



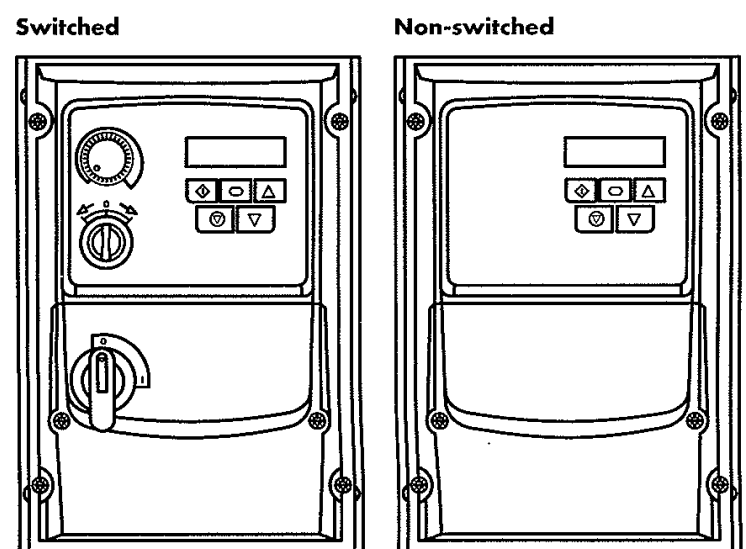
OPTIDRIVE™ E3

AC Variable Speed Drive

IP66 (NEMA 4X)

0.37kW – 22kW / 0.5HP – 30HP

110V & 230V Single Phase input,  
230V & 480V 3 Phase input



- CHECK:** Check the correct drive type, check suitable motor type & info
- PREPARE:** Correct tools, suitable mounting location, weather protection
- MOUNT:** Mechanical mounting
- CONNECT:** Power & Control connections
- CHECK:** Final check of everything before operation
- POWER ON**
- COMMISSION** the drive parameters
- OPERATE** and check everything is as intended

**WARNING!** The Optidrive should **ONLY** be installed by a qualified electrician.  
**NOTE** This guide does not provide detailed installation, safety or operational instructions.  
See the Optidrive E3 IP66 Outdoor User Manual for complete information.  
Unpack and check the drive. Notify the supplier and shipper immediately of any damage.

**1 CHECK**

Identifying the Drive by Model Number

Each drive can be identified by its model number, as shown in the table below.

ODE	-	3	-	1	2	0021	-	1	F	1	B
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Product Family

Generation

Frame Size

Input Voltage

IP Rating

Dynamic Brake

Filler Type

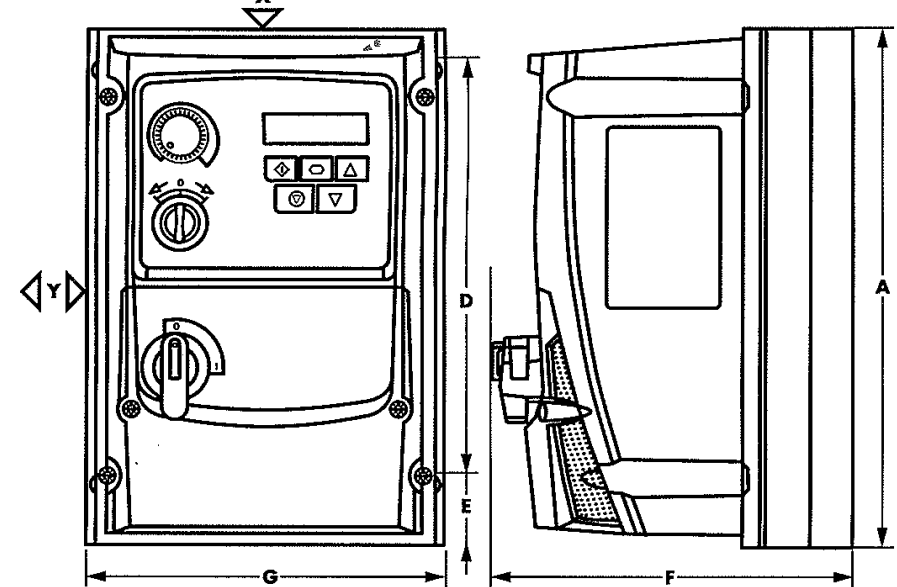
No. Of Input Phases

Output Current x 10

- 2 PREPARE**
- Prepare the Mounting Location**
- The Optidrive must be mounted in a vertical position only.
  - Installation should be on a suitable flat, flame resistant surface. Do not mount flammable material close to the drive.
  - Refer to Technical Data and ensure the chosen mounting location is within the drive specification.
  - The mounting location should be free from vibration.
  - Do not mount the drive in any area with excessive humidity, corrosive airborne chemicals or potentially dangerous dust particles.
  - Avoid mounting close to high heat sources.
  - The drive must not be mounted in direct sunlight. If necessary, install a suitable shade cover.
  - The mounting location must be free from frost.
  - Do not restrict the flow of air through the drive heatsink. The drive generates heat which must be naturally allowed to dissipate. Correct air clearance around the drive must be observed.
  - If the location is subject to wide ambient temperature and air pressure variation, install a suitable pressure compensation valve in the drive gland plate.
- NOTE** If the drive has been in storage for a period longer than 2 years, the DC link capacitors must be reformed. Refer to online documentation for further information.

**3 MOUNT**

**Mechanical Dimensions**



Dimensions

Drive Size	A	B	C	D	E	F	G
1	232.0	913	189.0	744	25.0	0.98	162.0
2	257.0	1012	200.0	787	28.5	1.12	182.0
3	310.0	12.20	251.5	990	33.4	1.31	238.0
4	360.0	1417	300.0	11.8	33.4	1.31	275.0

Weight

Drive Size	kg	lb
1	2.3	5.5
2	3.5	7.7
3	7.0	15.4
4	9.5	20.9

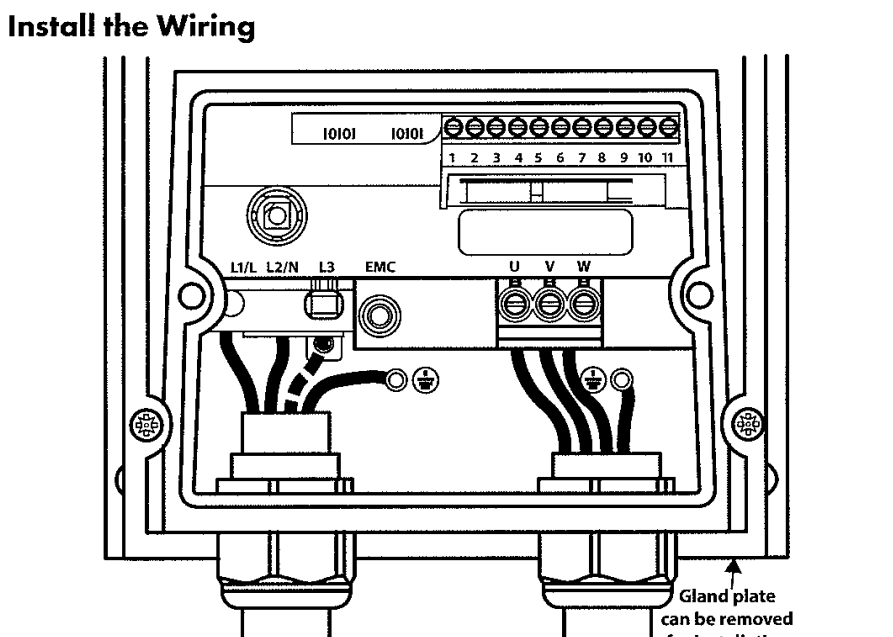
Mounting Clearance

Drive Size	X Above & Below	Y Either Side
	mm	in
All Frame Sizes	200	7/8"

**NOTE** Typical drive heat losses are approximately 3% of operating load conditions. Above are guidelines only and the operating ambient temperature of the drive MUST be maintained at all times.

Mounting Bolts & Tightening Torques				
Mounting Bolts		Tightening Torques		
Frame Size		Frame Size	Control Terminals	Power Terminals
All Frame Sizes	4 x M4 (#8)	All Frame Sizes	0.8 Nm (7 lb-in)	1.5 Nm (13 lb-in)

- 4 CONNECT**
- Cable Selection**
- For 3 phase supply (Sizes 1-3 only), the main power cables should be connected to U1/L1, L2/LN.
  - For 3 phase supplies, the main power cables should be connected to L1, L2, and L3. Phase sequence is not important.
  - For compliance with CE and C Tick EMC requirements, refer to online documentation.
  - A fixed installation is required according to IEC61800-5-1 with a suitable disconnecting device installed between the Optidrive and the AC Power Source. The disconnecting device must conform to the local safety code / regulations (e.g. within Europe, EN60204-1, Safety of machinery).
  - The cables should be dimensioned according to any local codes or regulations. Maximum dimensions are given in the Rating Tables section of this Quick Start Guide.



Cable Gland Sizes

Drive Size	Power Cable	Motor Cable	Control Cables
1	M20 (PG13.5)	M20 (PG13.5)	M20 (PG13.5)
2	M25 (PG21)	M25 (PG21)	M20 (PG13.5)
3	M25 (PG21)	M25 (PG21)	M20 (PG13.5)
4	M32 (PG29)	M32 (PG29)	M20 (PG13.5)

**Motor Terminal Box Connections**

Most general purpose motors are wound for operation on dual voltage supplies. This is indicated on the nameplate of the motor. This operational voltage is normally selected when installing the motor by selecting either STAR or DELTA connection. STAR always gives the higher of the two voltage ratings.

Connection

Incoming Supply Voltage	Motor Nameplate Voltages	Connection
230	230 / 400	Delta
400	400 / 690	Star
400	230 / 400	Star

**Information for UL Compliance**

Optidrive E3 is designed to meet the UL requirements. For an up to date list of UL compliant products, please refer to UL listing NMM5 E226333. In order to ensure full compliance, the following must be fully observed.

Input Power Supply Requirements

Supply Voltage	200 – 240 RMS Volts for 230 Volt rated units, +/- 10% variation allowed. 240 Volt RMS Maximum. 380 – 480 Volts for 400 Volt rated units, +/- 10% variation allowed, Maximum 500 Volts RMS.
Frequency	50 – 60Hz +/- .5% Variation
Short Circuit Capacity	All drives are suitable for use on a circuit capable of delivering not more than 100kA maximum short-circuit Amperes symmetrical with the specified maximum supply voltage when protected by Class 'I' fuses.

**Mechanical Installation Requirements**

All Optidrive E3 units are intended for installation within controlled environments which meet the condition limits shown in the Environment section of this Quick Start Guide.

The drive can be operated within an ambient temperature range as stated in the Environment section of this Quick Start Guide.

For IP66 (Nema 4X) units, installation in a pollution degree 2 environment is permissible.

**Electrical Installation Requirements**

Incoming power supply connection must be according to the install the Wiring section of this Quick Start Guide.

Suitable power and motor cables should be selected according to the data shown in Rating Tables section of this Quick Start Guide and the National Electrical Code or other applicable local codes.

Motor Cable 75°C Copper must be used.

Power cable connections and tightening torques are shown in the Mechanical Dimensions section of this Quick Start Guide.

Integral Solid State short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the national electrical code and any additional local codes. Ratings are shown in the Rating Tables section of this Quick Start Guide.

For Canadian installations transient surge suppression must be installed on the line side of this equipment and shall be rated 480V (phase to ground), 480 Volt (phase to phase), suitable for over voltage category II and shall provide protection for a rated impulse withstand voltage peak of 2.5kV.

**General Requirements**

Optidrive E3 provides motor overload protection, set at 150% of full load, in accordance with the National Electrical Code (US).

Where a motor thermostat is not fitted, or not utilized, Thermal Overload Memory Retention must be enabled by setting P-60 = 1.

Where a motor thermostat is fitted and connected to the drive, connection must be carried out according to the information shown in the Motor Thermostat Connection section of the Quick Start Guide.

UL rated ingress protection ("Type") is only met when cables are installed using a UL recognized building or fitting for a flexible conduit system which meets the required level of protection ("Type").

For conduit installations the conduit entry holes require standard opening to the required sizes specified per the NEC.

Not intended for installation using rigid conduit system.

**WARNING:** The opening of the branch-circuit protective device may be an indication that a fault has been interrupted. To reduce the risk of fire or electric shock, current-carrying parts and other components of the controller should be examined and replaced if damaged. If burnout of the current element of an overload relay occurs, the complete overload relay must be replaced.

- Control Terminal Wiring**
- All analog signal cables should be suitably shielded. Twisted pair cables are recommended.
  - Power and Control Signal cables should be routed separately where possible, and must not be routed parallel to each other.
  - Signal levels of different voltages e.g. 24 Volt DC and 110 Volt AC, should not be routed in the same cable.
  - Maximum control terminal tightening torque is 0.5Nm.
  - Control Cable entry conductor size: 0.05 – 2.5mm<sup>2</sup> / 30 – 12 AWG.

**Control Terminal Connections**

**Switched Units:** May use the built in control switch and potentiometer, or external control signals connected to the control terminals.

**Non-Switched Units:** Require external control signals to be connected to the control terminals.

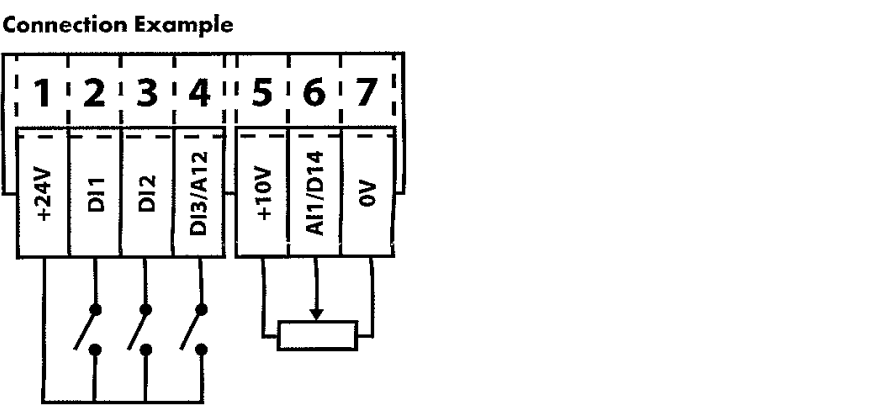
Switched Units: Default functions of the control switches

Switch Position	POT	Notes
Run Reverse	STOP	Run Forward
STOP	Set the output frequency	Factory Default Configuration. Run Forward or Reverse with speed controlled from the Local POT.

**NOTE** Other functions are possible, please refer to the online documentation for additional information.

Using the Control Terminals

No.	Purpose	Function
1	+24VDC 100mA Output	24 VDC Output
2	D11 Digital Input 1	Function defined by P.12 & P.15. See below for further info
3	D12 Digital Input 2	
4	D13 Digital Input 3 / A12 Analog Input 2	
5	+10VDC 10mA Output	10 VDC Output for external potentiometer
6	D14 Digital Input 4 / A11 Analog Input 1	Function defined by P.12 & P.15. Signal format selected by P.16
7	0VDC Common	
8	AO Analog Output / Digital Output	Function selected by P.25. See Parameter List
9	0VDC Common	
10	RL1 Output Relay	Function defined by P.18. See Parameter List
11	RL2 Output Relay	



Factory Default Functions

No.	Description	Function
D11	0/1	Open : Stop Closed : Run
D12	0/1	Open : Forward Rotation Closed : Reverse Rotation
D13	Analog Speed Reference / Preset Speed	Open : Speed Reference set by Analog Speed Reference Closed : Speed Reference set by Preset Speed 1 (P-20)
A11	Analog Speed Reference Input	Set the Speed Reference <b>NOTE</b> For Switched units, the internal pot is selected by default in P.16. For Non-switched units, an external pot or 0 - 10V reference may be connected. Other signal types may also be used, see P.16 to the correct format.

**NOTE** Additional functions are possible, refer to the online documentation for further information.

**Motor Thermostat Connection**

Where a motor thermostat is to be used, it should be connected as follows:

Control Terminal Strip

Control Terminal Strip	Additional Information
1 2 3 4	Compatible Thermostat: PTC Type, 2.5kΩ trip level. • Use a setting of P-15 that has Input 3 function as External Trip, e.g. P-15 = 3. Refer to online documentation for further details. • See P.47 = "Ptc - Lth"

**5 CHECK**

**6 POWER ON**

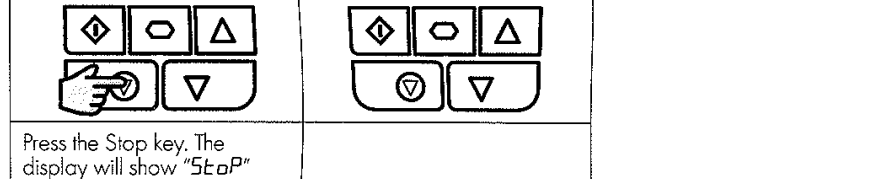
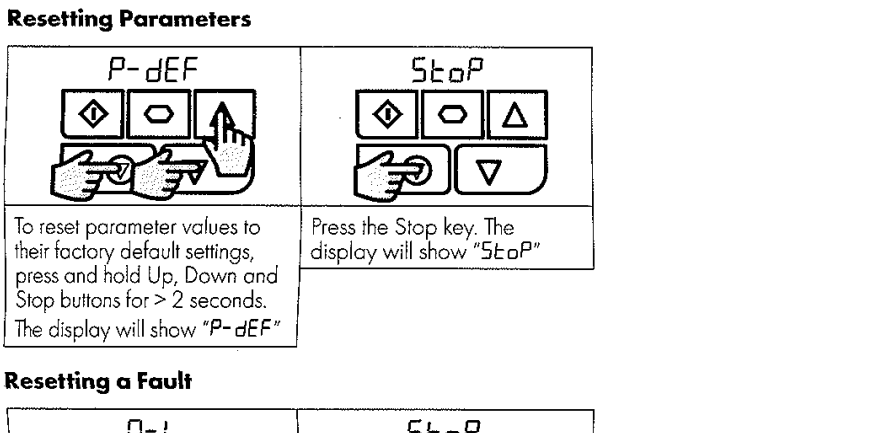
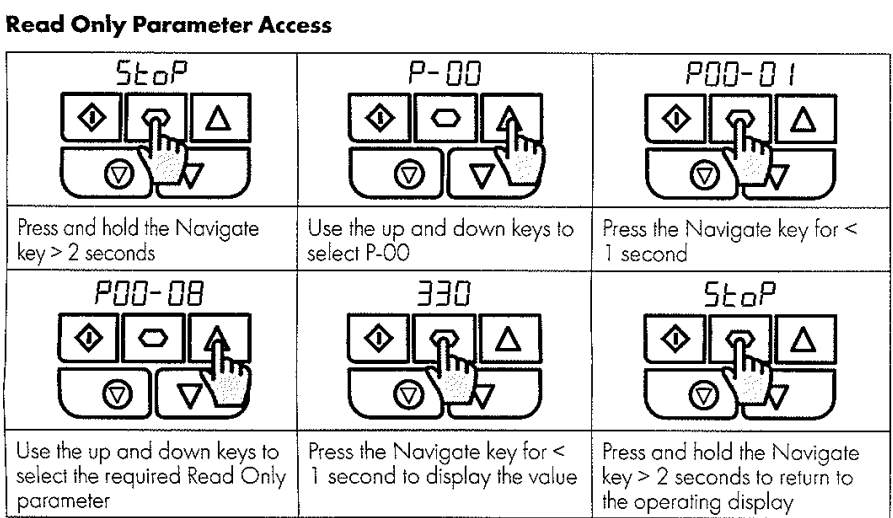
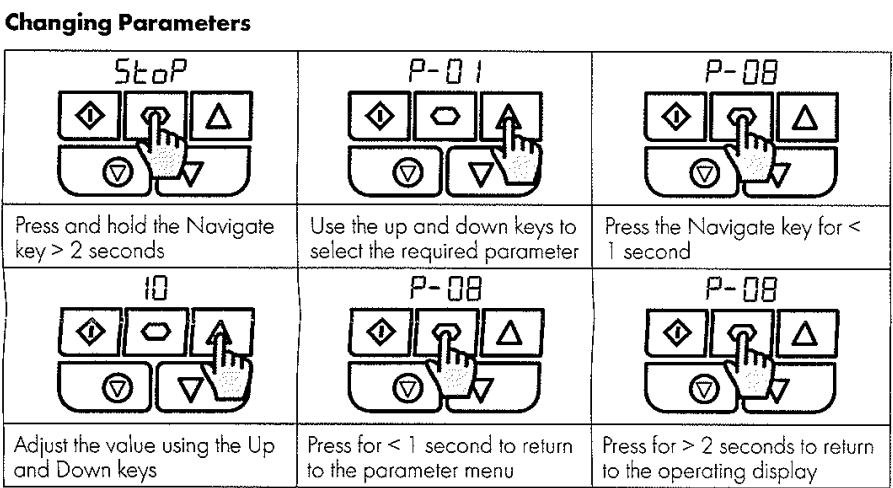
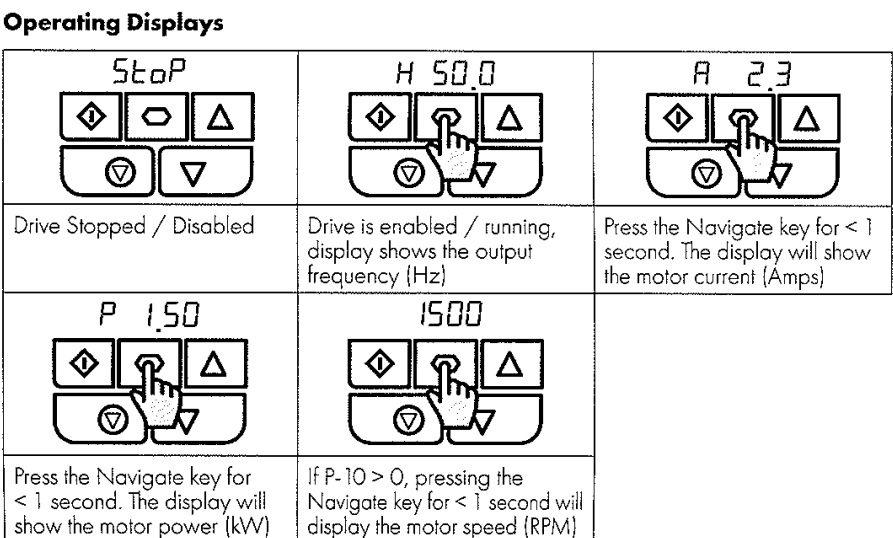
**7 COMMISSION**

**Operation**

**Managing the Keypad**

The drive is configured and its operation monitored via the keypad and display.

START	When in keypad mode, used to Start a stopped drive or to reverse the direction of rotation if bi-directional keypad mode is enabled.
UP	Used to increase speed in real-time mode or to increase parameter values in parameter edit mode.
DOWN	Used to decrease speed in real-time mode or to decrease parameter values in parameter edit mode.
NAVIGATE	Used to display real-time information, to access and exit parameter edit mode and to store parameter changes.
RESET / STOP	Used to reset a tripped drive. When in Keypad mode is used to Stop a running drive.



Please scan the QR code to access the complete User Manual

Or visit [bit.ly/E3manuals](http://bit.ly/E3manuals)

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**8 OPERATE**

Parameters

Standard Parameters

Par.	Description	Min	Max	Default	Units
P-01	Maximum Frequency/Speed Limit	P-02	500.0	50.0 (60.0)	Hz/RPM
P-02	Minimum Frequency/Speed Limit	0.0	P-01	0.0	Hz/RPM
P-03	Acceleration Ramp Time	0.00	600.0	5.0	s
P-04	Deceleration Ramp Time	0.00	600.0	5.0	s
P-05	Stopping Mode / Mains Loss Response	0	4	0	-

On Disable

On Mains Loss

On Parameter Access Lock

On Unlocked

On Analog Input 1 Offset

On Index 1: Display Scaling Factor

On Index 2: Display Scaling Source

On P-41 PI Controller Proportional Gain | 0.0 | 30.0 | 1.0 | - |

On P-42 PI Controller Integral Time | 0.0 | 30.0 | 1.0 | s |

On P-43 PI Controller Operating Mode | 0 | 3 | 0 | - |

On Direct Operation

On Inverse Operation

On 2: Direct Operation, Wake at Full Speed

On 3: Reverse Operation, Wake at Full Speed

On P-44 PI Reference (Setpoint) Source Select | 0 | 1 | 0 | - |

On P-45 PI Digital Setpoint | 0.0 | 100.0 | 0.0 | % |

Parameters

Advanced Parameters

Par.	Description	Min	Max	Default	Units
P-46	PI Feedback Source Select	0	5	0	-
P-47	Analog Input 2 Signal Format	-	-	-	U0-10
P-48	Standby Mode Timer	0.0	25.0	0.0	s
P-49	PI Control Wake Up Error Level	0.0	100.0	5.0	%
P-50	Output User Load Hysteresis	0.0	100.0	0.0	%

Parameters

Advanced Parameters

Par.	Description	Min	Max	Default	Units
P-51	Motor Control Mode	0	5	0	-
P-52	Motor Parameter Autotune	0	1	0	-

**Technical Data**

**Environment**

Operational ambient temperature range

Enclosed Drives

Storage ambient temperature range

Maximum altitude

Maximum humidity

Rating Tables

Frame Size	kW	HP	Input Current	Fuse / MCB (Type B)	Maximum Cable Size, mm	Output Current, A	Recommended Break Resistance, Ω
110 - 115 (+/- 10%) V 1 Phase Input, 230V 3 Phase Output (Voltage Doubler)							
1	0.37	0.5	78	10	8	8	2.3
2	1.1	1.5	21.9	32	30	8	5.8
200 - 240 (+/- 10%) V 1 Phase Input, 3 Phase Output							
1	0.37	0.5	3.7	6	8	8	2.3
2	1.1	1.5	10.9	16	17.5	8	4.3
3	1.5	2	12.9	16	17.5	8	7
4	2.2	3	19.2	25	25	8	10.5
5	3.0	4	26.2	40	40	8	15.3
380 - 480 (+/- 10%) V 3 Phase Input, 3 Phase Output							
1	0.75	1	3.5	6	8	8	2.2
2	1.5	2	5.6	10	10	8	4.1
3	2.2	3	8.5	16	15	8	7
4	3.0	4	11.5	16	15	8	10.5
5	3.7	5	14.5	25	25	8	15.3
6	4.5	6	17.5	32	30	8	18
7	5.5	7.5	20.4	40	35	8	24
8	7.5	10	27.5	40	45	16	30
9	11	15	33.3	63	70	16	5
10	15	20	44.1	63	70	16	5

Rating Tables

Frame Size	kW	HP	Input Current	Fuse / MCB (Type B)	Maximum Cable Size, mm	Output Current, A	Recommended Break Resistance, Ω
110 - 115 (+/- 10%) V 1 Phase Input, 230V 3 Phase Output (Voltage Doubler)							
1	0.37	0.5	3.7	6	8	8	2.3
2	1.1	1.5	10.9	16	17.5	8	4.3
3	1.5	2	12.9	16	17.5	8	7
4	2.2	3	19.2	25	25	8	10.5
5	3.0	4	26.2	40	40	8	15.3
380 - 480 (+/- 10%) V 3 Phase Input, 3 Phase Output							
1	0.75	1	3.5	6	8	8	2.2
2	1.5	2	5.6	10	10	8	4.1
3	2.2	3	8.5	16	15	8	7
4	3.0	4	11.5	16	15	8	10.5
5	3.7	5	14.5	25	25	8	15.3
6	4.5	6	17.5	32	30	8	18
7	5.5	7.5	20.4	40	35	8	24
8	7.5	10	27.5	40	45	16	30
9	11	15	33.3	63	70	16	5
10	15	20	44.1	63	70	16	5

**NOTE** Cable sizes shown are the maximum possible that may be connected to the drive. Cables should be selected according to local wiring codes or regulations at the point of installation.

## Troubleshooting

### Fault Code Messages

Fault Code	No.	Description
OL -b	01	Brake channel over current
OL-br	02	Brake resistor overload
OL-t	03	Output Over Current
OL-trP	04	Motor Thermal Overload (I2t)
OV-UL	06	Over voltage on DC bus
UV-UL	07	Under voltage on DC bus
OT	08	Heatsink over temperature
UT	09	Under temperature
ET-trIP	11	External trip
SC-DBS	12	Optibus comms loss
FL-tr-ds	13	DC bus ripple too high
P-LOSS	14	Input phase loss trip
h-O-I	15	Output Over Current
th-F	16	faulty thermostat on heatsink
dRAM-F	17	internal memory fault (IO)
4-20 F	18	4-20mA Signal loss
dRAM-E	19	Internal memory fault (DSP)
F-Ptc	21	Motor PTC thermostat trip
FAN-F	22	Cooling fan fault (IP66 only)
OUT-HERF	23	Drive internal temperature too high
OUT-F	26	Output fault
Ref-02	41	Autoline Fault
SC-F01	50	Modbus comms loss fault
SC-F02	51	CAN comms loss trip