

Feature Summary

- +/- 6 degrees of rotation
- Class 3 preloaded precision ball-screw with a brushless servo or stepper motor drivetrain for high precision.
- Resolution to 0.2 arc-seconds
- Precision cross-roller bearings deliver high capacity, excellent rigidity and long life.
- Very stiff rotational correction stage for moderate payloads

Overview

Primatics PLR190 Series rotary positioning tables offer a compact solution for systems in need of small, stiff angular corrections. An innovative drive system creates arc-second accuracy and fast settling times, making the PLR190 ideal for fine position correction in assembly and optical applications where worm drives don't provide the necessary accuracy, throughput or life.

Smart Design

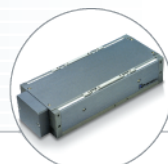
The PLR190 Series drivetrain incorporates a Class 3 preloaded precision ballscrew with a brushless motor. The ballscrew nut is constrained in two dimensions, but is allowed to pivot in the third where it's tangentially attached to the output platen, providing +/- 6 degrees of rotation. Position feedback is provided by a high resolution encoder on the outer diameter of the platen. For servo motor configurations a rotary encoder is on the drivetrain for velocity feedback enabling better servo control. Precision cross roller bearings support the platen, delivering high capacity, excellent rigidity and long life. The use of a precision ballscrew drivetrain makes the PLR190 extremely stiff over a wide dynamic range, helping to eliminate backlash and reduce settling times.

Versatile Application

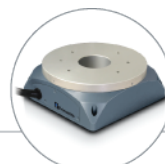
The low profile of the PLR190 supports its use in tight spaces. The open throat design allows cables to be routed through its center up to tooling mounted above the stage. Multiple mounting hole patterns ease integration of the PLR190 into many applications.

Performance Verification

All PLR190 performance specifications are verified and a full set of accuracy & repeatability plots are included with each stage. Calibration data is also provided. In addition to test data, a 12 hour burn-in test is performed, insuring that the stage will perform as specified.



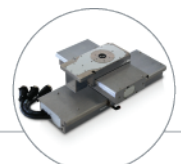
Linear Positioning



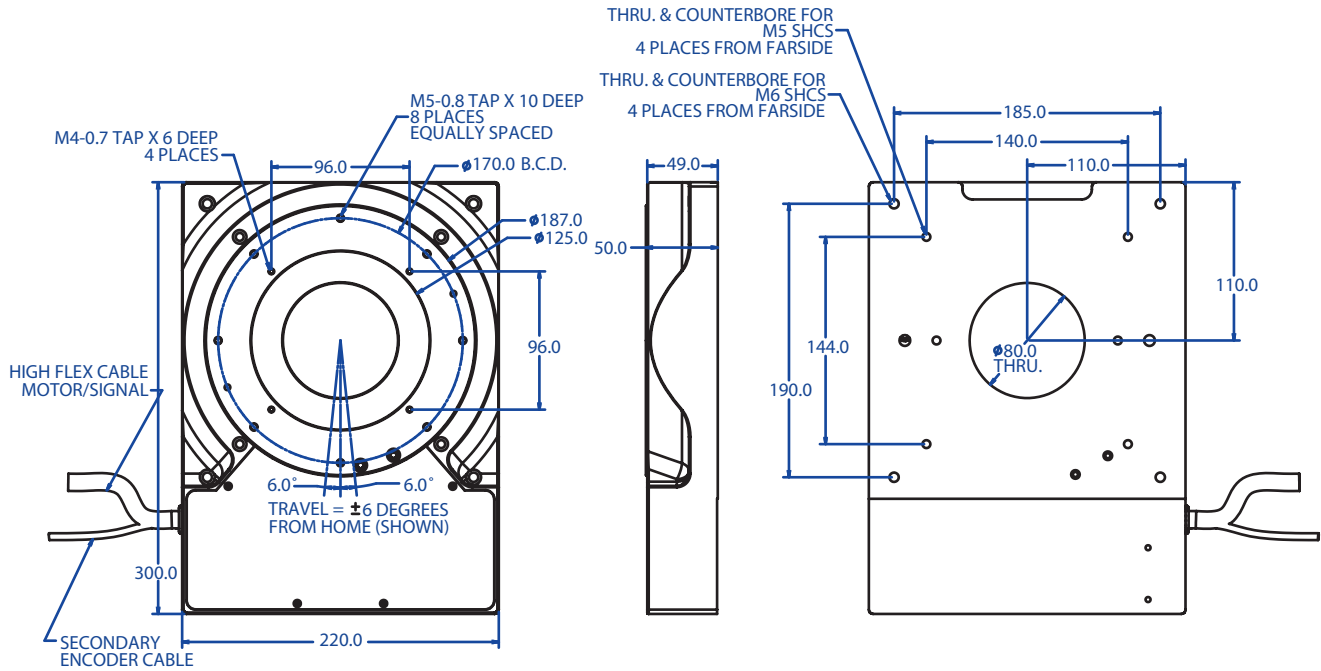
Rotary Positioning



Motion Controls



OEM Solutions



All dimensions subject to change w/o notice.

Specifications

2mm Ballscrew & 0.1 μm Tape Encoder	PLR190, Aluminum Precision Grade
Travel (degrees)	+/- 6
Table Diameter (mm)	188
Mechanical Drive System	Class 3, 2mm Lead Ballscrew
Max Speed (degrees / sec)	15
Axial Runout (μm)	+/- 0.5
Radial Runout (μm)	+/- 1
Accuracy (arc-seconds), Calibrated	+/- 1.6
Bi-directional Repeatability (arc-seconds)	+/- 0.8
Minimum Resolution (arc-seconds)	0.2
Acceleration (deg-sec ²)	360
Axial Load Capacity (kg)	70
Radial Load Capacity (kg)	35
Weight (kg)	8.1

All specifications subject to change w/o notice.

Rotary Motor Specifications	PLR190 (M1)
Continuous Torque (N-m) ¹	0.1
Continuous Current (Amps)	1.1
Peak Torque (N-m) ²	0.6
Peak Current (Amps)	7.5
Torque Constant (N-m/Amps)	0.08
Back EMF Constant (V/Krpm)	8.4
Resistance (Ω)	6.4
Inductance (mH)	2.2
Poles	6

Hall Effect Specifications	Specification
Input Power	+5 to +12 VDC, 30 ma
Output	Open collector, Current sinking, 20 ma Max

Stepper Motor Specifications	PLR190 (M2)
Step Angle (deg)	1.8
Holding Torque (N-m)	0.36
Series Phase Current (Amps)	1.7
Series Phase Resistance (Ω)	1.7
Series Phase Inductance (mH)	3.6

Stage Information	PLR190
Max Breakaway Torque at Motor (N-m)	0.1
Max Running Torque at Motor (N-m)	0.05
Maximum Motor Bus Voltage (VDC)	170
Length of Stage Cable (mm)	450
Bearing Life x 10 ⁶ Revs	100

Encoder Specifications	Specification
Input Power	5 VDC +/- 5%, 150 ma
Output	Square wave differential line driver
Reference (Z channel)	Synchronized pulse, duration equal to one resolution bit

Limit Specifications	Specification
Input Power	+12 to +24 VDC, 50 ma
Output	Current Sinking, Sink current maximum of 100 ma

¹ At 25°C temp rise

² At 10% duty cycle and 1 second maximum

All specifications subject to change without notice

CONNECTOR PINOUTS

Servo Axis connector

Mate: FCI (Burdny) Female, Circular Connector, 28 Contacts, Size 20 Shell Pin-out

Pin	Function
A	Motor A
B	Motor B
C	Motor C
D	Motor Shield
E	Encoder 5V - power for encoder
F	Encoder A+ output
G	Encoder A- output
H	Encoder B+ output
J	Encoder B- output
K	Encoder Shield
L	12VDC - for limit, home, and temp sensor
M	DCCOM
N	NC
P	NC
R	NC
S	Chassis
T	Hall V+
U	Hall V
V	Encoder Common
W	Encoder Index +
X	Encoder Index -

Servo Axis connector (continued)

Pin	Function
Y	Forward Limit
Z	Reverse Limit
a	NC
b	Hall A
c	Hall B
d	Temperature Monitor
e	Hall C

Secondary Rotary Encoder (with E1 option)

Mate: Dsub 9 position with sockets

Pin	Function
1	Encoder 5V - power for encoder
2	Encoder V-
3	Encoder A+ output
4	Encoder A- output
5	Encoder B+ output
6	Encoder B- output
7	Encoder Index + output
8	Encoder Index - output
9	Encoder Shield
10	NC

Stepper Axis Connector Pinout is on the next page...

CONNECTOR PINOUTS

Stepper Axis connector

Mate: FCI (Bumdy) Female, Circular Connector, 28 Contacts, Size 20 Shell Pin-out

Pin	Function
A	Motor A+
B	Motor B+
C	Motor B-
D	<Key>
E	Encoder 5V - power for encoder
F	Encoder A+ output
G	Encoder A- output
H	Encoder B+ output
J	Encoder B- output
K	Encoder Shield
L	12VDC - for limit, home, and temp sensor
M	DCCOM
N	No Connection
P	No Connection

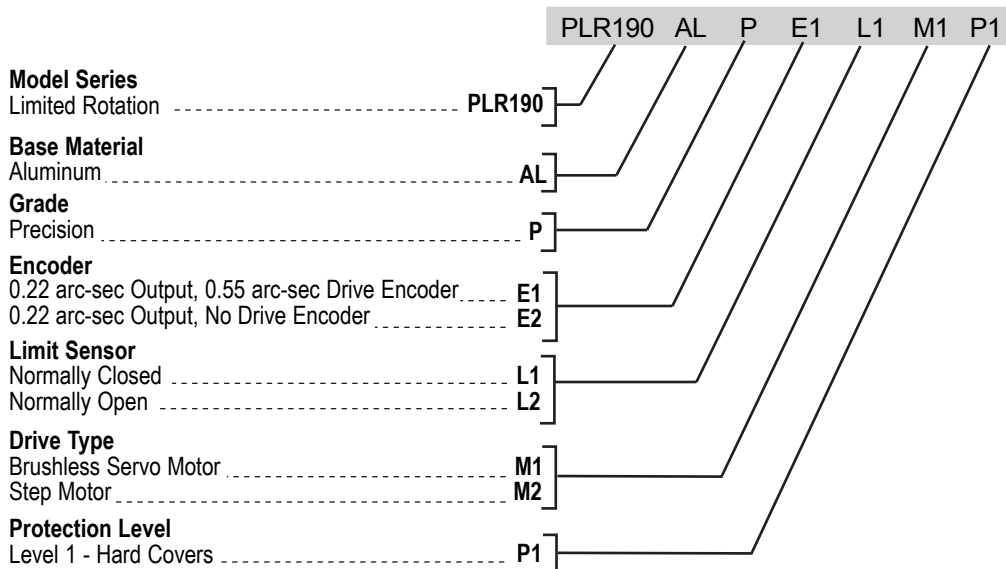
Stepper Axis connector (continued)

Pin	Function
R	No Connection
S	Signal Shield
T	Motor A-
U	Motor B Common
V	Encoder Common
W	Encoder Index +
X	Encoder Index -
Y	Forward Limit
Z	Reverse Limit
a	Motor Shield
b	Motor A Common
c	DCCOM
d	Temperature Sensor
e	No Connection

MODEL NUMBER CONFIGURATION

OPTIONS:

SAMPLE MODEL NUMBER:



The output encoder directly reads the rotary position. The drive encoder is on the motor drive and is used for motor velocity feedback for dual-loop positioning control. We recommend encoder option E1 for Servo motor drive type and E2 for Stepper motor drive type.

At the center of travel, one revolution of the motor produces 0.76367 degrees of stage rotation. The M1, E1 option includes a 1250 line encoder on the motor which yields 6547.3 counts / deg (0.54984 arc-sec / count). The M2, E2 option includes a stepper motor with 200 full steps per ballscrew revolution. This yields a stage displacement of 261.89323 full-steps / deg (13.74606 arc-sec / full step).

