



SMART MOTOR DEVICES

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STEP MOTOR DRIVER SMD-4.2DIN ver.3

**User Manual
SMDDIN.42.V3.001
2025**



1. Product designation

Stepper motor driver SMD-4.2DIN ver.3 is an electronic device designed to operate with a 2 or 4-phase stepper motor with a maximum current per phase up to 4.2 Amp.

2. Functions and possibilities

- Pulse position control with standard logic signals «STEP», «DIR» and «ENABLE» is provided. Low-level voltage is 0...1VDC and high-level voltage is 5...12VDC (up to 24VDC on condition that additional current limiting resistances are used).
- Analog speed control is provided: using internal or external potentiometers or analog voltage signal 0..5VDC or 0..10VDC. The maximum frequency of the internal oscillator is 10 kHz. To select the signal range, a special jumper is provided on the circuit board of the driver. Rotation is started and stopped by pressing a button on the front panel or by the signal level at the input START/STOP.
- Monitoring of the drive state. Output "Fault" and LED indicators on the front panel are used to control the state of the driver.
- Motor phase current reduction by 50% in holding mode.

3. Technical characteristic

Table 1

Common characteristics:	
Maximum output current per phase, Amp	4.2
Minimum output current per phase, Amp	2.7
Phase current setting increment, A	0.1
Microstepping	1/1, 1/2, 1/4, 1/8, 1/16, 1/32, 1/64, 1/128, 1/256
Power supply, VDC (stabilized)	12...48
Maximum overall dimensions, mm	116x100x23
Inputs STEP, DIR, ENABLE, START/STOP	
High voltage level, VDC	5...12 (24VDC on condition of using additional current limiting resistors)
Low voltage level, VDC	0...1
Inputs STEP, START/STOP resistance, kOhm, no less	3
Inputs DIR and ENABLE resistance, kOhm, no less	1
Input current of control input STEP, START/STOP, mA	1,4...4
Input current of control inputs DIR и ENABLE, mA	4...12
Analog signal SPD	
Control signal voltage range, V	0.1...5 or 0.1...10
Input resistance, kOhm, not less than	15
Input current, mA	1
Output «FAULT» parameters	
Signal type	Opto-coupler output
Maximum voltage, VDC	48
Maximum load current, mA	50
Resistance, Ohm, no more	15

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

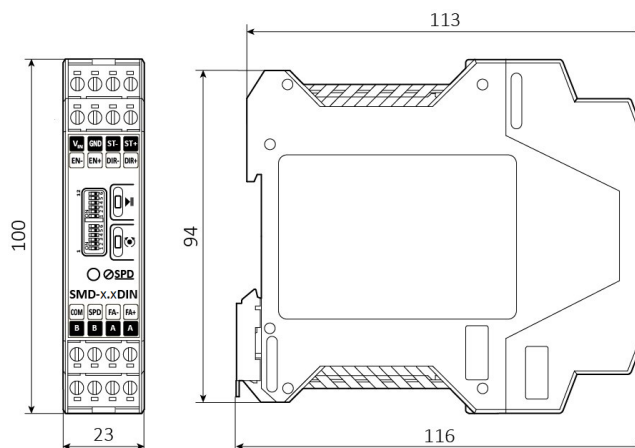


Fig. 1. Dimensions of the stepper motor driver SMD-4.2DIN ver.3.

4. Construction

The driver SMD-4.2DIN ver.3 is designed as a circuit plate with electronics components, indication and control elements, terminals, and connectors. The plastic case of the driver is designed to be mounted on a DIN rail. There are graphical symbols of the control elements and the terminals assignment on the front plate of the controller.

Besides the control elements at the driver frame, there are:

- terminals for connection stepper motor phases;
- terminals for connection to a power supply unit;
- terminals for connection control input signals STEP (ST), DIR (DIR), ENABLE (EN), and output Fault signal (FA);
- speed adjustment potentiometer SPD;
- terminals for connection analog voltage signal SPD
- LED for indication of the drive status;
- start/stop and reverse buttons;
- microswitches for setting the current and microstepping modes.

5. Connection

Please follow this manual carefully for connection and assembly.

Please, connect wires only when the 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.

When connecting, observe the polarity. Incorrect polarity, as well as exceeding the supply voltage, can damage the unit. During installation, it is necessary to strictly observe the correct connection of all wires.

Connection examples are shown in Figures 2 - 11. Possible connection schemes for motors are given below in Table 2.



Connection of input and output signals of the driver:

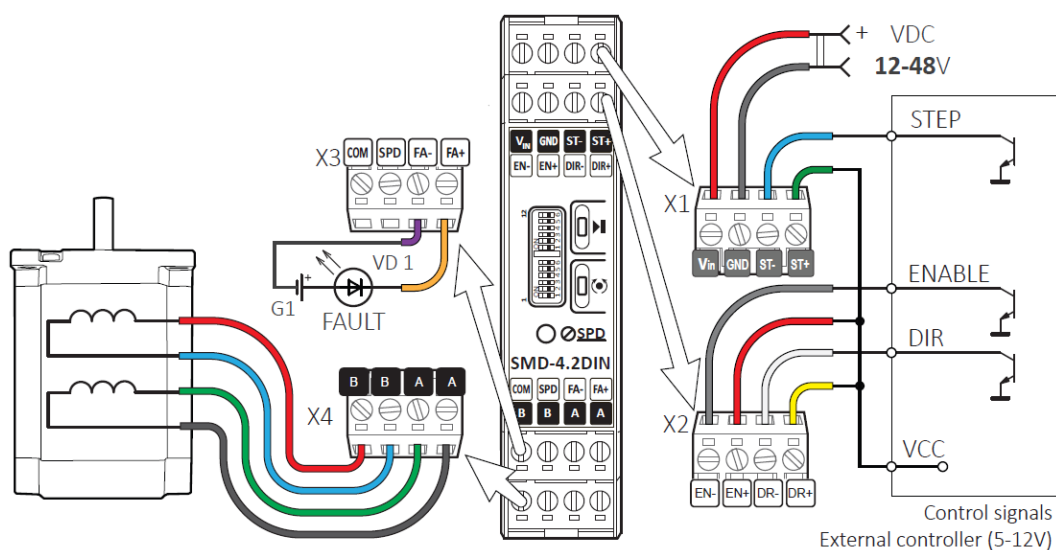


Fig.2. Example of connection to a source of logical signals STEP/DIR/ENABLE - open collector, NPN.

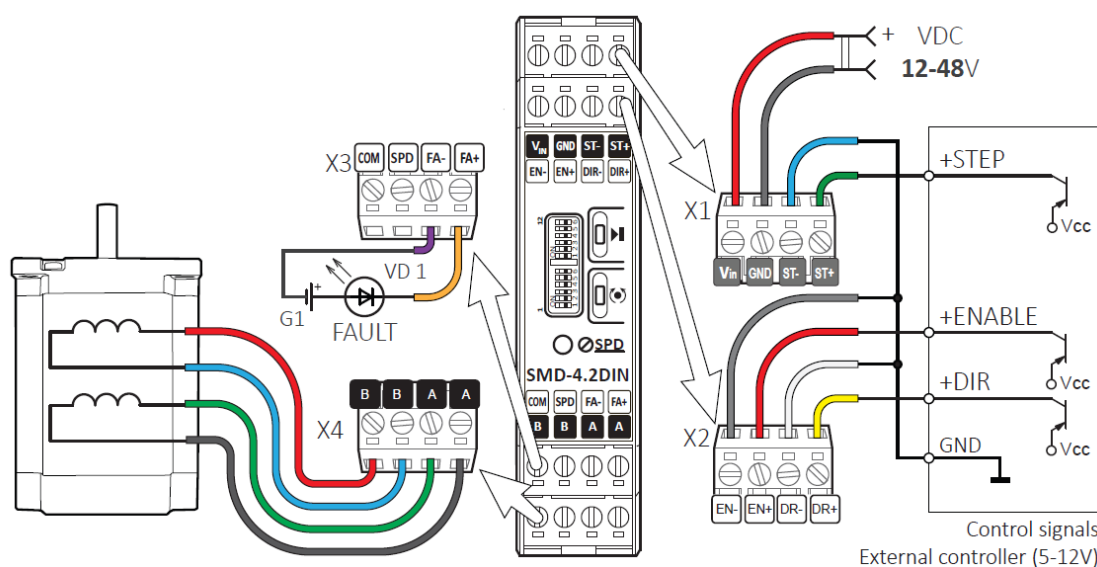


Fig.3. Example of connection to a source of logical signals STEP/DIR/ENABLE - open collector, PNP.

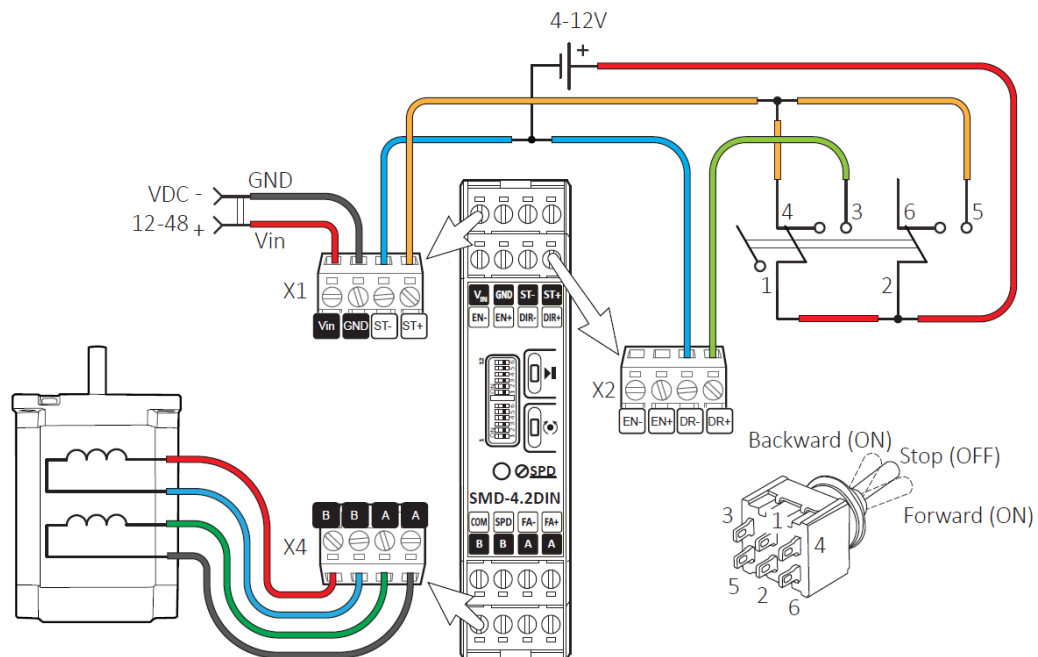


Fig.4. Example of connecting discrete input signals of the driver in analog speed control mode. 1.

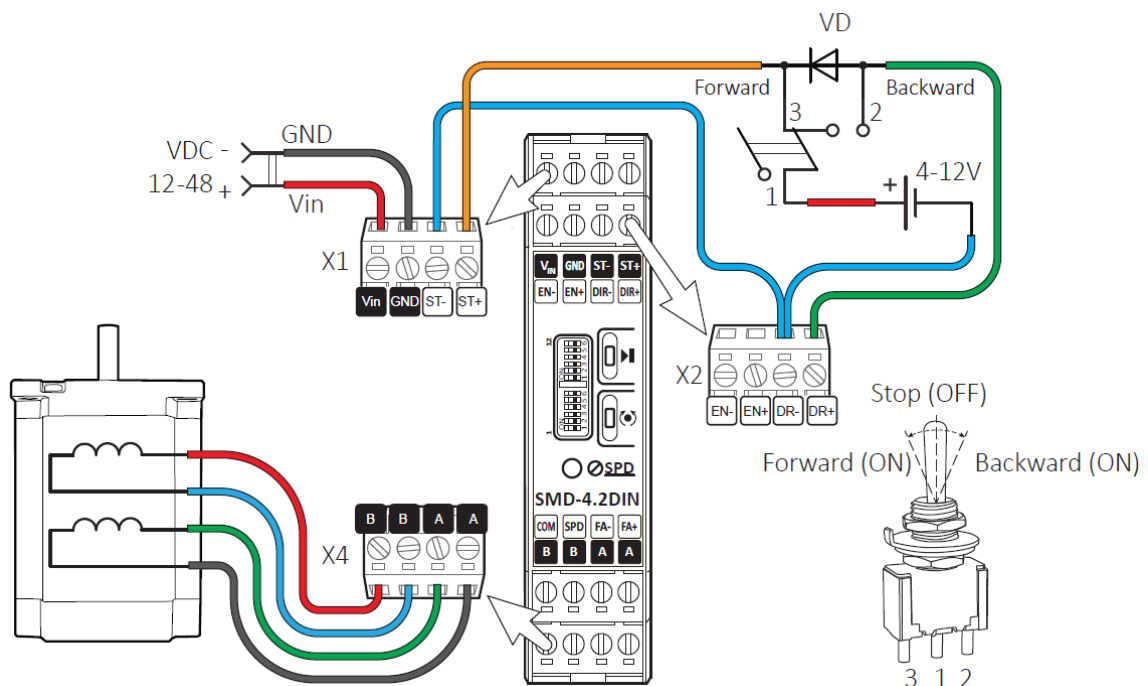


Fig.5. Example of connecting discrete input signals of the driver in analog speed control mode. 2.

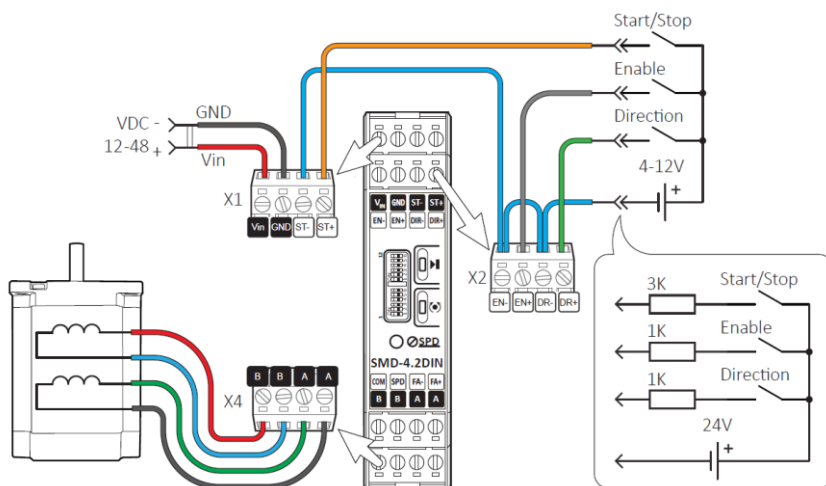


Fig. 6. Example of connecting discrete input signals of the driver in analog speed control mode. 3.

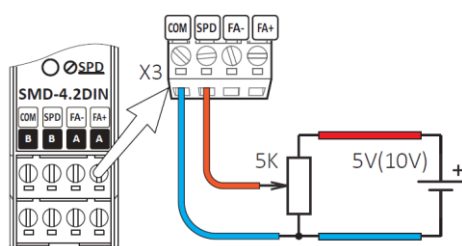


Fig. 7a. Examples of connecting an external analog signal input - speed adjustment with an external potentiometer

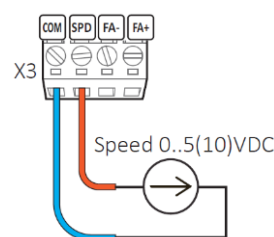


Fig. 7b. Examples of connecting an external analog signal input - speed regulation by an external voltage source

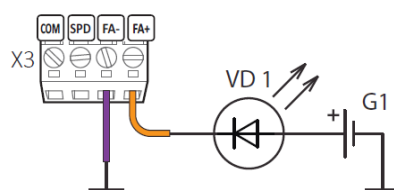


Fig. 8. Example of connecting the alarm output signal FAULT alarm.

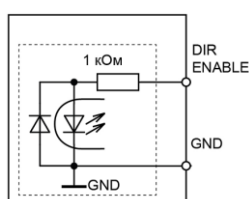


Fig. 9. Circuit design of DIR and EN inputs.

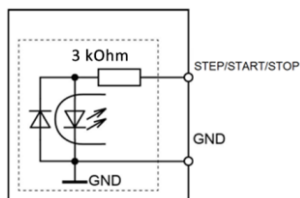


Fig. 10. Circuit design of ST input.

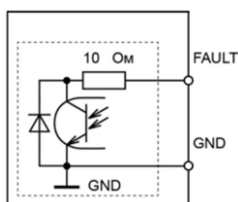


Fig. 11. Circuit design of the FAULT alarm output.

The FAULT output signal is intended to monitor the state of the driver. In normal conditions, the resistance between terminals "FA+" and "FA-" tends to infinity. When an emergency occurs, the resistance outputs "FA+" and "FA-" are closed.

Signal type – opto-coupler output. Max. voltage: 48VDC, max. current: 50 mA



Connection of a stepper motor

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

Table 2

Scheme 1	Scheme 2	Scheme 3	Scheme 4

8 wires step motor connection (4 phases):
 Scheme 1 – serial connection;
 Scheme 2 – parallel connection.

6 wires step motor connection (2 phases with midpoint taps):
 Scheme 3;

4 wires step motor connection (2 phases without midpoint taps):
 Scheme 4.

6. Controller parameters settings

Adjustment is carried out by microswitches on the front panel of the driver.

Set the phase current according to the table 3. The phase current is set using the microswitches SW1 - SW4.

Table 3. Phase current

microswitches				SMD-4.2DIN ver.3
SW1	SW2	SW3	SW4	Phase current, A
OFF	OFF	OFF	OFF	2,7
OFF	OFF	OFF	ON	2,8
OFF	OFF	ON	OFF	2,9
OFF	OFF	ON	ON	3
OFF	ON	OFF	OFF	3,1
OFF	ON	OFF	ON	3,2
OFF	ON	ON	OFF	3,3
OFF	ON	ON	ON	3,4
ON	OFF	OFF	OFF	3,5
ON	OFF	OFF	ON	3,6
ON	OFF	ON	OFF	3,7
ON	OFF	ON	ON	3,8
ON	ON	OFF	OFF	3,9
ON	ON	OFF	ON	4
ON	ON	ON	OFF	4,1
ON	ON	ON	ON	4,2

Selection of a control mode, analog signal, setting of the holding current, and inversion of the enable signal are set by microswitches according to Table 4.

Table 4. Common settings

Enable inversion		Selecting an analog signal		Holding current		Control mode	
SW5		SW6		SW7		SW8	
OFF	Turned off	OFF	External signal	OFF	100%	OFF	Analog speed control
ON	Turned on	ON	Built-in potentiometer	ON	50%	ON	STEP/DIR/EN pulse position control



Microstepping mode is set by the switches SW9 to SW12 as shown in Table 5.

Table 5. Microstepping

SW9	SW10	SW11	SW12	Microstepping
OFF	OFF	OFF	OFF	256
OFF	OFF	OFF	ON	128
OFF	OFF	ON	OFF	64
OFF	OFF	ON	ON	32
OFF	ON	OFF	OFF	16
OFF	ON	OFF	ON	8
OFF	ON	ON	OFF	4
OFF	ON	ON	ON	2
ON	OFF	OFF	OFF	1
ON	OFF	OFF	ON	1
ON	OFF	ON	OFF	1
ON	OFF	ON	ON	1
ON	ON	OFF	OFF	1
ON	ON	OFF	ON	1
ON	ON	ON	OFF	1
ON	ON	ON	ON	1

7. Stepper motor control

If used **STEP/DIR pulse position control mode (SW8 = ON)**, give a sequence of signals «STEP» (pulse), «DIR» (level), and «ENABLE» to the inputs ST, DIR, and EN accordingly.

High level of the signals – 4..12VDC, low level - 0..1VDC.

One step (or microstep) executes as the front edge of the voltage pulse at the «STEP» input. Direction switches by changing the voltage level at the «DIR» input. The motion is enabled if the signal to «ENABLE» input is given. The signals oscillogram is shown in Fig. 12.

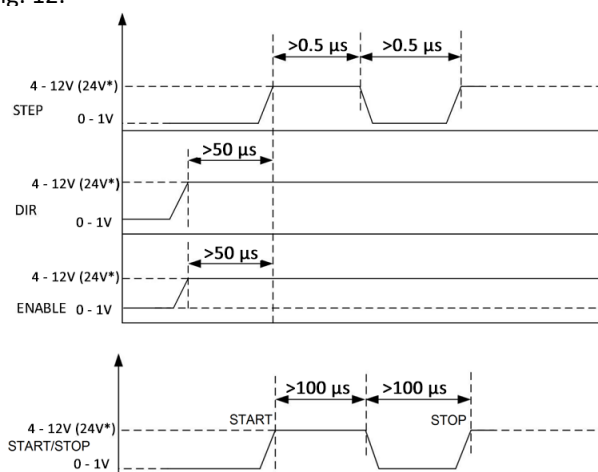


Fig.12. signals order and duration

*Connect additional current limiting resistance if using high-level signal +24VDC: 3KOhm for ST input, 1KOhm for all the rest inputs.

If using **analog speed control mode (SW8 = OFF)** – adjust the rotation speed with the built-in SPD potentiometer or external analog signal. Control can be carried out by buttons located on the front panel or by external control signals EN/ST/DIR.

The range of the external analog signal is set by the jumper shown in Fig. 14. The jumper is located on the circuit board under the case. To open the case, it is necessary to release the two latches next to the connectors.

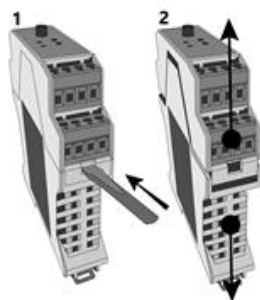


Fig.13. Taking of the case of the driver.

To set the jumper:

- Disconnect the terminals from the controller;
- Open the housing as shown in Figure 3;
- Press down on the latch with a flathead screwdriver on both sides;
- Pull the top and bottom of the case apart;
- Set the jumper to the required position (Fig.14).



Fig.14. – a jumper for selecting the analog signal range.

8. Errors detection

The output signal "Fault" is intended to monitor the state of the driver. In the normal state, the resistance between terminals "FA+" and "FA-" tends to infinity. In the event of an emergency, the resistance outputs "FA +" and "FA-" are closed.

Detailed information on LED status indication is given in Table 6.

Table 6. State indication

LED	Meaning
Lit green	Normal state – standby, motor phases are de-energized
Blinking green 1 time per second	Normal state – motor phases energized.
Blinking green 2 times per second	Normal state – motor phases energized, and the internal generator is in operation.
Blinking red 2 times per second	Short circuit in motor phases A, phases are de-energized
Blinking red 3 times per second	Short circuit in motor phases B, phases are de-energized
Blinking red 4 times per second	The driver is overheated, phases are de-energized

9. Delivery in complete sets

Stepper motor driver SMD-4.2DIN ver.3

1 pcs

10. Manufacturer information

Smart Motor Devices adheres to the line of continuous development and reserves the right to make changes and improvements in the design and software of the product without prior notice.

The information contained in this manual is subject to change at any time and without prior notice.

11. Warranty

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

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

The manufacturer's sales department address:

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