

preliminary data

INDUSTRIAL

ENG www.phytron.eu



TM StepDrive 24-48V/5A

Stepper Motor Module for the SIMATIC®ET 200®SP

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 provided 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.

In Focus



Integrated Driver



Digital

The TM StepDrive 24-48V/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 – 48 V_{DC}
- up to 1/256 microsteps
- online controller parameterisation and diagnostics
- programming via STEP®7 or TIA Portal®
- controller via application program or Simatic Technology Object

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.

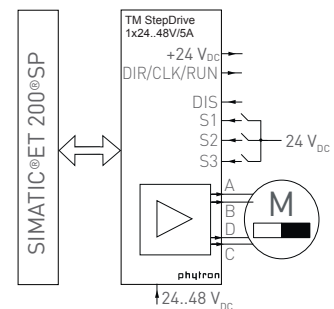
he power stage can be optimised for the requirements of the drive system during commissioning. Furthermore it is possible to adjust the power stage during 'CPU RUN', particularly for the next program sequence.

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.

Fine positioning to 1/256 step

Almost all commercially available stepper motor power stages can be operated in micro step mode. When driving the motor with encoder feedback, it is apparent that certain micro step positions cannot often be reached because of a lack of fine current settings and the motor may not reach the desired position.

The TM StepDrive technology guarantees a high-precision current adjustment and enables fine positioning up to 1/256 step.



overview

Industrial

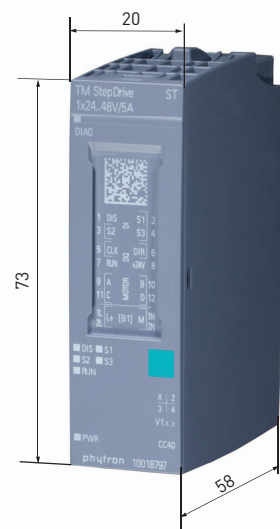
Specification

Mechanical

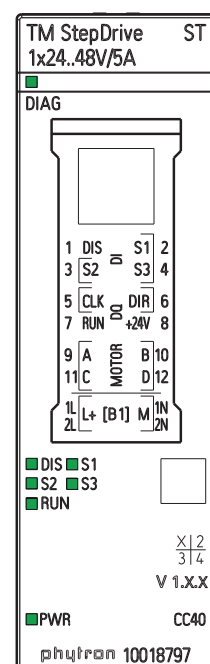
design	SIMATIC®ET 200®SP plastic housing
dimensions (W x H x D)	20 x 73 x 58 mm
weight	58 g
mounting position	any (vertical recommended)
mounting	plug-in in SIMATIC®ET 200®SP

Features

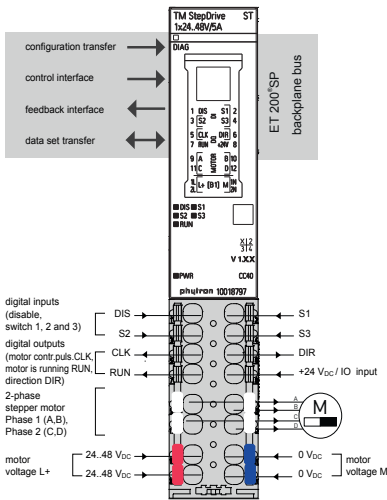
stepper motors	suitable for bipolar control of 2 phase stepper motors with 4, (6) or 8 lead wiring
superior main station	SIMATIC®ET 200®SP
power supply	24 to 48 V _{DC}
reverse polarity protection	yes
phase current	5 A _{PEAK} (short circuit-proof, overload protected)
motor current adjustment	100 mA 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	shielded: 100 m max.
diagnostic LEDs	<ul style="list-style-type: none"> • DIAG (group error) • PWR (power supply voltage) • DIS (power stage is deactivated) • S1 (digital input switch 1 active) • S2 (digital input switch 2 active) • S3 (digital input switch 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 • technology object mode (TO mode): control by a technology object of the SIMATIC® S7-1500 CPU
security modes	security 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"> • control interface, feedback interface via cyclical data • parameterising in Step®7 and TIA Portal® by hardware support package • parameter modification possible with data set; supports clock synchronisation • parameterisation in other systems by GSD
hardware error detection	short circuit, overcurrent >10 A spike at the controller over temperature at the power stage T > 85 °C
refresh rate	2 ms



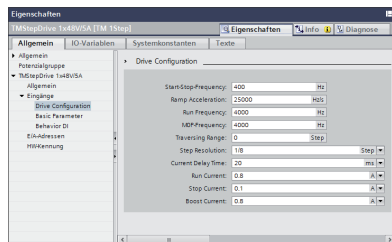
dimensions



diagnostic LEDs



connection diagram



parameterisation

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: <1.0 V 1 signal: >2.3 V DIS: • power stage activation/deactivation S1/S2/S3: • reference switch and also limit switch towards forward / reverse • limit switch configurable to open / close						
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 +24 V_{DC}: • power supply +24 Vdc for the limit switch						
backplane bus and module supply	backplane bus of the ET 200 [®] SP module supply via external power module						
compatible Siemens module 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>Typ B1</td> </tr> </tbody> </table>	module	order number	terminal	BU20-P12+A0+4B	6ES7193-6BP20-0BB1	Typ B1
module	order number	terminal					
BU20-P12+A0+4B	6ES7193-6BP20-0BB1	Typ B1					

Communication and Parameterising

basic parameterising	via STEP [®] 7 or TIA Portal [®] GSD / GSDML
control interface (synchronous possible)	parameter assignments • run frequency F _{RUN} • start/stop frequency F _{SS} positioning • move to a reference point • set home position • relative incremental mode (relative positioning) • absolute incremental mode (absolute positioning) • revolution mode • reference setting
feedback interface (synchronous possible)	configurable • residual path • absolute positioning • velocity also included in the feedback • position reached • parameterization error • power stage error • limit switch causes a stop • and other states

Industrial

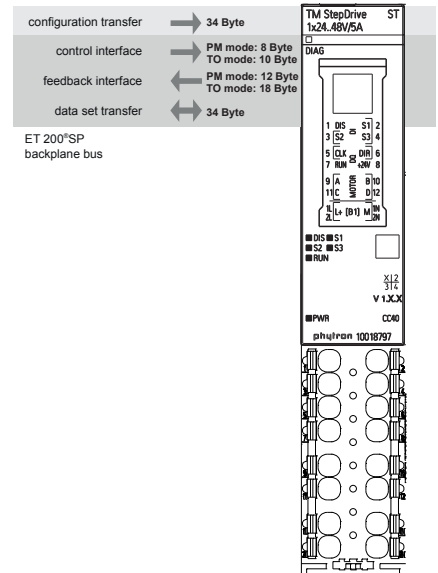
Specification

Communication and Parameterising (continued)

data set transfer to the TM StepDrive (asynchronous while CPU RUN)	parameterising the TM StepDrive power stage <ul style="list-style-type: none"> • step resolution (1/1, 1/2 up to 1/256) • preferred direction of rotation • 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 set transfer from the TM StepDrive (asynchronous while CPU RUN)	diagnostics feedback of the following driver parameters to the main station <ul style="list-style-type: none"> • Reverse reading controller parameter • Basic position • Error (short circuit, over temperature, parameterising error)

Operating Conditions

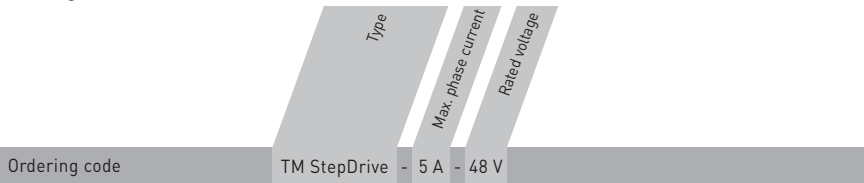
operating temperature	0 to +60 °C
storage and transport temperatures	-40 to +70 °C
relative humidity	max. non-condensing
degree of pollution	level 2
protection class	IP 20
vibration / shock protection	according to EN 60068-2-6 according to EN 60068-2-27/29
EMC immunity / EMC emission	according to EN 61000-6-2 according to EN 61000-6-4
approval	CE



communication mechanism

Ordering Code

Ordering number 10018797



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

Extent of Supply

- TM StepDrive module
- CD-ROM incl. configuration file (HSP), application example and PDF manual

Optional Accessories

manual as printout (ID no. 10019960)

Phytron GmbH

Industriestraße 12 – 82194 Gröbenzell
 T +49-8142-503-0 F +49-8142-503-190