EM-176A DC-MOTOR CONTROLLER 12/24Vdc 10A

**FEATURES:**
- 4 Quadrants
- Braking
- Freewheeling
- Reversal
- 0...10V control
- Optional ±10V control
- Soft start ramp
- Adjustable current limit
- Load compensation (RxI)
- High efficiency
- High peak loading capacity
- Rail mountable

EM-176A is designed for DC-motor speed control. The unit can be used with unregulated DC supply. Motor loading can be compensated with inbuilt RxI-type adjustment. EM-176A utilizes PWM driven H-bridge, thus achieves high efficiency and extensive controlling options. Speed control value can be set with voltage signal or with potentiometer, there is an auxiliary voltage signal output for potentiometer use. The scale trimmer can be used to scale set value to correspond better the motor rpm. An auxiliary card can be fitted into EM-176A for bipolar input controlling with voltage signal or potentiometer. The ramp feature is used to limit the motor start and brake speed, in other words soften the operation and prevent the occurrence of current spikes. The current limit limits motor torque that is current; this protects the motor and the mechanics. The unit has separate inputs for brake, freewheel and reverse. Brake short-circuits the motor poles and produces powerful braking. Freewheel detaches the power stage from the motor and leaves motor rotating freely. Reverse changes motor rotating direction, this is done using the set ramp times. Brake and freewheel bypass the ramp feature.

**Technical data**

- **Supply**
  - 12-35Vdc
- **Over voltage protection**
  - 39V
- **Idle current**
  - approx. 30mA
- **Motor current**
  - 10A cont. (Ta < 50°C)
  - 15A peak (20% on/80% off)
- **Motor voltage**
  - 0-29V (0-100%)
- **Current limit**
  - adj. 0...15A
  - 0...5V (0...15A)
  - adj. 0...3s
- **Voltage loss**
  - 1.2V (Im=10A)
- **Operating freq.**
  - 25kHz
- **Aux. voltages**
  - +5V 10mA (option -5V)
- **Set value range**
  - 0...5 or 0...10V
  - (+5V or ±10V option)
- **Set value input imp.**
  - 100kohm (pin 7 and 9)
- **Control voltage**
  - "on" when Uin 4-30V
  - "off" when Uin 0-1V or open
- **Control input imp.**
  - 10kohm (pin 5, 6 and 8)
- **Recom. control pot.**
  - 4.7...47k
- **Operating temp (Ta)**
  - -20...+70
- **Measures**
  - 65x73x30mm
- **Weight**
  - approx. 100g

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EM-176A WIRING AND INSTALLATION

INSTALLATION EM-176A

Supply voltage 12-35VDC, ripple <30% at full load.
CAUTION ! Wrong polarity may damage the device.
CAUTION ! The device is not equipped with an internal fuse.

SETTINGS AND ADJUSTMENTS

Set trimmers in center position. Current limit can be set in the range of 0-15A. If an external voltage signal (0-5V) or potentiometer is used to set the current limit, set the inbuilt current limit trimmer to 0-position.

The compensation (RxI) is used as follows: first set the motor running slowly. Then increase compensation until the motor starts twitching. Now decrease compensation a little so that the twitching ends. Finally test the operation: when loading the motor, the rotation speed should almost remain constant.

The acceleration- and braking ramp are set with trimmers in the range of 0-3s (the time from zero to full speed or vice versa). The speed can be set with potentiometer or with 0-5V voltage signal. With the set value trimmer the set value range can be scaled to match the motor rotating speed range.

If the use of bipolar control signal is desired, an auxiliary card EM-A1 can be fitted onboard, which makes it possible to use either ±5V or ±10V control voltage signals. EM-A1 card also gives ±5V auxiliary voltage into pin8; this enables potentiometer to be used to control both speed and direction (forward-stop-reverse).

EXAMPLE 1
CONTROLLING WITH SWITCHES.
SPEED SET WITH POTENTIOMETER.
SPEED RANGE ADJUSTABLE WITH SPEED SET RANGE ADJUSTMENT.
CURRENT LIMIT CAN BE SET WITH INBUILT TRIMMER. IF EXTERNAL ADJUSTMENT IS USED, SET THE INBUILT CURRENT LIMIT TRIMMER TO MINIMUM.

EXAMPLE 2
CONTROLLING WITH VOLTAGES.
CURRENT 0-5V CORRESPONDS TO 0-15A.
CURRENT LIMIT TRIMMER IS SET TO MIN.
SPEED 0-5V CORRESPONDS TO 0-100% SPEED. SCALE WITH TRIMMER.
DIRECTION, FREEWHEEL OR BRAKE
0-1V OR OPEN=OFF, 4-30V=ON.

EXAMPLE 3 (OPTIONAL)
EM-A1 BIPOLAR-CARD INSTALLED.
CONTROLLING WITH POTENTIOMETER
FORWARD/REVERSE OR WITH VOLTAGE SIGNAL, ±5V OR LARGER BIPOLAR VOLTAGE, RANGE ADJUSTABLE WITH RANGE SCALE TRIMMER ADJUSTMENT.
OTHER CONTROLS AS IN PREVIOUS EXAMPLES.

CAUTION ! Wrong polarity can damage the device. Select a fuse (1-16A) in accordance with the application.