



INSTRUCTION MANUAL

RPLR and RPL SERIES ROTARY LINEAR FEEDTHROUGHS

Version 2

SERIAL # _____

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Preface

Congratulations! You have purchased a precision vacuum positioning device from Thermionics. This unit is capable of many years of use with minimal care and maintenance. This manual is a tool to aid you in obtaining this service.

We at Thermionics encourage your comments and suggestions on this manual.

Product Description

RPL and RPLR series linear and rotary/linear feedthroughs are all metal sealed, all metal probes with positive coupled drive. Probes with up to 60" or greater stroke lengths are available.

Construction

Refer to the attached cross-sectional drawing.

Both the linear and rotary actuation are supplied by bellows sealed rotary feedthroughs (Thermionics model FRM-133-25). The probe does not rotate on any unit, but the probe tip does on linear/rotary units. These units are supplied with 2.75" OD mounting flanges, standard.

LINEAR: (RPLR and RPL units) The 3/4" OD tubular probe assembly is guided by recirculating stainless steel ball bushings and extended/retracted via a rack and pinion mechanism. Slight ball tracking on the sides of the probe due to the hardened balls is normal. 0.4345" (theoretical) of travel is achieved with each revolution of the rotary feedthrough.

ROTARY: (RPLR units only) Rotary actuation is accomplished via an axially mounted, stationary rotary feedthrough. This rotation is coupled to the traveling probe via an all-stainless steel ball bearing, rolling spline telescoping assembly. The extending probe (3/4" OD) DOES NOT ROTATE. Only the 3/8" OD probe tip rotates on the RPLR units. This allows the fitting of grips and jaw devices, with the rotary action supplying actuation of the gripping unit.

Unpacking

RPLR series probes are normally shipped in plywood re-reinforced cardboard boxes filled with custom foam-in-place packing. We have found this the only system to provide adequate protection for shipment. The foam is separated approximately halfway inside the crate with thin plastic. We strongly

recommend the packing be saved for possible future shipment or equipment storage.

Installation

***** WARNING *****

Shipping vibration can loosen screws. The user must check to verify the screw fasteners have not backed off on the unit during shipment. This is critical for safe and reliable operation. The 133 flange bolts are utilized in fine adjustment of mechanical component alignment and should not be disturbed unless absolutely necessary.

*****THIS IS IMPORTANT *****

The RPL or RPLR can be installed directly from the box. As usual, care should be exercised to protect the knife seal edge. The standard unit mounts to a 2.75" OD flange. (other flanges are available). Proper tightening technique should be observed whenever tightening a metal sealed flange. We recommend a small quantity of high temperature anti-seize lubricant be used on all mounting bolts. This is especially important if the unit will be subject to bake- outs.

The RPL and RPLR units are suitable for mounting in all positions but in the horizontal position it's best to mount with either the in vacuum drive rack 'up' or the linear drive feedthrough 'up'. Consider the following recommendations when installing the unit.

HORIZONTAL

When mounting horizontally, adequate support must be supplied depending upon the stroke, payload, and mounting flange. This mounting may require additional support other than the mounting flange. For units mounted on tilt or XY assemblies, counterbalance spring units are available.

VERTICAL

Vertical mounting applies additional torque to the pinion linear drive. Special care must be exercised to lock the rotary feedthrough. Accidental release will allow the probe and actuator to "spin down", which may cause damage to the unit or other equipment. Self-locking motor drives and special "fail-safe" rotary brakes for manual operation are available.

Adjustments

Your probe is correctly adjusted prior to shipment. No field adjustments are normally required or recommended. This section is included to aid the user in making changes in these adjustments if so desired. Please feel free to contact the factory for information or recommendations prior to undertaking adjustments.

LINEAR BEARINGS:

The linear bearings are open recirculating ball bushings. They are adjusted by shimming the bearing bore. This adjustment is made to within 0.002" diameter (0.001" shim). This adjustment can only be made by removing the bearing from the bearing bore and replacing the shim. Slight probe/bearing clearance should be allowed to assure smooth operation and long life (see note in bakeout section).

RACK AND PINION ENGAGEMENT:

The linear drive pinion is mounted on the output shaft of a FRM133-25 rotary feedthrough. The rotation axis is intentionally off the axis of the 1.33" OD mounting flange. Gear mesh is adjusted by loosening the mounting flange and rotating the FRM body. Slight play should be left in the rack and pinion engagement. Without this, rough operation and/or binding may occur. This adjustment must be done at atmosphere, and re-tightening of the mounting bolts must be uniform. Play must be verified throughout the range of stroke.

RACK GUIDE:

The 1.33" OD flange located next to the pinion rotary feedthrough is the rack guide mount (anti-rotation assembly). Attached to the vacuum side of the flange is a dual bearing guide. To remove the assembly with the probe in place, gently rotate the bearing assembly around the rack as you lift out the guide.

The two ball bearings contact the sides of the rack. The bearing positions are adjustable on their mounts. They should be adjusted to allow only 0.002 to 0.005" gap between the bearings and the rack sides.

Lubrication

All in vacuum bearings are coated with Tungsten Disulfide. Normally additional lubrication is not required. After extended use, additional Tungsten Disulfide may be burnished into the bearings if needed.

Bakeout Procedure:

We recommend limiting the bakeout temperature to 200° C or less.

Care should be taken to heat and cool the unit slowly and uniformly. This is required because of the close tolerances, poor thermal contact of the moving components with the exterior of the probe, and the overall length of many of the units.

All motors, limit switches, and position indicators must be removed during bakeout.

Motorized Operation:

Both axis of your probe can be motorized. Retrofit kits are available for field installation. Please consult the factory for further information.

We at Thermionics have a large stake in your new equipment operating up to your expectations. If you experience difficulty with this unit, or any other aspect of your endeavor where our experience might be of value, we want to hear from you. We want to be part of your success.

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