

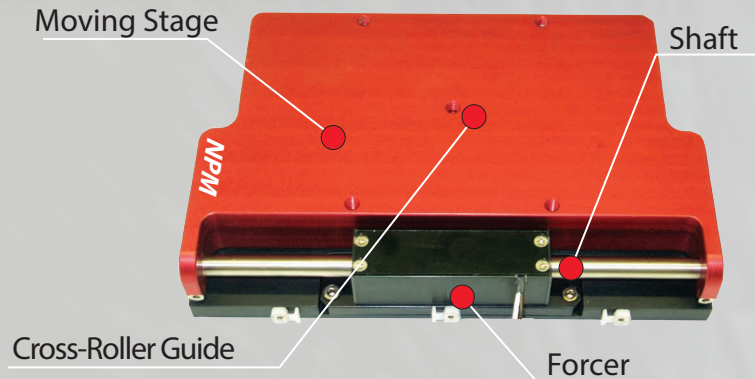
SCR

NANOPOSITIONING SERIES

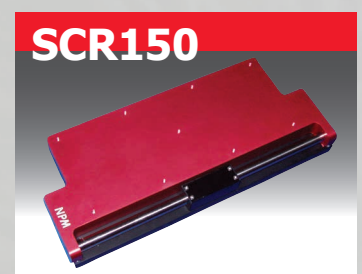
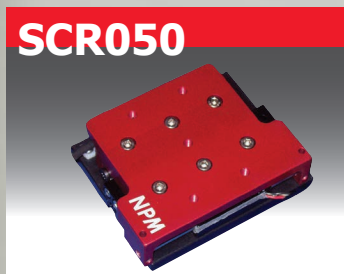
High Precision Single-Axis Linear Stage

The SCR Nanopositioning Series offers the accuracy of piezo driven stages with the speed and performance of servo stages. SCR series stages produce extremely accurate results with no loss in stability, regardless of the complexity of the motion profile. As in all Linear Shaft Motor applications, a non-critical air gap allows for a system that does not have any variation of force generated.

The SCR stage also includes an integrated cross-roller guide. With a simple, lightweight, compact shaft-type linear motor comprised of only a magnet and a coil, large drive force is gained with an efficient and short coil length, allowing for high speed and high precision applications. Because there is no friction, there is no sound or dust, making the motor maintenance-free.



Four SCR stage models allow for design flexibility in high-precision applications:



SLP

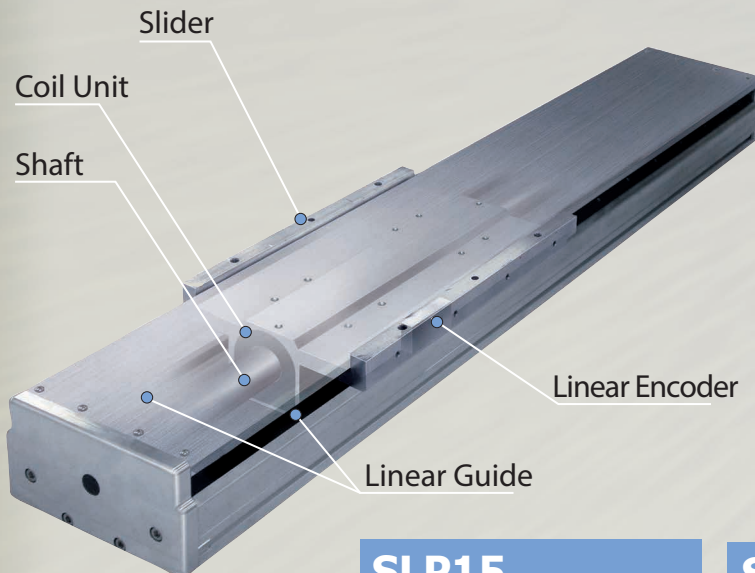
ACCULINE SERIES

High Performance Single-Axis Linear Stage

A high-precision stage for industrial applications, the SLP Acculine Series stage offers superior technology unmatched by any other linear stage system.

All-inclusive SLP series stages provide integrated shaft support within the housing, simplifying the transition from conventional linear motion systems such as ball-screws and pneumatic actuators. Because it features an integrated, lightweight, compact Linear Shaft Motor, the SLP is a low-profile, high-precision stage. The Linear Shaft Motor is designed for the ultra high-precision market (see page 19 of this booklet for more information).

The SLP series features the smallest deadzone of any stage system available on the market. In addition, no competing stage matches the SLP series' force-to-volume ratio, making it an outstanding solution for projects and applications with space limitations.

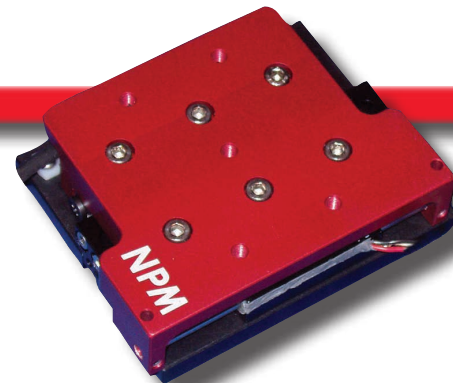


There are three SLP models to meet your high-performance needs:



SCR050

The SCR050 stage utilizes a S040 Linear Shaft Motor, making it a compact, precise solution for small-scale stage applications. The encoder and motor cables are built into the stationary base and are designed so there is no need for them to bend and flex. All SCR stages utilize a moving magnet design. With a built-in optical linear encoder that provides sub-nanometer resolution, the SCR050 is a complete compact stage solution for small-scale precision movement.



Stage Specifications

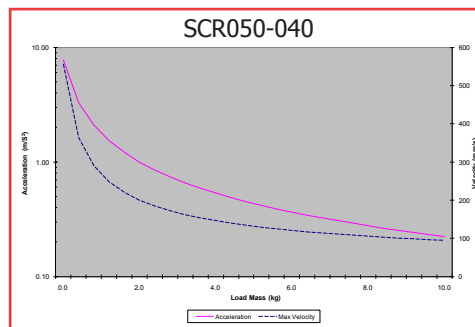
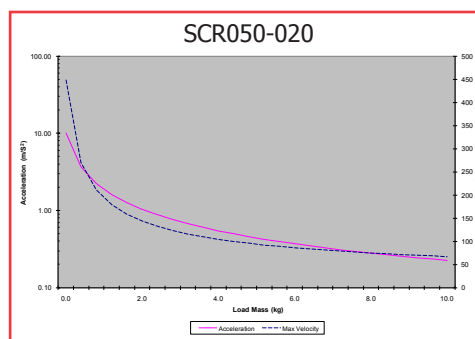
Stage Specifications	Units	SCR050-020	SCR050-040
Travel/Stroke	mm	20	40
Accuracy	μm	2	2
Encoder Resolution	nm	1000, 500, 100, 50, 10	
Bi-Directional Repeatability ¹		±1 count	
Maximum Acceleration	m/s ²	10	7
Maximum Velocity ²	m/s	0.4	0.5
Load Capacity ³	kg	10	
Moving Mass	kg	0.229	0.298
Total Mass	g	630	730
Straightness & Flatness	μm	2.5/25mm	
Index & Limit Sensor		Standard	
Limit Switch Over Travel	mm	1	
Hard Stop Over Travel	mm	2	
Bearing		Cross-roller Bearing	
Linear Shaft Motor		S040Q	

¹ Repeatability +/- 2 counts at sub 0.1 μm resolutions

² For 10nm (0.01 μm) resolution, max velocity of encoder is limited to 135mm/sec; for 50nm (0.05 μm), the limit is 675mm/sec; and for 100nm (0.1 μm), the limit is 1350mm/sec

³ Please contact our Applications Engineers for loads exceeding 10kg

Acceleration/Velocity Curves



Motor Cable UL1440
 AWG 28
 U-red
 V-white
 W-black
 Length: 300mm (0.3m)
 Encoder Cable Length:
 min. 1000mm

Dimensions

4X M4X0.7 - 6H THRU TOOLING HOLES

4X Ø .177 ± .050 MOUNTING HOLES FAR SIDE

M4X0.7 - 6H ± .031 TOOLING HOLE

MODEL	TRAVEL mm	A
SCR050-020	20	75
SCR050-040	40	95

SCR050-020	.787 [20]	2.953 [75]
SCR050-040	1.575 [40]	3.740 [95]

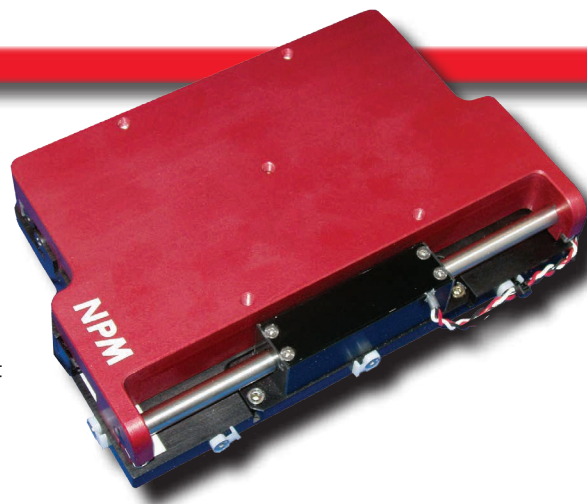
Linear Shaft Motor Specifications

Motor Specifications	S040Q (Units)
Fund. Motor Constant	0.41N/√W
Motor Force Constant	2.1N/Arms
Back-EMF Constant	0.7V/m/s
Coil Resistance @ 25°C	22.4Ω
Coil Inductance	1mH
Cont. Current @ 135°C	0.3Arms
Acceleration Current	1.1Arms
Cont. Force @ 135°C	0.58N
Acceleration Force	2.3N
Cont. Power Rating	2.016W
Thermal Resistance	62.6°C/W

SCR075

The SCR075 stage is a complete single-axis stage with an integrated slide guide, encoder and Linear Shaft Motor. It offers a wide range of advantages for applications requiring high performance and accuracy. The Linear Shaft Motor allows for higher resolution, speed, and continuous force than standard stepper or piezo servomotors.

The SCR075 uses a standard S080Q Linear Shaft Motor; however, the coil windings are customizable to a double or triple winding. The SCR075 features a moving magnet design, a precision ground cross roller, and a built-in encoder.



Stage Specifications

Stage Specifications ¹	Units	SCR075-050	SCR075-100	SCR075-150
Travel/Stroke	mm	50	100	150
Stage Width (B)	mm	140	190	240
Accuracy	µm	3	5	7
Encoder Resolution	nm	1000, 500, 100, 50, 10		
Bi-Directional Repeatability ²		±1 count		
Maximum Acceleration	m/s ²	28	20	15
Maximum Velocity ³	m/s	1.1	1.4	1.5
Load Capacity ⁴	kg	45.5		
Moving Mass	kg	0.493	0.669	0.881
Total Mass	kg	1	1.3	1.7
Straightness & Flatness	µm	2.5/25mm		
Index & Limit Sensor		Standard		
Limit Switch Over Travel	mm	1		
Hard Stop Over Travel	mm	2		
Bearing		Cross-roller Bearing		
Linear Shaft Motor		S080Q		

¹ Standard stage specifications are based on the S080Q Linear Shaft Motor

² Repeatability +/- 2 counts at sub 0.1µm resolutions

³ For 10nm (0.01µm) resolution, max velocity of encoder is limited to 135mm/sec; for 50nm (0.05µm), the limit is 675mm/sec; and for 100nm (0.1µm), the limit is 1350mm/sec

⁴ Please contact our Applications Engineers for loads exceeding 45.5kg

Note: All Nippon Pulse SCR and SLP stages require a servo driver to operate the stage. Two SCR stages will bolt directly together to form a very stiff, compact X-Y assembly, without the need for adaptor plates (provided they are part of the same series). Two SCR stages can be supplied as an X-Y stage to ensure true orthogonal orientation between the two axes.

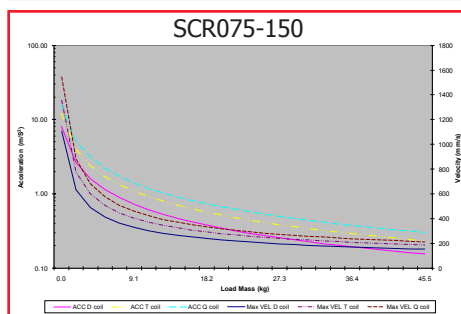
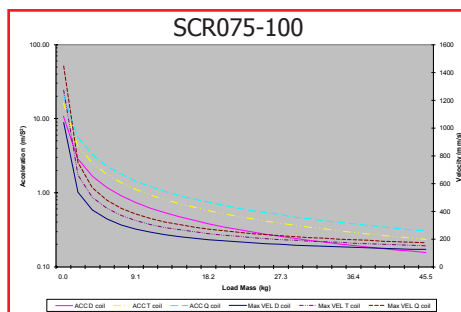
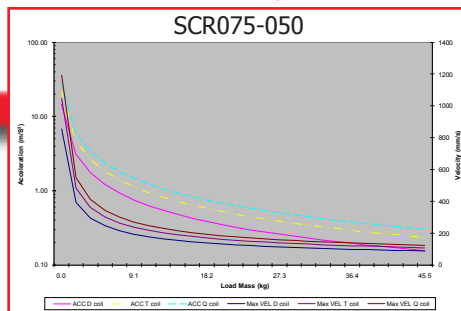
SCR075

Linear Shaft Motor Specifications

Linear Shaft Motor Force Specifications	Units	S080Q
Fundamental Motor Constant	N/W	1.46
Motor Force Constant (Kf)	N/A rms	4.2
Back-EMF Constant	V/m/s	1.4
Coil Resistance @ 25°C	Ω	9.0
Coil Inductance	mH	1.3
Continuous Current @ 135°C	A	0.8
Acceleration Current	A	3.4
Continuous Force @ 135°C	N	3.5
Acceleration Force	N	14
Continuous Power Rating	W	5.76
Thermal Resistance	°C/W	17.3

Note: Curves apply only to the stage's standard Linear Shaft Motor, the S080Q. Please contact our application engineers to learn more about using S080D or S080T coils in your stage.

Acceleration/Velocity Curves



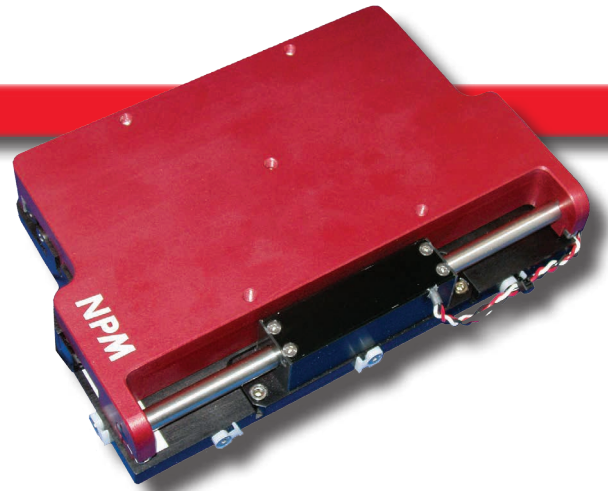
Dimensions

Motor Cable
Lapp Unitronic 190-602803
AWG 28
U-red
V-white
W-black
Length: 3000mm
Encoder cable length:
minimum 1000mm

MODEL	TRAVEL mm	A	B	C
SCR075-050	50	N/A	140	N/A
SCR075-100	100	115	190	115
SCR075-150	150	165	240	165

All units are listed in mm

SCR100



Like its relatives, the SCR100 integrates a slide guide, encoder and a Linear Shaft Motor. A wide range of options allows for a better match for stage applications that require sub-nanometer resolution that is free from motion errors. Like the SCR050 and SCR075, the encoder and motor cables are built into the stationary base and are designed so there is no need for them to bend and flex.

Stage Specifications

Specifications ¹	Units	SCR100-050	SCR100-100	SCR100-150	SCR100-200	SCR100-250	SCR100-300
Travel/Stroke	mm	50	100	150	200	250	300
Stage Width (B)	mm	140	190	240	290	340	390
Accuracy	µm	3	5	7	9	11	12
Encoder Resolution	nm	1000, 500, 100, 50, 10					
Bi-Directional Repeatability ²		±1 count					
Maximum Acceleration	m/s ²	17	12	10	8	7	6
Maximum Velocity ³	m/s	0.9	1	1.2	1.2	1.3	1.3
Load Capacity ⁴	kg	45.5					
Moving Mass	kg	0.8	1.1	1.3	1.6	2.0	2.2
Total Mass	kg	1.6	2.1	2.6	3.2	3.9	4.5
Straightness & Flatness	µm	2/25mm					
Index & Limit Sensor		Standard					
Limit Switch Over Travel	mm	1					
Hard Stop Over Travel	mm	2					
Bearing		Cross-roller bearing					
Linear Shaft Motor		S080Q					

¹ Standard stage specifications are based on the S080Q Linear Shaft Motor

² Repeatability +/- 2 counts at sub 0.1µm resolutions

³ For 10nm (0.01µm) resolution, max velocity of encoder is limited to 135mm/sec; for 50nm (0.05µm), the limit is 675mm/sec; and for 100nm (0.1µm), the limit is 1350mm/sec

⁴ Please contact our applications engineers for loads exceeding 45.5kg

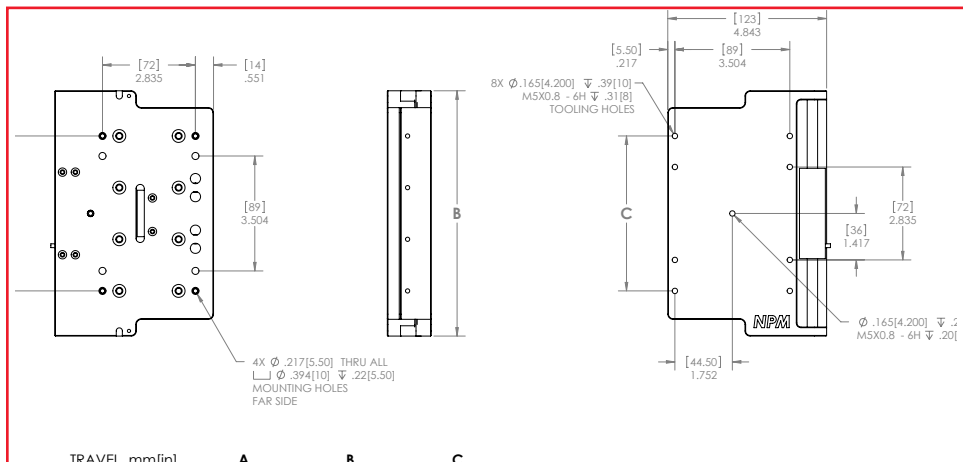
SCR100

Linear Shaft Motor Specifications

Linear Shaft Motor Force Specifications	Units	S080Q
Fundamental Motor Constant	N/W	1.39
Motor Force Constant (Kf)	N/A rms	4.2
Back-EMF Constant	V/m/s	1.4
Coil Resistance @ 25°C	Ω	9
Coil Inductance	mH	1.3
Continuous Current @ 135°C	A	0.84
Acceleration Current	A	3.4
Continuous Force @ 135°C	N	3.5
Acceleration Force	N	14
Continuous Power Rating	W	12.7
Thermal Resistance	°C/W	17.3

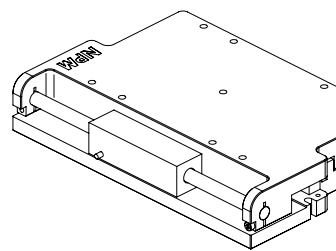
Note: Curves apply only to the stage's standard motor, the S080Q. Please contact our application engineers to learn more about using S080D or S080T coils in your stage.

Dimensions



Motor Cable

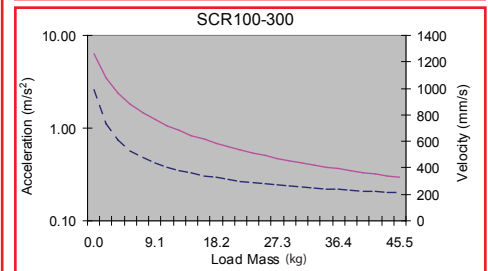
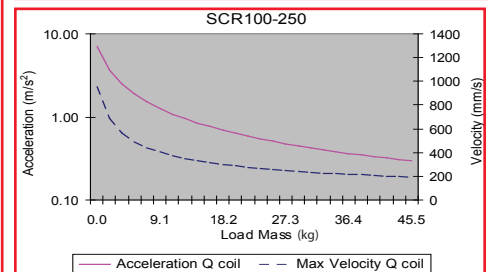
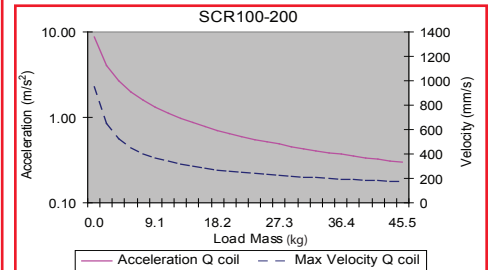
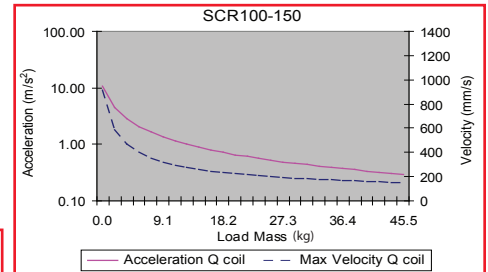
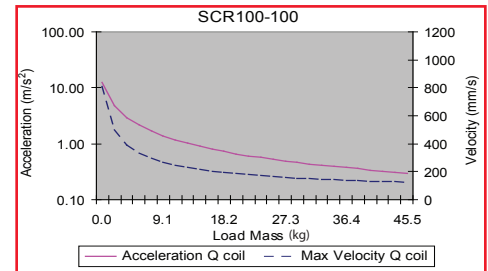
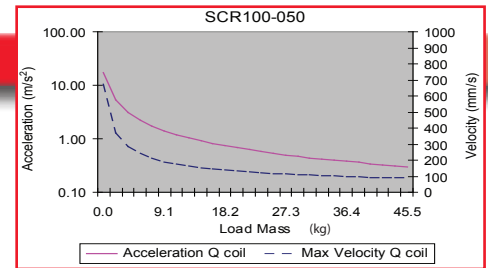
Lapp Unitronic 190-602803
 AWG 28
 U-red
 V-white
 W-black
 Length: 3000mm
 Encoder cable length:
 minimum 1000mm



MODEL	TRAVEL mm	A	B	C
SCR100-050	50	N/A	140	N/A
SCR100-100	100	120	190	120
SCR100-150	150	160	240	160
SCR100-200	200	200	290	200
SCR100-250	250	260	340	260
SCR100-300	300	300	390	300

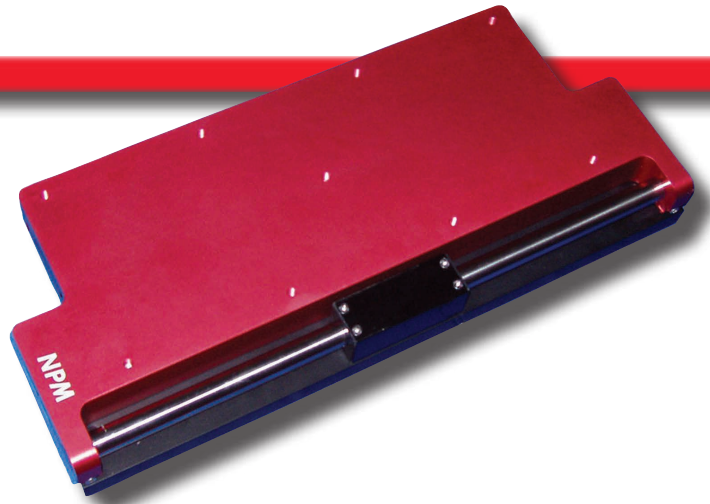
All units are listed in mm

Acceleration/Velocity Curves



SCR150

The largest of the SCR stages, the SCR150 stage has stroke lengths up to 300mm while maintaining the high performance and accuracy of the smaller SCR stages. Like the other three stages, the SCR150 is a complete single-axis stage with an integrated slide guide, encoder and a Linear Shaft Motor. It offers a wide range of advantages for applications requiring high performance and accuracy.



Stage Specifications

Specifications ¹	Units	SCR150-100	SCR150-150	SCR150-200	SCR150-250	SCR150-300
Travel/Stroke ²	mm	100	150	200	250	300
Stage Width (B)	mm	230	280	330	380	430
Stroke	mm	100	150	200	250	300
Accuracy	µm	5	7	9	11	12
Encoder Resolution	nm	1000, 500, 100, 50, 10				
Bi-Directional Repeatability ³		±1 count				
Maximum Acceleration	m/s ²	17	13	11	9	8
Maximum Velocity ⁴	m/s	1.3	1.3	1.4	1.5	1.5
Load Capacity ⁵	kg	45.5				
Moving Mass	kg	2.3	2.9	3.5	4.1	4.7
Total Mass	kg	5.2	6.5	7.9	9.2	10.6
Straightness & Flatness	µm	2/25mm				
Home & Limit Sensor		Standard				
Limit Switch Over Travel	mm	1				
Hard Stop Over Travel	mm	2				
Bearing		Cross-roller bearing				
Linear Shaft Motor		S160D				

¹ Standard stage specifications based on the S160D Linear Shaft Motor

² Travel/Stroke with S160D coil; when using S160T, stroke is 30mm shorter; when using S160Q, stroke is 60mm shorter

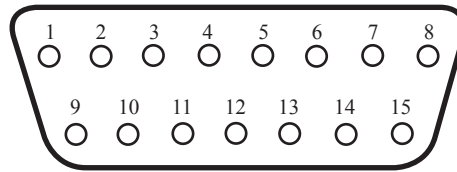
³ Repeatability +/- 2 counts sub 0.1µm resolutions

⁴ For 10nm (0.01µm) resolution, max velocity of encoder is limited to 135mm/sec; for 50nm (0.05µm), the limit is 675mm/sec; for 100nm (0.1µm), the limit is 1350mm/sec

⁵ Please contact our applications engineers for loads exceeding 45.5kg

SCR Standard Pinout

Pin	Signal	Function
2	0V	Ground
4	Z-	Reference Mark
5	B-	Incremental Signal
6	A-	Incremental Signal
7	5V	Power
8	5V	Power
9	0V	Ground
10	Q	Limit
11	P	Limit
12	Z+	Reference Mark
13	B+	Incremental Signal
14	A+	Incremental Signal
15	shield	

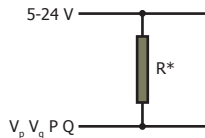


SLP Pinout

Pin	Signal	Wire Color	Function
1	A+	White	Incremental Signal
2	0V	Black/Red	Ground
3	B+	Green	Incremental Signal
4	5V	Red	Power
7	Z-	Black/Yellow	Reference Mark
9	A-	Black/White	Incremental Signal
11	B-	Black/Green	Incremental Signal
14	Z+	Yellow	Reference Mark

Note: Limits-open collector output, asynchronous pulse

Limit Outputs

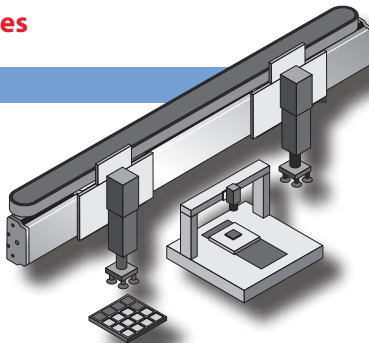


*select R for I max <20 mA
Alternatively, use a suitable relay or opto-isolator

Application Examples

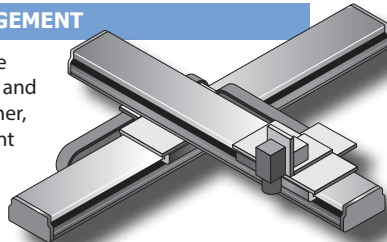
LOADER/UNLOADER

- Multiple sliders move independently with accuracy.
- Multi-sliders save space and cut costs.



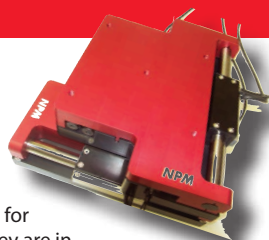
STANDARD X-Y ARRANGEMENT

- Due to the many ways the high-speed SLP15, SLP25 and SLP35 can be used together, a wide range of movement is possible.



SCR X-Y ARRANGEMENT

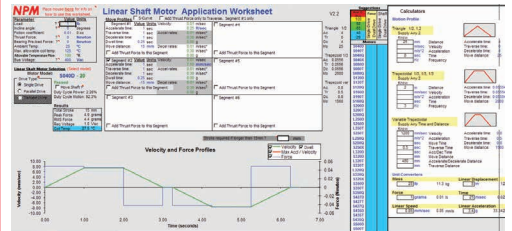
- Each SCR and SLP stage requires a servo driver to operate the stage. Any two SCR stages will bolt directly together to form a very stiff, compact X-Y assembly, without the need for adaptor plates (provided they are in the same series).



Nippon Pulse SMART

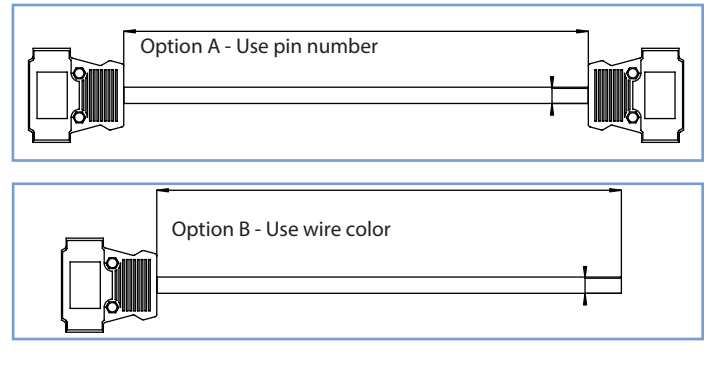
Nippon Pulse provides the Linear Shaft Motor Application Resource Tool (SMART) sizing resource for your convenience. You must be running Microsoft Excel 98 or a later version.

SMART is available at nipponpulse.com/support/manuals



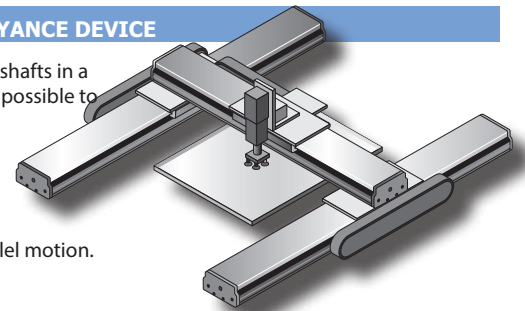
(Requires Microsoft Excel 98 or newer.)

SLP Cable Options



SUBSTRATE CONVEYANCE DEVICE

- By placing the lower shafts in a parallel position, it is possible to place the work in the central space.
- The shaft motors can be driven with one driver or in parallel motion.



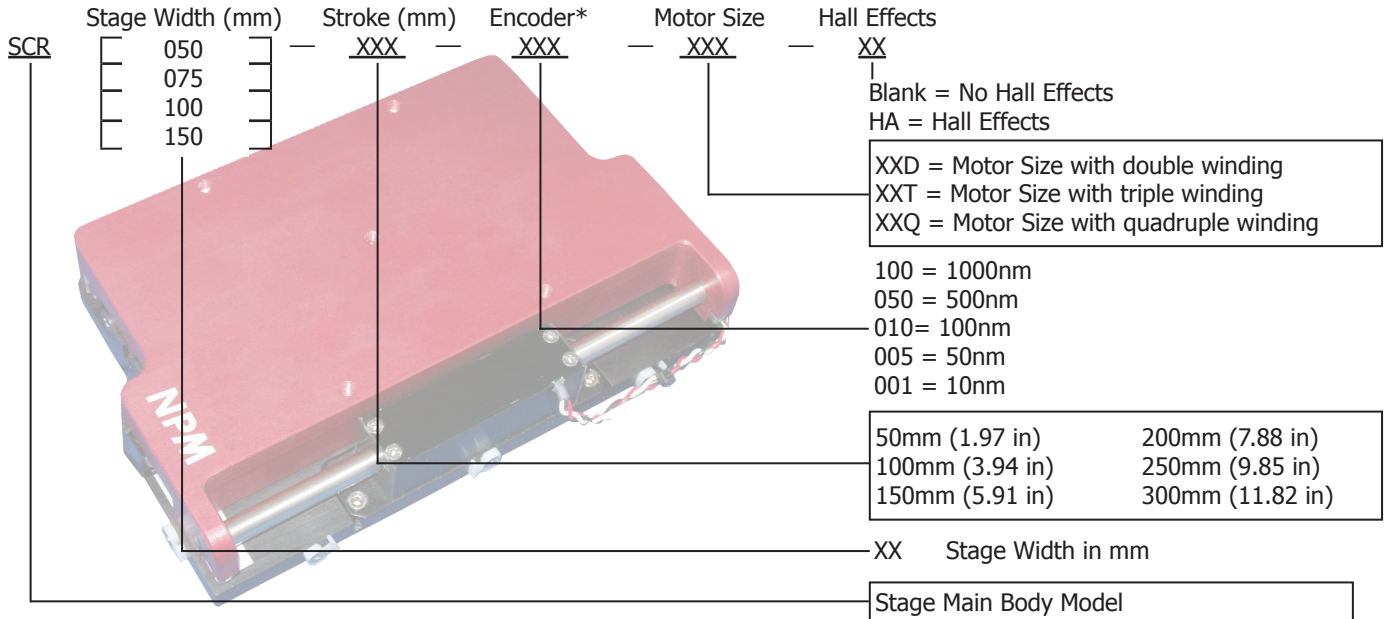
Orthogonal Jig Plate for use with SLP X-Y table

When constructing a multiple-axis table that utilizes several SLP series stages, installation is exceptionally easy with the placement of the jig plate between the axes. It is possible to easily gain orthogonal precision between the lower axis and the upper axis by positioning the two attached positioning pins to the precision holes on the face of the stage's slider installation. (Because there is a limit to the possible combinations for certain models, please use the models suitable for multiple axes.) Z-axis jig plates are also available for three-dimensional motion. Jig plates are not needed for SCR stage multi-axis arrangements.

- Jig Plate A - Lower axis SLP 15, Upper axis SLP 15
- Jig Plate B - Lower axis SLP25/35, Upper axis SLP 15/25/35
- Z-axis Jig Plate - Z-axis SLP15, X-axis SLP25

SCR Stage Part Numbering Guide

Example model number: SCR100-50-010-080Q



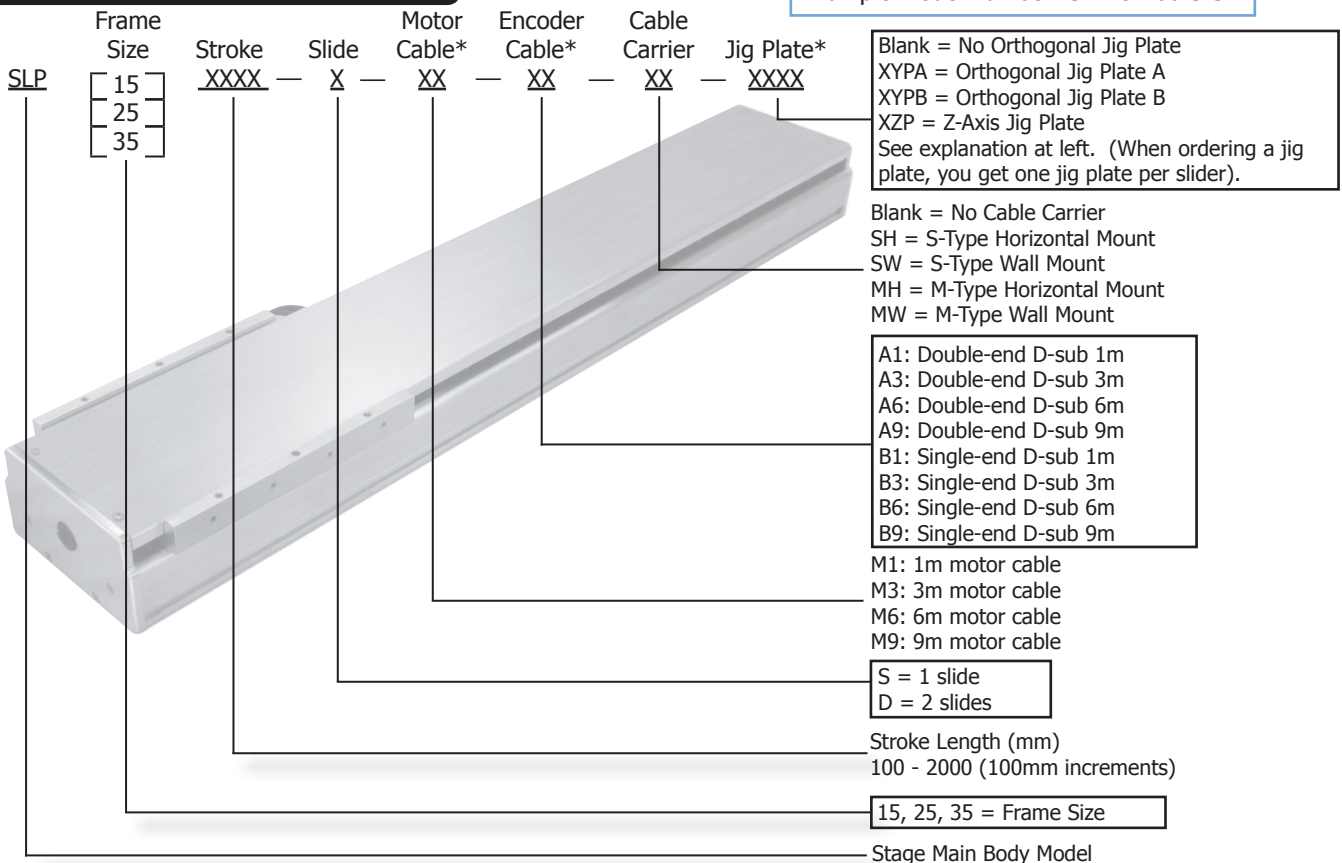
***SCR Encoder Upgrade Notice**

As of September 1, 2010, all Nippon Pulse SCR Nanopositioning stages are available with an upgraded encoder. Any stage built after Sept. 1, 2010, and beginning with unit SN#080210-001, comes standard with the Renishaw Tonic Encoder.

The previous encoder was the Renishaw RGH24, which used optional and separate read switch end-of-travel limits. The Tonic Encoder includes limit switches as a part of the new read head and makes end limits standard at no additional cost. This change optimizes performance and eliminates extra wiring needed with the optional limit switches. Other benefits of using the new encoder include improving interpolation feedback by four times, achieving 5nm resolution without the use of a large RGB interpolator, and increased resolution and speed options.

SLP Stage Part Numbering Guide

Example model number: SLP15-200-S-SH



*Motor cables, encoder cables, and jig plates can be ordered separately. When ordering, add 'SL-' in front of the part number. Example: SL-A9 for a single-end D-sub 9m encoder cable or SL-XYPA for an orthogonal jig plate A.