



## Industrial motor controller for brushless DC motors 12 / 24 VDC

Design for output currents up to 2 A

Control with the following functions:

- reversal of direction of rotation
- open-loop speed control (external)
- overcurrent limit
- dynamic brake
- thermal protection
- “motor spinning” digital output
- 10V reference voltage output

To snap onto the DIN rail EN 50022

Unit width: 45 mm



<b>Type</b>	<b>UB-BL-2-24</b>
<b>Article number</b>	<b>06.33.001</b>
<b>Operating data</b>	
Nominal voltage	$U_{nom}$ 24,0 VDC
Supply voltage	$V_{CC}$ 8 .. 30 VDC
Control inputs	$U_{DI}$ 24,0 VDC
Analog input	$U_{AI}$ 0 .. 10 VDC
Quiescent current typ	$I_0$
<b>Technical data: load circuit</b>	
Max. current / continuous load current typ	$I_{max}/I_{con}$ 2,5 / 1,8 A
PWM frequency	$F_S$ TBD kHz
Duty cycle	0 .. 100 %
Power stage driver	MOS-FET
<b>Other data</b>	
Dimensions	45 x 64 x 36 mm
Connectors	screw terminal, pitch 5 mm cross section 0,2 – 2,5 mm <sup>2</sup>
Permissible ambient temperature	$T_{amb}$ -20 .. +50 °C
Temperature monitoring / overvoltage protection	yes / yes
Dynamic brake (Armature short circuit)	can be switched on

Other data	
Installation position / Assembly	any / top-hat rail EN 50022
Installation place, typical	Switch cabinet
Storage temperature	-30 to +85 °C
Permissible humidity	to 95 %, non-condensing
Weight	TBD kg
Hazardous substance norm	RoHS3
EMC interference immunity	EN 61000-6-2:2016
EMC emitted interference	EN 61000-6-3:2007 + A1:2011
Technical data: digital input	
High Signal typ	U > 10 V
Low Signal typ	U < 4 V
Impedance typ	R <sub>DI</sub> 15 kΩ
Technical data: analog input	
Voltage range	0 .. 10 V
V <sub>CC</sub> tolerant	yes
Impedance typ	R <sub>AI</sub> 118,7 kΩ
Supply for external Potentiometer (at Supply Voltage 11 – 30 V)	10 V 100μA
recommended external Potentiometer resistance	100 kΩ
Technical data: Hall sensor inputs	
Internal pull up resistor	10kΩ
Hall supply voltage	U <sub>HALL</sub> 5V DC 200mA max.
Hall sensor arrangement	120°
Technical data: digital output	
„Motor not spinning“	GND (3kΩ Pull-Down)
„Motor spinning“	VCC
Current typ	I <sub>DO</sub> 700 mA
Short circuit-proof	Yes, self-limiting

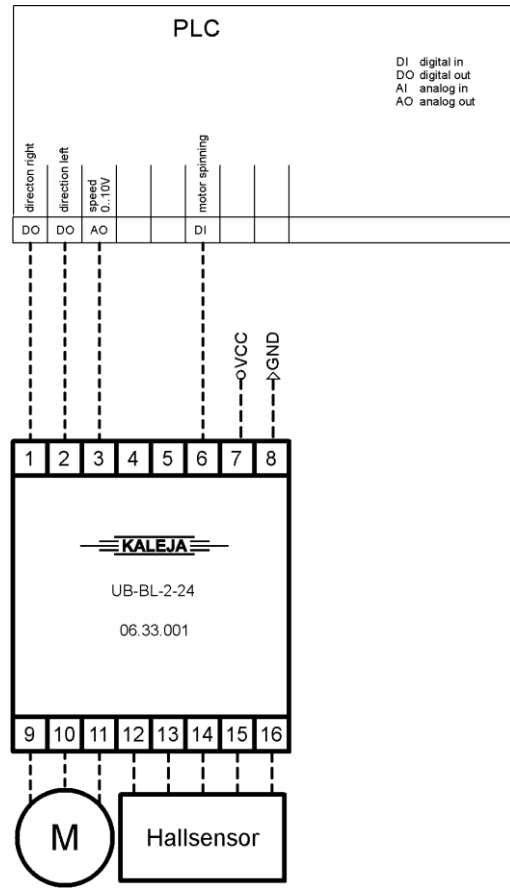
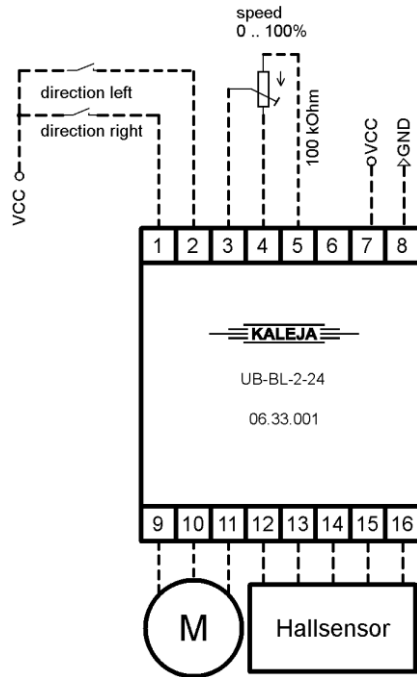
**Description**

The UB-BL-2-24 module is a motor controller for small BLDC-motors with integrated open collector hall sensors. It is intended for use in industrial environments. It ensures the switching on and off, as well as the controlled driving of motors. The Module has two digital inputs, one analog input and one digital output.

The motor's direction of rotation can be set via the digital inputs. The dynamic brake can be activated by setting both inputs high. By means of the analog input the speed can be set between 0 to 100%. An external 100 kΩ potentiometer for the speed input can be supplied by the module. The maximum motor current is limited by the hardware and is therefore not adjustable. The digital Output is switched on while the motor is spinning.

Typical application: Standard

Typical application: PLC



**Terminal diagram**

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
Digital input „CW“ (high active)	Digital input „CCW“ (high active)	Analog input 0 .. 10V speed 0 .. 100%	GND for external potentiometer	+10VDC source for potentiometer	Digital output “spinning”	V <sub>CC</sub> supply voltage	GND supply
<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>
Hall signal C 10kΩ pullup internal	Hall signal B 10kΩ pullup internal	Hall signal A 10kΩ pullup internal	Hall +5V 50mA Voltage source hall sensors	Hall GND	Motor phase C	Motor phase A	Motor phase B

**State table**

direction „CCW“ (8)	direction „right“ (2)	Motor phase (14) (15) (16)	Function
0	1	A -> B -> C	run right
1	0	C -> B -> A	run left
1	1	GND	dyn. braking
0	0	open	off

0 = off 1 = on x = don't care

**Function: Speed setting**

Via the analog input at terminal (4) it is possible to set the PWM duty cycle that is to be issued to the motor. Within a range from 0 V to 10 V, the voltage is applied as a 0 – 100 % output. With a loading of the motor, the speed reduces.

voltage (4)	Rotational speed / PWM
> 10V	100%
0...10V	Linear 0 – 100%
0 V	off
open	off

**Function: current limitation**

When the motor current exceeds the fixed max. current value, the module decreases the speed unless the motor current is equal or lower as the adjusted limit.

**Function: dynamic brake**

The function “dynamic braking” is deactivated as standard. The function is activated by applying a High Signal at both direction terminals (7) and (8). If dynamic braking is active, the motor winding is switched to GND at all motor terminals. The motor is stopped with armature short circuit braking. If dynamic braking is not active, the motor spins with no braking.

**Function: temperature shut-off**

The module is equipped with a temperature sensor. If the maximum allowed temperature is exceeded, the motor is switched-off without dynamic braking. After a cooling down, the motor can be started again by setting of a direction input. The necessary cooling down time is dependent on ambient temperature and mounting situation of the module.

**Dimensional drawing**

TBD

## Safety notes

### Maximum operational data

The maximum operating data may not be exceeded.

### Installation

The installation and start-up must be performed by specialist personnel exclusively.

All affected components must be disconnected from the mains.

### Start-up

For the first start-up, the motor should be operated without load.

### Risk of death

Do not touch live parts after switching on!

The assembly must be operated exclusively on safety extra-low voltage. With operation on extra-low voltage (e.g. via autotransformer), death or injury can occur.

### Fire protection

The assembly must be installed in a switch cabinet, which is suitable as a fire protection enclosure.

The assembly must be safeguarded with a pre-fuse aligned with the nominal data.

### Hot surface

Components and possibly existing heat sinks can become hot during operation! Do not touch!

### Field of application

The assembly may only be used as intended.

Other components must be checked for their approvals and regulations.

### Safety devices

An additional safety device must be used to bring the system into a safe state in case of a cable break, incorrect operation, failure of the control/controller unit.

### EMC / EMI

The wiring must be done according to EMC / EMI standards. If necessary, shielded cables and EMC suppressors must be used for the connected consumer.

For operation in a public low-voltage distribution network, the module must be supplied with an approved AC adapter.

If the module is supplied with an AC adapter, other equipment, operated on the same power supply, must be suitable for use in industrial environments.

### Repairs

Repairs must be performed by authorised persons exclusively. With unauthorised opening, the warranty cover is voided and this may also result in danger for the user and for the system.

### Maintenance

The assembly is wear-free by design.

For modules **with** cooling openings free air circulation must be checked at the cooling openings or on the housing at regular intervals. If necessary, the cooling holes / the housing must be cleaned.

Good ventilation must be ensured.



## contact details



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