

PGS-P Linear Encoder Installation Manual and Owner's Guide

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Introduction

PGS-P linear encoders are compatible with all ANILAM readout and control systems. These encoders are shipped pre-assembled and ready for installation. ANILAM offers a mounting kit to support most encoder installations. This procedure outlines the installation of PGS-P linear encoders on Bridgeport and Lagun type knee mills, and lathes. All necessary parts, hardware, and documentation are included in these kits.

Anilam kit, P/N 32500325 for X and Y-axis PGS-P linear encoder installation on Bridgeport type machines.

Anilam kit, P/N 32500326 for X and Y-axis PGS-P linear encoder installation on Lagun type machines.

Anilam kit, P/N 32500327 for X and Z-axis PGS-P linear encoder installation on lathes.

For additional information, please contact your local authorized ANILAM distributor, or call us directly:

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Encoder Specifications



Figure 1, PGS_P Linear Encoder Mounting Dimensions

Table 1.	PGS-P	Linear	Encoder	Operating	I Spec	ifications
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Weight	0.280 Kg + 1.5 Kg/m	Operating Temp	0 - 50° C
Grating Pitch	0.02 mm	Storage Temp	-20° to 60° C
Resolution	0.005 mm	Operating Humidity	5% - 95% relative humidity.
Accuracy	+/- 0.015 mm/m	Storage Humidity	5% - 95% relative humidity
Repeatability	1.4 μm	Required Move	2 N (with lip seal)
		Force	1 N (without lip seal)
Slew Rate	1 m/s	Coefficient of Linear Expansion	10 μm/°/m
Acceleration	50 m/s ²	CE Mark	Yes
Feed Power	250 mW	Reference Marks (zero crossing)	none
Cable Length	max 20m	Light Source	LD 264 (IR)

5 Micron Encoders	ANILAM Part Number
≅10"/250mm	19810110
≅12"/300mm	19810112
≅15"/375mm	19810115
≅20"/500mm	19810120
≅24"/600mm	19810124
≅29"/725mm	19810129
≅30"/750mm	19810130
≅35"/875mm	19810135
≅36"/900mm	19810136
≅40"/1000mm	19810140
≅42"/1052mm	19810142

Table 2, ANILAM 5 Micron DB-9	Encoder Part Number Listing
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5 Micron Encoders	ANILAM Part Number
≅48"/1200mm	19810148
≅54"/1375mm	19810154
≅60"/ 1525mm	19810160
≅65"/ 1650mm	19810165
≅70"/1800mm	19810170
≅72"/1850mm	19810172
≅80"/2050mm	19810180
≅90"/2300mm	19811090
≅100"/2550mm	19811100
≅110"/2800mm	19811110
≅120"/3050mm	19811120

Tools & Equipment Required

- Indicator, 0.0005" resolution, with magnetic base
- Hex keys (Allen wrenches), metric sizes
- Hex keys (Allen wrenches), English sizes
- Drill, 3/8" chuck
- Taps, sized as follows: #8-32, #10-32, 1/4-20, 3/8 X 16
- Drill bits, sized as follows: #29, #21, #7, and 1/4"
- Tap handle
- Transfer punches, complete set
- Ball peen hammer
- Center punch
- Safety glasses
- Combination Square, 12"
- Torque wrench (set to 2 ft-lbs.)

General Installation and Safety Information

This installation should only be performed by gualified personnel. Read the entire procedure and become familiar with the parts before starting the installation.

Wear eye protection and follow standard shop safety practices while installing this equipment.

Encoders contain glass components that can break. Do not drop the encoder. Do not use a hammer on the encoder.

This document describes typical installations. Custom installations may require a different arrangement of mounting brackets. The following guidelines apply for every installation.

- The reader head mounting bracket must maintain the alignment set by the plastic alignment brackets. This alignment must be preserved through out the machine's entire range of travel along the encoder.
- The run out along the top of the encoder must be parallel to the machine's movement • along the axis (within 0.002") over the entire range of travel.
- The run out along the face of the encoder must be parallel to the machine's movement • along the axis (within 0.005") over the entire range of travel.
- The encoder should be mounted so the reader head can never come in contact with the end caps.

Mounting brackets for large custom applications can be manufactured locally. When designing custom brackets, note that excessively long or weak brackets can cause the readout display to flutter from machine vibration.

Ensure all mounting surfaces are solid.

When planning an installation, consider the routing of the cable. The cable should not be routed so it is in danger of being pinched or crushed by moving parts. Cables should not drape across any more open space than necessary.

The encoder can be installed with either side against the machine. Switching sides changes the direction that the cable feeds out of the reader head. Choose the side that permits the most convenient cable routing.

All holes should be drilled and tapped 90 degrees to the mounting surface.

PGS-P Linear Encoders are precision measuring instruments. Failure to mount the encoder properly can result in encoder damage or poor accuracy.

PGS-P Linear Encoders are optical devices. The performance of the encoder can be affected by dirt or debris blown past the lip seals into the encoder housing. Install the encoder in a manner that minimizes the possibility of coolant and debris getting into the encoder body. In extreme environments, consider fitting a splash shield to the encoder.

In all cases, the encoder should be installed with the lip seal and reader head down and away from a direct spray of coolant and chips.

Inventory the parts in each installation kit. Check that all of the required parts are included.

Check the machine's travel along each axis and verify that encoder sizes are correct for the machine.

Before Starting

- Read the entire procedure and look over all the parts information before attempting encoder installation.
- Using the parts list contained in the Parts Listing paragraph, inventory each kit. Check that all parts are present and that none are damaged.
- This installation should only be performed by qualified personnel.

CAUTION: Do not use an encoder that is shorter than the machine's range of travel.

Knee Mill Installation

ANILAM Kits provide all of the necessary parts and hardware for the standard knee mill installations described here.

Install Y Axis Backer Bar

- 1. Position the saddle against the dead stop furthest from the column.
- 2. Locate the existing mounting holes on the side of the knee, these holes are used to mount the backer bar. These holes are usually drilled and tapped to 1/4-20 or 3/8-16 sizes, hardware is provided to accommodate either size. Strip the paint from the area around each hole to provide solid contact between the spacers and the machine.
- 3. Machines that do not have pre-existing holes for the backer bar, need to be drilled and tapped. The best method for locating the holes depends on the machine. If the saddle already has holes that can be used to attach the vertical mount, the backer bar, offset block, and vertical mount can be temporarily assembled and used as a jig.



Figure 2, Backer Bar Installation

- 4. Refer to Figure 2, Backer Bar Installation. Assemble the Y-axis backer bar to the knee as shown. When the backer bar is properly oriented, the elongated slots are near the top, and the pairs of #8-32 holes in the lower edge are away from the column. Only one set of spacers is required, use two if additional clearance is needed. The following assembly notes apply:
- If the tapped mounting holes are 1/4-20, use the adapters (P/N 66300171) through the backer bar slots, these adapters prevent the smaller screw heads from pulling through. The adapters are designed to extend through the backer bar into the spacers for alignment. The 1/4" lock washers must be used with the adapters.

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- If the tapped mounting holes are 3/8-16, no adapters are required. Use the 3/8 " lock washers and flat washers under the screw heads.
- If the mounting screws are difficult to thread in, chase the threads with a tap. Tighten the fasteners just enough to hold the backer bar in place.

Checking Y Axis Backer Bar Alignment

- 1. Mount an indicator base to the bottom of the saddle and position the indicator to check that the face of the backer bar is parallel to the Y-axis movement of the saddle.
- 2. Move the saddle through its range of travel while observing the indicator. The face of the backer bar should be within 0.005" of parallel from end to end.

NOTE: If the backer bar is not correctly aligned, the reader head will not read correctly.

- 3. Insert 0.005" shims under the backer bar spacers to adjust the alignment to within limits. The 0.005" shims are supplied in the kit. If adding shims is not sufficient, it may be necessary to face off a spacer.
- 4. Once the backer bar is aligned, fully tighten the mounting screws.
- 5. Recheck the alignment after tightening the screws.

Install and Align Y Axis Encoder

- 1. Before installing the encoder, remove both endcaps and visually check the alignment of the reader head. Verify that the reader head is approximately centered within the housing and is not twisted in any way. Do not reinstall the end caps at this time.
- Refer to <u>Figure 3, Encoder Mounting Hole Usage</u>. Mount the encoder to the backer bar with the #8-32 screws provided. The 16-inch encoder mounts only one way; 12-inch encoders are either centered or offset to the rear. Some encoders require 2 screws and some require three. Tighten the screws just enough to hold the encoder in place and still be loose enough to allow adjustment.

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Figure 3, Encoder Mounting Hole Usage

- 1. Mount the indicator base to the bottom of the saddle, and set the indicator to check the position along the top of the encoder.
- 2. Move the saddle through its range of travel and observe the indicator. The top of the encoder should be within 0.005" of parallel to the Y-axis movement of the saddle.

NOTE: If the encoder is not properly aligned the reader head will not read correctly.

- 3. Loosen the screws at one end of the encoder and adjust the encoder up or down as required. The play in the mounting holes should provide enough movement for alignment.
- 4. Fully tighten the encoder mounting screws once aligned.
- 5. Recheck the alignment after tightening the mount screws.
- 6. Move the saddle to the positive Y-axis dead stop before starting the next step.

Mount and Align Y Axis Reader Head

During assembly, the reader head mount is temporarily screwed to the backer bar to aid reader head positioning. The last step of the installation is to remove the screws holding the reader head mount to the backer bar. There are two possible temporary reader head mount positions.

- 12" encoder, reader head mount temporarily installed 1/4" from positive travel dead stop.
- 16" encoder, reader head mount temporarily installed 1/4" from positive travel dead stop.



Figure 4, Assembling Reader Head Mount to Backer Bar

 Refer to Figure 4, Assembling Reader Head Mount to Backer Bar and Figure 5, Reader Head Mount Screw Holes. Temporarily assemble the reader head mount to the bottom of the backer bar. Be sure to use the correct #8-32 holes for the option selected.

With the #8 washers between the backer bar and the reader head mount, there will be approximately 0.040" between the backer bar and the reader head mount.



Figure 5, Reader Head Mount Screw Holes



Figure 6, Keeper Installation

2. Two orange plastic keepers are used to align the reader head during installation. Separate the keepers and install one on each side of the reader head.

Refer to **Figure 6**, **Keeper Installation**. To install, hold the keeper with the hooks up and the rounded end away from the reader head. The two square posts should face away from the machine. Insert the keeper in the bottom of the encoder body about 1/16 ", and rotate the keeper so the two square posts face the reader head. The two small hooks will grab the lower edge of the encoder. Slide the keeper against the reader head so the square posts fit into the two holes on the side of the reader head.

 With the keepers installed, there should be a small gap between the base of the reader head and the reader head mount. Refer to <u>Figure 7, Reader Head Screws</u>. Install the two reader head mounting screws with lock washers, but do not tighten. Start all four jack screws.





Figure 7, Reader Head Screws

CAUTION: Do not use the reader head mounting screws to pull the reader head flush against the reader head mount. The reader head must maintain the alignment set by the plastic keepers. The purpose of the jack screws is to maintain the reader head's position once the keepers are removed.

4. Refer to <u>Figure 8, Reader Head Positioning</u>. Set the indicator to measure the position of the front of the reader head. Screw in the first jack screw in until it just contacts the backer bar. Continue turning the jack screw until it pushes the reader head 0.002" from its initial position. One at a time, screw in the remaining jack screws until they just contact the backer bar. Do not push the reader head beyond the 0.002" position. Gently tighten the two reader head mounting screws. Torque reader head screws to 2 foot-pounds. Do not over tighten.



Figure 8, Reader Head Positioning

CAUTION: The reader head is designed to sit on the jack screws, overtightening the mounting screws will bend the reader head base and ruin the alignment.

- 5. Remove the two plastic keepers from the reader head.
- 6. Refer to <u>Figure 14, Y Axis Parts Diagram for Bridgeport</u>. Loosely assemble the vertical mount and offset block between the saddle and the reader head mount. On Bridgeport type machines, the vertical mount is installed on the end of the saddle. The vertical mount and offset block should be aligned so the offset block sits flush on the reader head mount. The vertical mount lays flat against the saddle. It may be necessary to reposition the backer bar to get the proper alignment. The backer bar's mounting holes are elongated for this purpose.
- 7. Refer to <u>Figure 16, Y Axis Parts Diagram for Lagun</u>. On Lagun type machines, the vertical mount is installed on the rear of the saddle facing the column. The vertical mount and offset block should be aligned so the offset block sits flush on the reader head mount. The vertical mount should lie flat against the saddle. It may be necessary to reposition the backer bar to get the proper alignment. The backer bar's mounting holes are elongated for this purpose.

Caution: The vertical mount, offset block, and reader head mount must be assembled to the machine so there is no twist or strain on any part.

NOTE: On non-Bridgeport machines the saddle may not be pre-drilled for the vertical mount. With the vertical mount flat against the saddle, and the offset block seated flush on the reader head mount, locate the required holes using a transfer punch. The vertical mount requires two mounting holes, both drilled and tapped to 1/4-20 X 1/2" deep (minimum).

- 8. Tighten all the fasteners connecting the vertical mount, offset block and the head mount together.
- 9. Refer to **Figure 4**, **Assembling Reader Head Mount to Backer Bar**. Remove the two #8-32 X 1 1/2" temporary screws and temporary #8 washers connecting the reader head mount to the underside of the backer bar. Removing these screws separates the reader head mount from the backer bar. The reader head is now free to slide inside the encoder as the saddle moves.

CAUTION: If the reader head mount springs or twists out of position after the temporary screws are removed, the entire assembly should be loosened and realigned.

CAUTION: Failure to separate the reader head mount from the backer bar will destroy encoders when the machine is used. Be sure the two #8-32 X 1 1/2" temporary screws and the two temporary #8 washers holding the reader head mount to the backer bar are removed.

10. After the installation is complete, perform a second visual inspection of the reader head. Reinstall both end caps.

Install and Align X Axis Encoder

- 1. Before installing the encoder, remove both endcaps and visually check the alignment of the reader head, verify that the reader head is approximately centered within the housing and is not twisted in any way. Do not reinstall the end caps at this time.
- 2. Refer to **Figure 9, X Axis Encoder Positioning**. Center the X-axis encoder along the length of the rear face of the table, with the bottom of the encoder even with the bottom of the table. Two bar magnets placed against the lower face of the table may make a good temporary support.



Figure 9, X Axis Encoder Positioning

- 3. Using a transfer punch, locate the encoder mounting screw positions.
- 4. Drill and tap the required #8-32 X 1/2" (minimum) mounting holes.
- 5. Mount the encoder using the #8-32 screws provided. Tighten the screws just enough to hold the encoder in place, and still be loose enough to make alignment adjustments.
- 6. Clear the table of loose debris and set an indicator to check the position of the top of the encoder.
- 7. Release the magnet on the base, and slide the indicator along the table while observing the reading. The top of the encoder should be within 0.005" of parallel to the top of table.

NOTE: If the encoder is not properly aligned the reader head will not read correctly.

- 8. Loosen the screws at one end of the encoder, and adjust the position up or down as required for alignment. The play in the mounting holes should provide enough movement.
- 9. Fully tighten the mounting screws once aligned.
- 10. Recheck the alignment after tightening the screws.

Mount and Align X Axis Reader Head

- 1. Move the table to the midpoint position of its full range of travel.
- 2. Position the reader head at the center of the encoder, and install the two orange plastic keepers. The plastic keepers maintain proper reader head alignment during installation.
- 3. Two orange plastic keepers are used to align the reader head during installation. Separate the keepers and install one on each side of the reader head.
- 4. Refer to Figure 6, Keeper Installation. To install, hold the keeper with the hooks up and the rounded end away from the reader head. The two square posts should face away from the machine. Insert the keeper in the bottom of the encoder body about 1/16 ", and rotate the keeper so the two square posts face the reader head. The two small hooks will grab the lower edge of the encoder. Slide the keeper against the reader head so the square posts fit into the two holes on the side of the reader head.
- 5. Use a transfer punch. Locate two reader head mounting holes on the rear of the saddle. The holes should be centered in the reader head's elongated slots.
- 6. Drill and tap two #8-32 X 1/2" (minimum) mounting screw holes.
- 7. Refer to Figure 7, Reader Head Screws. With the keepers installed, there should be a small gap between the base of the reader head and the saddle. Install the two reader head mounting screws with washers, but do not tighten. Start all four jack screws.

CAUTION: Do not use the reader head mounting screws to pull the reader head flush against the saddle. The reader head must maintain the alignment set by the plastic keepers. The purpose of the jack screws is to maintain the reader head's position once the keepers are removed.

8. Set the indicator to measure the position of the front of the reader head. Turn in the first jack screw in until it just contacts the saddle. Continue turning the jack screw until it pushes the reader head 0.002" from its present position. One at a time, turn in the remaining three jack screws until they just contact the saddle, but do not push the reader head beyond the 0.002" position. Gently tighten the reader head mounting screws until the reader head is secure. Do not over tighten.

CAUTION: The reader head is designed to sit on the jack screws, overtightening the mounting screws will bend the reader head base and ruin the alignment.

- 9. Remove the plastic keepers from the reader head.
- 10. After the installation is complete, perform a second visual inspection of the reader head and reinstall both end caps.
- 11. A saddle stop block should be installed to keep the X-axis reader head from being crushed against the machine column. The stop block is a block of metal approximately 1/8" larger than the reader head. The stop block should be bolted to some position on the rear of the saddle to ensure the reader head cannot come in contact with the column. Install the stop block using the 1/4-20 x 1 socket head screw included in the kit.

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Lathe Installation

The PGS-P linear encoder can also be installed on the Z-axis of a lathe. Use Anilam hardware kit P/N 32500327 to complete the installation.

Z Axis Installation

On the Z-axis of a lathe, the backer bar (and encoder) is usually mounted on the back side of the bed. The reader head is mounted to a bracket fixed on the carriage.

This procedure outlines the installation of a Z-axis encoder using one of the optional lathe Z-axis backer bar kits.

On most installations, the bed of the lathe is not a machined surface. To compensate for surface unevenness a backer bar is used. The backer bar is drilled and tapped to accept regularly spaced 1/4-20 internal wrenching jack screws. The backer bar is supported away from the lathe bed on the jack screws. The backer bar mounting bolts oppose the jack screws and hold the backer bar against the lathe bed.

When properly installed, the face of the backer bar should be parallel to the Z-axis movement of the saddle (within 0.005") along its entire range of movement. Additionally, the face of the backer bar should lie in a single plane (no twisting).

A universal reader head mounting bracket (found in the universal reader head mounting kit) is used with a universal side mount bracket to mount the reader head. The backer bar should be mounted so the holes in the reader head will line up with the mounting holes in the reader head mounting bracket when the encoder is installed.

CAUTION: The encoder and reader head should never be positioned so it is possible for the machine to drive the reader head beyond the encoder's range of travel.





Figure 10, Backer Bar, Encoder, and Reader Head Mount Positioning

Refer to **Figure 10, Backer Bar, Encoder, and Reader Head Mount Positioning**. The backer bar is properly oriented when the mounting bolt counterbore is away from the machine and the pre-drilled #8-32 screw is above the backer bar centerline.

- 1. Move the carriage to the dead stop closest to the head stock.
- 2. Slide the reader head as far as possible to the same end of the encoder.
- 3. Line the forward mounting hole on the encoder with the pre-drilled #8-32 hole on the backer bar. Hold the backer bar and encoder against the back side of the lathe bed and find a backer bar location that will support the reader head which will be within reach of the reader head mounting bracket, when it is installed.
- 4. Use a punch to mark the location of the center backer bar mounting hole. The center is chosen to help balance the weight of the bar.

- 5. Drill and tap the first 1/4-20 backer bar mounting hole.
- 6. Install the 1/4-20 set screws and temporarily bolt the backer bar to the lathe. Snug the mounting hole only enough to hold the backer bar in place.
- 7. Using a bubble level, level the backer bar.
- 8. Adjust the jack screws so the face of the backer bar is parallel to the Z-axis travel of the saddle, within 0.005, along its full length. Ensure the backer bar is not twisted.
- 9. Use a punch to mark the position of the remaining mounting holes.
- 10. Drill and tap the remaining 1/4-20 backer bar mounting holes.
- 11. Remount the backer bar and use the indicator to realign the face of the backer bar.
- 12. Install and tighten the remaining mounting bolts and jack screws. Adjust the jack screws as required to preserve the alignment of the backer bar.
- 13. Recheck the alignment.

Installing and Aligning the Encoder

- 1. Before installing the encoder, remove both end caps and visually check the alignment of the reader head. Verify that the reader head is centered within the housing and is not twisted in any way. Do not reinstall the end caps at this time.
- 2. Break loose the two screws holding the reader head alignment brackets to the reader head. Retighten only enough to keep the brackets in place. They will be removed at the end of the procedure.
- 3. Place the encoder against the backer bar and install the forward #8-32 mounting screw.
- 4. Mount a magnetic indicator on the carriage so the indicator probe measures the position of the top of the encoder.
- 5. Move the carriage through its full range of travel and observe the indicator. The top of the encoder should be parallel to the Z-axis movement of the carriage (within +/-0.002") along its entire length. Use a transfer punch to mark the remaining holes.
- 6. Remove the encoder.
- 7. Drill and tap the remaining #8-32 mounting holes.
- 8. Install the encoder using the #8-32 screws provided. Tighten the screws just enough to hold the encoder in place.
- 9. Re-align the encoder. Using a torque wrench, tighten the screws to 24 in-lbs. Do not overtighten the screws.

NOTE: If the encoder is not properly aligned the reader head will not read correctly.

10. Recheck the alignment.

Mount and Align Z Axis Reader Head

The universal reader head mounting bracket kit is packaged with a universal side mount bracket. The spacer block must be drilled and bolted to the carriage so the reader head mounting bracket aligns within (+/-) 1/16" of the reader head.

The bracket must be positioned in back of the reader head. The bracket can also be positioned to the right or to the left of the spacer block.

- 1. Mount the spacer block to the carriage.
- 2. Mount the reader head bracket to the spacer block using the $\frac{1}{4}$ in. cap screws provided.
- 3. Two orange plastic keepers are used to align the reader head during installation. Separate the keepers and install one on each side of the reader head. Refer to Figure 6, Keeper Installation.

To install, hold the keeper with the hooks up and the rounded end away from the reader head. The two square posts should face away from the machine. Insert the keeper in the bottom of the encoder body about 1/16 ", and rotate the keeper so the two square posts face the reader head. The two small hooks will grab the lower edge of the encoder. Slide the keeper against the reader head so the square posts fit into the two holes on the side of the reader head.

4. With the keepers installed, there should be a small gap between the base of the reader head and the reader head mount. Refer to Figure 7, Reader Head Screws. Install the two reader head mounting screws with washers, but do not tighten. Start all four jack screws.

CAUTION: Do not use the reader head mounting screws to pull the reader head flush against the reader head mount. The reader head must maintain the alignment set by the plastic keepers. The purpose of the jack screws is to maintain the reader head's position once the keepers are removed.

CAUTION: The reader head is designed to sit on the jack screws. Overtightening the mounting screws will bend the reader head base and ruin the alignment.

- 5. Refer to Figure 8, Reader Head Positioning. Set the indicator to measure the position of the front of the reader head. Screw in the first jack screw in until it just contacts the bracket. Continue turning the jack screw until it pushes the reader head 0.002" from its initial position. One at a time, screw in the remaining jack screws until they just contact the bracket and move the indicator to within 0.002". Gently tighten the two reader head mounting screws. Torque reader head screws to 2 foot-pounds. Do not overtighten.
- 6. Remove the two plastic keepers from the reader head.
- 7. After the installation is complete, perform a second visual inspection of the reader head and reinstall both end caps.

Connecting the Encoder

Connect each cable to the appropriate connector on the back of the DRO. The connectors on the DRO are marked. Plug the connector into the port and tighten both the thumbscrews until secure.

When routing each cable, position the machine so that the reader head is as far away from the DRO as possible. Tie-wrap each cable neatly. Drill and tap 10-32 holes for tie-wrap anchors. Ensure that enough slack remains to prevent tension anywhere along the cable. Arrange the cable so it cannot be pinched or crushed by any moving parts. Do not drape the cable across open spaces any more than necessary. Avoid putting any sharp bends or kinks in the cable.

CAUTION: Leave sufficient slack in the cables to permit the full range of up and down knee travel.

Testing the Encoder

- 1. Connect the scales to an active DRO.
- 2. Move the saddle to the dead stop position closest to the machine column.
- 3. Set the indicator to measure the position of the rear face of the table.
- 4. Set the DRO to "0".
- 5. Cycle the saddle (Y-axis) through its full range of travel and back to the original position as determined by the indicator.
- 6. Verify the DRO again reads "0".
- 7. Repeat this procedure for the X-axis.

NOTE: This procedure can be applied to check encoder accuracy with many setup variations. When checking the encoder, always approach the "0" position from the same direction, to eliminate reversal errors. Position errors are usually caused by encoder or head misalignment.

Encoder Replacement Parts

Occasionally, a runaway machine overextends its range of travel. This, in turn, causes the reader head to break through the encoder end cap. If the glass inside the encoder is not broken, the encoder can be reused. Do not attempt to force a damaged reader head back on the glass after an accident. Doing so could break the glass. Usually, the reader head and encoder end cap must be replaced after this type of accident.

The encoder reader head (with cable attached) and the encoder end caps are available as replacement parts. Refer to Table 3, Reader Head Replacements.

NOTE: Consult an ANILAM service technician before you replace the reader head due to a suspected electrical fault.

Replacement Reader Head & Cable Assembly	ANILAM Part Number
5 Micron Reader Head - 4 Meter Cable	P/N 19010137
5 Micron Reader Head - 6 Meter Cable	P/N 19010138

Table 3, Reader Head Replacements

NOTE: Reader heads with custom cable lengths are available as special order items.



Replacing a Reader Head



Figure 11, Reader Head and Encoder Cross Section View

- 1. Turn off power.
- 2. Reinstall the two plastic reader head alignment brackets. Use the screws included with the encoder.
- 3. Remove the reader head mounting bolts. The head should slide freely along the encoder.
- 4. Remove one encoder end cap.
- 5. Slide reader head out with the alignment brackets attached.
- 6. Refer to **Figure 11, Reader Head and Encoder Cross Section View**. Carefully install the new reader head (with plastic alignment brackets attached) as shown. If the new reader head does not move smoothly on the way in, do not force it. Gently correct the alignment until the reader head glides into the encoder body.
- 7. Align the reader head as described in the appropriate installation procedure.
- 8. Remove and store reader head alignment brackets.
- 9. Replace the end cap.

Parts Listing

Parts information is as listed in the following figures.

Figures	Description	ANILAM P/N	Kit Quantity
13, 14, and 15			Quantity
Item No.			
	Y Axis Bridgeport type PGS-P Encoder Installation Kit	32500325	1
1	• Washer, flat, 1/4	66100106	4
3	• Shim, .005"	66100415	2
4	Mount, vertical (Bridgeport Kit Only)	67201276	1
5	PGSP Reader head bracket	66300174	1
6	• Bar, backer	66300170	1
7	Adapter	66300171	2
8	Spacer bar	66300172	4
9	 Screw, #8-32 x 1", hex socket 	86100222	8
10	 Screw, #8-32 x 1 ½", hex socket 	86100223	2
11	 Screw, #10-32 x 3/8", Phil. Pan Head, Steel 	86100301	3
12	 Screw, ¼-20 x 2", hex socket 	86100494	2
13	 Screw, ¹/₄-20 x ¹/₂", hex socket 	86100510	1
14	 Screw, ¼-20 x 1 ¼", hex socket 	86100512	4
15	 Screw, 3/8-16 x 1 ½", hex socket 	86100580	2
16	• Screw, 3/8-16 x 2", hex socket, (use with extra spacer)	86100581	2
17	• Washer, flat, #8	86300120	6
18	Washer, #8, lock, split	86300121	4
19	• Washer, 3/8, lock, split	86300174	2
20	• Washer, 3/8, flat	86300203	2
21	 Screw, #8-32 x 1/2", hex socket 	86100217	4
22	 Block, offset (Bridgeport Kit Only) 	67201294	1
23	 Screw 5/16-18 x 3/4", hex socket 	86100805	2
24	Washer 1/4", lock	66100112	6
*	• Ty-wraps, 4"	85900001	12
*	Anchor, ty-wrap, #10	85900003	3
27	Saddle Stop Block	67201295	1
30	PGS-P Encoder Kit	Ref.	-
31	Screws, jack	With Encoder	4
*	Keepers, LH & RH	With Encoder	11

*Not shown



Figures	Description	ANILAM P/N	Kit Quantity
and 16			Quantity
Item No.			
	Y Axis Lagun type PGS-P Encoder Installation Kit	32500326	1
1	• Washer, flat, 1/4	66100106	6
3	• Shim, .005"	66100415	2
4	 Mount, vertical (Lagun Kit Only) 	66300173	1
5	 PGSP Reader head Mtg Bracket 	66300174	1
6	• Bar, backer	66300170	1
7	Adapter	66300171	2
8	Spacer bar	66300172	4
9	 Screw, #8-32 x 1", hex socket 	86100222	8
10	 Screw, #8-32 x 1 ½", hex socket 	86100223	2
11	 Screw, #10-32 x 3/8", Phil. Pan Head, Steel 	86100301	3
12	 Screw, ¼-20 x 2", hex socket 	86100494	2
13	 Screw, ¹/₄-20 x ¹/₂", hex socket 	86100510	1
14	 Screw, ¹/₄-20 x 1 ¹/₄", hex socket 	86100512	4
15	 Screw, 3/8-16 x 1 ½", hex socket 	86100580	2
16	• Screw, 3/8-16 x 2", hex socket, (use with extra spacer)	86100581	2
17	• Washer, flat, #8	86300120	6
18	 Washer, #8, lock, split 	86300121	4
19	• Washer, 3/8, lock, split	86300174	2
20	• Washer, 3/8, flat	86300203	2
21	 Screw, #8-32 x ½", hex socket 	86100217	4
24	• Washer ¼", lock	66100112	8
25	• Screw, ¼-20 X 1"	86100503	2
*	• Ty-wraps, 4"	85900001	12
*	 Anchor, tv-wrap, #10 	85900003	3
26	Vertical Slider	66300168	1
27	Saddle Stop Block	67201295	1
30	PGS-P Encoder Kit	Ref.	-
31	 Screws, jack 	With Encoder	4
*	• Keepers, LH & RH	With Encoder	11

*Not shown



Figure 12	Description	ANILAM P/N	Quantity
Item No.			
	• Z Axis Lathe type PGS-P reader head mounting kit	32500327	1
1	Bracket, Univ. Side Mount PGSP	66300175	1
2	PGSP Reader Head Bracket	66300174	1
4	• Washer, FL #1/4 x ¾"	66100108	4
5	Washer, Lock #1/4 Split Zinc Plated	66100112	4
6	• SCR Mach, 8-32 x 1/2" Hex Soc Blk Oxide	86100217	4
*	• SCR Mach, 8-32 x 1" Hex Soc Blk Oxide	86100222	6
*	• SCR Mach 8-32 X 1 1/2" Hex Soc Blk Oxide	86100223	2
7	• SCR Mach, 1/4-20 x 1 1/4 Hex Soc Blk Ox Steel	86100512	2
8	• SCR Mach 1/ 4-20 x1" Hex Boc Ox Steel	86100503	2
9	Washer, FI #8 Steel Zinc Type A	86300120	6
11	Washer, Lock #8 Split Lock Steel- Zinc	86300121	4

*Not shown



Figure 12, Z Axis Lathe Mounting Kit







Figure 14, Y Axis Parts Diagram for Bridgeport

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Figure 15, X Axis Parts Diagram



Figure 16, Y Axis Parts Diagram for Lagun

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