PDX Series

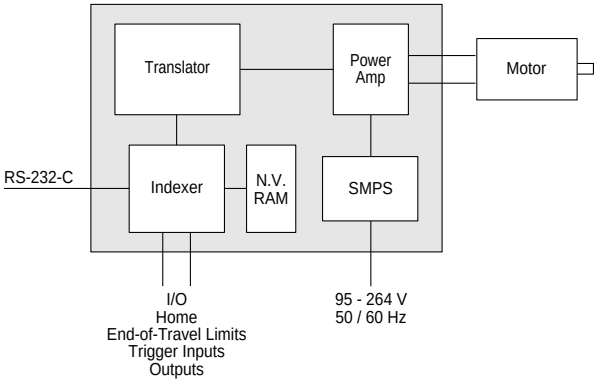
Packaged Drive Indexer

The PDX drives are ideal for single-axis applications or multi-axis applications that do not require complex coordinated motion control. The integral indexer reduces panel real estate, external cabling and installation problems. Typically referred to as an “Intelligent Drive” the PDX can be programmed with complete motion programs, which interact with the drive’s I/O to synchronize motion to other external events.

Features

- Integral indexer reduces wiring and installation costs
- Indexer provides homing, end-of-travel limit and trigger input functions
- IBM PC™ Compatible Application Development Software
- Nonvolatile memory stores complete application programs
- RS232C Serial Communications for download of motion programs
- Serial Communications Data Streaming for interactive motion programs
- Daisy-chaining allows up 255 drives to be commanded from single host computer
- Encoder input for optional closed loop operation

Diagram



PDX Specifications

Parameter	Value
AC Power Input	
Connector	IEC 3-way, mating cable supplied
Supply voltage	95VAC - 264VAC (absolute limits)
Supply frequency	47 to 63Hz
Power factor	Better than 0.9 over full input voltage and output power range
Performance	
Speed range	0.01-50 rps
Acceleration range	0.01-999 rps^2
Position range	±1-99,999,999 steps
Resolution	Switch selectable; 400, 1,000, 2,000 and 4,000 steps/rev
Speed/Torque	Curves located on page C49; CE motors located on page C52
RS232C Communications	
Type	RS232C serial link, 3-wire implementation (TX, RX, GND)
Parameter	9600 baud, 8 data bits, 1 stop bit, no parity
Configuration	PDX drives may be daisy-chained from a single RS232C port Up to 8 PDX drives if using hardware address selection inputs Up to 255 PDX drives if using software address selection
Protection	Drive shuts down and signals a fault in any of the conditions listed
Short-circuit	Across and between phase and phase to GND
Brownout	If DC Bus <50VDC
Overvoltage	If DC Bus >90VDC
Internal supplies	Any internal supply out of specification
Overtemperature	If internal temperature >90°C (194°F)
Indexer Hardware	
Inputs	3 trigger inputs, TTL levels 3 sequence select inputs, TTL levels 3 address select inputs, TTL levels Home and end-of-travel limits, TTL levels
Outputs	2 programmable, TTL levels Dedicated Fault, Step, Direction and Shutdown, TTL levels
Encoder	Single-ended TTL inputs for A, B and Z channels
Indexer Software	
Motion programming	Preset absolution or incremental indexes Comprehensive homing functions Stall detection and position maintenance from encoder input
Memory storage	Battery-backed memory to store programs 7 sequences of 256 characters per sequence
Program selection	RS232C command XR Sequence selection inputs Auto-run on power-up
Physical	
Drive dimensions	Height 9.8" (250 mm), wideth 2" (50 mm), depth 7.5" (190 mm); drawings located on page C55
Weight (drive only)	Net 4 lbs (1.8 Kg)
Environmental	
Operating temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	-40°C to 85°C (40°F to 185°F)
Relative Humidity	0% to 95% (non-condensing)
Ingress protection	IP20
Mounting	Panel mount. Vertical mounting only Mounting slots for #8 (M4) Allen Cap or Fillister/Pan Head screws
Diagnostics	Power LED (green): Fault LED (red)

Command Listing

A	Acceleration
B	Buffer Status
BS	Buffer Size Status
C	Continue
CG	Correction Gain
CR	Carriage Return
D	Distance
DB	Dead Band
DW	Dead Band Window
E	Enable Communications
ER	Encoder Resolution
F	Disable Communications
FS	Encoder Functions Report
FSA	Set Indexer to Inc/Abs Mode
FSB	Set Indexer to Motor/Encoder Step Mode
FSC	Enable/Disable Position Maintenance
FSD	Stop on Stall
FSE	Turn on Output 1 on Stall
FSF	Stop Motion on Trigger 3
FSG	Turn on Output 2 when in Dead-Band
FSH	Enable Stall Detection
G	Go
GH	Go Home
^H	Delete
H	Set Direction
IS	Input Status
K	Kill
L	Loop
LD	Limit Deceleration
LF	Line Feed
MC	Mode Continuous
MN	Mode Normal
MPA	Mode Position Absolute
MPI	Mode Position Incremental
MRD	Motor Resolution Define
N	End of Loop
O	Output
OS	Report Homing Function Setup
OSA	Define Active State of end-of-travel Limits
OSB	Back-Up to Home
OSC	Define Active State of Home Switch
OSD	Home to Z-Channel
OSH	Reference Home Switch Edge
PR	Absolute Position Report
PS	Pause
PX	Report Absolute Encoder Position
PZ	Set absolute counter to zero
"	Quote
Q	Velocity Profiling Mode
R	Request Indexer Status
RA	Request Status of End-of-Travel Limits
RB	Status of Loop, Pause, Shutdown and Trigger Input
RC	Closed Loop Status
RM	Rate Multiplier
RV	Revision Level
S	Stop
SN	Scan Debounce Time
SS	Software Switch Function Setup
SSA	RS232C Echo Control
SSG	Clear/Save Command Buffer on Limit
SSH	Clear/Save Command Buffer on Stop
ST	Shutdown
SV	Servoing Parameter
T	Time Delay
TR	Wait for Trigger
TS	Trigger Input Status
U	Pause and Wait For Continue
V	Velocity
W1	Signed Binary Position Report
W3	Hexadecimal Position Report
XC	Sequence Checksum
XD	Sequence Define
XE	Sequence Erase
XP	Power-Up Sequence Mode
XQ	Sequence Interrupted Run Mode
XR	Run a Sequence
XRP	Run a Sequence with Pause
XSD	Sequence Status Definition
XSP	Sequence Status Power-Up
XSR	Sequence Status Run
XSS	Sequence Status
XT	Sequence Termination
XU	Upload Sequence
Y	Stop Loop
Z	Reset
#	Remote Address

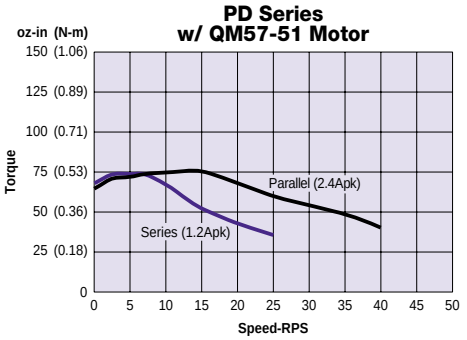
Non-CE Motor Speed/Torque Curves

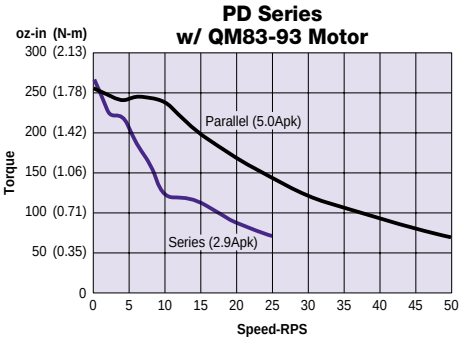
Power Dump Option

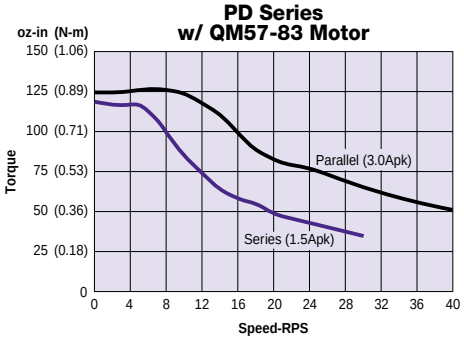
Applications involving rapid deceleration of high-inertia loads may require the addition of a circuit to dissipate the regenerated power. The need for a power dump will depend on the system inertia, the maximum speed and the deceleration time.

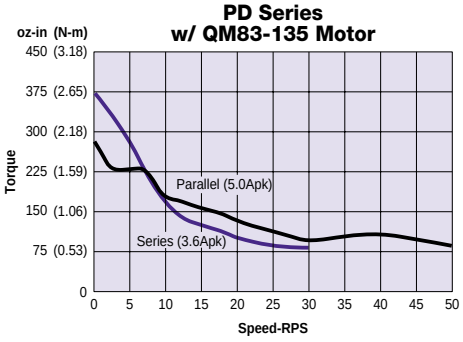
The -D version of the PD Series incorporates a power dump with a continuous rating of 15 watts (170 watts peak). This version is needed if the deceleration time in seconds from a maximum speed w is less than (Jw^2 - 0.1), where J is the total system inertia in Kg-m^2 (including the motor) and w is the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

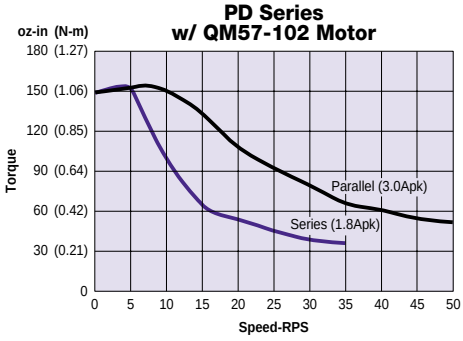
Note: ±10% torque variance due to motor tolerance.

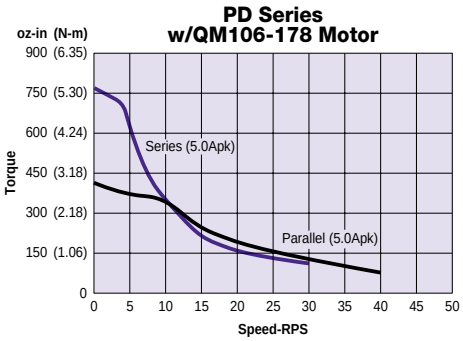


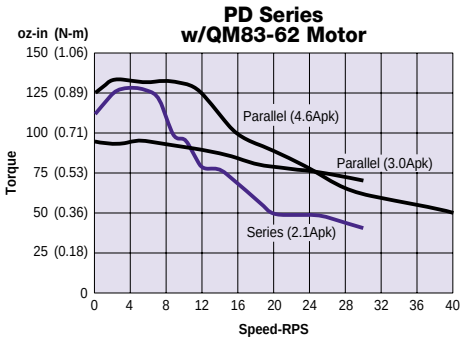


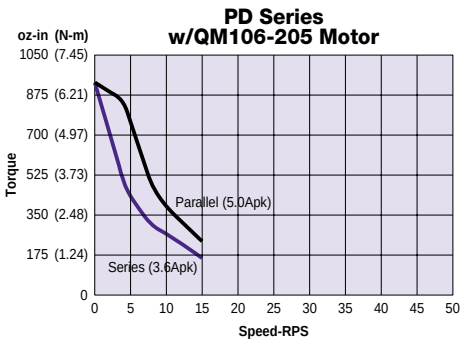




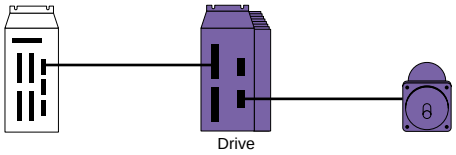








Drive's Peak Current Levels	
PDS/X13	0.9–3.0 Apk
PDS/X15	2.5–5.0 Apk



QM Motor Data (Non-CE)

		Size 23			Size 34			Size 42	
		QM-57-51	QM-57-83	QM-57-102	QM-83-62	QM-83-93	QM-83-135	QM-106-178	QM-106-205
Rotor inertia									
oz-in^2		0.546	1.10	1.69	3.47	6.76	10.47	44.0	52.0
(kg-cm^2)		(0.100)	(0.201)	(0.309)	(0.635)	(1.24)	(1.92)	(8.05)	(9.51)
Bearings									
Thrust load	lb	25	25	25	50	50	50	50	50
	(kg)	(11.3)	(11.3)	(11.3)	(22.6)	(22.6)	(22.6)	(22.6)	(22.6)
Radial load	lb	15	15	15	25	25	25	25	25
	(kg)	(6.8)	(6.8)	(6.8)	(11.3)	(11.3)	(11.3)	(11.3)	(11.3)
End play	in	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Reversing load	(mm)	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)
Equal to 1 lb									
Radial play	in	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008
Per 0.5 lb load	(mm)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Weight (net)									
Motor+Cable									
+Connector	lb	1.6	2.4	3.2	3.8	5.1	8.3	19.1	23.4
	(kg)	(0.7)	(1.1)	(1.5)	(1.7)	(2.3)	(3.8)	(8.7)	(10.7)

All motors: Cable length = 10 ft (3 m) with pigtails.

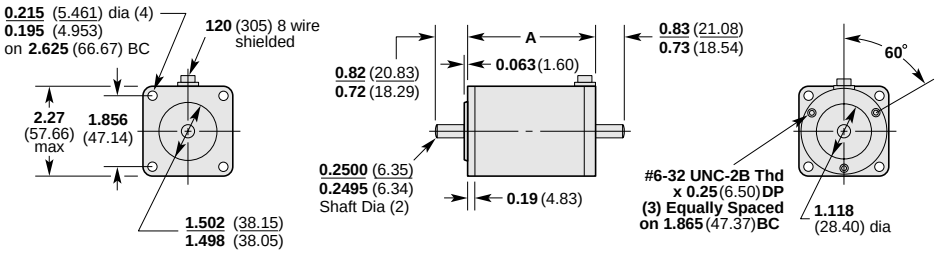
Parker Automation
Parker Hannifin Corporation
Compumotor Division
Rohnert Park, California

Non-CE Motor Dimensions

(—) denotes millimeters

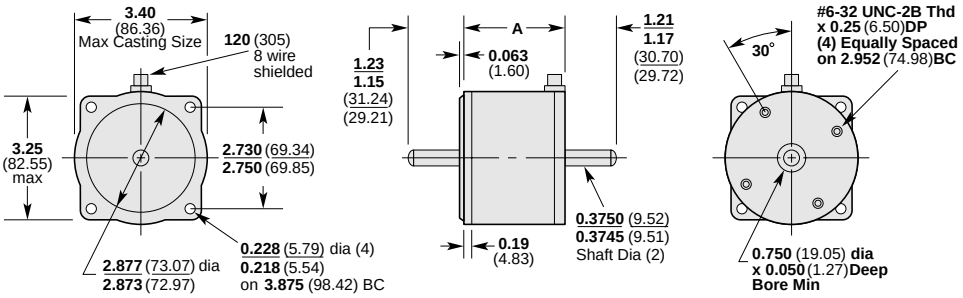
Size 23 frame

Model	A
QM-57-51	**2.0** (50.23)
QM-57-83	**3.1** (75.23)
QM-57-102	**4.0** (101.6)



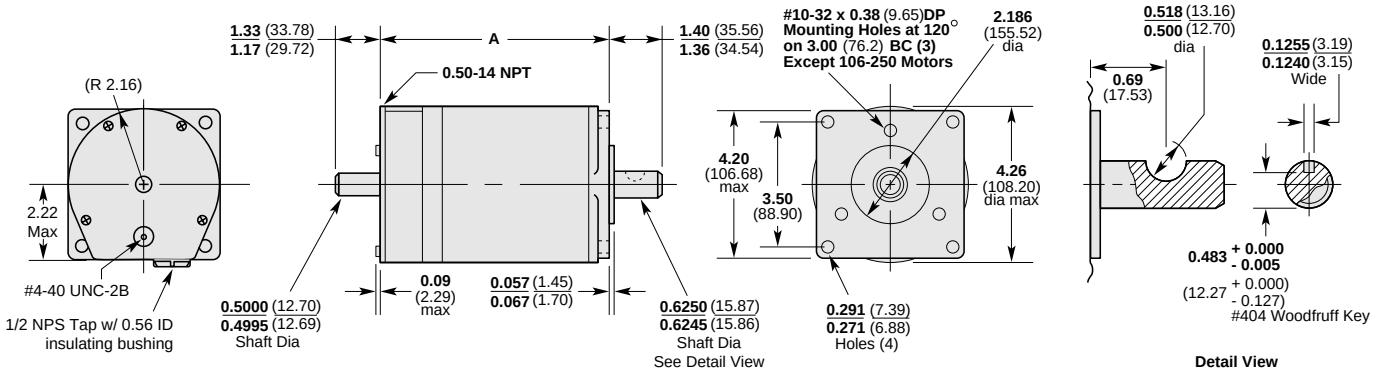
Size 34 frame

Model	A
QM-83-62	**2.5** (62.0)
QM-83-62	**2.5** (62.0)
QM-83-93	**3.7** (93.98)
QM-83-135	**5.2** (129.0)

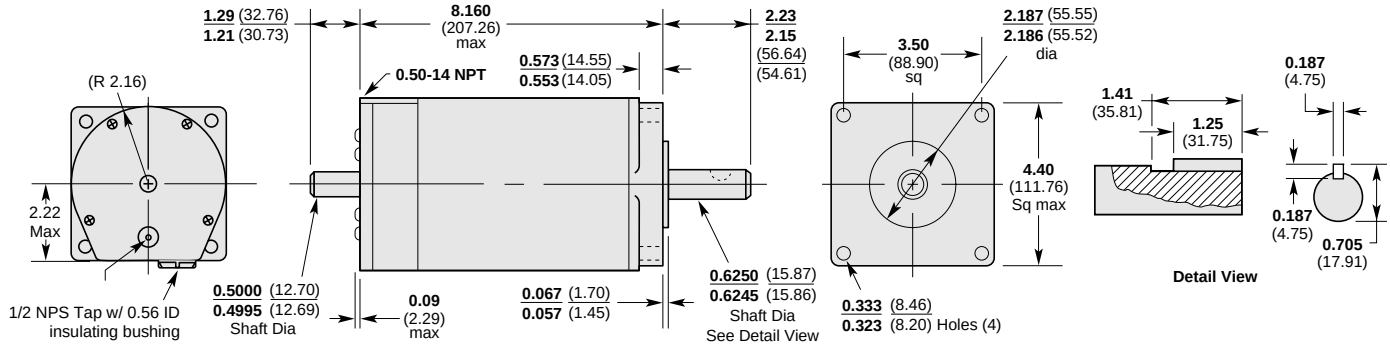


Size 42 frame

Model	A
QM-106-178	**7.56** (192.02) **single endshaft**
QM-106-178	**7.69** (195.32) **Double endshaft**



Model QM-106-205, QM-106-205



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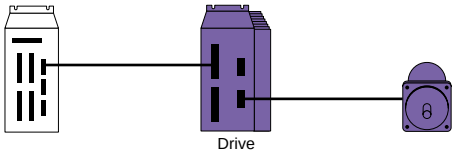


CE Motor Speed/ Torque Curves

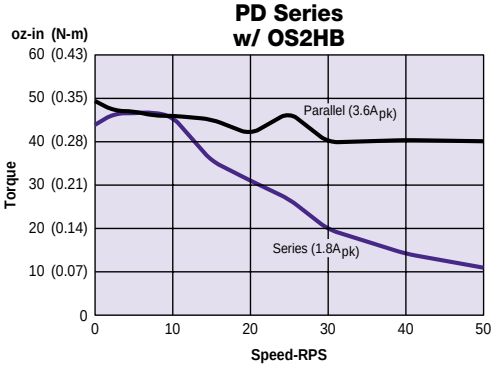
Power Dump Option

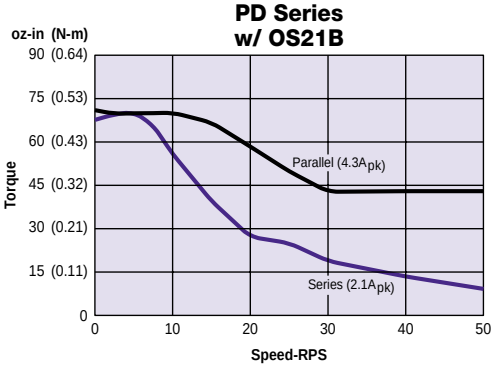
Applications involving rapid deceleration of high-inertia loads may require the addition of a circuit to dissipate the regenerated power. The need for a power dump will depend on the system inertia, the maximum speed and the deceleration time.

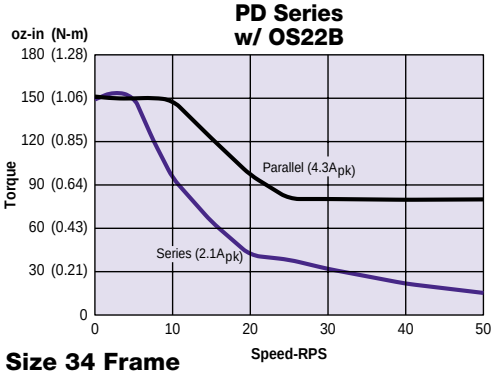
The -D version of the PD Series incorporates a power dump with a continuous rating of 15 watts (170 watts peak). This version is needed if the deceleration time in seconds from a maximum speed w is less than (Jw^2 - 0.1), where J is the total system inertia in Kg-m^2 (including the motor) and w is the 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: ±10% torque variance due to motor tolerance.

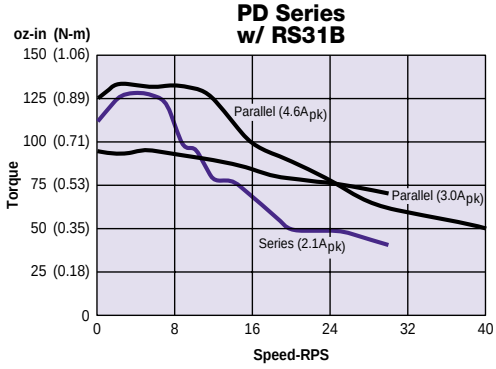
Size 23 Frame



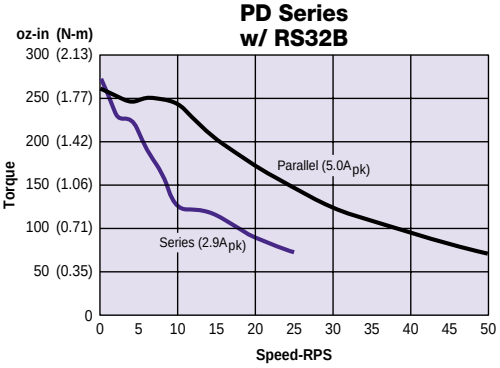


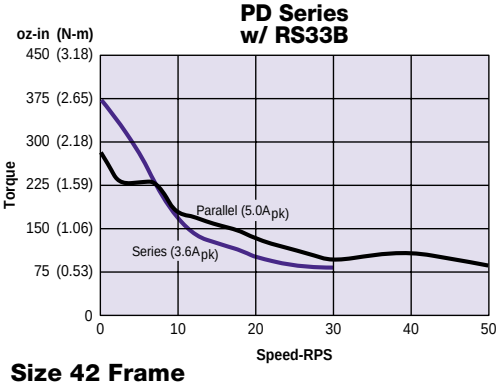


Size 34 Frame

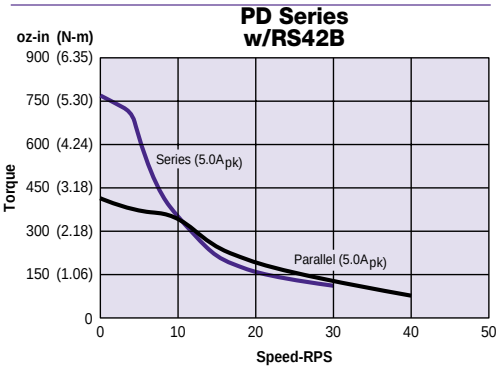


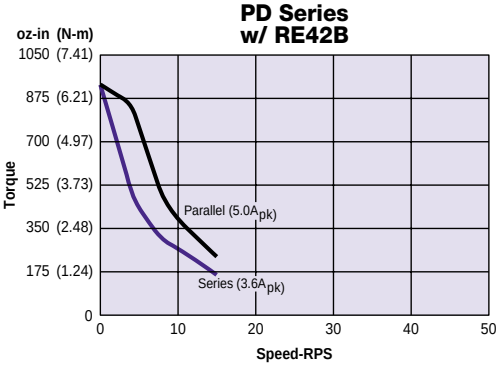
Size 34 Frame





Size 42 Frame

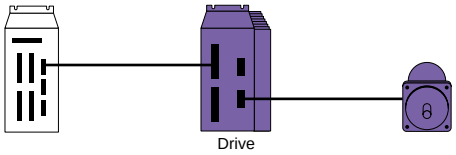




Drive's Peak Current Levels	
PDS/X13	0.9–3.0 Apk
PDS/X15	2.5–5.0 Apk

CE Motor Data

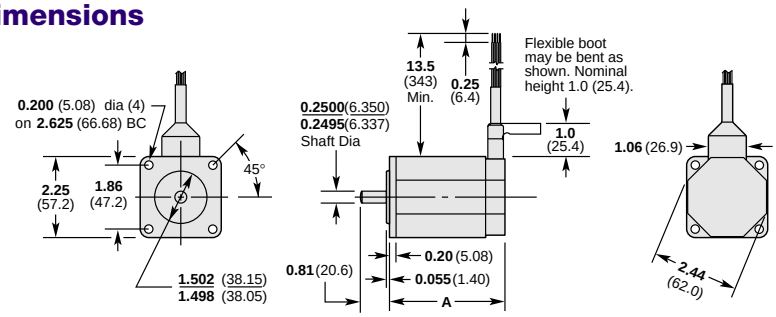
	Size 23 Frame			Size 34 Frame			Size 42 Frame	
	OS2HB	OS21B	OS22B	RS31B	RS32B	RS33B	RS42B	RE42B
Static torque								
oz-in	43	82	155	135	270	375	750	900
(Nm)	(0.30)	(0.58)	(1.09)	(0.95)	(1.91)	(2.65)	(5.30)	(6.35)
Rotor inertia								
oz-in^2	0.386	0.656	1.390	3.204	6.563	9.652	61.76	61.76
(kg-cm^2)	(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)	(1.6)	(81.6)	(182)	(182)
Radial Load								
lb	20	20	20	35	35	35	140	140
(kg)	(9.1)	(9.1)	(9.1)	(5.9)	(5.9)	(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



PD Series CE Motor Dimensions

(—) denotes millimeters

Size 23 Frame, O Series



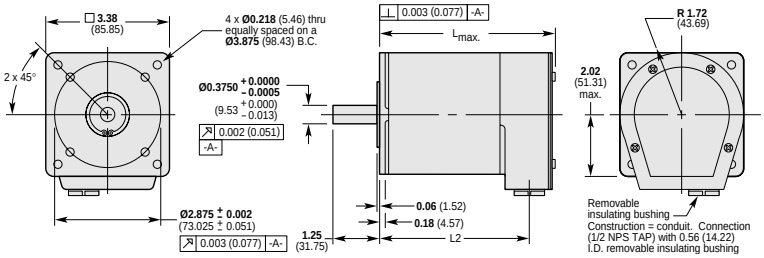
Frame Size 23

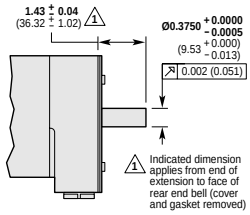
Model		A
OS2HA	(OEM57-40)	**1.60** (40.6)
OS21A	(OEM57-51)	**2.06** (52.3)
OS22A	(OEM57-83)	**3.10** (78.7)

Dimensions in inches (millimeters)

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)

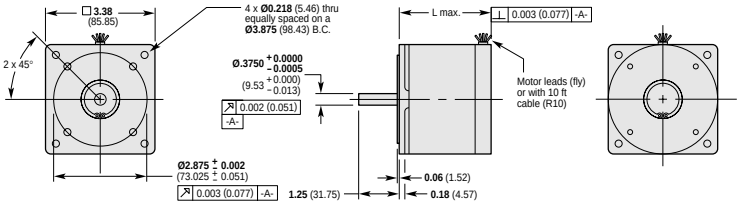


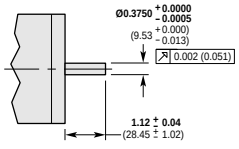


Double Shaft Configuration

Size 34 Frame, R Series Regular Construction (R10)

Model	Lmax
RS31B–□□R10	**2.58** (65.54)
RS32B–□□R10	**3.76** (95.51)
RS33B–□□R10	**5.06** (128.53)



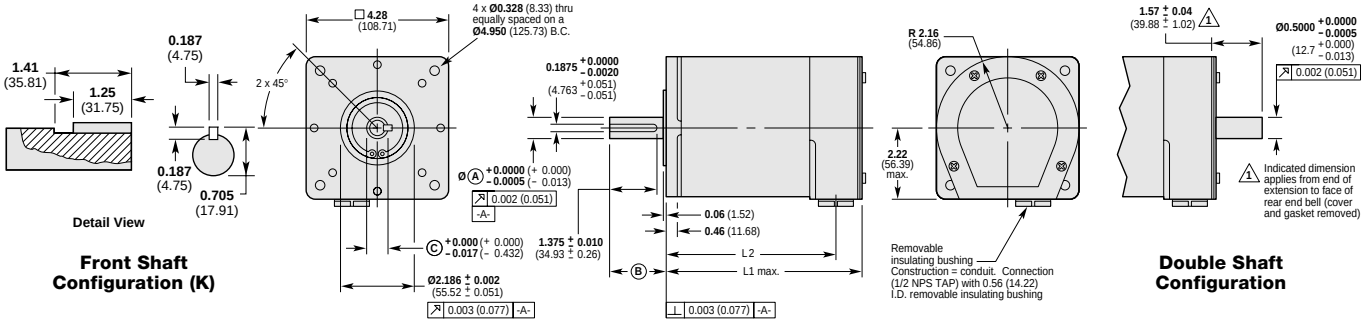


Rear Shaft Configuration = D

Double Shaft Configuration

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)



Front Shaft Configuration (K)

Double Shaft Configuration

Parker Automation

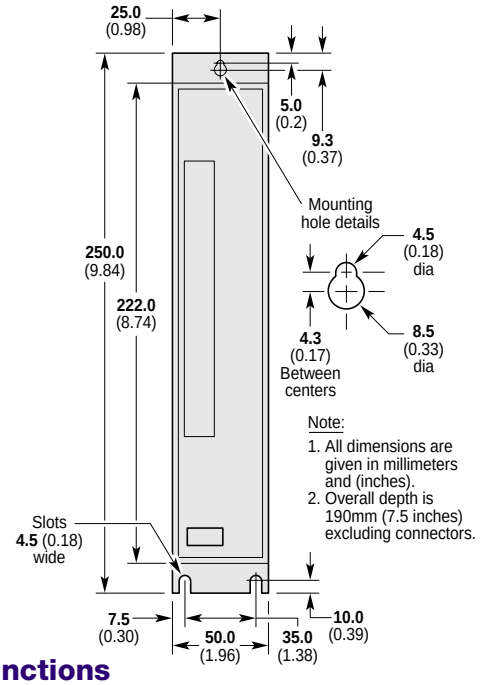
Parker Hannifin Corporation
Compumotor Division
Rohnert Park, California

Drive Dimensions

(PDS and PDX drives have same dimensions.)

Drive comes complete with hood for 25-pin D-type connector. Depth with hood = 9.8" (250mm).

Drive mounting holes and slots are suitable for #8 or M4 screws.



I/O Connections and Switch Functions

PDS/PDX Drives
Motor Connector
5-Pin Screw
Pin No. Signal

Pin No.	Signal
1	A +
2	A -
3	GND
4	B +
5	B -

PDS/PDX Drives
AC Power
IEC Plug
Pin No. Signal

Pin No.	Signal
1	Hot (Line)
2	GND
3	Neutral

PDS Drive
Switch Functions
Pin No. Signal

Pin No.	Signal
1	Self-Test
2	Standby Mode
3	Oscillator Int/Ext Potentiometers
4	Step Resolution
5	Step Resolution
6	Motor Current
7	Motor Current
8	Motor Current

PDS Drive
Control I/O Connector
25-Pin D-Type Socket
Pin No. Signal

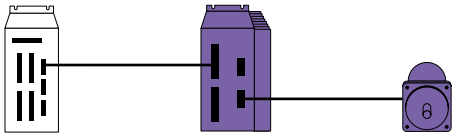
Pin No.	Signal
1	Step +
2	Direction +
3	Reserved—Do Not Connect
4	Reserved—Do Not Connect
5	Reserved—Do Not Connect
6	External Slow Potentiometer
7	External Fast Potentiometer
8	Reserved—Do Not Connect
9	Fault +
10	Reserved—Do Not Connect
11	Reserved—Do Not Connect
12	Slow Run
13	Fast Run
14	Step -
15	Direction -
16	Shutdown +
17	Shutdown -
18	Reserved—Do Not Connect
19	External Potentiometer Common
20	Internal Clock Out
21	Fault -
22	Reserved—Do Not Connect
23	Aux Clock
24	Aux Dir
25	GND

PDX Drives
Control I/O Connector
25-Pin D-Type Socket
Pin No. Signal

Pin No.	Signal
1	Step Output
2	Direction Output
3	CW Limit
4	CCW Limit
5	Home Input
6	Reserved—Do Not Connect
7	GND
8	Output 2
9	Fault Output
10	Output 1
11	Sequence Select Input 1
12	Sequence Select Input 2
13	Sequence Select Input 3
14	TX-RS232C
15	RX-RS232C
16	Shutdown Output
17	Encoder Channel A
18	Encoder Channel B
19	Encoder Channel Z
20	Trigger Input 1
21	Trigger Input 2
22	Trigger Input 3

PDX Drives
Switch Functions
Pin No. Signal

Pin No.	Signal
1	Self-Test
2	Standby Mode
3	No Function
4	Step Resolution
5	Step Resolution
6	Motor Current
7	Motor Current
8	Motor Current



Ordering Information

Drives

Part No.	Description	CE (LVD)
PDS13	Packaged 3Apk, 70VDC bus ministepping drive	
PDS15	Packaged 5Apk, 70VDC bus ministepping drive	
PDS15-D	Packaged 5Apk, 70VDC bus ministepping drive and power dump	

Indexers/Drive

Part No.	Description	CE (LVD)
PDX13	Packaged 3Apk, 70VDC bus ministepping indexer/drive	
PDX15	Packaged 5Apk, 70VDC bus ministepping indexer/drive	
PDX15-D	Packaged 5Apk, 70VDC bus ministepping indexer/drive and power dump	

Standard (Smooth) Motors

Part No.	Description
QM57-51-MO	Standard, size 23, (57-51) single-stack motor
QM57-83-MO	Standard, size 23, (57-83) double-stack motor
QM57-102-MO	Standard, size 23, (57-102) triple-stack motor
QM83-62-MO	Standard, size 34, (83-62) single-stack motor
QM83-93-MO	Standard, size 34, (83-93) double-stack motor
QM83-135-MO	Standard, size 34, (83-135) triple-stack motor
QM106-178-MO	Standard, Size 42, double-stack (106-178) motor
QM106-205-MO	Enhanced, Size 42, double-stack (106-205) motor

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	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 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 R10=Regular construction with non-CE marked10-ft cables (S/ZETA/QM motor construction—not CE marked)		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)

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Rohnert Park, California