



DC BRUSH MOTOR CONTROLLER BMD

Manual

BMD.24.005

1. Product designation

Controller BMD is electronic device to operate and control DC brush motors with maximum voltage 28VDC and power under 300W. Controller is designed to control speed, direction, smooth start and stop of brush motors.

2. Technical characteristic

Power voltage V_{sup} : 7 – 28VDC

Max. operation motor current: 12A

Overcurrent protection: 16A

Max. output voltage (to the motor): $0,98 * V_{sup}$

Min. output voltage (to the turned on motor): $0,05 * V_{sup}$

Min. acceleration and deceleration setting: $(V_{sup} / 8)$ V/sec

Max. acceleration and deceleration setting: $(3V_{sup})$ V/sec

- voltage: 0 – 5V

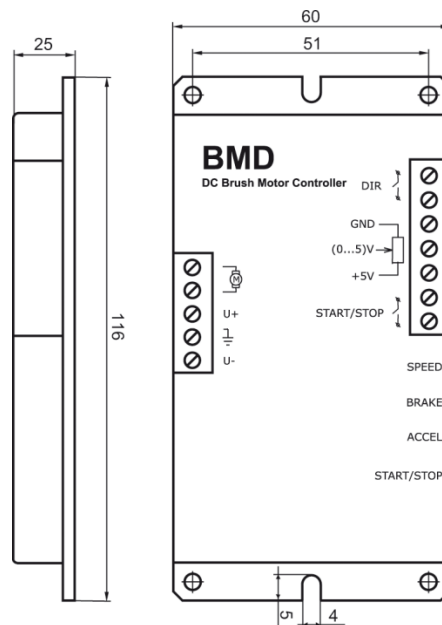
- resistance: 720 Ω

Input signals "DIRECTION" and "START/STOP" parameters:

- max. closed contact resistance of breaker contact: 2 k Ω

- max. current: 0,5 mA

Overall dimensions: 116x60x25 mm



Dimensions and control elements

Environmental Conditions:

Ambient Temperature: -25...+50°C

Humidity: 90% RH or less upon condition +25°C

Condensation and freezing: none

3. Construction and control elements

BMD is designed as circuit plate with electronics elements, installed on a plate and covered with a metal case.

Besides electronic components, there are indicating and control elements and connection terminals on the board:

- terminal screws for power supply, motor windings and control circuit connection;
- "START/STOP button";
- Internal preset potentiometers to adjust speed "SPEED", acceleration "ACCEL" and reversing deceleration "BRAKE";
- LED for indication of the controller status.


To adjust motor speed internal potentiometer "SPEED" and analog input "(0..5)V" are provided. To adjust acceleration and reversing deceleration internal potentiometers "ACCEL" and "BRAKE" are provided. To change the direction input "DIR" is intended. To start or stop motion button and input "START/STOP" are intended.

4. Assembly and connection

Please, learn this manual carefully before connection and assembly.

Please, wire just 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.

- 1) Make sure the power supply is turned off. Please, wire just when power is off.
- 2) Please, choose the speed adjusting method:
 - Internal potentiometer - additional connection doesn't required.
 - External potentiometer – connect potentiometer to the "SPEED" contacts "(0..5)V" and "+5V". The internal potentiometer "SPEED" should be turned to the end left position.
 - Analog signal 0-5VDC – connect the source of analog signal 0-5VDC to the "SPEED" contacts: "-" to the "GND" contact and "+" to the "(0..5)V" contact. The motor speed is proportional to the signal voltage.
- 3) If needed, connect control elements to the "START/STOP" and "DIR" contacts. These inputs are clean contact. Signals are activated as per the front edge of the signal.
- 4) Connect brush motor to contacts  of the controller. The motor rotation direction depends on the polarity of motor wiring.
- 5) Connect power supply to contacts "+" – to "U+", "-" to "U-". $\frac{1}{2}$ - is the electric ground. At the maximum speed adjusting 0.98 of power supply voltage will be applied to the motor.
- 6) Turn on the power supply.

5. Motor control

The LED color is non-blinking green then the power supply is ON and the BMD controller is ready to operate.

1. To start the motor rotation press "START/STOP" button or activate "START/STOP" signal (clean contact). The LED indicator is blinking when the motor is running.

2. To stop the motor press "START/STOP" button or activate "START/STOP" signal (clean contact) when the motor is running.

3. The motor speed depends on speed adjusting signal.

- Internal potentiometer - additional connection doesn't required. The minimum speed corresponds to the left position of the potentiometer "SPEED". The maximum speed corresponds to the right position of the potentiometer "SPEED".
- External potentiometer – should be connected according to the section 4.2. The internal potentiometer "SPEED" should be turned to the end left position. The minimum resistance of the potentiometer corresponds to the maximum motor speed. Increasing resistance leads to reducing motor speed. We recommend to use 10KOhm potentiometer.
- Analog signal 0-5VDC – the signal source should be connected according to the section 4.2

The motor voltage is $0,05 * V_{sup}$ (5% of supply voltage) at the minimum speed. The motor can completely stop at the minimum speed if the motor model doesn't accept the voltage. The motor voltage is $0,98 * V_{sup}$ (98% of supply voltage) at the maximum speed.

4. The motor acceleration depends on the "ACCEL" potentiometer position. The maximum acceleration (minimum acceleration time) corresponds to the end left position - $(3V_{sup})$ V/sec. The minimum acceleration (maximum acceleration time) corresponds to the end right position - $(3V_{sup}/8)$ V/sec.

Note: When motor starts in short period after it was stopped, motor start speed depends on "BRAKE" potentiometer position and time period since it was stopped.

5. The motor reversing deceleration depends on the "BRAKE" potentiometer position. The maximum deceleration (minimum deceleration time) corresponds to the end left position - $(3V_{sup})$ V/sec. The minimum acceleration (maximum acceleration time) corresponds to the end right position - $(3V_{sup}/8)$ V/sec.

6. The motor direction depends on the motor wiring. Motor rotation direction can be changed by signal DIR.

Signals is activated as per the front edge of the signal. The acceleration and reverse deceleration are applied according "ACCEL" and "BRAKE" potentiometers position. Please, refer to the section 5.4 and 5.5.

6. Delivery in complete sets

The brush motor controller BMD	1 pcs.
Manual BMD.24.004	1 pcs.

7. 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 – section 2.

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