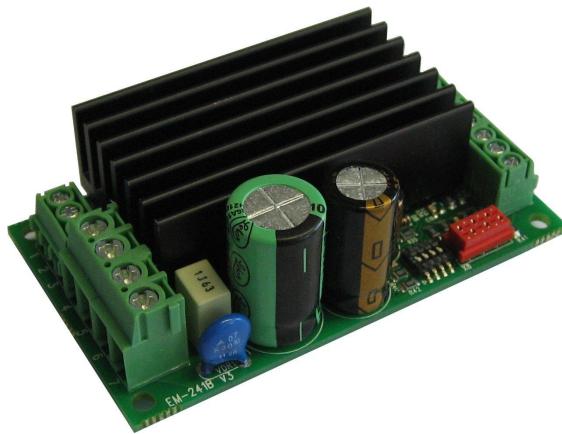


EM-241C-48V DC-MOTOR CONTROLLER 24-48V 10A



- small size
- high current output
- current limit
- zero current limit
- overvoltage brake
- speed setting
- flexible control inputs
- impulse / continuous mode
- rail base mountable
- digital parameter setting
- 48V version of EM-241C
- current limit setting input (new)
- freewheel options (new)
- 2 or 16kHz PWM freq. (new)

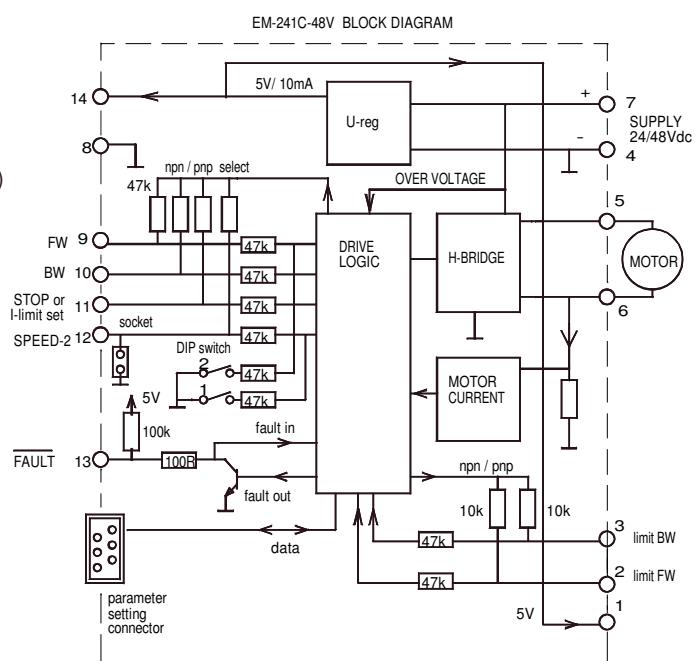
EM-241C-48V is a full bridge DC-motor starter for nominal voltage 24, 36 or 48V. It is designed to work with DC-motor in applications where some special functions are needed. Starter has adjustable acceleration and deceleration ramps, which make possible the smooth starts and stops. Adjustable current limit protects motor against overcurrent and it can also be used as an end-stop. This device has also two settable speeds, which are useful in positioning applications. Control inputs FW and BW start the forward and backward run. STOP is for the motor soft shut-down but there are also available individual limit inputs for FW and BW directions. SPEED-2 input activates preset speed-2, but it can also be used as input for analog speed control signal 0-5V. STOP input can be set to work as current limit setting. FAULT terminal has at the same time input and output function, the pin is normally high, but is pulled down in overheating and conditionally also in current trip situation. If FAULT-line is pulled down externally it will cause a stop and prevent the new start. For example, it is possible to link fault pins of several units together and achieve a synchronous stop. C-version includes two new parameters: freewheel options for releasing the rotor of motor, and PWM frequency select, but notice, that in silence 16kHz PWM frequency, the output current is smaller!

There are two selectable control modes, continuous and impulse. In continuous mode the motor runs as long as the control is active. In impulse mode a short command starts the motor, and only a new impulse will change the status. There are also few special settings start-kick and auto reverse. The card has selectable input logics. Inputs are divided in two groups, control and limit -inputs. Groups can be individually set for NPN or PNP logic.

For parameters setting there are next options: EM-236 interface unit, EM-268 with EmenTool-Lite PC-program and EM-326 with EmenTool-App application for smartphone

TECHNICAL DATA (prog ver. 241C-48 v1.0)

Supply voltage range nom. 24-48V / max. 20-60V
Overvoltage limit adjustable 15-60V
Start up voltage 14V, shutdown voltage 12V
Continuous current output when ambient temp is <50°C)
10A at 100% speed / 7A at 5-99% speed PWM=2kHz
7A at 100% speed / 4A at 5-99% speed PWM=16kHz
Peak (5s.) 25A at 2kHz PWM and 20A at 16kHz PWM
Current limit adjustable 0.1-25A (at start max 30A)
Overheat limit 100°C
Start and stop ramp adjustable 0-5s
PWM frequency 2kHz / 16kHz
Speed input scale (speed-2) 0-5V = 0-100% PWM
I-limit input scale (stop input) 0-5V = 0-20A
Input control logic: high=4-30V, low=0-1V
Control input impedances typ. 47kohm
Limit FW / BW input imped. typ 10kohm
Control input response time typ 5ms.
Fault out. NPN open collector max 30V / 50mA
Fault in actives Uin < 1V (NPN)
Motor and supply connectors 2.5mm
Control connectors 1mm
Dimensions 42x72x25mm
Dimensions in DIN-rail base 45x80x45mm
CE-tested for industrial environment (EMC)
Operating temp (Ta) -40...60°C
Weight 75g



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CONNECTIONS

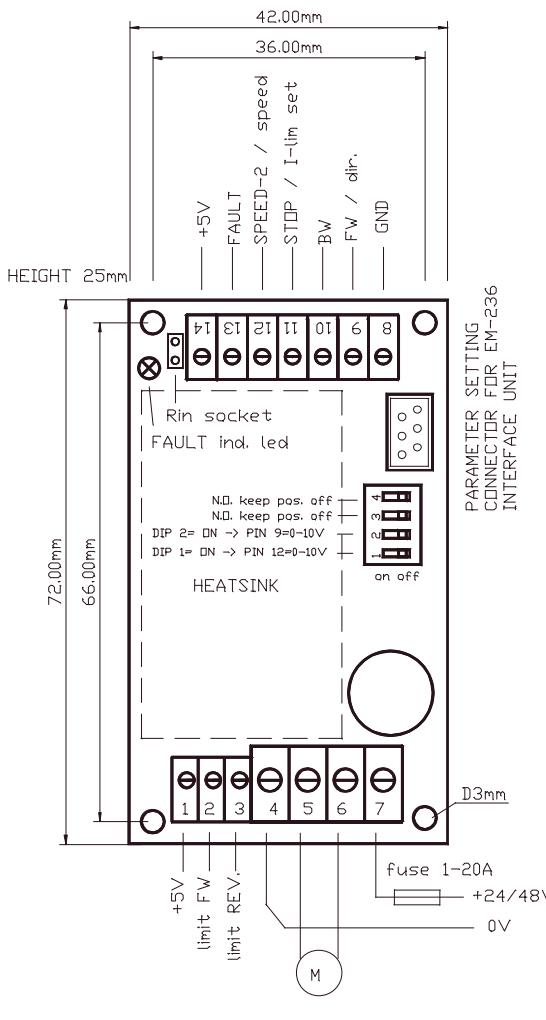
Supply voltage must be filtered DC of 10-35V, and ripple should be less than 30% at full load.
CAUTION ! Wrong polarity can damage the unit.
CAUTION ! Unit doesn't have an internal fuse, so an external fuse should be added if fuse required.

MONITORABLE VALUES

- 1/5 Motor current 0-20A (0-200)
- 2/5 PWM-level-% 0-100% (0-100)
- 3/5 hour counter (max.65535h)
- 4/5 start counter (max.65535)
- 5/5 carry counter for start counter

FAULT-LED signal codes

1. power on	one blink
2. current on limit	led is lit
3. current trip	fast blinking...
4. zero-cur trip	long blink- short pause...
5. overvoltage	4 x blink -pause...
6. overheat	short blink- long pause...
7. timeout	3 x blink + long blink...
8. fault input	2 x short + 1x long blink...



ADJUSTMENT AND SETTINGS (prog ver. EM-241C-48V v.1.0)

Settings can be done with three interface device options.
1. EM-236 interface unit
2. EM-268 interface unit with EmenTool Lite PC-software
3. EM-326 interface unit with EmenTool App smartphone application
When using App you can set device-specific access code, which protects device against unauthorized smartphone connections. The access code can be reset with simultaneous FW and BW command, when power switch on.

SETTABLE PARAMETERS 20pcs. (defaults in brackets)

- 1- command mode: 0,1 and 2 (0)
 - 0= continuos FW / REV
 - 1= impulse commands FW / REV, with stop
 - 2=impulse commands FW / REV without stop
- 2- start condition combinations: 0-3 (1)
 - 0= start both direction after I-trip and Stop
 - 1= start only opposite direction after I-trip
 - 2= start only opposite direction after Stop
 - 3= start only opposite direction after I- and Stop
- 3- input logic combinations 0-3 PNP/NPN (0)
 - 0= command and limit inputs as PNP (positive)
 - 1= command inputs NPN, and limit inputs PNP
 - 2= command inputs PNP, and limit input NPN
 - 3= command and limit inputs NPN (negative)
- 4- running speed-1: 0-100% / 0-100 (100)
- 5- running speed-2: 0-100% / 0-100 (50)
- special parameter values of param. 5
 - 0= "speed 2-input" is used as analog 0-5V speed control input.
 - 1= FW direction is automatically "on" and FW input works as direction change input.
- 6- current limit FW: 0-25A / 0-250 (30)
- 7- current limit REV: 0-25A / 0-250 (30)
 - notice! If both 6 & 7 is set = 0, then I-limit input is enabled, and works as current limit adjust input.
- 8- Trip combinations: 0-3 (1)
 - 0= no I-trip, no zero-current-trip
 - 1= only I-trip
 - 2= only zero-current-trip
 - 3= both I-trip and zero-current-trip
- 9- I-trip delay: 0-255ms / 0-255 (20)
- 10- Fault output combinations: 0-3 (1)
 - 0= I-trip and zero current won't cause fault output signal
 - 1= only I-trip causes fault output signal
 - 2= only zero current causes fault output signal
 - 3= both I-trip and zero current causes fault output signal.
- 11- overvoltage limit: 15-60V / 15-60 (55)
 - Overvoltage can be caused by load driving the motor or when braking the speed down but supply can not accept the current back from driver. Exceeding the limit will cause the power stageset to free-wheel state, and if voltage still rises then powerstages shorted to brake motor more
 - In battery supply use the brake current is charging the battery and the voltage will not normally rise.
- 12- load compensation: 0-255 / 0-255 (0)
 - Load compensation (Rx1) improves low speed and start torque, but too high compensation achieve unstable running.
 - Run motor at low speed (30%) Increase compensation with small steps until motor start behaviour unstable, then decrease value about 10%
- 13- timeout: 0-255s. / 0-255 (0-not in use) (0)
- 14- Reset for start and hour-counter 0/1 (0)
 - selecting 1 and push SAVE => reset counters
- 15- start ramp: 0-5s / 0-500 (100)
- 16- stop ramp: 0-5s / 0-500 (100)
- 17- start-kick 0-200ms / 0-200 (0)
 - This gives full drive at start and I-lim is 30A
 - The start kick length is 0-200ms.
- 18- I-trip auto reversing 0-5s / 0-500 (0)
 - Change automatically run direction when I-trip occurs the reversing time will select with this parameter
- 19- Freewheel options 0-3 (0)
 - 0= no freewheel
 - 1= freewheel when stopped
 - 2= freewheel during stop ramp
 - 3= freewheel during stop ramp and if stopped
- 20- Pwm frequency 1=2kHz / 2=16kHz



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