



**SMART MOTOR DEVICES**

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**STEP MOTOR DRIVER  
SMD-8.0DIN ver.2**

*manual*  
**SMDDIN.80.V2.001**



## 1. Product designation

Stepper motor driver SMD-8.0DIN ver.2 is an electronic device designed to operate with 2 or 4-phase stepper motor with maximum

## 2. Functions and possibilities

- The driver provides stepper motor control in two operation modes:
  - Pulse position control mode - motor control with standard logic signals "STEP", "DIR" and "ENABLE" 0 ... 1V as a low level and high level 4 ... 12V as a high level.; it is allowed to use high level voltage up to 24V on condition of connecting additional current-limiting resistors.
  - Analog speed control mode – adjusting the motor speed using the built-in potentiometer.

Refer to the part 6 of the manual for setting the operating modes and parameters of the driver.

- The FAULT output is intended for monitoring of the normal state of the driver.

## 3. Technical characteristic

Table 1.

<b>Main parameters:</b>	
Maximum output current per phase, Amp	8.0
Minimum output current per phase, Amp	1.0
Microstepping	1/1, 1/2, 1/4, 1/8, 1/16 (current control mode); 1/32, 1/64, 1/128 (voltage control mode – selected motor models only)
Power supply, VDC (stabilized)	24...48
Maximum overall dimensions, mm	122x100x46
<b>Inputs STEP, DIR, ENABLE</b>	
High voltage level, VDC	4...24 (24VDC on condition of using additional current limiting resistors)
Low voltage level, VDC	0...1
Input STEP resistance, kOhm, no less	3
Inputs DIR and ENABLE resistance, kOhm, no less	1
Input current of control input STEP, mA	1,4...4
Input current of control inputs DIR и ENABLE, mA	4...12
<b>Output «FAULT» parameters:</b>	
Signal type	Opto-coupler output
Maximum voltage, VDC	20
Maximum load current, mA	100
Resistance at close contact, Ohm, no more	100

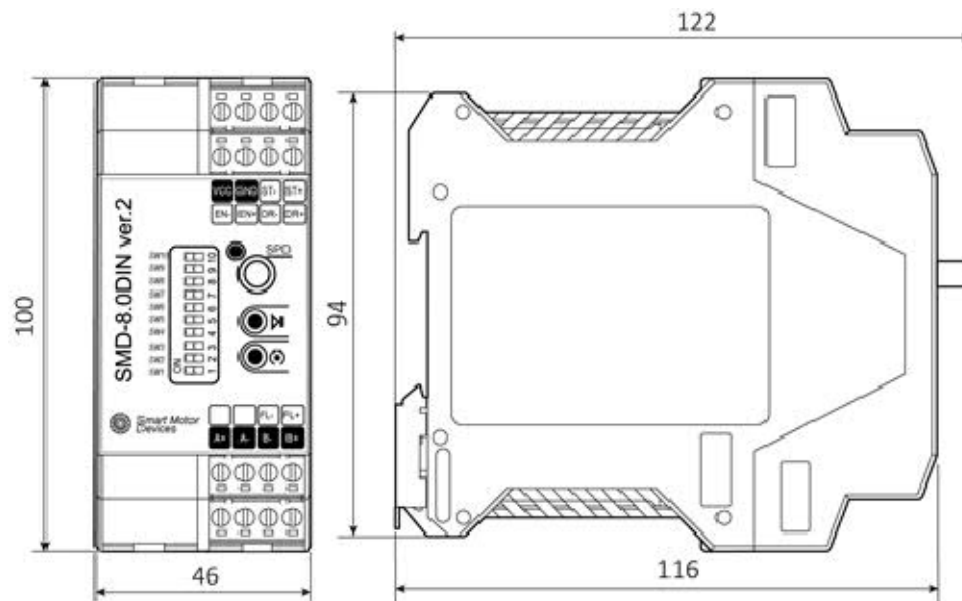


Fig. 1. Dimensions of the stepper motor driver SMD-8.0DIN ver.2



## Environmental Conditions:

Ambient Temperature: 0...+40°C  
Humidity: 90% RH or less upon condition +25°C  
Condensation and freezing: none  
Pressure: 650...800 mm of mercury

## 4. Construction

The driver SMD-8.0DIN ver. 2 is designed as a circuit plate with electronics components, LED indicator and control elements, terminals and connectors. There is a cooling fan under the case. The plastic case of the driver is designed to be mounted on a DIN rail. The heatsink is installed inside the case on the circuit plate. There are graphical symbols of the control elements and the terminals assignment on the case.

Besides the control elements at the driver frame there are:

- connector for a stepper motor phases connection;
- connector for connection of control signals STEP, DIR, ENABLE and FAULT;
- internal potentiometer SPEED for analog speed control;
- buttons START/STOP to start and stop a motor and RESET to reset the driver.

## 5. Connection

Installation must be carried out by qualified personnel. The product is mounted on a standard 35 mm DIN rail. Please follow this manual carefully for connection and assembly.

**Please, connect wires only when power is off. Do not attempt to change wiring while the power is ON.**

Please, provide a reliable contact in connection terminals. During wiring, please, observe the polarity and wire management. Overvoltage may damage the unit. Connection examples are shown on figures 2 - 5. Possible connection schemes for motors are given below in the table 2.

It is possible to use the voltage 24VDC as a high level signals for inputs DIR and ENABLE on condition of using additional current limiting resistors 1kOhm. It is possible to use the voltage 24VDC as a high level signals for input STEP on condition of using additional current limiting resistors 3kOhm.

### Connection examples:

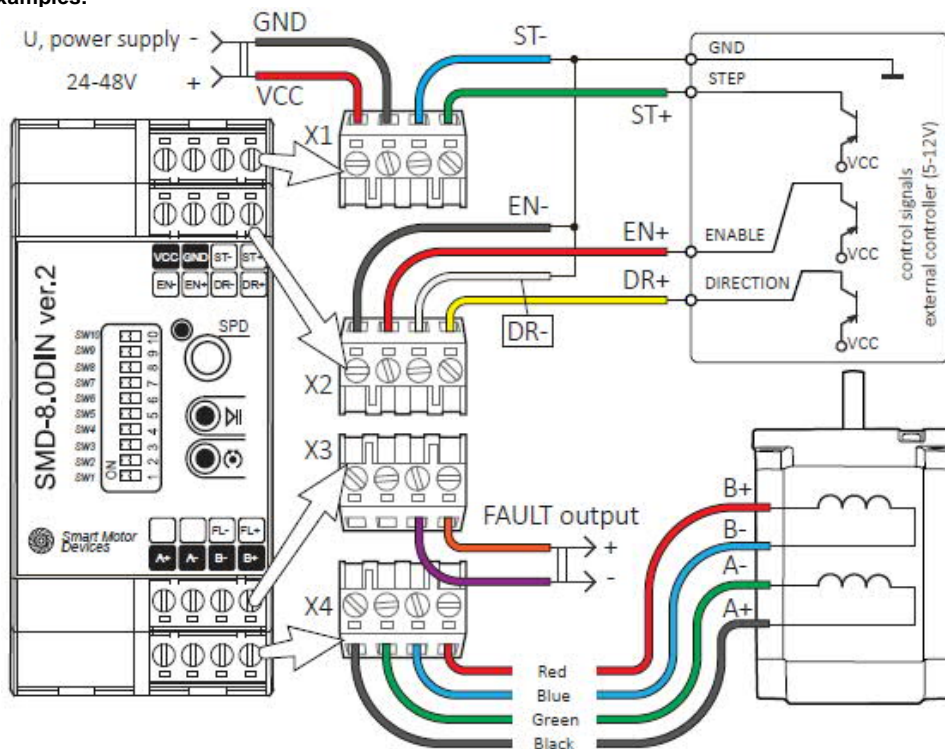


Fig.2.Example 1. Control signals type - common cathode.

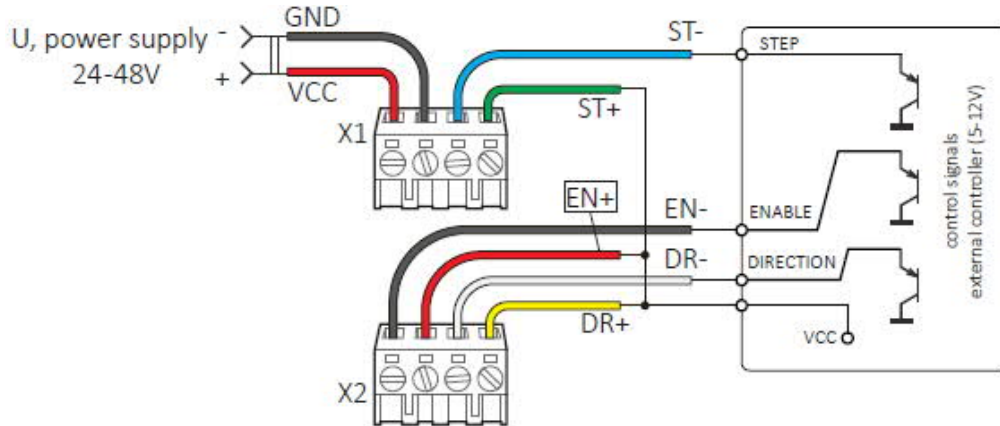
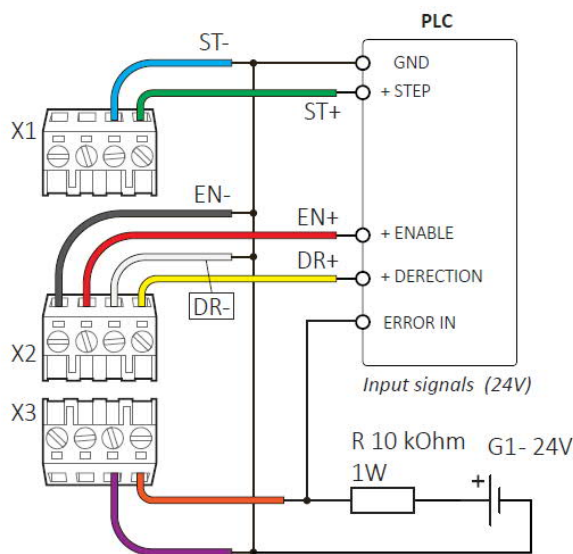
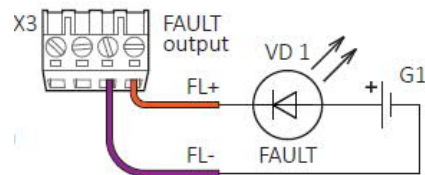
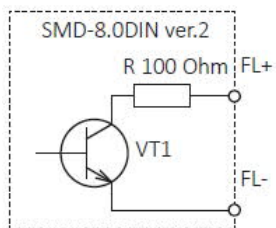


Fig.3. Example 2. Control signals type - common anode (open collector)



In the normal (working) state of the driver, there is no signal at the PLC ERROR IN input. In a case of an emergency at the FAULT output of the driver, the connection to the ground (GND) is broken and the voltage from the G1 source (24V), through a 10 kOhm resistor, goes to the ERROR IN input of the PLC.

Fig.4. Example 3. Connection to an external PLC



In the normal (working) state of the driver SMD-8.0DIN ver.2, there is a resistance of 150-160 ohms between the "FL +" and "FL-" terminals.

In a case of an emergency, the resistance between the terminals tends to infinity.

In the normal (working) state of the driver SMD-8.0 DIN ver. 2 LED VD1 is on.

In a case of an emergency, VD1 fades out.

**FAULT output, open collector type**

**State LED indication**

Fig.5. Examples of FAULT output connection

**Connection of a stepper motor**

The driver provides operation with 2 or 4-phase stepper motors, 4, 6 or 8 wires. Winding connection examples are in the table 2. Connect stepper motor wires to A+, A-, B+ and B- terminals of the driver according to the table 2.



Table 2.

 Scheme 1	 Scheme 2	 Scheme 3	 Scheme 4
8 wires stepmotor connection (4 phases): Scheme 1 – serial connection; Scheme 2 – parallel connection. 6 wires stepmotor connection (2 phases with midpoint taps): Scheme 3; 4 wires stepmotor connection (2 phases without midpoint taps): Scheme 4.			

### Connection and assembling

Assembling order is as below:

1. Connect the driver to a stepper motor according table 2.
2. Connect external control lines to inputs STEP, DIR, ENABLE and output FAULT according figures 2 - 5.
3. Connect a power unit to the terminals GND and VCC.

### 6. Operation order

1. Make sure the power supply is turned off.
2. Make assembly and connection according to the section 5.
3. Select the suitable microstepping mode and set microswitches SW1, SW2 and SW3 according to the table 3:

Table 3

Microstepping	SW1	SW2	SW3	Microstepping	SW1	SW2	SW3
Current control mode				Voltage control mode			
1/1	OFF	OFF	OFF	1/32	ON	OFF	ON
1/2	ON	OFF	OFF	1/64	OFF	ON	ON
1/4	OFF	ON	OFF	1/128	ON	ON	ON
1/8	ON	ON	OFF				
1/16	OFF	OFF	ON				

Depending on a microstepping the driver uses current or voltage control mode to commutate motor phases. In case of 1/1 – 1/16 microstepping and current control mode is selected, it is necessary to set the switches SW6 – SW9 according to a motor current (refer to the table 4). In case of 1/32 – 1/128 microstepping and voltage control mode is selected, it is necessary to set the switches SW6 – SW9 according to a motor model (refer to the table 5).

**Current control mode** – during the motor control the target parameter is a maximum operation current given to a motor phase. If use this control mode, it is possible to connect any motor to the controller under the condition of a correct current setting. The current motor control mode performs better torque and high rotation speed, but it is limited with a maximum microstepping division 1/16;

**Voltage control mode** – performs smooth motion and provides microstepping division up to 1/128. However, rotation speed and torque are less in comparison with the current control mode. This control mode is only applicable to the exact list of motor models. The models list resides in the controller memory (please, refer to the table 5).

4. If microstepping 1/1..1/16 and current control mode selected, set the value of motor current per phase by the switches SW6 – SW9 according to the table 4.

Table 4

Current per phase, Amp	SW6	SW7	SW8	SW9	Current per phase, Amp	SW6	SW7	SW8	SW9
1,0	OFF	OFF	OFF	OFF	4,5	OFF	OFF	OFF	ON
1,5	ON	OFF	OFF	OFF	5,0	ON	OFF	OFF	ON
2,0	OFF	ON	OFF	OFF	5,5	OFF	ON	OFF	ON
2,2	ON	ON	OFF	OFF	6,0	ON	ON	OFF	ON
2,5	OFF	OFF	ON	OFF	6,2	OFF	OFF	ON	ON
2,8	ON	OFF	ON	OFF	6,5	ON	OFF	ON	ON
3,0	OFF	ON	ON	OFF	7,0	OFF	ON	ON	ON
4,2	ON	ON	ON	OFF	8,0	ON	ON	ON	ON

5. If microstepping 1/32..1/128 and voltage control mode selected, set the motor model by the switches SW6 – SW9 according to the table 5.



Table 5.

SW6	SW7	SW8	SW9	Max. current per phase, Amp	Resistance per phase, Ohm	Inductance per phase, mH	Step angle	Motor model
OFF	OFF	OFF	OFF	2.8	0.9	2.5	1.8	
ON	OFF	OFF	OFF	2.8	1.13	3.6	1.8	SM5776
OFF	ON	OFF	OFF	2.8	1.13	5.6	0.9	
ON	ON	OFF	OFF	2.8	0.7	3.9	1.8	
OFF	OFF	ON	OFF	2.8	2.8	15.6	1.8	
ON	OFF	ON	OFF	4.2	0,375	3.4	1.8	SM8680 Parallel connection
OFF	ON	ON	OFF	4.2	1.5	13.6	1.8	SM8680 Serial connection
ON	ON	ON	OFF	4.2	0.45	6	1.8	-
OFF	OFF	OFF	ON	4.2	1.8	24	1.8	-
ON	OFF	OFF	ON	4.2	0,625	8	1.8	-
OFF	ON	OFF	ON	4.2	2.5	32	1.8	-
ON	ON	OFF	ON	6.0	0.6	6.5	1.8	-
OFF	OFF	ON	ON	6.2	0.75	9	1.8	-
ON	OFF	ON	ON	5.5	0.9	12	1.8	-
OFF	ON	ON	ON	6.5	0.8	15	1.8	-
ON	ON	ON	ON	8	0.67	12	1.8	SM110201

6. Set the switch SW5 ON, if signal ENABLE inversion is required.

7. Select the operation mode by the switch SW4:

SW4 – ON: analog speed control by internal potentiometer SPEED;

SW4 – OFF: pulse position control.

- **If used pulse position control mode (SW4=OFF)**, give a sequence of signals «STEP» (pulse), «DIR» (level) and «ENABLE». High level of the signals – 4..12VDC (24VDC\*), low level - 0..1VDC. One step (or microstep) executes as per the front edge of the voltage pulse on the «STEP» input. Direction switches by changing voltage level at the «DIR» input. The motion is enabled if the signal to «ENABLE» input is given. The signals oscillogram is shown on fig.6.

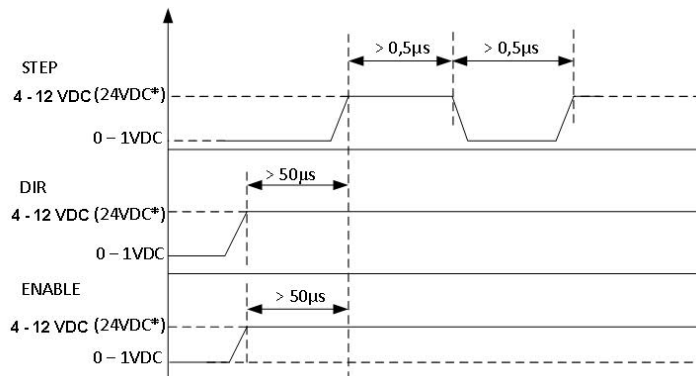


Fig.6. «STEP», «DIR» and «ENABLE» signals order and duration

\*Please, connect additional current limiting resistance if use high level signal +24VDC instead of 5VDC: 3KOhm for STEP input, 1KOhm for all the rest inputs.

- **If used analog speed control (SW4=ON)** – control the motor velocity using the internal potentiometer SPEED. The motor motion can be started and stopped by pressing the START/STOP button, or by signal at the ENABLE input.

Designation of the control inputs, which are used in the mentioned operation modes, are given in the section 4 «Construction». Signal inputs are activated by the high voltage level. The motor rotation direction depends on a signal level on the input DIR. During normal operation the output FAULT is short to GND. In case of emergency this circuit is open. An emergency stop of the motor is performed by signal 0..1VDC at the ENABLE input (or 4...12VDC in case of inverting the signal).

## 7. Delivery in complete sets

Stepmotor driver SMD-8.0DIN ver.2  
Manual SMDDIN.80.V2.001

1 pcs  
1 pcs



## 8. Warranty

**Any repair or modifications are performed by the manufacturer or an authorized company.**

The manufacturer guarantees the failure-free operation of the controller for 12 months since date of sale when the operation conditions are satisfied.

The manufacturer sales department address:

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Date of sale:

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