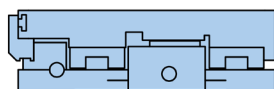
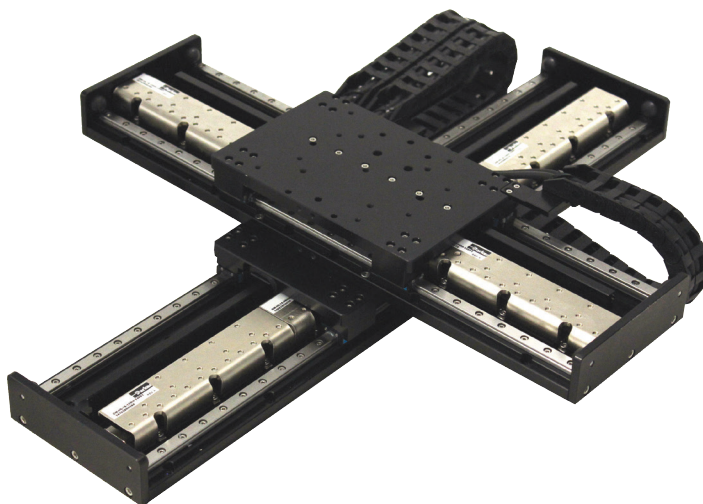


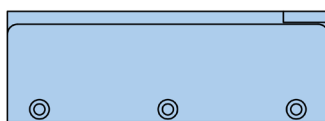
mSR Miniature Square Rail Positioner

Optimize your design and its footprint.

- Two miniature form factors: the mSR 80 measuring 80 x 25 mm, or the mSR 100 measuring 100 x 35 mm.
- Dual precision square rail bearings
- Six different linear encoder options
- Two different linear motor technologies
- Standard travel options ranging from 25 mm to 500 mm of stroke



mSR80



mSR100

HMRS08

Maximum Travel (mm)	1200
Maximum Payload (N)	1800
Maximum Acceleration (m/sec ²)	10

- Integrated and adjustable home and limit sensing
- Common tapped mounting holes and dowel locating holes
- Complete error mapping on each precision grade version – with linear slope correction value provided
- CE and RoHS compliance
- A standard magnetic counterbalance (mSR 80 - 25 mm stroke)

For instrument builders who need smooth motion in a small package, the mSR is a linear positioner that provides sub-micron level precision in two different form factors (80 and 100).

The mSR series is a precision machined, square rail bearing guided linear positioner which is driven with one of two different linear servo motor technologies, and utilizes selectable levels of linear encoder technology that are configured to match the application need.

The mSR was developed to complement the successful MX80L positioner, and allows OEM's developing equipment a number

of added layers of value, in an extremely compact package, which is easy to apply, and can be tailor-fitted to match the need regardless if one is interested in the reliability of a cost-competitive mechanically driven alternative, or a high precision positioner delivering best of breed performance – all in the same footprint.

Because of its compact, all-encompassing design, the mSR is an ideal positioning solution for applications in the life sciences. Typical applications range from imaging systems performing scanning operations to identify biological markers, to high-throughput processing of micro

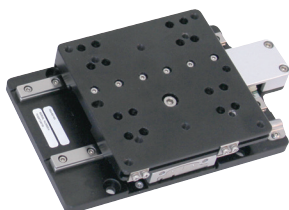
plates, to applications in cellular therapeutics requiring cell selection and high precision placement to supplement regenerative medicine techniques. Know that the mSR has been designed with typical instrument regulations and certifications in mind as all versions meet CE and RoHS requirements.

Likewise, the mSR is also ideal in application in electronics manufacturing due to its low profile and precision performance. Typical applications could range from semiconductor metrology, to wafer scribing.



The Best of Both Worlds

The mSR design has been optimized around two different linear motor technologies to best suit packaging restraints and application needs. Each of these motors has been optimized to deliver best in class performance and response.

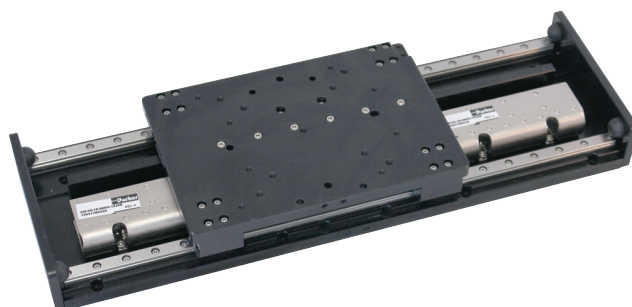
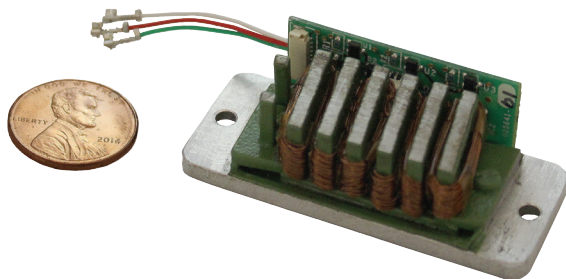


mSR80 Ironcore

Ironcore Technology Benefits

- High force per size
- Lower cost
- Excellent heat dissipation

The mSR80 uses the same ironcore linear motor technology used on the MX80L, but it allows for a wider variety of encoder technologies to be applied in a similar foot print, delivering higher performance at a lower relative cost. The mSR80 has been designed to minimize the overall packaging while still achieving MX80L level thrust.

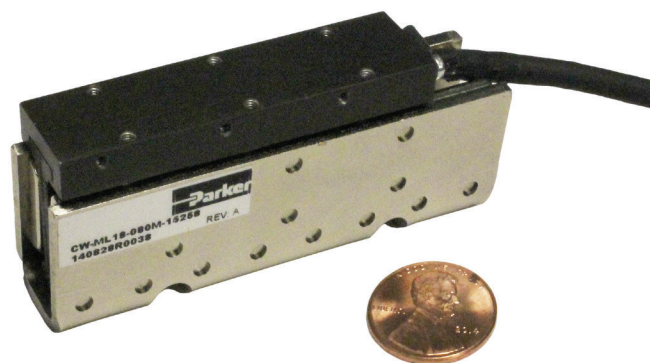


mSR100 Ironless

Ironless Technology Benefits

- No attractive forces between stator and magnet track – yielding smoother phase transitions
- No cogging
- Lower force weight

The mSR100 makes use of Parker's latest ironless linear motor, the ML18. As a result the mSR100 is ideal for applications requiring a higher load than the mSR 80, extremely smooth motion, or minimal velocity ripple. The mSR100 also allows for strokes up to 500 mm, as well as a BiSS-C absolute encoder for applications requiring constant positional information.



Within the same form factor, OEMs have two options:

- The precision grade mSR is the most accurate **standard** positioner ever made by Parker, achieving a repeatability of 100 nm and an accuracy of 5.0 microns over 50 millimeters of stroke.
- The more cost competitive standard version takes advantage of magnetic encoder technology, which is ideal for applications which do not require the same level of precision, to compete with similar ballscrew driven stages.

These positioners are ideal for a variety of applications, ranging from imaging systems in digital pathology equipment to metrology instruments in semiconductor or electronics manufacturing.

Maximize Instrument Performance — Not Its Size

The mSR (miniature square rail) positioner offers instrument builders optimized packaging of a linear motor, guidance and encoder, as well as limits and home sensors in one complete solution.

Best of Breed Encoder Technology

The mSR positioner offers instrument builders a plethora of different encoding technologies and resolutions to select from.

Standard incremental optical resolutions range from one micron all the way down to ten nanometers of resolution. This optical encoder offers exceptionally low sub-divisional errors, allowing for very tight control over velocity ripple.

The analog (sine/cosine) encoder option is an ideal way to reach high resolution when paired with controls using interpolating technology to achieve high precision and high speed.

A one micron magnetic option is ideal for cost sensitive applications requiring more basic positioning, and lastly, the mSR 100 offers a BiSS-C encoder option to give absolute feedback for applications requiring constant positional information.

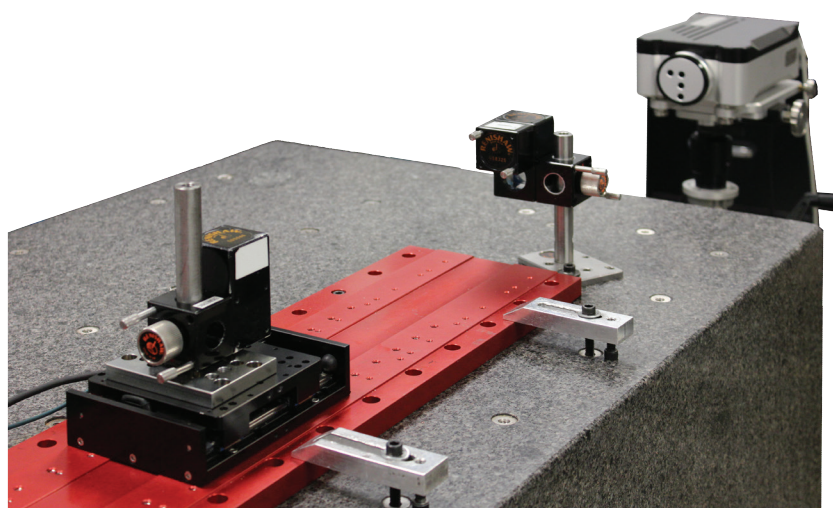
mSR Series Specifications

	Units	mSR80	mSR100
Size (W x H)	mm	80 x 25	100 x 35
Travel (Max)	mm	150	500
Normal Load (Max)	kg	8	12
Thrust (Max)			
Continuous	N	8	16.7
Peak		24	50
Acceleration (Max – no load)	G	3	3
Speed (Max – no load) ¹	mm/s	2000	3000
Rated Bus Voltage	Volts DC	48	48
Repeatability ²	µm	±0.1	±0.2
Accuracy ^{2,3}	µm	5	5
Straightness & Flatness ²	µm	±4	±4
Feedback Compatibility			
1 µm Optical (incremental)		•	•
0.1 µm Optical (incremental)		•	•
0.01 µm Optical (incremental)		•	•
Analog Sine/Cosine		•	•
1 µm Magnetic (incremental)		•	•
0.05 µm BiSS-C (absolute)			•

¹ At 48 Volt DC bus

² Precision grade version stage mounted to granite surface, 0.01 micron optical encoder, 50 mm stroke

³ Measurements taken at 35 mm above the center of the carriage, with linear slope correction

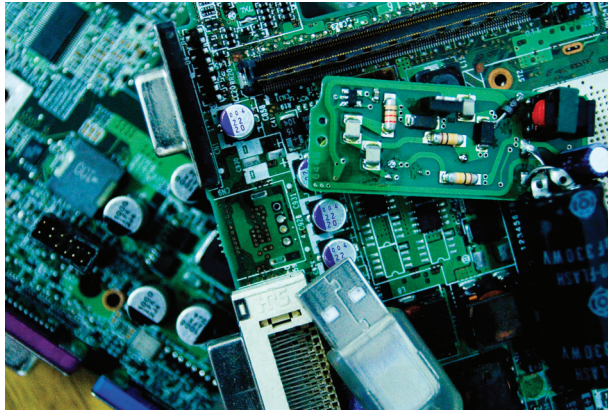


Laser Grade Precision

Every precision grade mSR is thoroughly tested with Parker's laser interferometer to ensure that it meets product specification. Parker also provides test data, with a linear slope corrected value noted, yielding higher stage accuracy with controller compensation.

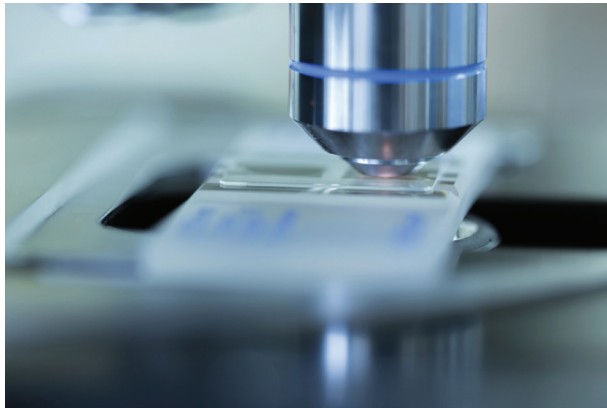
mSR Application Solutions

Electronics Manufacturing



The mSR is an ideal positioning system for high throughput electronics manufacturing equipment, as its design combines high performance linear motor technology with a variety of high resolution feedback devices for quick, precise placement of miniature components. The mSR also provides an extremely robust solution for electronics inspection systems, as its direct drive linear motor technology has been designed to stand the test of time.

Life Sciences - Digital Pathology



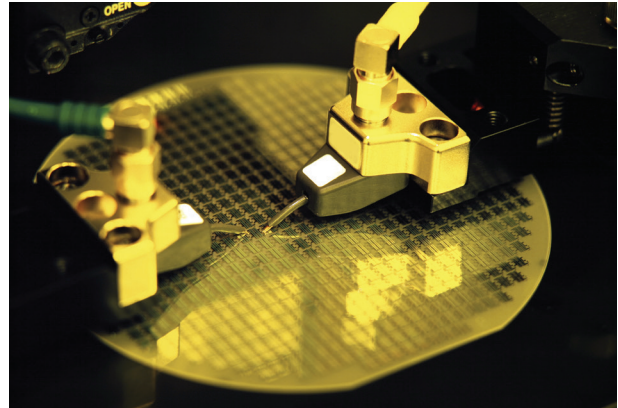
Miniature packaging, high precision performance, and quick settling times make the mSR an optimum solution for imaging instruments used in digital pathology. With limited wear components the mSR is a durable stage that will minimize the risk of machine downtime.

Life Sciences - Cellular Therapeutics

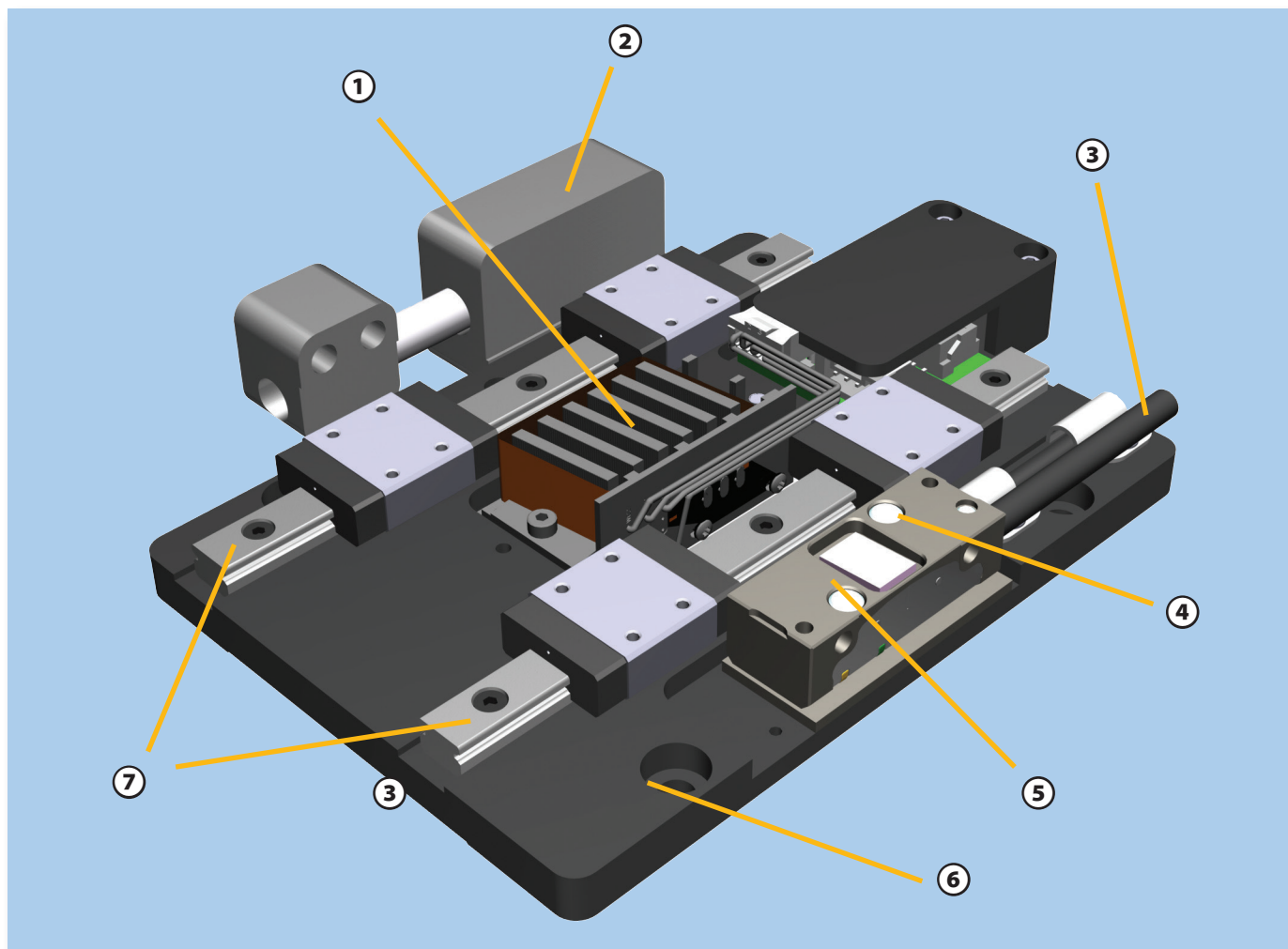


With the emergence of cellular therapeutics, the mSR provides a high precision, miniature means of picking and placing cells for cell therapy instruments. These instruments require highly repeatable positioning to pick cells of interest and incubate them for future cell based therapies.

Semiconductor Handling and Metrology



Given the combination of its superior geometric performance and miniature packaging, the mSR series positioner is ideal for semiconductor handling and metrology applications. Regardless of whether you are examining features on the micro or nano-scale, the mSR can be adapted to meet the need with its wide array of encoder options. The mSR also offers a stroke scalable mechanical solution with standard designs up to 500 mm.



- ① Center Driven Ironcore Linear Motor**
The mSR80 offers both a 4 and 8 pole ironcore linear motor based upon the application thrust requirements. Each of these motors have been optimized to operate on 48 Volts DC.

- ② An Optional Magnetic Counterbalance**
The mSR80 with 25 mm stroke has an optional magnetic counterbalance that can be used for Z axis applications. The magnetic counter balance is a more robust solution when compared to spring or pneumatic driven alternatives.

- ③ High Flex Cabling**
The mSR 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.

- ④ Integrated and Adjustable Home and Limit Sensing**
Home and limit sensors have been integrated into the mSR80 encoder read head, and signals are passed through the same cable, minimizing the amount of cables requiring cable management

- ⑤ Five Different Linear Encoder Technologies**
The mSR80 provides maximum versatility with three different optical encoder resolutions (1, 0.1, and 0.01 micron), an analog sine/cosine option as well as an economical 1 micron magnetic option.

- ⑥ Tapped Holes and Dowel Pinning**
The mSR has tapped holes in both the top and base for ease of mounting and dowel pins to ensure repeatable mounting when configuring XY systems made with mSR positioners.

- ⑦ Dual Precision Square Rails**
Two precision aligned square rail bearings support the payload and provide superior straightness and flatness.

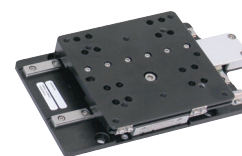
CE and RoHS Compliance
The mSR conforms to both CE and RoHS directives as standard.



SPECIFICATIONS

SPECIFICATIONS

The mSR series of miniature, dual square rail guided, linear motor positioners have been engineered to deliver a combination of modularity, flexibility, and performance in an extremely compact package.



		Travel (mm)				
Specification	Units	25	35	50	100	150
Max. Load	kg (lb)	4 (9)	4 (9)	8 (18)	8 (18)	8 (18)
Peak Thrust	N (lb)	12 (2.7)	12 (2.7)	24 (5.4)	24 (5.4)	24 (5.4)
Continuous Thrust	N (lb)	4 (0.9)	4 (0.9)	8 (1.8)	8 (1.8)	8 (1.8)
Duty Cycle (Acceleration and Load Dependent)	%	100				
Acceleration (Unloaded)	G	3				
Straightness & Flatness	Standard Grade	μm	±6	±8	±10	±15
	Precision Grade	μm	±3	±4	±5	±10
Carriage Mass	kg	0.2365	0.2365	0.3065	0.4115	0.519
Stage Mass	kg	0.525	0.5815	0.7395	1.0665	1.403

Magnetic Encoder – 1 Micron Resolution

Max. Speed	mm/s	1100	1500	2000	2000	2000
Bi-Directional Repeatability	μm	±5.0				
Positional Accuracy	μm	40	40	60	80	80

Optical Encoder – 1 Micron Resolution

Max. Speed	mm/s	1100	1500	2000	2000	2000
Bi-Directional Repeatability	μm	±2.0				
Positional Accuracy	μm	9	9	9	11	13
Positional Accuracy (Slope Corrected)	μm	5	6	6	6	7

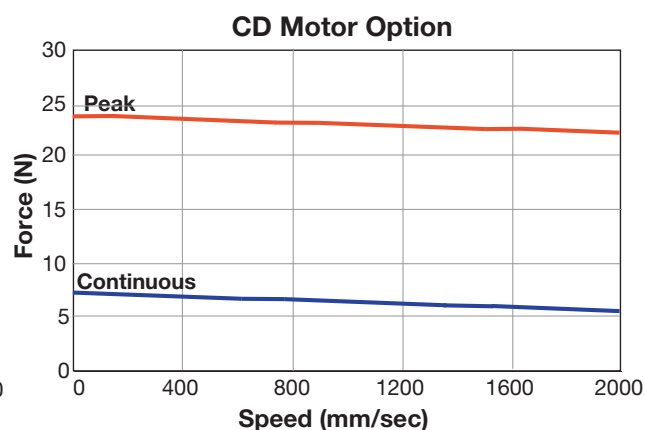
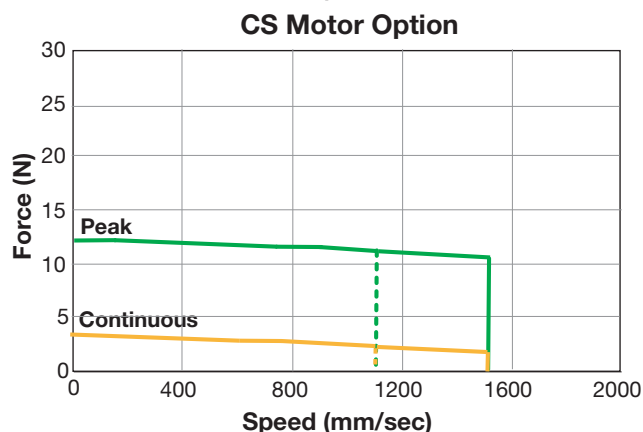
Optical Encoder – 0.1 Micron Resolution

Max. Speed	mm/s	300	300	300	300	300
Bi-Directional Repeatability	μm	±0.3				
Positional Accuracy	μm	8	8	8	10	12
Positional Accuracy (Slope Corrected)	μm	4	5	5	5	6

Optical Encoder – 0.01 Micron Resolution

Max. Speed	mm/s	30	30	30	30	30
Bi-Directional Repeatability	μm	±0.1				
Positional Accuracy	μm	8	8	8	10	12
Positional Accuracy (Slope Corrected)	μm	4	5	5	5	6

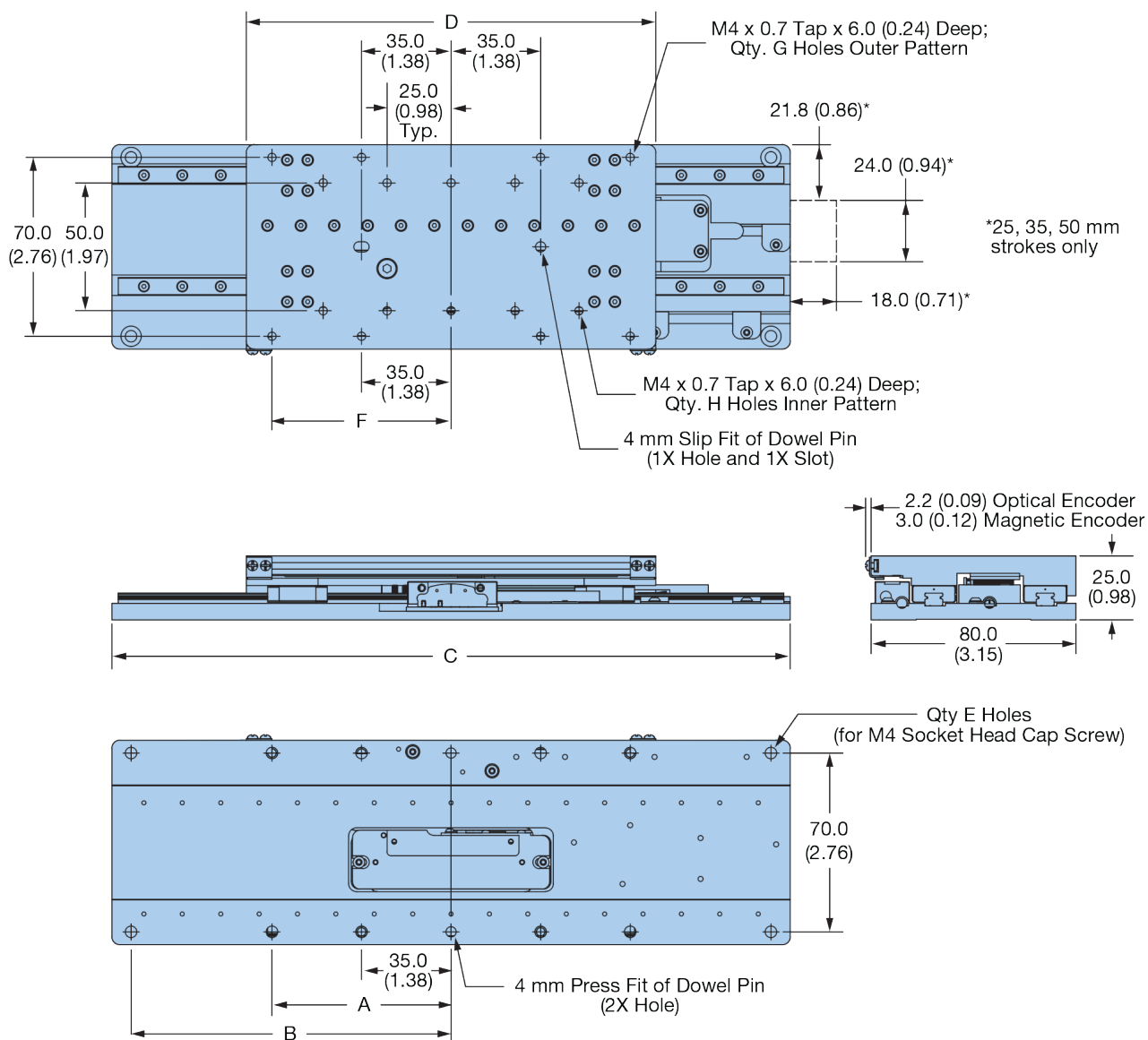
mSR80 Force/Speed Performance



DIMENSIONS

DIMENSIONS

Dimensions – mm (in)



Dimensions – mm (in)

Travel (mm)	A	B	C	D	Qty. E	F	Qty. G	Qty. H
25	—	—	110 (4.33)	80	4	—	4	6
35	—	—	120 (4.72)	80	4	—	4	6
50	70 (2.76)	—	165 (6.50)	110 (4.33)	8	—	4	6
100	70 (2.76)	125 (4.92)	265 (10.43)	160 (6.30)	12	70 (2.76)	8	10
150	100 (3.94)	175 (6.89)	365 (14.37)	210 (8.27)	12	100 (3.94)	8	14

Free sizing and selection support
from Virtual Engineer at
parker.com/VirtualEngineer



mSR Motor Information

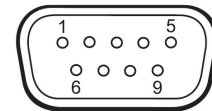
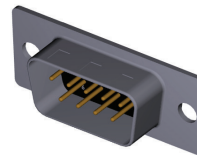
Motor Specifications	Units	mSR80		mSR100	
		4 Pole (CS Option)	8 Pole (CD Option)	3 Pole (LS Option)	5 Pole (LD Option)
Magnetic Pitch	mm	13	13	40	40
Continuous Force ¹	N	4	8	11	16.7
Peak Force	N	12	24	33	50
Continuous Current ¹	A (rms)	0.8	1.6	1.2	2.18
Peak Current ^{2,3}	A (rms)	2.4	4.8	3.5	6.5
Voltage Constant ^{2,3}	Volts/m/s	4.5	4.5	7.7	6.3
Force Constant ²	N/A (rms)	5.51	5.51	9.4	7.65
Resistance ²	Ohms	8.8	4.3	6.3	2.82
Inductance ⁴	mH	2.4	1.6	1	0.5
Max Bus Voltage	VDC	48	48	48	48
Rated/Max Winding Temperature	Degrees C	25/95	25/95	25/125	25/125
Thermal Resistance <small>(winding to case)</small>	C/Watt	3.68	1.32	1.6	0.92
Thermal Resistance <small>(case to ambient)</small>	C/Watt	3.16	2.08	3.9	2.64
Winding Thermal Time Constant	Minutes	0.5	0.5	1.3	0.8
Motor Thermal Time Constant	Minutes	0.8	0.8	15	10

¹ @ 25° C ambient

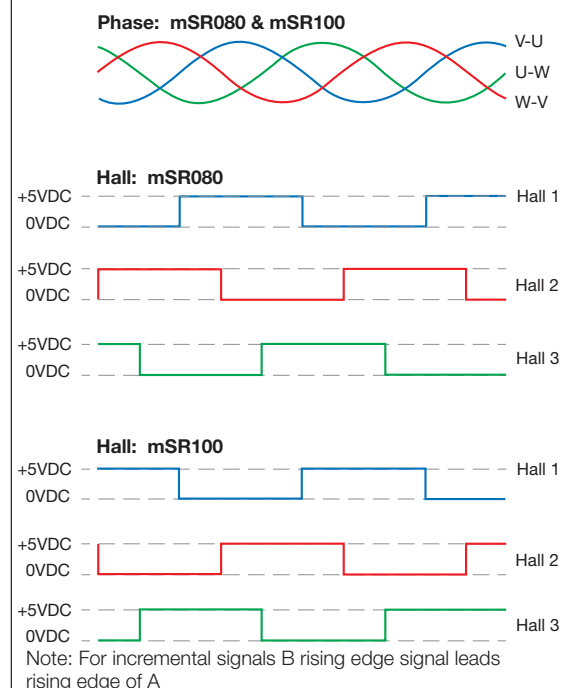
² Measured line to line

³ Value is measured peak of sine

⁴ ±30% Line-to-Line, induction bridge measurement @ 1 KHz

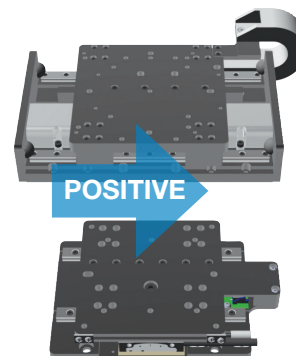


Phase/Encoder/Hall Signals While Moving in the Positive Direction



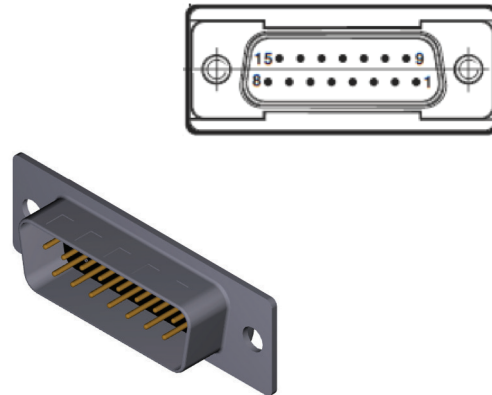
Motor and Hall Wiring

Function	Color	Pin #
Motor Phase U	Red	1
Motor Phase V	Brown	2
Motor Phase W	Orange	3
PE Ground	Green/Yellow	4
Hall Power (+5 Volts DC)	Black	5
Hall Ground	White	6
Hall 1	Yellow	7
Hall 2	Blue	8
Hall 3	Green	9



Optical Encoder

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	Positive Limit	11
	Negative Limit	10
Setup	(Used in installation)	1
Error Output	NPN	3



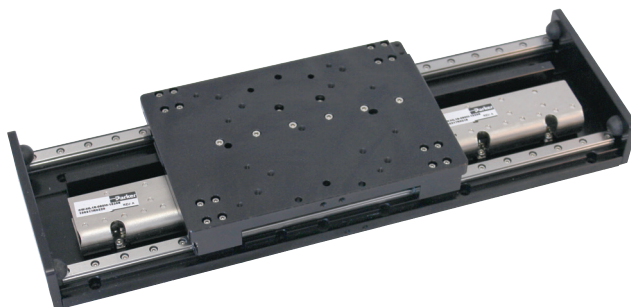
Sine Cosine Encoder

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	Positive Limit	7
	Negative Limit	8
Setup	(Used in installation)	6
Remote Calibration	NPN	14

Magnetic Encoder

Function	Signal	Pin #
Power	5 Volts DC	8
	Ground	9
Incremental Signals	A +	14
	A -	6
	B +	13
	B -	5
Reference Mark	Z+	12
	Z-	4
Limits	Positive Limit	11
	Negative Limit	10
Home	NPN	2
Error Output	NPN	3

BiSS-C Absolute Encoder (mSR100 only)



Function	Signal	Color
Power	5 Volts DC	Brown
	Ground	Green White
Serial Communications	MA+	Violet
	MA-	Yellow
	SLO+	Grey
	SLO-	Pink
Shield	Inner shield	-
	Outer	Case

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



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.

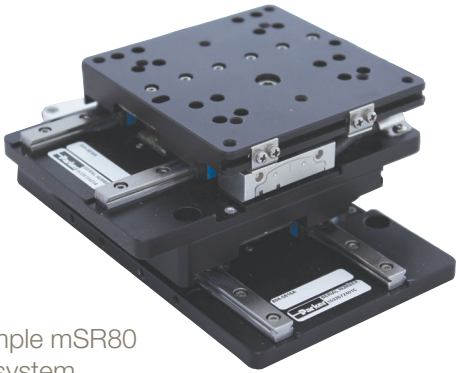
The Pulse version can be configured for step and direction control input and includes analog inputs for torque or velocity control. Select Indexer mode to create up to 64 position table entries triggered via inputs or over an RS422 interface.

Parker Drives and Cable Accessory Part Numbers

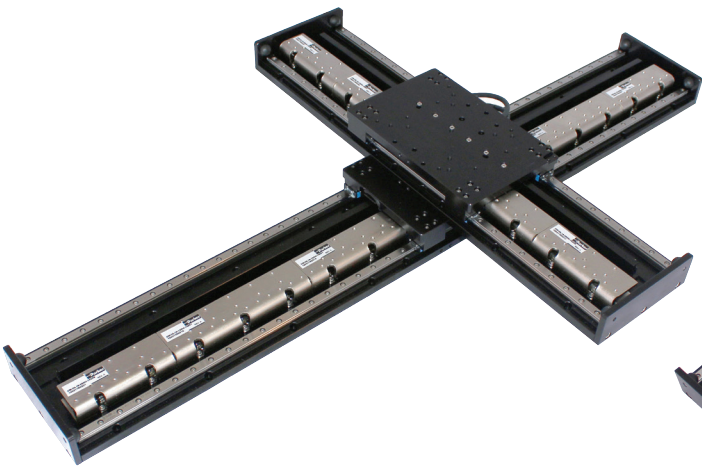
Encoder Type	Drive	Cable Interconnect Part Number
Digital	IPA	006-2690-01
Analog	IPA	006-2692-01
Digital	P Series	006-2691-01
Digital/Analog	Motor Power and Hall Flying Lead	006-2678-01
Digital	Digital Encoder Flying Lead	006-2679-01
Analog	Analog Encoder Flying Lead	006-2680-01

Multi-axis Systems

The mSR series was designed to be highly modular, such that it can easily be configured into multi-axis systems made out of other mSR or MX80L positioners, as the mSR80 uses the same bolt pattern. Since the entire mSR series was designed with this common hole pattern in mind, X-Y systems can be developed without the need for an additional transition plate.



Example mSR80 X-Y system



mSR100 X-Y standard orientation

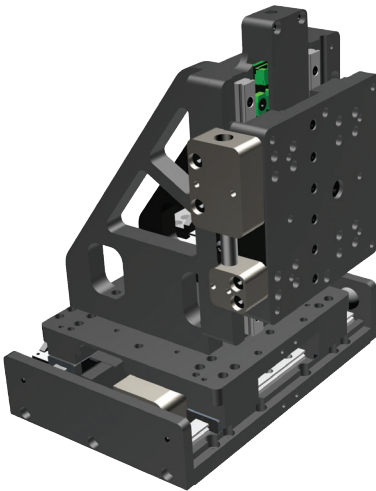


mSR100 X-Y carriage-to-carriage direct mount orientation

The mSR100 was designed such that it can be configured into two different X-Y orientations: one reflecting a standard X-Y design and the other with the carriages mounted directly to one another. If you choose to develop your machine with the carriage-to-carriage approach, the Y axis cable carrier is eliminated.

The mSR100 is also populated with mounting holes to mount an mSR80 directly to it so that X-Y, X-Z or X-Y-Z systems can be created with any combination of the mSR80 and mSR100. Pictured here is the mSR80 with a standard Z bracket.

mSR100 X with mSR80 Z including magnetic counterbalance



Z-Axis Brackets

mSR80 & mSR100	Part Number
25, 35, and 50 mm	002-2238-01
100 & 150 mm	002-2240-01

ORDERING INFORMATION

mSR80

ORDERING INFORMATION

Fill in an order code from each of the numbered fields to create a complete part number

Order Example:

①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
MSR	080	L	050	P	CD	E3	H1	L1	CM01	X0	

① Series

MSR Series

② Size (width in mm)

080 80 mm wide profile

③ Drive Train

L Linear Motor Drive

④ Stroke Length (mm)

025 25 mm

035 35 mm

050 50 mm

100 100 mm

150 150 mm

⑤ Grade

P Precision

S Standard

⑥ Motor

CS Ironcore, single (25 and 35 mm travels only)

CD Ironcore, double (50, 100, and 150 mm travels only)

⑦ Encoder

E1 1µm optical incremental*

E2 0.1µm optical incremental*

E3 0.01µm optical incremental*

SC Sine/Cosine*

M1 1µm magnetic incremental**

*Available on precision grade only

**Available on standard grade only

⑧ Home Sensor

H1 Home Sensor (M1 Option), Index Mark (E1, E2, E3, and SC Options)

⑨ Limit Sensor

L1 End-of-travel limit sensors

⑩ Cable Options

CM01 No cable management, 1 meter

CM03 No cable management, 3 meter

⑪ Other Options

X0 No counter balance

X1 Magnetic counterbalance* (0.5 N)

X2 Magnetic counterbalance* (2.0 N)

X3 Magnetic counterbalance* (3.0 N)

X4 Magnetic counterbalance* (3.5 N)

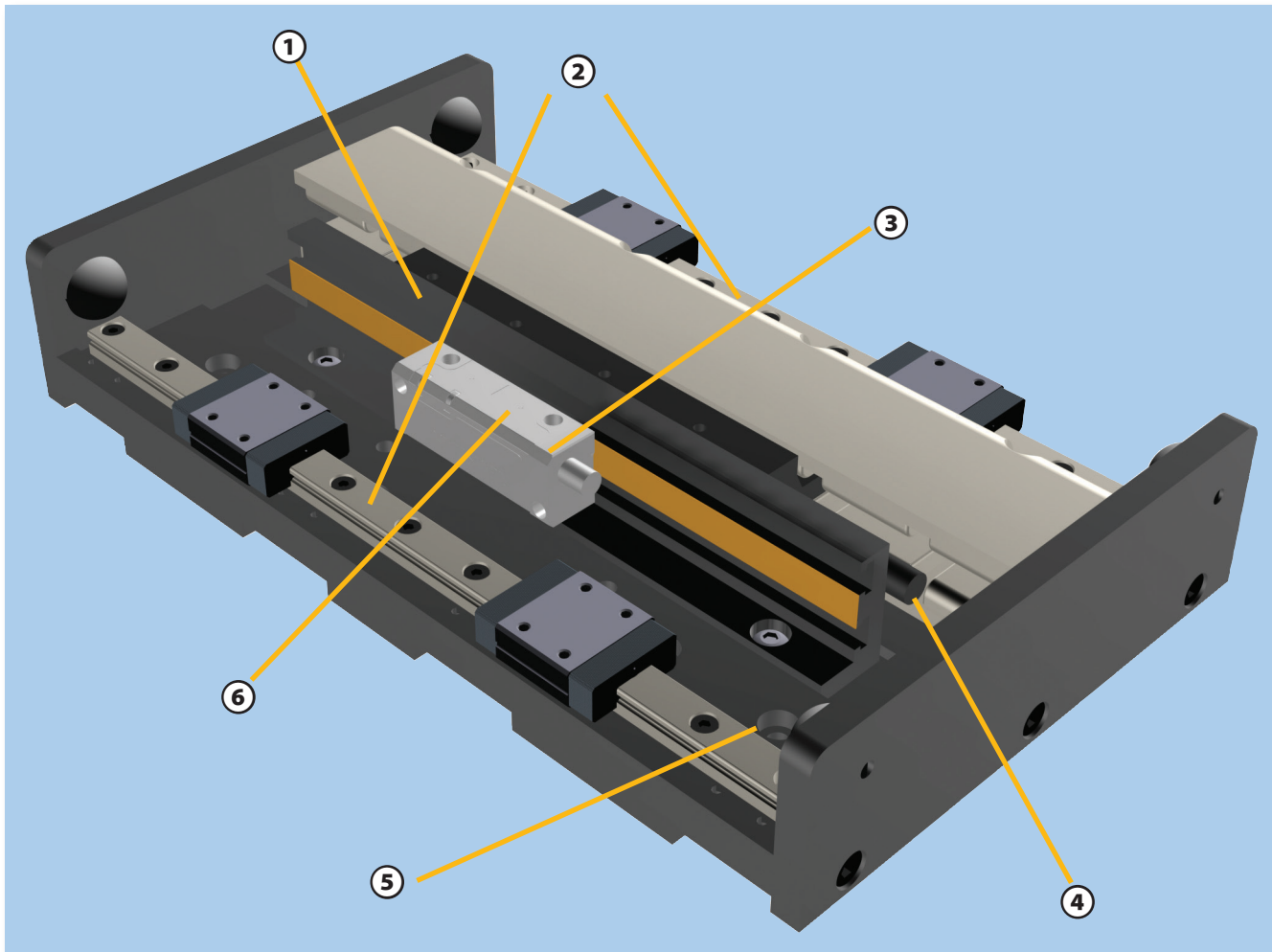
X5 Magnetic counterbalance* (4.3 N)

X6 Magnetic counterbalance* (6.3 N)

*Available on 25 mm stroke only

Free sizing and selection support
from Virtual Engineer at
parker.com/VirtualEngineer





- ① **Center Driven Ironless Linear Motor**
The mSR100 offers both a 3 and 5 pole ironless linear motor (mL18) — space based upon the application thrust requirements. Each of these motors have been optimized to operate on 48 Volts DC.
- ② **Dual Precision Square Rails**
Two precision aligned square rail bearings to support the payload and provide superior straightness and flatness.
- ③ **Integrated Home and Limit Sensing**
Home and limit sensors have been integrated into the mSR100 encoder read head, and signals are passed through the same cable, minimizing the amount of cables requiring cable management.
- ④ **High Flex Cabling**
The mSR 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.

- ⑤ **Tapped Holes and Dowel Pinning**
The mSR has tapped holes in both the top and base for ease of mounting, and dowel pins to ensure repeatable mounting when configuring XY systems made with mSRs.

- ⑥ **Six Different Linear Encoder Technologies**
The mSR100 provides maximum versatility with three different optical encoder resolutions (1, 0.1, and 0.01 micron), an analog sine/cosine option as well as an economical 1 micron magnetic option. The mSR100 also offers a BiSS-C, 0.05 micron absolute encoder option for application that require constant positional feedback.

CE and RoHS Compliance

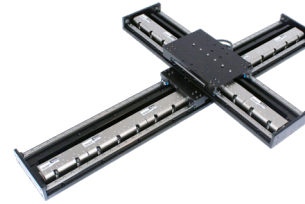
The mSR conforms to both CE and RoHS directives as standard.



SPECIFICATIONS

SPECIFICATIONS

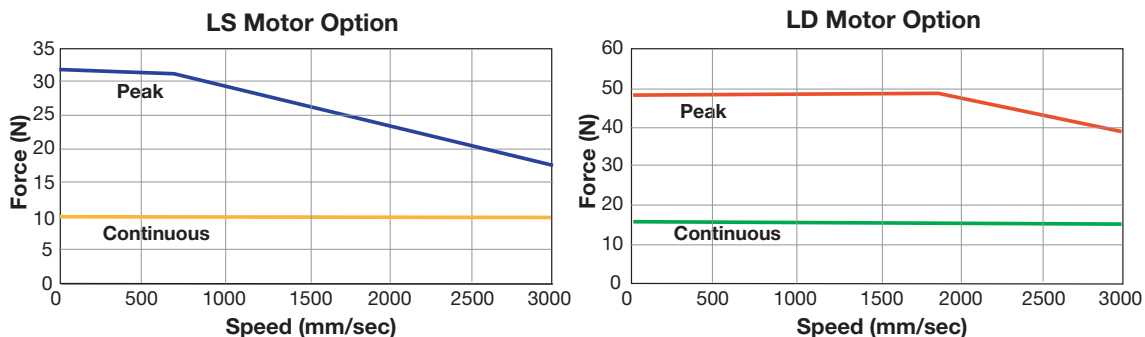
The mSR series of miniature, dual square rail guided, linear motor positioners have been engineered to deliver a combination of modularity, flexibility, and performance in an extremely compact package.



		Travel (mm)											
		Units	25 (LS)	50 (LS)	50 (LD)	100 (LS)	100 (LD)	150 (LS)	150 (LD)	200 (LS)	200 (LD)	250 (LS)	250 (LD)
Maximum Load		kg (lb)	12 (26.5)	12 (26.5)	12 (26.5)	12 (26.5)	12 (26.5)	12 (26.5)	12 (26.5)	12 (26.5)	12 (26.5)	12 (26.5)	12 (26.5)
Peak Thrust		N (lb)	33 (7.4)	33 (7.4)	50 (11.2)	33 (7.4)	50 (11.2)	33 (7.4)	50 (11.2)	33 (7.4)	50 (11.2)	33 (7.4)	50 (11.2)
Continuous Thrust		N (lb)	11 (2.5)	11 (2.5)	16.7 (3.75)	11 (2.5)	16.7 (3.75)	11 (2.5)	16.7 (3.75)	11 (2.5)	16.7 (3.75)	11 (2.5)	16.7 (3.75)
Duty Cycle (Acceleration & Load Dependent)		%	100										
Acceleration (Unloaded)		G	3										
Straightness & Flatness	Standard Grade	μm	±5	±5	±5	±8	±8	±8	±8	±8	±8	±10	±10
	Precision Grade		±3	±3	±3	±4	±4	±4	±4	±4	±4	±5	±5
Carriage Mass		kg	0.34	0.34	0.46	0.34	0.46	0.34	0.46	0.34	0.46	0.34	0.46
Stage Mass		kg	1.06	1.21	1.57	1.45	1.80	1.68	2.03	1.91	2.35	2.23	2.59

Specification	Units	Travel (mm)									
		300 (LS)	300 (LD)	350 (LS)	350 (LD)	400 (LS)	400 (LD)	450 (LS)	450 (LD)	500 (LS)	500 (LD)
Maximum Load	kg (lb)	12 (26.5)	12 (26.5)	12 (26.5)	12 (26.5)	12 (26.5)	12 (26.5)	12 (26.5)	12 (26.5)	12 (26.5)	12 (26.5)
Peak Thrust	N (lb)	33 (7.4)	50 (11.2)	33 (7.4)	50 (11.2)	33 (7.4)	50 (11.2)	33 (7.4)	50 (11.2)	33 (7.4)	50 (11.2)
Continuous Thrust	N (lb)	11 (2.5)	16.7 (3.75)	11 (2.5)	16.7 (3.75)	11 (2.5)	16.7 (3.75)	11 (2.5)	16.7 (3.75)	11 (2.5)	16.7 (3.75)
Duty Cycle (Acceleration & Load Dependent)	%	100									
Acceleration (Unloaded)	G	3									
Straightness & Flatness	Standard Grade										
	Precision Grade										
	μm	±10	±10	±12	±12	±16	±16	±20	±20	±20	±20
	μm	±5	±5	±6	±6	±8	±8	±10	±10	±12	±12
Carriage Mass	kg	0.34	0.46	0.34	0.46	0.34	0.46	0.34	0.46	0.34	0.46
Stage Mass	kg	2.47	2.82	2.7	3.05	2.93	3.37	3.25	3.6	3.48	3.84

mSR100 Force/Speed Performance



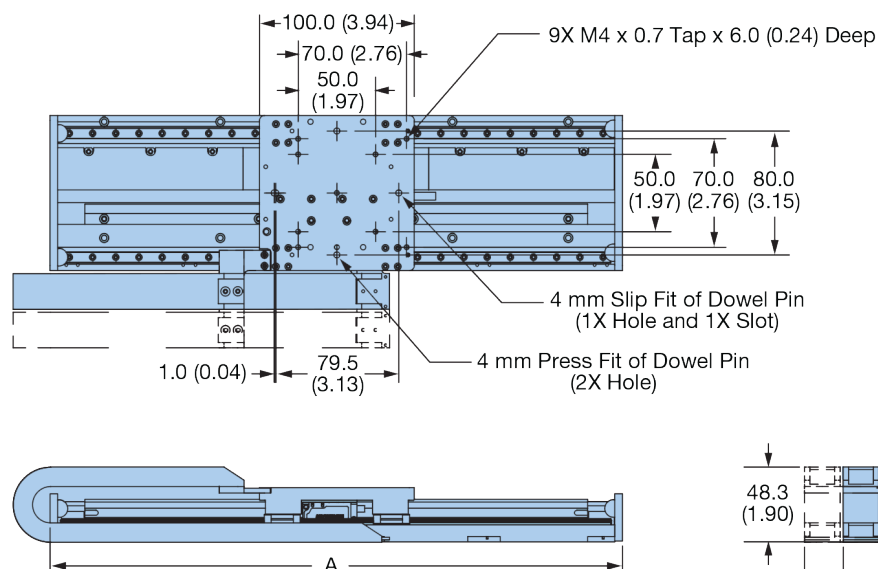
mSR100 Specifications (Travel & Encoder Dependent)

Specification	Units	Travel (mm)										
		25 (LS)	50 (LS)	50 (LD)	100 (LS)	100 (LD)	150 (LS)	150 (LD)	200 (LS)	200 (LD)	250 (LS)	250 (LD)
Magnetic Encoder – 1 Micron Resolution												
Max. Speed	mm/s	1100	1500	3000	3000	3000	3000	3000	3000	3000	3000	3000
Bi-directional Repeatability	μm	±5.0										
Positional Accuracy	μm	40	40	40	80	80	80	80	100	100	100	100
Optical Encoder – 1 Micron Resolution												
Max. Speed	mm/s	1100	1500	3000	3000	3000	3000	3000	3000	3000	3000	3000
Bi-directional Repeatability	μm	±2.0										
Positional Accuracy	μm	10	10	10	10	10	10	10	12	14	14	14
Positional Accuracy (Slope Corrected)	μm	6	6	6	6	6	7	7	7	7	8	8
Optical Encoder – 0.1 Micron Resolution												
Max. Speed	mm/s	300	300	300	300	300	300	300	300	300	300	300
Bi-directional Repeatability	μm	±0.4										
Positional Accuracy	μm	9	9	9	9	9	9	9	11	11	13	13
Positional Accuracy (Slope Corrected)	μm	5	5	5	5	5	6	6	6	6	7	7
Optical Encoder – 0.01 Micron Resolution												
Max. Speed	mm/s	30	30	30	30	30	30	30	30	30	30	30
Bi-directional Repeatability	μm	±0.2										
Positional Accuracy	μm	8	8	8	8	8	8	8	10	10	12	12
Positional Accuracy (Slope Corrected)	μm	4	4	4	4	4	5	5	5	5	6	6
BiSS-C Absolute Encoder – 0.05 Micron Resolution												
Max. Speed	mm/s	1100	1500	3000	3000	3000	3000	3000	3000	3000	3000	3000
Bi-directional Repeatability	μm	±0.4										
Positional Accuracy	μm	9	9	9	9	9	9	9	11	11	13	13
Positional Accuracy (Slope Corrected)	μm	5	5	5	5	5	6	6	6	6	7	7

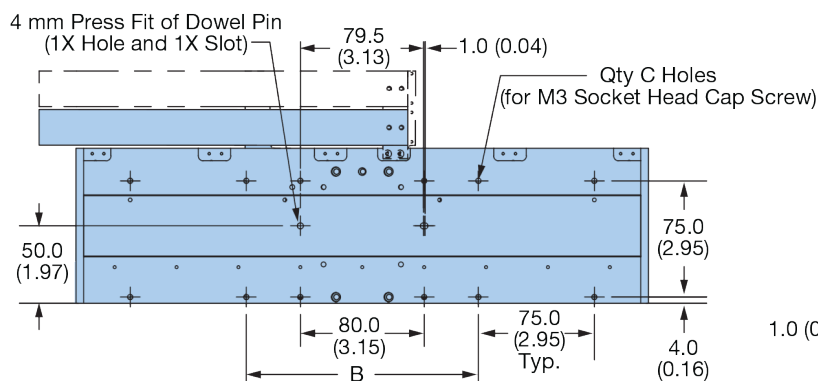
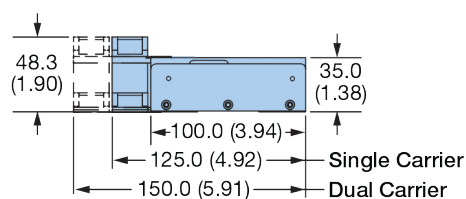
mSR100 Specifications (Travel & Encoder Dependent)

Specification	Units	Travel (mm)									
		300 (LS)	300 (LD)	350 (LS)	350 (LD)	400 (LS)	400 (LD)	450 (LS)	450 (LD)	500 (LS)	500 (LD)
Magnetic Encoder – 1 Micron Resolution											
Max. Speed	mm/s	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
Bi-directional Repeatability	μm	±5.0									
Positional Accuracy	μm	100	100	100	100	100	100	100	100	100	100
Optical Encoder – 1 Micron Resolution											
Max. Speed	mm/s	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
Bi-directional Repeatability	μm	±2.0									
Positional Accuracy	μm	16	16	18	18	20	20	22	22	24	24
Positional Accuracy (Slope Corrected)	μm	8	8	9	9	9	9	10	10	10	10
Optical Encoder – 0.1 Micron Resolution											
Max. Speed	mm/s	300	300	300	300	300	300	300	300	300	300
Bi-directional Repeatability	μm	±0.4									
Positional Accuracy	μm	15	15	17	17	19	19	21	21	23	23
Positional Accuracy (Slope Corrected)	μm	7	7	8	8	8	8	9	9	9	9
Optical Encoder – 0.01 Micron Resolution											
Max. Speed	mm/s	30	30	30	30	30	30	30	30	30	30
Bi-directional Repeatability	μm	±0.2									
Positional Accuracy	μm	14	14	16	16	18	18	20	20	22	22
Positional Accuracy (Slope Corrected)	μm	6	6	7	7	7	7	8	8	8	8
BiSS-C Absolute Encoder – 0.05 Micron Resolution											
Max. Speed	mm/s	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
Bi-directional Repeatability	μm	±0.4									
Positional Accuracy	μm	15	15	17	17	19	19	21	21	23	23
Positional Accuracy (Slope Corrected)	μm	7	7	8	8	8	8	9	9	9	9

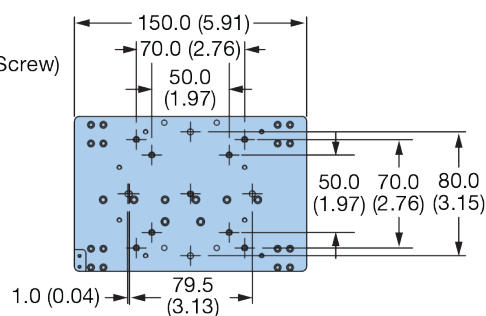
DIMENSIONS



Dimensions – mm (in)



Dimensions – mm (in)



LD Option

Travel (mm)

LS Option	LD Option	A	B	Qty. C
25	—	145 (5.71)	100 (3.94)	8
50	—	170 (6.69)	125 (4.92)	8
100	50	220 (8.66)	150 (5.91)	8
150	100	270 (10.63)	200 (7.87)	8
200	150	320 (12.60)	125 (4.92)	8
250	200	370 (14.57)	150 (5.91)	12
300	250	420 (16.54)	200 (7.87)	12
350	300	470 (18.50)	125 (4.92)	12
400	350	520 (20.47)	150 (5.91)	12
450	400	570 (22.44)	200 (7.87)	16
500	450	620 (24.41)	125 (4.92)	16
—	500	670 (26.38)	150 (5.91)	16

OPTIONS & ACCESSORIES

mSR Motor Information

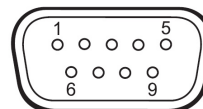
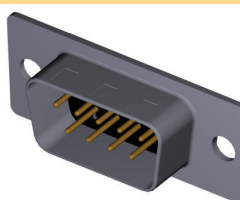
Motor Specifications	Units	mSR80		mSR100	
		4 Pole (CS Option)	8 Pole (CD Option)	3 Pole (LS Option)	5 Pole (LD Option)
Magnetic Pitch	mm	13	13	40	40
Continuous Force ¹	N	4	8	11	16.7
Peak Force	N	12	24	33	50
Continuous Current ¹	A (rms)	0.8	1.6	1.2	2.18
Peak Current ^{2,3}	A (rms)	2.4	4.8	3.5	6.5
Voltage Constant ^{2,3}	Volts/m/s	4.5	4.5	7.7	6.3
Force Constant ²	N/A (rms)	5.51	5.51	9.4	7.65
Resistance ²	Ohms	8.8	4.3	6.3	2.82
Inductance ⁴	mH	2.4	1.6	1	0.5
Max Bus Voltage	VDC	48	48	48	48
Rated/Max Winding Temperature	Degrees C	25/95	25/95	25/125	25/125
Thermal Resistance _(winding to case)	C/Watt	3.68	1.32	1.6	0.92
Thermal Resistance _(case to ambient)	C/Watt	3.16	2.08	3.9	2.64
Winding Thermal Time Constant	Minutes	0.5	0.5	1.3	0.8
Motor Thermal Time Constant	Minutes	0.8	0.8	15	10

¹ @ 25° C ambient

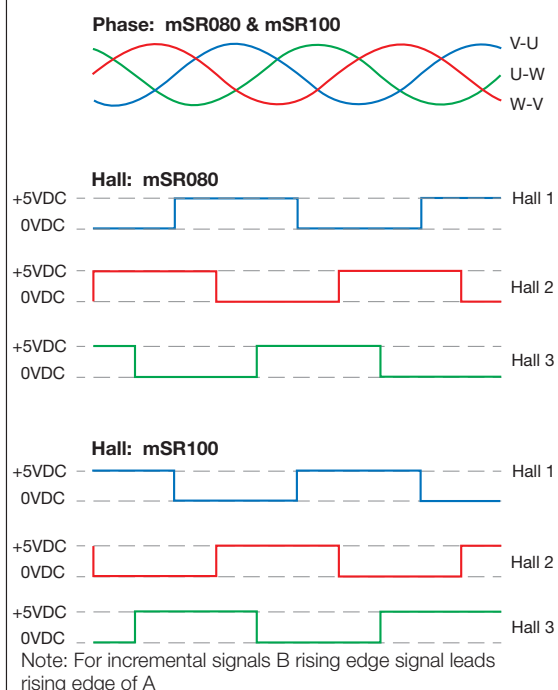
² Measured line to line

³ Value is measured peak of sine

⁴ ±30% Line-to-Line, induction bridge measurement @ 1 KHz

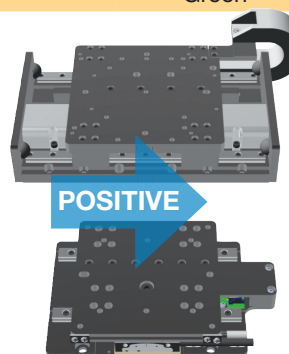


Phase/Encoder/Hall Signals While Moving in the Positive Direction



Motor and Hall Wiring

Function	Color	Pin #
Motor Phase U	Red	1
Motor Phase V	Brown	2
Motor Phase W	Orange	3
PE Ground	Green/Yellow	4
Hall Power (+5 Volts DC)	Black	5
Hall Ground	White	6
Hall 1	Yellow	7
Hall 2	Blue	8
Hall 3	Green	9



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.

Drivel Solutions



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.

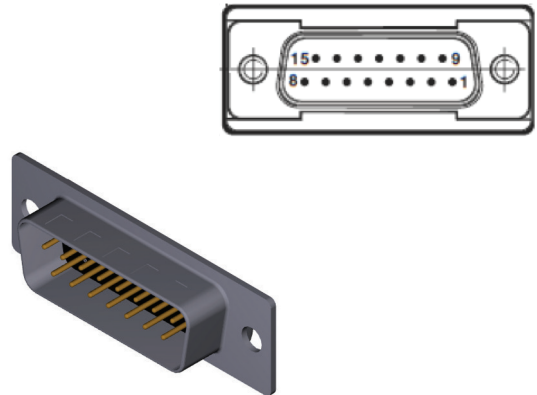
The Pulse version can be configured for step and direction control input and includes analog inputs for torque or velocity control. Select Indexer mode to create up to 64 position table entries triggered via inputs or over a RS422 interface.

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

Optical Encoder

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	Positive Limit	11
	Negative Limit	10
Setup	(Used in installation)	1
Error Output	NPN	3



Sine Cosine Encoder

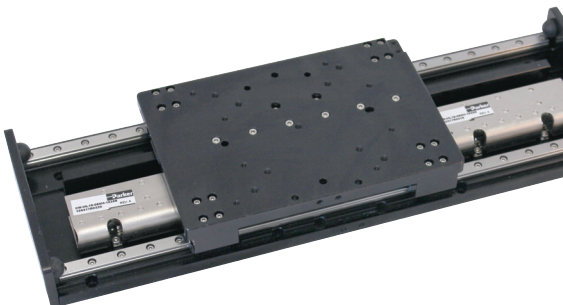
Function	Signal	Pin #
Power	5 Volts DC	4, 5
	0 Volts DC	12, 13
Incremental Signals	Cosine +	9
	Cosine -	1
	Sine +	10
	Sine -	2
Reference Mark	Z+	3
	Z-	11
Limits	Positive Limit	7
	Negative Limit	8
Setup	(Used in installation)	6
Remote Calibration	NPN	14

Magnetic Encoder

Function	Signal	Pin #
Power	5 Volts DC	8
	Ground	9
Incremental Signals	A +	14
	A -	6
	B +	13
	B -	5
Reference Mark	Z+	12
	Z-	4
Limits	Positive Limit	11
	Negative Limit	10
Home	NPN	2
Error Output	NPN	3

Miniature
Positioners

BiSS-C Absolute Encoder (mSR100 only)



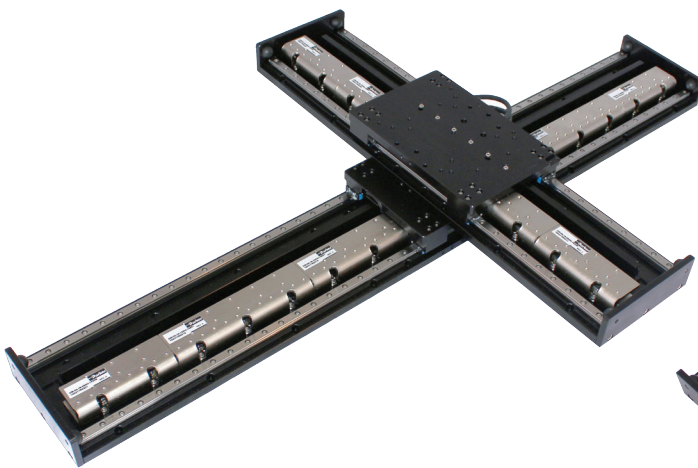
Function	Signal	Color
Power	5 Volts DC	Brown
	Ground	Green White
Serial Communications	MA+	Violet
	MA-	Yellow
	SLO+	Grey
	SLO-	Pink
Shield	Inner shield	-
	Outer	Case

Multi-axis Systems

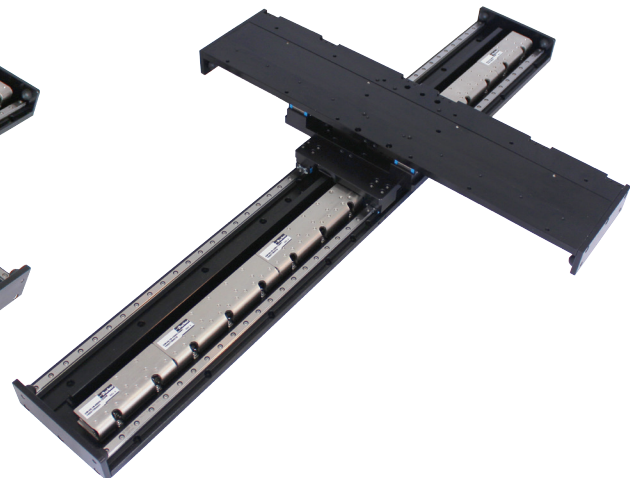
The mSR series was designed to be highly modular, such that it can easily be configured into multi-axis systems made out of other mSR or MX80L positioners as the mSR80 uses the same bolt pattern. Since the entire mSR series was designed with this common hole pattern in mind, X-Y systems can be developed without the need for an additional transition plate.



Example mSR80
X-Y system



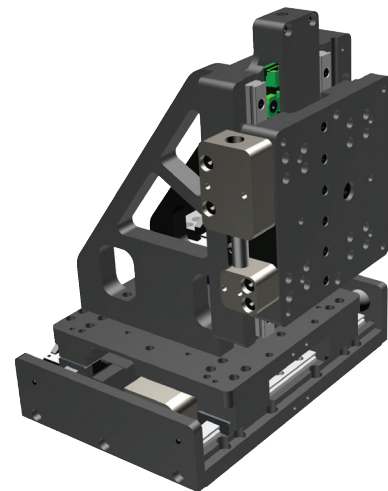
mSR100 X-Y standard orientation



mSR100 X-Y carriage-to-carriage direct mount orientation

The mSR100 was designed such that it can be configured into two different X-Y orientations: one reflecting a standard X-Y design and the other with the carriages mounted directly to one another. If you choose to develop your machine with the carriage-to-carriage approach, the Y axis cable carrier is eliminated.

The mSR100 is also populated with mounting holes to mount an mSR80 directly to it so that X-Y, X-Z or X-Y-Z systems can be created with any combination of the mSR80 and mSR100. Pictured here is the mSR80 with a standard Z bracket.



mSR100 X with mSR80 Z including
magnetic counterbalance

Z-Axis Brackets

mSR80 & mSR100	Part Number
25, 35, and 50 mm	002-2238-01
100 & 150 mm	002-2240-01

ORDERING INFORMATION

mSR100

ORDERING INFORMATION

Fill in an order code from each of the numbered fields to create a complete part number

①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪
MSR	100	L	050	P	LS	E3	H1	L1	CM03	X0

Order Example:

- | | | |
|---|--|---|
| <p>① Series
MSR Series</p> <p>② Size (width in mm)
100 100 mm wide profile</p> <p>③ Drive Train
L Linear Motor Drive</p> <p>④ Stroke Length (mm)
025 25 mm
050 50 mm
100 100 mm
150 150 mm
200 200 mm
250 250 mm
300 300 mm
350 350 mm
400 400 mm
450 450 mm
500 500 mm</p> <p>⑤ Grade
P Precision (Optical, Sine/Cosine, and BiSS-C Absolute only)
S Standard (Magnetic Encoder only)</p> | <p>⑥ Motor
LS Ironless, single
LD Ironless, double (50 to 500 mm stroke only)</p> <p>⑦ Encoder
E1 1μ optical incremental
E2 0.1μ optical incremental
E3 0.01μ optical incremental
SC Sine/Cosine
M1 1μ magnetic incremental
R1 0.05μ BiSS-C Absolute</p> <p>⑧ Home Sensor
H0 No home sensor (BiSS-C Absolute Only)
H1 Home Sensor (M1 Option), Index Mark (E1, E2, E3, and SC Options)</p> <p>⑨ Limit Sensor
L0 No limit sensor (BiSS-C Absolute Only)
L1 End-of-travel limit sensors (Magnetic, Optical and Sine/Cosine only)</p> | <p>⑩ Cable Options
CM03 No cable management, 3 meter
CM13 Single cable carrier, 3 meter
CM23 Double cable carrier, 3 meter
*Cable length is given as length from carriage, it does not take into account any reduction in length due to cable management</p> <p>⑪ Other Options
X0 No options</p> |
|---|--|---|

Miniature
Positioners

Free sizing and selection support
from Virtual Engineer at
parker.com/VirtualEngineer

