

EV800 Series General Purpose Drive User Manual

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Chapter 1 Safety Information

1.1 Warnings, Cautions And Notes

	A Warning contains information, which is essential for avoiding a safety hazard.
	A Caution contains information, which is necessary for avoiding a risk of damage to the product or other equipment.
	A Note contains information, which helps to ensure correct operation of the product.

1.2 Electrical Safety - General Warning

The voltages used in the drive can cause severe electrical shock and/or burns, and could be lethal. Extreme care is necessary at all times when working with or adjacent to the drive.

Specific warnings are given at the relevant places in this guide.

1.3 System Design And Safety Of Personnel

The drive is intended as a component for professional incorporation into complete equipment or system. The drive is not classified as a fire enclosure. A separate fire enclosure must be provided. If installed incorrectly, the drive may present a safety hazard. The drive uses high voltages and currents, carries a high level of stored electrical energy, and is used to control equipment which can cause injury.

System design, installation, commissioning and maintenance must be carried out by personnel who have the necessary training and experience. They must read this safety information and this guide carefully.

The STOP and START controls or electrical inputs of the drive must not be relied upon to ensure safety of personnel. They do not isolate

dangerous voltages from the output of the drive or from any external option unit. The supply must be disconnected by an approved electrical isolation device before gaining access to the electrical connections.

The drive is not intended to be used for safety-related functions.

Careful consideration must be given to the function of the drive which might result in a hazard, either through its intended behavior or through incorrect operation due to a fault. In any application where a malfunction of the drive or its control system could lead to or allow damage, loss or injury, a risk analysis must be carried out, and where necessary, further measures taken to reduce the risk - for example, an over-speed protection device in case of failure of the speed control, or a fail-safe mechanical brake in case of loss of motor braking.

1.4 Environmental Limits

Instructions within the supplied data and information in this manual regarding transport, storage, installation and the use of the drive must be complied with, including the specified environmental limits. Drives must not be subjected to excessive physical force.

1.5 Access

Access must be restricted to authorized personnel only. Safety regulations which apply at the place of use must be complied with. The IP (Ingress Protection) rating of the drive is installation dependant.

1.6 Compliance And Regulations

The installer is responsible for complying with all relevant regulations, such as national wiring regulations, accident prevention regulations and electromagnetic compatibility (EMC) regulations. Particular attention must be given to the cross-sectional areas of conductors, the selection of fuses and other protection, and protective earth (ground) connections.

Within the European Union, all machinery in which this product is used must comply with the following directives:

98/37/EC: Safety of machinery

89/336/EEC: Electromagnetic compatibility

1.7 Motor

Ensure the motor is installed in accordance with the manufacturer's recommendations. Ensure the motor shaft is not exposed. Standard squirrel cage induction motors are designed for single speed operation. If it is intended to use the capability of a drive to run a motor at speeds above its designed maximum, it is strongly recommended that the manufacturer is consulted first. Low speeds may cause the motor to overheat because the cooling fan becomes less effective. The motor should be fitted with a protection thermistor. If necessary, an electric force vent fan should be used. The values of the motor parameters set in the drive affect the protection of the motor. The default values in the drive should not be relied upon. It is essential that the correct value is entered into P06, motor rated current. This affects the thermal protection of the motor.

1.8 Adjusting Parameters

Some parameters have a profound effect on the operation of the drive. They must not be altered without careful consideration of the impact on the controlled system. Measures must be taken to prevent unwanted changes due to error or tampering.

1.9 Electrical Installation

1.9.1 Electric Shock Risk

The voltages present in the following locations can cause severe electric shock and may be lethal:

- AC supply cables and connections
- Output cables and connections
- Many internal parts of the drive

Unless otherwise indicated, control terminals are single insulated and must not be touched.

1.9.2 Isolation Device

The AC supply must be disconnected from the drive using an approved isolation device before any cover is removed from the drive or before any servicing work is performed.

1.9.3 STOP Function

The STOP function does not remove dangerous voltages from the drive, the motor or any external option units.

1.9.4 Stored Charge

The drive contains capacitors that remain charged to a potentially lethal voltage after the AC supply has been disconnected. If the drive has been energized, the AC supply must be isolated at least ten minutes before work may continue.

Normally, the capacitors are discharged by an internal resistor. Under certain, unusual fault conditions, it is possible that the capacitors may fail to discharge, or be prevented from being discharged by a voltage applied to the output terminals. If the drive has failed in a manner that causes the display to go blank immediately, it is possible the capacitors will not be discharged. In this case, consult Control Techniques or their authorised distributor.

1.9.5 Equipment Supplied By Plug And Socket

Special attention must be given if the drive is installed in equipment which is connected to the AC supply by a plug and socket. The AC supply terminals of the drive are connected to the internal capacitors through rectifier diodes which are not intended to give safety isolation. If the plug terminals can be touched when the plug is disconnected from the socket, a means of automatically isolating the plug from the drive must be used (e.g. a latching relay).

Chapter 2 Rating Data

This chapter introduces the general data and model ratings of EV800 series drives.

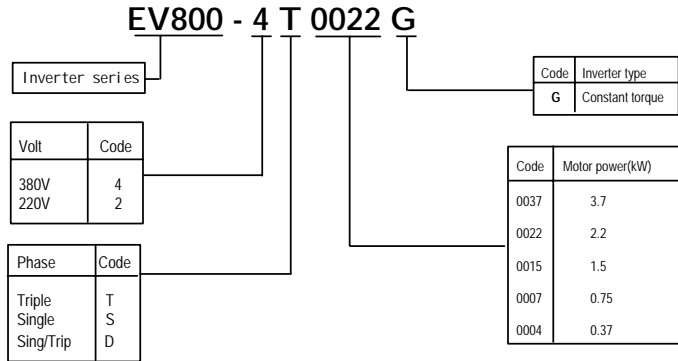


Figure 2-1 Model code explanation

Table 2-1 Models

Model number	Rated capacity (kVA)	Rated input current (A)	Rated output current (A)	Motor power (kW)
EV800-2S0002G	0.7	4.3	1.7	0.25
EV800-2S0004G	1.0	5.8	2.2	0.37
EV800-2S0005G	1.2	8.1	3.0	0.55
EV800-2S0007G	1.5	10.5	4.0	0.75
EV800-2D0011G	2.0	14.2	5.2	1.1
EV800-2D0015G	2.7	17.4	7.0	1.5
EV800-2D0022G	3.7	23.2	9.6	2.2
EV800-4T0004G	1.0	1.7	1.3	0.37
EV800-4T0005G	1.2	2.5	1.7	0.55
EV800-4T0007G	1.5	3.1	2.1	0.75
EV800-4T0011G	2.0	4.0	2.8	1.1
EV800-4T0015G	2.7	5.2	3.8	1.5
EV800-4T0022G	3.7	7.3	5.1	2.2


Model number	Rated capacity (kVA)	Rated input current (A)	Rated output current (A)	Motor power (kW)
EV800-4T0030G	5.1	9.5	7.2	3.0
EV800-4T0037G	6.3	11.9	9.0	3.7

Output frequency: 0 to 1500Hz

Output voltage: 3 phase, 0 to drive rating (240 or 480Vac maximum set by P08).

The maximum continuous current inputs are used to calculate input cable sizing. Where no maximum continuous input currents are indicated, use the typical full load input current values.

Chapter 3 Mechanical Installation

	<p>Enclosure</p> <p>The drive is intended to be mounted in an enclosure which prevents access except by trained and authorized personnel, and which prevents the ingress of contamination. It is designed for use in an environment classified as pollution degree 2 in accordance with IEC 60664-1. This means that only dry, non-conducting contamination is acceptable.</p>
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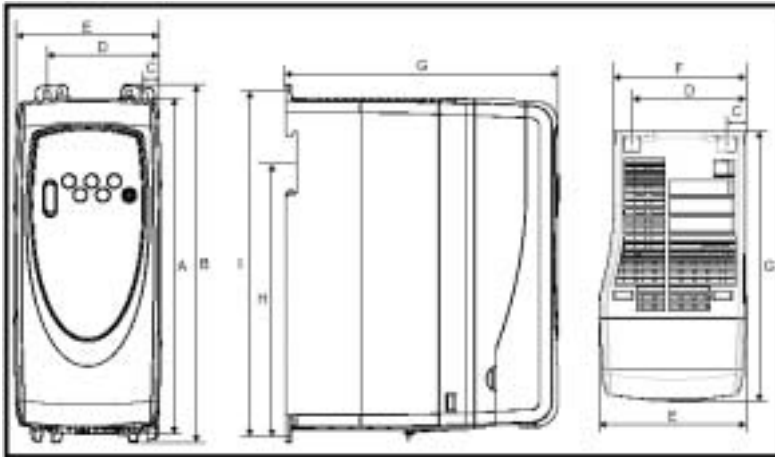


Figure 3-1 Drive dimensions

Mounting holes: 4 × M4 holes

See the following table for the specific numbers:

Table 3-1 Drive dimensions

Drive size	A		B		C		D		E		F		G		H		I	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in		
A	143	5.51	154	6.06	11	0.43	64	2.52	75	2.95			145	5.71	104	4.09	143	5.63
B	193	7.48	205	8.07	10.9	0.43	65.9	2.6	85	3.35	17	3.0	156	6.15	145.9	6.13	194	7.64
C	243	9.45	258	10.16	10.4	0.41	61.1	3.2	100	3.94	91.9	3.62	173	6.81			244	9.61

*Size C is not DIN rail mountable.

Note:

If DIN rail mounting is used in an installation where the drive is to be subjected to shock or vibration, it is recommended that the bottom mounting screws are used to secure the drive to the back plate.

If the installation is going to be subjected to heavy shock and vibration, then it is recommended that the drive is surface mounted rather than DIN rail mounted.

Note:

The DIN rail mounting mechanism has been designed so no tools are required to install and remove the drive from a DIN rail. Please ensure the top mounting lugs are located correctly on the DIN rail before installation is initiated.

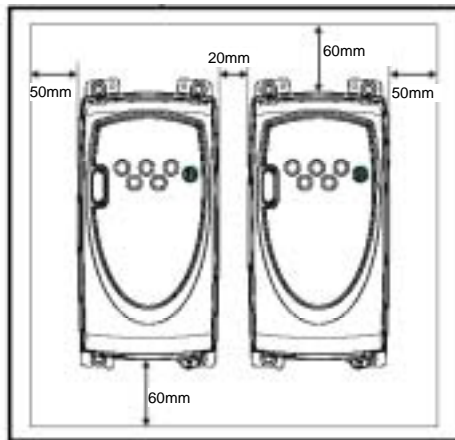


Figure 3-2 Minimum mounting clearances

Chapter 4 Electrical Installation

4.1 Power Terminal Connections

See the following figures for the power terminal connections:

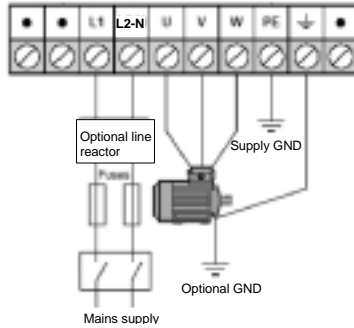


Figure 4-1 Size A power terminal connections

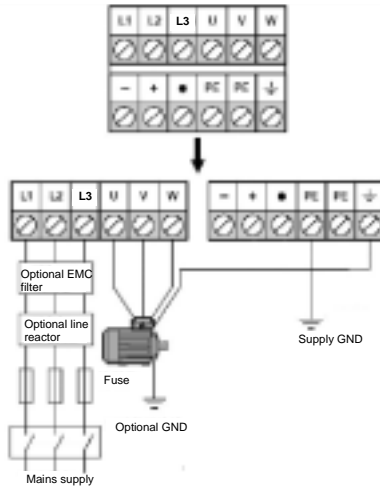


Figure 4-2 Sizes B and C power terminal connections




	<p>Fuses/MCB: The AC supply to the drive must be fitted with suitable protection against overload and short circuits. Failure to observe this requirement will cause risk of fire. See <i>Chapter 2 Rating Data</i> for fuse ratings.</p>
	<p>The drive must be grounded by a conductor sufficient to carry the prospective fault current in the event of a fault.</p>
	<p>To avoid a fire hazard and maintain validity of the UL listing, adhere to the specified tightening torques for the power and ground terminals. Refer to the table below.</p>

Table 4-1 Maximum power terminal screw torque

Frame size	Maximum power terminal screw torque
A	0.5Nm / 4.4 lb in
B and C	1.4Nm / 12.1 lb in

<p>NOTE:</p>	<p>When connecting single phase to a dual rated 200V unit, use terminals L1 and L3.</p>
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4.1.1 Ground Leakage Current

<p>NOTE:</p>	<p>There is an internal voltage surge suppression device connected to ground. Under normal circumstances, this carries negligible current (<1mA).</p>
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4.2 External EMC Filters


A full range of external EMC filters are available for Commander SL. An external EMC filter is required if:


- Operating in the first environment of EN 61800-3
- Conformity to the generic emission standards is required
- Equipment which is sensitive to electrical interference operating nearby

When an EMC filter is used, it is also necessary to:

- Use screened motor cable, with screen clamped to the grounded metal panel
- Use screened control cable, with screen clamped to the grounded metal panel

4.3 Control Terminals I/O Specification

	<p>The control circuits are isolated from the power circuits in the drive by basic insulation (single insulation) only. The installer must ensure that the external control circuits are insulated from human contact by at least one layer of insulation (supplementary insulation) rated for use at the AC supply voltage.</p>
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	<p>If the control circuits are to be connected to other circuits classified as Safety Extra Low Voltage (SELV) (e.g. to personal computer), an additional isolating barrier must be included in order to maintain the SELV classification.</p>
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NOTE: The digital inputs are positive logic only.

0V	0V common
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AI	Analogue input 1: voltage, current or digital input
Default	Analogue voltage input
Input range: Voltage / Current / Digital	0 to +10V / 4 to 20mA / 0 to +24V
Input impedance	100k Ω (voltage) / 200 Ω (current) / 6k Ω (digital)
Digital input	See terminals T6, T7 and T8

10V	+10V reference output
Maximum output current	5mA

AO	Analog voltage or digital output
Default:	Digital output: 'At zero speed'
Range: Voltage output / Digital output	0 to +10V / 0 to +24V
Maximum output current: Analogue output Digital output	5mA 50mA

NOTE	The total available current from the digital output plus the +24V output is 100mA.
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24V	+24V output
Maximum output current	100mA

DIN1	Digital input 1 (Enable/Reset)**
DIN2	Digital input 2 - run forward (edge triggered)**
DIN3	Digital input 3 - run reverse (edge triggered)**
Logic	Positive logic only
Voltage range	0V/ +24V
Nominal threshold voltage	+10V

The function of terminal DIN3 is automatically changed by the setting of P05.

The function of terminals DIN1, DIN2 and DIN3 can also be changed by the setting of P11.

RL1/RL2	Status relay - Drive healthy (normally open)
Voltage rating	240Vac/30Vdc
Current rating	2A/6A (resistive load)
Contact isolation	1.5kVac (overvoltage category II)

Operation of contact	<p>OPEN</p> <ul style="list-style-type: none"> • AC supply removed from drive • AC supply applied to drive with drive in tripped condition <p>CLOSED</p> <ul style="list-style-type: none"> • AC supply applied to drive with drive in a 'ready to run' or 'running' condition (not tripped)
	Provide fuse or other over-current protection in status relay circuit.

If the enable terminal is opened, the drives output is disabled and the motor will coast to a stop. The drive cannot be re-enabled until 1.0s has elapsed since it was disabled.

* Following a drive trip, opening and closing the enable terminal will reset the drive. If the run forward or run reverse terminal is closed, the drive will run straight away.

** Following a drive trip and a reset via the stop/reset key, the enable, run forward or run reverse terminals will need to be opened and closed to allow the drive to run. This ensures that the drive does not run when the stop/reset key is pressed.

The enable, run forward and run reverse terminals are level triggered apart from after a trip where they become edge triggered. See * and ** by terminals DIN1, DIN2 and DIN3.

If the enable and run forward or enable and run reverse terminals are closed when the drive is powered up, the drive will run straight away up to the set speed.

Chapter 5 Keypad And Display

The front panel of the drive, with LED and keypad on it, can be used to control the drive and display various information.

5.1 Keypad Description

The keypad is shown in the following figure.

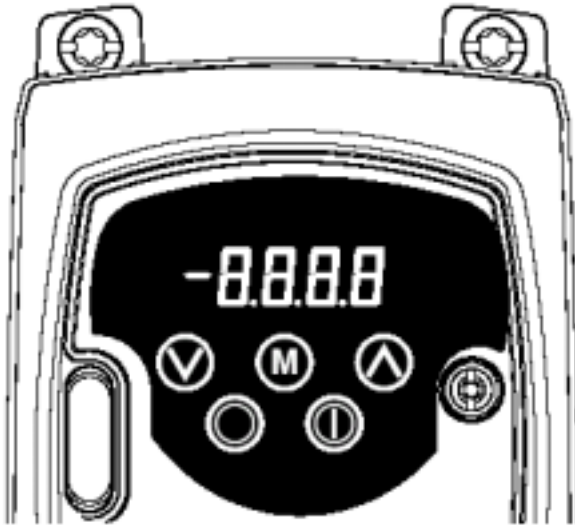





Figure 5-1 Keypad and display


5.1.1 Programming Keys

The MODE key  is used to change the mode of operation of the drive.

The UP key  and DOWN key  are used to select parameters and edit their values. In keypad mode, they are used to increase and decrease the speed of the motor.





5.1.2 Control Keys

The START key  is used to start the drive in keypad mode.


The STOP/RESET key  is used to stop and reset the drive in keypad mode. It can also be used to reset the drive in terminal mode.

5.1.3 Display Indications

Status modes:

Display	Status	Explanation
	Drive ready	The drive is enabled and ready for a start command. The output bridge is inactive.
	Drive inhibited	The drive is inhibited because there is no enable command, or a coast to stop is in progress or the drive is inhibited during a trip reset.
	Drive has tripped	The drive has tripped. The trip code will be displayed in the display.
	DC injection braking	DC injection braking current is being applied to the motor.

Speed indications:

Display	Explanation
	Drive output frequency in Hz

5.2 Selecting And Changing Parameter

NOTE	This procedure is written from the first power up of the drive and assumes no terminals have been connected, no parameters have been changed and no security has been set.
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See the following figure for operation menus of the drive.

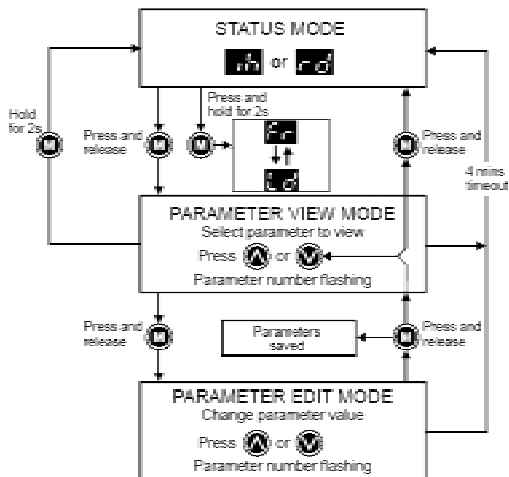





Figure 5-2 Operation menus

5.3 Saving Parameters

Parameters are automatically saved when the MODE key  is pressed when going from parameter edit mode to parameter view mode.

5.4 Parameter Access

There is only one level of parameter access. All parameters are accessible from default by scrolling through the parameters by pressing the UP key  or DOWN key .

The setting of user security P25 determines whether the parameter access is read only (RO) or read write (RW).


5.5 Security Codes

Setting a security code allows view only access to all parameters.




A security code is locked into the drive when P25 is set to any value other than 0 and then LoC is selected in P10. On pressing the MODE key, P10

is automatically changed from LoC to OPEn and P25 will automatically be set to 0 as not to reveal the security code.

5.5.1 Setting A Security Code


- Set P25 to the desired security code e.g. 5
- Set P10 to LoC
- Press the MODE key 
- P10 will now be reset to OPEn and P25 will be reset to 0
- The security code will now be locked into the drive
- Security will also be set if the drive is powered down after a security code has been set into P25

5.5.2 Unlocking A Security Code

- Select parameter to be edited
- Press the MODE key , the display will flash 'CodE'
- Press the UP key  to enter the correct security code
- Press the MODE key 
- If the correct security code has been entered, the display will now flash the parameter value and this can be adjusted
- If the security code has been entered incorrectly, the display will return to parameter view mode


5.5.3 Re-locking Security

When a security code has been unlocked and the required parameter changes made, to re-lock the same security code:

- Set P10 to LoC
- Press the MODE key 

5.5.4 Setting Security Back To 0 (Zero) - No Security



- Go to P25
- Unlock security as above

- Set P25 to 0
- Press the MODE key 

NOTE

If a security code has been lost or forgotten, please contact your local drive centre or distributor.

5.5.5 Setting The Drive Back To Default Values

- Set P29 to EUR and press the MODE key . This loads 50Hz default parameters or
- Set P29 to USA and press the MODE key . This loads 60Hz default parameters

Chapter 6 Parameters

6.1 Parameter Descriptions

Table 6-1 Parameter description

No	Function	Range`	Defaults	Description
01	Minimum set speed	0.0 to P02Hz	0.0	Used to set the minimum speed at which the motor will run in both directions
02	Maximum set speed	0.0 to 1500Hz	Eur: 50.0 USA: 60.0	Used to set the maximum speed at which the motor will run in both directions
03	Acceleration rate	00 to 3200 s/100Hz	5.0	Sets the acceleration and deceleration rate of the motor in both directions in seconds/100Hz
04	Deceleration rate		10.0	
05	Drive configuration	AV, AI, AV, Parameter, AI.Pr, Pr, PAd	AV	The setting of P05 automatically sets up the drives configuration.
06	Motor rated current	0.0 to drive rated current A	Drive rating	Enter the motor current rating (taken from the motor name plate) Warning: Motor rated current must be set correctly to avoid a risk of fire in the event of a motor overload.



No	Function	Range`	Defaults	Description
07	Motor rated speed	0 to 9999 rpm	Eur: 1500 USA: 1800	Enter the rated full load speed of the motor (taken from the motor name plate)
08	Motor rated voltage	0 to 240V 0 to 480V	Eur: 230/400 USA: 230/460	Enter the motor rated voltage (taken from the motor name plate)
09	Motor power factor	0 to 1	0.85	Enter the motor rated power factor $\cos \varphi$ (taken from the motor name plate)
10	Parameter access	OPEn, LoC	OPEn	OPEn: All parameters can be accessed Loc: Used to lock a security code in the drive. See section 5.7 Security Codes for further details.
11*	Start/Stop logic select	0 to 4	Eur: 0 USA: 4	This parameter changes the functions of terminals 6, 7 and 8 which are normally associated with enabling, stopping and starting the drive.
15	Jog reference	0.0 to 400.0 Hz	1.5	Defines the jog speed
17	Enable negative preset speeds	OFF, On	OFF	OFF: Direction of rotation controlled by run forward and run reverse terminals On: Direction of rotation controlled by preset speed values (use run forward terminal)
18	Preset speed 1	± 1500 Hz (Limited by setting of Pr02 Maximum set speed)	0.0	Defines preset speeds 1 to 4
19	Preset speed 2			
20	Preset speed 3			
21	Preset speed 4			

No	Function	Range`	Defaults	Description
25	Security set-up	0 to 9999	0	Used to set-up a user security code. See section 5.7 <i>Security Codes</i> .
27	Power up keypad reference	0, LAST, PrS1	0	0: Keypad reference is zero LAST: Keypad reference is last value selected before the drive was powered down PrS1: Keypad reference is copied from preset speed 1
29*	Load defaults	no, Eur, USA	no	no: Defaults are not loaded Eur: 50Hz default parameters are loaded USA: 60Hz default parameters are loaded
30	Ramp mode select	0 to 3	1	0: Fast ramp select 1: Standard ramp with normal motor voltage selected 2: Standard ramp with high motor voltage selected 3: Fast ramp with high motor voltage selected
31	Stopping mode select	0 to 4	1	0: Coast to stop selected 1: Ramp to stop selected 2: Ramp to stop with 1 second DC injection braking 3: DC injection braking with the detection of zero speed 4: Timed DC injection braking
32	Dynamic V to f select	OFF, On	OFF	OFF: Fixed linear voltage to frequency ratio (constant torque – standard load) On: Voltage to frequency ration dependant on load current (dynamic/variable torque load)

No	Function	Range`	Defaults	Description
33#	Catch a spinning motor select	0 to 3	0	0: Disabled 1: Detected positive and negative frequencies 2: Detect positive frequencies only 3: Detect negative frequencies only
35*	Analog/digital output mode select	Fr, Ld, A, Por, n=0, At.SP, lo.SP, hEAL, Act, ALAr, I.Lt, At.Ld	n=0	Analog output modes Fr: Voltage proportional to motor speed Ld: Voltage proportional to motor load A: Voltage proportional to output current Por: Voltage proportional to output power Digital output modes n=0: At zero speed At.SP: At speed lo.SP: At minimum speed hEAL: Drive healthy Act: Drive active ALAr: General drive alarm I.Lt: Current limit active At.Ld: At 100% load
37	Maximum switching Frequency	3, 6, 12, 18*** kHz	3	3: 3kHz 6: 6kHz 12: 12kHz 18: 18kHz**
39	Motor rated Frequency	0.0 to 1500 Hz	Eur: 50.0 USA: 60.0	Enter the motor rated frequency (taken from the motor rated name plate)

No	Function	Range`	Defaults	Description
40	Number of motor Poles	Auto, 2P, 4P, 6P, 8P	Auto	Auto: Automatically calculates the number of motor poles from the settings of P07 and P39 2P: Set for a 2 pole motor 4P: Set for a 4 pole motor 6P: Set for a 6 pole motor 8P: Set for a 8 pole motor
41# #	Voltage mode Select	Ur S, Ur, Fd, Ur A, Ur I, SrE	Fd	Ur S: Stator resistance is measured each time the drive is enabled and run Ur: No measurement is taken Fd: Fixed boost Ur A: Stator resistance is measured the first time the drive is enabled and run Ur I: Stator resistance is measured at each power-up when the drive is enabled and run SrE: Square law characteristic
42	Low frequency voltage boost	0.0 to 50.0 %	3.0	Determines the boost level when P41 is set to Fd or SrE
45	Software version	1.00 to 99.99	-	Indicates the software version fitted to the drive
55	Last trip	-	-	
56	Trip before P55	-	notr (no trip)	Indicates drive trip codes. See Chapter 7 Diagnostics.
57	Trip before P56	-		
58	Trip before P57	-		

NOTES:

* A change to these parameters is set by pressing the MODE key  on exit from parameter edit mode. The drive must be disabled, stopped or tripped for a change to take place. If these parameters are changed while the drive is running, when the MODE key  is pressed on exit from parameter edit mode, the parameter will change back to its previous value.

** Not available on Commander SL 400V units

If the drive is configured in fixed boost mode (P41 = Fd or SrE) with catch a spinning motor software enabled, an autotune (see P41##) must be carried out to measure the motor's stator resistance beforehand. If a stator resistance is not measured, the drive may trip on OV or OI.AC while trying to catch a spinning motor.

In all Ur modes, the drive operates in open loop vector mode. The motor/load must be stationary before an autotune is carried out when one of the Ur modes is selected. Carrying out an autotune when the motor/load is not stationary could result in poor motor performance or OI.AC, It.AC or OV trips.

P05 Drive configuration

In all of the settings below, the status relay is set up as a drive healthy relay:

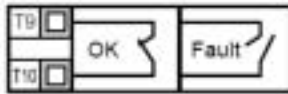


Figure 6-2 Drive healthy relay

Configuration	Description
AV	Voltage input
AI	Current input
AV.Pr	Voltage input with 1 preset speed
AI.Pr	Current input with 1 preset speed
Pr	4 preset speeds
PAd	Keypad control

6.2 Diagnostic Parameters

The following Read Only (RO) parameters can help you diagnose drive faults.

Table 6-3 Diagnostic parameters

No	Function	Range	Type
81	Frequency reference selected	$\pm P02$ (Hz)	RO
82	Pre-ramp reference	$\pm P02$ (Hz)	RO
83	Post-ramp reference	$\pm P02$ (Hz)	RO
84	DC bus voltage	0 to drive maximum Vdc	RO
85	Motor frequency	$\pm P 02$ (Hz)	RO
86	Motor voltage	0 to drive rating V	RO
87	Motor speed	± 9999 rpm	RO
88	Motor current	+ Drive maximum A	RO
91	Reference enabled indicator	OFF, On	RO
92	Reverse selected indicator	OFF, On	RO
93	Jog selected indicator	OFF, On	RO
94	Analog input level	0 - 100 %	RO
95-99	Not used		

Chapter 7 Diagnostics



Do not attempt to carry out internal repairs. Return a faulty drive to the supplier for repair.

Table 7-1 Trip codes list

Trip code	Condition	Possible cause
UU	DC bus under voltage	Low AC supply voltage
OU	DC bus over voltage	Dec rate set too fast for the inertia of the machine
OI,AC**	Drive output instantaneous over current	1. Insufficient ramp times 2. Phase to phase or phase to ground short circuit on the drive's output
O.SPd	Over speed	Excessive motor speed (typically caused by mechanical load driving the motor)
It.AC	I ² t on drive output current	Excessive mechanical load
O.ht	Over heat based on drive heatsink	Heatsink temperature exceeds allowable maximum
O.Ld1*	User +24V or digital output overload	Excessive load or short circuit on +24V output
EEF	Internal drive EEPROM failure	Possible loss of parameter values (set default parameters, see P29)
PH	Input phase imbalance or input phase loss	One of the input phases has become disconnected from the drive (applies to 200/400V three phase drives only, not dual rated drives)
rS	Failure to measure motors stator resistance	Motor too small for drive Motor cable disconnected during measurement
O.cL	Overload on current loop input	Input current exceeds 25mA

* The Enable/Reset terminal will not reset an O.Ld1 trip. Use the Stop/Reset key.

** This trip cannot be reset for 10 seconds after it occurs.

Table 7-2 DC bus voltages

Drive voltage rating	UV trip-	UV reset	Braking level	OV trip
200V	175	215*	390	415
400V	330	425*	780	830

NOTE	* These are the absolute minimum DC voltages the drives can be supplied by.
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Table 7-3 Alarm Warnings

Display	Condition	Solution
OUL.d	l x t overload	Reduce motor current
hot	Heatsink/IGBT temperature high	Reduce ambient temperature or reduce motor current
ACLt	Drive current limit is active	Reduce motor current

NOTE	If no action is taken when an alarm warning appears, the drive will trip on the appropriate fault code.
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Cooling fan control (size B and C only)

As default, the drive's cooling fan is controlled by the drive. The fan will remain off until the heatsink temperature reaches 60°C or the output current rises above 75% of the drive rating. The fan will then switch on and run at full speed for a minimum of 10s.

Appendix 1 Optional Parts

The optional parts of EV800, including their functions, are described in the following Table. Please select according to your actual need.

Table 1 Optional parts

Name	Function
EV-FSL485-800	Providing standard RS485 signal
NEMA 1 top cover	Providing a protective cover
EMI filter	Make the drive meet IEC61800-3

1 EV-FSL485-800

EV-FSL485-800 is used to provide the standard RS485 signal.

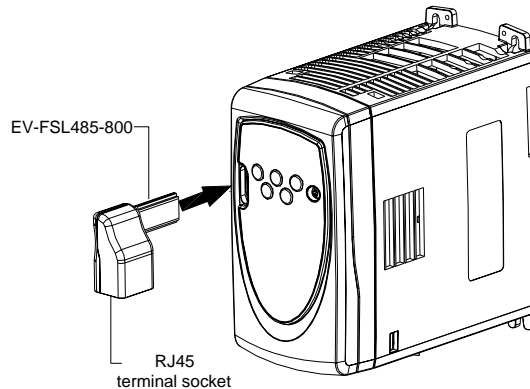


Figure 1 EV-FSL485-800 appearance

The RJ45 terminal socket is shown in the following figure.

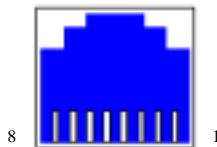


Figure 2 RJ45 terminal socket

The pins in Figure 2 are described in the following table.

Table 2 Pin definition

No.	F nction
1	Terminal resistor
2	Rx Tx
3	0V
4	+24V
5	/
6	Tx Enable
7	$\overline{\text{Rx Tx}}$
8	$\overline{\text{Rx Tx}}$

2 NEMA 1 Top Cover

This optional part provide EV800 drive with a protective cover to prevent particles from falling into the drive from above. The top cover has 3 different sizes to match different drives.



Figure 3 NEMA 1 top cover

3 EMI Filter

You need to purchase an EMI filter yourself. The dimensions of EMI filters are shown below:



Figure 4 EMI filter sizes

In the above figure, the A, a, B, b and D of EMI filter vary with different drive models. See the following table for details.

Table 3 Dimensions of EMI filter

EMI filter model	Dimensions				
	A (mm)	a (mm)	B (mm)	b (mm)	D (mm)
Schaffner-FS6512-12-07	74	48	193	173	40
Schaffner-FS6513-10-07	77	50	252	227	
Schaffner-FS6513-20-07					
Schaffner-FS6514-24-07	94	65	303	277	
Schaffner-FS6514-14-07					

The models listed in the following table has been tested on EV800 drives.

Table 4 EMC filter list

Drive model	Filter model	Rated current (A)	Max. power (A)	Work leakage current (mA)	Tightening torque (Nm)	Weight (kg)
EV800-2S0002G	Schaffner FS6512-12-07	12	3.7	51.2	0.8	0.65
EV800-2S0004G						
EV800-2S0005G						
EV800-2S0007G						
EV800-2S0011G	Schaffner FS6513-20-07	20	7.1	65	0.8	0.65
EV800-2S0015G						
EV800-2S0022G	Schaffner FS6514-24-07	24	8.5	75	0.8	0.75
EV800-4T0004G	Schaffner FS6513-10-07	10	6.9	62	0.8	0.65
EV800-4T0005G						
EV800-4T0007G						
EV800-4T0011G						
EV800-4T0015G						
EV800-4T0022G	Schaffner FS6514-14-07	14	8.6	72	0.8	0.75
EV800-4T0030G						
EV800-4T0037G						

Appendix 2 EU Declaration Of Conformity

According to the Low Voltage Directive 73/23/EEC
with the Amendment Directive 93/68/EEC and the Directive for
Electromagnetic Compatibility 89/336/EEC

For the following equipment	AC Motor Drive
Product:	
Type Designation/Trademark:	EV800-2S0002G, EV800-2S0004G, EV800-2S0005G, EV800-2S0007G
Manufacturer's Name:	Emerson Network Power Co. Ltd
Manufacturer's Address:	No.1 Kefa Road, Science & Industry Park, Nanshan District, Shenzhen, 518057, China

is herewith confirmed to comply with the requirements set out in the
Council Directive 73/23/EEC for electrical equipment used within certain
voltage limits and the Amendment Directive 93/68/EEC and with the
requirements of the Directive 89/336/EEC. For the evaluation of the
compliance with this Directives, the following standards were applied:

EN61800-5-1: Adjustable speed electrical power drive systems –Part
5-1: safety requirements- electrical, thermal and energy

EN 61800-3: 1996+A11: 2000: Adjustable speed electrical power
drive systems. EMC product standard including specific test methods

EN 61000-6-2: 2001: Electromagnetic compatibility (EMC) Part6-2:
Generic standards. Immunity standard for industrial environments

EN 61000-6-4: 2001: Electromagnetic compatibility (EMC) -Part6-4:
Generic standards. Emission standard for industrial environments

LVD Compliance technical report issued by Emerson Network Power Co.
Ltd., report number: SKLA-0051, dated May. 26, 2005.

EMC Compliance technical report issued by Emerson Network Power Co.
Ltd., report number: FSLS271GZ-TCT-2V1, dated May. 26, 2005.

Responsible for making this declaration is the manufacturer.



Person responsible for making this declaration

Name, Surname: Weiguo Zeng

Position/Title: Director, Test Dept of R&D

(Place)

(Date)

(Company stamp and legal signature)

Appendix 3 UL Listing Information

1 Common UL Information

1.1 Conformity

The drive conforms to UL listing requirements only when the following are observed:

- Class 1 60/75°C (140/167°F) copper wire only is used in the installation
- The ambient temperature does not exceed 40°C (104°F) when the drive is operating
- The terminal tightening torques specified in Table 3-2 are used
- The drive is installed into a separate electrical enclosure. The drive has a UL 'Opentype' enclosure rating

1.2 AC Supply Specification

The drive is suitable for use in a circuit capable of delivering not more than 100,000 RMS symmetrical Amperes at 264Vac RMS maximum.

1.3 Motor Overload Protection

The drive provides motor overload protection. The overload protection level is 150% of full-load current. It is necessary for the motor rated current to be entered into P06 for the protection to operate correctly. The protection level may be adjusted below 150% if required.

1.4 Overspeed Protection

The drive provides overspeed protection. However, it does not provide the level of protection afforded by an independent high integrity overspeed protection device.

2 Power Dependant UL Information

2.1 EV800 Size A

Conformity

The drive conforms to UL listing requirements only when the following is observed:

UL listed class CC fast acting fuses e.g. Bussman Limitron KTK series, Gould Amp-Trap ATM series or equivalent are used in the AC supply.



Emerson Network Power Co. Ltd.

Maintenance Record

Customer Company:				
Address :				
Zip Code :	Zip Code :			
Tel :	Tel :			
Machine SN :				
Power :	Model :			
Contract No :	Date of purchase :			
Service provider :				
Contact person :	Tel :			
Maintenance person :	Tel :			
Date of service :				
Customer's opinion about the service:				
Excellent	Satisfactory	Acceptable	Unsatisfactory	
Other comments:				
Signature :		DD	MM	YYYY
Customer Service Center Visit Record :				
by phone call		by questionnaire		
Others:				
Signature of technical support engineer:		DD	MM	YYYY

Note: The form becomes invalid if the customer cannot be revisited.

Warranty Agreement

1. The scope of warranty is confined to the drive only.
2. Warranty period is 18 months, ENP conducts free maintenance and repair services to the drive that has fault or damage under the normal operation conditions.
3. The warranty period starts from the date the product is delivered, and the user, distributor and the manufacturer should negotiate under special conditions.
4. Even within 18 months, maintenance should also be charged in case of the following situations:
 - 1) Damages incurred to the drive due to mis-operations which are not in compliance with the User Manual;
 - 2) Damages incurred to the drive due to fire, flood, abnormal voltage, etc;
 - 3) Damages incurred to the drive due to the improper use of drive functions.
5. The service fee will be charged according to the actual costs. If there are any maintenance contracts, priority will be put to the contract.
6. Please keep this paper and show this paper to the maintenance unit when the product needs to be repaired.
7. If you have any other question, please contact the distributor or our company directly.

Variable Speed Drive Service Dept.

Emerson Network Power Co., Ltd.

Address: NO.6 Keyuan Road, 3F.SSIP Building, Shenzhen Science & Industry Park, Nanshan District, 518057, Shenzhen, PRC

Customer Service Hotline: (86) 755-86010581

Complaint Hotline: (86) 755-86010800

To Customers :

Thank you for choosing our products. To improve the product and provide better service for you, could you please fill in the form after the product has been operated for 1 month, and mail or fax it to our Customer Service Center? We will send you an exquisite souvenir upon receiving the complete Product Quality Feedback Form. Furthermore, if you can give us some advices on improving the product and service quality, you will be awarded a special gift. Thank you very much!

Emerson Network Power Co., Ltd.

Product Quality Feedback Form

Customer name		Tela	
Address		Zip code	
Model		Date of use	
Machine SN			
Appearance or structure			
Performance			
Package			
Material			
Quality problem during usage			
Suggestion about improvement			

Address: No.6 Keyuan Road, 3F.SSIP Building. Shenzhen Science & Industry Park, Nanshan District, 518057, Shenzhen, PRC

Tel: +86 755 86010581