

Custom 3-Axis Module for 10-Station Dial Machine

Single design change solves both height and travel requirements

Application

Converting their old, manual-setup machining operations, including some machines from the 1940's, to a computer-controlled modular system, an after-market automotive products manufacturer looked to achieve dramatic reductions in setup times and associated costs. Initially, the company is designing and assembling a 10-station prototype unit with 3-axis modular machining units performing gun drilling, face milling and boring. Once the concept is proven, the company plans to produce three more similar dial machines.

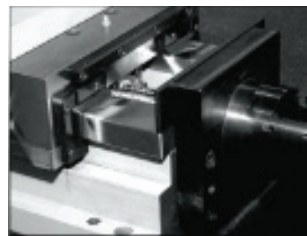
Challenge

Typically, the company makes runs of 4,000-100,000 oil pump castings in batch runs, then tears down the line and sets up for another run. Two special problems needed to be solved which did not allow for the use of stock components. First, the vertical travel of the unit needed to be higher, 10" instead of 6", and second, the module would require a manually adjustable "X" travel of 2".

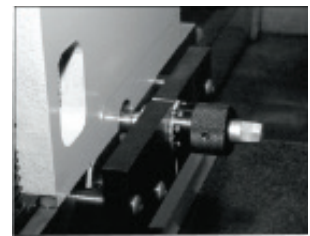
Solution

Demonstrating Gilman's ability to work closely with customers' engineers to realize optimal solutions, both the travel and adjustment requirements were achieved by a single design change. A new casting was designed to accommodate the additional travel and the bottom of the vertical bracket was cast with a male dovetail, while the "Z" axis hardened way saddle was then machined with the complementary female dovetail groove. A manual lead screw drive with a micrometer dial was added, completing the

design change. This excellent solution delivered the requisite machining travels while eliminating one entire tolerance level (a separate complete slide for the "X" travel).



Micrometer "X" adjustment



Precision lead screw drive



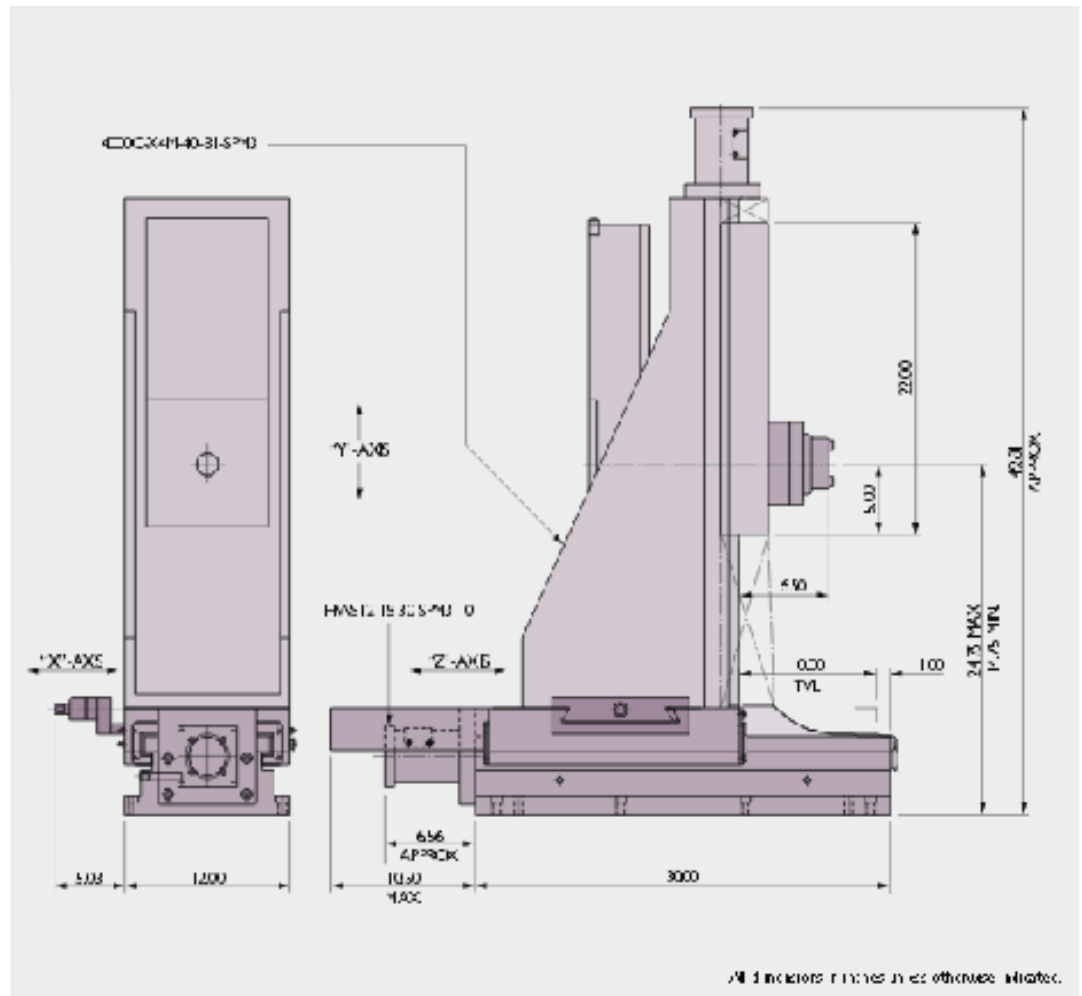
This Gilman Design feature allows 2" "X" axis adjustment without an additional slide.

Cost Savings

Setup times that were 40 hours have been reduced to approximately one hour. All machining units are now interchangeable so that if one goes down another unit can be installed quickly. Because all the multi-axis modules employ the same spindle, stocking requirements were reduced from four spindles to one.

Time Line

Gilman received this competitive bid order after demonstrating their superior response and delivery times. In fact, Gilman's prototype module was on the customer's floor before any approval prints had been received from other project bidders.



Technical Specifications

Spindle:

- Nose end bearings preloaded triplex set, ABEC 7, 15° angular contact ball bearing, medium preload, 55mm I.D.
- Drive end bearing preloaded pair, ABEC 7, 15° angular contact ball bearing, medium preload 45mm I.D.
- Synthetic grease lubrication
- Labyrinth seal each end, air purge nose end
- Maximum thrust into spindle 847 LBS.
- Maximum operating speed 6100 RPM

"Z" Axis Slide: Model No. (HWS12-18-30-SPM3-10)

- 32mm - 5mm ground ball screw
- Preloaded nut
- 85 IN-LBS. maximum input torque

"Y" Axis Vertical Slide: Model No. (400C-X4M-40-BI-SPM3)

- 32mm - 5mm ground ball screw
- Preloaded nut
- Gordillo covers
- 10 inch travel capability
- 85 IN-LBS. maximum input torque

"X" Axis Adjustment Slide

- 10 pitch Acme screw
- Special locking assembly
- Micrometer dial



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Gilman Precision
1230 Cheyenne Avenue
Grafton, WI 53024
Telephone: 1 262 377 2434
Fax: 1 262 377 9438
Email: sales@gilmanprecision.com
www.gilmanprecision.com