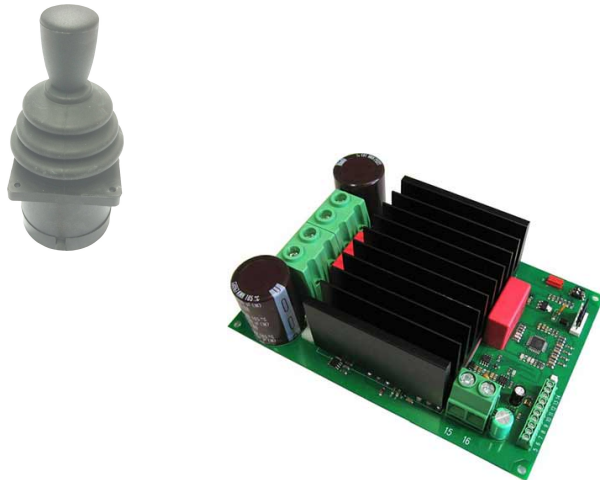


# EM-282C-JS1 DC-MOTOR CONTROLLER 12-42V 100A

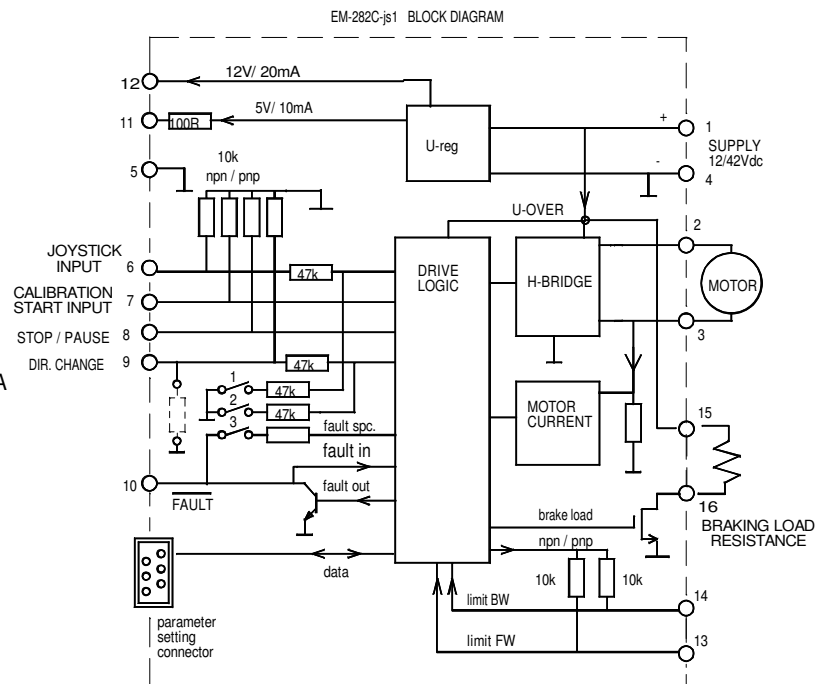


- JS1 is specially for joystick use
- three point calibration
- small size
- high current output
- current limit
- for motors up to 100W
- overvoltage brake
- own speed ranges for FW and REV.
- rail base mountable
- digital parameter setting
- JS1 program can be update also for standard EM-282 board
- Prog. 1.3 direction change input added
- Prog. 1.4 stop input, brake output and fan output options added
- Prog 1.6 wire breakage detection added

EM-282-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 11V, shutdown voltage 10V  
 Idle current typ 20mA  
 Motor current max. with 2 & 16 kHzpwm  
 100% pwm 100A, ( at Tamb <40°C )  
 Motor current with 2 kHz pwm,  
 20-99pwm% 75A and  
 Motor with 16kHz pwm  
 20-99pwm% 60A  
 Motor current peak 200A ( 5s. )  
 Current limit adjustable 1-200A  
 Notice! current limit is increased 25% at start  
 Braking load current ( pin 16) max cont 50A peak 100A  
 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 42V / 0.5A  
 Fault in. actives Uin < 1V ( NPN with 100k pull up)  
 Motor and supply connectors 16mm<sup>2</sup>  
 Control connectors 1mm<sup>2</sup>  
 Dimensions 180x122x60mm  
 CE-tested for industrial environment ( EMC )  
 Operating ambient temp ( Ta ) -40..60°C  
 Weight 750g



**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-282C-JS1 v1.6 )**

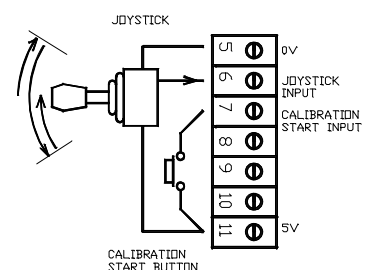
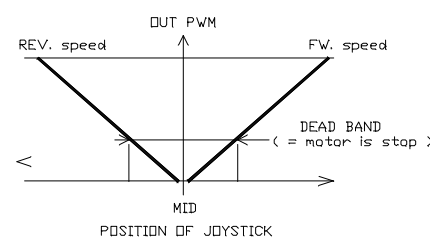
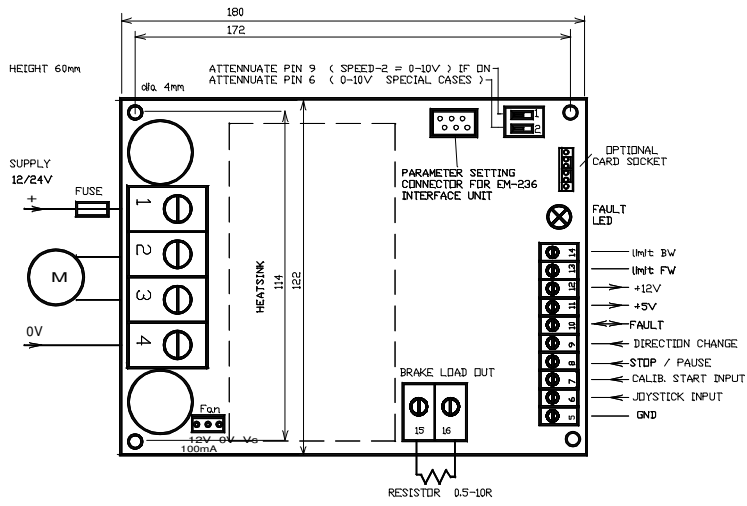
Adjusting and parameter setting of eg. current limit value, ramp times and speed-2 value can be done with various EM-interface units EM-236 is basic parameter setting device. EM-268 and EM- 328 are USB-serial converters, which makes it possible to set parameters also with computer where is installed 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

**SETTABLE PARAMETERS 20pcs. ( prog. EM-282C-js1 v1.6 ) ( defaults in brackets )**

- 1- not in use
- 2- stop input options 0-1 ( input pin 8 ) ( 0 )  
 0= stop with command , new start is possible  
 1= stop command stops with ramp and stay stopped as long as command occurred, it starts again when when command disappears
- 3- input logic for limit inputs 1-4 PNP/NPN ( 1 )  
 1= limit inputs PNP 2= limit input NPN  
 3= limit inputs PNP N.C. 4=limit inputs NPN N.C.  
 ( N.C. = normally closed = open circuit stops )
- 4- max. speed FW. 0-100% / 0-100 ( 100 )
- 5- max. speed REV. 0-100% / 0-100 ( 100 )
- 6- current limit FW. 1-200A / 1-200 ( 30 )
- 7- current limit REV. 1-200A / 1-200 ( 30 )
- 8- current trip 0= disabled, 1= enabled : ( 1 )
- 9- Brake output pin 16 options 0-1 ( 0 )  
 0 =overvoltage, 1= "run" indication
- 10- Fault output pin 10 combinations: 0-3 ( 0 )  
 0= overtemp, current trip, overvoltage  
 1= as above + calibration indication  
 2= current limit indication  
 3= "run" indication  
**NOTICE !** fault input is disabled in settings 2 and 3
- 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 ( Rxl ) 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 l-lim is 30A  
 The start kick length is 0-200ms.
- 18- Dead band 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 ( 2 )
- 21- Braking current limit 5-200A / 5-200 ( 50 )



**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

**NOTICE 2 !** Firmware version 1.6 and later has added joystick wire breakage detection This function watches pin 6 voltage, and if it goes to 0V or open circuit, then driver will shutdown motor. ( fault ind. with 2 blink + pause)

**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