

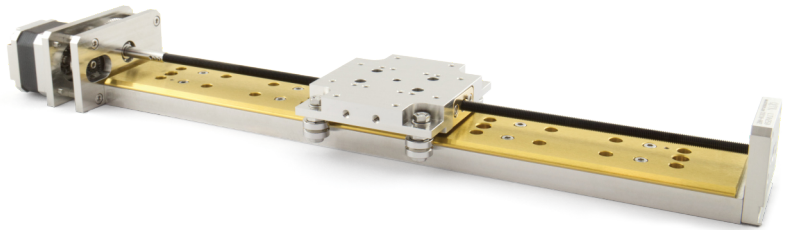
# LTV Translation Stage

UHV Linear Sample Transporter

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 utilise 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.

Can optionally be fitted with limit switches or optical encoder.



## FEATURES

- Travel ranges 50 to 400 mm
- Resolution to 1  $\mu\text{m}$  per step
- Negligible backlash
- Low profile construction
- Load capacity to 20 kg
- 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
- Limit switch or optical encoder options available
- May be customised

## SPECIFICATIONS

Specification	Unit	LTVL	LTVH
Travel	mm	50 / 100 / 150 / 200 / 250 / 300 / 350 / 400	
Resolution in full steps	µm	5	1
Maximum speed	mm/s	15	4
Recommended loaded speed in UHV	mm/s	2	0.8
Bi-Directional Repeatability	µm	±0.5	±0.5
Centred Load Capacity (Normal)	kg	20	
Load moment	Nm	<5	
Axial load force @ 500Hz, 1A phase current	kg	3	10
Backlash	µm	Negligible	
Roll, Pitch & Yaw (Unloaded)	µrad	<25	
Roll, Pitch & Yaw Compliance	µrad/Nm	33	
Straightness of Travel	µm	<1.3 µm / 100 mm	
Stepper Motor		D35.1	
Vacuum	mBar	1 x 10 <sup>-10</sup>	
Maximum temperature	°C	200 (reduces to 120 when an optical encoder is fitted)	
MTBF (5 kg load and 30% duty cycle)	hrs	15,000	10,000
Total mass for 50 mm travel	kg	1.2	1.5
Increase in total mass per additional 50 mm of travel	kg	0.35	

## 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 33 µrad/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.

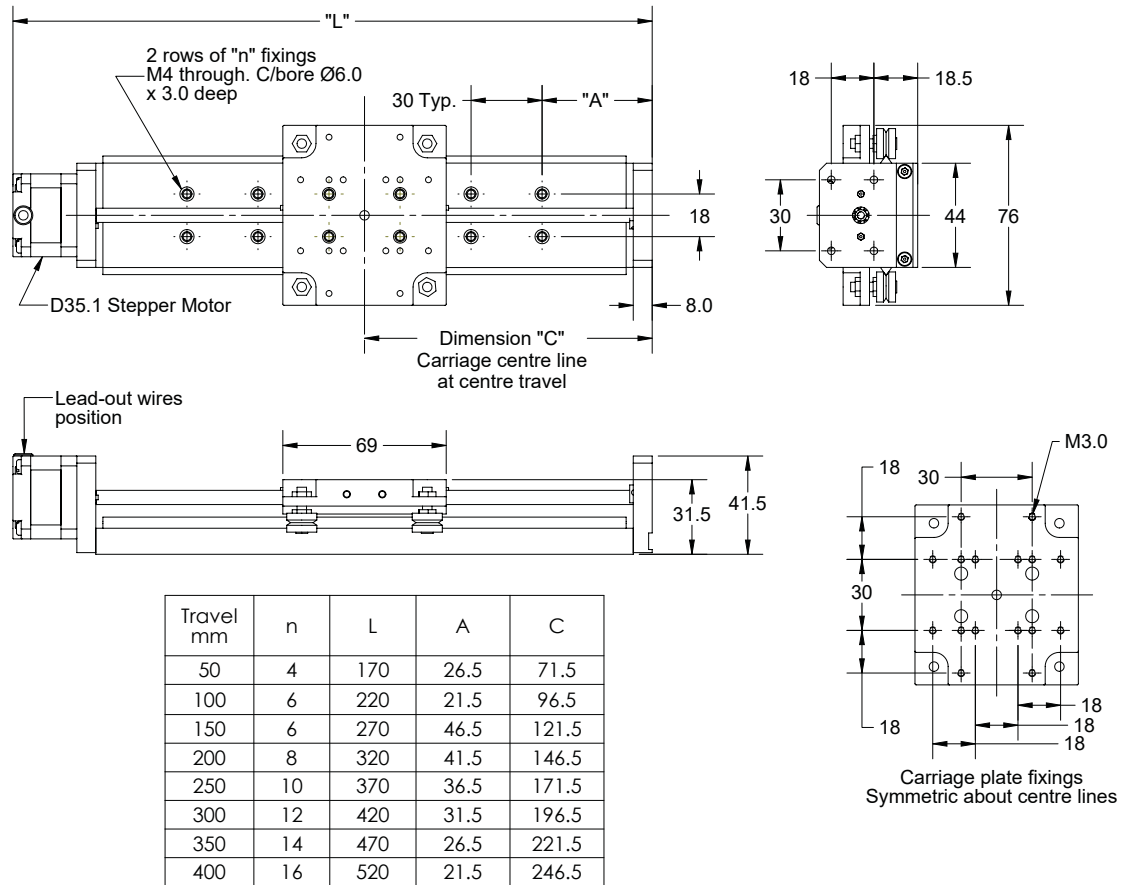
**LUBRICATION:** Running surfaces are dissimilar materials or dry lubricated with molybdenum disulfide. Leadscrews are lubricated with Nyetorr® 6300 UHV grease. Dry lubrication can be specified.

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

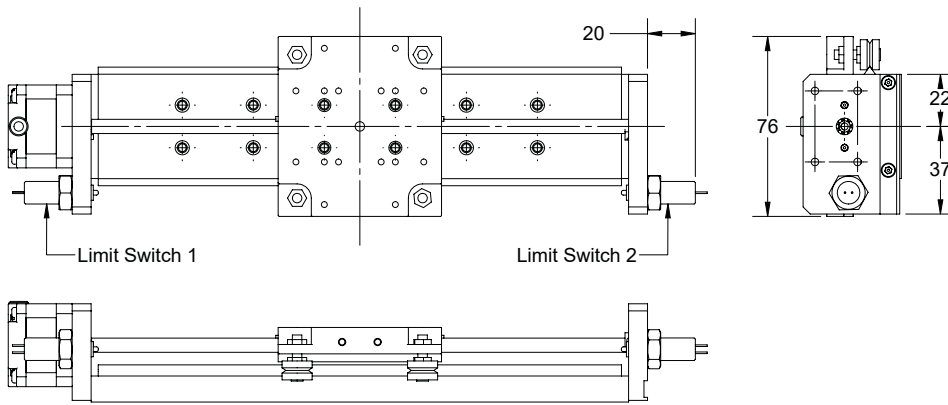
**STACKED MECHANISMS:** For 3-axis motion, mount the stage moving the load vertically on top of the others to avoid adding their weight to its load.

# DIMENSIONS

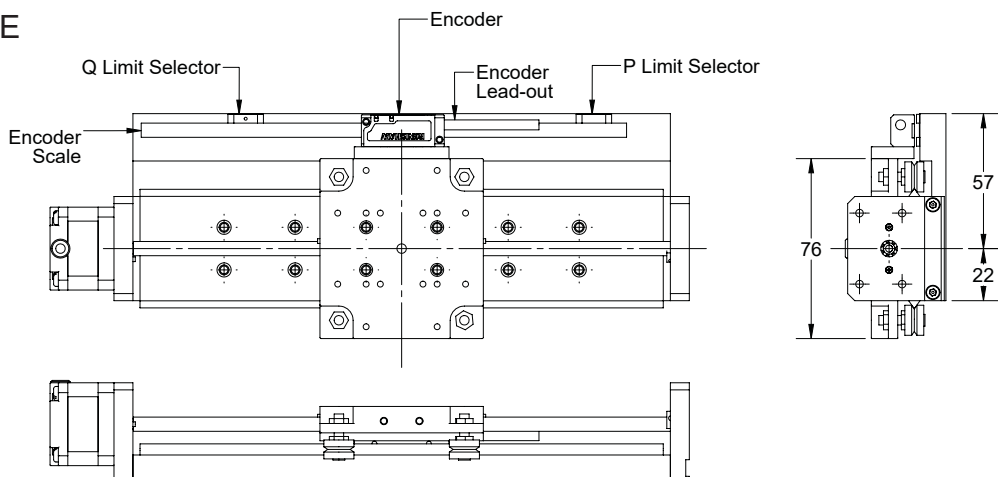
## LTVL



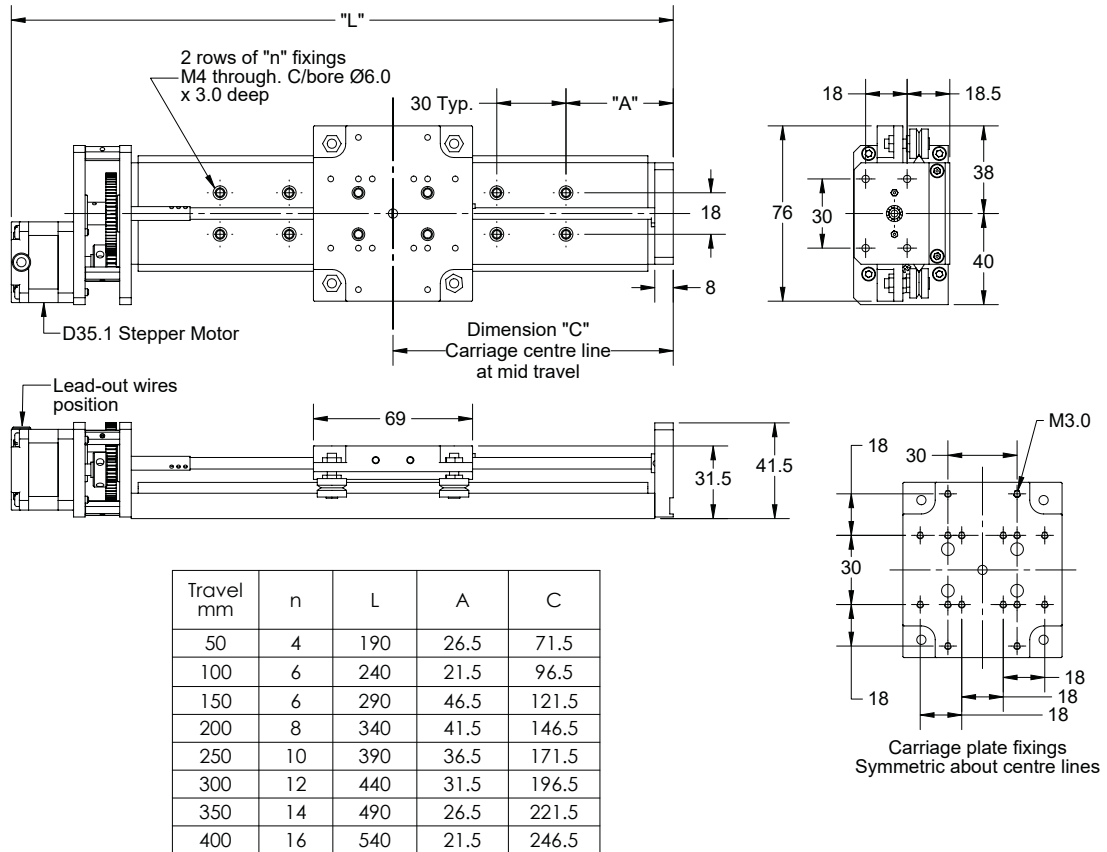
## LTVL-LS



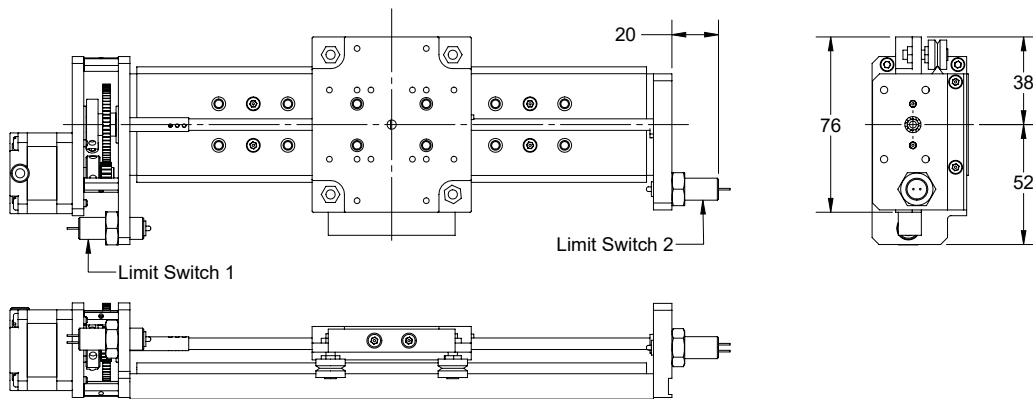
## LTVL-E



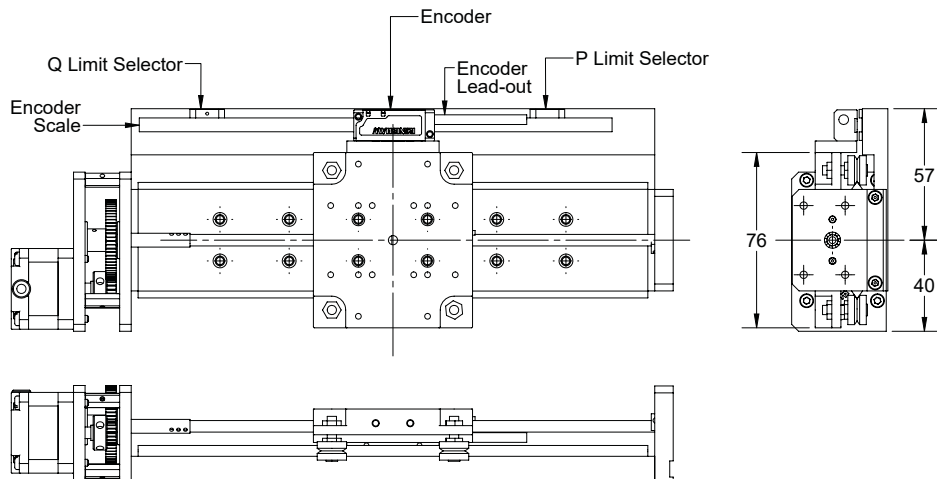
# LTVH



# LTVH-LS



# LTVH-E



## ORDERING INFORMATION

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Order Code	
LTVL-xxx	Translation stage, 5 µm (xxx = travel in mm)
LTVL-xxx-LS	Translation stage, 5 µm with 2 x limit switches
LTVL-xxx-E	Translation stage, 5 µm with optical encoder
LTVH-xxx	Translation stage, 1 µm (xxx = travel in mm)
LTVH-xxx-LS	Translation stage, 1 µm with 2 x limit switches
LTVH-xxx-E	Translation stage, 1 µm with optical encoder

Related Products	
SMD210	Stepper Motor Controller
SMD3	Stepper Motor Drive
MLF18F	18-way Electrical Feedthrough
MLF18NBL	3 metre lead, SMD210 to MLF18F



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AML pursues a policy of continuous improvement and reserves the right to make detail changes to specifications without consultation. E and OE.