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CE (EMC and LVD)

PDHX-E Series

Packaged Drive/Indexer

The PDHX-E indexer version is equipped with the powerful X150E controller that accepts motion commands via RS-232C serial link. The command language is based on an enhanced version of Compumotor's popular X-Code, which is user friendly and extremely versatile. The indexer can store up to 64 complete motion programs in its non-volatile memory and offers advanced programming features such as conditional branching and math functions. With flexible input and output circuits compatible with virtually all PLC systems and the option of thumbwheel switch or remote operator panel control, the PDHX-E can be integrated into a wide range of industrial applications.

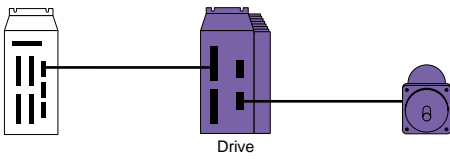
PD-E Series drives are supplied with comprehensive installation instructions to ensure that the completed system fully complies with the requirements of the EMC and low-voltage directives.

Features

- CE marked with full EMC and LVD compliance
- Meets emission directive without cabinet mounting
- Meets most stringent EMC directives relevant to motion control products
- Up to 32 drives can be daisy chained via RS-232C
- Non-volatile memory stores up to 64 motion programs
- 7-segment diagnostic display
- Dedicated inputs for end-of-travel and home position switches
- Ten user-definable inputs, 6 outputs
- Sinking or sourcing outputs; software selectable
- Optional remote panel or thumbwheel input
- High-speed (15 μ S) registration input
- Internal noise suppression filter

PDHX-E Specifications

Parameter	Value
AC Power Input	
Drive supply voltage	95VAC–264VAC (absolute limits)
Supply frequency range	47 to 63Hz
Power factor	Better than 0.9 over full input voltage and output power range
Maximum input power	300VA
Input current	3 A rms max
Recommended supply protection	3 A MCB type C characteristics
Performance	
Position range	±1 to 268,435,455 steps
Velocity range	0.0001 to 200 revs/sec
Acceleration range	0.06 to 999,999 revs/sec ²
Maximum encoder freq.	100kHz
User resolution range	1 to 32,767 steps/rev
Coordinate system	Incremental or absolute
Operating modes	Preset, preset with speed change, continuous, scaled following, preset following, registration
Indexer update time	2 milliseconds
Speed/Torque	Curves located on page C62
RS-232C Interface	
Connections	3-wire (Tx, Rx, Gnd), minimum voltage swing = ±3V
Parameters	9,600 baud, 8 data bits, 1 stop bit, no parity
Connector	8-way mini DIN or 9-way D-type
Configuration	Up to 32 interfaces can be controlled from a single RS232C port; device address set up by DIL switch
Protection	
Short-circuit	Drive shuts down and signals a fault in any of the conditions listed
Brownout	Across and between phase and phase to GND
Overvoltage	If DC Bus <50VDC
Internal supplies	If DC Bus >90VDC
Overtemperature	Any internal supply out of specification If internal temperature >90° (194°F)
Inputs	
Number	Ten user-definable inputs and 5 dedicated inputs. User-definable inputs can be assigned special functions such as trigger, motion kill, pause/continue, go direction, jog, data strobe, reset and motor shutdown. The dedicated input functions are home, end-of-travel limits, stop and auxiliary-in.
Connector	Screw (removable) terminal
Electrical	Optically isolated, inputs can be configured for 5V or 24V operation. Groups of inputs can be configured for either sinking or sourcing. In 5V mode, the input levels are low <2.5V, high >3.0V. In 24V mode, the input levels are low <5.7V, High >9.0V. Hysteresis on each input improves noise immunity.
Outputs	
Number	Six user-definable outputs. Outputs can be assigned special functions such as in-position, moving/not moving, program running, data strobe and fault.
Connector	Screw (removable) terminal
Electrical	Opto-isolated. Sinking (NPN) or sourcing (PNP) operation (software selectable). NPN: Max. OFF state voltage 30V, Max. current sink 300mA, ON state voltage of 2.5V at 300mA. PNP: Max. OFF state voltage 30V. Max. current source 300mA. ON state voltage of 2.5V at 300mA. [Note: PDHX-E supplies 160 mA (max). External 24VDC supply required to source more than 160 mA, up to 1.0A max]
Encoder Outputs	
Type	Buffered from motor encoder
Connector	15-pin D-type socket (user I/O)
Electrical	Quadrature A, B with Z channel. Differential TTL line driver. 100 kHz maximum frequency.
Motion Programs	
Storage	8000 characters of battery backed RAM
Program length	Variable up to memory limit
Number	64 programs
Execution	a) Command from serial port, b) Sequence selection inputs, c) Automatic execution at power-up, selected by XP command, d) RP240, e) TM8 Thumbwheel
Environmental	
Weight	2.9 Kg
Operating temperature range	0°–40°C (32°–104°F) or 50°C (122°F) if no user access to case
Ingress protection	IP20
Max power dissipation of drive unit	PDHX15E—30 watts; PDHX15E-D—45 watts



CE Motor Speed/Torque Curves

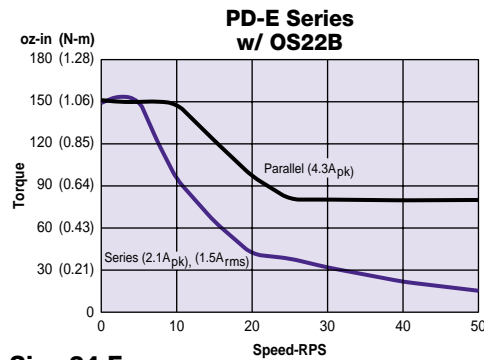
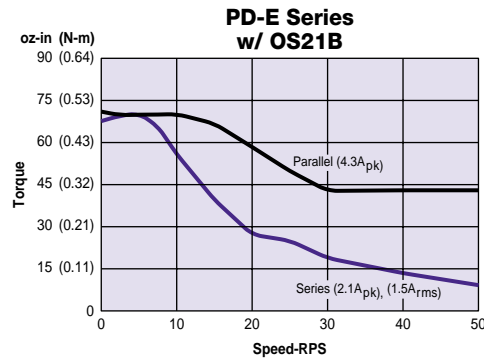
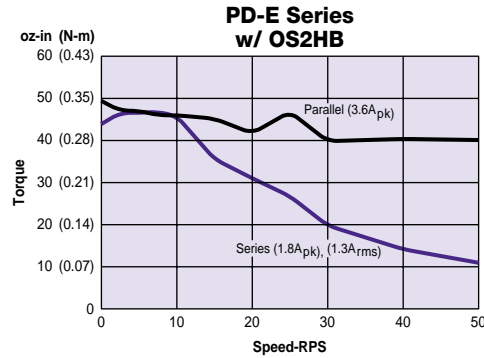
Power Dump Option

Applications involving rapid deceleration of high-inertia loads may require the addition of a circuit to dissipate the regenerated power. The need for a power dump will depend on the system inertia, the maximum speed and the deceleration time.

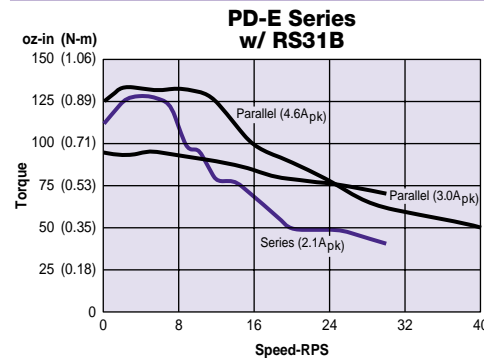
The -D version of the PD-E Series incorporates a power dump with a continuous rating of 15 watts (170 watts peak). This version is needed if the deceleration time in seconds from a maximum speed w is less than $(Jw^2 - 0.1)$, where J is the total system inertia in $\text{Kg}\cdot\text{m}^2$ (including the motor) and w is the maximum speed in revs/sec . If the expression in brackets is negative, no power dump is required. The dump option is strongly recommended with size 42 (metric 106) motors.

Note: $\pm 10\%$ torque variance due to motor tolerance.

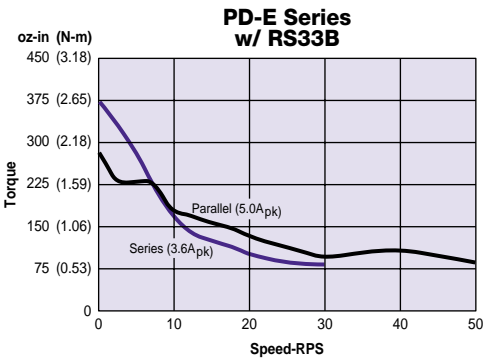
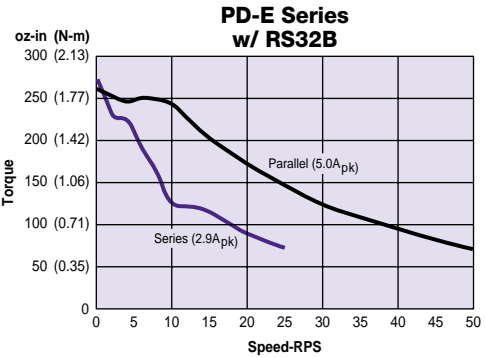
Size 23 Frame



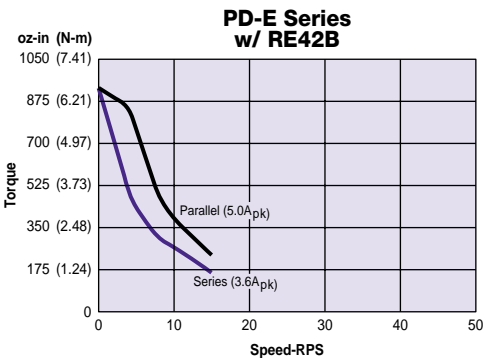
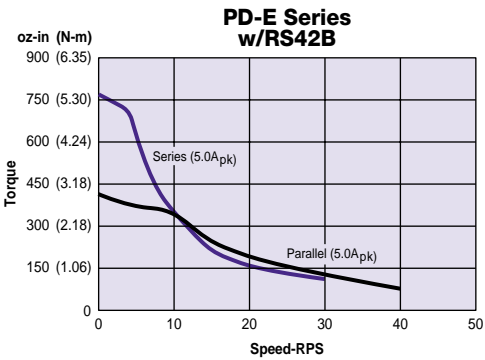
Size 34 Frame



Size 34 Frame



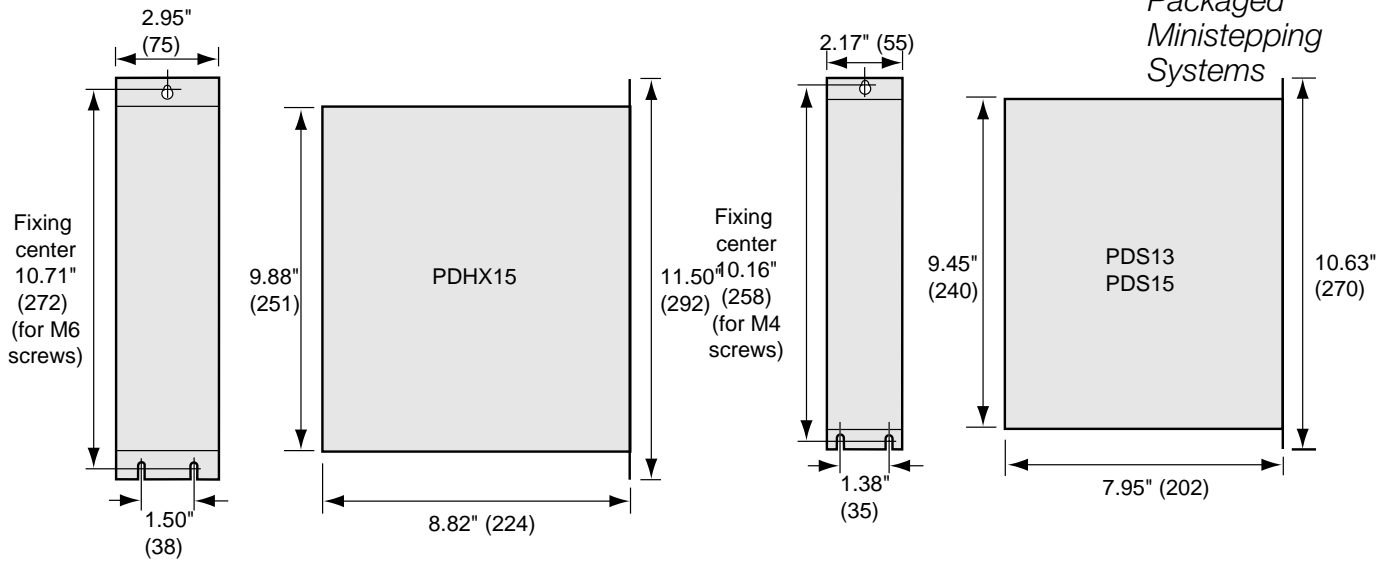
Size 42 Frame



Drive's Peak Current Levels

PDS13E	0.9–3.0 Apk
PDS15E/PDHX15E	2.5–5.0 Apk

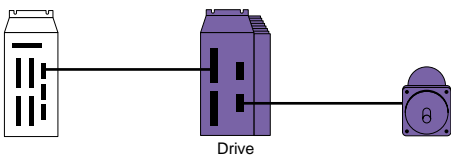
Dimensions (—) denotes millimeters



CE Motor Data

	Size 23 Frame			Size 34 Frame			Size 42 Frame	
	OS2HB	OS21B	OS22B	RS31B	RS32B	RS33B	RS42B	RE42B
Static torque								
oz-in	43	82	155	135	270	375	750	900
(Nm)	(0.30)	(0.58)	(1.09)	(0.95)	(1.91)	(2.65)	(5.30)	(6.35)
Rotor inertia								
oz-in ²	0.386	0.656	1.390	3.204	6.563	9.652	61.76	61.76
(kg-cm ²)	(0.070)	(0.119)	(0.253)	(0.583)	(1.195)	(1.757)	(11.30)	(11.30)
Drive Current (Apk)(Arms)								
Series	1.8 (1.3)	2.1 (1.5)	2.1 (1.5)	2.1 (1.5)	2.9 (2.1)	3.6 (2.5)	5.0 (3.5)	3.6 (2.5)
Parallel	3.6 (2.5)	4.3 (3.0)	4.3 (3.0)	4.6 (3.3)	5.0 (3.5)	5.0 (3.5)	5.0 (3.5)	5.0 (3.5)
Phase Inductance (mH)								
Series	8.6	12	16.6	7.5	11.6	23.3	8.5	42.6
Parallel	2.2	3	4.2	1.9	2.9	5.8	2.1	10.6
Detent Torque								
oz-in	2.5	4.0	7.0	8.8	18.0	27.0	41.7	81.0
(Nm)	(0.018)	(0.028)	(0.049)	(0.062)	(0.130)	(0.190)	(0.294)	(0.570)
Bearings Information								
Thrust Load								
lb	13	13	13	180	180	180	400	400
(kg)	(5.9)	(5.9)	(5.9)	(81.6)	(81.6)	(81.6)	(182)	(182)
Radial Load								
lb	20	20	20	35	35	35	140	140
(kg)	(9.1)	(9.1)	(9.1)	(15.9)	(15.9)	(15.9)	(63.6)	(63.6)
End Play (Reversing load equal to 1 lb)								
in	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
(mm)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)
Radial Play (Per 0.5 lb load)								
in	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008
(mm)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Motor Weight								
lb	1	1.5	2.5	3.2	5.3	7.6	18.2	18.2
(kg)	(0.45)	(0.68)	(1.14)	(1.45)	(2.41)	(3.45)	(8.26)	(8.26)
Certifications								
UL recognized	Pending	Pending	Pending	Yes	Yes	Yes	Yes	Yes
CE (LVD)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CE (EMC& LVD)	No	No	No	w/ C10	w/ C10	w/ C10	w/ C10	w/ C10

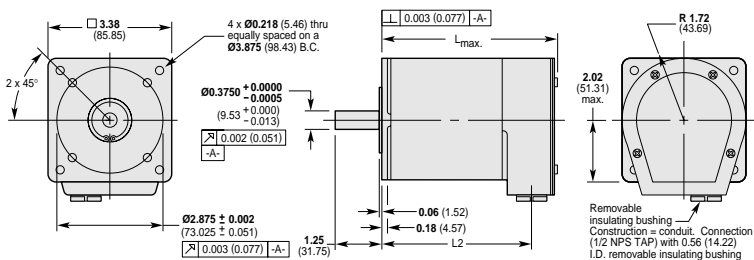
C Step Motor Systems



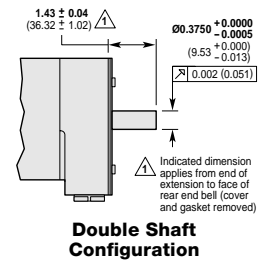
PD-E Series CE Motor Dimensions

Size 23 Frame, O Series

Size 34 Frame, R Series End Bell Construction (NPS)

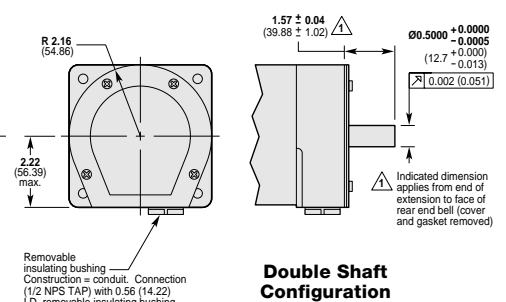
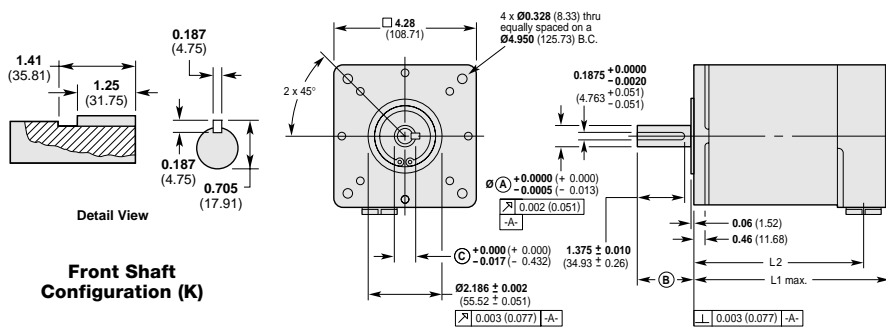


Model	Lmax	L2
RS31B-□□NPS	3.62 (91.95)	2.87 (72.9)
RS32B-□□NPS	4.77 (121.16)	4.02 (102.11)
RS33B-□□NPS	6.05 (153.67)	5.30 (134.62)



Size 42 Frame, R Series End Bell Construction (NPS)

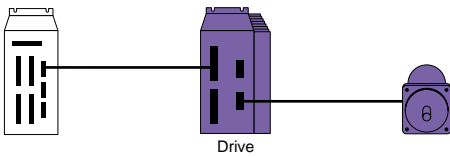
Model	Lmax	L2	A	B	C
RS42B-□□NPS	8.04 (204.22)	7.29 (185.17)	0.625 (15.87)	2.19 (55.63)	0.705 (17.91)
RE42B-□□NPS	8.04 (204.22)	7.29 (185.17)	0.625 (15.87)	2.19 (55.63)	0.705 (17.91)



PDHX-E Alphabetical Command Listing

#	Step sequence	HALT	Halt	RE	Drive Status	V	Velocity
;	Comment	HELP	Produce Help		Request	VAR	Variables
A	Acceleration		Screens	REPEAT	Repeat	VARD	Read variable from parallel I/O
	Rate	ID	Immediate	RFS	Return Servo to Factory Settings	VARn=FUN	Enable and read function keys (RP240)
B	Buffer Status		Distance	RG	Report Go Home Status	VARn=NUM	Enable and read numeric keys (RP240)
	Request	IF	If		Return Indexer to Factory Settings	VRD	Read velocity value from parallel I/O
BS	Buffer Size	IN	Define input functions	RIFS	Report Sequence Status	WHEN	Set WHEN condition
	Request	IO	Immediate	RPO	Report Servo Errors	WHILE	Set WHILE condition
C	Continue		Output	RS	Freeze Torque Demand	XBS	Sequence memory available
CAG	Configure Acceleration	IS	Input Status	RSE	Revision	XC	Checksum
	Gain	IV	Immediate	RST	Stop	XD	Download Sequence
CCP	Configure		Velocity	RV	SAVE Parameters	XE	Sequence Delete
	Current Clamp	JA	Jog Acceleration	S	Stop Buffered	XG	GOTO sequence
CCS	Configure	JV	Jog Velocity	SAVE	Set Indexer/ Following Mode	XP	Power-On Sequence Number
	Command Source	K	Kill Motion	SB	Skip On 'Equals'	XR	Run Sequence read sequence from parallel I/O
CDG	Configure	KILL	Kill Motion	SIM	Skip On 'Not Equal'	XRD	Run/Pause Sequence
	Derivative Gain	L	Loop	SK	Set current position to value	XRT	Return From Sequence
CEW	Configure In-Position Window	LA	Limit	SKN	Set Switches	XSD	Sequence Download
		LD	Deceleration	SP	RS232C Echo Control	XSR	Status Report
CFG	Configure	LS	Limit Disable	SS	Set Output 1 as Composite Fault Signal	XSS	Sequence Run Status Report
	Feedforward	MC	Fast Stop	SSA	Save Command Buffer	XT	Sequence Terminator
	Gain	MN	Mode	SSD	On Limit	XTR	Set trace mode
CIG	Configure	MPA	Continuous	SSG	Save Command Buffer	XU	Sequence Upload
	Integral Gain		Mode Normal	SSH	On Stop	XWHEN	Set WHEN sequence
CIT	Configure In-Position Time	MPI	Mode Position	SSI	Sequence Select Inputs	XZ	Reset Power-Up
		MQ	Absolute	ST	Energize/De-Energize Drive	Y	Sequence Mode
CIW	Configure		Mode Position	STOP	Stop Motion	Z	Terminate Loop
	Integral Action Window	N	Incremental	SV	Save		Reset
CIX	Configure Index Resolution	NIF	Speed Change	T	Time Delay		
		NWHILE	Mode	TMRD	Read timer value from parallel I/O		
CJL	Enter Motor + Load Inertia	O	End Loop	TRD	Trigger On Input Distance		
			End of IF	TRE	Trigger On Input Equal		
CMR	Configure Motor Resolution	OFF	Programmable Output	TRIP	Trigger On In Position		
			De-Energize Drive	TRMN	Trigger on negative motor distance		
COFF	Configure Amplifier Offset	ON	Drive	TRMP	Trigger on positive motor distance		
		OS	Energize Drive	TRN	Trigger On Input Not Equal		
CPE	Configure Position Error	OSA	Other Switches	TRR	Registration Mode		
		OSB	Home @ Index Pulse	TUNE	Show Tuning Settings		
CPG	Configure Proportional Gain	OSC	Integral Action Selection	TUNET	Self-Tune Servo (Torque Amplifier)		
			Monitor	TUNEV	Self-Tune Servo (Velocity Amplifier)		
CTG	Configure Filter Time Constant	OSJ	Command Reporting	U	Pause		
		OSK	Jog Enable	UNTIL	Until		
CTQ	Enter Motor Torque	OSF	Initialization on Limit				
		OSJ	RAT 16/24 Bit select				
CUR	Configure User Resolution	OSK	Encoder				
		OSM	Integrity Check				
CVG	Configure Velocity Gain	OSO	Integral Action Sensitivity				
		OUT	Suppress Units				
CVT	Configure Velocity Trip	P	Define output functions				
		PIC	Position				
D	Distance	PR	Picture				
DCLR	Clear RP240 display	PS	Position Report				
		PZ	Pause				
DCNT	Enable/Disable the RP240	QS	Position Zero				
			Transmit An Identifier				
	Pause/Continue keys	R	Report Control Module Status				
DFX	Display Flags Indexer	RA	Report A – Limit Status Request				
		RAT	Set Rate				
DIC	Display Indexer Counter	RB	Multiplier Value				
			Report B – Miscellaneous Status Request				
DLED	Turn RP240 LEDs on/off						
DPA	Display Position Actual						
DPC	Position cursor on RP240 display						
DPE	Display Position Error						
DPS	Display Position Setpoint						

Note: The positioner card used in PDHX-E series drives is a general-purpose controller used in a range of products. The HELP screens displayed by the positioner include additional commands which are not relevant to the PDHX-E drive. These are identified in the user guide.



Installation and Performance Data

The User Guide supplied with all PD-E Series drives provides detailed information on installation. The installation instructions must be closely followed if EMC compliance is to be maintained. They cover details such as mechanical mounting, safety earth connections and motor wiring. Since all necessary line filter components are an integral part of the drive, many potential problems associated with the mounting and wiring of external filter units are avoided.

The use of the correct motor cable and the method of termination are of prime importance. To comply with EMC, a CE (LVD) step motor and C10 option (LVD/EMC cable kit) are required.

Ordering Information

Drives

Part No.	Description	CE (EMC and LVD)
PDS13E	Packaged 3Apk, 70VDC bus ministeping drive	
PDS15E	Packaged 5Apk, 70VDC bus ministeping drive	
PDS15E-D	Packaged 5Apk, 70VDC bus ministeping drive and power dump	

Indexers/Drive

Part No.	Description	CE (EMC and LVD)
PDHX15E	Packaged 5Apk, 70VDC bus ministeping indexer/drive	
PDHX15D-E	Packaged 5Apk, 70VDC bus ministeping indexer/drive and power dump	

CE Size 23 Frame Motors

Part No.	Description	CE (LVD)
OS2HB-□□□□□	Standard, Size 23, half-stack (57-40), B winding motor	
OS21B-□□□□□	Standard, Size 23, single-stack (57-51), B winding motor	
OS22B-□□□□□	Standard, Size 23, double-stack (57-83), B winding motor	

CE Size 34 Frame Motors

Part No.	Description	CE (LVD)
RS31B-□□□□□	Standard, Size 34, single-stack (83-62), B winding motor	
RS32B-□□□□□	Standard, Size 34, double-stack (83-93), B winding motor	
RS33B-□□□□□	Standard, Size 34, triple-stack (83-135), B winding motor	

CE Size 42 Frame Motors

Part No.	Description	CE (LVD)
RS42B-□□□□□*	Standard, size 42, double-stack (106-178), B winding motor	
RE42B-□□□□□	Enhanced, size 42, double-stack (106-205), B winding motor	

Accessories

	CE (EMC and LVD)
C10	LVD/EMC step motor cable kit (includes CE book, EMC 10-ft cable, gland (360°C shield connector), R-clamp, screw, assembly instructions)

* Contact Compumotor for availability.

How to Order CE Motors

Size 23 Frame

Series O (Octagonal)	Type S=Standard	Frame Size 2=Size 23 (2.5")	No. of Rotor Stacks H=Half stacks 1=1 stack 2=2 stacks	Winding Type B=170VDC winding (black painted motors)	Shaft S=Single D=Double	Shaft Modification N=Standard (smooth)	Motor Construction/ Hookup FLY=Regular construction with flying (8) leads L10=Regular construction with 10-ft cables (call for availability)	Encoder Option Blank=No feedback HJ=512 ppr single-ended kit encoder with 12" flying leads RE=1000 ppr differential kit encoder with line driver with 12" flying leads (call for availability) RC=1000 ppr differential kit encoder with line driver with 10-ft cable (call for availability)
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Size 34 Frame

Series R (Round)	Type S=Standard	Frame Size 3=Size 34 (3.38")	No. of Rotor Stacks 1=1 stack 2=2 stacks 3=3 stacks	Winding Type B=170VDC winding (black painted motors)	Shaft S=Single D=Double	Shaft Modification N=Standard (smooth)	Motor Construction/ Hookup NPS=End bell/terminal board via 1/2" NPS Pipe thread C10=NPS option with (C10) LVD/EMC cable kit	Encoder Option Blank=No feedback EC=1000 ppr differential encoder with line driver and 10-ft cable (-E Series) (call for availability)
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Size 42 Frame

Series R (Round)	Type S=Standard E=Enhanced	Frame Size 4=Size 42 (4.33")	No. of Rotor Stacks 2=2 stacks	Winding Type B=170VDC winding (black painted motors)	Shaft S=Single D=Double	Shaft Modification K=Straight Key	Motor Construction/ Hookup NPS=End bell/terminal board via 1/2" NPS Pipe thread C10=NPS option with (C10) LVD/EMC cable kit	Encoder Option Blank=No feedback EC=1000 ppr differential encoder with line driver and 10-ft cable (-E Series) (call for availability)
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