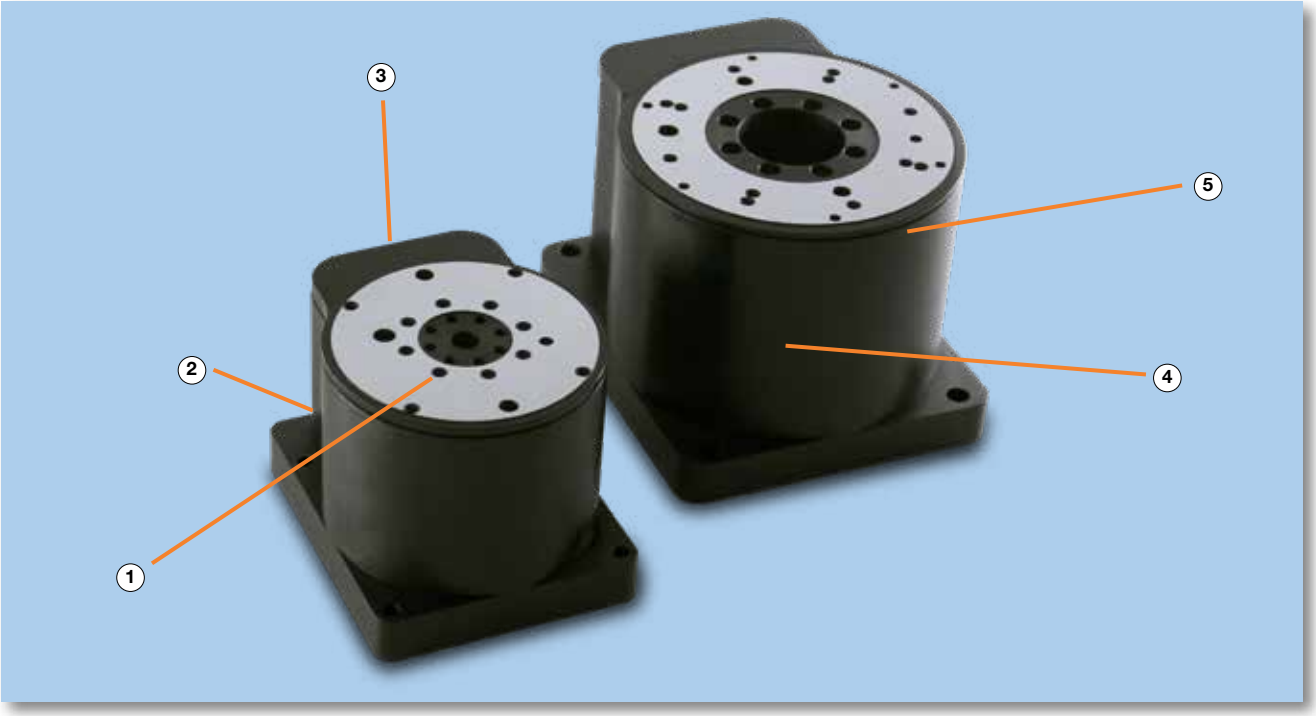
mPR Design Advantages



1 Tapped Holes and Dowel Pinning
The mPR has tapped holes in both the top and base for ease of mounting and dowel pins to ensure repeatable mounting when mounting additional tooling to the stage.

2 High Flex Cabling
The mPR uses high flex cabling as standard to ensure maximum life of the stage regardless of whether it's integrated into a multi or single axis system.

3 Integrated, Optical Linear Encoder
The mPR provides maximum versatility with three different optical digital encoder resolutions and an analog sine/cosine option. Easily change resolutions with an external interface, instead of changing the entire head.

4 Frameless Kit Motor Direct Drive
The frameless kit motor is directly integrated with the drive train to deliver reliable performance in small spaces.

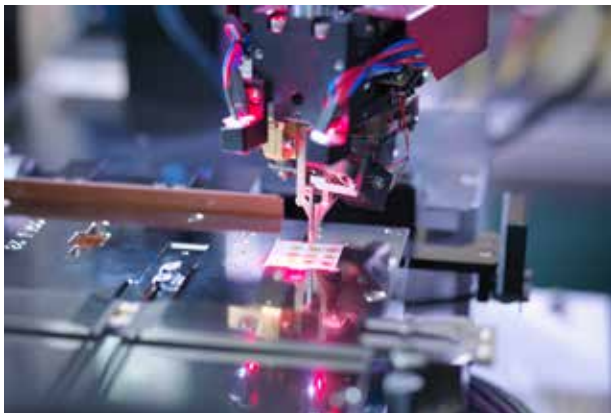
5 High Precision Crossed Roller Bearings
High performance precision-grade bearings have up to five times the life expectancy of typical ball bearings. These bearings are lubricated for the life of the product to reduce maintenance.

Standard Features

Travel	360 Degree Continuous
Motor	Frameless Direct Drive Motor (will hall Effect Device)
Feedback	Non-Contact Optical Encoder
Scale	20um Pitch Stainless Steel Ring
Resolution	1Vp-p Analog Output (see specifications) Digital Output Options (see specifications)
Sensors	Integrated Home Mark (Encoder Channel C)
Runout	Axial: < 6um available (see specifications) Radial: < 6um available (see specifications)
Bearings	High Precision Crossed Roller Bearings
Encoder Cable	High Flex, 10M Cycle, 3m length
Motor / Hall Cable	Integrated with Motor
Structure	Anodized Aluminum 6064-T6
Environment	Standard Optional: Clean Room
Temperature	0–50 degrees Celsius
Humidity	10–80% Non-Condensing

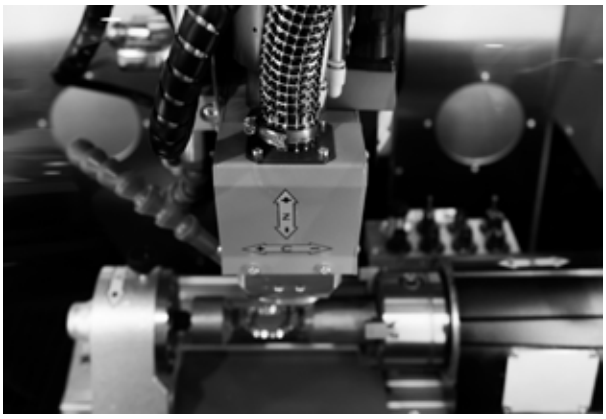
6 Clean Room Tested
Limited contact surfaces within the product make the mPR ideal for clean room applications. Higher clean room versions are available for order as custom. Contact the Parker applications engineering department for more details at 1.800.358.9070.

Application Solutions: Rotary Driven Automation Tables



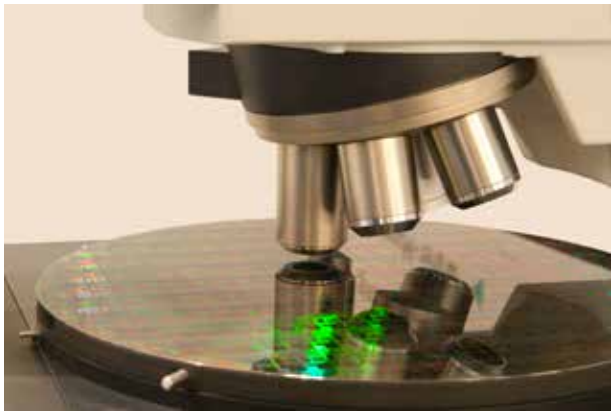
Electronics Manufacturing

The mPR is an ideal theta axis for electronics manufacturing given its combination of tight geometric performance, precision and speed. The combination of precision cross roller bearing, high resolution feedback device, and high performance servo drive make the mPR extremely responsive for high speed pick and place of miniature components for electronics manufacturing. In addition to its geometric and dynamic performance, the mPR is also very robust, as it is designed for 100% duty cycle, and lubricated for the life of the product, requiring no preventative maintenance.



Laser Machining and Laser Processing

The mPR is an excellent rotary axis for laser machining and laser processing applications given its spectacular bearing performance and smooth motion. Regardless if cutting, marking, etching or welding the mPR is an ideal rotary stage for laser processing equipment given the tight integration of slotless rotary servo motor, high resolution feedback and high precision rotary bearing. The combination of all these key design elements in the mPR will make all features in the work piece smooth and precisely positioned.



Semiconductor Manufacturing, Handling, and Metrology

The mPR in combination with other Parker precision linear axes (XR, mSR, and MX) make ideal building blocks for applications in semiconductor manufacturing, handling, and metrology. The precision and clean operation make the mPR ideal for applications for skew adjustment of the wafer. Direct mounting to the XR, mSR and MX is also very advantageous when making XY-theta systems.

Precision Metrology

The mPR makes for a spectacular rotary axis for automated metrology equipment. Smooth precise angular motion, and limited runout errors make the mPR an ideal rotary stage for optical metrology equipment measuring miniature parts or features. The compact size and ease of integration make the mPR an ideal rotary compliment to multi axis metrology systems.

SPECIFICATIONS
mPR80
(80 mm diameter profile)

The mPR80 is a miniature precision rotary stage that has been engineered to deliver a combination of modularity, flexibility, and performance in an extremely compact package.

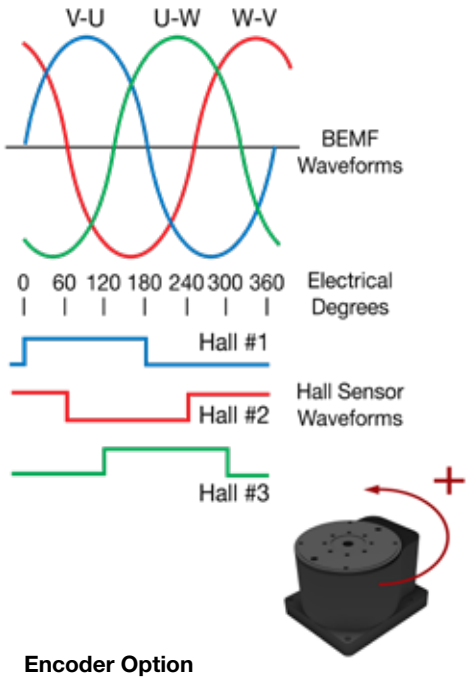
mPR mounted atop an mSR XY system.

Stage Information

Stage Mass	kg	1.45
Max Load (Axial)	kg	4.0
Max Load (Radial)	kg	4.0
Moving Mass	kg	0.54
Rotating Moment of Inertia	kg*mm^2	320

Motor Information

Stall Current	Arms	1.6
Peak Current	Arms	5.04
Voltage Constant	Vrms/krpm	13.86
Torque Constant	Nm/Arms	0.229
Resistance	Ohms	6.5
Inductance	mH	5.5
Stall Torque Continuous	Nm	0.36
Peak Torque	Nm	0.9
Max Bus Voltage	Vdc	340
Max Winding Temperature	Degree C	125
Winding Thermal Resistance	Deg C / watt	2.36
Magnet Pitch	Deg	120
Motor Thermal Time Constant	minutes	11
Motor Cable Diameter	mm	4.7
Encoder Diameter	mm	4.5
Cable Length	m	3



		Encoder Option			
Encoder Dependent Specifications		**E1**	**E2**	**E3**	**SC**
Travel	Degrees	360	360	360	360
Home Position Location	+/- Degrees	1	1	1	1
Encoder lines Per Revolution	lines / rev	11,840	11,840	11,840	11,840
Encoder Resolution	Arc-Sec	5.47	0.547	0.0547	Analog Sine/Cos
Bi-directional Repeatability	+/- Arc-Sec	11	2.5	1.25	*
Axial Runout	µm	6	6	6	6
Radial Runout	µm	6	6	6	6
Wobble	Arc-Sec	15	15	15	15
Max Velocity	RPM	600	100	10	600

* SC encoder resolution is dependent upon drive input resolution.

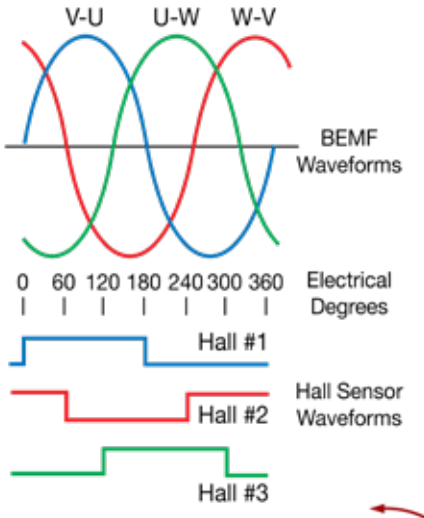
mPR100
(104 mm diameter profile)

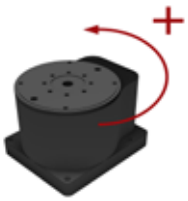
The mPR100 is a self-contained precision rotary stage, including a direct drive motor, feedback device, and precision rotary bearings.


mPR mounted atop a single axis XR.

Stage Information		
Stage Mass	kg	2.9
Max Load (Axial)	kg	12.0
Max Load (Radial)	kg	12.0
Moving Mass	kg	1.0
Rotating Moment of Inertia	kg*mm^2	1000

Motor Information		
Stall Current	Arms	3.79
Peak Current	Arms	11.95
Voltage Constant	Vrms/krpm	41.28
Torque Constant	Nm/Arms	0.68
Resistance	Ohms	3.9
Inductance	mH	8.9
Stall Torque Continuous	Nm	2.0
Peak Torque	Nm	6.2
Max Bus Voltage	Vdc	340
Max Winding Temperature	Degree C	125
Winding Thermal Resistance	Deg C / watt	1.02
Magnet Pitch	Deg	60
Motor Thermal Time Constant	minutes	28
Motor Cable Diameter	mm	7.5
Encoder Cable Diamter	mm	4.5
Cable Length	m	3





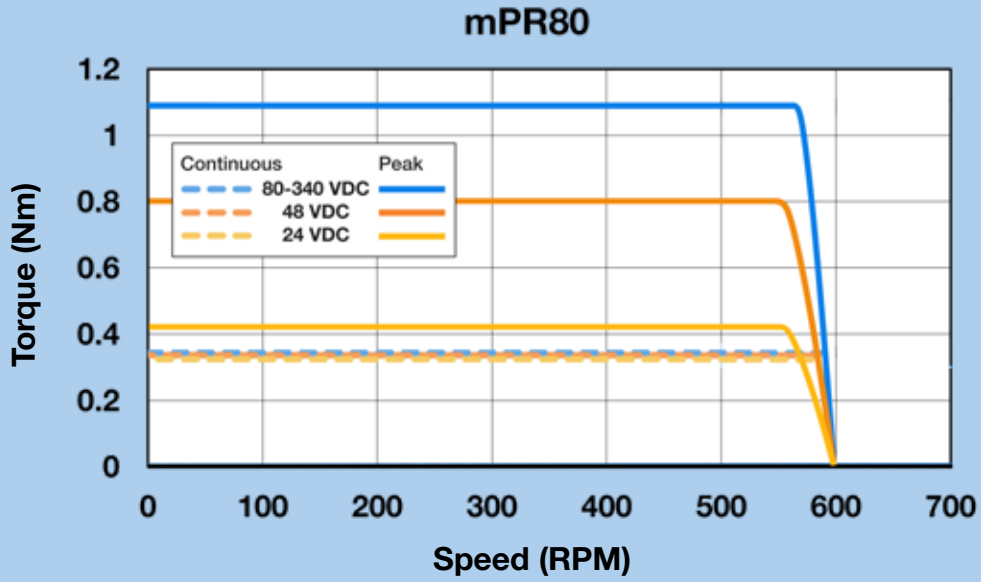
Encoder Dependent Specifications		Encoder Interpolator E1	E2	E3	SC
Travel	Degrees	360	360	360	360
Home Position Location	+/- Degrees	1	1	1	1
Encoder lines Per Revolution	lines / rev	15,744	15,744	15,744	15,744
Encoder Resolution	Arc-Sec	4.116	0.4116	0.0412	Analog Sine/Cos
Bi-directional Repeatability	+/- Arc-Sec	10	2	1	*
Axial Runout	µm	6	6	6	6
Radial Runout	µm	6	6	6	6
Wobble	Arc-Sec	12.5	12.5	12.5	12.5
Max Velocity	RPM	600	95	9.5	600

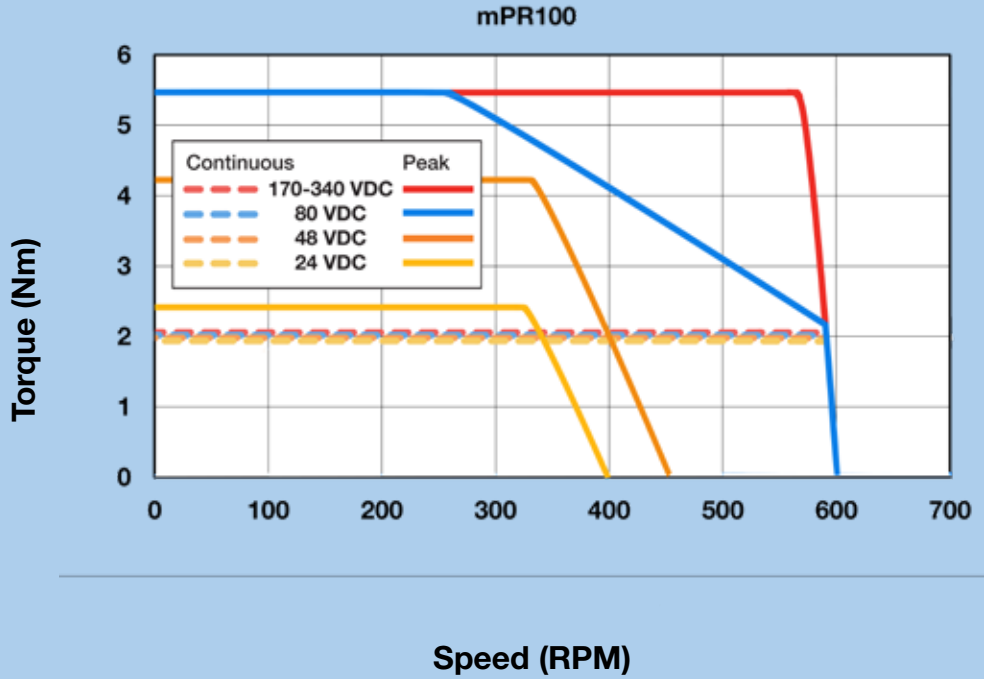
* SC encoder resolution is dependent upon drive input resolution.

Speed-Torque Performance

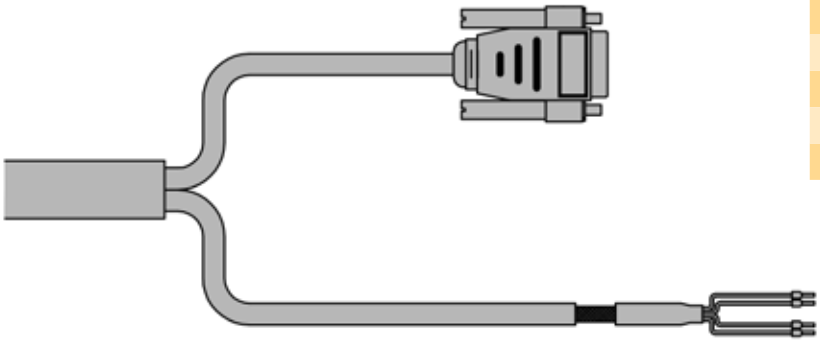
Parker MotionSizer sizing software available for free download at www.parker.com/emn.

Below are speed-torque performance curves at a variety of different bus voltages supplied to the mPR. To achieve full speed-torque performance of the motor, a bus voltage of 170–340 volts is required. ***Note: Speed is limited by encoder resolution. See specifications sheet for limits.***





Motor Hall and Power Cable Information



Male 9 Pin D-Sub

Color	Function	Pin Number
Black	Hall Power	5
White	Hall Ground	6
Yellow	H1	7
Blue	H2	8
Green	H3	9

Motor Leads

Color	Function
Red	U
Brown	V
Orange	W
Green/Yellow	Ground

Stage Wiring Encoder Information

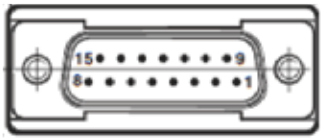
Optical Encoder (E1, E2, E3 Option)

Function	Signal	Pin #
Power	5 Volts DC	8
	Ground	2, 9
Incremental Signals	A+	14
	A-	6
	B+	13
	B-	5
Reference Mark	Z+	12
	Z-	4
Limits*	Not connected	10, 11
Setup	(Used in installation)	1
Error Output	NPN	3

Sine Cosine Encoder (SC Option)

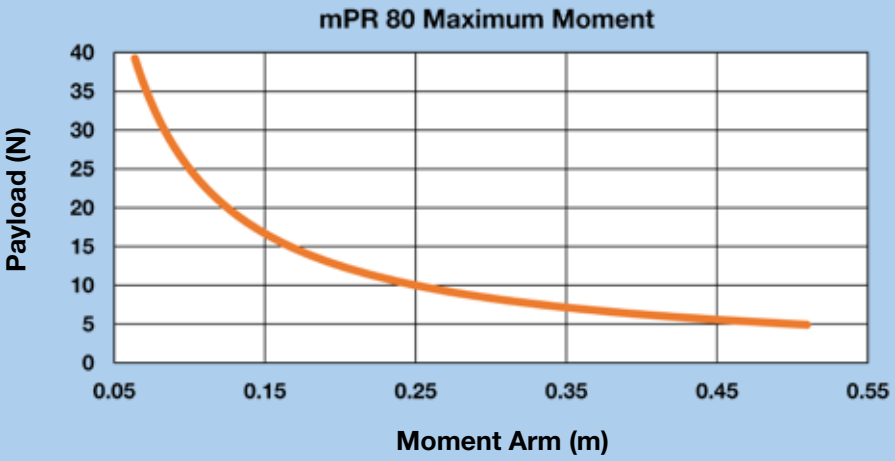
Function	Signal	Pin #
Power	5 Volts DC	4, 5
	0 Volts DC	12, 13
Incremental Signals	Cosine +	9
	Cosine -	1
	Sine +	10
	Sine -	2
Reference Mark	Z+	3
	Z-	11
Limits*	Not connected	7, 8
Setup	(Used in installation)	6
Remote Calibration	NPN	14

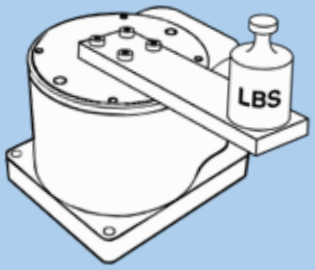
*** The mPR is not equipped with limit sensors. However, the unit's encoder system can be equipped with limit sensors "integral" to the scale. Consult the factory for more information.**

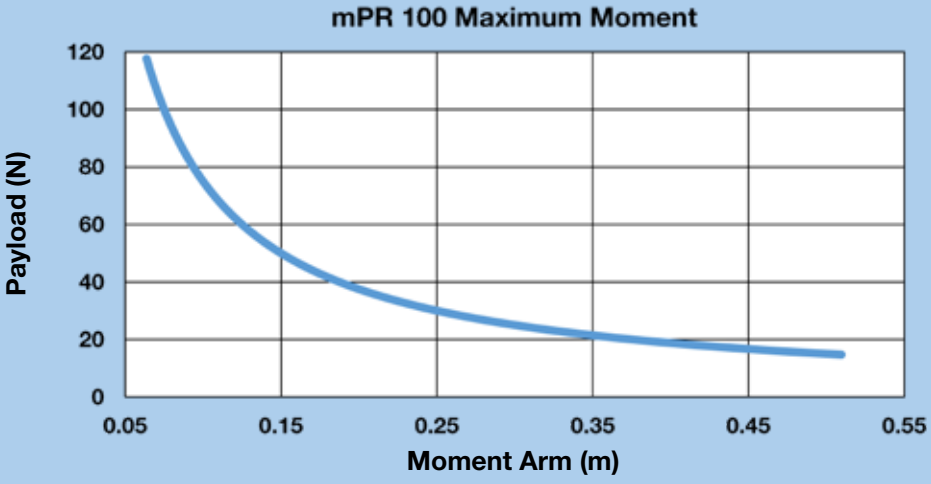


Moment Loading

Below are two plots indicating the maximum allowable moment arms at a given payload to ensure product life of 1 billion revolutions.



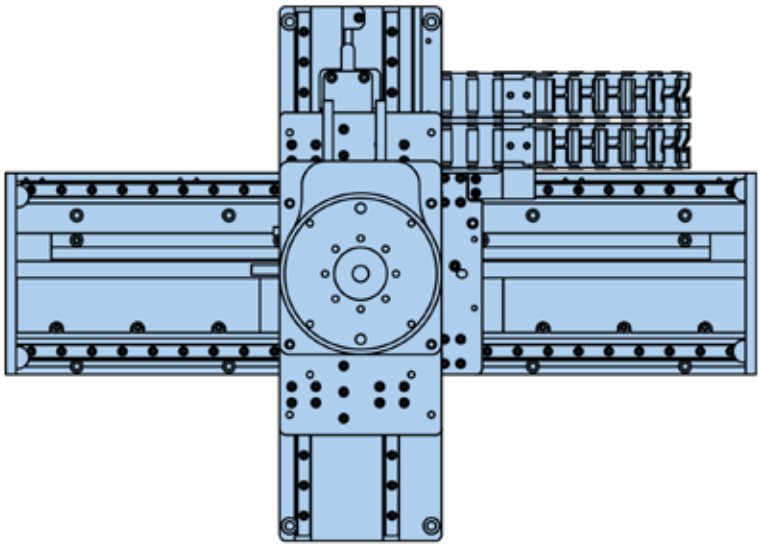




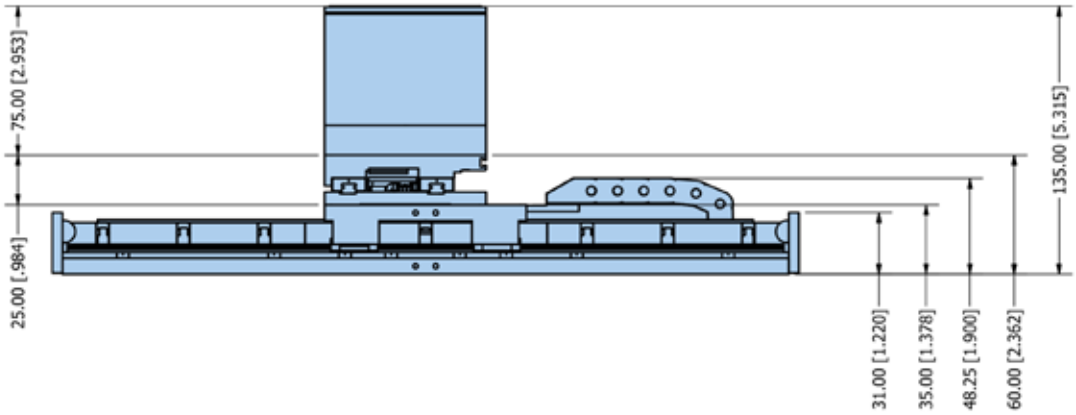
CONFIGURATIONS

mPR80 Multi-Axis Cartesian Robot Configurations

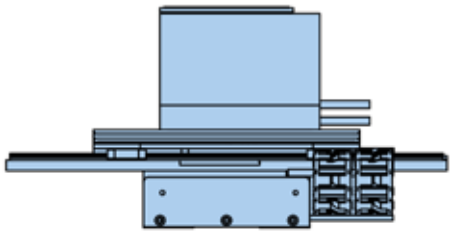
Top



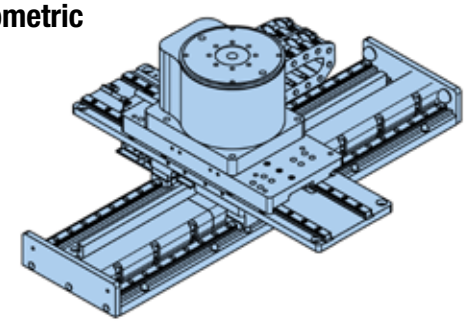
Side



Front

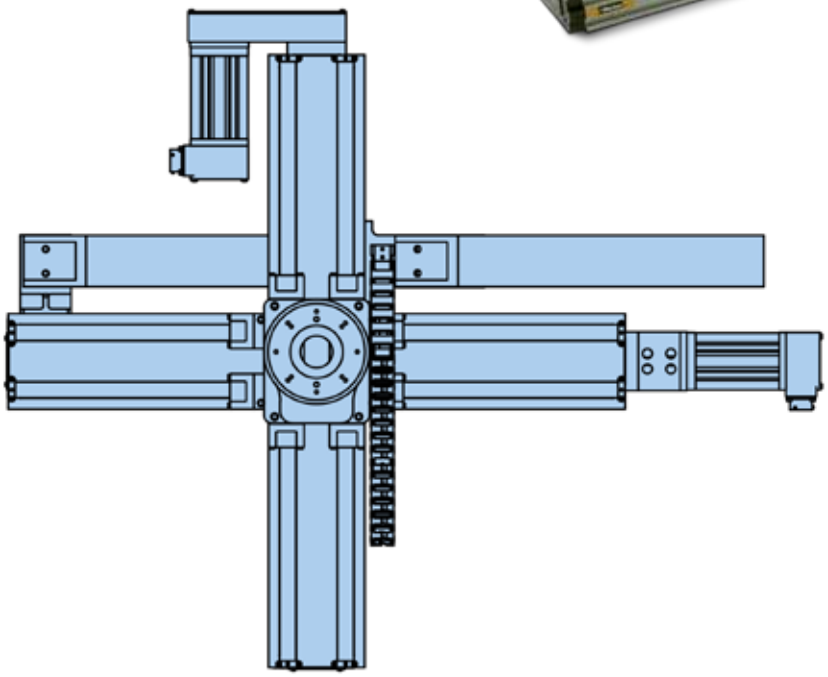


Isometric

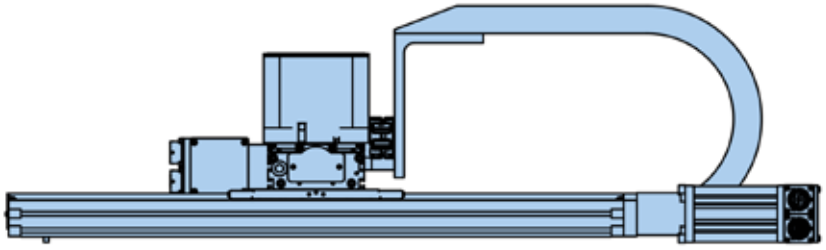


mPR100 Multi-Axis Cartesian Robot Configurations

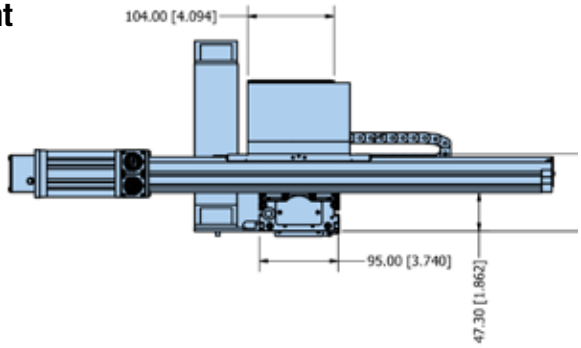
Top



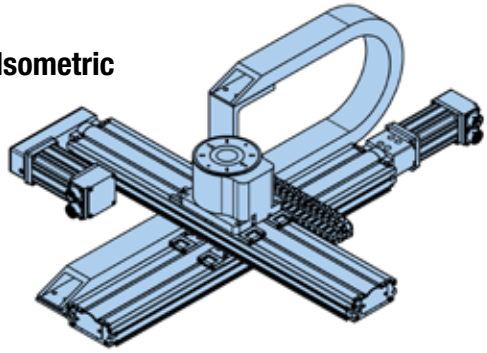
Side



Front



Isometric



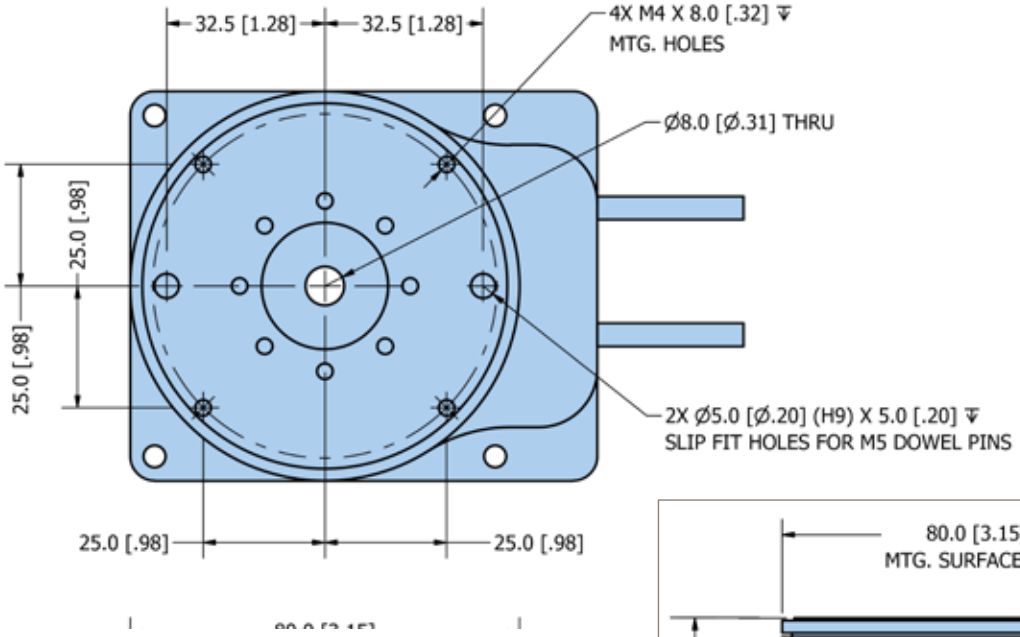
DIMENSIONS

mPR80 Dimensions

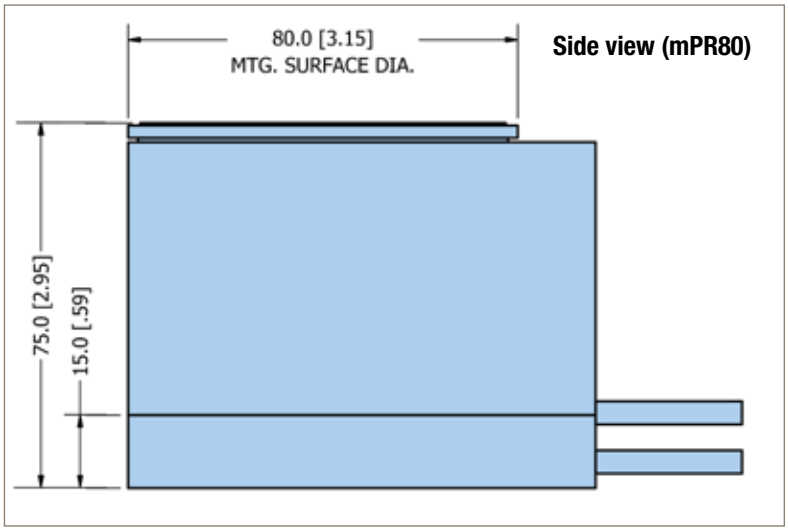
Download 2D & 3D files from www.parker.com/emn/mPR

Dimensions (mm)

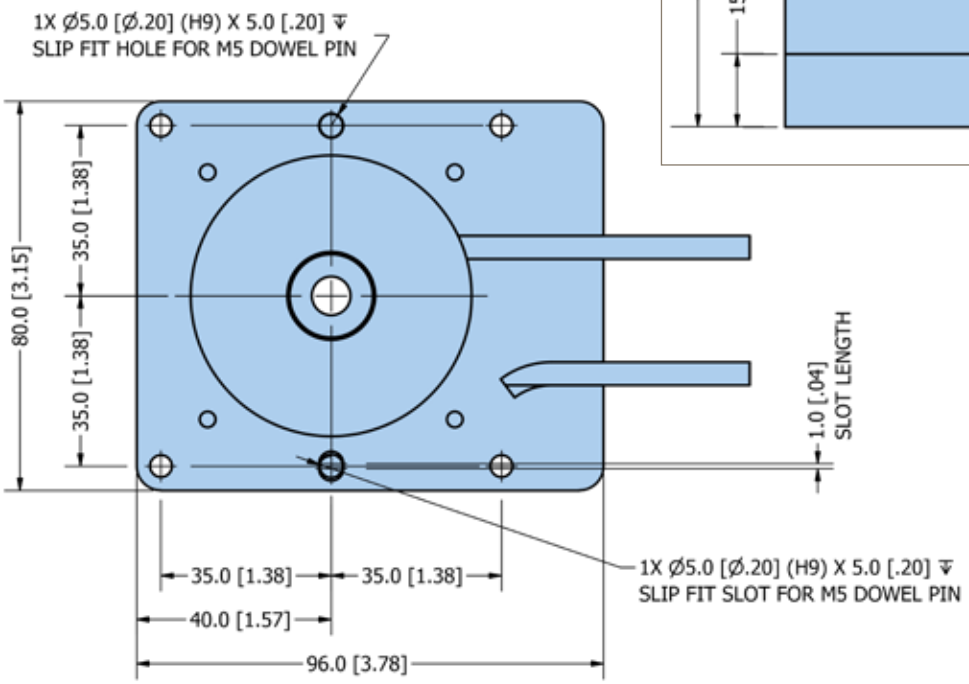
Top view (mPR80)



Side view (mPR80)

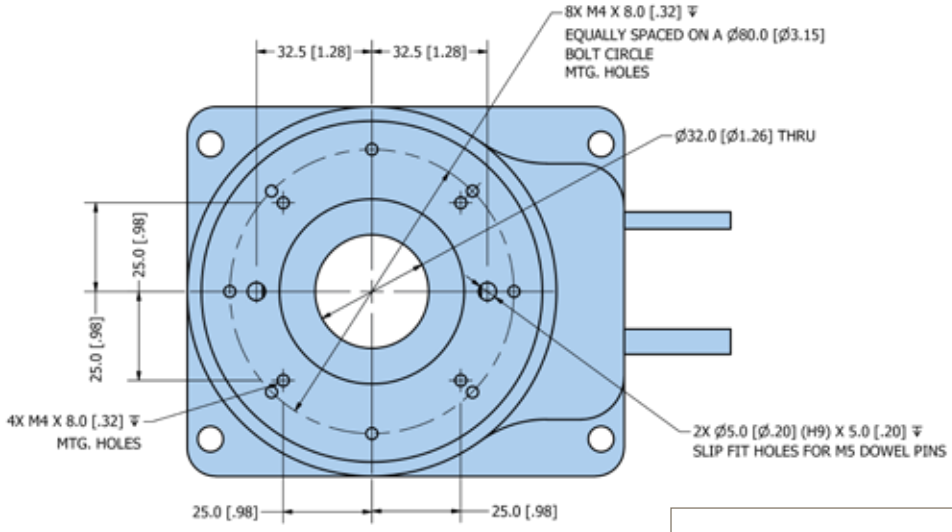


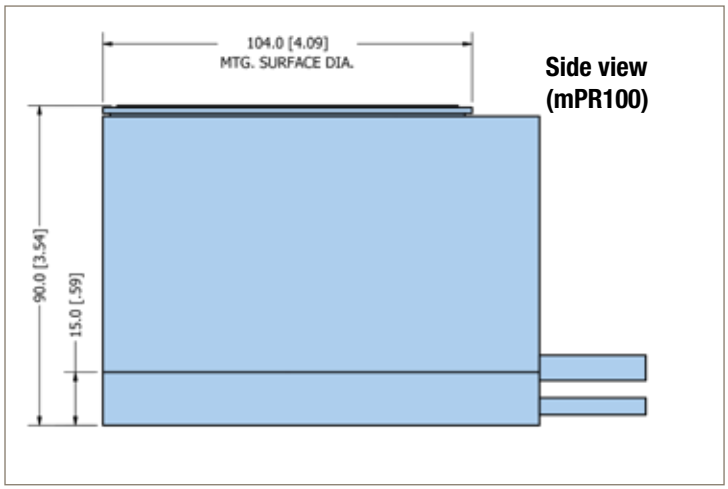
Bottom view (mPR80)



mPR100 Dimensions

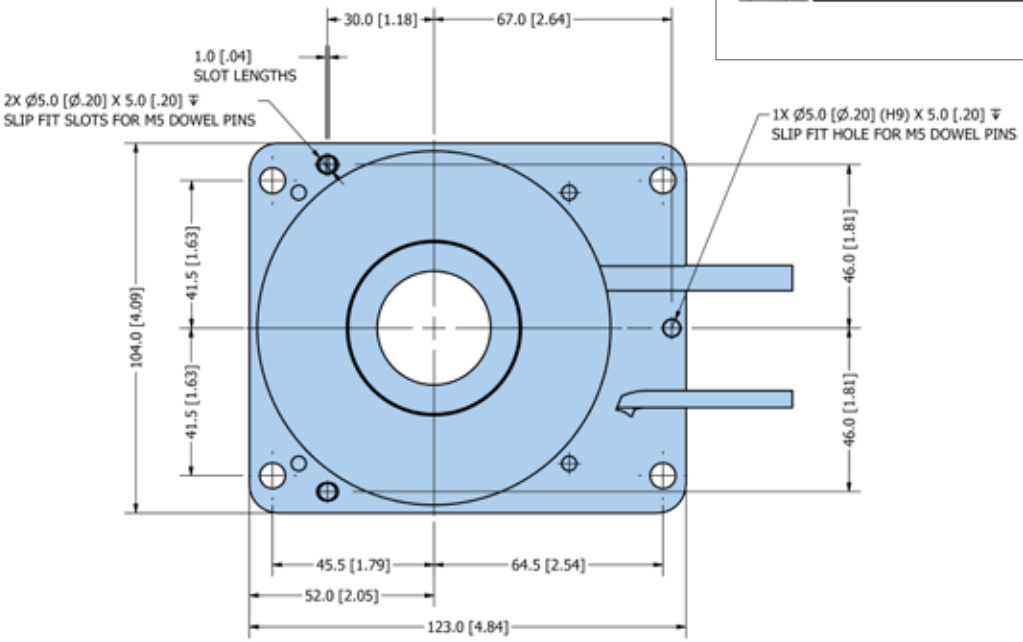
Top view (mPR100)



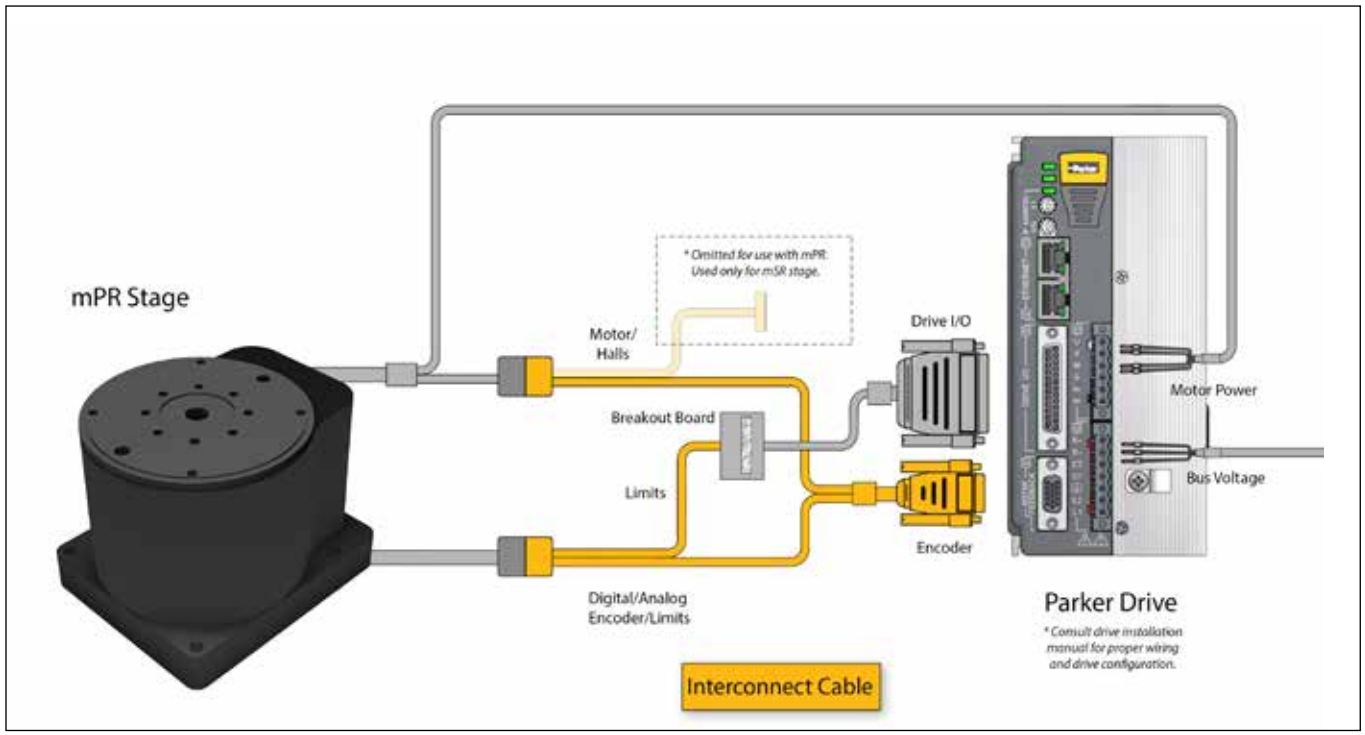


Side view (mPR100)

Bottom view (mPR100)



OPTIONS & ACCESSORIES



Parker Drives and Cable Accessory Part Numbers

Encoder Type	Drive	Cable Interconnect Part Number
Digital	IPA	006-2690-01
Analog	IPA	006-2692-01
Digital	P Series	006-2691-01
Digital/Analog	Motor Power and Hall Flying Lead	006-2678-01
Digital	Digital Encoder Flying Lead	006-2679-01
Analog	Analog Encoder Flying Lead	006-2680-01

ORDERING INFORMATION
mPR Series

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

	①	②	③	④	⑤	⑥	⑦	⑧
Order Example:	mPR	080	D	A	E2	H	3	N

① Series

mPR	

② Size

080	80mm
100	104mm

③ Drive

D	Direct

④ Motor Option

A	Standard Option

⑤ Encoder Resolution

	mPR80	**mPR100**
E1	5.47 Arc-Sec	4.116 Arc-Sec
E2	0.547 Arc-Sec	0.4116 Arc-Sec
E3	0.0547 Arc-Sec	0.0412 Arc-Sec
SC	Analog Sine/Cosine	Analog Sine/Cosine

⑥ Home

H	H

⑦ Cable Option

3	3 meter high-flex

⑧ Clean Room Option

N	Standard Class 1000
*	Consult factory for higher cleanroom options

mPR Drive Solutions

Drive/Control Solutions

The Intelligent Parker Amplifier, or IPA, is a versatile servo drive/controller based on the ACR control platform.

The IPA provides a dual port Ethernet interface which gives the machine builder the flexibility needed to create cost effective motion control solutions.

The IPA operates as a fully programmable stand-alone motion controller with on-board I/O and virtual axis capability or can be integrated into a PLC or PC-based machine control solution.

Software tools are included to optimize motion performance and efficiently monitor and manage the application.

EtherNet/IP gives IPA users a popular connectivity option to PLCs for easy integration of servo motion in larger machine control application. The IPA is an EtherNet/IP adapter device supporting both I/O and Explicit Messaging. Add-On Instructions are available for seamless integration with Logix controllers.

Drive Solutions

P Series Drive

P Series - DC version

The P-Series drives operate with a variety of machine control architectures, and offer sophisticated servo functionality. Accurate and easy to use inertia detection leads to fast set-up of tuning parameters and minimal settling time.

Advanced filtering and vibration suppression features can be used to increase throughput and improve positioning performance.

For high speed, real-time network applications, the P-Series is available with, EtherCAT, the fastest growing, most flexible industrial Ethernet protocol. Ideal for use with the Parker Automation Controller, the P-Series also follows the open standards for EtherCAT.

The Pulse version can be configured for step and direction control input and includes analog inputs for torque or velocity control. Select Indexer mode to create up to 64 position table entries triggered via inputs or over a RS422 interface.