



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.

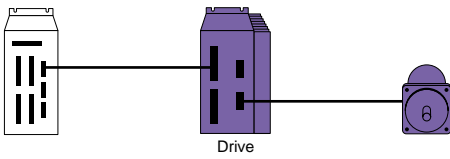
PD-E Series drives are supplied with comprehensive installation instructions to ensure that the completed system fully complies with the requirements of the EMC and low-voltage directives.

#### 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  $\mu$ S) registration input
- Internal noise suppression filter

## PDHX-E Specifications

Parameter	Value
<b>AC Power Input</b>	
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
<b>Performance</b>	
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 <sup>2</sup>
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
<b>RS-232C Interface</b>	
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
<b>Protection</b>	
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)
<b>Inputs</b>	
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.
<b>Outputs</b>	
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]
<b>Encoder Outputs</b>	
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.
<b>Motion Programs</b>	
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
<b>Environmental</b>	
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

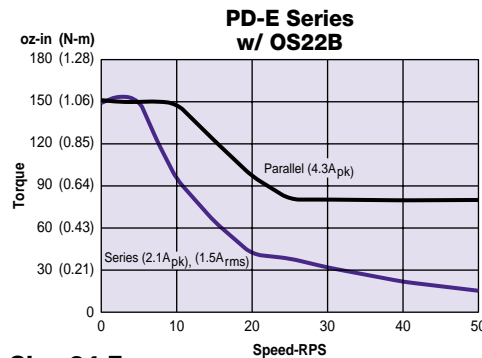
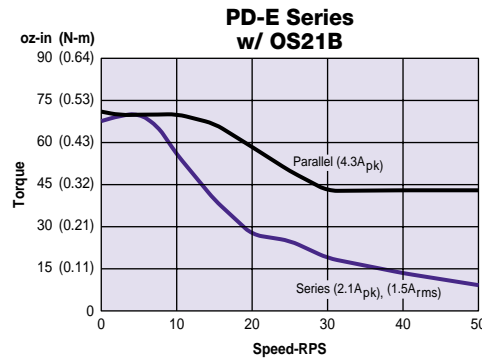
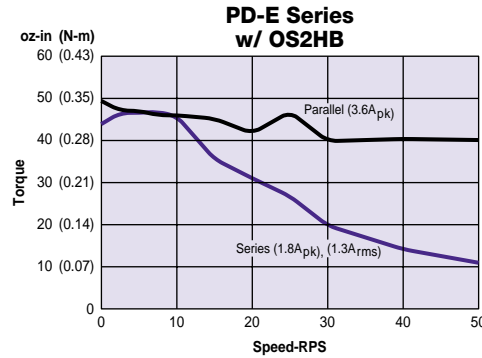
### Power Dump Option

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.

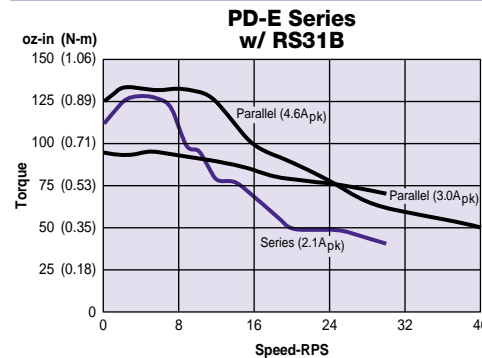
The -D version of the PD-E Series incorporates a power dump with a continuous rating of 15 watts (170 watts peak). This version is needed if the deceleration time in seconds from a maximum speed  $w$  is less than  $(Jw^2 - 0.1)$ , where  $J$  is the total system inertia in  $\text{Kg}\cdot\text{m}^2$  (including the motor) and  $w$  is the maximum speed in  $\text{revs}/\text{sec}$ . 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.

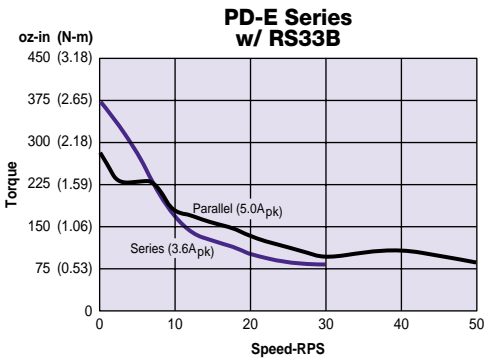
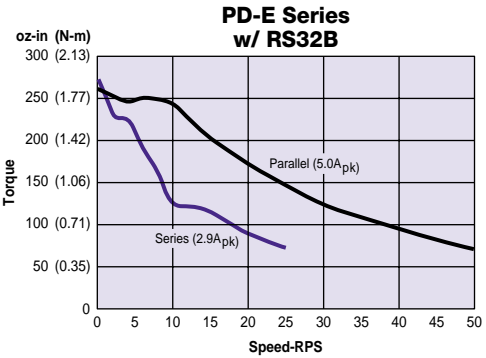
### Size 23 Frame



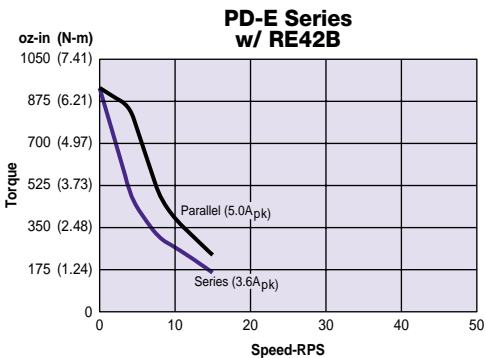
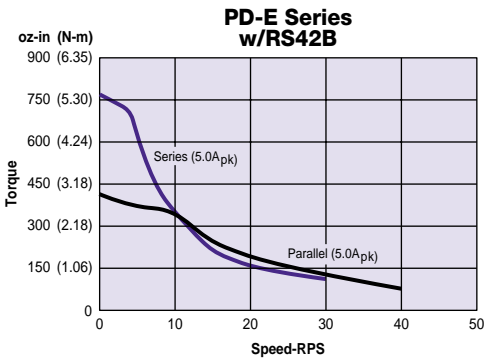
### Size 34 Frame



### Size 34 Frame



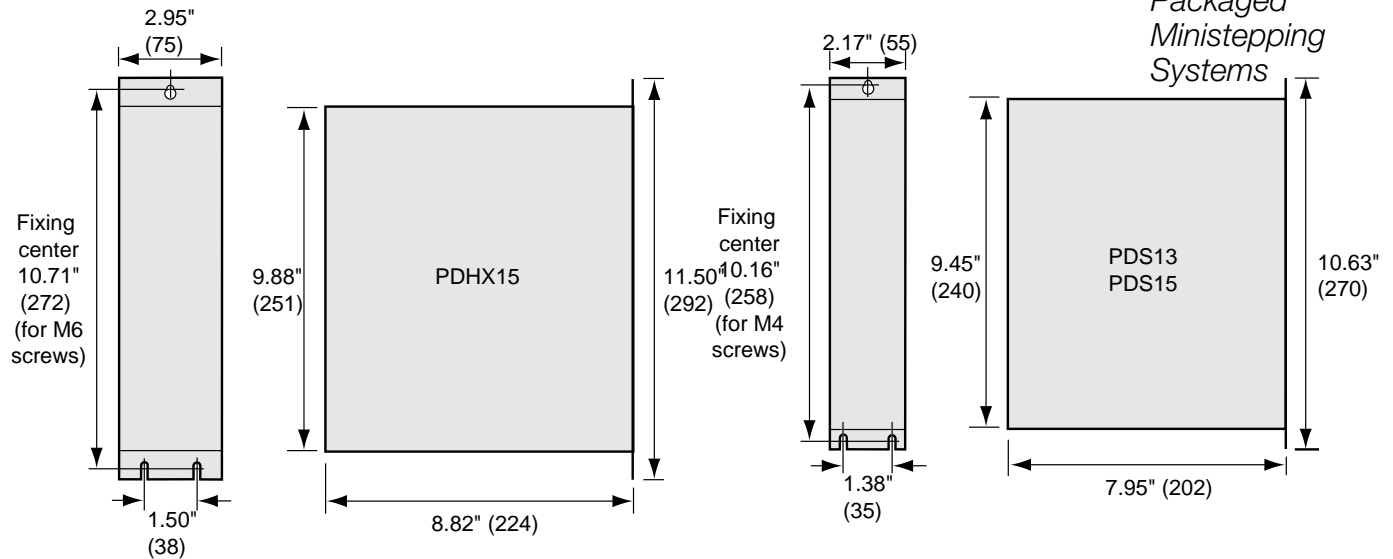
### Size 42 Frame



#### Drive's Peak Current Levels

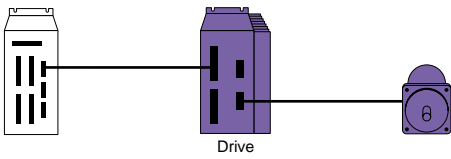
PDS13E	0.9–3.0 Apk
PDS15E/PDHX15E	2.5–5.0 Apk

**Dimensions** (—) denotes millimeters



**CE Motor Data**

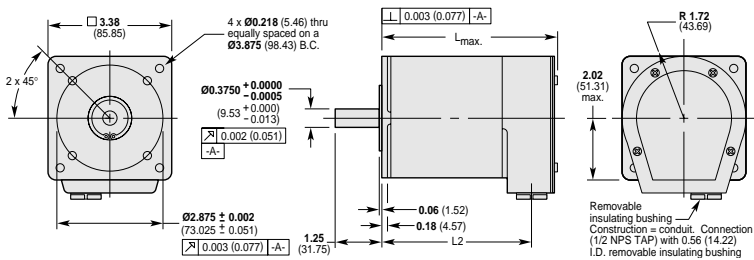
	Size 23 Frame			Size 34 Frame			Size 42 Frame	
	OS2HB	OS21B	OS22B	RS31B	RS32B	RS33B	RS42B	RE42B
<b>Static torque</b>								
oz-in	43	82	155	135	270	375	750	900
(Nm)	(0.30)	(0.58)	(1.09)	(0.95)	(1.91)	(2.65)	(5.30)	(6.35)
<b>Rotor inertia</b>								
oz-in <sup>2</sup>	0.386	0.656	1.390	3.204	6.563	9.652	61.76	61.76
(kg-cm <sup>2</sup> )	(0.070)	(0.119)	(0.253)	(0.583)	(1.195)	(1.757)	(11.30)	(11.30)
<b>Drive Current (Apk)(Arms)</b>								
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)
<b>Phase Inductance (mH)</b>								
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
<b>Detent Torque</b>								
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)
<b>Bearings Information</b>								
<b>Thrust Load</b>								
lb	13	13	13	180	180	180	400	400
(kg)	(5.9)	(5.9)	(5.9)	(81.6)	(81.6)	(81.6)	(182)	(182)
<b>Radial Load</b>								
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)
<b>End Play (Reversing load equal to 1 lb)</b>								
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)
<b>Radial Play (Per 0.5 lb load)</b>								
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)
<b>Motor Weight</b>								
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)
<b>Certifications</b>								
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



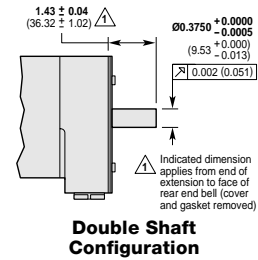
## PD-E Series CE Motor Dimensions

### Size 23 Frame, O Series

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

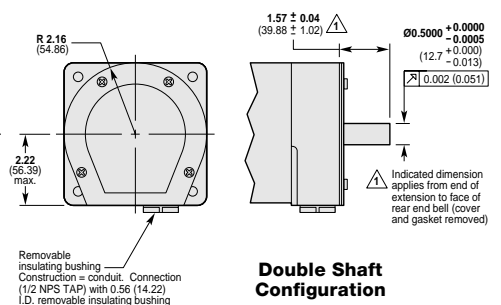
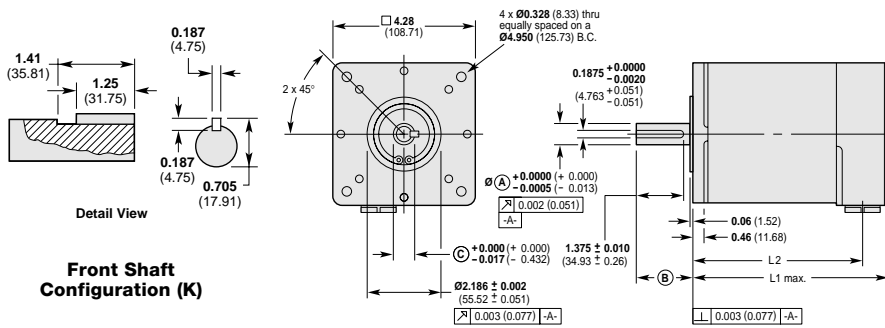


Model	L <sub>max</sub>	L <sub>2</sub>
RS31B-□□NPS	3.62 (91.95)	2.87 (72.9)
RS32B-□□NPS	4.77 (121.16)	4.02 (102.11)
RS33B-□□NPS	6.05 (153.67)	5.30 (134.62)



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

Model	L <sub>max</sub>	L <sub>2</sub>	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)

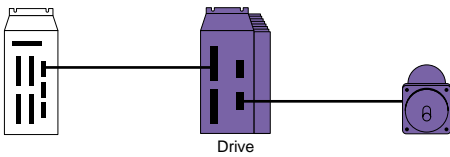


**PDHX-E Alphabetical Command Listing**

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

**C Step Motor Systems**



## 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 ministepping drive	
PDS15E	Packaged 5Apk, 70VDC bus ministepping drive	
PDS15E-D	Packaged 5Apk, 70VDC bus ministepping drive and power dump	

### Indexers/Drive

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

	Description	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	Type	Frame Size	No. of Rotor Stacks	Winding Type	Shaft	Shaft Modification	Motor Construction/ Hookup	Encoder Option
O (Octagonal)	S=Standard	2=Size 23 (2.5")	H=Half stacks 1=1 stack 2=2 stacks	B=170VDC winding (black painted motors)	S=Single D=Double	N=Standard (smooth)	FLY=Regular construction with flying (8) leads L10=Regular construction with 10-ft cables (call for availability)	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)

### Size 34 Frame

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

### Size 42 Frame

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