

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.

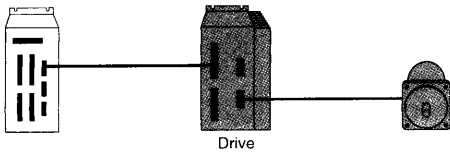
#### Features

- 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

**C Step Motor Systems**



## CE Motor Speed/ Torque Curves

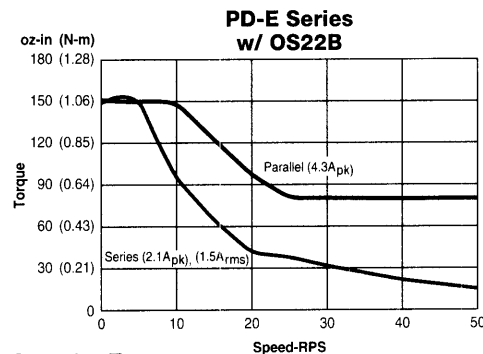
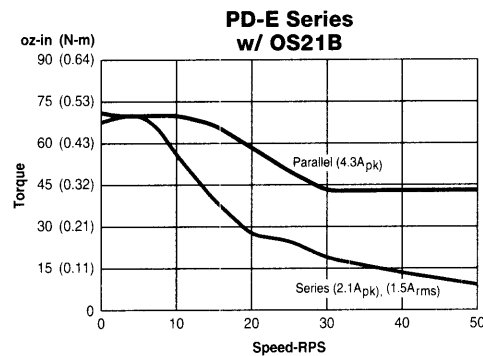
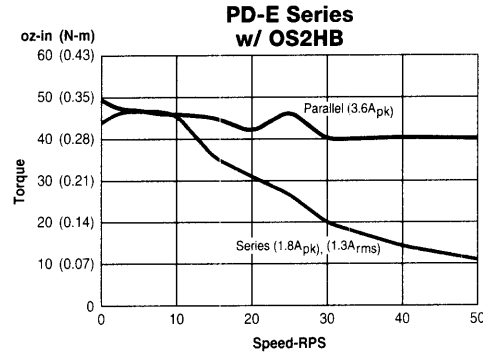
### Power Dump Option

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.

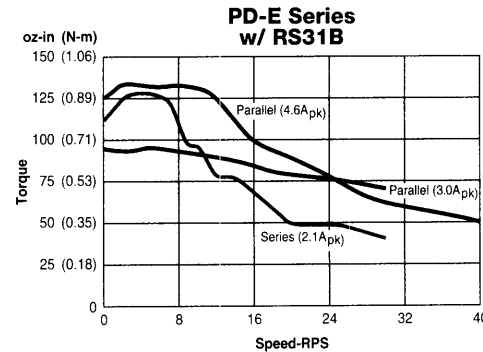
The -D version of the PD-E Series incorporates a power dump with a continuous rating of 15 watts (170 watts peak). This version is needed if the deceleration time in seconds from a maximum speed  $w$  is less than  $(Jw^2 - 0.1)$ , where  $J$  is the total system inertia in  $\text{Kg}\cdot\text{m}^2$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

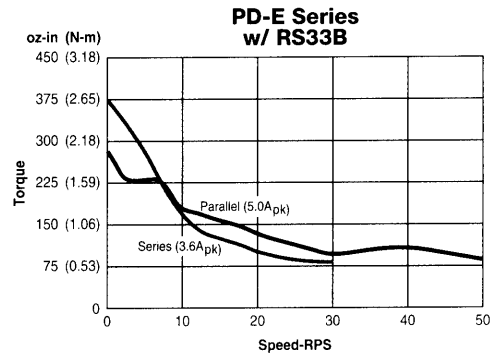
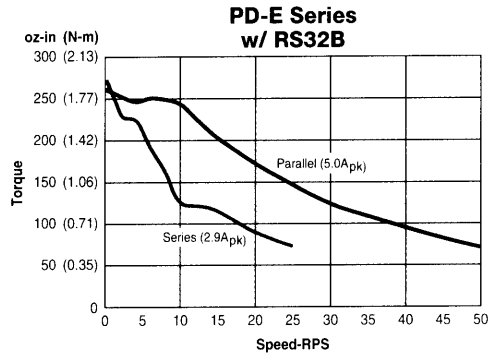
### Size 23 Frame



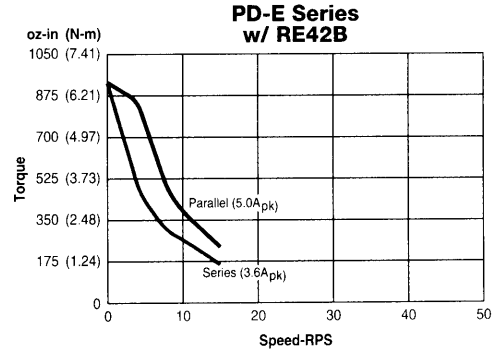
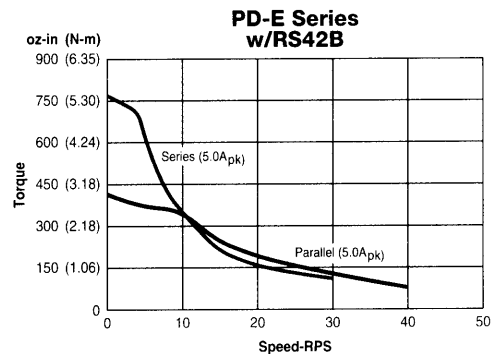
### Size 34 Frame



### Size 34 Frame



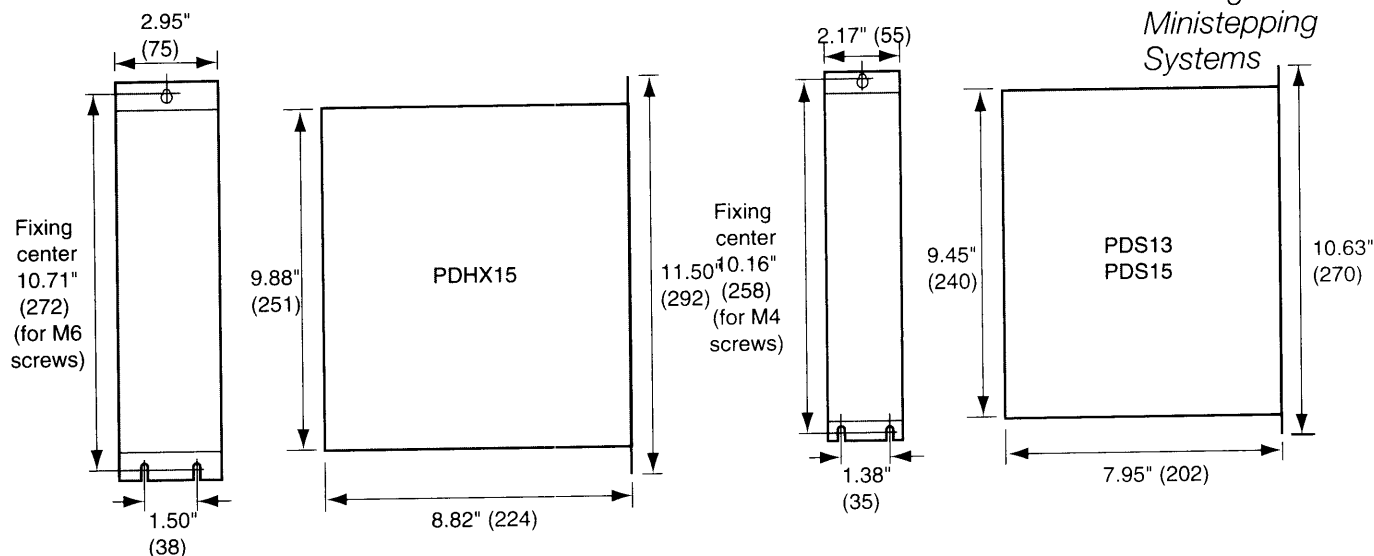
### Size 42 Frame



#### 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
<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

**C Step Motor Systems**

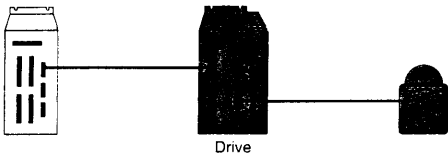


**PDHX-E Alphabetical Command Listing**

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

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 connectors 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)