ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *IVEK 2000 Series* at our website: ***Click HERE***

Table Of Contents

Section	Description	Page #
5.	**Linear Actuator Module**	**5-2**
5.1	Description	5-2
5.2	Operation	5-2
5.2.1	Sensors	5-2
5.2.2	Coupling (hub)	5-3
5.2.3	Porting	5-3
5.3	Installation	5-4
5.4	Options	5-5
5.4.1	Encoder	5-5
5.5	Maintenance	5-5
5.6	Problem Guide	5-5
5.7	Specifications	5-5
5.8	Model Number	5-5
5.9	Illustrated Parts Breakdown	5-5

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

5. LINEAR ACTUATOR MODULE

5.1 DESCRIPTION (Figure 5.1)

The Linear Actuator Module, hereafter referred to as the Actuator Module, contains the mechanism for controlling the rotary and linear motion of the piston. The Actuator Module is composed of the motor, lead screw (either 20-pitch or 40-pitch), pump coupling, clutch/brake assembly, sensors and the cable connector.

Either a 20-pitch or 40-pitch model has been supplied depending on the size of the Pump Module chosen for your application. The 20-pitch Actuator Module is used for the B, C and D size pumps and measures 10 1/2" high, 3" deep, 2 1/2" wide and weighs approximately 5 pounds. The 40-pitch Actuator Module is used for the "A" series pumps and measures 9" high, 3" deep, 2 1/2" wide and weighs approximately 4.5 pounds. Both modules provide accurate control of the piston for precise dispensing volumes.

WARNING

Never remove a safety cover while the Actuator Module is running. Moving parts are located under these covers. Physical harm to individuals is possible.

5.2 OPERATION

The Actuator Module utilizes a permanent magnet stepping motor, a lead screw and an electromagnetic clutch and brake to produce a controllable linear and rotary motion. A linear displacement of the lead screw is produced by rotating a drive nut, internal to the stepping motor, while preventing the screw from rotating with the electromagnetic brake. Angular displacement steps of 1.8^{O} produced by the stepping motor are thus converted to linear displacement steps at the screw. Angular displacement of the lead screw is accomplished by releasing the brake and coupling the lead screw to the motor drive nut through the electromagnetic clutch. The coupling of these members allows the stepping motor to impart a rotary motion to the lead screw.

Electronic control over these linear and rotary functions allows a mounted Pump Module to be driven so the linear motion is used to fill or empty the Pump Module and rotary motion is used to valve to the intake and discharge ports.

5.2.1 Sensors

There are two sensors in the Actuator Module; both are used to control the stopping location of the lead screw. The linear sensor is activated when the lead screw is in the linear home location. The rotary sensor is activated when the lead screw is in the rotary home location.



Figure 5.1 Actuator Module

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

5.2.1.1 Linear Sensor

The linear sensor sends a signal to the Controller Module when the lead screw is in the linear home position. When the cylinder is filling, the lead screw is drawing the piston back. When the cylinder is full, the lead screw activates the linear sensor stopping the piston. The linear home sensor detects a piston withdrawn to full chamber capacity. A fault can only be generated during a load operation (when using the standard operating methods).

5.2.1.2 Rotary Sensor

The rotary sensor sends a signal to the Controller Module when the lead screw is in the rotary home position. The rotary sensor is used to detect problems during rotation of the piston (valving between port A and B).

When power is first applied to the Controller Module, the piston needs to be referenced to the home position prior to operation (Refer to Chapter 3).

When a fault occurs, the piston needs to be referenced. At the completion of the reference cycle, the rotary position is determined by the Port setting on the Controller Module. If the setting is Port B, the piston flat will align to Port B. If the setting is Port A, the piston flat will align to Port A.

CAUTION

If the Controller Module is set for REVERSE and a fault occurs, the piston will reference to the selected port, but the Controller Module will revert back to FORWARD.

5.2.2 Coupling (hub)

A coupling, located on the pump side of the Actuator Module, provides a mounting location for the piston. The piston drive pin slides into a slot on the coupling hub and is secured with two set screws.

CAUTION

The coupling is factory set to a precise location. Moving the coupling could cause damage to the Actuator Module or Pump Module.

5.2.3 Porting (Figure 5.2)

The porting arrangement is preset at the factory based on the application. This arrangement allows the standard discharge port (Port B) to be on any side of the Actuator Module.

5.2.3.1 Operation

The Pump Module may be mounted to the Actuator Module with its intake and discharge ports positioned in one of two positions. This affects the internal setup of the Actuator Module and can be changed if required.

5.2.3.2 Porting Adjustment (Figure 5.3)

The following procedure describes changing the orientation of the porting.

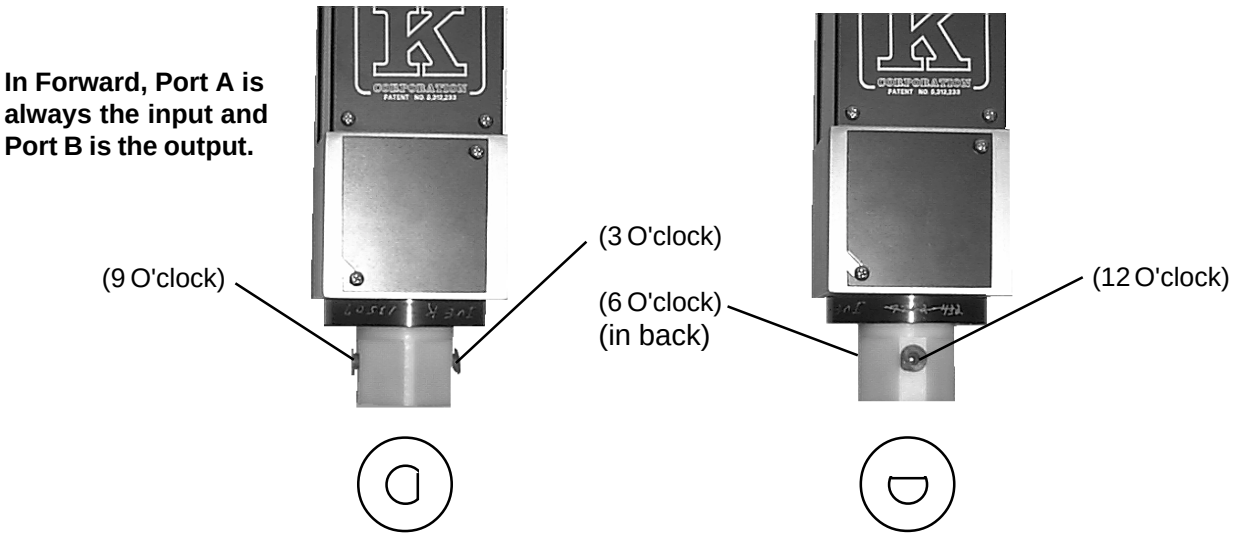


Figure 5.2A Port Locations **Figure 5.2B Port Locations**

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Tools Required

1. Philips Head Screwdriver
2. 3/32 Hex Key
3. 5/32 Hex Key

Setup

1. Connect Controller Module to Actuator Module using the cable.
2. Turn power on and reference the system.
3. Change the Controller Module to Meter mode.
4. Press START to meter piston fully forward.
5. Remove covers (12) and (13).
6. Use 5/32 hex key to remove Pump Module (refer to Chapter 7, leave the piston in place)
7. Loosen, do not remove, #4-40 socket head cap screw (19)
8. Rotate the piston so the flat lines up with the desired discharge port position (refer to figure 5.2). Do this by rotating the coupling that holds the piston. Use an edge of the coupling housing (1) as a visual reference.
9. Tighten #4-40 socket head cap screw (19).
10. Press the LOAD button on the Controller Module to fully retract the piston.
11. Press the START button to meter the piston fully forward.
12. Recheck piston flat to verify port alignment.
13. Repeat adjustments 7 through 9 if needed.
14. Insure there is approximately 1/32" gap between spool bushing (18) and drive hub (10) when pump is metered forward.
15. Replace Pump Module (refer to Chapter 7).
16. Replace covers (12) and (13).

5.3 INSTALLATION

The Actuator Module includes two 1/4-20 tapped mounting holes. These mounting holes can be used for mounting onto various apparatuses. The position of the Pump Module should be considered when mounting the Actuator Module. Plan to mount so the intake and discharge tubing and the end cap can be easily accessed. Additional consideration should be taken regarding the fluid flow. Always keep the discharge of the Pump Module even with or higher than the intake and never mount the Actuator Module so the pump end cap is above the ports.

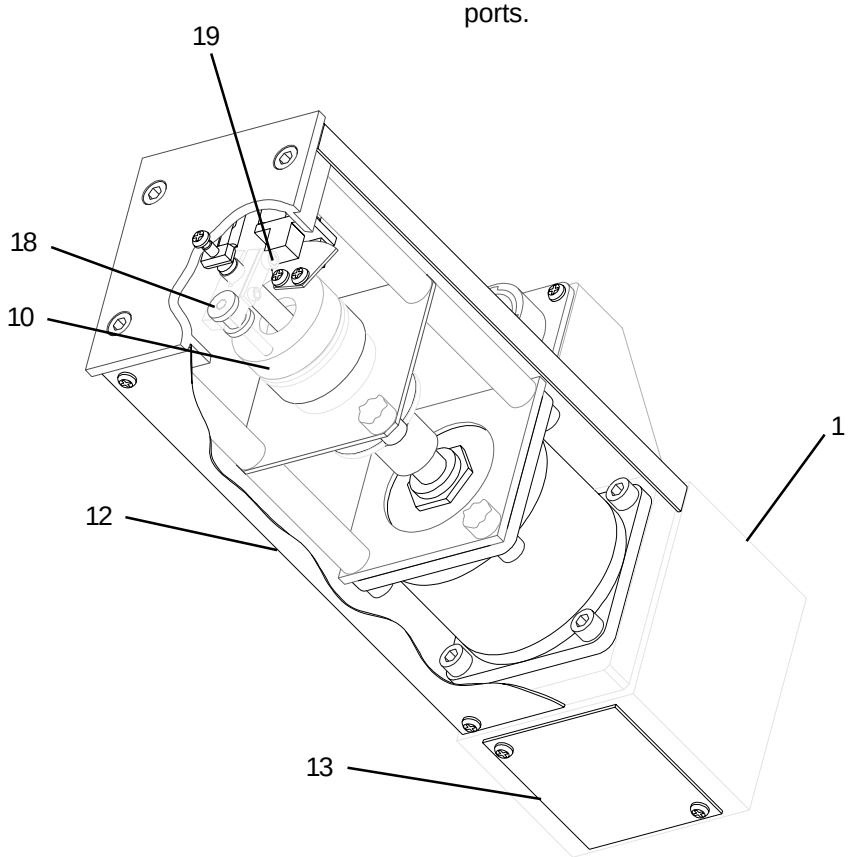


Figure 5.3 Actuator Module Port Change Illustration

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

5.4 OPTIONS

IVEK Corporation offers a variety of options to best meet the customers needs. Following is a list and description of available options for the Actuator Module. Refer to the Title Section of this manual for the list of options provided with this system.

5.4.1 Encoder

The encoder option must be present in the channel card (in Controller Module), the interconnecting cable and in the corresponding Actuator Module.

This option adds an encoder to the Actuator Module which allows the channel card to verify all motions of the Actuator Module. Any stall during fluid displacement or valving will immediately be sensed using the encoder, and will generate a fault condition. The encoder works in conjunction with the linear and rotary sensors.

5.5 MAINTENANCE

CAUTION

Never connect or disconnect the cable from the Actuator Module connector while power is on. Damage to the equipment may result.

Minimal maintenance is necessary for this Actuator Module.

5.6 PROBLEM GUIDE

Table 5.1 contains a list of possible problems, causes and solutions for the Actuator Module.

5.7 SPECIFICATIONS

Motor:	23 Frame 1.8^{O} Stepper
Lead Screw:	1/4-20 Acme or 1/4-40 60^{O} V Thread
Lead Accuracy:	.0001" / inch noncumulative
Maximum Stroke:	1/4-20 = 1/2" = 2000 steps or 1/4-40 = 1/4" = 2000 steps

5.8 MODEL NUMBER

The model number provides important information about the specifics of your Linear Actuator Module. Refer to this number when calling IVEK Technical support. The model number for your Actuator Module is located in the Title Page section of this manual.

40 Pitch Actuator **032037 - ## #**
20 Pitch Actuator **032038 - ## #**

Dispense Port Position
- **03** - 3 O'Clock (standard)
- **06** - 6 O'Clock
- **09** - 9 O'Clock
- **12** - 12 O'Clock

Encoder Option
- **1** - No Encoder
- **2** - Encoder

5.9 ILLUSTRATED PARTS BREAKDOWN

The illustrated parts breakdown (Figure 5.4) contains replacement parts for the Actuator Module.

Table 5.1 Common Operational Problems and Solutions

PROBLEM	PROBABLE CAUSE	POSSIBLE SOLUTION
Controller Module power on and operational, but will not activate Actuator Module.	I/O Cable	Check connection of cable between Controller Module and Actuator Module. Inspect and repair faulty cable.
System is running but not pumping fluid.	Damaged Coupling	If piston not referenced to output, check coupling for damage.
	Loose fitting	Tighten fitting
Rotary or Linear Sensor Fault	Piston seized in cylinder	Remove and soak.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
		Linear Actuator Module	**1**
032037-###			
1	032133	Front Shell Fabrication	1
2	032083	Cover Plate	1
3	032128	Thumb Screw Fabrication	2
4	001576	Adaptor Ring	1
032038-###			
1	032132	Front Shell Fabrication	1
2	032083	Cover Plate	1
3	032128	Thumb Screw Fabrication	2
4	032050	Adaptor Ring (optional) (supplied with pump module, not shown)	1

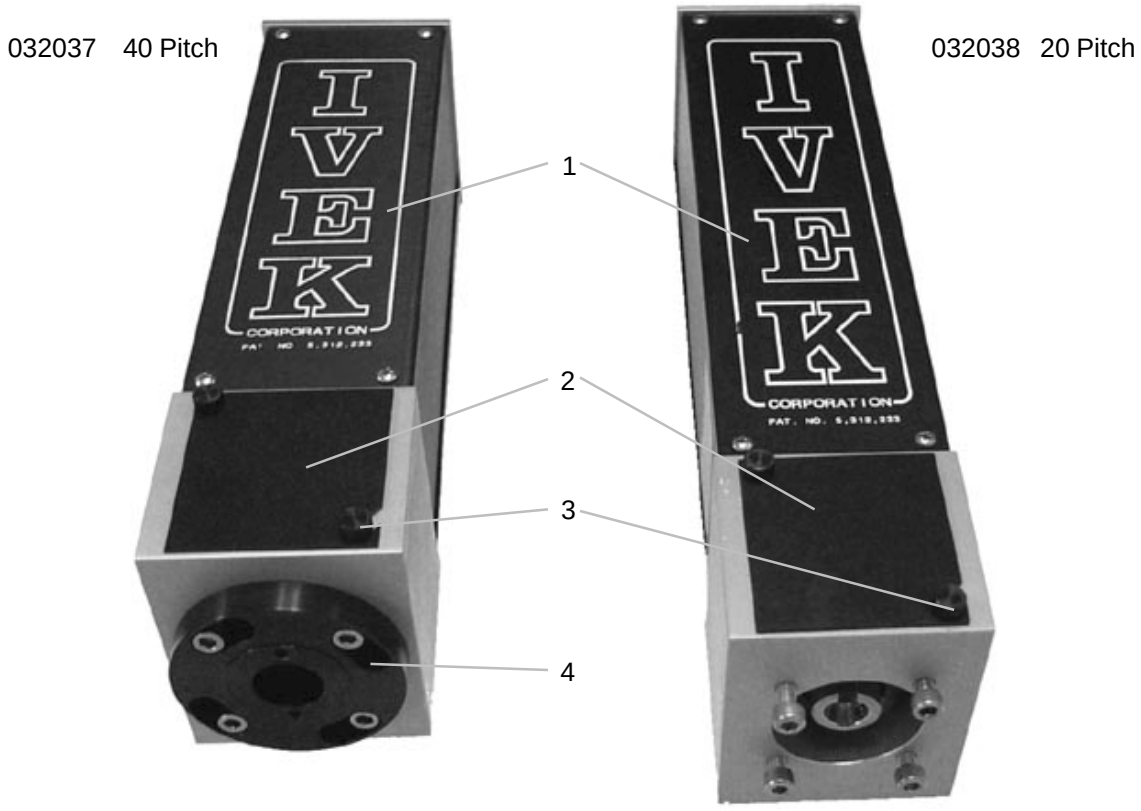


Figure 5.4 Linear Actuator Module (Sheet 1 of 1)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP