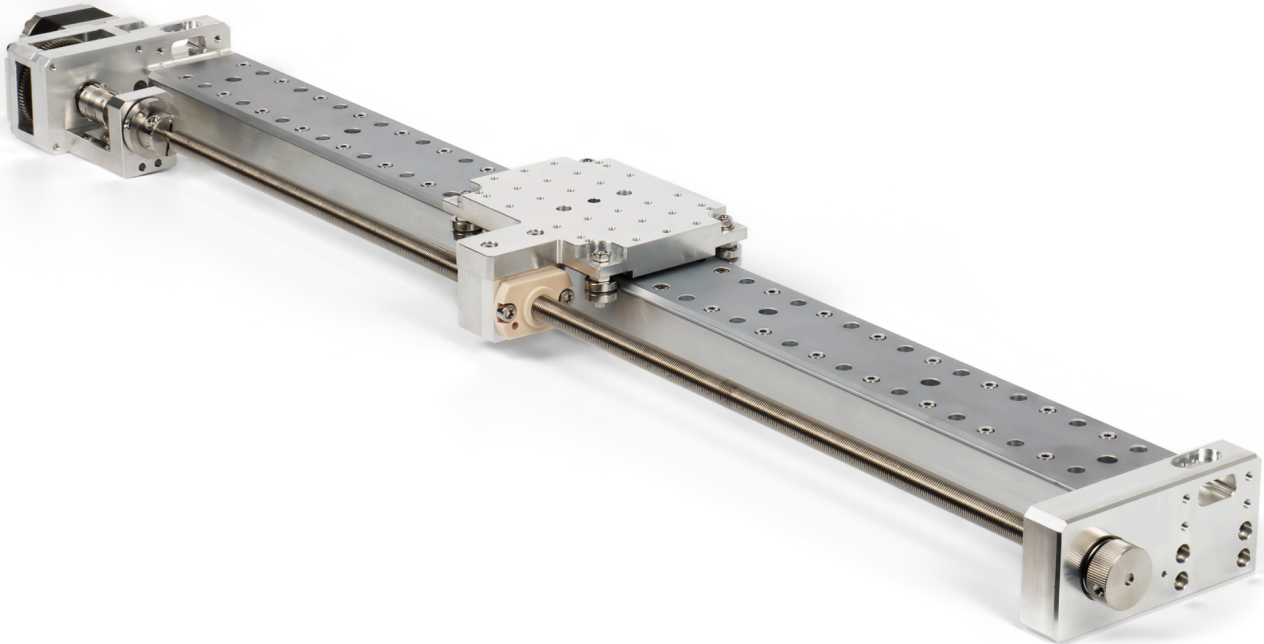


# VSM30-X Datasheet

Extra Long Travel Modular UHV Compatible Stage



Extra long travel ultra-high vacuum compatible modular linear translation stages provide long travel with minimum height for loads of up to 40 kilograms. They have widely spaced 'V' roller guides and are useful in applications where extra long travel is required but torsional loads are small.

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

They can be used standalone or in combination with other VSM modular stages to create multi-axis mechanisms.

## FEATURES

- Standard travels from 500 mm
- 5  $\mu\text{m}$  resolution (1  $\mu\text{m}$  for option HR)
- $\pm 2 \mu\text{m}$  repeatability
- Maximum speed 25 mm/s (5 mm/s for option HR)
- Suitable for use to  $1 \times 10^{-10}$  mBar
- 40 kg centred load capacity
- UHV-prepared aluminium construction as standard
- Bakeable to 150°C
- Features AML D42.1 stepper motor
- Limit switches included as standard
- Encoder options available
- Compatible with all VSM modular stages
- May be customised for specific requirements

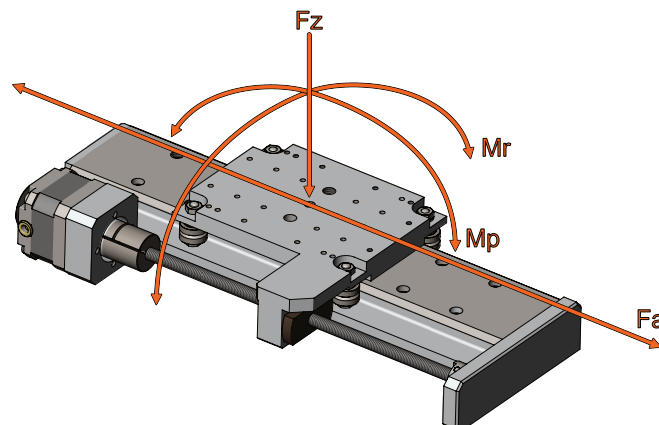
## SPECIFICATIONS

Specification	VSM30-X	Option HR
Travel (mm)	500 / 600 / 700 / 800 / 900 / 1,000	
Resolution	5 $\mu\text{m}$	1 $\mu\text{m}$
Maximum Speed	25 mm/s	5 mm/s
Repeatability	$\pm 2 \mu\text{m}$	
Centred Load Capacity (Normal) (Fz)	40 kg	
Maximum Load Moment (Mr, Mp)	10 Nm	
Axial Load Capacity @ 500 Hz/s 1000 Hz 1A Phase Current (Fa)	20 kg	40 kg
Backlash	$\pm 1 \mu\text{m}$	
Roll and Pitch	$\pm 40 \mu\text{rad}$	
Roll and Pitch Compliance	285 $\mu\text{rad}/\text{Nm}$	
Leadscrew Accuracy	0.03/100 mm	
Stepper Motor	AML D42.1	
Vacuum Environment	$< 1 \times 10^{-10}$ mBar	
Maximum Temperature	150°C (reduces to 120°C when an optical encoder is fitted)	
MTBF (5 kg load and 30% duty cycle)	15,000 hrs	
Mass for 500 mm Travel	3.5 kg	TBC kg
Mass Increase per 100 mm Travel	TBC kg	TBC kg

Optional Encoder Specification	ER (Incremental Encoder)	EA (Absolute Encoder)
Readhead	Renishaw TONiC™ T1630-15M	Renishaw RESOLUTE™ RL26BVE050D15V
Scale	RKLC20 20 $\mu\text{m}$ pitch	RELA30 30 $\mu\text{m}$ pitch
Interface Module	T10040A10A 40x interpolation factor	None
Electrical Interface	Square wave differential line driver to EIA RS422A	BiSS-C (unidirectional) 26 bit
Resolution	500 nm	50 nm

## NOTES

LOAD DIAGRAM:



## NOTES CONT.

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**MATERIALS:** The major components of standard stages are manufactured from 6061 T6 aluminium. The material surface is processed to obtain a thin, dense aluminium oxide coating which reduces diffusion and desorption at UHV.

**BACKLASH:** Backlash in the gearbox of the high resolution (option code "HR") VSM30-X 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.

**CARRIAGE COMPLIANCE:** The carriage will deflect under load moments about the principal axes by 285  $\mu\text{rad}/\text{Nm}$ . 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 multi-axis motion, mount the stage moving the load vertically on top of the others to avoid adding their weight to its load.

## OPTIONS

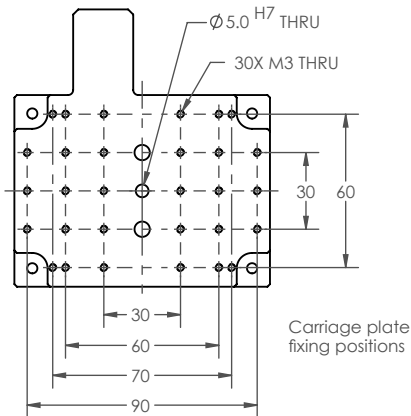
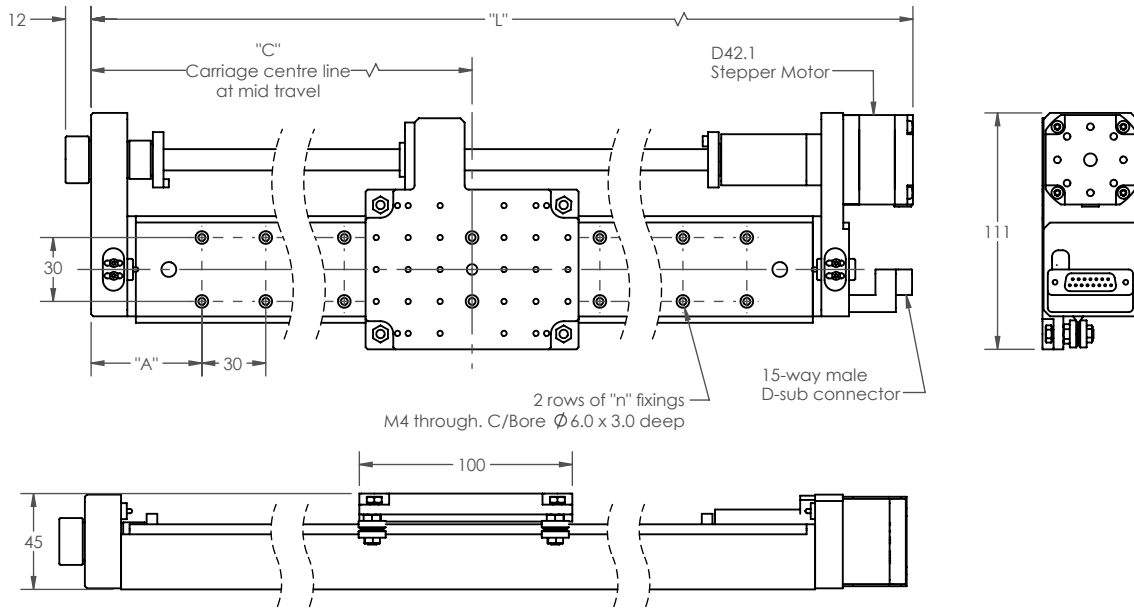
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**HR** 1  $\mu\text{m}$  resolution achieved with optional gearbox.

**ER** Renishaw TONiC™ incremental encoder. Readhead part number: T1630-15M.

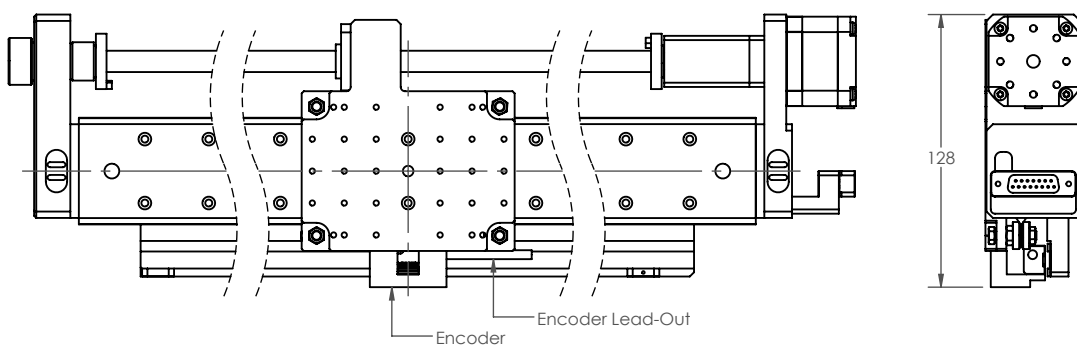
**EA** Renishaw RESOLUTE™ absolute encoder. Readhead part number: RL26BVE050D15V.

# DIMENSIONS



Travel mm	L	L (Option HR)	C	A	n
500	670	694	322	52	19
600	770	794	372		
700	870	894	422		
800	970	994	472		
900	1070	1094	522		
1000	1170	1194	572		

## Encoder Option (ER/EA)



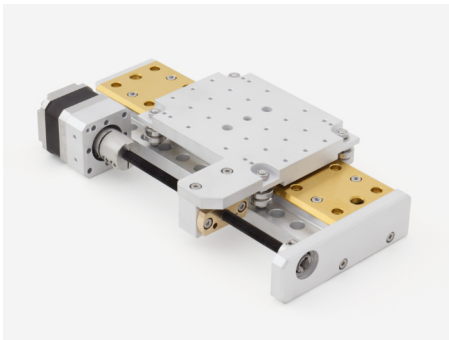
## RELATED PRODUCTS



### VSA MOUNTING BRACKETS AND TABLE

Mounting Brackets and Table For UHV Compatible Stages.

AML UHV compatible mounting brackets for use with VSM stages. Used to reorient stages and create complex multi-axis mechanisms with standard products. Constructed with lightweight UHV-prepared aluminium to reduce mass whilst maintaining stability.



### VSM23-X

Long Travel, Modular UHV Compatible Stage.

Linear translation stage suitable for use in UHV. Can support loads of up to several kilograms and travel from 100 to 200 mm. 5 µm resolution allows for precise in-vacuum motion.



### SMD4

Single-axis Bipolar Stepper Motor Drive.

Engineered to operate vacuum-compatible stepper motors with maximum performance while minimising temperature rise. It is optimised for use with AML UHV-compatible motors.

## ORDERING INFORMATION

Order Codes	
VSM30-X-xxx	Linear stage (xxx=travel in mm)
VSM30-X-xxx-HR	Linear stage, 1 µm resolution
VSM30-X-xxx-ER	Linear stage with encoder (incremental)
VSM30-X-xxx-EA	Linear stage with encoder (absolute)

Example Order Code	
VSM30-X-500-HR-ER	Linear stage, 500 mm travel, 1 µm resolution, incremental encoder.



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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.