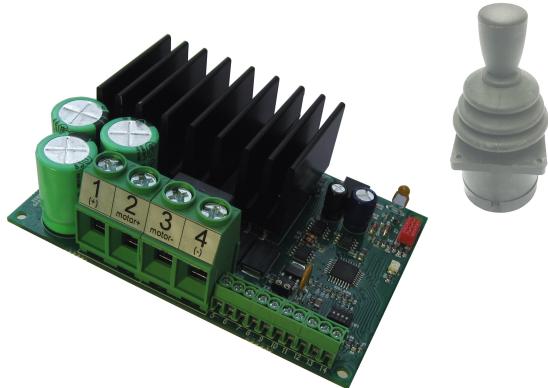


EM-243C-JS1 DC-MOTOR CONTROLLER 12-42V 50A



- JS1 is specially for joystick use
- three point calibration
- compact size
- for motor up to 500W
- high current output
- current limit
- overvoltage brake
- own speed ranges for FW and REV.
- rail base mountable
- digital parameter setting
- JS1 program can be update also for standard EM-243A or 243C boards

EM-243C-JS1 is a full bridge DC-motor starter. It is designed for joystick controlled DC-motor applications. The driver has adjustable acceleration and deceleration ramps, which enable the smooth starts and stops. Adjustable current limit protects the motor against overcurrent and it can also be used as an end-stop. This device has also two settable speeds, separate speed ranges for forward and reverse direction. Control input is specially designed for joystick control. The joystick range calibration is done automatically, when calibration function is activated. Calibration detects forward, reverse and midpoint positions. FAULT terminal has simultaneously both input and output functions, the pin is normally high, but is pulled down in overheat and conditionally also in current trip situation. If FAULT-line is pulled down externally it will cause a stop and prevent it from starting again. For example, it is possible to link fault pins of several units together and achieve a synchronous stop.

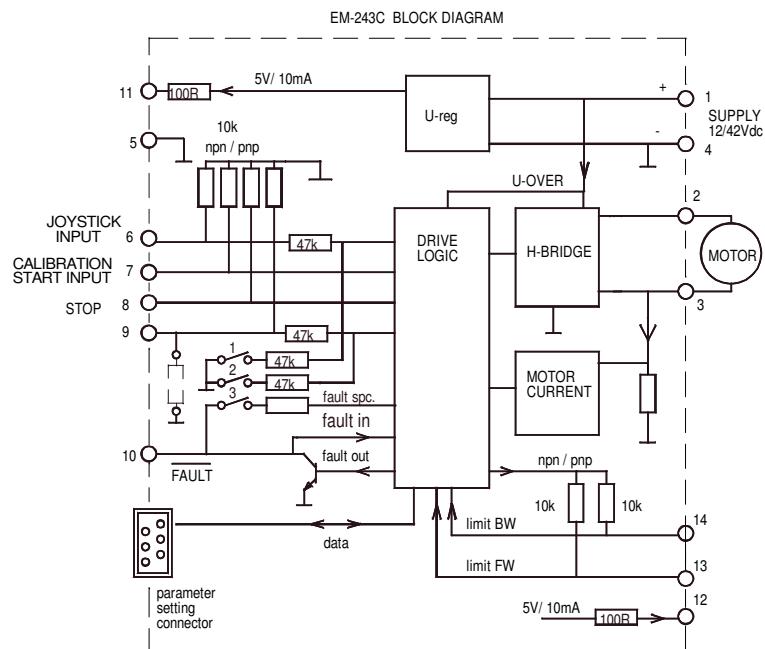
There are also special settings as start-kick which can be used in case the device is in danger of being jammed.

Limit input can be individually set for NPN or PNP logic.

The parameter's settings can be done with various EM-interface units. Operation of the controller and some of its functional values can also be monitored with interface units.

TECHNICAL DATA

Supply voltage nominal 12-42V, limits 10-55V
 Start up voltage 9V, shutdown voltage 8V
 Idle current typ 15mA
 Motor current max. with 2kHz pwm
 100% pwm 50A ,
 20-99pwm% 35A and peak 100A (5s)
 Motor current max. with 16kHz pwm
 100% pwm 40A ,
 20-99pwm% 20A and peak 60A (5s)
 Current limit adjustable 1-100A
 Notice! current limit is increased 50% at start
 Overheat limit 100°C
 Start and stop ramp adjustable 0-5s
 PWM frequency 2kHz or 16kHz (selectable)
 joystick input scale 0-5 or 0-10V (if dip 1 is ON)
 Input control logic: high =4-30V, low=0-1V
 Control input impedances typ. 10kohm
 Control input response time typ 5ms.
 Fault out. NPN open coll. max. 50V / 1A
 Fault in actives Uin < 1V (NPN)
 Motor and supply connectors 4mm
 Control connectors 1mm
 Dimensions 107x72x40mm
 Dimensions in DIN-rail base 110x80x55mm
 CE-tested for industrial environment (EMC)
 Operating ambient temp (Ta) -40...60°C
 Weight 190g



CONNECTIONS

Supply voltage recommendation is 12-42VDC
and ripple should be less than 30% at full load.
Supply voltage limit is 55Vdc
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

1/6 Motor current 0-20A (0-200)
2/6 PWM-level-% 0-100% (0-100)
3/6 hour counter (max.65535h)
4/6 start counter (max.65535)
5/6 carry counter for start counter
6/6 joystick position 0-1024

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... |

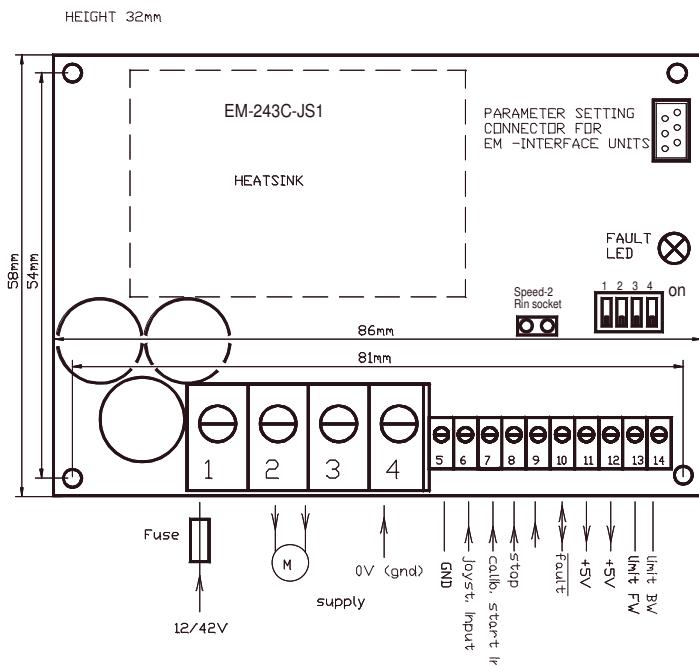
Special codes for calibration mode
solid light = calibration can be done
blink light = calibration is done

ADJUST AND SETTINGS (prog ver. EM-243C-JS1 v1.1)

Adjusting and parameter setting of eg.
current limit value, ramp times and speed-2
value can be done with various EM-interface units
EM-236 is basic parameter setting device.
EM-268 and EM-328 are USB-serial converters,
which makes it possible to set parameters also
with computer where is installed EmenTool Lite
program. EM-326 is Bluetooth -dongle which can
be used in smart devices with the EmenTool App.

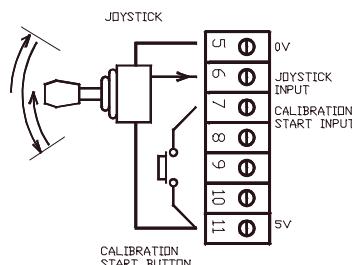
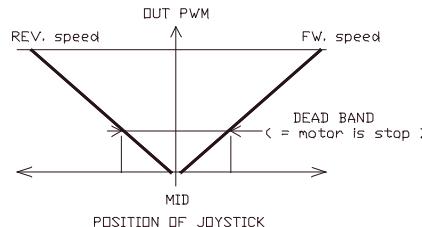
DIP SWITCHES

Dip-1 Damping pin 6 if set ON (joystick input)
Dip-2 Damping pin 9 if set ON
Dip-3 NOT in use keep always OFF
Dip-4 NOT in use keep always OFF



SETTABLE PARAMETERS 20pcs. (defaults in brackets)

- 1- not in use
- 2- not in use
- 3- input logic for limit inputs 1 or 4 PNP/NPN (1)
 - 1= limit inputs PNP 2= limit input NPN
 - 3= limit inputs PNP N.C. 4=limits inputs NPN N.C
(N.C.= normally closed = open circuits stops.)
- 4- max. speed FW. 0-100% / 0-100 (100)
- 5- max. speed REV. 0-100% / 0-100 (100)
- 6- current limit FW. 1-100A / 1-100 (30)
- 7- current limit REV. 1-100A / 1-100 (30)
- 8- current trip 0= disabled, 1= enabled : (1)
- 9- not in use
- 10- Fault output combinations: 0-2 (0)
 - 0= overtemp, current trip, overvoltage
 - 1= as above + calibration indication
 - 2= current limit indication
- NOTICE ! fault input is disabled in setting 2
- 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 stage set to free-wheel state.
With a direct battery supply the brake current is charging the
battery and the voltage will not normally rise.
There is also 60V fixed dynamic brake point = motor pole shorted
- 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 becomes 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 (50)
- 16- stop ramp: 0-5s / 0-500 (20)
- 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- Dead band wide 0-50% / 0-50 (5)
- 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 (1)



JOYSTICK CALIBRATION

Give about 3s. control signal to CALIB
input. when Fault-led of device will be lit:
-push joystick full forward, then
-pull joystick full reverse, then
-release joystick to mid position, then
-wait until led starts to blink = calibration done

NOTICE ! calibration above defines joystick
full fw, full rev. and mid point positions.
But the max. speed can be set with
parameters 4 and 5