

GTS30V High-Precision Vertical Linear Stage



GTS30V Advantages

- 30 mm of precision vertical travel in a compact unit
- Ideal for horizontal samples, the GTS30V offers unobstructed access to the payload from any side
- Direct vertical guiding system minimizes runout errors
- Anti-creep crossed roller bearings ensure ripple-free motion without cage migration
- Integrated linear encoder with 50 nm resolution provides high sensitivity and ensures highly repeatable and accurate motion

The GTS30V is the ideal foundation for applications that require long travel vertical motion of horizontally oriented samples. Its low profile and high-precision motion capabilities make this stage an excellent choice for applications such as semiconductor wafer inspection, nanotechnology, automated device alignment, metrology, and quality control processes.

When combined with our XM, GTS, VP, ILS, or IMS series of linear stages, the GTS30V is a space-saving alternative to traditional XYZ stacks of stages, and provides unobstructed access to the payload from any side. Furthermore, centering the payload over the bearings, ensures less cantilevering load effects and Abbe induced motion errors.

High-precision vertical motion is achieved using a direct vertical guiding system composed of matched pairs of anti-creep crossed roller bearings. Compared to alternative wedged designs, this direct guiding method provides consistently lower and more repeatable runout errors. In addition, the lack of any re-circulating elements in the bearings leads to outstanding ripple-free motion required in high-sensitivity focus adjustments. Lastly, the geared retainers prevent bearing cage migration, a problem often found with other linear bearings, especially in vertical arrangements.

A folded DC motor with a precision ground, low friction lead screw arrangement delivers ultra-smooth motion and does not back drive even at high loads. A reduction belt between the motor and the lead screw increases the available output torque, reduces the servo sensitivity and ensures 100 nm minimum incremental motion with all Newport motion controllers and drivers.

Precision position feedback is provided by an optical scale with 50 nm resolution. Compared to alternative designs featuring a screw mounted rotary encoder, this direct position feedback avoids drive train errors impacting positioning performance, hence leading to superior positioning accuracy and repeatability.



Example of a compact XYZ assembly consisting of a GTS150 linear stage, a GTS70 linear stage and a GTS30V vertical stage.

Design Details

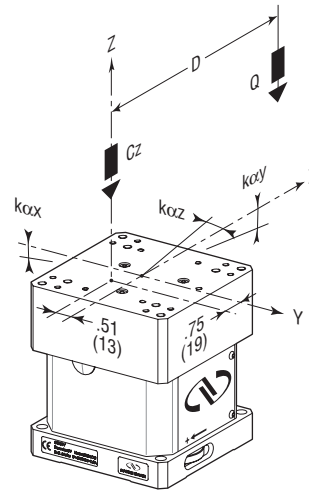
Base Material	High-strength 7075 Aluminum
Bearings	Anti-creep crossed roller bearings
Drive Mechanism	6 mm diameter, precision ground lead screw, gravity preloaded nut
Drive Screw Pitch	1 mm
Feedback	Linear steel scale, 20 μm signal period, 0.05 μm resolution, RS422 differential output
Limit Switches	Optical
Origin	Optical, located 5 mm from lower position travel limit
Motor	DC servo motor UE34CC
Cable Length	3 m
MTBF	20,000 h at 25% load and with a 30% duty cycle

Specifications

Travel Range (mm)	30 (-5 mm/+25 mm from origin)
Resolution (μm)	0.05
Motion Sensitivity (μm)	0.1 typical
Bi-directional Repeatability (μm)	0.2 guaranteed
On Axis Accuracy (μm)	0.5 typical; 1.5 guaranteed
Maximum Speed (mm/s)	10
Straightness, Flatness (μm)	1.5 typical
Pitch/ Yaw (μrad)	50 guaranteed
Weight (kg)	3.3

Load Characteristics and Stiffness

C_z , Normal centered load capacity	40 N
$k_{\alpha x}$, Compliance in roll	40 $\mu\text{rad}/\text{N}\cdot\text{m}$
$k_{\alpha y}$, Compliance in pitch	40 $\mu\text{rad}/\text{N}\cdot\text{m}$
$k_{\alpha z}$, Compliance in yaw	25 $\mu\text{rad}/\text{N}\cdot\text{m}$
Q_x, Q_y , Off-center load	$Q \leq C_z / (1 + D/30)$
D max., Cantilever distance	100 mm



Motion Controller Options

For optimum performance and seamless compatibility, we recommend using one of the following Motion Controllers/Drivers:



XPS



ESP300



SMC100CC



A typical assembly with an ILS250 linear stage, a GTS30V vertical stage and a URS100 rotation stage.

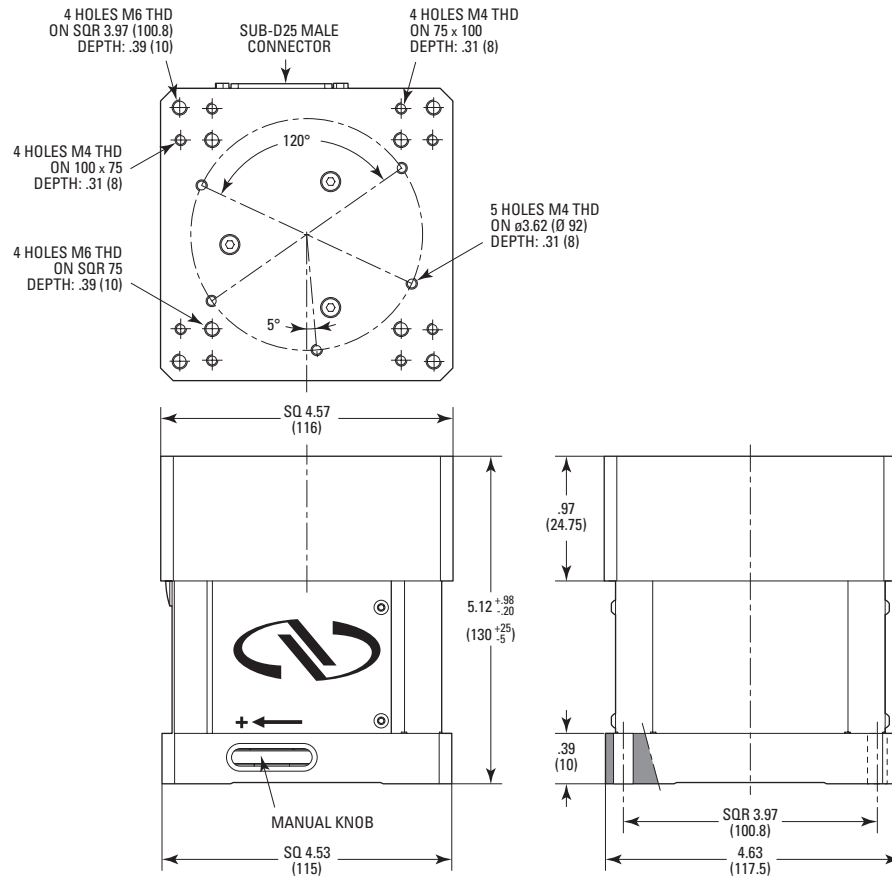
Ordering Information

Model	Description
GTS30V	High-Precision Vertical Linear Stage



A typical XYZ assembly with a GTS30V vertical stage and two VP-25XA stages.

Dimensions



ISO 9001
FM 27207

Newport & Spectra-Physics sales offices

Newport Corporation, Irvine, California, has been certified compliant with ISO 9001 by the British Standards Institution.

Belgium

Newport Spectra-Physics B.V.
Phone: +32-(0)16 40 29 27
Fax: +32-(0)16 40 22 27
belgium@newport-de.com

Italy

Micro-Controle Italia
Phone: +39-(0)2/92.90.921
Fax: +39-(0)2/92.32.448
newport@tin.it

United Kingdom / Ireland

Newport Spectra-Physics Ltd.
Phone: +44-(0)1635 521757
Fax: +44-(0)1635 521348
uk@newport.com

France

MICRO-CONTROLE Spectra-Physics S.A
Phone: +33-(0)1.60.91.68.68
Fax: +33-(0)1.60.91.68.69
france@newport-fr.com

Netherlands

Newport Spectra-Physics B.V.
Phone: +31-(0)30 659 21 11
Fax: +31-(0)30 659 21 20
netherlands@newport-de.com

USA

Newport Corporation
Phone: +1-949-863-3144
Fax: +1-949-253-1680
info@spectra-physics.com

Germany / Austria / Switzerland

Newport Spectra-Physics GmbH
Phone: +49 (0) 61 51 / 708 - 0
Fax: +49 (0) 61 51 / 708 - 954
verkauf@newport-de.com



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