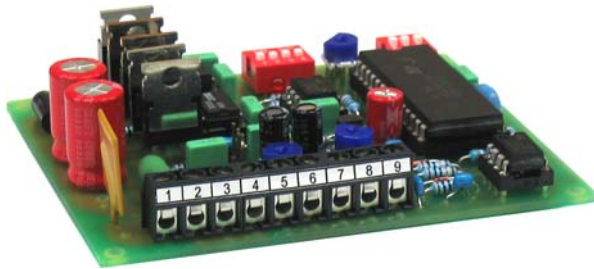# EM-101-BI MOTOR CONTROLLER 24V 4A 4-QUAD

FEATURES

- **4 Quadrants**
- **Self recovery fuse**
- **Adjustable current limit**
- **Adjustable accel./braking ramp**
- **Load compensation**
- **Special braking options**
- **Supply voltage compensation**
- **Speed control ±10V (±5V)**
- **Positive control logic**
- **Mounting with DIN-rail or screws**
- **High efficiency**

EM-101-BI is designed for modern automation systems. Controls can be performed easily with relay- or open collector outputs. Analog controls work with ±10V voltage. Usable motor can be permanent magnet motor with brushes in power range of 5...80 W. Due to the advanced pulse control (PWM) the unit operates with high efficiency, low temperature losses and provides a high starting torque.

Loading of the motor can be compensated with inbuilt RI-adjustment. The current, or in other words, the torque of the motor can be controlled with DIP-switch. The operation of the current limit is indicated with a red led. There are a variety of braking options available in this device. For most effective braking "reverse braking"-mode can be used. In this mode reversed driving is used for braking, which effects extremely fast function. Additionally the card utilises short circuit braking which short circuits the motor circuit during the braking.

EM-101 also has inbuild settable time acceleration- and braking ramps.

TECHNICAL DATA

Supply	12-34Vdc
Over volt. protect.	36V
Idle current	approx. 50mA
Control current	4A continuous, 5A max.
Control power	80W continuous
Motor voltage	0-15V (12V range)
	0-29V (24V range)
Current limit	0.3...5A
Voltage loss	1V when Im=4A
Fuse	4A self recovery.
Ramp	0,5s...5s
Control voltage	-5...0...5V -->-10...0...10V
Control pot.	2...10kohm
Digital cont.	"on" when Uin 4 -30V
	"off" when Uin 0-1V or open
Dimensions	89x73x26mm
Weight	approx. 70g

EM-101-BI BLOCK DIAGRAM
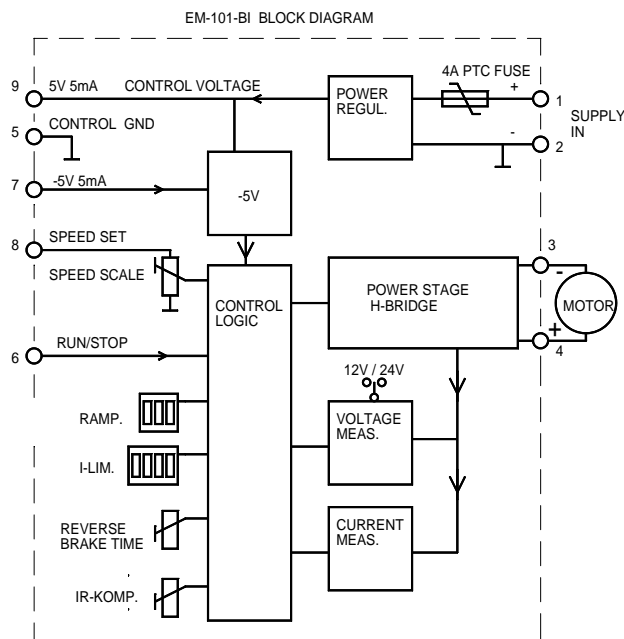
OPERATING INSTRUCTIONS EM-101-BI

Supply voltage must be DC with ripple less than 20%. Supply voltage 12...34V. In the beginning set all trimmers as shown in lay-out picture. Choose 12 / 24 according to the supply used.

NOTE! When reversed braking is used the controller will take a very high current peak. Capacitor for the power supply should be at least 4700uF at 1A.
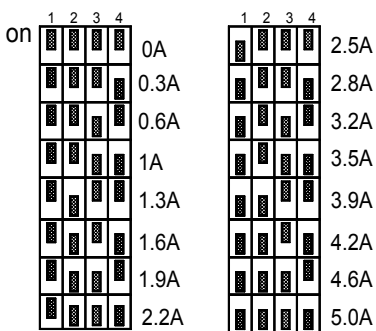

POWER SOURCE
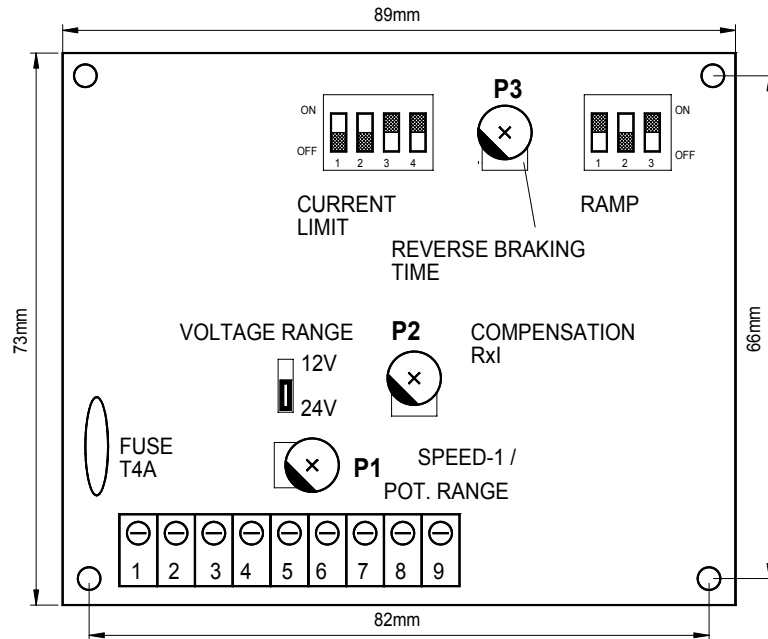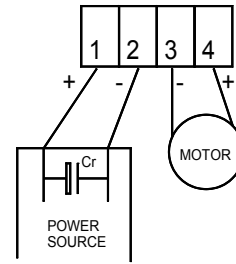
MOTOR

CONNECTORS

1. Supply 12-34Vdc
2. Supply GND 0V
3. Motor (-)
4. Motor (+)
5. Control GND 0V
6. Run / (Stop)
7. -5V Aux. voltage out (5mA)
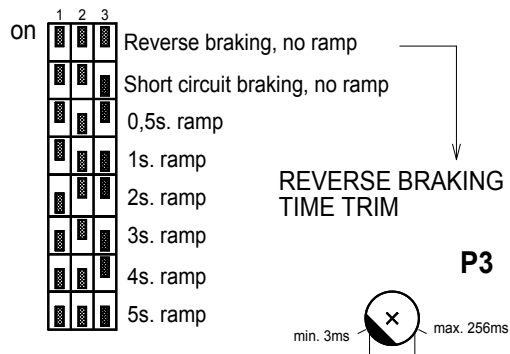8. Reference voltage in
9. +5 Reference out (5mA)

P3

CURRENT LIMIT

REVERSE BRAKING TIME

RAMP

VOLTAGE RANGE
12V
24V

P2

COMPENSATION RxI

FUSE T4A

P1

SPEED-1 / POT. RANGE

89mm

73mm

66mm

82mm

CURRENT LIMIT
Limitation of the current (torque)
Controlled with DIP-switches.

| on 1 2 3 4		1 2 3 4	
	0A		2.5A
	0.3A		2.8A
	0.6A		3.2A
	1A		3.5A
	1.3A		3.9A
	1.6A		4.2A
	1.9A		4.6A
	2.2A		5.0A

THE RAMP & BRAKING
In the map below the first two ramp settings are special braking options. The first position is so called reverse braking; the motor is controlled in opposite direction. Reverse braking time is set with trim P3. braking where the motor circuit is short circuited during the braking. Other positions are for normal acceleration and braking settings which are set with DIP-switches.

on 1 2 3	
	Reverse braking, no ramp
	Short circuit braking, no ramp
	0,5s. ramp
	1s. ramp
	2s. ramp
	3s. ramp
	4s. ramp
	5s. ramp

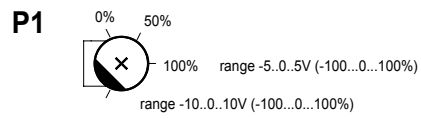REVERSE BRAKING TIME TRIM

P3

min. 3ms   max. 256ms

COMPENSATION

With compensation you can compensate the load effect to motor rpm. This feature increases controlling if current increases in the motor circuit. The need for compensation depends on application and motor. Typically small motors require more compensation than big ones. Over compensation occurs as twiching of the motor.
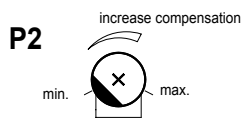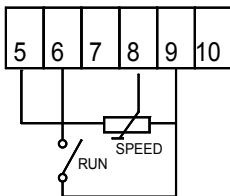
CONTROLLING

The max value of controlling voltage ranges ±(5...10V). The full range is thus maintained on 0...5V. The range can be set with trim P1.
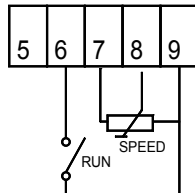
P2

increase compensation

min.   max.

P1

0%   50%

100%   range -5..0..5V (-100...0...100%)

range -10..0..10V (-100...0...100%)

EM-101 CONNECTION EXAMPLES

One direction drive.
Speed adjustment with potentiometer.

5	6	7	8	9	10

SPEED
RUN

Two direction drive.
Speed and direction control with potentiometer.

5	6	7	8	9

SPEED
RUN

Two direction drive with voltage signal.
Run continuous on.

5	6	7	8	9

Ucont.
CONTROL VOLTAGE -5..0..5 or -10..0..-10V
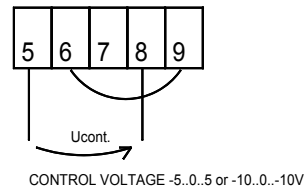
Two direction drive with switch.
Run continuous on.

5	6	7	8	9

REWIND FORWARD
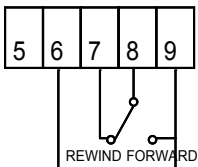
Two direction drive with switch.
Speed with external potentiometer.
Run continuous on.

5	6	7	8	9

REWIND
SPEED
FORWARD
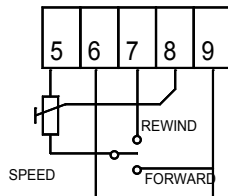
Two direction drive with voltage signal,
run with voltage control.

5	6	7	8	9

Uk
RUN WHEN
Uk > 4V
Ucont.
CONTROL VOLTAGE -5..0..5 or -10..0..-10V