

LIGHTSPEED
TECHNOLOGIES

Variable Vacuum Slit Assembly (VSA)
MS30-18-VSA
Adjustment from 0mm to 18mm

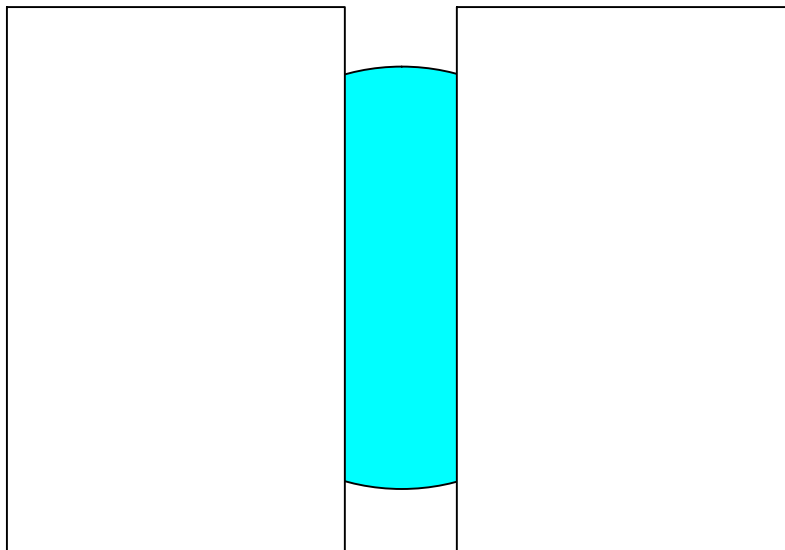
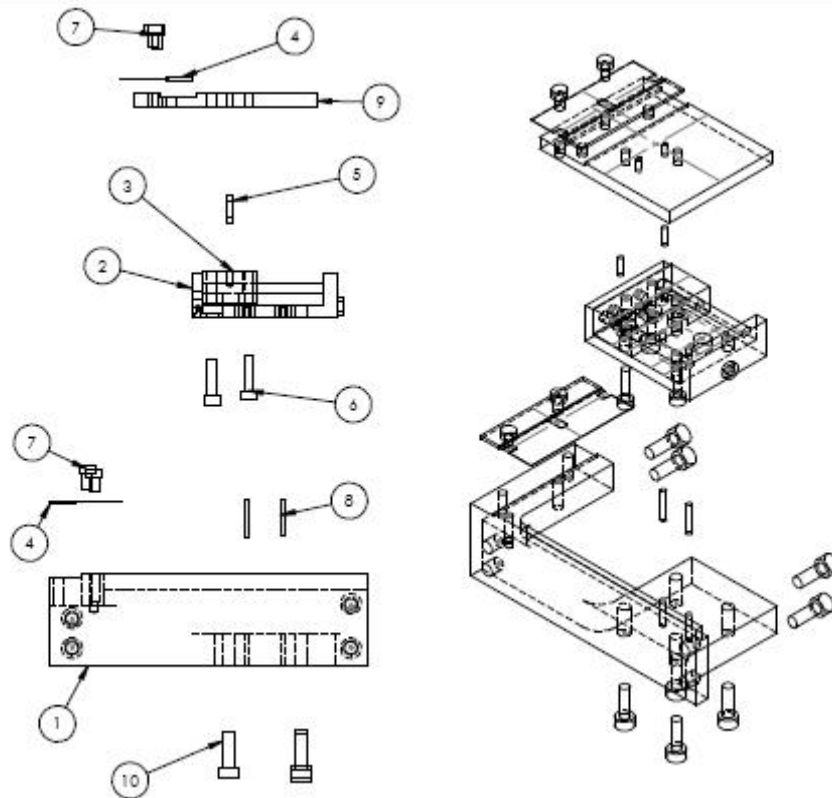


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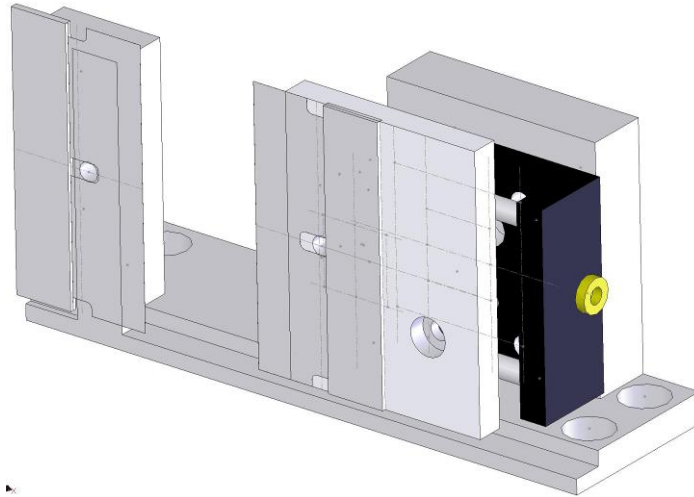
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Components List



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1		Slit Assembly Mount	1
2		MS30-18	1
3		MS30 - slider	1
4		Razor Blade	2
5		M1.5 X 3mm pin	2
6		M2.5 X 10mm SHCS	2
7		M2.5 X 4mm SHCS	4
8		M1.5 X 10mm pin	2
9		Razor Mounting Adapter	1
10		M3 X 10mm SHCS	4
11		6-32 X .375 SHCS	4
		Vented Mounting Screws	

Introduction



The MS30-18-VSA variable vacuum slit assembly (VSA) is a precision, remote controlled aperture for optical applications. Two sharp edges are accurately positioned in parallel. One of the sharp edges is fixed while the other moves along a stage slide to provide variable slit width from completely closed to as wide as 18mm.

Warnings

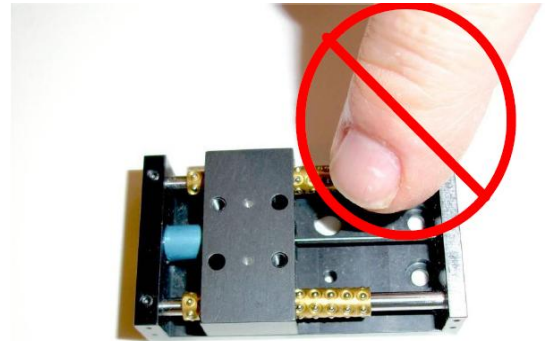
Use all precautions for keeping vacuum components clean.

The knife edges are sharp.

Do not exceed bakeout temperature of **120° C**

Do not short the connection to the piezo controller.

Do not push the drive pin laterally.



Operating Temperature and Vacuum Preparation

The VSA is prepared for operation at 1E-9 Torr.

The maximum temperature for open and closed loop for bakeout (without operation) is about 120° C. When higher temperatures are used, either the linear measuring system or the piezo inertial drive will be damaged.

Operation

Precision control of the moveble edge is achieved with a piezo motor. The MS30 long travel piezo stage employs a 'slip-stick' mechanism to allow long travel with piezo high precision.

Three MS30 piezo stages can be controlled with one CU30 controller. Each stage has its own control line and they all can share the same return line using a total of 4 pins on a feedthrough for open loop configurations. The CU30 is powered by USB and the stages are controlled by the CU30 software.

In the open loop configuration, software allows the user to set number of steps and velocity. The CU30 is capable of partial steps of approximately 20-30nm and when setting number of steps in software, the user is really setting the number of 'partial steps'.

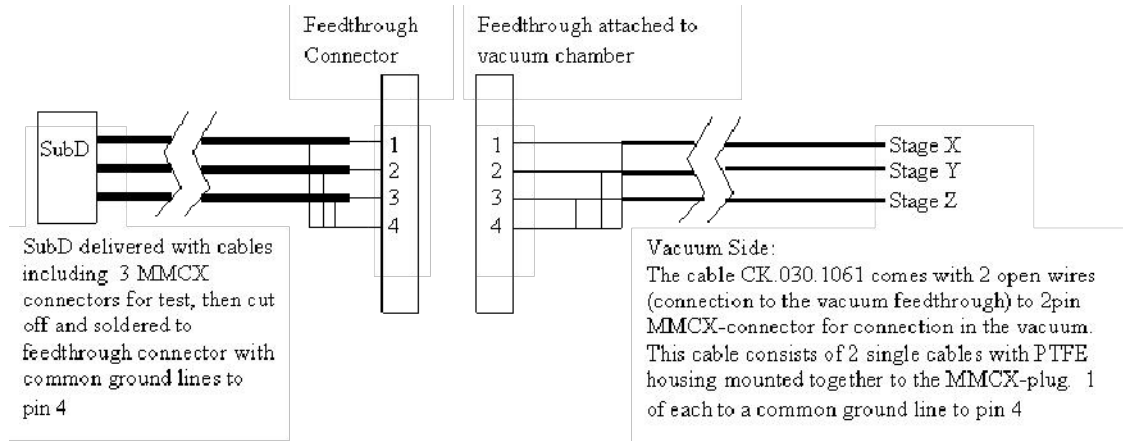
Open loop stages can be characterized for approximate position experimentally. The piezo mechanism may move a little more for each step in one direction compared to the other but are consistent for each direction. For example, a complete span in one direction may require 100,000 steps while in the reverse direction require 110,000 steps. This may vary for other conditions such as vacuum or ambient pressure, variation of temperature, etc. Characterize the open loop stages as they will be used. If inside a vacuum chamber and there is no visible access to the stage, there is a distinct audio change when the stages reach a hard limit and this can be useful when characterizing a stage for the number of steps per total travel for a particular condition. Once the number of steps required to span the total travel distance, divide 18mm by the total number of steps to determine approximate travel per step. Optical Encoders are available for closed loop operation.

When closing, blades will slide one under the other, completely closing the slit. There is a certain number of steps required to begin opening the slit. As the slit opens, some of the edge may still make contact. The slit is reasonably open with uniform aperture at approximately 0.002 to 0.003 inches.

Hard Limits

The MS30 stages can drive against a hard limit without damage. Hard limits can be used as a reference location if characterizing open loop stages for travel. Drive the stages to a hard limit for reference and characterize the number of steps required for the total travel. Divide 18mm by the total number of steps to get an approximate value for travel per step (will be different in each direction).

Wiring Diagram



Specifications

Slit Width:

Minimum slit width: Closed

Minimum slit: 0.002-0.003 inches

This represents the minimum slit with uniform throughput. Smaller than 0.002 inches blades may be partially closing some locations.

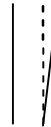
Step size: approximately 20nm with CU30 controller. User must characterize for operating conditions

Maximum slit width: 18mm

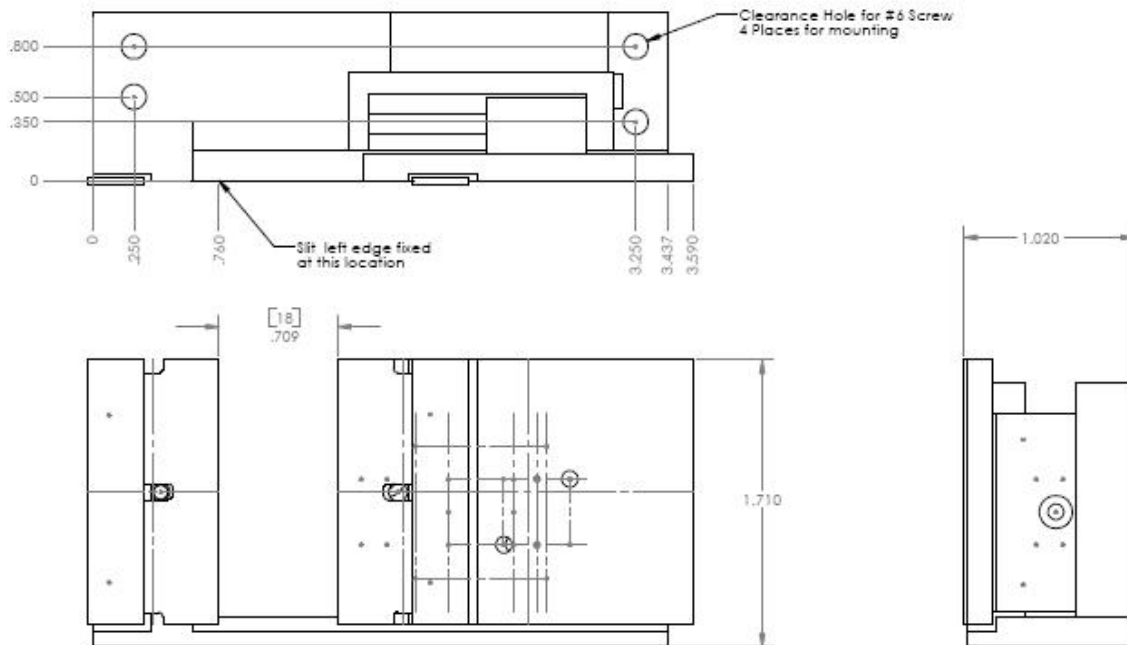
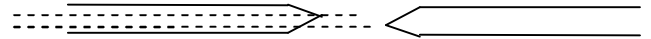
Edges Perpendicularity to Base: within <0.5 degree



Parallelism of 2 edges: within <0.1 degree



Blades are co-planar within 0.002 inches (serial numbers 2 and 3) 0.007 inches (serial number 1).



Warranty and Contact Information

Contact Lightspeed Technologies Inc. with any questions about the Variable Slit Assembly. Electronics and workmanship are warrantied for one year. Piezo elements are warrantied for 90 days. If return for repair is required, contact Lightspeed Technologies.

Mailing address for official correspondence:

Lightspeed Technologies Inc.

P.O. Box 110161

Campbell, CA 95011-0161

Shipping Address:

Lightspeed Technologies Inc.

1350 Dell Ave. Suite 103

Campbell, CA 95008

Phone: (408) 761-0062

Fax: (408) 378-3629

Email: info@light-speed-tech.com

Website: www.light-speed-tech.com