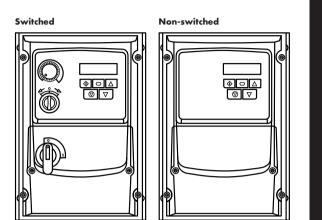


# **OPTIDRIVE**<sup>™</sup> (Ě<sup>³</sup>

AC Variable Speed Drive

# IP66 (NEMA 4X)

0.37kW - 22kW / 0.5HP - 30HP 110V & 230V Single Phase input, 230V & 480V 3 Phase input



- 1 CHECK: 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
- 8 OPERATE and check everything is as intended

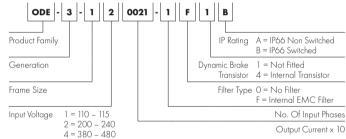
#### WARNING! The Optidrive should ONLY be installed by a qualified electrician.

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





# 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.

Drive A		A		)		-	0		G	;
Size	mm	in	mm	in	mm	in	mm	in	mm	in
1	232.0	9.13	189.0	7.44	25.0	0.98	162.0	6.37	161.0	6.34
2	257.0	10.12	200.0	7.87	28.5	1.12	182.0	7.16	188.0	7.40
3	310.0	12.20	251.5	9.90	33.4	1.31	238.0	9.37	211.0	8.30
4	360.0	14.17	300.0	11.8	33.4	1.31	275.0	10.82	240.0	9.44

#### Weight

**Quick Start Guide** 

Drive	We	ight
Size	kg	lb
1	2.5	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		
Drive Size	mm	in	mm	in	
All Frame Sizes	200	7.87	10	0.39	
NOTE	load conditions	s. Above are gui ient temperatur	proximately 3% delines only and e of the drive M	l the	

#### Mounting Bolts & Tightening Torques

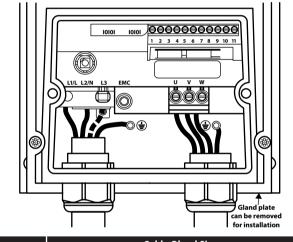
Mountin	g Bolts		Tightening Torqu	les		
Frame Size		Frame Size	Frame Size Control Terminals Powe			
All Frame Sizes	4 × M4 (#8)	All Frame Sizes	0.8 Nm (7 lb-in)	1.5 Nm (13 lb-in)		

#### 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 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.

#### Install the Wiring



Duine Cine	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 (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

Incoming Supply Voltage	Motor Nameplate Voltages		Connection
230	230 / 400		
400	400 / 690	Delta	
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 se refer to UL listing NMMS E226333. Ju

For Canadian installations transient surge suppression must be installed on the line side of this equipment 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 peak of 2.5k

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

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 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.

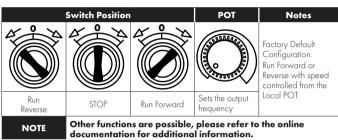
# **Control Terminal Wiring**

- 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 2.5mm2 / 30 12 AWG.

#### **Control Terminal Connections**

Switched Units: May use the built in control switch and potentiometer, or external control ed to the control terminals. Non-Switched Units: Require external control signals to be connected to the control terminals.

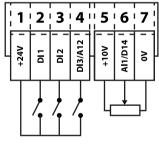
#### Switched Units: Default functions of the control switches



# **Using the Control Terminals**

$\ominus$	$\ominus$	$\ominus$	$\ominus$	$\ominus$	$\ominus$	$\ominus$	$\ominus$	$\ominus$	$\ominus$	$\in$
1	2	3	4	5	6	7	8	9	10	11
+24 VDC	DI1	DI2	DI3 Al2	+10 VDC	DI4 Al1	ov	AO	ov	RL1	RL2
No.	Purpo	se			Functi	on				
1	+24VD	C 100m	A Output		24 VD0	C Output				
2	DI1 Dig	gital Inpu	t 1		Function defined by P-12 & P-15.					
3	DI2 Dig	gital Inpu	t 2		See be	low for fi	urther info	)		
4		gital Inpu alog Inpi								
5	+10VD	C 10mA	Output		10 VD0	C Output	for exter	nal poter	ntiometer	
6		gital Inpu alog Inpi					d by P-12 elected by			
7	OVDC	Commor	1							
8	AO An Digital	alog Ou Output	tput/		Functio	n selecte	d by P-2:	5. See Po	arameter	List
9	OVDC	Commor	1							
10	RL1 Ou	utput Rela	iy				d by P-18			
11	RL2 Ou	utput Rela	y		See Pa	rameter l	_ist			

# **Connection Example**

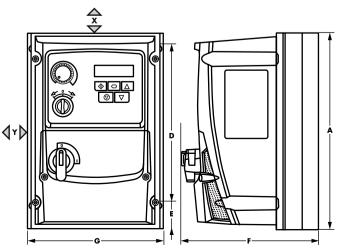


# **Factory Default Functions**

rucior		0115
No.	Description	
DI 1	0/1	Open : Stop Closed : Run
DI2	ひ/ひ	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 <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 - 10 V reference may be connected. Other signal types may also be used, set P-16 to the correct format.
NOTE	Additional functions further information	s are possible, refer to the online documentation for

# 3 MOUNT

#### **Mechanical Dimensions**



following must be fully observed.

#### Input Power Supply Requirements 200 – 240 RMS Volts for 230 Volt rated units, + /- 10% variation allowed. upply Voltage 240 Volt RMS Maximur 380 – 480 Volts for 400 Volt rated units, + / - 10% variation allowed, Maximum 500 Volts RMS. 50 – 60Hz + / - 5% Variation Frequency All drives are suitable for use on a circuit capable of delivering not more Short Circuit Capacity than 100kA maximum short-circuit Amperes symmetrical with the specified naximum 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 ondition 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**

ncoming 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.

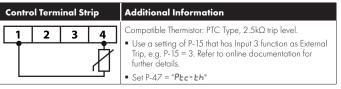
Motor Cable 75°C Copper must be used.

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

Integral Solid 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.

#### Motor Thermistor Connection

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



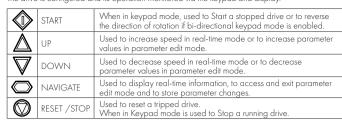
# 5 СНЕСК

# 6 POWER ON

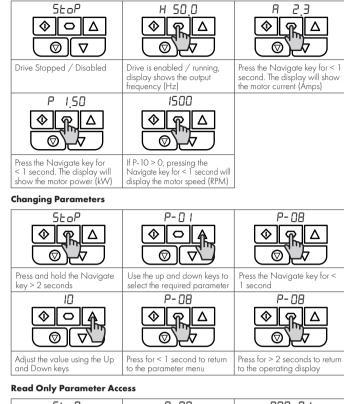
# 7 COMMISSION

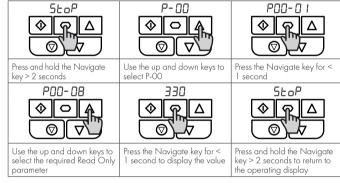
# Operation

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

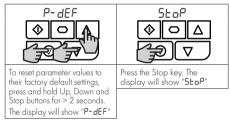


#### **Operating Displays**

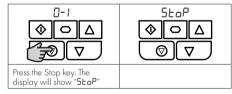




#### **Resetting Parameters**



#### **Resetting a Fault**



# 8 OPERATE

**Parameters** 

**Standard Parameters** 

P-02 2 P-03 2 P-04 2 P-05 2	Limit		Description				Default	Units		
P-03 P-04 P-05	Minimum	Maximum Frequency/Speed Limit				P-(	02	500.0	50.0 (60.0)	Hz/RPM
P-04 P-05	Minimum Frequency/Speed Limit			t 0.	0	P-01	0.0	Hz/RPM		
P-05	Accelera	tion Ran	np Time	0.0	00	600.0	5.0	s		
	Decelera	tion Rar	np Time	0.0	00	600.0	5.0	s		
	Stopping Respons		Mains Loss	c	)	4	0	-		
	Setting	On Dis	able	On Mains Loss						
						gh (Recove peration)	r energy from	load to		
	1	Coast		Coast						
	2		Stop (P-04)				24), Coast if F			
	3		Stop (P-04) Flux Braking	Fast Rc	mp	to Stop (P-2	24), Coast if F	2-24 = 0		
	4		Stop (P-04)	No ac	tion					
-06	Energy C	ptimise	r	C	)	3	0	-		
	Setting Motor Energy Optimise					Optidrive	Energy Opt	imisation		
	0	Disablec	1			Disabled				
	1	Enabled				Disabled				
	2	Disablec	1		Enabled					
	3	Enabled			E	nabled				
	Motor Ro at rated s		age/Back EN /BLDC)	\F C	•	250/ 500	230/400	v		
-08	Motor Ro	ated Cur	rent	Dr	<b>Drive Rating Dependent</b>			A		
-09	Motor Ro	ated Free	quency	10	10 500		50 (60)	Hz		
-10	Motor Ro	ated Spe	ed	C	)	30000	0	RPM		
-11	Low Freq	uency To	orque Boost	0.	0	Drive D	ependent	%		
-12	Primary	Comma	nd Source	C	)	9	0	-		
	2: Bi-dire	ctional H	<i>.</i> .		6: P					
	4: Modb NOTE Wh the control	us Netw nen P-12 = terminals,	ork Control 1, 2, 3, 4, 7, 8 c digital input 1.	r 9, an e	7: C 8: C 9: S enat	AN Contr AN Contr lave Mod	rol rol de			
P-13	4: Modb NOTE Wh the control	nen P-12 = terminals, <b>ng Mode</b>	ork Control 1, 2, 3, 4, 7, 8 c digital input 1. Select	or 9, an e	7: C 8: C 9: S enat	AN Contr AN Contr lave Mod ble signal m 2	rol rol de ust still be pro			
P-13	4: Modb NOTE Wh the control Operatin	nen P-12 = terminals, <b>ng Mode</b>	ork Control 1, 2, 3, 4, 7, 8 c digital input 1. Select e 1: Pump A Current 1	r 9, an e C Node Forque	7: C 8: C 9: S enat	AN Contr AN Contr Jave Mod ole signal m 2 Fan Mode Spin	rol rol de ust still be pro	ovided at - Dverload eaction		
-13	4: Modb NOTE Wh the control Operatin 0: Indust	us Netw nen P-12 = terminals, ng Mode rial Mod Appli-	ork Control 1, 2, 3, 4, 7, 8 c digital input 1. Select e 1: Pump A Current Limit (P-54)	n 9, an e Node Forque racter	7: C 8: C 9: S 9: S enak 2:	AN Contr AN Contr Jave Mod ole signal m 2 Fan Mode Spin Start	rol de ust still be pro 0 3 Thermal C Limit Re	ovided at - Dverload action idex 2)		
-13	4: Modb NOTE Wh the control Operatin O: Industr Setting 0 1	us Netw nen P-12 = terminals, <b>19 Mode</b> rial Mod Appli- cation General Pump	Orrk Control       1, 2, 3, 4, 7, 8 c       digital input 1.       Select       e     1: Pump N       Limit (P-54)     Char Char Char Char Char Char Char Char	nr 9, an e Node Forque racter Constan Variable	7: C 8: C 9: S 9: S enak 2: istic	AN Contr AN Contr lave Mod ble signal m 2 Fan Mode Spin Start (P-33) 0: Off 0: Off	rol rol de ust still be pro 0 Thermal C Limit Re (P-60 In 0: T 1: Current Lin	- Dverload eaction idex 2) Tip nit Reduction		
-13	4: Modb NOTE Wh the control Operatin 0: Industr Setting	us Netw hen P-12 = terminals, <b>ng Mode</b> rial Mod Appli- cation General	ork Control       1, 2, 3, 4, 7, 8 c       digital input 1.       Select       e     1: Pump N       Limit (P-54)     Char Char Char Char Char Char Char Char	nr 9, an e Node Forque racter Constan Variable	7: C 8: C 9: S 9: S enak 2: istic	AN Contr AN Contr lave Mod ble signal m 2 Fan Mode Spin Start (P-33) 0: Off	rol rol de ust still be pro o Thermal C Limit Re (P-60 In O: T	- Dverload eaction idex 2) Tip nit Reduction		
P-13	4: Modb NOTE Wh the control Operatin O: Industr Setting 0 1	us Ne nen P-1: termino <b>ng Mo</b> rial M Appl catio Gener Pump	tw 2 = als, <b>de</b> od i- n	twork Control       twork Control       2 = 1, 2, 3, 4, 7, 8 c       als, digital input 1.       de Select       ode     1: Pump A       i-     Limit (P-54)     Cha Cha Cha       al     150%     C       al     150%     C	al Keypad Control twork Control twork Control 2 = 1, 2, 3, 4, 7, 8 or 9, an e als, digital input 1. de Select Control 1: Pump Mode i- h Limit (P-54) Constan al 150% Constan b 110% Variable	al Keypad Control twork Control     7: C       twork Control     8: C       twork Control     9: S       2 = 1, 2, 3, 4, 7, 8 or 9, an end als, digital input 1.     0       de Select     0       ode     1: Pump Mode     2:       i- n     Current Limit (P-54)     Torque Characteristic       al     150%     Constant       al     110%     Variable	al Keypad Control twork Control 7: CAN Control   twork Control 8: CAN Control   twork Control 9: Slave Mod   2 = 1, 2, 3, 4, 7, 8 or 9, an enable signal models, digital input 1. 0   de Select 0 2   ode 1: Pump Mode 2: Fan Model   i- n Current Limit (P-54) Torque Characteristic Spin Start (P-33)   al 150% Constant 0: Off   al 150% Constant 0: Off	twork Control 8: CAN Control   twork Control 9: Slave Mode   2 = 1, 2, 3, 4, 7, 8 or 9, an enable signal must still be pro- als, digital input 1. 0   de Select 0 2   ode 1: Pump Mode 2: Fan Mode   i- n Current Limit (P-54) Torque Characteristic Spin Start (P-33) Thermal C Limit Re (P-60 In 0: Off   al 150% Constant 0: Off 0: T   al 10% Variable 0: Off 1: Current Limit		
P-13	4: Modb NOTE Withe control Operatin O: Industri Setting 0 1 2	us Netw hen P-12 = terminals, ag Mode rial Mod Appli- cation General Pump Fan I Menu A	ork Control       1, 2, 3, 4, 7, 8 c       digital input 1.       Select       e     1: Pump N       Limit (P-54)     Char Char Char Char Char Char Char Char	nr 9, an e Node Forque racter Constan Variable	7: C 8: C 9: S enak 2: istic	AN Contr AN Contr lave Mod ble signal m 2 Fan Mode Spin Start (P-33) 0: Off 0: Off	rol rol de ust still be pro 0 Thermal C Limit Re (P-60 In 0: T 1: Current Lin	Dverload action idex 2) irip		

Par.	Description	Min	Max	Default	Units
P-15	Digital Input Function Select	0	17	0	-
P-16	Analog Input 1 Signal Format	See I	Below	U0-10	-
	U D     U     D	OVolt refe on loss ip on loss			
P-18	Output Relay Function Select		9	1	_
-10	0: Drive Enabled (Running) 1: Drive Healthy 2: At Target Frequency (Speed) 3: Drive Tripped 4: Output Frequency >= Limit	5: C 6: C 7: C 8: A	Output Cu Output Fre Output Cu nalog Inp	rrent >= Lir equency < I rrent < Lim but 2 > Limit dy to Run	Limit it
P-20	Preset Frequency / Speed 1	-P-01	P-01	5.0	Hz/RPM
P-21	Preset Frequency / Speed 2	-P-01	P-01	25.0	Hz/RPM
P-22	Preset Frequency / Speed 3	-P-01	P-01	40.0	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 Digital Output Mode. Logic 1 = +	0	11	8	-
	1: Drive Healthy 2: At Target Frequency (Speed) 3: Drive Tripped Analog Output Mode 8: Output Frequency (Motor Spe	6: C 7: C	Output Free Output Cur Output Pe		limit
P-31	9: Output (Motor) Current Keypad Start Mode Select	0	Load Curi 7	rent 1	
P-01					
	0: Minimum Speed, Keypad Star 1: Previous Speed, Keypad Start 2: Minimum Speed, Terminal Enal	5:P ble 6:C	reset Spe urrent Sp	eed, Keypo ed 4, Keyp eed, Termin	ad Start nal Start
	0: Minimum Speed, Keypad Star 1: Previous Speed, Keypad Start 2: Minimum Speed, Terminal Enal 3: Previous Speed, Terminal Enal	5:P ble 6:C ble 7:P	reset Spe urrent Sp reset Spe	ed 4, Keyp eed, Termi ed 4, Termi	ad Start nal Start
P-33	0: Minimum Speed, Keypad Star 1: Previous Speed, Keypad Start 2: Minimum Speed, Terminal Enal 3: Previous Speed, Terminal Enal Spin Start 0: Disabled 1: Enabled 2: Enabled on Trip, Brown Out of	5: P ble 6: C ble 7: P 0	reset Spe urrent Sp reset Spe 2	ed 4, Keyp eed, Termi	ad Start nal Start
P-33 P-34	0: Minimum Speed, Keypad Star 1: Previous Speed, Keypad Start 2: Minimum Speed, Terminal Enal 3: Previous Speed, Terminal Enal Spin Start 0: Disabled 1: Enabled	5: P ble 6: C ble 7: P 0	reset Spe urrent Sp reset Spe 2	ed 4, Keyp eed, Termi ed 4, Termi	ad Start nal Start
P-33 P-34	0: Minimum Speed, Keypad Star 1: Previous Speed, Keypad Star 2: Minimum Speed, Terminal Enal 3: Previous Speed, Terminal Enal Spin Start 0: Disabled 1: Enabled 2: Enabled on Trip, Brown Out of Brake Chopper Enable (Not Size 1) 0: Disabled 1: Enabled With Software Prote 2: Enabled With Software Prote 3: Enabled With Software Prote 4: Enabled Without Software Prote	5: P ble 6: C ble 7: P 0 or Coast : 0 ction otection ction otection	reset Spe urrent Sp reset Spe 2 Stop 4	ed 4, Keyp eed, Termin ed 4, Termin 0	ad Start nal Start
P-33	0: Minimum Speed, Keypad Star 1: Previous Speed, Keypad Start 2: Minimum Speed, Terminal Enal 3: Previous Speed, Terminal Enal Spin Start 0: Disabled 1: Enabled 2: Enabled on Trip, Brown Out of Brake Chopper Enable (Not Size 1) 0: Disabled 1: Enabled With Software Prote 2: Enabled With Software Prote 3: Enabled With Software Prote	5: P ble 6: C ble 7: P 0 or Coast 0 ction otection ction	reset Spe urrent Sp reset Spe 2 Stop 4	ed 4, Keyp eed, Termi ed 4, Termi 0	ad Start nal Start
P-33 P-34	0: Minimum Speed, Keypad Star 1: Previous Speed, Keypad Star 2: Minimum Speed, Terminal Enal 3: Previous Speed, Terminal Enal Spin Start 0: Disabled 1: Enabled 2: Enabled on Trip, Brown Out of Brake Chopper Enable (Not Size 1) 0: Disabled 1: Enabled With Software Prote 2: Enabled With Software Prote 4: Enabled Without Software Prote 4: Enabled Withou	5: P ble 6: C ble 7: P 0 or Coast : 0 ction otection ction otection	reset Spe urrent Sp reset Spe 2 Stop 4	ed 4, Keyp eed, Termin ed 4, Termin 0	ad Start nal Start
	0: Minimum Speed, Keypad Star 1: Previous Speed, Keypad Star 2: Minimum Speed, Terminal Enal 3: Previous Speed, Terminal Enal Spin Start 0: Disabled 1: Enabled 2: Enabled on Trip, Brown Out of Brake Chopper Enable (Not Size 1) 0: Disabled 1: Enabled With Software Prote 2: Enabled With Software Prote 4: Enabled Without Software Prote 4: Enabled Withou	5: P ole 6: C ole 7: P 0 or Coast : 0 ction otection otection 0	reset Spe urrent Sp reset Spe 2 Stop 4	ed 4, Keyp eed, Termi ed 4, Termi 0 0	ad Start nal Start - -
	0: Minimum Speed, Keypad Star 1: Previous Speed, Keypad Start 2: Minimum Speed, Terminal Enal 3: Previous Speed, Terminal Enal Spin Start 0: Disabled 1: Enabled 2: Enabled on Trip, Brown Out of Brake Chopper Enable (Not Size 1) 0: Disabled 1: Enabled With Software Prote 2: Enabled With Software Prote 4: Enabled With Software Prote 4: Enabled Without	5: P ble 6: C ble 7: P 0 or Coast 0 ction otection otection 0 -500.0	reset Spe urrent Sp reset Spe 2 Stop 4 1 500.0	ed 4, Keyp eed, Termin ed 4, Termin 0 0 0	ad Start nal Start - -
	0: Minimum Speed, Keypad Star 1: Previous Speed, Keypad Start 2: Minimum Speed, Terminal Enal 3: Previous Speed, Terminal Enal Spin Start 0: Disabled 1: Enabled 2: Enabled on Trip, Brown Out of Brake Chopper Enable (Not Size 1) 0: Disabled 1: Enabled With Software Prote 2: Enabled With Software Prote 2: Enabled With Software Prote 4: Enabled With Software Prote 5: Cold Without Software Prote 1: Locked Analog Input 1 Offset Index 1: Display Scaling Factor	5: P ole 6: C ole 7: P 0 r Coast : 0 ction otection otection otection 0 -500.0 0 0 0.000	reset Spe urrent Sp reset Spe 2 Stop 4 1 500.0 16.000	ed 4, Keyp eed, Termin ed 4, Termin 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1.0	ad Start nal Start - -
	0: Minimum Speed, Keypad Star 1: Previous Speed, Keypad Star 2: Minimum Speed, Terminal Enal 3: Previous Speed, Terminal Enal Spin Start 0: Disabled 1: Enabled 2: Enabled on Trip, Brown Out of Brake Chopper Enable (Not Size 1) 0: Disabled 1: Enabled With Software Prote 2: Enabled With Software Prote 4: Enabled Without Software Prote 1: Locked 0: Unlocked 1: Locked Analog Input 1 Offset Index 1: Display Scaling Factor Index 2: Display Scaling Source PI Controller Proportional Gain PI Controller Integral Time	5: P ole 6: C ole 7: P 0 r Coast : 0 ction otection otection otection 0 -500.0 0 0 0 0 0 0 0 0 0	reset Spe urrent Sp reset Spe 2 Stop 4 1 500.0 16.000 3 30.0 30.0	ed 4, Keyp eed, Termin ed 4, Termin 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1.0 1.0	ad Start nal Start - -
P-33 P-34 P-38 P-39 P-40 P-41 P-42 P-43	0: Minimum Speed, Keypad Star 1: Previous Speed, Keypad Star 2: Minimum Speed, Terminal End 3: Previous Speed, Terminal End 5: Previous Speed, Terminal End 6: Disabled 1: Enabled on Trip, Brown Out of 8: Brake Chopper Enable (Not 5: Previous Office Protection 1: Locked Office Protection Pi Controller Integral Time Pi Controller Integral Time Pi Controller Operation 1: Inverse Operation 2: Direct Operation, Wake at Fu 3: Reverse Operation, Wake at Fu	5: P ole 6: C ole 7: P 0 r Coast 1 0 ction otection otection otection 0 -500.0 0 0.000 0 0 0 0 0 0	reset Spe urrent Sp reset Spe 2 Stop 4 1 500.0 16.000 3 30.0 30.0 30.0 3	ed 4, Keyp eed, Termin ed 4, Termin 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1.0	ad Start nal Start nal Start - - - - - - - -
P-33 P-34	0: Minimum Speed, Keypad Star 1: Previous Speed, Keypad Star 2: Minimum Speed, Terminal End 3: Previous Speed, Terminal End 5: Disabled 1: Enabled on Trip, Brown Out of Brake Chopper Enable (Not Size 1) 0: Disabled 1: Enabled With Software Prote 2: Enabled With Software Prote 4: Enabled Without Software Prote 1: Index 1: Display Scaling Factor Index 2: Display Scaling Source PI Controller Integral Time PI Controller Integral Time PI Controller Operation 1: Inverse Operation 2: Direct Operation, Wake at Fu 3: Reverse Operation, Wake At Fu 4: Reverse Operation, Wake At Fu 4: Reverse Oper	5: P ole 6: C ole 7: P 0 cr Coast 2 cr Coast 2 coast 2	reset Spe urrent Sp reset Spe 2 5top 4 1 500.0 16.000 3 0.0 30.0 30.0 30.0 30.0 1 4	ed 4, Keyp eed, Termin ed 4, Termin 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ad Start nal Start nal Start - - - - - - - - - - - - - - - - - - -
P-33 P-34 P-38 P-39 P-40 P-41 P-42 P-43	0: Minimum Speed, Keypad Star 1: Previous Speed, Keypad Star 2: Minimum Speed, Terminal End 3: Previous Speed, Terminal End 3: Previous Speed, Terminal End 5pin Start 0: Disabled 1: Enabled 2: Enabled on Trip, Brown Out of Brake Chopper Enable (Not Size 1) 0: Disabled 1: Enabled With Software Prote 2: Enabled With Software Prote 2: Enabled Without Software Prote 4: Enabled Without Software Prote 1: Locked Analog Input 1 Offset Index 1: Display Scaling Factor Index 2: Display Scaling Source PI Controller Proportional Gain PI Controller Operation 1: Inverse Operation 2: Direct Operation, Wake at Fu 3: Reverse Operation, Wake at PI Reference (Setpoint) Source	5: P ole 6: C ole 7: P 0 cr Coast 2 cr Coast 2 coast 2	reset Spe urrent Sp reset Spe 2 5top 4 1 500.0 16.000 3 0.0 30.0 30.0 30.0 30.0 1 4	ed 4, Keyp eed, Termin ed 4, Termin 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ad Start nal Start nal Start - - - - - - - - - - - - - - - - - - -

Par.	Description	Min	Max	Default	Units
P-46	PI Feedback Source Select	0	5	0	-
	0: Analog Input 2 1: Analog Input 1 2: Motor Current	3: D 4: A 5: L	nalog 2)		
P-47	Analog Input 2 Signal Format	-	-	-	U0-10
	U   D-ID   : Unidirectional, External 0 –     R   D-2D   : External 0 – 20mA signal     L   H-2D   : External 4-20mA signal, trip     r   H-2D   : External 4 – 20mA signal     L   2D-4   : External 20 – 4mA signal, trip     r   2D-4   : External 20 – 4mA signal     L   2D-4   : External 20 – 4mA signal     PEC-Eh   : Motor thermistor	on loss	erence / po	t	
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	User Output Relay Hysteresis	0.0	100.0	0.0	%

#### **Advanced 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 control 3: BLDC motor vector speed control										
	4: Synchronous Reluctance moto 5: LSPM motor vector speed con	or vector	speed c	ontrol							
P-52	Motor Parameter Autotune	0	1	•							
P-52		0		0							
	0: Disabled 1: Enabled										

# **Technical Data**

Environment Operational ambient temperature range -20 ... 40°C (frost and condensation free) Enclosed Drives: -40 ... 60°C Storage ambient temperature range: 2000m. Derate above 1000m: 1 % / 100m Maximum altitude: Maximum humidity: 95%, non-condensing **Rating Tables** 

Frame Size	kW	НР	Input Current		/MCB be B)		imum e Size	Output Current	Recommended Brake Resistance
				Non UL	UL	mm	AWG	A	Ω
110 - 115	5 (+ /	- 10%	) V 1 Phc	ıse Inp	ut, 23	0V 3 P	hase O	utput (Vol	tage Doubler)
1	0.37	0.5	7.8	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	<b>i0 (</b> + <i>)</i>	/ - 10	%) V 1 Pł	nase In	put, 3	Phase	Outpu	it .	
1	0.37	0.5	3.7	10	6	8	8	2.3	-
1	0.75	1	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	<b>i0 (</b> + <i>)</i>	/ - 10	%) V 3 Pł	nase In	put, 3	Phase	Outpu	ıt.	
1	0.37	0.5	3.4	6	6	8	8	2.3	-
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	7.5	26.4	40	35	8	8	24	20
4	7.5	10	33.3	40	45	16	5	30	15
4	11	15	50.1	63	70	16	5	46	10
380 - 48	30 (+ /	/ - 10	%)V 3 Ph	ase In	put, 3	Phase	Outpu	t	
1	0.75	1	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	7.5	16	10	8	8	5.8	200
2	4	5	11.5	16	15	8	8	9.5	120
3	5.5	7.5	17.2	25	25	8	8	14	100
3	7.5	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
	hle siz	es show	wn are the	mavimu	m nossil	ole that	may be	connected t	o the drive. Cables

**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					
01-6	01	Brake channel over current					
OL-Бг	02	Brake resistor overload					
0-1	03	Output Over Current					
I_E-ErP	04	Motor Thermal Overload (12t)					
0-uolt	06	Over voltage on DC bus					
U-uoct	07	Under voltage on DC bus					
0-E	08	Heatsink over temperature					
U-E	09	Under temperature					
E-Er iP	11	External trip					
50-065	12	Optibus comms loss					
FLE-dc	13	DC bus ripple too high					
P-LOSS	14	Input phase loss trip					
h 8-1	15	Output Over Current					
EH-FLE	16	Faulty thermistor on heatsink					
dALA-F	17	Internal memory fault (IO)					
4-20 F	18	4-20mA Signal Lost					
dREA-E	19	Internal memory fault (DSP)					
F-Ptc	21	Motor PTC thermistor trip					
FRn-F	22	Cooling Fan Fault (IP66 only)					
O-HERE	23	Drive internal temperature too high					
OUE-F	26	Output Fault					
AFE-05	41	Autotune Fault					
5C-FO I	50	Modbus comms loss fault					
SC-F02	51	CAN comms loss trip					

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NOTE Following an over current or overload trip (1, 3, 4, 15), the drive may not be reset until the reset time delay has elapsed to prevent damage to the drive