

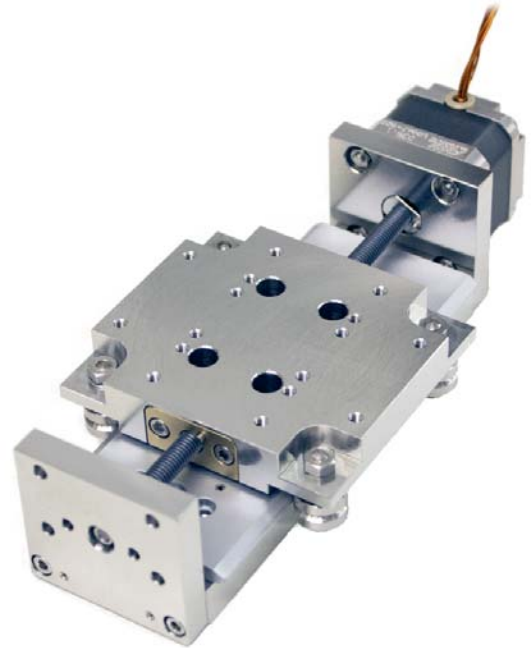
# LTV Translation Stage

## UHV Linear Sample Transporter

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AML ultra high vacuum compatible linear translation stages provide long travel with minimum height for loads of up to several kilograms. They have widely spaced 'V' roller guides and are useful in simpler compound mechanisms where torsional loads are small. They are manufactured with UHV compatible material and construction methods and utilize AML UHV stepper motors.

Smooth motion is provided by a diamond corrected lead screw and a matched, precision lapped nut to ensure good positional stability and incorporate a preloaded leadscrew nut to eliminate backlash.



### FEATURES

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- Travel ranges 50 to 250mm
- Resolution to 1µm per step
- Negligible backlash
- Low profile construction
- Load capacity to 20kg
- Directly stackable for XYZ
- Suitable for use below  $1 \times 10^{-10}$  mBar
- Bakeable to 200°C
- "V" roller guide bearing motion
- Diamond corrected leadscrew and matched nut
- Gamma radiation hard to  $1 \times 10^6$  Gy versions available
- May be customised

## SPECIFICATIONS

Specification	Unit	LTVL	LTVH
Travel	mm	50 / 100 / 150 / 200 / 250	50 / 100 / 150 / 200 / 250
Resolution in full step	µm	5	1
Max. Speed	mm/s	15	4
Recommended loaded speed in UHV	mm/s	2	0.8
Repeatability	µm	1	0.2
Load Capacity (Horizontal)	kg	20	20
Load moment	Nm	<5	<5
Axial load force @ 500Hz I <sub>φ</sub> = 1A	kg	3	10
Backlash	µm	Negligible	Negligible
Roll, Pitch & Yaw (Unloaded)	µrad	<25	<25
Roll Pitch & Yaw Compliance	µrad/Nm	33	33
Straightness of Travel	µm	<1.3µm / 100mm	<1.3µm / 100mm
Stepper Motor		D35.1	D35.1
Vacuum	mBar	1 x 10 <sup>-10</sup>	1 x 10 <sup>-10</sup>
Max. Temperature	°C	200	200
MTBF (5kg load and 30% duty cycle)	hrs	15,000	10,000

## NOTES

**BACKLASH.** Backlash in the gearbox of LTVH is controlled by special gearing and is negligible. Backlash between the nut and leadscrew is controlled by a pre-loaded nut and is much less than the resolution. If the transporter is used for motion with a significant vertical component (>45°), the load provided by the carriage weight is sufficient to eliminate backlash and a plain nut can be specified. In these cases mount with the motor at the top. Since speeds are low, acceleration forces are negligible.

**CARRIAGE COMPLIANCE.** The carriage will deflect under load moments about the principal axes by 33µradian per Nm. In most applications the load deflection will be constant and can be compensated for in the sample mount. For stacked XY motions in a horizontal plane the movement of the carriage and load on the upper transporter will produce a varying moment about the axis of the lower transporter. Minimise this by stacking the shorter transporter on the longer.

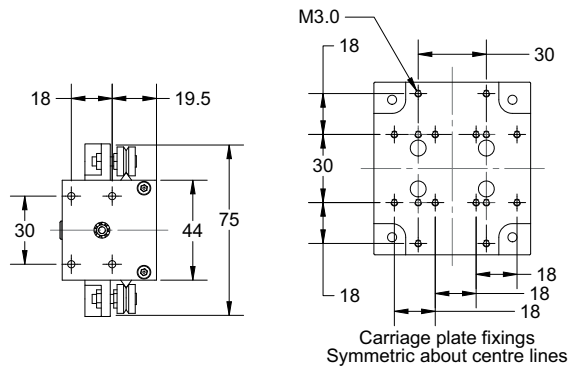
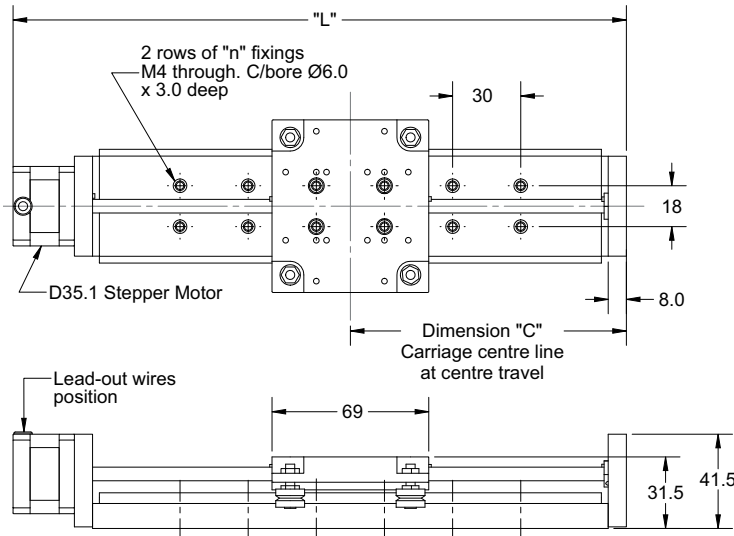
**LUBRICATION.** Running surfaces are dissimilar materials or dry lubricated with molybdenum disulfide. Lead-screws are lubricated with Nyetorr® 6300 UHV grease. Dry lubrication can be specified.

**VERNIER STOP.** These transporters may be driven to the vernier stops at the limits of their travel and stalled without damage.

**STACKED MECHANISMS.** For 3-axis motion mount the stage moving the load vertically on top of the others to avoid adding their weight to its load.

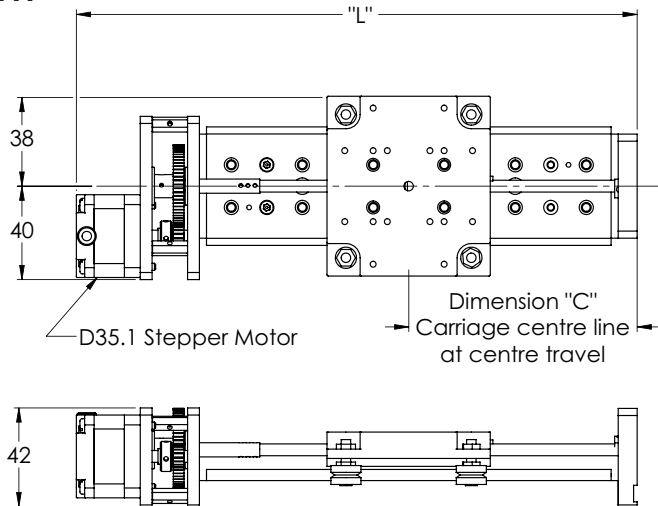
## DIMENSIONS

### LTVL



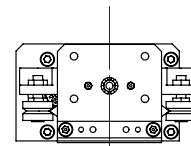
Travel (mm)	n	L	C	Mass (kg)
50	4	170	71.5	1.20
100	6	220	96.5	1.55
150	6	270	121.5	1.90
200	8	320	146.5	2.25
250	10	370	171.5	2.60

### LTVH



Travel(mm)	L	C	Mass (kg)
50	190	71.5	1.50
100	240	96.5	1.85
150	290	121.5	2.20
200	340	146.5	2.55
250	390	171.5	2.90

All other dimensions as LTVL



## ORDERING INFORMATION

Order Code	
LTVLxxx	Translation stage, 5µm (xxx = travel in mm)
LTVHxxx	Translation stage, 1µm (xxx = travel in mm)
Related products	
SMD210	Stepper motor drive
MLF18F	18-way electrical feedthrough
MLF18NBL	3-metre lead, SMD210 to MLF18F



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