

Schneider Series Service Manual

TSXCAY33

1. Description

The TSXCAY33 is a specialized motion control module from Schneider Electric's TSX Micro PLCs series, tailored for servo motors. This unit is designed for precise operational control and accommodates various input configurations.

2. Specifications

Specification	Value
Manufacturer	Schneider Electric
Product	Type Motion control modules
Product	Line TSX Micro PLCs
Part	Number TSXCAY33
EAN	3389110105704
Weight	1.00 lbs (0.45 kg)
Module	Format Standard
Application	For servo motors
Servo	Loop Type Proportional to overshoot compensation and gain switching
Speed	Profile Path Trapezoidal or parabolic
Resolution	≤ 1000 position units per point, ≥ 0.5 position units per point
Acquisition	Speed ≤ 270,000 points/min, ≥ 54,000 points/min
Acceleration	Time 8 ms to 10 s
Operating	Modes OFF, FOLLOWER, Manual, Direct drive mode, Automatic
Type	of Axis 2/3 axis linear interpolation
Input	Compatibility Absolute encoder SSI output 12-25 bits, Incremental encoder 10-30 V totem pole, Incremental encoder 5 V DC RS422, 2-wire/3-wire sensor (24 DC) auxiliary input, Absolute encoder parallel output ABE7CPA11
Clock	Frequency 200 kHz SSI absolute encoder, Incremental encoder frequency x1 500 kHz, Incremental encoder frequency x4 1000 kHz in counting, 250 kHz in input
Power	Dis

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Technical specifications for TSXCAY33

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Product Line TSX Micro PLCs

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EAN 3389110105704

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Input Compatibility Absolute encoder SSI output 12-25 bits, Incremental encoder 10-30 V totem pole, Incremental encoder 5 V DC RS422, 2-wire/3-wire sensor (24 DC) auxiliary input,

Absolute encoder parallel output ABE7CPA11

Clock Frequency 200 kHz SSI absolute encoder, Incremental encoder frequency x1 500 kHz, Incremental encoder frequency x4 1000 kHz in counting, 250 kHz in input

Power Dissipation 10-17 W

Input Type Current sink auxiliary input conforming to EN/IEC 1131 Type 2, Resistive counter input, Resistive servo drive control input conforming to EN/IEC 1131 Type 1

Input Voltage 24 V 8 mA auxiliary input, 24 V 8 mA servo drive control input, 5 V 18 mA counter input

Range of product

Modicon Premium Automation platform

Product or component type

Motion control modules

Product specific application

For servo motors

Servo loop type

Proportional to overshoot compensation and gain switching 4 ms

Checks

Presence of voltage/sensor feedback counter input

Consistency of commands

Encoder coupling, servo drive present, emergency stop

Proper execution of movement

Sensor power supply

Validity of parameters

Complementary

Speed profile path

Trapezoidal or parabolic

Resolution

≤ 1000 position units per point

≥ 0.5 position units per point

Length of axis

256...32000000 P

Acquisition speed

≥ 54000 points/mn

≤ 270000 points/mn

Acceleration time

8 ms...10 s

Operating mode

Direct drive mode

FOLLOWER

Automatic

Manual

OFF

Type of axis

Limited axis

2/3 axis linear interpolation

I/O modularity

3 axes

Input compatibility

Incremental encoder 10...30 V totem pole

Incremental encoder 5 V DC RS422

With 2-wire/3-wire sensor (24 DC) auxiliary input

Absolute encoder parallel output ABE7CPA11

Absolute encoder SSI output 12...25 bits

Clock frequency

200 kHz SSI absolute encoder

Incremental encoder frequency x1

500 kHz

Incremental encoder frequency x 4

1000 kHz in counting

250 kHz in input

Power dissipation in W

10...17 W

Input type

Current sink auxiliary input EN/IEC 1131 Type 2

Resistive servo drive control input EN/IEC 1131 Type 1

Resistive counter input

Input logic

Positive

Input voltage

24 V 8 mA auxiliary input

24 V 8 mA servo drive control input

5 V 18 mA counter input

Input voltage limits

≤ 5.5 V counter input

19...30 V auxiliary input

19...30 V servo drive control input

Voltage state 1 guaranteed

≥ 11 V auxiliary input

≥ 11 V servo drive control input

≥ 2.4 V counter input

Current state 1 guaranteed

≥ 3.5 mA servo drive control input)

≥ 3.7 mA counter input)

≥ 6 mA auxiliary input)

Voltage state 0 guaranteed

≤ 1.2 V auxiliary input

≤ 1.2 V counter input

≤ 5 V servo drive control input

Current state 0 guaranteed

≤ 1 mA counter input)

≤ 1.5 mA servo drive control input)

≤ 1 mA auxiliary input)

Input impedance

270 Ohm counter input

3000 Ohm auxiliary input

3000 Ohm servo drive control input

Number of outputs

3 reflex output static EN/IEC 61131

3 analogue output static

3 servo drive validation output relay

Analogue output range

+/- 10...24 V

Analogue output resolution

13 bits + sign

LSB value

1.25 mV analogue output

Output voltage

24 V DC reflex output:

24 V DC servo drive validation output:

Output voltage limits

Reflex output 19...30 V

Servo drive validation output 5...30 V

Nominal output current

0.5 A reflex output

Maximum output current

1.5 mA analogue output

200 mA servo drive validation output

625 mA reflex output

Minimum load

1 mA 1 V

Maximum voltage drop

<1 V at state on reflex output

Maximum leakage current

0.3 mA reflex output

Switching time

< 5 ms for servo drive validation

< 500 µs for reflex output

Output compatibility

Positive logic DC inputs (resistance ≤ 15 kOhm) reflex

Short-circuit protection

Current limiter reflex output

Thermal tripping reflex output

Output overload protection

Current limiter reflex output

Thermal tripping reflex output

Output overvoltage protection

Zener diode between outputs and 24 DC reflex output

Reverse polarity protection

Reflex output reverse diode on supply

Local signalling

1 LED (green) for module operating (RUN)

1 LED (red) for external fault (I/O)

1 LED (red) for internal fault, module failure (ERR)

3 LEDs (green) for axis diagnostics available

Electrical connection

1 connector HE-10 20 pins for servo drive ctrl inputs + for ext power supply of servo drive inputs/outputs

2 connectors HE-10 20 pins for aux inputs, reflex output, for external sensor and preactuator power supply

1 connector SUB-D 9 for an analogue output (speed reference)

3 connectors SUB-D 15 for an incremental or absolute encoder

Current consumption

22...40 mA 24 V DC on 10/30 V absolute encoder module

1500 mA 5 V DC

30 mA 24 V DC

Module format

Double

Net weight

1.34 lb(US) (0.61 kg)

Environment

Protective treatment

TC

Ambient air temperature for operation

32...140 °F (0...60 °C)

Ambient air temperature for storage

-13...158 °F (-25...70 °C)

Relative humidity

5...95 % without condensation

Operating altitude

<= 2000 m

Description

The Schneider Electric TSXCAY33 stands as a versatile motion control module within the TSX Micro PLCs series, specifically for servo motor applications. The module adopts a standard format and is engineered to facilitate intricate motion operations.

With the servo loop designed to be proportional to overshoot compensation and gain switching, the TSXCAY33 ensures highly responsive control. Users can select between trapezoidal or parabolic speed profiles tailored to their requirements. The resolution of this module is exceptional, supporting positions up to 1000 units per point and maintaining accuracy down to 0.5 position units.

In terms of performance, the module demonstrates impressive acquisition speeds, reaching up to 270,000 points per minute, with a minimum rate of around 54,000 points per minute. Operating modes for the TSXCAY33 include OFF, FOLLOWER, Manual, Direct drive mode, and Automatic, providing flexible operational choices. It supports 2/3 axis linear interpolation, accommodating diverse motion applications.

The TSXCAY33 also excels in input compatibility, integrating with various encoder types. These include absolute encoders with SSI output ranging from 12 to 25 bits and incremental encoders boasting voltages from 10-30 V totem pole configurations. Additional inputs for 2-wire/3-wire sensors and absolute encoders with ABE7CPA11 parallel output further enhance its capabilities.

The clock frequency specification is noteworthy. It supports up to 200 kHz for SSI absolute encoders and higher frequencies for incremental encoders, allowing for detailed and rapid counting. Power dissipation for this module falls within the range of 10 to 17 W, ensuring efficient operation.

The input voltage requirements are straightforward: 24 V for both auxiliary and servo drive control inputs and 5V for counter input operation. The current sink auxiliary input adheres to EN/IEC 1131 Type 2 standards, establishing reliable performance standards for resistive input applications.