



ENG www.phytron.eu/TMStepDrive



TM StepDrive 1x24..48V/5A

Stepper Motor Module for the SIMATIC®ET 200®SP

In coordination with Siemens

TM StepDrive 24-48V/5A is a stepper motor controller with integrated power stage. It is specially developed for application in the decentralised SIMATIC®ET 200®SP peripheral system.

This TM StepDrive 24-48V/5A module is configured via mouse click with the STEP®7 or TIA Portal® by using the downloaded configuration files and then parameterised. The module is ready for use

in a very short time and supplements the SIMATIC®ET 200®SP with a fully integrated, powerful and high-precision positioning controller for 2 phase stepper motors.

Application

Application examples for the TM StepDrive module are assembly and transfer lines, building automation, x-y-tables, paper mills, printing and textile machines.

Highlights

Online parameterisation

These Phytron power stages are eminently suitable for not only setting the basic parameters via interface bus, but also the technological parameters found in the application.

he power stage can be optimised for the requirements of the drive system during commissioning. Furthermore it is possible to adjust the power stage during 'CPU RUN', particularly for the next program sequence.

For example, raise the stop current when the motor is holding a load and then reduce it as soon as the system comes to a standstill without the load to minimize the power requirement and motor heating. Using these functions combined with additional parameters bring out the best in your system.

Two connection types

The function of the TM StepDrive module can be defined differently with the two connection types.

Connection type „power stage“: The integrated power stage is used to supply a stepper motor as a fully stepper motor control.

Connection type „indexer“: The TM module provides the control signals control pulses and direction for a separate external power stage. This enables the operation of more powerful motors.

In Focus



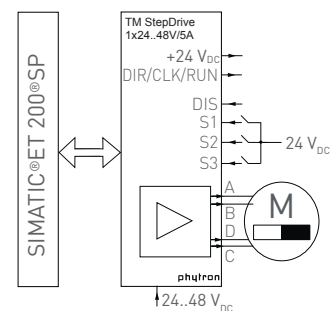
Integrated Driver



Digital

The TM StepDrive 1x24..48V/5A module successfully completed the system compliance test performed by Siemens.

- stepper motor controller with an integrated power stage for SIMATIC®ET 200®SP
- for 2 phase stepper motors
- 5 A_{PEAK} at 24 to 48 V_{DC}
- up to 1/256 microsteps
- two operating modes and connection types
- programming via TIA Portal® (from V15) or via GSD(ML) file
- controller via application program or Simatic Technology Object



overview

Industrial

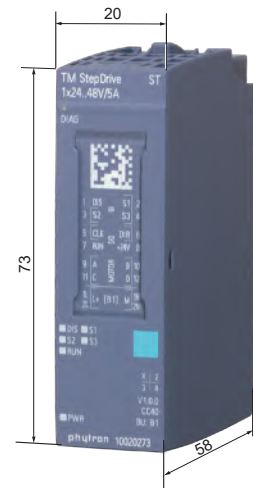
Specification

Mechanical

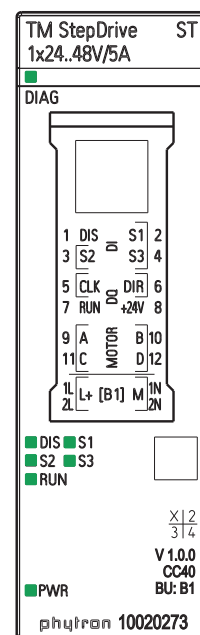
design	SIMATIC®ET 200®SP plastic housing
dimensions (W x H x D)	20 x 73 x 58 mm
weight	62 g
mounting position	any (vertical recommended)
mounting	plug-in in SIMATIC®ET 200®SP

Features

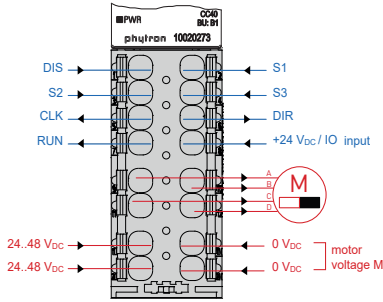
stepper motors	suitable for bipolar control of 2 phase stepper motors with 4, (6) or 8 lead wiring
superior main station	SIMATIC®ET 200®SP
power supply	24 to 48 V _{DC}
reverse polarity protection	yes
phase current	5 A _{PEAK} (short circuit-proof, overload protected)
motor current adjustment	100 mA steps
step resolution	full step, half step, 1/4, 1/8, 1/16, 1/32, 1/64, 1/128, 1/256 microstep
maximum step frequency	250.000 steps/s
physical resolution	approx. 51,200 positions per revolution (0,0070°/step) with a 200 step motor. An encoder with a counter should be considered for very fine positioning
current consumption (max.)	3 A _{DC} at 5 A _{PEAK}
mechanical output power	up to the 200 W range
cable length - motor	shielded: 50 m max.
cable length - digital inputs	3 m max.
diagnostic LEDs	<ul style="list-style-type: none"> • DIAG (group error) • PWR (power supply voltage) • DIS (power stage is deactivated) • S1/S2/S3 (digital input switch 1/2/3 active) • RUN (motor is running)
controller modes	<ul style="list-style-type: none"> • positioning mode (PM mode) for linear and rotary axis: <ul style="list-style-type: none"> - relative positioning - move to a reference point - absolute positioning - free run with variable speed - position setting - motor stop - emergency stop • technology object mode (TO mode): control by a technology object of the SIMATIC® S7-1500 CPU
connection types	<ul style="list-style-type: none"> • power stage • indexer
safety modes	safety modes, such as e. g. Safe Torque Off (STO) from IEC 61508-2 are compatible with external components.
mechanism of the communication via backplane bus	<ul style="list-style-type: none"> • synchronous: control interface, feedback interface • asynchronous – PLC in STOP mode: base parameterising • asynchronous – PLC in RUN mode: parameterising with data record
hardware error detection	over temperature at the power stage T > 105 °C
refresh rate	1 ms



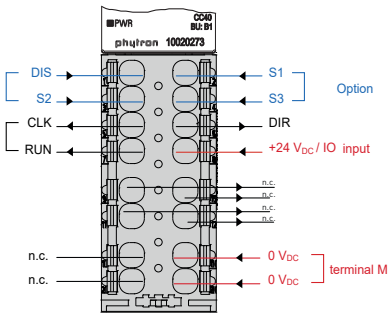
dimensions



diagnostic LEDs



Connection type „Power stage“



Connection type „Indexer“

Specification

Interfaces

analogue outputs	A, B, C, D - for a 2 phase stepper motor						
digital inputs	3 configurable digital inputs S1/S2/S3: 0 signal: 0 ... 1 V with max. 2 mA 1 signal: 2.3 V ... 30 V with typ. 5 mA DIS: • power stage activation/deactivation S1/S2/S3: • for PM mode: reference switch and and at the same time limit switch in forward / reverse direction • for TO mode: one of the inputs can be configured as reference switch						
digital outputs	DIR: • direction of rotation of the motor CLK: • control pulses signal via indexer control pulses frequency max.: 250 kHz RUN: • motor is running						
DC Eingang	+24 V _{DC} : • power supply +24 Vdc for the digital outputs						
backplane bus and module supply	backplane bus of the ET 200 [®] SP module supply via external power module						
compatible Siemens BaseUnit for the TM StepDrive 24..48V/5A	<table border="1"> <thead> <tr> <th>module</th> <th>order number</th> <th>terminal</th> </tr> </thead> <tbody> <tr> <td>BU20-P12+A0+4B</td> <td>6ES7193-6BP20-0BB1</td> <td>type B1</td> </tr> </tbody> </table>	module	order number	terminal	BU20-P12+A0+4B	6ES7193-6BP20-0BB1	type B1
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Communication and Parameterising

basic parameterising	via TIA Portal [®] (from V15) or GSD / GSDML
control interface (synchronous)	<p>specifications in positioning mode:</p> <ul style="list-style-type: none"> • target position with absolute positioning • number of steps for relative positioning • frequency at free run • offset during reference run • use of the reference sensor during reference travel • traversing job <ul style="list-style-type: none"> - moving to absolute position - moving by relative distance - reference point run - free run with variable velocity - set position - motor stop - emergency stop <p>required parameters for operation with technology object:</p> <ul style="list-style-type: none"> • control word • velocity reference value
feedback interface (synchronous)	<p>configurable in positioning mode</p> <ul style="list-style-type: none"> • residual path • velocity <p>also included in the feedback</p> <ul style="list-style-type: none"> • absolute position • status bits <p>feedback when operating with technology object:</p> <ul style="list-style-type: none"> • status word • actual velocity value • counted pulses as actual position

Industrial

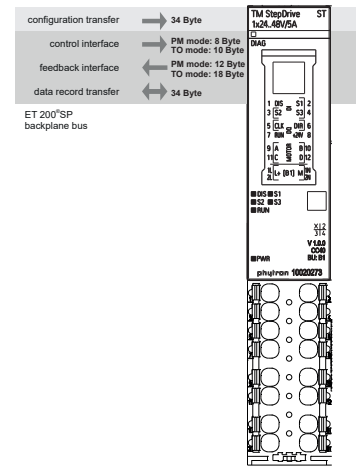
Specification

Communication and Parameterising (continued)

data record transfer to the TM StepDrive (asynchronous while CPU RUN)	<p>parameterising of the power stage</p> <ul style="list-style-type: none"> • step resolution (1/1, 1/2 up to 1/256) • run current (100 mA increments) • stop current (100 mA increments) • boost current (100 mA increments) • current delay time 1 up to 1000 ms • reaction to CPU stop
data record transfer from the TM StepDrive (asynchronous)	<p>diagnostics</p> <p>feedback of the following driver parameters to the main station</p> <ul style="list-style-type: none"> • Reverse reading controller parameter • Error (over temperature, parameterising error, DIS input)

Operating Conditions

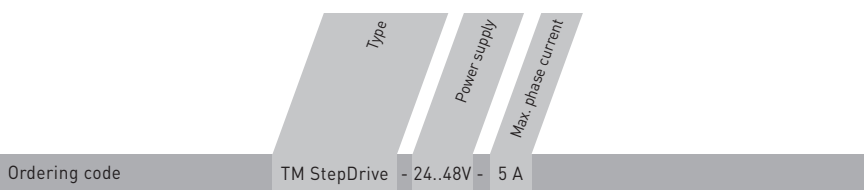
operating temperature	0 to +60 °C
storage and transport temperatures	-40 to +70 °C
relative humidity	max. 95 % non-condensing
degree of pollution	level 2
protection class	IP 20
EMC tests	according to EN 55011 according to EN 61000-2,3,4,5,6
approval	CE



communication mechanism

All illustrations, descriptions and technical specifications are subject to modifications, no responsibility is accepted for the accuracy of this information.

Ordering Code



SIMATIC®, ET 200®, STEP®7 and TIA Portal® are trademarks of Siemens AG.

Extent of Supply

- TM StepDrive module
- Download of the configuration file (HSP or GSD(ML)), application example and PDF manual from the Phyttron or Siemens website

Optional Accessories

- manual as printout (ID no. 10019960)
- CD-ROM with HSP configuration file, application example and PDF manual (ID no. 10021984)
- EMC filter (ID 10022069)

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