marker pulse Z+ (5 VDC)
	5	Z-	Encoder input, zero marker pulse Z-
	6	-	-
	7	10...30 V	Encoder power supply output (+ 10...30 VDC)
	8	0V	Encoder power supply output (- 0 VDC)
	9	-	-
	10	B+5V	Encoder input, pulse B+ (5 VDC)
	11	B-	Encoder input, pulse B-
	12	-	-
	13	EPSR	Encoder power supply return + input.
	14	-	-
	15	5V	Encoder power supply output (+5 VDC)

Equivalent Circuit Diagram of Module Encoder Inputs A, B and Z

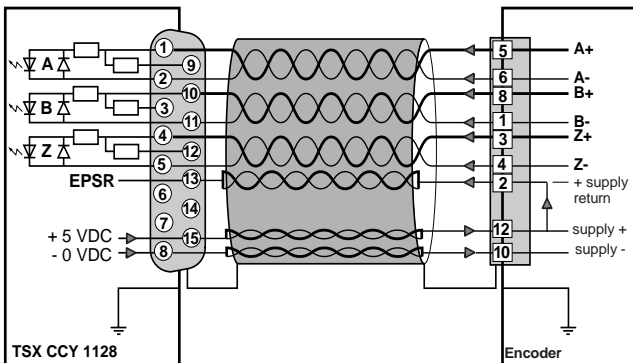
This diagram shows the equivalent circuit diagram of encoder input A, B or Z used with an incremental encoder which has:

- A line emitter output stage
- A 5VDC standard RS 422 output voltage

Note: Each A, B and Z input has a differential line check.



Connection Diagram

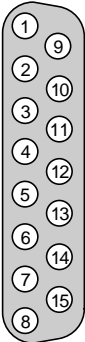


Recommendations

- Using a twisted pair:
 - Connect each encoder signal A+/A-, B+/B-, Z+/Z-.
 - Connect each power supply point in order to reduce line voltage drops.
- Connect the cable shielding to the machine ground at both ends.

⚠ Before connecting the encoder to the module, check the pinout given by the encoder manufacturer. Failure to follow this recommendation may result in damage to the encoder and the module.

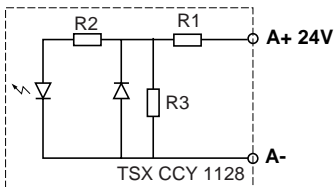
Pinout of the Module 15-pin SUB D Connector

Diagram (view from the front)	Pin no.	Signal	Description
	1	-	-
	2	A-	Encoder input, pulse A-
	3	B+24V	Encoder input, pulse B+ (10...30VDC)
	4	-	-
	5	Z-	Encoder input, zero marker pulse Z-
	6	-	-
	7	10...30 V	Encoder power supply output (+10...30 VDC)
	8	0V	Encoder power supply output (-0 VDC)
	9	A+24V	Encoder input, pulse A+ (10...30VDC)
	10		
	11	B-	Encoder input, pulse B-
	12	Z+24V	Encoder input, pulse Z+ (10...30VDC)
	13	EPSR	Encoder power supply return + input
	14	-	-
	15	5V	Encoder power supply output (+5 VDC)

Equivalent Circuit Diagram of Module Encoder Inputs A, B and Z

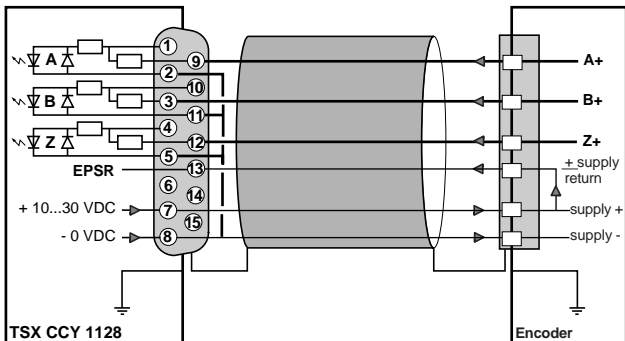
The following diagram shows the equivalent circuit diagram of encoder input A, B or Z used with an incremental encoder which has:

- A Totem Pole output stage
- A 10...30 VDC output voltage



Note: Differential mounting is not possible. The - pole of each input (A-, B- and Z-) must be linked to the encoder 0V, and the + inputs (A+, B+ and Z+) to encoder outputs A+, B+, Z+.

Connection Diagram

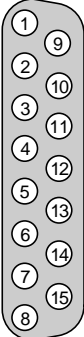


Recommendations

- Connect the module EPSR input to the encoder supply + if the encoder does not have an EPSR output.
- Connect the cable shielding to the machine ground at both ends.

⚠ Before connecting the encoder to the module, check the pinout given by the encoder manufacturer. Failure to follow this recommendation may result in damage to the encoder and the module.

Pinout of the Module 15-pin SUB D Connector

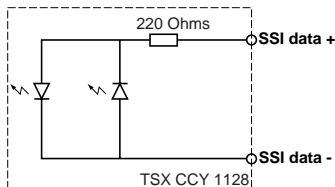
Diagram (view from the front)	Pin no.	Signal	Description
	1	SSI data+	Encoder input, SSI data + (5 VDC)
	2	SSI data-	Encoder input, SSI data-
	3	-	-
	4	-	-
	5	-	-
	6	SSI CLK+	Encoder output, SSI CLK + (5VDC)
	7	10...30V	Encoder power supply output (+10...30 VDC)
	8	0V	Encoder power supply output (-0 VDC)
	9	-	-
	10	-	-
	11	-	-
	12	-	-
	13	EPSR	Encoder power supply return + input
	14	SSI data-	Encoder output, SSI CLK -
	15	5V	Encoder power supply output (+5 VDC)

Equivalent Circuit Diagram of Module Encoder Inputs A, B and Z

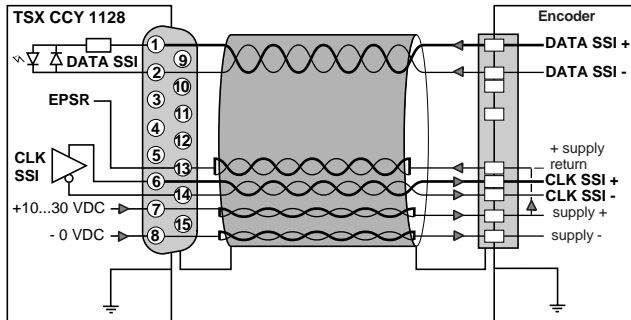
This diagram gives the equivalent circuit diagram of an SSI data input used with an SSI absolute encoder which has:

- A line emitter output stage
- A standard RS 422/RS 485 5VDC output voltage

Note: The SSI data input has a differential line check.



Connection Diagram



Recommendations

- Using a twisted pair:
 - Connect each encoder signal (SSI data, SSI CLK, EPSR).
 - Connect each power supply point in order to reduce line voltage drops.
- Connect the module EPSR input to the encoder power supply + if the encoder does not have an EPSR output.
- Connect the cable shielding to the machine ground at both ends.

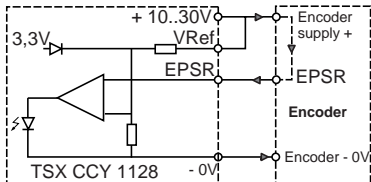
⚠ Before connecting the encoder to the module, check the pinout given by the encoder manufacturer. Failure to follow this recommendation may result in damage to the encoder or the module.

Principle

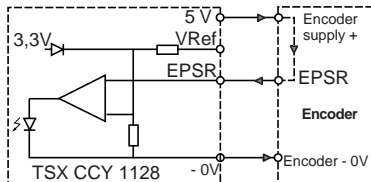
The EPSR input signal from the encoder is compared with:

- Either a fixed voltage of 3.3 V generated internally, if the VRef input is not connected,
- Or a voltage equal to 66% of the voltage applied at the Vref input, + pole of the encoder supply voltage.

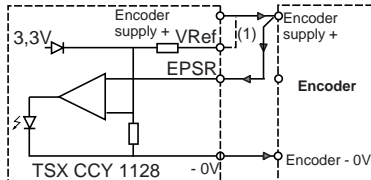
• Connection Diagram if the Encoder is Supplied with 10...30 V



• Connection Diagram if the Encoder is Supplied with 5 V



• Connection Diagram if the Encoder does not have a Power Supply Return



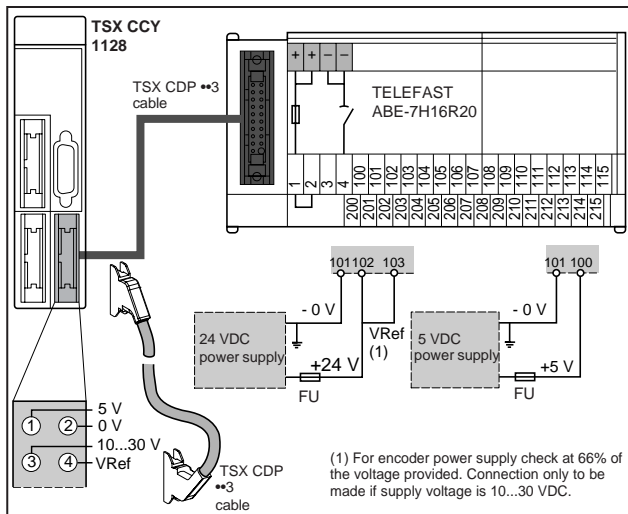
(1) Connection to be made if the encoder is supplied with 10...30V

Connection Diagrams

The encoder power supply is connected:

- Either via a TELEFAST ABE-7H16R20 wiring interface, which is itself connected to the module via a TSX CDP ••3 cable,
- Or directly via a TSX CDP •01 prewired cable.

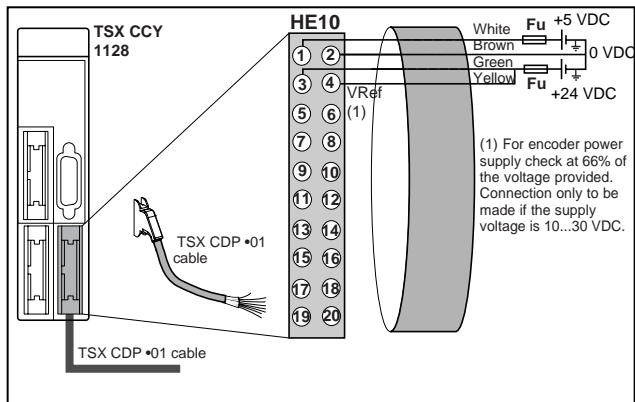
Connection Diagram for the Encoder Power Supply via a TELEFAST Interface



Catalog of TSX CDP ••3 connection cables

Cable reference	Length
TSX CDP 053	0.5 meters
TSX CDP 103	1 meter
TSX CDP 203	2 meters
TSX CDP 303	3 meters
TSX CDP 503	5 meters

Power Supply Connection Diagram using Prewired Cable TSX CDP •01



Catalog of TSX CDP •01 connection cables

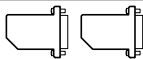
Cable reference	Length
TSX CDP 301	3 meters
TSX CDP 501	5 meters

Recommendations

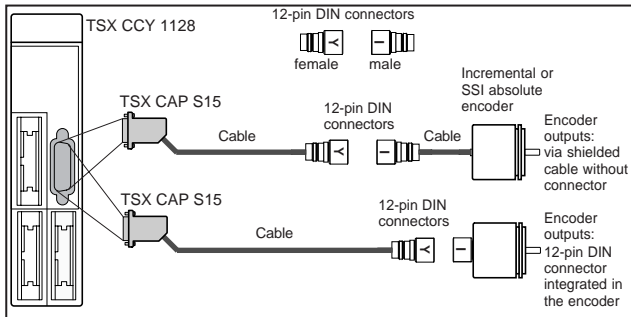
- Maximum length of the wires between the power supply outputs and the connection points on the TELEFAST: must be less than 0.5 meter.
- Protection on the power supply + : It is essential to install a 1A fast-blow fuse (Fu) on the power supply +.
- Machine grounding of the power supply 0V: This must be done as close as possible to the power supply output.

TSX CAP S15 Accessory

The kit consists of two 15-pin SUB D connectors which can be used to provide the interface for connecting the module to the encoder connection system.



• Integration of the 15-pin SUB D Connector in the Connection System

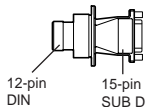


TSX TAP S1505/S1524 and TSX CCP S15• Accessories

• Presentation

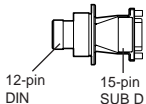
TSX TAP S1505 Accessory

- Function: Mechanical interface, equipped with two connectors which convert a 15-pin SUB D connector to a 12-pin DIN connector.
- Use: Can be used in the module/encoder connection system to connect an RS 422 output incremental encoder supplied with 5 VDC.



TSX TAP S1524 Accessory

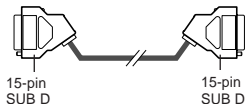
- Function: Mechanical interface, equipped with two connectors which convert a 15-pin SUB D connector to a 12-pin DIN connector.
- Use: Can be used in the module/encoder connection system to connect a Totem Pole output encoder supplied with 24 VDC.



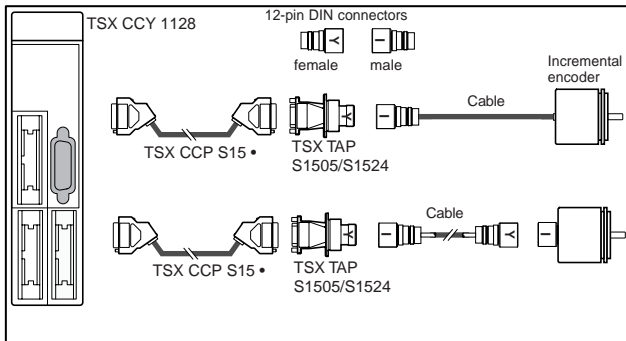
TSX TA S1505/S1524 and TSX CCP S15• Accessories, continued

TSX CCP S15• Accessory

- Function: Connection cable with 24 gauge wires and a 15-pin SUB D connector at both ends.
- Use: Can be used in the module/encoder connection system to connect the module to the TSX TAP S1505 or TSX TAP S1524.

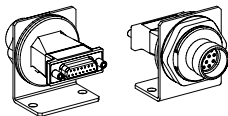


• Integration of the TSX TAP S1505/ S1524 and TSX CCP S15• Accessories in the Connection System



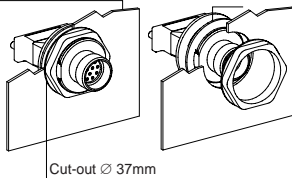
• Mounting the TSX TAP S1505 / TAP S1524 Accessories

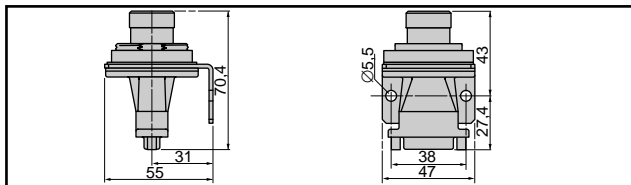
Mounting on Telequick plate AM1-PA•



Mounting in enclosure feedthrough

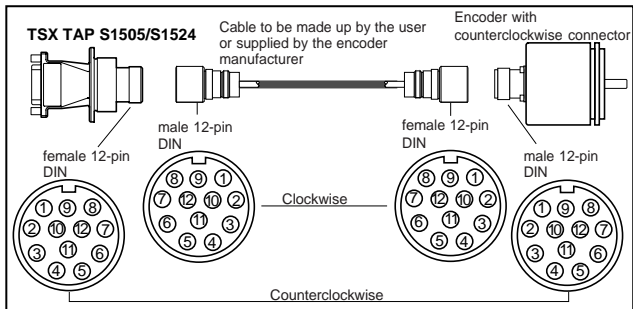
Max. thickness = 5mm



TSX TA S1505/S1524 and TSX CCP S15• Accessories, continued
• Dimensions of the TSX TAP S1505 / TAP S1524 Accessories

• Clockwise and Counterclockwise Direction of the 12-pin DIN Connectors in the Connection System

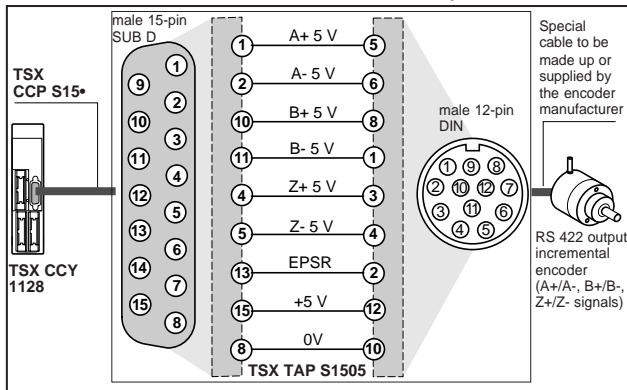
For ease of connection, the numbers of the pins on the 12-pin DIN connectors in the connection system must correspond exactly. For this, the pinout of these connectors must be:

- Clockwise for connectors which belong to the cable connecting the TSX TAP S1505/S1524 accessory to the encoder
- Counterclockwise for connectors which belong to the encoder and to the TSX TAP S1505/S1524 accessory

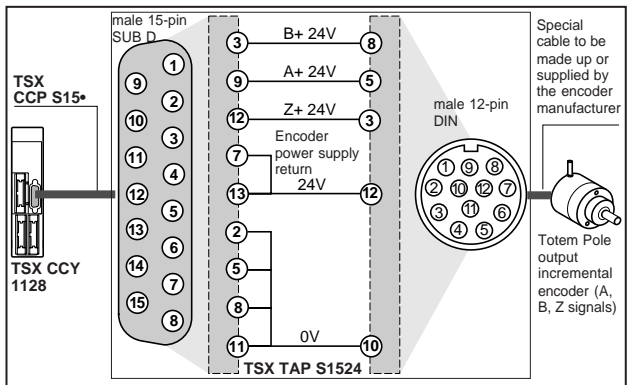


TSX TA S1505/S1524 and TSX CCP S15• Accessories, continued

• Pinout of the Connectors on the TSX TAP S1505 Accessory

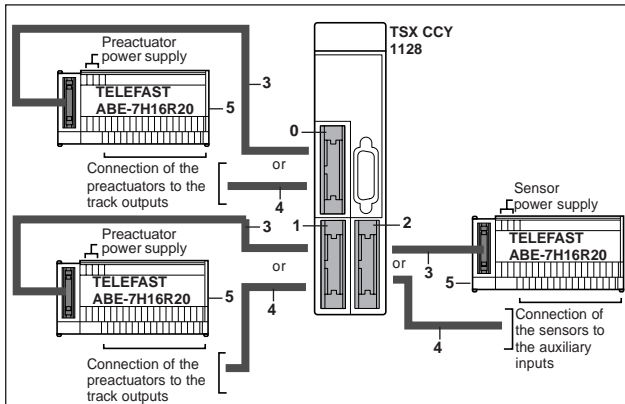


• Pinout of the Connectors on the TSX TAP S1524 Accessory



System for Connecting the Auxiliary Inputs and the Track Outputs

The following diagram illustrates the principle of the system for connecting the auxiliary inputs and track outputs.



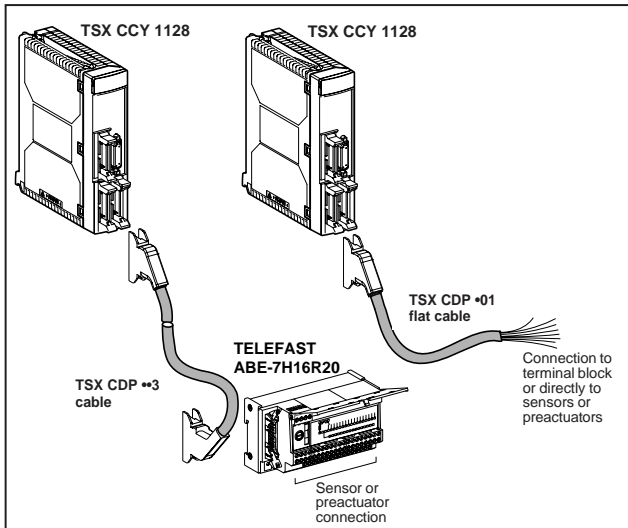
• Elements and Their Functions

Number	Element	Function
0	20-pin HE10 connector	Connects the preactuators controlled by the group 0 and 1 track outputs and their power supply
1	20-pin HE10 connector	Connects the preactuators controlled by the group 2 and 3 track outputs and their power supply
2	20-pin HE10 connector	Connects the auxiliary input sensors and their power supply as well as the encoder power supply
3	TSX CDP ••3 cables	Connect the module to the TELEFAST sub-base. .TSX CDP 053: 0.5 meters, TSX CDP 103: 1 meters, TSX CDP 203: 2 meters, TSX CDP 303: 3 meters, TSX CDP 503: 5 meters
4	TSX CDP •01 flat cables	Connect the module I/O directly to the sensors and preactuators. TSX CDP 301: 3 meters, TSX CDP 501: 5 meters
5	TELEFAST ABE-7H16R20 sub-bases	Used to convert an HE10 connector to a screw terminal connector, for quick connection of sensors and preactuators

• **Connection Accessories**

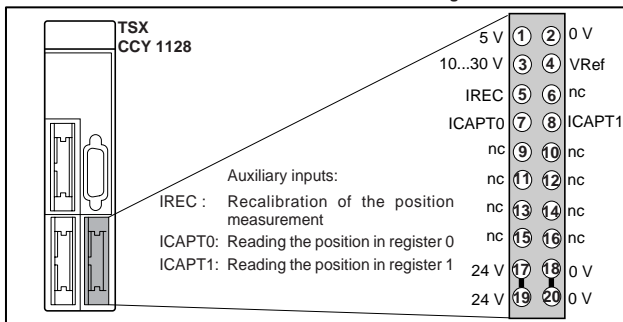
The sensors are connected to the auxiliary inputs and the preactuators to the track outputs in the following way:

- Either via a TELEFAST ABE-7H16R20 sub-base and TSX CDP **3 cable (recommended system),
- Or directly using a TSX CDP *01 flat cable.

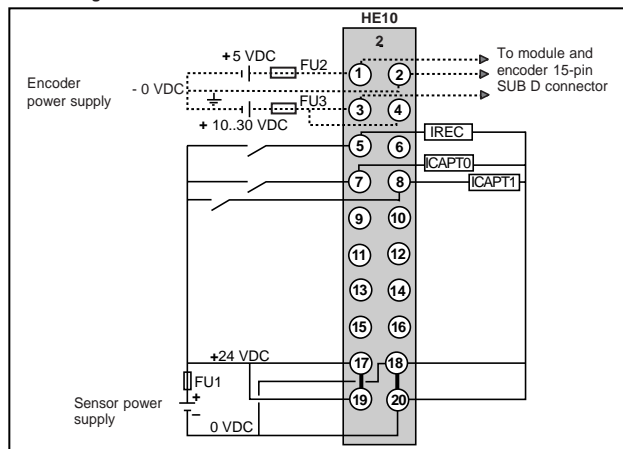


Connecting the Auxiliary Inputs

• Position of the HE10 Connector and Identification of the Signals

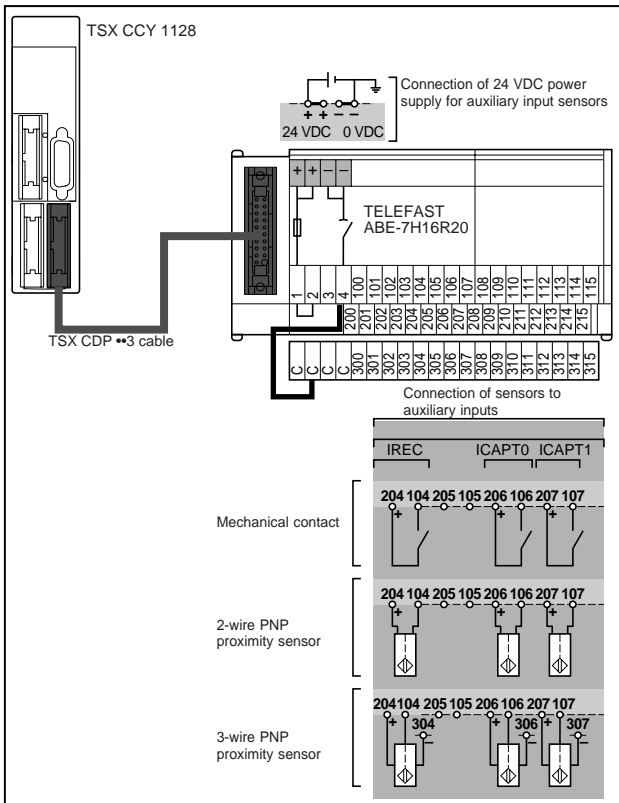


• Circuit Diagram



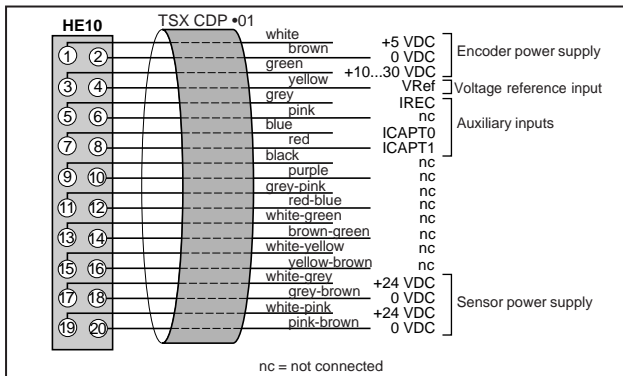
Connecting the Auxiliary Inputs, continued

• Connection Using TELEFAST Sub-Base and TSX CDP ••3 Cable



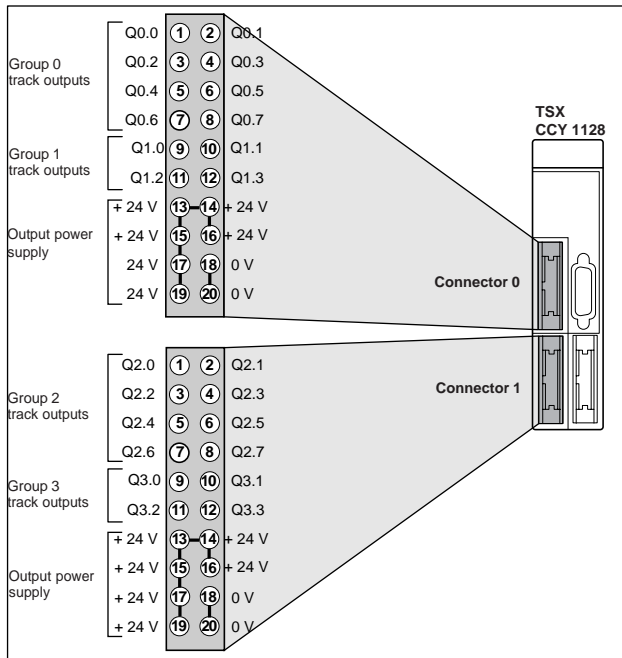
Connecting the Auxiliary Inputs, continued

• Connection Using TSX CDP •01 Flat Cable



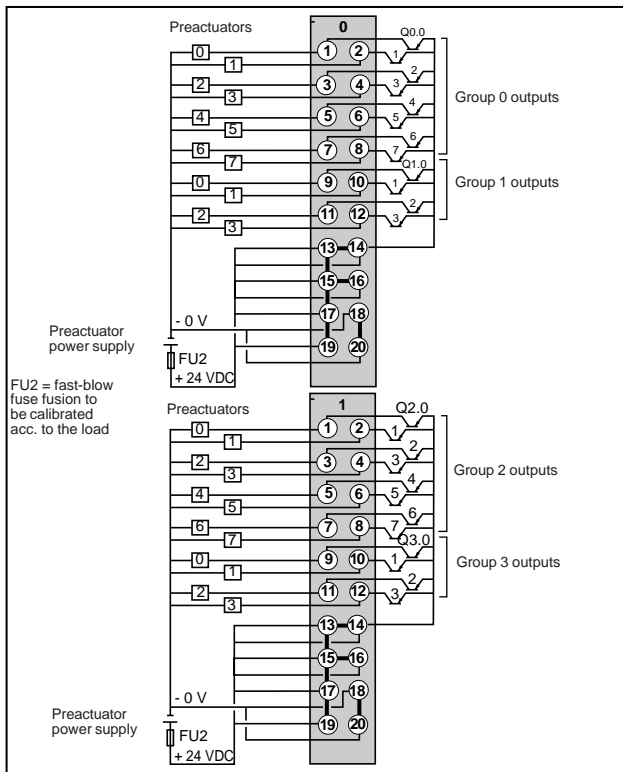
Connecting the Track Outputs

• Position of the HE10 Connectors and Identification of the Signals



Connecting the Track Outputs, continued

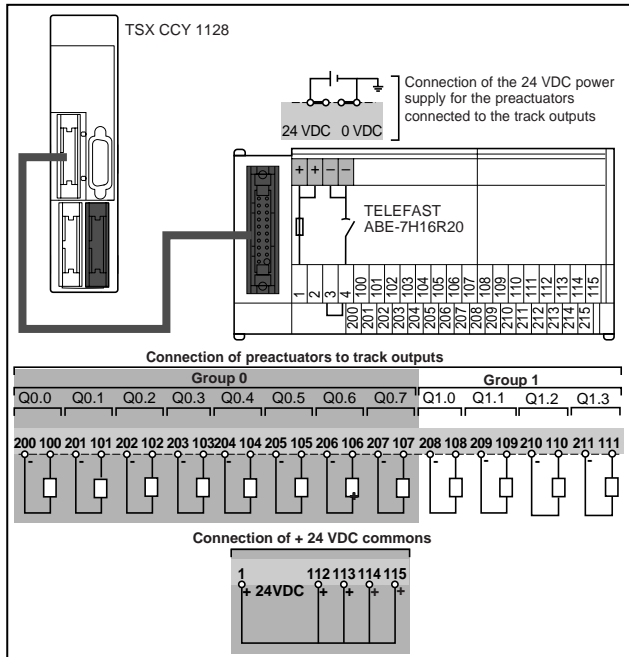
• Circuit Diagram



Connecting the Track Outputs, continued

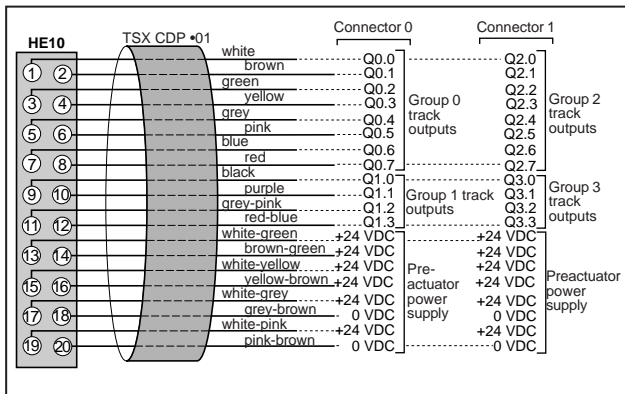
• Connection Using TELEFAST Sub-Base and TSX CDP ••3 Cable

Example of connecting the preactuators to the connector 0 track outputs (groups 0 and 1).
Perform the same operations for connector 1 (output groups 2 and 3).



Connecting the Track Outputs, continued

• Connection Using TSX CDP •01 Flat Cable



General Specifications of the Module

Current consumption of the module	On internal 5V	typical	0.66 A
		maximum	1 A
	On sensor/preactuator 24V	typical	15 mA
		maximum	18 mA
	On 10...30V (when using an SSI absolute encoder and single 24V power supply)	typical	11 mA
		maximum	20 mA
Power dissipated in the module		typical	7 W (1)
		maximum	10 W (2)
Sensor/preactuator supply monitoring	Yes		
Insulation resistance	> 10 Mohms at 500 VDC		
Dielectric strength with ground or PLC 0V	1000 Vrms-50/60Hz-1min		
Operating temperature	0...60°C		
Storage temperature	- 25°C to +70°C		
Relative humidity without condensation	5% to 95%		
Operating altitude	0 to 2000 m		

(1) Under normal operating conditions: one auxiliary input active, 24 VDC supply voltage, standard RS 422 signals

(2) Under extreme operating conditions: 100% of auxiliary inputs active, 30 VDC supply voltage, etc

Encoder Input Specifications

Inputs		RS 422 operation	30...30 VDC operation
Logic		Differential inputs	Positive or negative
Nominal values	Voltage	-	24 V
	Current	10 mA	15.5 mA
Limit values	Voltage	≤ 5.5 V	≤ 30V (possible up to 34 V, limited to 1 hour in every 24 hours).
	At state 1	Voltage > 3V (1)	≥ 11V
	Current > 5.8 mA (1)	≥ 5 mA	
	At state 0	Voltage ≤ - 3V	< 5V
	Current ≤ - 5.8 mA	< 2 mA	
Input impedance at nominal voltage		-	1.5 kOhms
Maximum permissible frequency	Incremental encoders	500 kHz with multiplication by 1	
		250 kHz with multiplication by 4	

(1) The positive or negative differential voltage must be greater than 3V and the current in the positive or negative loop must be greater than 5.8 mA to ensure:

- That counting pulses up to 500 kHz are taken into account
- That the line check does not detect any errors whatever the frequency

Note: An encoder which has standard RS 422 outputs can control the inputs of two TSX CCY 1128 modules in parallel. To ensure the required voltage levels, the encoder supply voltage should be greater than 4.5V.

Specifications of the Encoder Power Supply Return

Parameters		Value
Limit values on the EPSR input	Voltage	30 V (possible up to 34 V, limited to 1 hour in every 24 hours).
	Current	≤ 1.5 mA
Voltage for OK state	VRef input not connected	OK if U > 3.3 V
	VRef input connected to encoder power supply +	OK if U > 66% of the voltage applied at VRef input

Specifications of Auxiliary Inputs IREC, ICAPT1 and ICAPT2

Parameters		Symbol	Value
Nominal values	Voltage	Un	24 V
	Current	In	8 mA
	Sensor power supply (including ripple)	U1	19...30 V (possible up to 34 V for 1 hour in every 24 hours).
Limit values	At state 1	Voltage	Uon ≥ 11V
		Current	Ion > 3 mA (at Uon)
	At state 0	Voltage	Uoff < 5V
		Current	Ioff < 1.5 mA
Response time	State 0 to 1	Ton	< 100 μs
	State 1 to 0	Toff	< 100 μs
Sensor voltage	OK	Uok	> 18 V
Monitoring threshold	Fault	Udef	< 14 V
Input impedance		Re	3 kOhms
Input type			Resistive
Logic type			Positive (sink)
IEC 1131-2 compatibility			Type 1
2-wire/3-wire prox. sensor compatibility	3-wire:	All 3-wire proximity sensors operate at 24 VDC	
	2-wire:	All 2-wire proximity sensors operate at 24 VDC with the following specifications: <ul style="list-style-type: none"> • Residual voltage at closed state ≤ 7 • Minimum switching capacity: ≤ 2.5 mA • Residual current at open state: ≤ 1.5 mA 	
Dielectric strength with ground			1500 V rms 50/60 Hz for 1 min

Track Output Specifications

Parameters	Symbol	Value
Nominal values	Voltage	Un 24 V
	Current	In 500 mA
Limit values	Voltage	U1 19...30V
	Max. current per output for U = 30 or 34V	I1 600 mA
	Maximum current per connector	I2 ≤ 6 A
	per module	I3 ≤ 12 A
Max. power for tungsten filament bulb		P1 10 W
Max. switching frequency on inductive load		F < 0.6/LI ² Hz
Electro discharge time		T < L/R ms
Preactuator voltage monitoring threshold	OK	Uok > 18 V
	Fault	Udef < 14 V
Compatibility with DC inputs		All positive logic DC inputs with input resistance of < 15 kOhms
Protection against overloads and short-circuits		By current limiter and thermal tripping (0.7A<Id<2A)
Protection against output overvoltages		By Zener diode between the outputs and the + 24V
Protection against polarity inversion		By diode reverse-mounted on the power supply
Dielectric strength		1500V rms 50/60 Hz for 1 min
IEC 1131-2 conformity		Yes

Physical Presentation

The module display block has 4 LEDs whose role it is to provide the user with information on:

- The operating mode of the module (normal operation, module faulty or off)
- Operating faults which are internal or external to the module



CH0 RUN ERR
I/O

LED States and Their Meaning

• Operating Mode Display

LED	Color	State	Meaning
RUN	Green	Lit	Module operating normally
		Off	Module faulty or off

• Fault Display

LED	Color	State	Meaning
ERR	Red	Lit	Internal module fault, module failure
		Flashing	Communication fault with the processor Application missing, invalid or execution fault
		Off	Normal operation, no fault
I/O	Red	Lit	Fault external to the module: <ul style="list-style-type: none"> • Wiring fault • Encoder power supply fault • Configuration/adjustment parameters refused
		Flashing	Not significant
		Off	Normal operation, no fault
CH0	Green	Lit	Normal operation, the channel is operational
		Flashing	The channel is not operating correctly, due to: <ul style="list-style-type: none"> • an external fault • a communication fault
		Off	The channel is inoperative: <ul style="list-style-type: none"> • channel not configured • channel incorrectly configured



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