



# Industrial motor controller for brushed DC motors 24 VDC

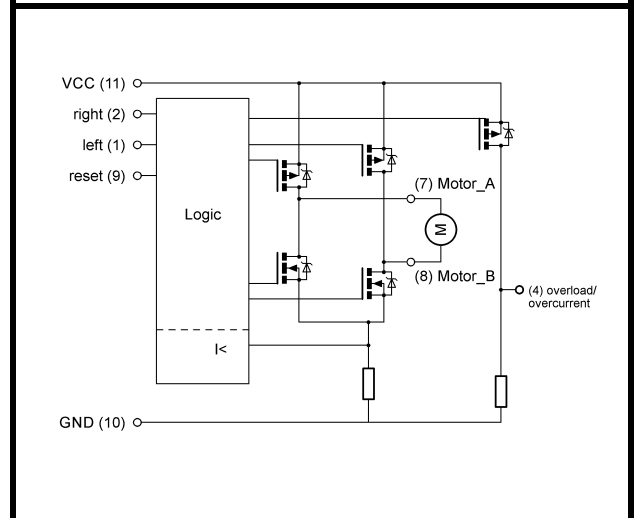
Design for output currents up to 6 A

Control with the following functions:

- reversal of direction of rotation
- overcurrent shutdown depends on direction of rotation
- overcurrent indication output
- adjustable current monitoring delay
- short circuit detection
- dynamic brake

To snap onto the DIN rail  
EN 50022

Unit width: 17,5 mm



<b>Type</b>	<b>M2-MWT-6-30</b>
<b>Article number</b>	<b>06.34.007</b>
<b>Operating data</b>	
Nominal voltage	$U_{nom}$ 24,0 VDC
Supply voltage	$V_{CC}$ 18 .. 30 VDC
Control inputs	$U_{DI}$ 24,0 VDC
Quiescent current typ	$I_o$ 50 mA
<b>Technical data: load circuit</b>	
Max. current / continuous load current	$I_{max}/I_{con}$ 15 / 6 A
Short circuit current detection typ	$I_{SC}$ 80 A
Shut-down time after short circuit typ	$t_{sc}$ 100 $\mu$ s
Power stage driver	MOS-FET
<b>Other data</b>	
Dimensions	17,5 x 70,4 x 85,0 mm
Connectors	push-in terminal, pitch 5 mm cross section 0,2 – 2,5 mm <sup>2</sup>
Permissible ambient temperature	$T_{amb}$ -20 .. +60 °C
Temperature monitoring / overvoltage protection	yes / yes
Status indication: error / right / left	LED1 red / LED2 green / LED3 green
Current limitation left adjustable over DIP(3,4) and TR2	0,4 .. 6 A
Current limitation right adjustable over DIP(1,2) and TR3	0,4 .. 6 A
Disable Time trimmer TR1 (CM-delay)	0 .. 0,7 s
Dynamic brake (Armature short circuit)	always on

Other data	
Installation orientation / Assembly	any / top-hat rail EN 50022
Installation place, typical	Switch cabinet
Storage temperature	-30 .. +85 °C
Permissible humidity	0 to 95 %, non-condensing
Weight	0,075 kg
Start up time	2 s
Hazardous substance norm	RoHS2
EMC interference immunity	EN 61326-1:2013-01 EN 61000-6-2:2005-08
EMC emitted interference, operation in industrial DC network	EN 61326-1:2013-01, Class A
EMC emitted interference, operation with power supply	EN 61326-1:2013-01, Class B
supply unit / power unit	KDR 120-24, Ott GmbH & Co. KG or comparable

Technical data: digital output overcurrent	
„Ready“	GND (4,7kΩ Pull-Down)
„Overcurrent“	V <sub>CC</sub>
Current typ	I <sub>DO</sub> 700 [mA]
Short circuit-proof	Yes, self-limiting

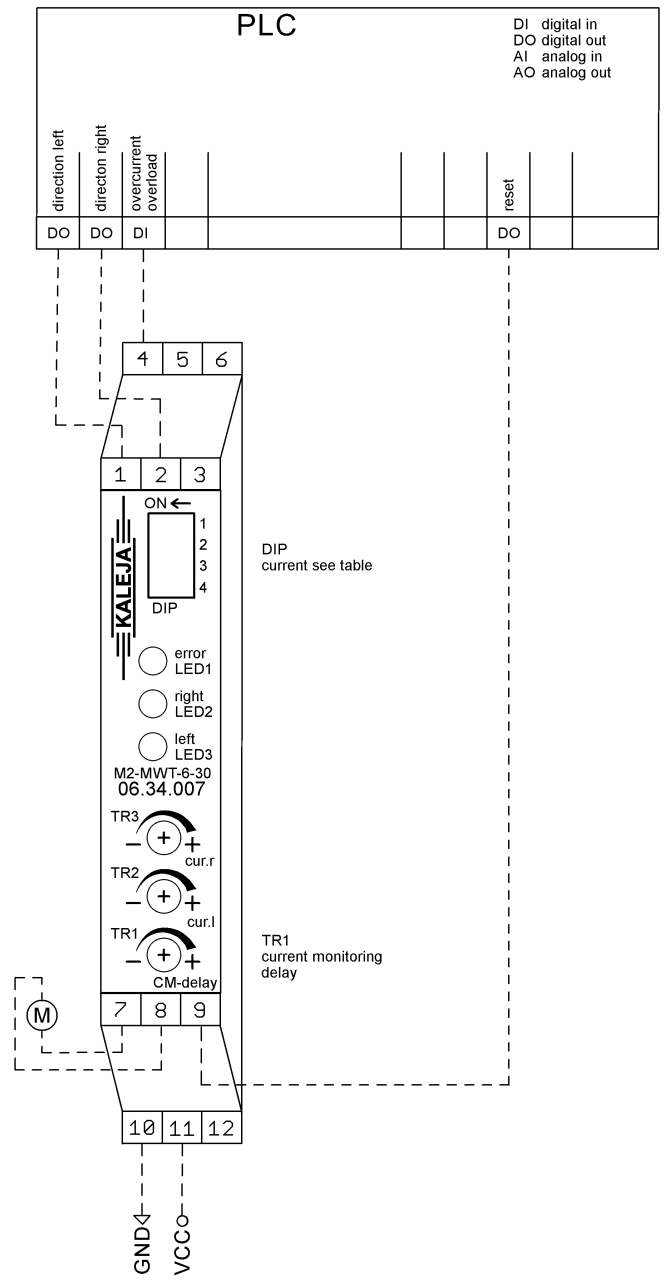
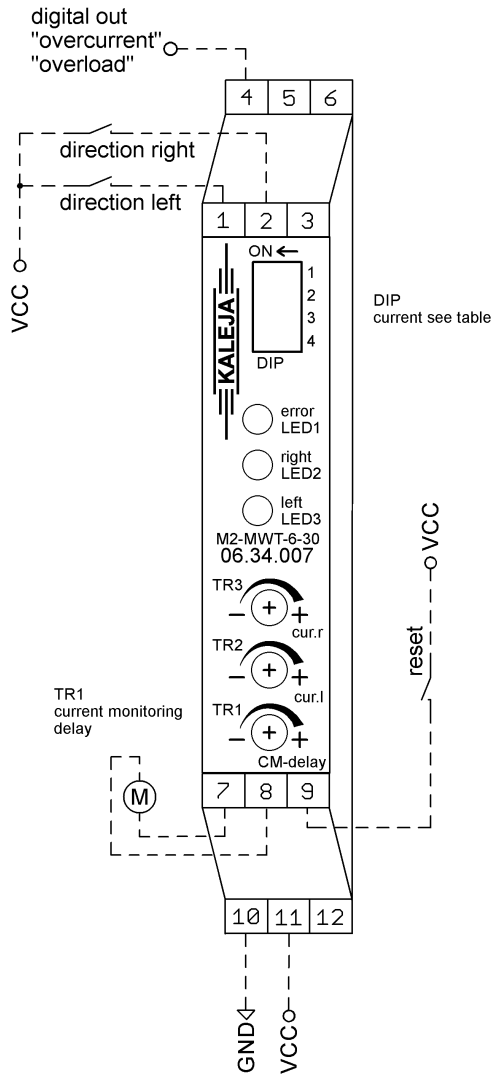
Technical data: digital input	
High Signal typ.	U > 10 V
Low Signal typ.	U < 4 V
Impedance typ.	R <sub>DI</sub> 15 kΩ

Flammability	
Housing, terminals, printed circuit board	UL94V-0

**Starting behavior**  
 After applying supply voltage, the module is ready for operation when the start up time has elapsed.

**Description**  
 The module is a two quadrant motor control for use in industrial environments. It ensures the switching on and off, as well as the controlled driving of motors. Over a DIP switch and two internal trimmer the motor current limit value for the overcurrent shutdown is for each direction of rotation adjustable. The continuous load current from the module is 6A. A digital output reports if the module is in overcurrent shutdown mode. Current monitoring delay is adjustable over Trimmer TR1.  
 The module has two digital inputs to select the rotation directions and one digital input to reset the module if an overcurrent shutdown has appeared.

Typical application: Standard	Typical application: PLC
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**Terminal diagram**

<b>4</b> digital output „overcurrent“ High-active	<b>5</b> Reserved NC	<b>6</b> Reserved NC
<b>1</b> digital input „direction left“ (p- switch)	<b>2</b> digital input „direction right“ (p- switch)	<b>3</b> Reserved NC
<b>7</b> Motor winding B	<b>8</b> Motor winding A	<b>9</b> digital input „reset“ (p- switch)
<b>10</b> GND supply	<b>11</b> +24 V supply +/-10 %	<b>12</b> Reserved NC

**State table**

direction „left“ (1)	direction „right“ (2)	Motor „A“ (9)	Motor „B“ (10)	Funktion
0	1	VCC	GND	run right
1	0	GND	VCC	run left
1	1	GND	GND	dyn. braking
0	0	GND	GND	dyn. braking

0 = off    1 = on    x = don't care

**Function: overcurrent shut-off**

The module has two trimmers (TR2 and TR3) and an DIP switch to adjust the maximum motor current. For each direction of rotation the maximum motor current can be set separately. See description "setting the maximum motor current"

In case of an overcurrent shut-off the digital output (4) is set HIGH.

To reset the module set a HIGH Signal on digital input "reset" (9) or set both direction inputs (1 & 2) to low and start again in any direction.

**Function: setting the maximum motor current**

The maximum motor current is adjusted via the DIP switch on the module. With the corresponding trimmer the current is adjustable from 50 to 100% of the current set at the DIP switch.

DIP1	DIP2	DIP3	DIP4	Current[A]		Trimmer
				Min.	Max.	
Off	Off	X	X	0,375	0,75	TR3
<b>On</b>	Off	X	X	0,75	1,5	TR3
Off	<b>On</b>	X	X	1,5	3	TR3
<b>On</b>	<b>On</b>	X	X	3	6	TR3
X	X	Off	Off	0,375	0,75	TR2
X	X	<b>On</b>	Off	0,75	1,5	TR2
X	X	Off	<b>On</b>	1,5	3	TR2
X	X	<b>On</b>	<b>On</b>	3	6	TR2

<b>Function: dynamic brake</b>	<b>Function: overload / short circuit detection</b>
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The motor always stops with dynamic brake while normal operation.

When the module detects overload or short circuit on the motor output, the motor switches off without dynamic braking. The motor can be restarted by means of a reset (9) or fresh setting of any input of direction of rotation.

<b>Function: disable overcurrent shutdown</b>	<b>Function: current monitoring delay</b>
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The overcurrent shutdown is disabled while there is a HIGH signal applied on the digital input on terminal (9). The overload shutdown is still active.

The current monitoring delay is adjustable by trimmer TR1. After setting any direction of rotation input the overcurrent shutdown is disabled for the adjusted time.

<b>Function: overcurrent output</b>	<b>Function: overload shutdown</b>
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The overcurrent output (digital output terminal 4) is "high" when the modul detects an overcurrent.

The module is internally protected with an overload shutdown. In case of rising of the motor current over the rated continuous load current the module switches of with a thermal safety function. After the shutdown the module is locked for a cooldown phase which is managed by the module.

With active overcurrent shutdown the motor is switched off simultaneous with the overcurrent output.

In case of an overcurrent shut-off the digital output (4) is set HIGH.

With deactivated overcurrent shutdown the overcurrent output is "high" when an overcurrent is detected and the motor runs till overload shutdown or stop from the user.

To reset the module the cooldown phase must be elapsed and both direction inputs (1 & 2) must set to low and start again in any direction.

<b>Device status</b>	<b>Display elements</b>
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The module status is displayed via the LEDs on the module front plate.

Module errors are displayed as flashing sequences. The end of the sequence is indicated by a pause of 1 second.

LED1 red	LED2 green	LED2 green	meaning
Off	Off	Off	Module is operational
Off	On	Off	Run right
Off	Off	On	Run left
flashing	Off	On	Module error 1 (see table) Occurred while running left
flashing	On	Off	Module error 1 (see table) Occurred while running right
flashing	flashing	flashing	Internal Error

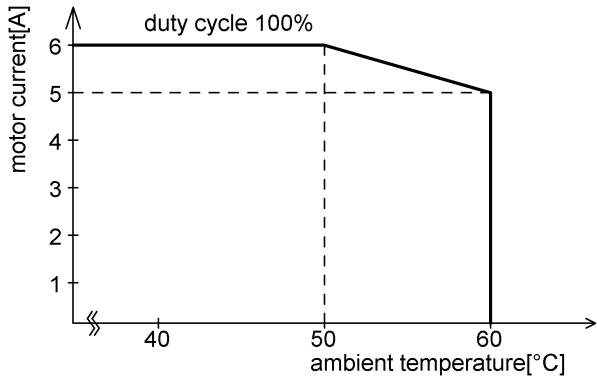
The number of flashes indicates the error number.

**Module error 1**

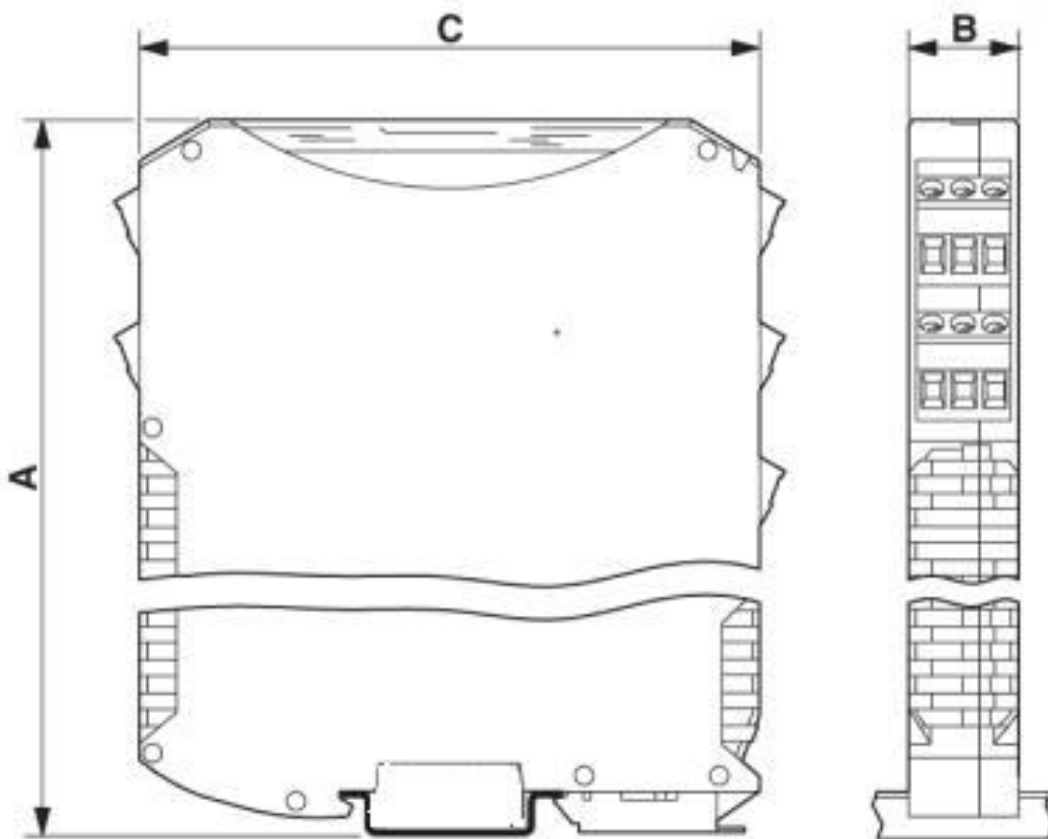
1	overcurrent
2	Over-temperature
3	short circuit detected
4	overvoltage
5	overload
6	Under-temperature
7	Low supply voltage
8	

**Temperature derating**

At 100% duty cycle and aligned modules with 10mm spacing the following diagram is valid.



**Dimensional drawing**



A = 70,4 mm; B = 17,5 mm; C = 85 mm

## Safety notes

### Maximum operational data

The maximum operating data must 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.

### 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



ready-to-use motor control solutions  
electronics design & manufacturing

### KALEJA GmbH

Strübelweg 14

73553 Alfdorf, Germany

Phone: +49 7172 93711 0

Fax: +49 7172 93711 90

E-Mail: [info@kaleja.com](mailto:info@kaleja.com)

[www.kaleja.com](http://www.kaleja.com)