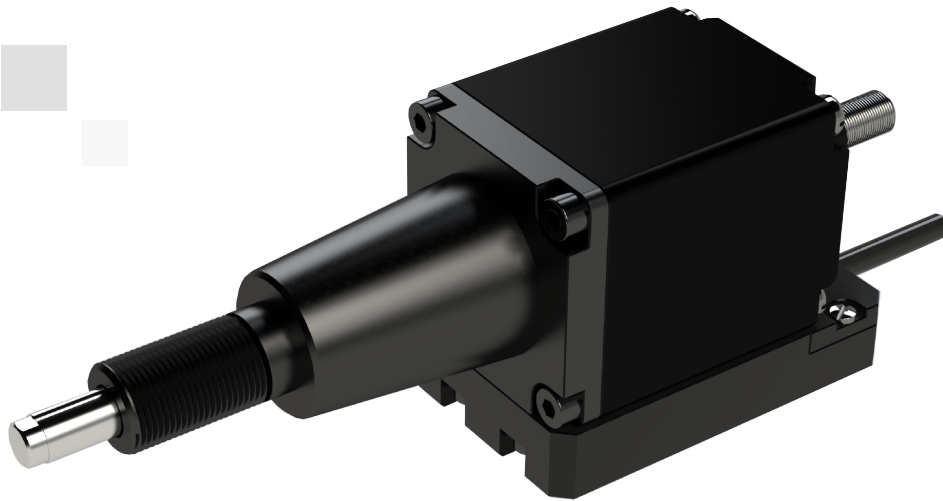


Micromike-30

Series



Micro Pusher Reference Manual

Micromike-30

Linear Actuator

Reference Manual

Rev 1.0

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1. Introduction

1.1 Product Description

The Micromike-30 linear actuator is designed for applications with very limited space conditions and high load requirements. Typical applications include actuation of manual drive stage and mirror mounts. It utilizes a 2-phase stepper motor and two mechanical limit switches for homing (custom options include an integrated encoder). Versions are capable of operation in vacuum (10⁻⁶ mbar) are available. The Micromike-30 is compatible with the MMC-200 and NanoDrive controllers

Product Specifications	MICROMIKE-30	
Travel	12mm	25mm
Open Loop Resolution	0.1 μ m	
Max Force	70 N (3mm/s)	
Limit Switch	Mechanical	
Environment	Atmospheric / HV	
Encoder	Upon Request	
Custom Adapter Tip	Upon Request	

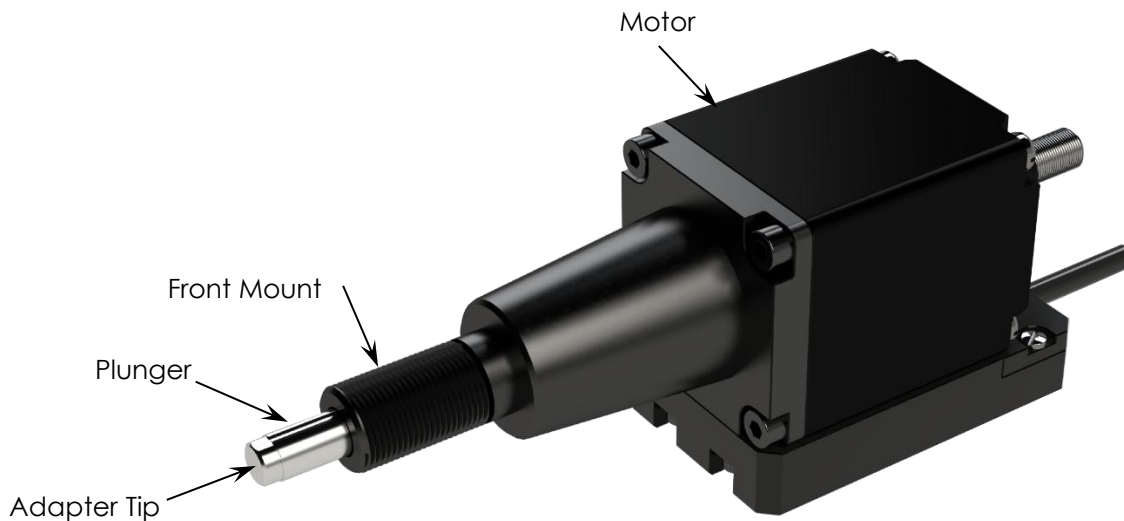


Figure 1-A. MICROMIKE-30

1.2 Recommended Controllers

The following controllers are available from MICRONIX USA:

Controller	Stepper Motor	Encoder
MMC-200	✓	Consult with Factory

1.3 Technical Data and Ordering Information

Detailed specifications and ordering information can be found on the [Micromike-30](#) product page on the MICRONIX USA website.

2. Preparing to Install the Micromike-30 Linear Actuator

2.1 Installation Preparation

The stage is calibrated to be within specification at $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ unless otherwise specified. Be sure to use the stage under the following conditions:

- Mount to a clean surface which is free of debris, burrs or dings.
- An indoor atmosphere free of corrosive gases, excessive dust, and condensation.
- Temperature range of $5\text{-}40^{\circ}\text{C}$.
- Relative humidity between 20-80%.
- Locate away from water, heat, and electrical noise.

2.2 Product Handling

- The Micromike-30 linear actuator is a precision mechanical device and should be handled with care. Do not drop or mishandle the actuator.
- Use proper cable management to ensure a clean and safe operating environment.
- The Micromike-30 is designed to support axial loads only. Do not apply radial loads.
- Allow for easy access to the stage in case of servicing.

2.3 Package Contents

If the product is damaged or there are missing components, contact MICRONIX USA immediately. Do not discard product packaging in case of return shipment.

Package Should Contain:

- Micromike-30 Linear Actuator
- Locking Nut & Wrench
- Reference Manual
- Any other previously agreed upon components such as a controller and cable.

3. Installing the Micromike-30 Linear Actuator

The Micromike-30 can be installed to motorize manual stage, mirror mounts, or other applications. The Micromike-30 is designed for axial loading; do not apply radial loads to the plunger.

3.1 Micromike-30 12 mm & 25 mm Installation

1. Unscrew the locking nut from the Micromike-30 and insert the Micromike-30 into the mounting surface.
2. Tighten the locking nut using the supplied wrench until secured and the body does not rotate. While installing, hold the Micromike-30 by the front mount to avoid applying torque to the limit switch housing.

Important: Do not apply radial loads to the plunger.

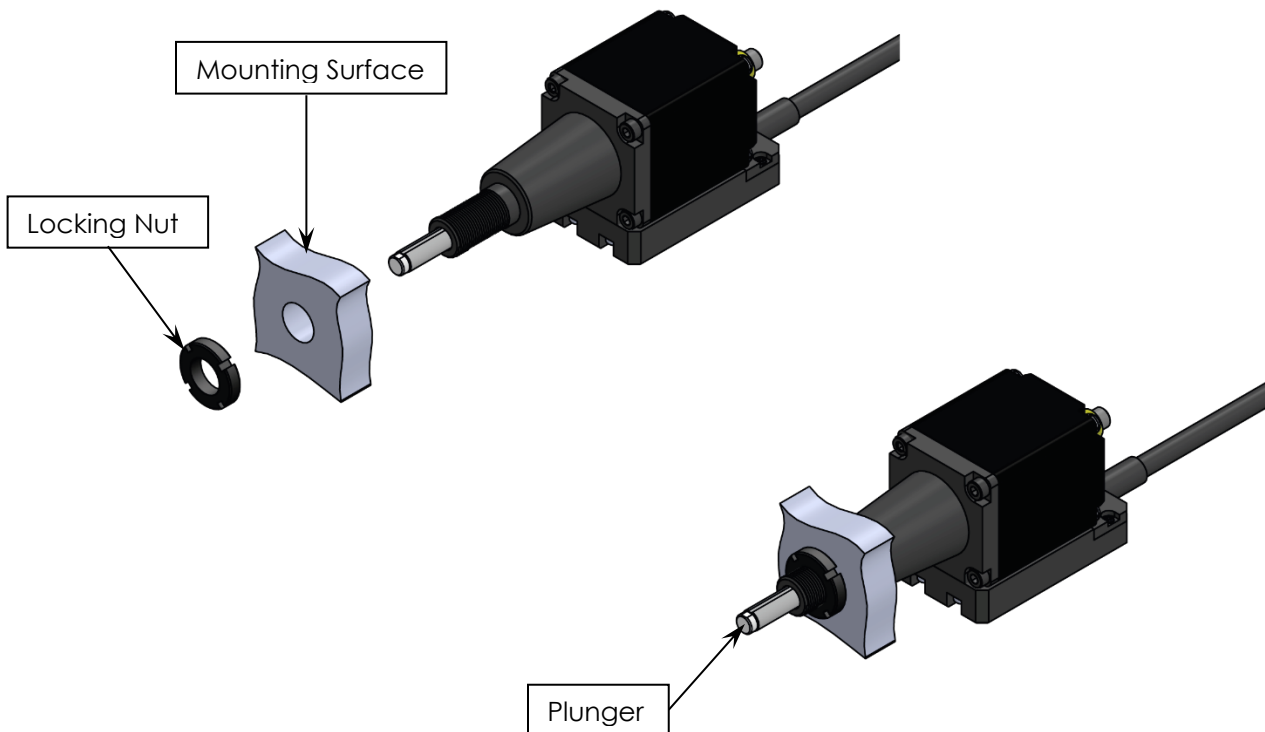
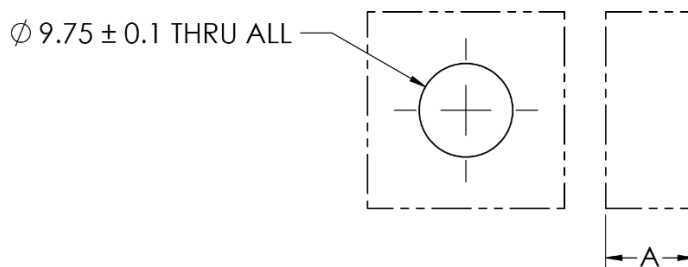


Figure 3-A. Micromike-30 12 mm & 25 mm General Installation

3.1.1 Recommended Mounting Design

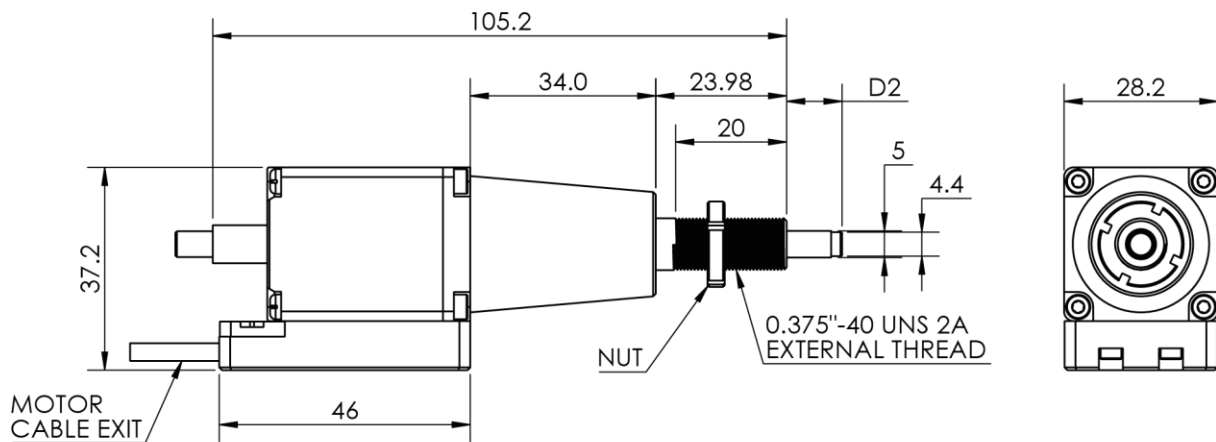
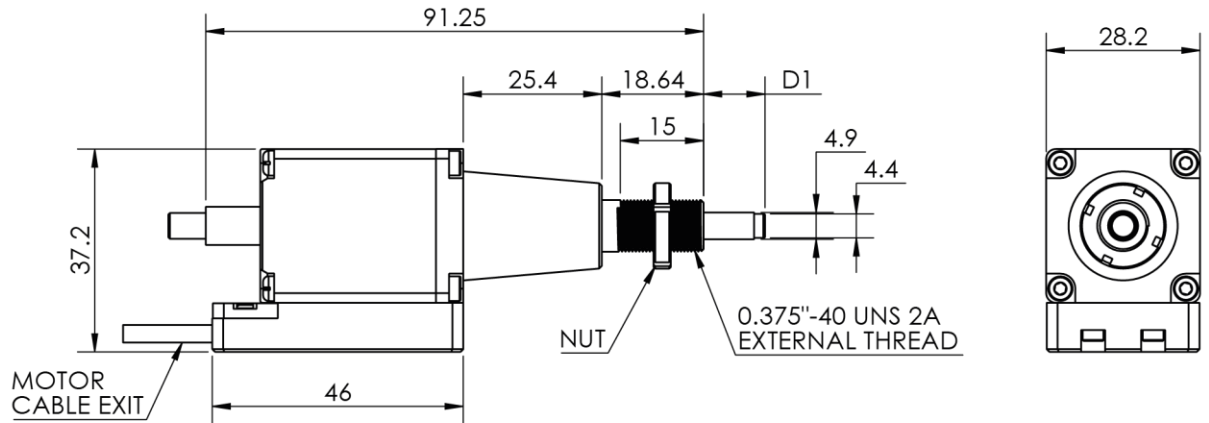


A (Mounting Thickness)

Minimum (mm)	9
Maximum (mm)	16

4. Dimensions

4.1 Micromike-30 12/25 mm Travel Actuator Dimensions



TIP LOCATION	D1	D2
Negative Limit (retraction)	3.5 ± 0.5	2.5 ± 0.5
Positive Limit (extension)	15 ± 0.5	26 ± 0.5

Connecting the Micromike-30 Linear Actuator

4.2 Atmospheric Environments

For controller information, refer to the appropriate MMC controller manual.

4.2.1 Atmospheric Wiring Diagram

Connecting the Micromike-30 Linear Actuator in only requires that the D-sub 9 Pin male motor cable be connected to a compatible controller. No other cables or components are required.

Cable Descriptions:

A. Motor Cable (Male Dsub9 Pin, 1.5m PVC Black Cable)

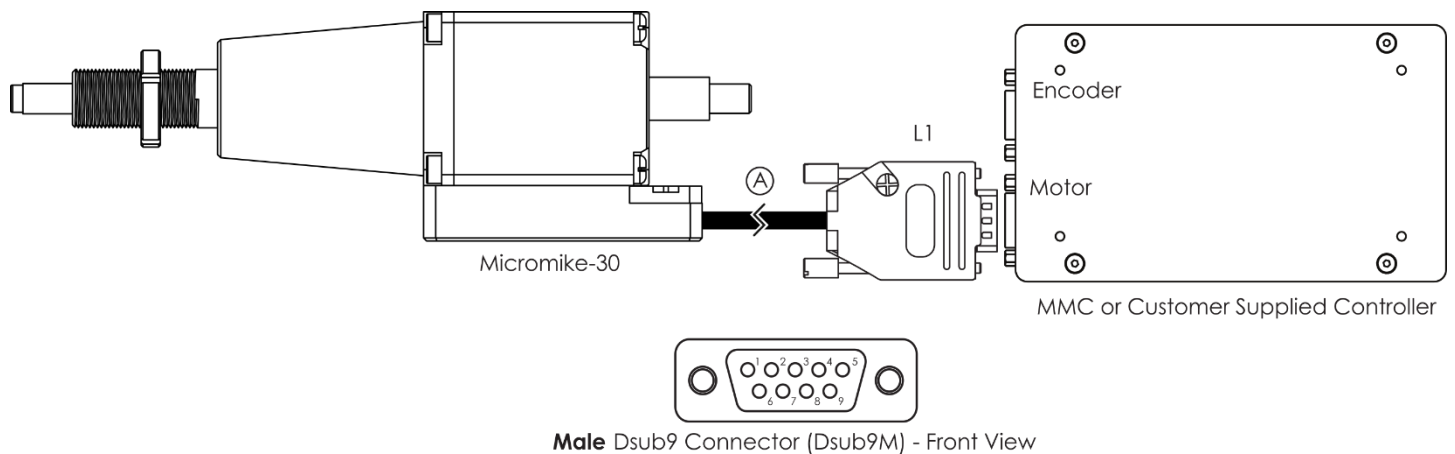


Figure 0-A. MICROMIKE-30, Atmospheric Wiring Diagram

4.2.2 Atmospheric Pinout

Pinout for MICROMIKE-30-2X010		Cable A Dsub9M
Description	Color	L1
Motor A+	Brown & White (Brown TP)	1
Motor A-	Green & White (Green TP)	2
Motor B+	Violet & White (Violet TP)	3
Motor B-	Grey & White (Grey TP)	4
Limit Common	Black	5
Limit Switch -	Blue	6
Limit Switch +	White (Blue TP)	7
Not Used	Not Used	8
Not Used	Not Used	9
Shield	-	Casing

4.3 Vacuum Environments

4.3.1 Handling and Preparation

When handling the actuator for vacuum environments, take the necessary precautions, such as wearing clean latex gloves, clean room clothing, etc. Avoid any contaminants. Maximum bake-out temperature is 100°C. MICRONIX USA optionally supplies the stage with vacuum compatible connectors, see chart below.

Connector Description	Connector Material	Contacts	Backshell
High Vacuum Glass- filled Diallyl Phthalate D-Subminiature	DAP (Diallyl Phthalate)	T2 Female Crimps, Gold Pins (Accuglass P/N: 111652)	Nickle-plated Zinc Backshell Strain Relief

Environment	Open Loop	Closed Loop
High Vacuum (10^{-6} mbar)	9 Pin Female DAP	15 Pin Female DAP

Connecting the Micromike-30 in a vacuum chamber requires the use of a feed through connector at the vacuum chamber wall.

The vacuum compatible Micromike-30 will be supplied with wiring for a straight through feed through, not a cross over gender changer. MICRONIX USA supplies test connectors that simulate the vacuum feed through to allow for functionality testing prior to installation in a vacuum chamber, see Appendix A.2 for feedthrough pins.

4.3.2 Vacuum Wiring Diagram

For details regarding the pinout and feedthrough specifications, see Appendix section A.2.

Cable Descriptions:

- A. Vacuum Motor Cable (Female Dsub9 Pin, 1.5m Silver Braided Cable)
- B. Atmospheric Motor Cable (Female Dsub9 Pin to Male Dsub9 Pin, 1.5m PVC Black Cable)

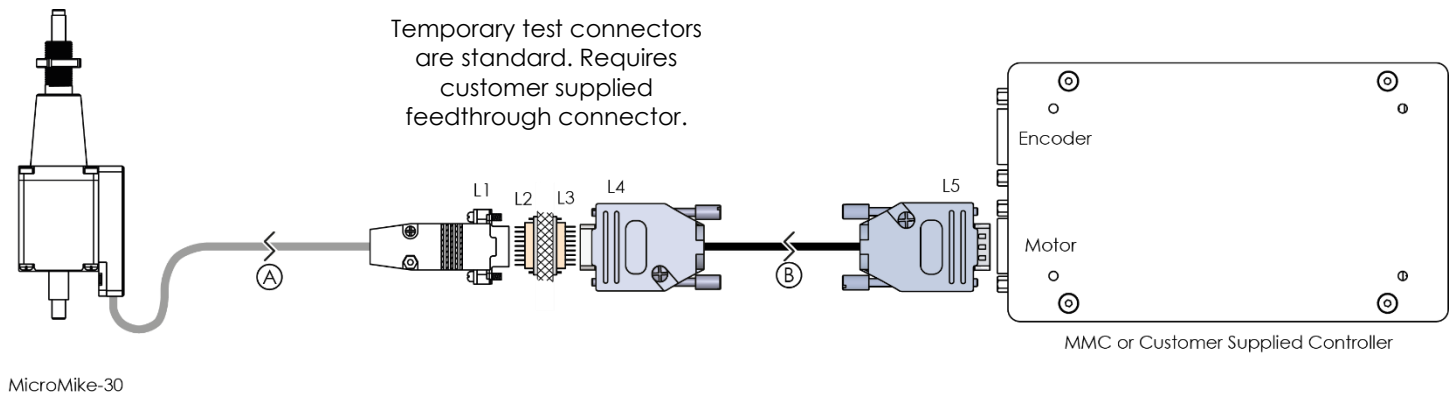
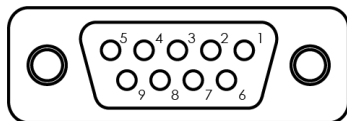


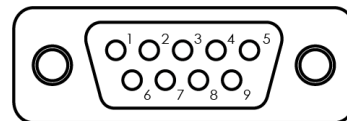
Figure 0-B. MICROMIKE-30, Vacuum Wiring Diagram

4.3.3 Vacuum Pinouts

	Pinout for MICROMIKE-30-2X016		Cable A Dsub9F			Feedthrough Dsub9M		Cable B Dsub9F		Cable B Dsub9M	
	Description	Color	L1	L2	L3	Color	L4	L5	L6	L7	L8
Motor	Motor A+	Green	5	5	1	Brown & White TP	1	1			
	Motor A-	Green & White	4	4	2	Green & White TP	2	2			
	Motor B+	Red	3	3	3	Violet & White TP	3	3			
	Motor B-	Red & White	2	2	4	Grey & White TP	4	4			
	Limit Common	Brown	1	1	5	Black	5	5			
	Limit Switch -	Violet	9	9	6	Blue	6	6			
	Limit Switch +	Blue	8	8	7	White (Blue TP)	7	7			
	N.C.	N/A	7	7	8	N/A	8	8			
	Shield	-	6	6	9	-	9	9			



Female Dsub9 Connector (DE-9S) - Front View



Male Dsub9 Connector (DE-9P) - Front View

5. Supplementary Information

5.1 Units and Conventions

All measurements in this document are in the metric system of units.

Metric Unit	English Unit
1 millimeter	0.0394 inches
1 micron	0.0000394 inches
1 Newton	0.2248 lbs
1 Newton-meter	8.85 in-lbs

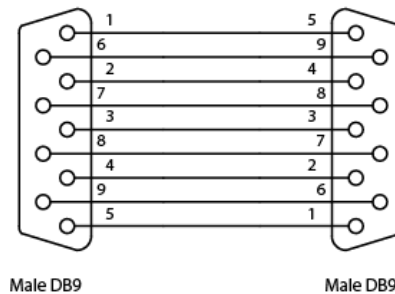
A. Appendix

A.1 Stepper Motor Operating Specifications

Motor Type	2 Phase Bipolar
Phase Current	0.42 A _{RMS} max*
Step Angle	1.8 °
Steps	200
Coil-Resistance	11.9 Ohms
Coil-Inductance	6.7 mH
Pitch	0.635 mm/rev
Resolution/Full step	3.175 µm (0.000125 in)

*If a 3rd party controller is used, then consult its manual since most controller vendors do not list if current setting as either A_{RMS} or A_{PEAK}. It is essential to make sure the driving current is set properly to ensure optimal performance.

A.2 Feedthrough



A.3 Limit Switches

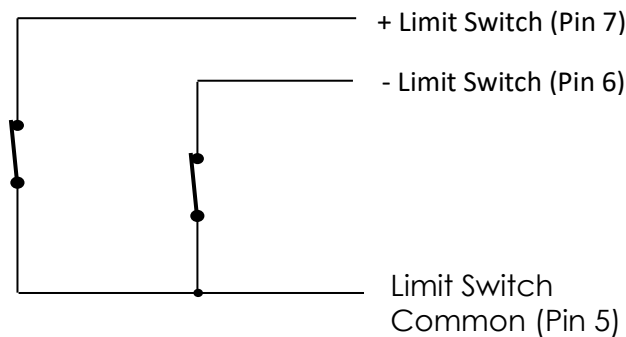
The Micromike-30 includes two mechanical limit switches near the ends of travel, used for overtravel protection and homing of the device. The limit switches are normally closed and pulled to Common when not activated and must be connected to a compatible controller configured for this operation. Failure to properly set the limit switches on the controller will result in physical damage to the stage. The mechanical limit switches are factory installed and are not user adjustable. Refer to the applicable controller user manual for additional information on homing and calibration procedures.

*For custom travel length actuators, please contact MICRONIX USA for recommended soft limit position.

A.3.1 Electrical Specification

Contact Rating	100 mA @ 12 V
Contact Type	Normally Closed

A.3.2 Limit Switch Schematic



A.3.3 Direction of Motion

