

# MPW Series

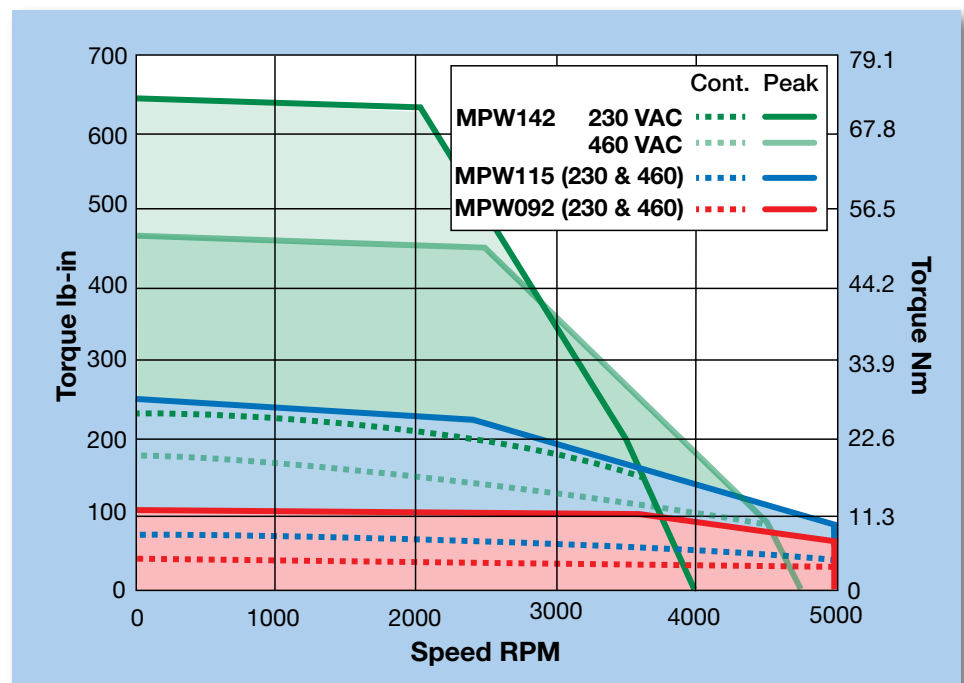
## Stainless Steel Servo Motors



The new MPW Series extends the MPP motor family to meet the needs of those applications exposed to high pressure, highly caustic, washdown environments. Specific applications can be found in such markets as Food and Beverage, Pharmaceutical, Packaging, and any other application that may be exposed to a harsh environment (salt, fog and humidity).

- 10 models covering three frame sizes
- Sealed to IP69K for 1200 psi washdown requirements
- Potted stator design for improved thermal efficiency
- 35 to 227 in-lbs continuous torque (230 and 460 VAC supply)
- Options include high resolution encoders, resolvers, and 24 V brake
- Cable options available to plug and play with a wide variety of drives

### Speed/Torque Range (Max)



### Contact Information:

Parker Hannifin Corporation  
**Electromechanical Automation Division**  
 5500 Business Park Drive  
 Rohnert Park, CA 94928

phone: 800.358.9068 / 707.584.7558

fax: 707.584.8015

email: emn\_support@parker.com

www.parkermotion.com

### MPW Common Specifications

Ambient Temp at Rating	$T_{amb}$	°C	40
Max Winding Temp	$T_{max}$	°C	155
Number of Rotor Magnet Poles	$N_p$	# poles	8
Environmental Protection Rating <sup>2</sup>	IP		IP69K



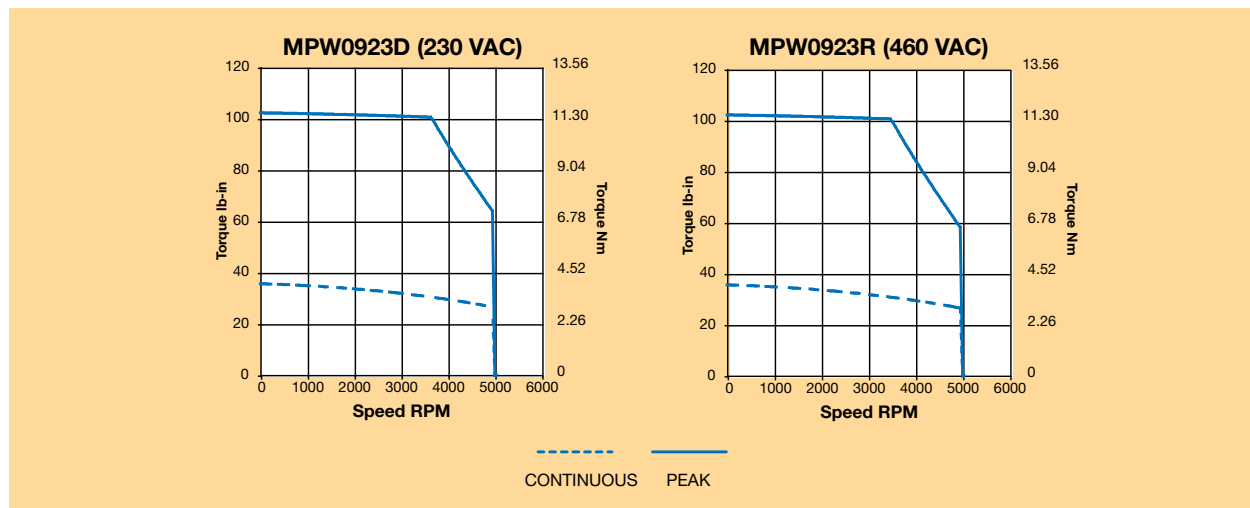
ENGINEERING YOUR SUCCESS.

# MPW Series Servo Motors

## Model 92 Performance Specifications

Parameter	Symbol	Units	MPW0923D	MPW0923R
Voltage		VAC	230	460
Stall Torque Continuous <sup>1, 2, 3</sup>	$T_{CS}$	Nm	4.03	4.02
		in-lb	35.6	35.6
Stall Current Continuous <sup>1, 2, 3</sup>	$I_{CS}(rms)$	Arms	7.2	3.6
		Nm	11.55	11.54
Peak Torque	$T_{pk}$	in-lb	102.2	102.1
		Arms	22.8	11.4
Peak Current	$I_{pk}(rms)$	Arms	22.8	11.4
Rated Speed <sup>1, 2, 3</sup>	$S_r$	rpm	4947	4947
Rated Torque <sup>1, 2, 3</sup>	$T_r$	Nm	3.00	3.00
		in-lb	26.5	26.5
Rated Shaft Output Power <sup>1, 2, 3</sup>	$P_{out}$	kW	1.55	1.55
Current at Rated Speed <sup>1, 2, 3</sup>	$I_r$	$A_{rms}$	5.59	2.79
Voltage Constant <sup>4</sup>	$K_e$	$V_{rms}/k_{rpm}$	33.95	67.90
Torque Constant <sup>4</sup>	$K_t(sine)$	$Nm/A_{rms}$	0.561	1.123
Resistance <sup>3, 4</sup>	R	ohm	1.20	4.81
Inductance <sup>3, 5</sup>	L	mH	6	26
MPW Rotor Inertia <sup>6</sup>	J	$kg\cdot m^2$	$1.130^{-4}$	$1.130^{-4}$
		$in\cdot lb\cdot sec^2$	$1.000^{-3}$	$1.000^{-3}$
Motor Weight <sup>6</sup>		kg	4.59	4.59
		lb	10.12	10.12

## Model 92 Speed-Torque Performance



1 Assumes motor is mounted to an aluminum plate with dimensions of 12" x 12" x 1/2" for 92 mm motor frames.

2 Maximum winding temperature is 155°C. Thermal protection device threshold may be at a lower temperature.

3 These ratings are valid for Parker drives. Other drives may not achieve the same ratings.

4 ±10%

5 ±30% @ 1kHz

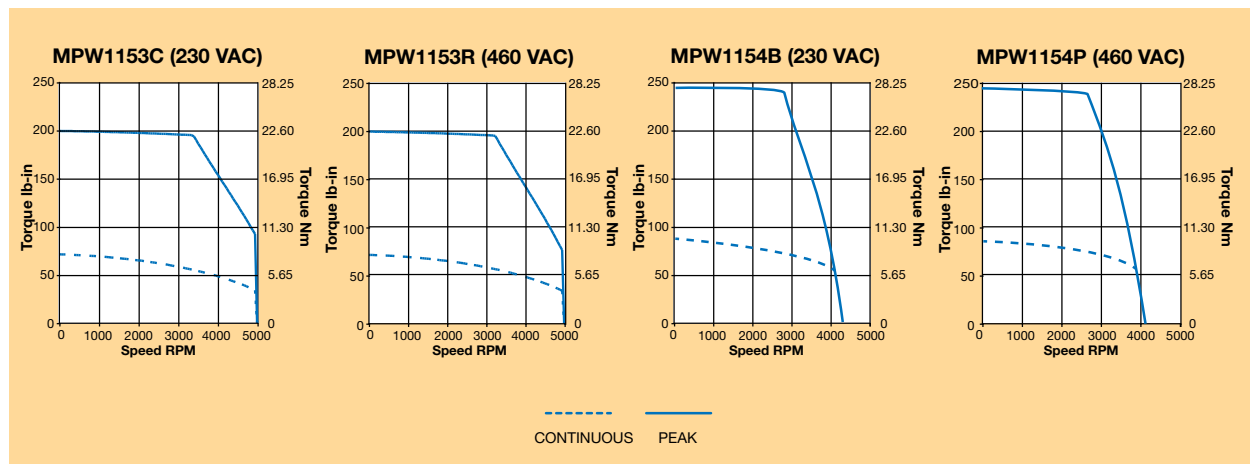
6 Reference only

Note: These specifications are based on theoretical motor performance and are not specific to any amplifier.

# Model 115 Performance Specifications

Parameter	Symbol	Units	MPW1153C	MPW1153R	MPW1154B	MPW1154P
<b>Voltage</b>		VAC	230	460	230	460
<b>Stall Torque Continuous</b> <sup>1,2,3</sup>	$T_{CS}$	Nm	8.04	8.03	9.86	9.85
		in-lb	71.2	71.1	87.3	87.2
<b>Stall Current Continuous</b> <sup>1,2,3</sup>	$I_{CS}(rms)$	Arms	12.1	6.0	10.7	5.4
		Nm	22.52	22.50	28.04	28.01
<b>Peak Torque</b>	$T_{pk}$	in-lb	199.3	199.1	284.2	247.9
		Arms	38.2	19.1	33.9	16.9
<b>Peak Current</b>	$I_{pk}(rms)$	Arms	38.2	19.1	33.9	16.9
<b>Rated Speed</b> <sup>1,2,3</sup>	$S_r$	rpm	4013	4013	3852	3839
<b>Rated Torque</b> <sup>1,2,3</sup>	$T_r$	Nm	5.46	5.45	6.67	6.69
		in-lb	48.3	48.3	59.1	59.2
<b>Rated Shaft Output Power</b> <sup>1,2,3</sup>	$P_{out}$	kW	2.29	2.29	2.70	2.70
<b>Current at Rated Speed</b> <sup>1,2,3</sup>	$I_r$	$A_{rms}$	8.52	4.26	7.50	3.80
<b>Voltage Constant</b> <sup>4</sup>	$K_e$	$V_{rms}/k_{rpm}$	40.45	80.91	55.87	111.74
<b>Torque Constant</b> <sup>4</sup>	$K_t(\text{sine})$	$Nm/A_{rms}$	0.669	1.338	0.924	1.848
<b>Resistance</b> <sup>3,4</sup>	$R$	ohm	0.49	1.97	0.69	2.6
<b>Inductance</b> <sup>3,5</sup>	$L$	mH	4	17	5	20
<b>MPW Rotor Inertia</b> <sup>6</sup>	$J$	$kg\cdot m^2$	$4.068^{-4}$	$4.068^{-4}$	$5.198^{-4}$	$5.198^{-4}$
		$in\cdot lb\cdot sec^2$	$3.600^{-3}$	$3.600^{-3}$	$4.600^{-3}$	$4.600^{-3}$
<b>Motor Weight</b> <sup>6</sup>		kg	7.28	7.28	8.6	8.6
		lb	16.06	16.06	18.9	18.9

# Model 115 Speed-Torque Performance



- 1 Assumes motor is mounted to an aluminum plate with dimensions of 12" x 12" x 1/2" for 115 mm motor frames
- 2 Maximum winding temperature is 155°C. Thermal protection device threshold may be at a lower temperature.
- 3 These ratings are valid for Parker drives. Other drives may not achieve the same ratings.
- 4 ±10%
- 5 ±30% @ 1kHz
- 6 Reference only

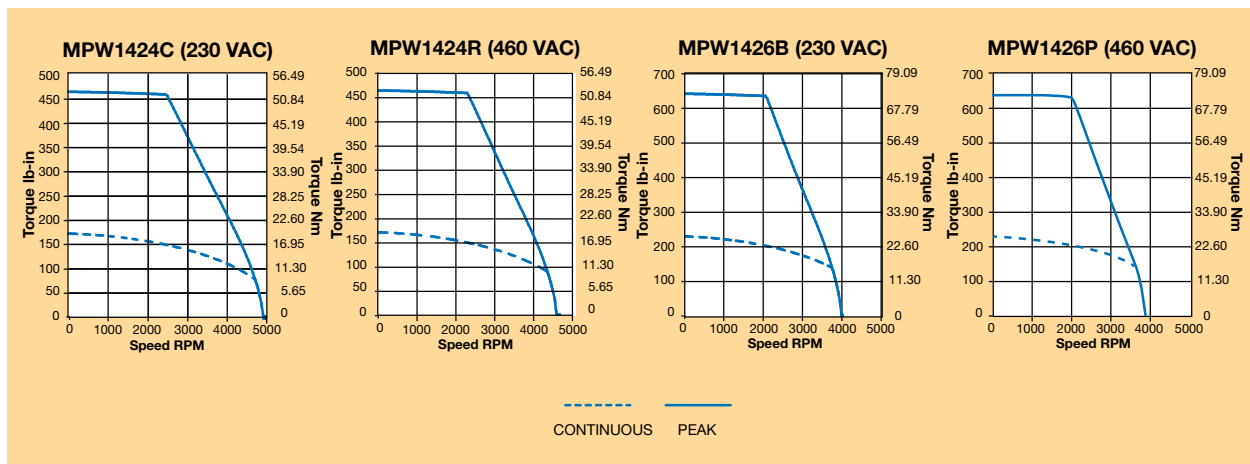
Note: These specifications are based on theoretical motor performance and are not specific to any amplifier.

# MPW Series Servo Motors

## Model 142 Performance Specifications

Parameter	Symbol	Units	MPW1424C	MPW1424R	MPW1426B	MPW1426P
<b>Voltage</b>		VAC	230	460	230	460
<b>Stall Torque Continuous</b> <sup>1, 2, 3</sup>	$T_{cs}$	Nm in-lb	19.28 170.6	19.26 170.4	25.73 227.7	25.70 227.5
<b>Stall Current Continuous</b> <sup>1, 2, 3</sup>	$I_{cs}(rms)$	Arms	24.3	12.1	26.2	13.1
<b>Peak Torque</b>	$T_{pk}$	Nm in-lb	52.35 463.3	52.31 463.0	72.30 639.9	72.25 639.4
<b>Peak Current</b>	$I_{pk}(rms)$	Arms	76.8	38.3	82.7	41.3
<b>Rated Speed</b> <sup>1, 2, 3</sup>	$S_r$	rpm	3650	3780	3386	3372
<b>Rated Torque</b> <sup>1, 2, 3</sup>	$T_r$	Nm in-lb	13.29 117.6	13.17 116.5	17.68 156.5	17.74 157.0
<b>Rated Shaft Output Power</b> <sup>1, 2, 3</sup>	$P_{out}$	kW	5.22	5.21	6.27	6.30
<b>Current at Rated Speed</b> <sup>1, 2, 3</sup>	$I_r$	$A_{rms}$	17.03	8.44	18.28	9.20
<b>Voltage Constant</b> <sup>4</sup>	$K_e$	$V_{rms}/k_{rpm}$	48.66	97.32	60.12	120.23
<b>Torque Constant</b> <sup>4</sup>	$K_t(sine)$	$Nm/A_{rms}$	0.805	1.610	0.994	1.989
<b>Resistance</b> <sup>3, 4</sup>	R	ohm	0.17	0.67	0.16	0.65
<b>Inductance</b> <sup>3, 5</sup>	L	mH	3	12	3	13
<b>MPW Rotor Inertia</b> <sup>6</sup>	J	$kg\cdot m^2$ $in\cdot lb\cdot sec^2$	$1.469^{-3}$ $1.300^{-2}$	$1.469^{-3}$ $1.300^{-2}$	$2.147^{-3}$ $1.900^{-2}$	$2.147^{-3}$ $1.900^{-2}$
<b>Motor Weight</b> <sup>6</sup>		kg lb	17.56 38.72	17.56 38.72	20.16 44.44	20.20 44.40

## Model 142 Speed-Torque Performance



1 Assumes motor is mounted to an aluminum plate with dimensions of 12" x 12" x 1" for 142 mm motor frames

2 Maximum winding temperature is 155°C. Thermal protection device threshold may be at a lower temperature.

3 These ratings are valid for Parker drives. Other drives may not achieve the same ratings.

4 ±10%

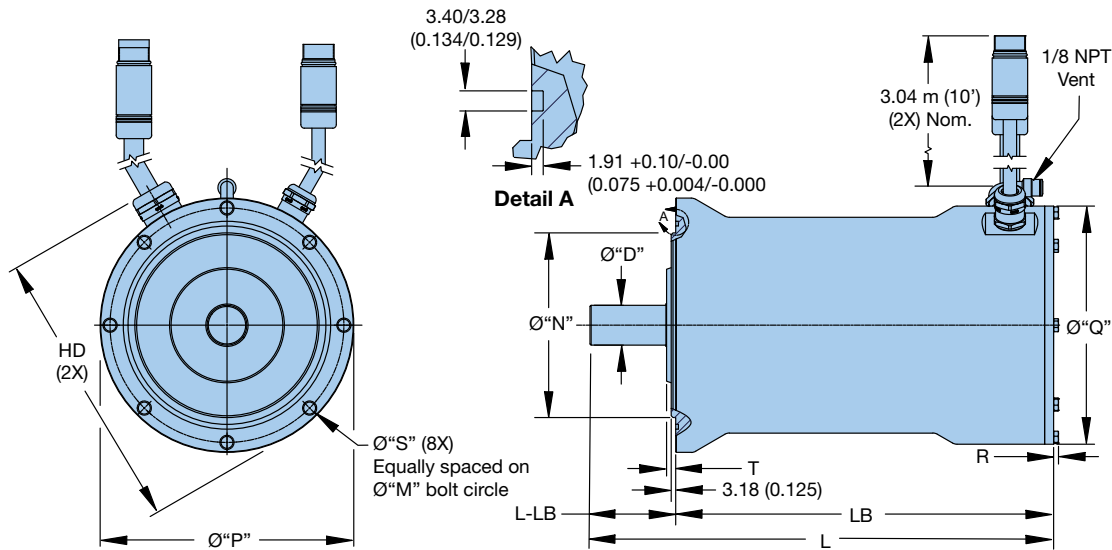
5 ±30% @ 1kHz

6 Reference only

Note: These specifications are based on theoretical motor performance and are not specific to any amplifier.

# MPW Dimensions

## Dimensions – mm (in)



Model Number	HD	T	L*	LB*	L-LB	D
MPW0923	138.8 (5.46)	5.35 (0.210)	224.3 (8.83)	184.2 (7.25)	40.1 (1.58)	16.007 (0.6302)
MPW1153	168.7 (6.64)	6.58 (0.026)	247.4 (9.74)	196.9 (7.75)	50.5 (1.99)	24.006 (0.9451)
MPW1154	168.7 (6.64)	6.58 (0.026)	295.8 (11.65)	245.5 (9.66)	50.4 (1.98)	24.005 (0.9451)
MPW1424	203.1 (8.00)	6.38 (0.025)	281.9 (11.09)	221.5 (8.72)	60.4 (2.38)	28.006 (1.1026)
MPW1426	203.1 (8.00)	6.38 (0.025)	333.5 (13.13)	273.1 (10.75)	60.4 (2.38)	28.006 (1.1026)

Model Number	M	S	N	P	Q	R
MPW0923	100 (3.937)	M6	80.013 (3.1501)	110 (4.331)	110 (4.331)	2.0 (0.08)
MPW1153	130 (5.118)	M8	110.012 (4.3312)	140 (5.512)	140 (5.512)	2.8 (0.11)
MPW1154	130 (5.118)	M8	110.012 (4.3312)	140 (5.512)	140 (5.512)	2.8 (0.11)
MPW1424	165 (6.496)	M10	130.002 (5.1182)	179 (7.047)	167.64 (6.600)	3.5 (0.14)
MPW1426	165 (6.496)	M10	130.002 (5.1182)	179 (7.047)	167.64 (6.600)	3.5 (0.14)

\*L and LB dimensions increase by the following with brake option "B": MPW092x 34.5 (1.36"); MPW115x 48.5 (1.91"); MPW142x 51.6 (2.03")

# MPW Series Servo Motors

## Motor/Drive Compatibility

Motor Model Number	Cont. Stall Current Amps-rms	Aries Drive Current Rating by Drive Model						
		AR01AE	AR02AE	AR04AE	AR08AE	AR13AE	AR20AE	AR30AE
		1.0	1.75	3.0	4.5	6.3	10.0	16.0
MPW0923D	7.2						●	
MPW0923R	3.6				●			
MPW1153C	12.1							●
MPW1153R	6.0					●		
MPW1154B	10.7							●
MPW1154P	5.4					●		
MPW1424C	24.3							
MPW1424R	12.1							●
MPW1426B	26.2							
MPW1426P	13.1							●

Motor Model Number	Cont. Stall Current Amps-rms	Single Axis Compax3S & Compax3H Drive Current Rating by Drive Model								
		S025 V2	S063 V2	S100 V2	S150 V2	S038 V4	S075 V4	S150 V4	S300 V4	H050 V4
		2.5	6.3	10.0	15.0	3.8	7.5	15.0	30.0	50.0
MPW0923D	7.2			●						
MPW0923R	3.6		●			●				
MPW1153C	12.1				●					
MPW1153R	6.0		●				●			
MPW1154B	10.7		●		●					
MPW1154P	5.4		●				●			
MPW1424C	24.3								●	
MPW1424R	12.1				●			●		
MPW1426B	26.2								●	
MPW1426P	13.1				●			●		

Motor Model Number	Cont. Stall Current Amps-rms	240/400 VAC 480 VAC	Multi-axis Compax3M Drive Current Rating by Drive Model			
			M050 D6	M10 D6	M150 D6	M300 D6
			5.0 4.0	10.0 8.0	15.0 12.6	30.0 25.0
MPW0923D	7.2			●		
MPW0923R	3.6		●			
MPW1153C	12.1				●	
MPW1153R	6.0			●		
MPW1154B	10.7				●	
MPW1154P	5.4			●		
MPW1424C	24.3				●	
MPW1424R	12.1				●	
MPW1426B	26.2				●	
MPW1426P	13.1				●	

● Ideal Motor / Drive combination

● These motors are rated for 460 volts AC. This combination, with the 230 volt drive, will result in motor running at 1/2 its rated speed

# Motor Feedback Drive Compatibility

MPP/MPJ Feedback Option	Order Code	Drive Compatibility			
		Aries	Compax3	Gemini	ViX
Encoder	1E	•	•	•	•
Resolver	41	•	•	•	•
Stegmann Absolute Encoder*	6S/9S		•		
Heidenhain Absolute Encoder**	7D	•	•*		

\* Stegmann absolute encoder compatible with Compax3 F11 feedback option

\*\* Heidenhain absolute encoder compatible with Compax3 F12 feedback option.

## Motor-to-Drive Feedback Cables\*

Drive	Feedback Type	Part Number
Aries	Encoder - Incremental	F-1A1-xx
	Heidenhain Absolute	F-1A2-xx
Compax3	Resolver	F-2B1-xx
	Encoder - Incremental	F-2C1-xx
	Stegmann Absolute	F-2B1-xx
	Heidenhain Absolute	F-2A2-xx

-xx denotes cable length in feet. Motor power and feedback cables available in standard lengths of 10,25,50 feet. Other lengths also available.

## Motor-to-Drive Power Cables\*

Model Number	Motor Current	Part Number <sup>1,2</sup>
MPW0923D	0 – 20 A rms; 230 or 460 V	P-3B1-xx
MPW0923R		
MPW1153C	0 – 20 A rms; 230 or 460 V	P-3B1-xx
MPW1153R		
MPW1154B		
MPW1154P		
MPW1424C	0 – 20 A rms; 230 or 460 V	P-4B1-xx
MPW1424R		P-3B1-xx
MPW1426B		P-4B1-xx
MPW1426P		P-3B1-xx

<sup>1</sup> Motor sizes 92 – 142 use size 1.0 PS Connector

<sup>2</sup> -xx denotes cable length in feet. Motor power and feedback cables available in standard lengths of 10, 25, 50 feet. Other lengths are available. Drive current values are default values. When running Drive PWM frequency at values other than default, current output values will change. Please consult drive manual for current values, and select motor power cable accordingly.

\* Motor-to-drive feedback and power cables connect to the integral 10' (3.04 m) cables equipped on the motor.

# MPW Series Servo Motors

## “PS” Connectors (all motor sizes)

The PS connector option for MPP/MPJ motors feature high-quality Hypertac - Interconnectron circular connectors mounted to the motor body. These connectors are a right-angle mount and can be fully rotated. This allows for greater cable routing options. Mating cables are specified and ordered separately. The PS option joins the motor phase wires and brake leads into a one connector. The second connector has motor feedback signals, Hall effect signals, and thermistor signals.

### Motor Power/Brake

Designation	Size 1.0 Connector Pin Number	Size 1.5 Connector Pin Number
Phase A	1	U
Phase B	2	V
Phase C	6	W
Ground	3	±
Shield	3	±
Brake	4	+
Brake	5	-

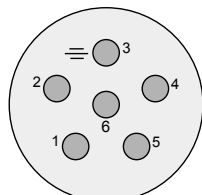
### Resolver Feedback (Order Code 41)

Designation	Motor Feedback Connector Pin Number
Sin+	2
Sin -	1
Cos+	11
Cos -	12
Ref+	14
Ref -	17
Temp	9
Temp	13

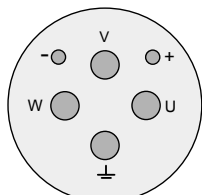
### Absolute Encoder - Heidenhain EnDat (Order Code 7D)

Designation	Motor Feedback Connector Pin Number
Vcc	14
Ground	7
CH A+	2
CH A-	1
CH B+	11
CH B-	12
Data +	15
Data -	16
Temp	13
Temp	9
Gnd	7
+5	8
CLK+	4
CLK-	5

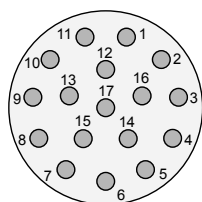
### Connector Pin Assignments



Size 1.0 Motor Connector  
# 43-024091-01  
(Mating Conn.# 43-021659-01)



Size 1.5 Motor Connector  
# 43-025366-01  
(Mating Conn.# 43-025495-01)



Feedback Connector  
# 43-025367-01  
(Mating Conn.# 43-021660-01)

### Incremental Encoder/Hall Feedback (Order Code 1E)

Encoder (or Smart Encoder) Designation	Motor Feedback Connector Pin Number
Vcc	8
Ground	7
CH A+	2
CH A-	1
CH B+	11
CH B-	12
Index + (or Data +)	15
Index - (or Data -)	16
Temperature Sensor	
Temp	13
Temp	9
Hall Gnd*	7
Hall +5*	8
Hall 1 (or CLK+)	4
Hall 2 (or CLK-)	5
Hall 3*	6

\*Not applicable with serial interface encoder  
(order code 3E)

### Absolute Encoder - Stegmann Hiperface® (Order Code 6S/9S)

Designation	Motor Feedback Connector Pin Number
Ref Sin	1
Sin +	2
Data +	5
Data-	6
Temp+	9
Cos+	11
Ref Cos	12
Temp	13
+5	14
Gnd	17



### Incremental Encoder Specifications (Order Code 1E)

Parameter	Value
Line Count	2000
Accuracy	±2 min of arc
Input power	5 VDC ±5%, 180 mA
Operating frequency	250 kHz max
Output device	26LS31
Sink/Source, nominal	20 mA
Suggested user interface	26LS32

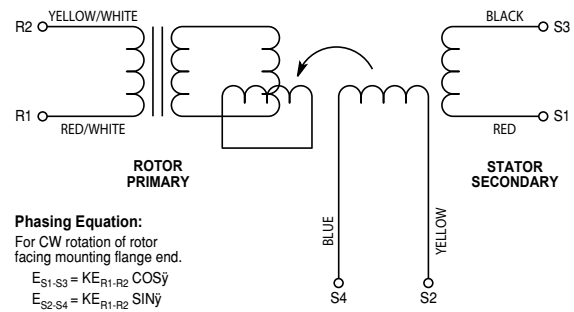
### Hall Effect Specifications

Parameter	Value
Input power	5 VDC ±5%, 80 mA
Output device - open collector	LM339
Maximum pull-up	12 VDC
Sink	16 mA

### Resolver Specifications (Order Code 41)

Parameter	Value
Input voltage @ 2 kHz	4 V rms
Input current, max	55 mA
Input power, nominal	0.045 watts
Impedance ZSO (@ 90°)	260 ohms
Impedance ZRO	150 ohms
Impedance ZRS	135 ohms
Transformation ratio	.5 ±10%
Output voltage	2.0 ±10%
DC rotor resistance	31 ±10%
DC stator resistance	126 ±10%
Sensitivity	35 mV/degree
Max error from EZ	±10 minutes
Phase shift, open circuit	20° leading ±10°
Null voltage, total	20 mV rms
Impedance ZSS	240 ohms
Inertia	incl. with motor spec.

### Resolver Schematic Diagram



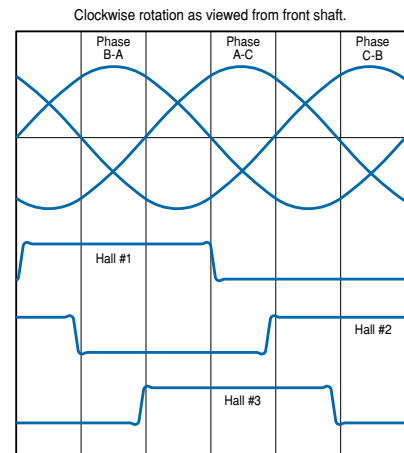
### Heidenhain Absolute Encoder Specifications (Order Code 7D)

Parameter	Multi-Turn (7D)
Absolute Position Values	
Position values/rev.	524,288 (19 bits)
Distinguishable rev.	4096 (12 bits)
Part Number	EQI 1331

### Stegmann Hiperface Absolute Encoder Specifications (Order Code 9S)

Parameter	Single-Turn (9S)	Multi-Turn (6S)
Absolute Position Values		
Position values/rev.	32768 (15 bits)	32768 (15 bits)
Distinguishable rev.	n/a	4096 (12 bits)
Part Number	SRS 50	SRM 50

### Commutation Chart



# MPW Series Servo Motors

## Electrically Released Brake

Parameter	Units	MPW092	MPW115	MPW142
Static Rated Torque	Nm (lb-in)	4.18 (37)	10.2 (90)	28.3 (250)
Coil Current @ 24 VDC	amps	0.50	0.70	1.28
Maximum Backlash	(minutes)	45	37	25
Engage/Disengage	mSec	50/20	110/25	70/50
Avg. Rotor Inertia*	Kg-M <sup>2</sup> (lb-in-s <sup>2</sup> )	0.00001 (0.00009)	0.00004 (0.00036)	0.00011 (0.00098)
Avg. Weight*	Kg (lb)	1 (2.2)	1.76 (3.89)	2.85 (6.27)

\* Consult factory for exact weights and inertia for specific motor.

\*\*Verify current capability of amplifier's brake circuitry.

## Proper MPW Venting Installation

### Vent



The vent on this motor requires tubing to be installed and routed to a dry air location to ensure IP69K sealing. Positive air pressure of 1.45psi can also be supplied through this same vent. FDA approved tube size should be 1/8 inch ID, 1/4 inch OD. If IP69K is not required replace the vent with a type 316 stainless steel pipe fitting, 1/8 inch pipe size, square head plug.

### EVA Tubing



Should be made from FDA compliant resins and USDA compliant for any food grade application.

#### Dimensions:

**1/8" ID**

**1/4" OD**

**1/16" wall thickness**

Sources can be, but are not limited to, McMaster Carr and MSC.

### Pipe Fitting



Type 316 stainless steel, 1/8 pipe size, square head plug, Class 150 low-pressure, NPT connection.

Sources can be, but are not limited to, McMaster Carr and MSC.

# MPW Ordering Information

Fill in an order code from each of the numbered fields to create a complete model order code.

## Order Example:

①	②	③	④	⑤	⑥	⑦	⑧
MPW	92	3	D	1E	- K	PS	N

①	②	③	④ Winding (VAC)		⑤	⑥	⑦	⑧
Series	Model	Stack	230	460	Feedback Type	Shaft	Connectors	Options
MPW	092	3	D	R	1E		PS	N or B
	115	3	C	R	41	K	P1	N or B
		4	B	P	7D		N	P2
	142	4	C	R	6S		Px	N or B
		6	B	P	9S			N

## Order Code Definitions:

<b>⑤ Feedback Type</b>	1E	2000-line incremental encoder
	41	Single speed resolver
	7D	Multi-turn high-resolution absolute encoder - Heidenhain EnDat*
	6S	Multi-turn high-resolution absolute encoder - Stegmann Hiperface®
	9S	Single-turn high-resolution absolute encoder - Stegmann Hiperface®
<b>⑥ Shaft</b>	N	Smooth shaft
	K	Keyway
<b>⑦ Connectors</b>	PS	Parker standard
	P1	Allen Bradley Kinetic 300 (P/N 2097 Indexing Servo Drive, Incremental Encoder)
	P2	Kollmorgen AKD (P/N P00306 Analog Amp)
	Px	See MPW product page on our website <a href="http://www.parkermotion.com">www.parkermotion.com</a>
<b>⑧ Options</b>	N	None
	B	24 volt failsafe spring brake

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