

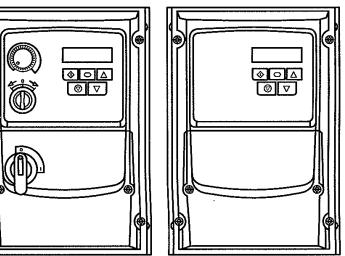
OPTIDRIVE™ (E³

AC Variable Speed Drive

IP66 (NEMA 4X)

0.37kW - 22kW / 0.5HP - 30HP110V & 230V Single Phase input, 230V & 480V 3 Phase input





THECK: Check the correct drive type, check suitable motor type & info

2 PREPARE: Correct tools, suitable mounting location, weather protection

3 MOUNT: Mechanical mounting

4 CONNECT: Power & Control connections

5 CHECK: Final check of everything before operation

6 POWER ON

7 COMMISSION the drive parameters

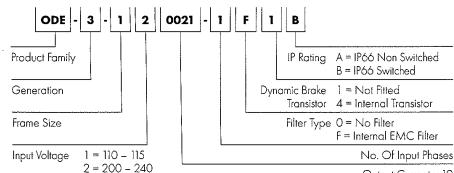
OPERATE and check everything is as intended

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.



Output Current x 10

2 PREPARE

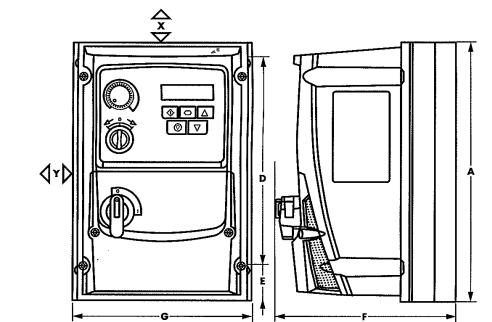
4 = 380 ~ 480

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



Drive	•	*								
Size	mm	in	mm	in	mm	in	mm	in	mm	in
J	232.0	9.13	189.0	7.44	25.0	0.98	162.0	6.37	161.0	6.34
2	25 <i>7</i> .0	10.12	200.0	7.87	28.5	1.12	182.0	7.16	188.0	<i>7</i> .40
3	310.0		251.5		33.4		238.0			
4	360.0	14.17	300.0	11.8	33.4	1,31	275.0	10.82	240.0	9.44

3.5 7.7 7.0 15.4 4 9.5 20.9

Mounting Clearance

5	X Above	& Below	Y Either Side		
Drive Size	mm	in	mm	in	
All Frame Sizes	200	7.87	10	0.39	
NOTE	load conditions	eat losses are ap s. Above are gui ient temperatur all times.	delines only an	d the	

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

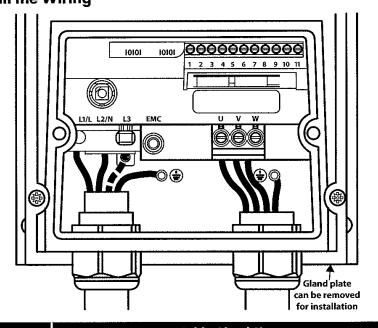
Cable Selection

• For 1 phase supply (Sizes 1-3 only), the mains power cables should be connected to L1/L, L2/N. • For 3 phase supplies, the mains power cables should be connected to L1, L2, and L3. Phase

• 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

 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.

Install the Wiring



D.i. Cia		Cable Gland Sizes	
Drive Size	Power Cable	Motor Cable	Control Cables
1	M20 (PG 13.5)	M20 (PG 13.5)	M20 (PG13.5)
2	M25 (PG21)	M25 (PG21)	M20 (PG13.5)
3	M25 (PG21)	M25 (PG21)	M20 (PG 13.5)
4	M32 (PG29)	M32 (PG29)	M20 (PG 13.5)

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

Incoming Supply Voltage	Motor Nameplate Voltages		Connection
230	230 / 400		DELTA A
400	400 / 690	Delta	
400	230 / 400	Star	STAR A O O O O V W

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 NMMS.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 J 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

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

lectrical 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

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 Sate 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 quipment and shall be rated 480Volt (phase to ground), 480 Volt (phase to phase), suitable for over voltage category iii and shall provide protection for a rated impulse withstand voltage

UL Listed ring terminals / lugs must be used for all bus bar and grounding connections.

Optidrive E3 provides motor overload protection, set at 150% of full load, in accordance with the National Electrical Code (US). Where a motor thermistor is not fitted, or not utilised, Thermal Overload Memory Retention must

be enabled by setting P-60 = 1. Where a motor thermistor is fitted and connected to the drive, connection must be carried out according to the information shown in the Motor Thermistor Connection section of the Quick

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

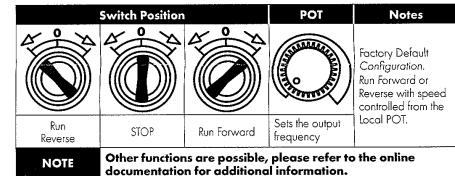
- All analog signal cables should be suitably shielded. Twisted pair cables are recommended. ■ Power and Control Signal cables should be routed separately where possible, and must not be routed parallel to each other.
- Signal levels of different voltages e.g. 24 Volt DC and 110 Volt AC, should not be routed in the
- Maximum control terminal tightening torque is 0.5Nm. Control Cable entry conductor size: 0.05 – 2.5mm2 / 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



Jsing	the C	Contro	l Tern	ninals						
Θ	\ominus	\ominus	\ominus	Θ	Θ	Θ	Θ	\ominus	\ominus	\bigcirc
1	2	3	4	5	6	7	8	9	10	11
+24 VDC	DII	DI2	DI3 AI2	+10 VDC	DI4 Al1	٥٧	AO	ov	RL1	RL2
No.	Purpo	se			Functi	on				
1	+24VD	C 100m.	A Outpu	İ	24 VDC Output Function defined by P-12 & P-15.					
2	DI1 Di	gital Inpu	11							
3	DI2 Di	DI2 Digital Input 2			See below for further info					
4		gital Inpu ialog Inp								
5	+10VD	C 10mA	Output		10 VD0	C Output	for exter	nal pote	ntiometer	
6		gital Inpu nalog Inp					d by P-12 lected b			
7	OVDC	Commo	1							

Function selected by P-25. See Parameter List

Function defined by P-18.

See Parameter List

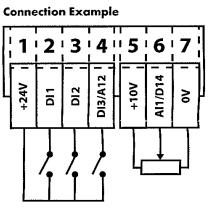
11 RL2 Output Relay

9 OVDC Common

10 RL1 Output Relay

AO Analog Output/

Digital Output



Factory Default Functions

No.	Description	
DII	0/1	Open : Stop Closed : Run
DI2	0/0	Open : Forward Rotation Closed : Reverse Rotation
DI3	Analog Speed Reference / Preset Speed	Open : Speed Reference set by Analog Speed Reference Closed : Speed Reference set by Preset Speed 1 (P-20)
All	Analog Speed Reference Input	Sets the Speed Reference NOTE For Switched units, the internal pot is selected by default in P-16. For Non-switched units, an external pot or 0 - 10 V reference may be connected. Other signal types may also be used, set P-16 to the correct format.

Control Terminal Strip	Additional Information
1 2 3 4	Compatible Thermistor: PTC Type, 2.5kΩ trip level. Use a setting of P-15 that has Input 3 function as Externation, e.g. P-15 = 3. Refer to online documentation for further details. Set P-47 = "PEc-Eh"

6 POWER ON

7 COMMISSION

Operation

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

	no connigorou or	to the operation memored 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.
\triangle	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 Keypod mode is used to Stop a running drive.

Operating Displays

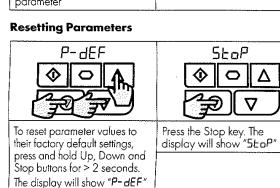
5±0P ♦ ○ △	H 50.0 P A	Ø P Δ
Drive Stopped / Disabled	Drive is enabled / running, display shows the output frequency (Hz)	Press the Navigate key for < second. The display will sho the motor current (Amps)
P 1.50	1500	
Press the Navigate key for < 1 second. The display will	If P-10 > 0, pressing the Navigate key for < 1 second will	

Changing Parameters

show the motor power (kW) display the motor speed (RPM)

5E0P	P-01	P-08
Press and hold the Navigate key > 2 seconds	Use the up and down keys to select the required parameter	Press the Navigate key for <
	P-08 P-08	
Adjust the value using the Up and Down keys	Press for < 1 second to return to the parameter menu	Press for > 2 seconds to retur to the operating display

Read Only Parameter Acc	ess	
<u> </u>	P-00	P00-0 I
Φ	♦ ○ 4	♦ ନ Δ
Press and hold the Navigate key > 2 seconds	Use the up and down keys to select P-00	Press the Navigate key for < 1 second
P00-08	330	StoP
$\Diamond \bigcirc A$	\Diamond \Diamond \triangle	
Use the up and down keys to select the required Read Only parameter	Press the Navigate key for < 1 second to display the value	Press and hold the Navigate key > 2 seconds to return to the operating display



	5±0P (*) (*) (*)
Press the Stop key. The display will show "5£aP"	

Please scan the QR code to access the complete User Manual



Or visit bit.ly/E3manuals



82-E3I66-IN_V1.04

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8 OPERATE

Parameters

Par. Description

Standard Parameter

-01	Maximum Frequency/Speed Limit										
02	Minimum	Minimum Frequency/Speed Limit Acceleration Ramp Time						it 0.0 P-01		Hz/RPM	
03	Accelera							0.00 600.0	5.0	S	
04	Decelera	tion Ramp Time	0.00	600.0	5.0	5					
05	Stopping Respons	g Mode/Mains Loss e	0	4	0	•					
	Setting	On Disable	On Ma	ins Loss							
	0	Ramp to Stop (P-04)	Ride Through (Recover energy from load to maintain operation)								
	1	Coast Coast									
	2	Ramp to Stop (P-04)	Fast Ramp to Stop (P-24), Coast if P-24 = 0								
	3	Ramp to Stop (P-04) with AC Flux Braking Fast Ramp to Stop (P-24), Coast if P-24 = 0									
	4 Ramp to Stop (P-O4) No action										
-06	Energy C)ptimiser	0	3	0	e variante de la composition della composition d					
	Setting	Motor Energy Optimi	sation	Optidrive	Energy Op	timisation					
	0	Disabled	Disabled								
	1	Enabled	Disabled								
	2	Disabled	Enabled								
	3	Enabled		Enabled							
,		ated Voltage/Back EM peed (PM/BLDC)	O	250/ 500	230/400	v					
	Motor Ro	ated Current	Driv	re Rating D	ependent	A					
9	Motor Ro	ated Frequency	10	500	50 (60)	Hz					
,	Motor Ro	ated Speed	0	30000	0	RPM					
	Low Frequency Torque Boost		0.0	Drive D	Pependent	%					
	Low Freq	uency torque Boost		tatio Maria anni anni							

(P-33) (P-60 Index 2)

	0: Industrial Mode 1: Pump Mod	de 2: Fan Mode
P-13	Operating Mode Select	20 22 0 0
	NOTE When P-12 = 1, 2, 3, 4, 7, 8 or 9, the control terminals, digital input 1.	, an enable signal must still be provided at
	4: Modbus Network Control	9: Slave Mode
	3: Modbus Network Control	8: CAN Control

	0	General	150%	Constant	O: Off	0: Trip
	1	Pump	110%	Variable	0: Off	1: Current Limit Reduction
	2	Fan	110%	Variable	2: On	1: Current Limit Reduction
500000000000000000000000000000000000000						

P-14	Extended Menu	Access code	0	65535	0	184

Par.	Description	Min	Max	Default	Uni				
P-15	Digital Input Function Select	0	17	0					
P-16	Analog Input 1 Signal Format	See	Below	UO-10					
	U D-10: Unidirectional, External 0 – 10Volt reference / pot								
	b 0-10: Bi-directional, External 0 – 10Volt reference / pot								
	A D-20: External 0 - 20mA signal								
	E 4-20: External 4-20mA signal, trip on loss								
	r 4-20 : External 4 – 20mA signal								
	E 20-4: External 20 – 4mA signal, trip	p on loss							

- 20-4 : External 20 – 4mA signal J 10−0 : External 10 – 0 Volt signal In-Pot: Switched units only: Internal pot P-18 Output Relay Function Select 0 9 1 -0: Drive Enabled (Running) 5: Output Current >= Limit 1: Drive Healthy 6: Output Frequency < Limit 2: At Target Frequency (Speed) 7: Output Current < Limit 8: Analog Input 2 > Limit 3: Drive Tripped

4: Output Frequency >= Limit 9: Drive Ready to Run P-20 Preset Frequency / Speed 1 -P-01 P-01 5.0 Hz/RPM -P-01 P-01 25.0 Hz/RPM P-23 Preset Frequency / Speed 4 -P-01 P-01 P-09 Hz/RPM P-24 2nd Ramp Time (Fast Stop) 0.00 600.0 0.00 s

P-25 Analog Output Function Select 0 11 8 -Digital Output Mode. Logic 1 = +24V DC

0: Drive Enabled (Running) 4: Output Frequency >= Limit 1: Drive Healthy 5: Output Current >= Limit 2: At Target Frequency (Speed) 6: Output Frequency < Limit 7: Output Current < Limit

3: Drive Tripped **Analog Output Mode**

8: Output Frequency (Motor Speed) 10: Output Power 9: Output (Motor) Current 11: Load Current P-31 Keypad Start Mode Select 0 7 1 -0: Minimum Speed, Keypad Start 4: Current Speed, Keypad Start

0 2 0 -

1: Previous Speed, Keypad Start 5: Preset Speed 4, Keypad Start 2: Minimum Speed, Terminal Enable 6: Current Speed, Terminal Start 3: Previous Speed, Terminal Enable 7: Preset Speed 4, Terminal Start P-33 Spin Start 0: Disabled

2: Enabled on Trip, Brown Out or Coast Stop P-34 Brake Chopper Enable (Not

1: Enabled With Software Protection 2: Enabled Without Software Protection

3: Enabled With Software Protection

4: Enabled Without Software Protection P-38 Parameter Access Lock 0 1 0 . 0: Unlocked 1: Locked P-39 Analog Input 1 Offset -500.0 500.0 0.0 % Index 1: Display Scaling Factor | 0.000 | 16.000 | 0.000

Index 2: Display Scaling Source 0 3 0 -P-41 PI Controller Proportional Gain 0.0 30.0 1.0 -P-42 PI Controller Integral Time 0.0 30.0 1.0 s P-43 PI Controller Operating Mode 0 3 0 -

0: Direct Operation 1: Inverse Operation 2: Direct Operation, Wake at Full Speed 3: Reverse Operation, Wake at Full Speed

P-44 PI Reference (Setpoint) Source 0 0: Digital Preset Setpoint 1: Analog Input 1 Setpoint www.invertekdrives.com P-45 PI Digital Setpoint 0.0 100.0 0.0 %

Min Max Default Units P-46 PI Feedback Source Select 0 5 0 -0: Analog Input 2 3: DC Bus Voltage 1: Analog Input 1 4: Analog I – Analog 2 2: Motor Current 5: Largest (Analog 1, Analog 2) Analog Input 2 Signal Format - - U0-10 □ □ □: Unidirectional, External 0 – 10Volt reference / pot A 0-20: External 0 - 20mA signal E 4-20: External 4-20mA signal, trip on loss - **4-20** : External 4 – 20mA signal E 20-4: External 20 – 4mA signal, trip on loss - 20-4 : External 20 – 4mA signal PEc-Eh: Motor thermistor 0.0 25.0 0.0 s Standby Mode Timer PI Control Wake Up Error Level 0.0 100.0 5.0 % User Output Relay Hysteresis 0.0 100.0 0.0 %

vanced Parameters

Par.	Description	Min	Max	Default	Units
P-51	Motor Control Mode	0	5	0	•
	0: Vector speed control mode				
	1: V/f mode				
	2: PM motor vector speed contro	I			
	3: BLDC motor vector speed contr	rol			
	4: Synchronous Reluctance moto	r vectoi	r speed co	ontrol	
	5: LSPM motor vector speed cont	rol			
P-52	Motor Parameter Autotune	0	1/2	0	
	0: Disabled 1: Enabled				

hnical Data:

erational ambient temperature range

-20 ... 40°C (frost and condensation free) osed Drives: age ambient temperature range: -40 ... 60°C

2000m. Derate above 1000m: 1% / 100m kimum altitude: kimum humidity: 95%, non-condensing

ing Tables

Frame Size	kW	HP	Input Current	Fuse/ (Typ	/MCB e B)			Output Current	Recommen Brake Resistan
				Non UL	UL	mm	AWG	Α	Ω
110 - 115	(+/	- 10%) V 1 Pho	se Inp	ut, 23	0V 3 P	hase O	utput (Vol	tage Doubl
1	0.37	0.5	<i>7</i> .8	10	10	8	8	2.3	~
1	0.75	1	15.8	25	20	8	8	4.3	
2	1.1	1.5	21.9	32	30	8	8	5.8	100
200 - 24	O (+ /	/ - 10 ¹	%) V I Pl	nase In	put, 3	Phase	Outpu	ŧ	
1	0.37	0.5	3.7	10	6	8	8	2.3	-
	0.75	11	7.5	10	10	8	8	4.3	-
1	1.5	2	12.9	16	17.5	8	8	7	-
2	1.5	2	12.9	16	17.5	8	8	7	100
2	2.2	3	19.2	25	25	8	8	10.5	50
3	4	5	29.2	40	40	8	8	15.3	25
200 - 24	0 (+/	/ - 10 ¹	%) V 3 Pł	ıase In	put, 3	Phase	Outpu	t	
	0.37	0.5	3.4	6	6	8	8	2.3	7 - Table 1
1	0.75	1	5.6	10	10	8	8	4.3	
1	1.5	2	8.9	16	15	8	8	7	•
2	1.5	2	8.9	16	15	8	8	7	100
2	2.2	3	12.1	16	17.5	8	8	10.5	50
3	4	5	20.9	32	30	8	8	18	25
3	5.5	<i>7</i> .5	26.4	40	35	8	8	24	20
4	<i>7</i> .5	10	33.3	40	45	16	5	30	15
4	11	15	50.1	63	<i>7</i> 0	16	5	46	10
380 - 48	io (+ /	/ - 10 ¹	%) V 3 Ph	ase In	put, 3	Phase	Outpu		
	0 <i>.7</i> 5	31	3.5	6	6	8	8	2.2	
1	1.5	2	5.6	10	10	8	8	4.1	-
2	1.5	2	5.6	10	10	8	8	4,1	250
2	2.2	3	<i>7</i> .5	16	10	8	8	5.8	200
2	4	5	11.5	16	15	8	8	9.5	120
3	5.5	7.5	1 <i>7</i> .2	25	25	8	8	14	100
3	<i>7.</i> 5	10	21.2	32	30	8	8	18	80
3	11	15	27.5	40	35	8	8	24	50
4	15	20	34.2	40	45	16	5	30	30
4	18.5	25	44,1	50	60	16	5	39	22
4	22	30	51.9	63	70	16	5	46	22

should be selected according to local wiring codes or regulations at the point of installation.

Troubleshooting Fault Code Messages

Fault Code	No.	Description
DI -6	01	Brake channel over current
OL-6r	02	Brake resistor overload
O-1	03	Output Over Current
I_E-ErP	04	Motor Thermal Overload (121)
0-uout	06	Over voltage on DC bus
U-uoct	07	Under voltage on DC bus
D-E	08	Heatsink over temperature
U-E	09	Under temperature
E-Er iP	11	External trip
50-065	12	Optibus comms loss
FLE-de	13	DC bus ripple too high
P-L055	14	Input phase loss trip
h 0-1	15	Output Over Current
Eh-FLE	16	Faulty thermistor on heatsink
dAFH-E	17	Internal memory fault (IO)
4-20 F	18	4-20mA Signal Lost
анен-е	19	Internal memory fault (DSP)
F-Ptc	21	Motor PTC thermistor trip
FAn-F	22	Cooling Fan Fault (IP66 only)
D-HEAL	23	Drive internal temperature too high
OUE-F	26	Output Fault
AFE-05	41	Autolune Fault
5C-F0 I	50	Modbus comms loss fault

NOTE Following an over current or overload trip (1, 3, 4, 15), the drive may not be reset until the

CAN comms loss trip

reset time delay has elapsed to prevent damage to the drive.