

GTS High-Precision Linear Stages



GTS High-Precision Linear Stages Advantages

- Manufactured to the highest quality standards, GTS stages deliver outstanding trajectory accuracy compatible with our popular ESP300 and SMC100CC motion controllers
- Ultra-quiet anti-creep crossed roller bearings assure ripple-free motion without cage migration
- Integrated linear encoder with 50 nm resolution provides high sensitivity and ensures highly repeatable and accurate motion
- Very low friction ball screw drive avoids stick-slip effects and ensures 100 nm incremental motion capability.

Preliminary information: Product to be available June 2006. All specifications, drawings and information are still subject to change. For most current information please visit the "New products" section on our website, or contact Newport's technical support group or your Newport representative.

The GTS high-precision linear stages provide high sensitivity and outstanding trajectory accuracy in a compact, robust and cost efficient package. They are an excellent, high-performance solution for applications such as surface scanning, test and calibration, optical component alignment and attachment, and high-precision optical delays lines.

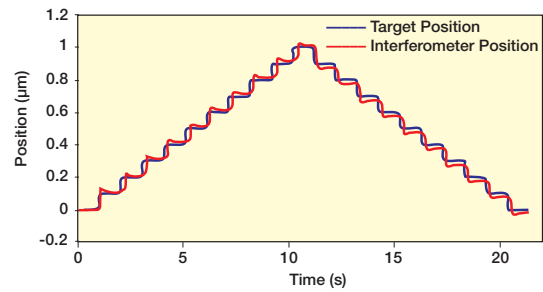
GTS stages are machined from stress-relieved 7075 aluminum for long-term strength and stability. All critical stage surfaces undergo multiple machining processes and precision grinding under strict temperature and quality control. The GTS's advanced asymmetric body design with defined flexible preload provides consistent results over varying temperatures and is most insensitive to non-ideal mounting surfaces. The extra thin and compliant carriage has been optimized for different load conditions including XY configurations, and for providing a high vertical load capacity.

To ensure the most accurate trajectory control, GTS stages feature matched pairs of best-in-class anti-creep crossed roller bearings. The lack of any re-circulating elements in these bearings leads to outstanding ripple-free motion adequate for the most demanding scanning and inspection systems. Moreover, their geared retainers prevent from bearing cage migration, which can occur with other linear bearings.

A high-torque DC motor with a precision ground and preloaded, low friction ball screw eliminates stick-slip effects and delivers ultra-smooth motion with 100 nm sensitivity. Because GTS stages have been designed to meet all stage performance without a tachometer feedback loop, they are compatible with a wide array of motion controllers including our popular ESP300, SMC100CC and XPS. And compared to alternative direct-drive technologies, GTS stages can be used in vertical applications with loads up to 30 N without complex counter-balance. Manual adjustments can be accomplished by a knob at the end of the motor.

Precision position feedback is provided by an optical scale with 50 nm resolution that is mounted in the center of the stage to eliminate all drive-train induced motion errors. The space-saving, fixed reading-head design avoids any moving cables inside the stage and underlines the robustness and long lasting value of the GTS stages with an MTBF of 20,000 hours.

GTS stages are mechanically compatible with our XM series ultra-precision linear stages, URS and RGV100 rotation stages, VP-25X precision compact linear stages and VP-5ZA vertical lift stages. In design, there is also a vertical lift stage with 30 mm travel that will become available end of 2006. For applications requiring a vertical mounting bracket, please call Newport.



GTS stages deliver 100 nm motion sensitivity with high reliability and stability.

Design Details

Base Material	High-strength 7075 Aluminum
Bearings	Anti-creep crossed roller bearings
Drive Mechanism	8 mm diameter, backlash-free, ground ball screw
Drive Screw Pitch	2 mm
Feedback	Linear steel scale, 20 µm signal period, 0.05 µm resolution, RS422 differential output
Limit Switches	Optical
Origin	Optical, at center of travel, including mechanical zero signal
Motor	DC servo motor UE34CC
Cable Length	3 m
MTBF	20,000 h

Specifications

Model	GTS70	GTS150
Travel Range (mm)	70	150
Resolution (µm)	0.05	0.05
Motion Sensitivity (µm)	0.1	0.1
Bi-directional Repeatability (µm)	0.2	0.2
On Axis Accuracy (µm)	2	2
Maximum Speed (mm/s)	50	50
Straightness/Flatness (µm)*	1	2
Pitch*	40	80
Yaw*	40	40
Weight (Kg)	2.7	3.6

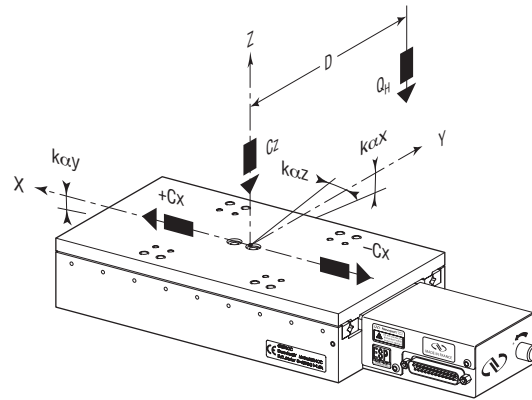
* Over center 80% travel

Load Characteristics and Stiffness

		GTS70	GTS150
C_z	(N)	100	100
$-C_x; +C_x$	(N)	25	20
$k_{\alpha x}$	($\mu\text{rad}/\text{N}\cdot\text{m}$)	10	5
$k_{\alpha y}$	($\mu\text{rad}/\text{N}\cdot\text{m}$)	10	5
$k_{\alpha z}$	($\mu\text{rad}/\text{N}\cdot\text{m}$)	10	5

Normal Load Characteristics

Q_H	Off-center load, $Q_H \leq C_z / (1 + D/100)$
D	Cantilever distance in mm
C_z	Normal center load capacity on bearings
+Cx	Direct load capacity on X axis without back-driving
-Cx	Inverse load capacity on X axis without back-driving
$k_{\alpha x}$	Angular stiffness (Roll)
$k_{\alpha y}$	Angular stiffness (Pitch)
$k_{\alpha z}$	Angular stiffness (Yaw)



A typical assembly with one GTS150, one GTS70 linear stage and one URS100 rotation stage.



A typical assembly with one GTS150, one VP-25ZA vertical stage and one RGV100 rotation stage.

Motion Controller Options

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

- XPS
- ESP300
- SMC100CC

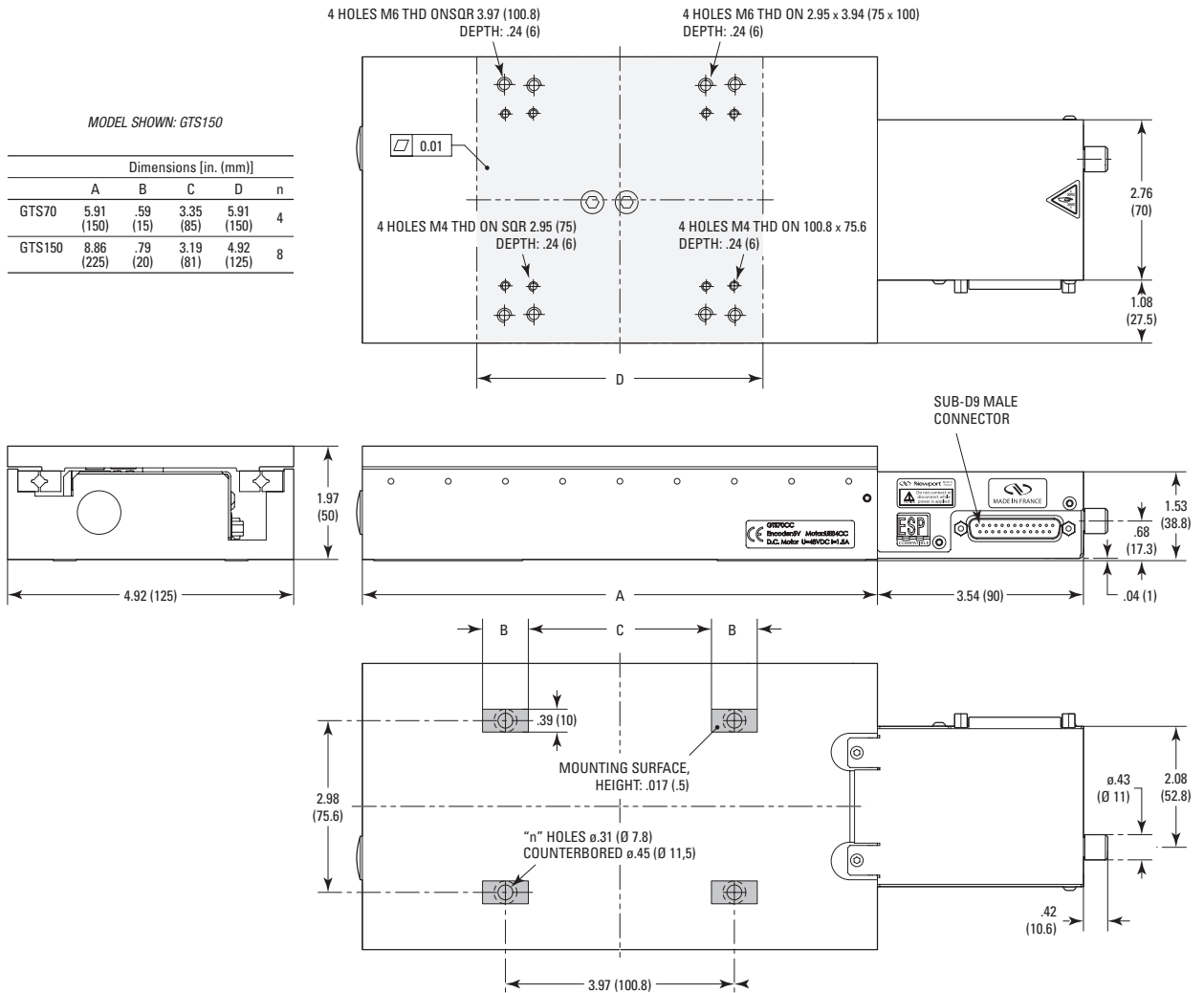
Ordering Information

Model	Description
GTS70	GTS linear stage, 70 mm travel
GTS150	GTS linear stage, 150 mm travel

Need Accuracy to 1 μm ?

For critical positioning applications, contact Newport to learn about our micropositioning calibration services. Upon request, we will create, implement and verify an electronic compensation process to improve the absolute position accuracy of GTS70 stages to 1 μm and GTS150 stages to 1.5 μm when used with our XPS advanced motion control system. A certificate of calibration along with measured error maps is included.

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.

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