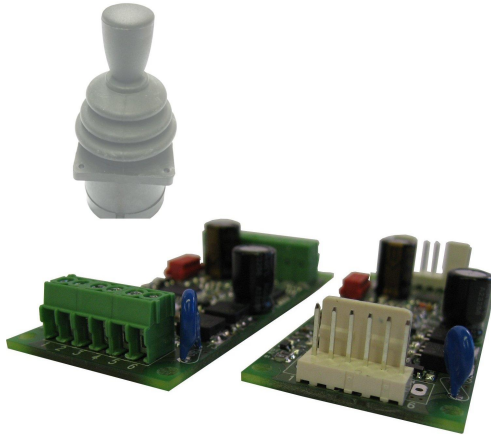


# EM-324C-JS1 DC-MOTOR CONTROLLER 12-24V 3/4A

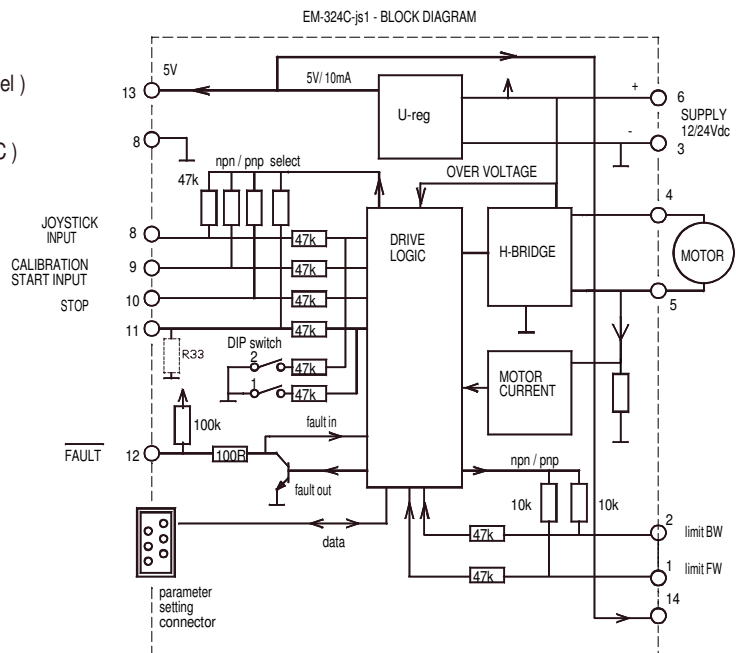


- JS1 is specially for joystick use
- three point calibration
- small size
- high current output
- current limit
- overvoltage brake
- own speed ranges for FW and REV.
- rail base mountable
- digital parameter setting
- 2KHz or 16kHz pwm frequency
- for motor 5-50W
- JS1 program can be update also for standard EM-324 board

EM-324C-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 parameters settings can be done with various EM- interface unit. Operation of the controller and some of its functional values can also be monitored with interface units.

## TECHNICAL DATA ( prog ver. 324C-JS1 v1.0 )

Supply voltage cont. max. 10-35V  
 Overvoltage limit adjustable 15-40V ( connect motor to freewheel )  
 Overvoltage dynamic brake 40V ( shorting motor poles )  
 Start up voltage 9V, shutdown voltage 8V  
 Motor current cont. max. 3A, peak max. 7A ( @ 16kHz, Ta<50°C )  
 Motor current cont max. 4A, peak 7A ( @ 2kHz, Ta<50°C )  
 Current limit adjustable 0.1-5 A ( at start max 7A )  
 Overheat limit 100°C  
 Start and stop ramp adjustable 0-5s  
 PWM frequency 2kHz / 16kHz ( selectable )  
 Joystick input scale 0-5V or 0-10V ( if dip 2 = ON )  
 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 coll. max 30V / 50mA  
 Fault in actives Uin < 1V ( NPN )  
 Motor and supply connectors 2.5mm  
 Control connectors 1mm  
 Dimensions 32x72x18mm  
 Dimensions in DIN-rail base 35x80x38mm  
 CE-tested for industrial environment ( emc )  
 Operating temp ( Ta ) -40...60°C  
 Weight 25g



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.

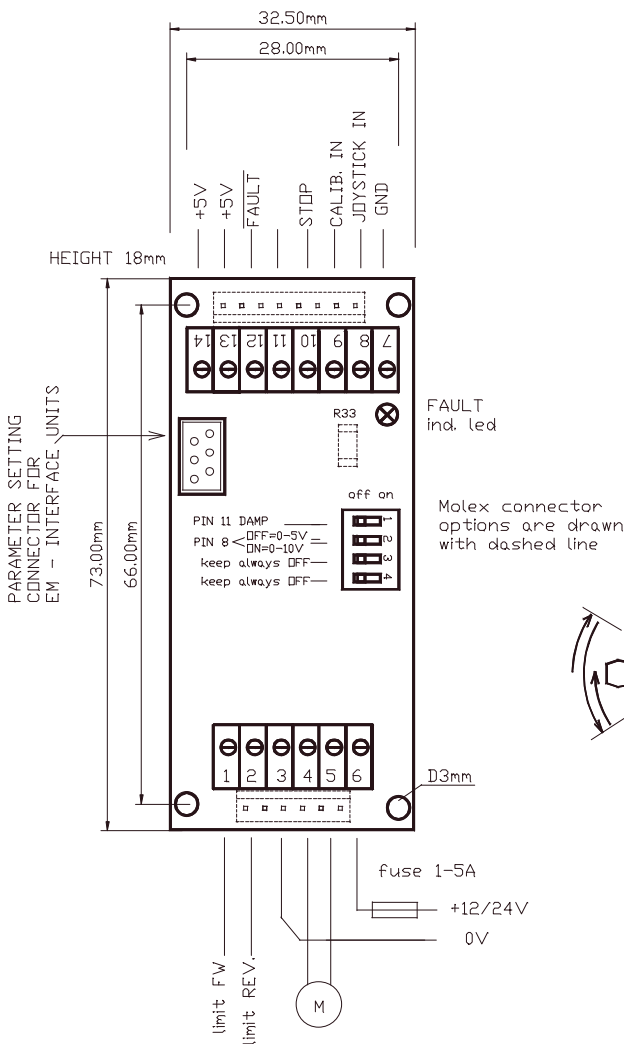
MONITORABLE VALUES

- 1/6 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

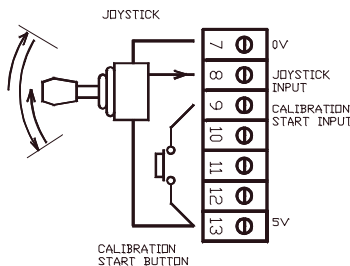


ADJUSTMENT AND SETTINGS ( prog ver. EM-324C-JS1 v1.0 )

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.

SETTABLE PARAMETERS 20pcs. ( defaults in brackets )

- 1- not in use
- 2- not in use
- 3- input logic for limit inputs 1 or 2 PNP/NPN ( 1 )  
 1= limit inputs PNP 2= limit input NPN
- 4- max. speed FW. 0-100% / 0-100 ( 100 )
- 5- max. speed REV. 0-100% / 0-100 ( 100 )
- 6- current limit FW. 0.1-20A / 1-200 ( 30 )
- 7- current limit REV. 0.1-20A / 1-200 ( 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: 15-40V / 15-40 ( 35 )  
 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 40V 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 l-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



JOYSTICK CALIBRATION

Give about 3s. control signal to CALIB. start 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

