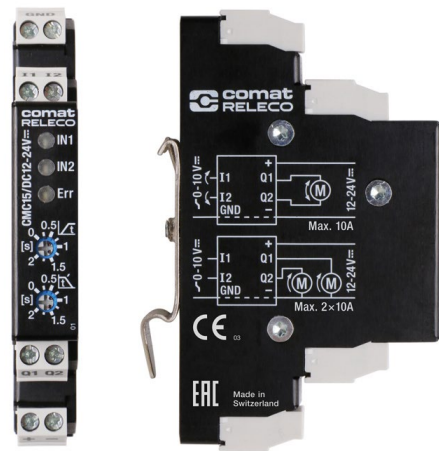# Motor Controller CMC15, CMC16

1 Features

- **Power supply DC 12…24 V**
- **Analogue control inputs 0 … 10 V or 4 … 20 mA**
- **Motor current 10 A continuously, temporary 20 A**
- **Adjustable start and break ramps**
- **Status and error displayed by LED**
- **Short-circuit-proof**
- **Wear free**

2 General description

The CMC15 and the CMC16 are control devices for DC motor operation. The Motor speed is set by corresponding signals at the analogue inputs. To adjust the acceleration and deceleration ramp two potentiometers are used. Up to two motors can be operated independently of each other. Mechanical shocks and high current peaks are prevented; the lifetime of the whole system is increased.

Motor Controllers of the CMC line comply to DIN standard 43880. Installation width is 14 mm.

Technical specification subject to change without notice.

3 Order designation

ComatReleco Motor Controller analogue 0 … 10 V CMC15/DC12-24V
ComatReleco Motor Controller analogue 4 … 20 mA   CMC16/DC12-24V

4 Connecting diagram

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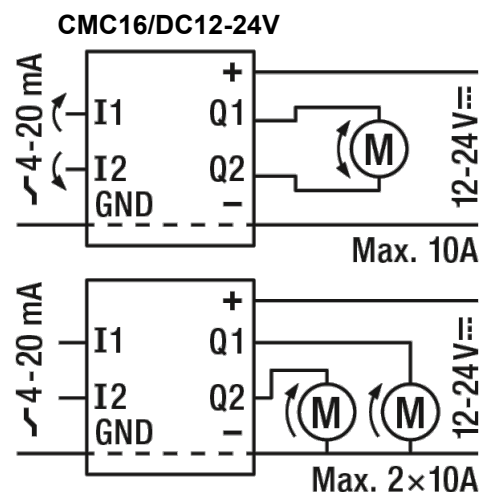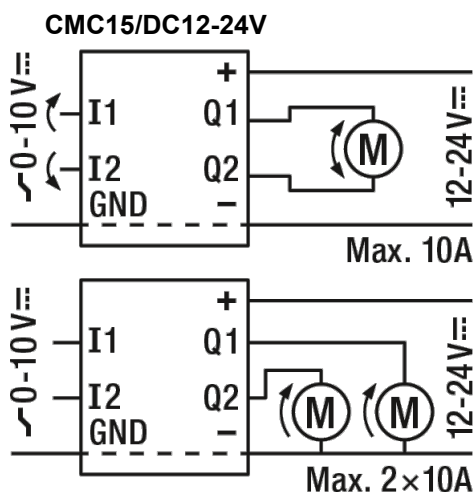
Terminal	CMC15/DC12-24V	CMC16/DC12-24V
I1	Analogue Input 1 (0 … 10 V)	Analogue Input 1 (4 … 20 mA)
I2	Analogue Input 2 (0 … 10 V)	Analogue Input 2 (4 … 20 mA)
GND	Ground of control signals	
Q1	Output 1	
Q2	Output 2	
+, -	Power supply	

5 Function description

The CMC15 and the CMC16 can be used to operate one or two DC motors simultaneously. In case of one motor operation an analogue signal at I1 or I2 is used to set the speed and the direction of rotation. For two motor operation I1 is used to control the motor connected to Q1 and I2 controls the motor connected to Q2. The acceleration and deceleration ramp can be set independently between 0 … 2 s using two potentiometers. Exceeding current or torque peaks are avoided due to controlled acceleration and deceleration. The voltage at the load is adjusted very low-loss by pulse width modulation (PWM). The power output stage is protected against short-circuit and overheating. Errors are displayed by LED.
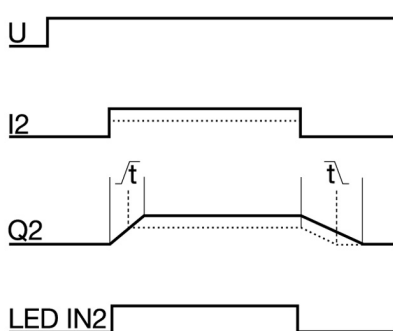
5.1 Operation mode with acceleration and deceleration ramp[1]

Ramp time t > 0 s
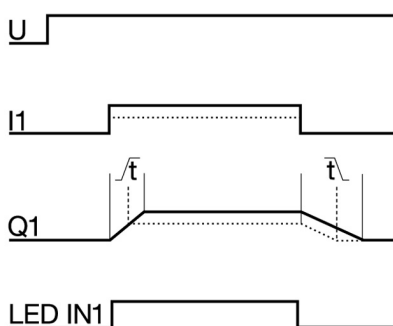
Triggering input I1 the voltage at output Q1 will be ramped up linearly during the preset time by the potentiometer. The motor is accelerated to speed set by signal at I1.
If input I1 is switched off (or signal is 0 V / 4 mA) the voltage at output Q1 is shut down linearly to zero during the preset time. The motor is decelerated to a halt.

Triggering input I2 the voltage at output Q2 will be ramped up linearly during the preset time by the potentiometer. The motor is accelerated to speed set by signal at I2.
If input I2 is switched off (or signal is 0 V / 4 mA) the voltage at output Q2 is shut down linearly to zero during the preset time. The motor is decelerated to a halt.

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[1] The acceleration and deceleration ramp can also be set by analogue signal from a master controller. Please refer to potentiometer settings and adjust if necessary.

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6 Specifications

6.1 General data

6.1.1 Mechanical data

Housing	System DIN
Outside dimension (W x H x D):	14 x 90 x 63 mm
Fastening	DIN Rail TS35
Connection	Screw terminal 2.5 mm^2
Ingress protection degree	IP20
Case material	Aluminum
Weight	80 g

6.1.2 Ambient conditions

Storage temperature range	-40 °C ... +85 °C
Operating temperature range	-25 °C ... +70 °C
Relative humidity	10 % ... +95 % (non condensing)

6.1.3 Life cycle

Expected life time (MTTF)	100 000 h (at 25 °C)

6.2 Electrical data

6.2.1 Power supply +, -

Nominal voltage	12...24 V DC
Admissible voltage range	8...28 V DC
Max. current consumption without load	10 mA
Max. power consumption without load at 12 V	120 mW
Max. power consumption without load at 24 V	240 mW

6.2.2 Analogue inputs I1, I2

Type	CMC15/DC12/24V	CMC16/DC12-24V
Nominal range	0 ... 10 V DC	4 … 20 mA
Resolution	8 Bit	8 Bit
Input impedance	55 kΩ	190 Ω

6.2.3 Outputs Q1, Q2

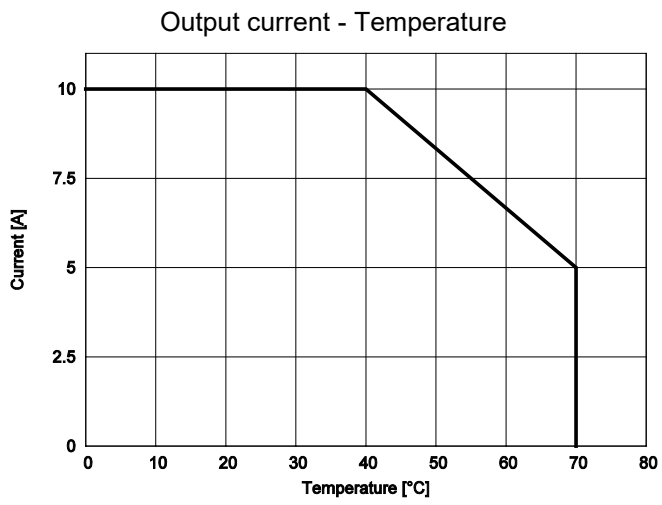|	
Nominal voltage	12 ... 24 V DC
Output	MOSFET H-bridge
Nominal current (40 °C max.)	10 A
Inrush current (3 s max.)	20 A
Switching current 24 V DC-1, DC-13	10 A
Switching current 24 V DC-3, DC-5	10 A

6.3 Time response
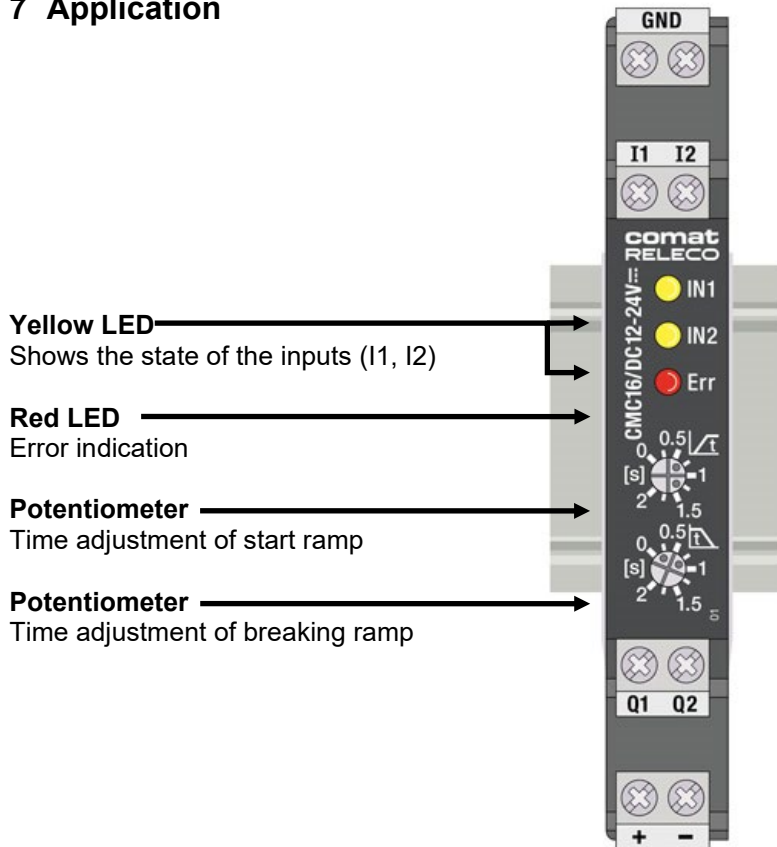
6.3.1 Ramps[2]

Start ramp	0 ... 2 s
Breaking ramp	0 ... 2 s

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[2] Time information corresponding to a jump over the full analogue input range (0 to 10 V or 4 to 20 mA and conversely).

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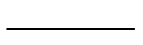
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6.4 Diagrams

Output current - Temperature

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7 Application

Yellow LED
Shows the state of the inputs (I1, I2)

Red LED
Error indication

Potentiometer
Time adjustment of start ramp

Potentiometer
Time adjustment of breaking ramp

7.1 Function display

Element	Functions one load	Functions two loads
Poti ⎰t̲	Ramp time acceleration 0 … 2 s	Ramp time acceleration 0 … 2 s
Poti t̲⎱	Ramp time deceleration 0 … 2 s	Ramp time deceleration 0 … 2 s
LED IN1	Signal at analogue input I1, motor in motion e.g. forward	Signal at analogue input I1, motor 1 is on
LED IN2	Signal at analogue input I2, motor in motion e.g. backward	Signal at analogue input I2, motor 2 is on
LED Err (Error)	Error detected, see chapter 7.2 Error display	Error detected, see chapter 7.2 Error display

7.2 Error display

LED Err (red)		Status	Troubleshooting
Not illuminated		Normal operation	
Illuminated at acceleration		Output current too high (> 12.5 A)	Reduce the load, extend the acceleration ramp
Blinking	⊓⊓⊓	Output stage overheated	Cool down (> 10 s), switch off inputs, reduce the load, reduce the voltage

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8 Dimension
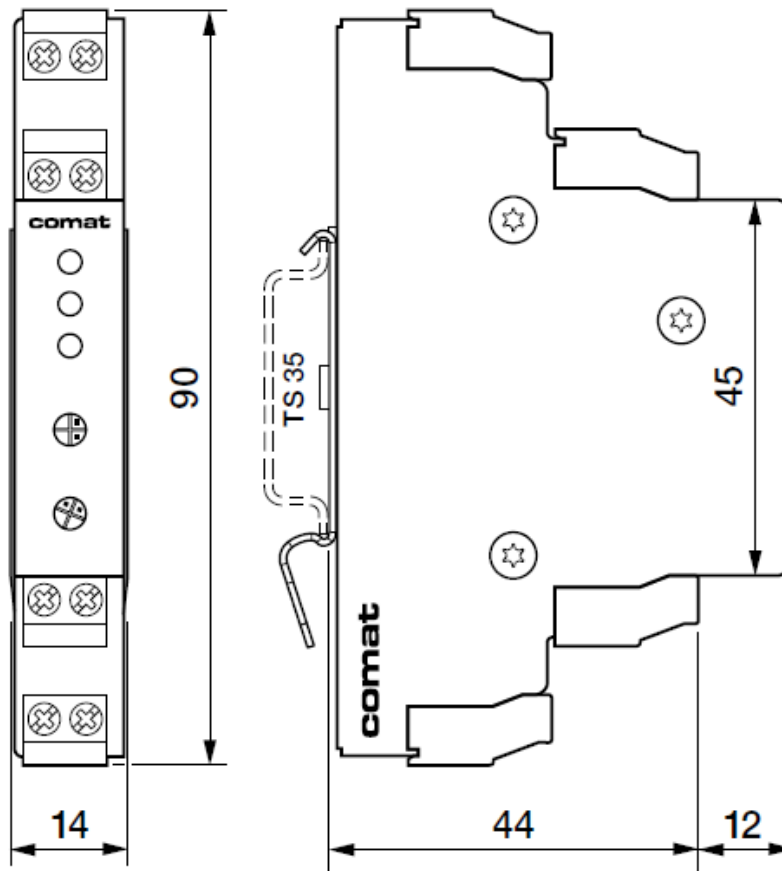
9 Standards

Interference immunity	EN 61000-6-2:2005
	EN 61000-4-2:2001 Level 3 (Air: 8 kV)
	EN 61000-4-4:2004 Level 3 (2 kV)
	EN 61000-4-5:2006 (100 V)
Interference emission	EN 61000-6-3:2007
	EN 55022:2006 Class B
Safety	EN 60730-1:2000
Conformities, identifications	CE

10 Revision history

Version	Revision date	Responsible	Realized modifications
55082-027-57-002	27.09.2013	Mi, Cp	Version 1
55082-027-57-002	13.03.2015	Mi	Increased output current of 10 A from lot code 1510