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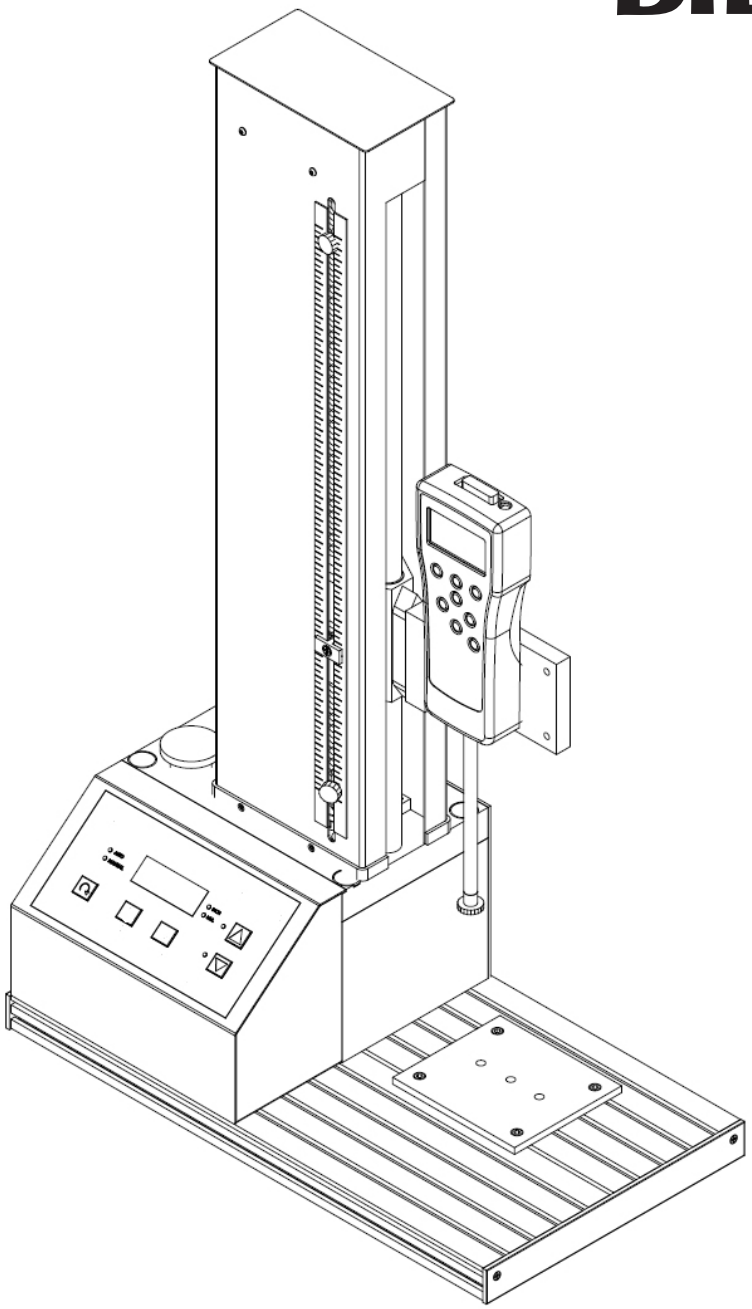

GTS-1000 Digital Control
Motorized Test Stand
Operator's Manual

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INTRODUCTION

The motorized test stand is a tool to improve the quality of force testing results. It helps attain the best testing repeatability by pulling or pushing at extremely consistent speed in a direction in-line with the measuring device, such as a force gauge. Motorized stands also improve ergonomics and testing throughput.

The Dillon GTS-1000 is a ball-screw driven digital test frame with capacity up to 1000 N (220 lbf / 100 kg). The dimensions, speed range and capacity have been carefully optimized to cover the test procedures and specimen sizes most often needed by quality departments within many sectors of R&D and production industry. Complemented by a Dillon force gauge, grips and accessories, it constitutes a key component in force measurement systems to accurately test a wide range of products.

This tester may be used for tensile and compression tests of many types (e.g. break, peel, flexural, top-load and many more). The digital controls make testing speed more accurate and the stand more intuitive to operate.

The crosshead features an adjustable generous 5 inch (127 mm) throat. Combined with the side-mounted controls and large working area, it can test large samples.

The Dillon GTX and GS force gauges are recommended for use with the GTS-1000 Test Stand. It can accommodate other gauges with proper fixturing and alignment.

With correct use your GTS-1000 will give many years of reliable service.

Please read this operating manual thoroughly before attempting to operate your GTS-1000 force tester.

SAFETY & EQUIPMENT PRECAUTIONS

Read the instruction manual completely before attempting to use the GTS-1000 Test Stand. By following the instructions contained in this manual, the optimum accuracy and performance can be attained in the safest manner.

RISK OF PERSONAL INJURY! Samples under test can store large amounts of energy which can be suddenly released upon sample failure. Sample failures can occur without warning. Be certain the operator is protected from flying/ whipping parts from potential high energy failures with some type of barrier.
Exercise extreme caution during testing or whenever the crosshead is moving.
ALWAYS Wear eye and face protection when testing.
NEVER place fingers inside the column!
NEVER place hands in vicinity of moving parts.
NEVER place hands near sample when subjected to load.
NEVER operate the GTS-1000 with the cover off.

RISK OF ELECTRICAL SHOCK! Do not remove cover. No user serviceable parts inside. Refer servicing to qualified service personnel.

RISK OF ELECTRICAL SHOCK! Do not allow fluid to run into the T-slots. This can reach the electrical circuitry. Tests with potential for running fluids should have a larger plate secured to the T-slot work surface. Always unplug the stand immediately if fluid runs into the T-slot and do not reconnect until all fluid is cleaned.

Verify Input Power Source BEFORE operation. The GTS-1000 may operate with 110V or 220V provided the Power Input Module is in the proper setting corresponding to the source power. Always make sure that the supply power matches the setting on the Power Input Module before connecting the power cord. Failure to do so will cause serious damage to the tester.

Use Dillon GS/GTX force gauges. The GTS-1000 is designed to be used safely with the Dillon GS/GTX force gauges.

Prevent overloads. Do not exceed capacity of the force gauge or stand (whichever is lower). Stand capacity is dependent upon gauge attachment position. See rear of crosshead. Damage from overload is not covered by warranty.

Watch for accidental contact. Loadcells and force gauges are delicate pieces of equipment and can easily be damaged irreparably. Damage commonly results from the

crosshead traveling downwards and running fixtures together. Take precaution to minimize this situation.

Verify alignment. Be sure to align any lower fixture location in line with the attached force gauge stem. The force must be applied in line for tests to be accurate and to avoid gauge damage.

Understand all aspects of testing equipment operation before operating! See users manual or contact your Dillon dealer with any questions.

SET-UP & FIRST CONFIGURATION

Register:

Register your Dillon products at www.dillonforce.com.

Unpacking the GTS-1000

Upon receiving the unit please check for obvious physical damage to the packaging material and the instrument itself. Be sure you have adequate equipment available to safely lift the test frame from the packaging. Once removed from the packaging, place the test frame on a stable, flat and level work surface. Inspect the machine for any signs of obvious transit damage. If any damage is evident, or if any of the items listed below are missing, please notify your Dillon distributor immediately.

- GTS-1000 test stand with feet and two limit switch knobs
- Tension plate and 10-32 short stud
- This User's Manual
- Appropriate power cable
- Allen key for side plates
- Allen key for tension plate hardware
- Two screws to mount gauge

If any damage is discovered do not go any further with installation and do not connect the unit to a power supply under any circumstances.

We recommend you keep all packaging for future shipping requirements.

Setting up for your supply voltage

The GTS-1000 Power Module has two settings:

- -110-120 VAC
- -220-240 VAC

The GTS-1000 requires a stable, regulated AC power source.

Confirm your AC supply power matches the setting on the power supply module. Read the voltage range at the bottom, next to the twin arrows – see circled items on image. If this does not match, the power supply module must be reversed. Carefully apply torque to the slot located under the main connector jack with a flathead screwdriver to open the power module. Pull out, flip over and reinsert fully. You may need to lift a closing gate Make sure the correct label is displayed at the bottom of the power entry module and that the module is fully seated.

CAUTION – Before connecting power:

1. Insure voltage setting on the stand agrees with your supply voltage.
2. Insure the AC power is regulated.

Non-warrantable stand damage can result if not followed.

If in question about your supply voltage or the stand voltage configuration, contact your Dillon distributor before connecting to power!

Connect to power

After all the above points have been checked and confirmed to be correct, connect your power cord and power the GTS-1000 on. The power switch is at the rear of the stand right above the power cord. The console will illuminate indicating the machine is ready for use.

WARNING

The power supply for the test frame must have a third-wire earth ground. Connecting the test frame to an outlet without an earth ground produces potential for dangerous electrical shocks.

Selecting units-of-measure for speed

The GTS-1000 displays speed in inches per minute or millimeters per minute as shown by the LED annunciator. To toggle the units, press ⎓ and ✣ speed keys simultaneously. Although easily changed, this parameter is generally set only once by most users.

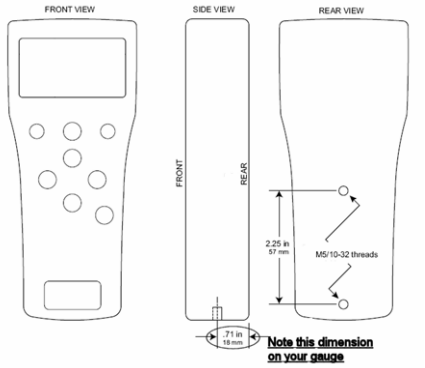
Alignment

Proper alignment is important for testing accuracy and to prevent damage to the stand, gauge and fixtures.

1. **Load cell alignment with the stand structural columns.** The GTS-1000 has a wide range of force gauges it can accommodate. However adapter plates and other hardware must be designed to insure the load cell stem extends no more than 28 mm in front of the crosshead. This is essential to prevent twisting loads to the frame, which can cause irreparable stand damage. See “Mounting the force gauge”.
2. **Load cell stem alignment with lower fixture (tension tests).** This is key for accuracy and to prevent damage to the gauge. Adjust lower tension plate hardware/fixturing to bring into alignment with load cell stem.

Mounting the force gauge

For long stand life, the gauge must be mounted so the load cell stem is in-line with the center of the internal columns. The standard GTS-1000 crosshead accommodates gauges that measure between 8 – 28 mm from the back of the gauge to the load cell stem center AND have 57 mm twin vertical hole spacing.



All GS/GTX Series gauges mount directly to the GTS-1000 tester in perfect alignment with the tester columns. Use included screws to secure.

If another force gauge will be mounted, discuss mounting with your Dillon dealer.

CAUTION

When using a force gauge other than a Dillon GS or GTX, it is the installer's responsibility to ensure:

1. strength of all connections and insure hardware mounting depth falls within gauge manufacturer requirements, and
2. load cell stem is centered on the columns within GTS-1000 specifications.

Choose the gauge mounting position on the crosshead noting the maximum rated stand capacity at that position. Secure with two screws insuring maximum depth for gauge is not exceeded.

GETTING FAMILIAR WITH THE GTS-1000 CAPABILITIES

Working area

The GTS-1000 Series features a large working area ideal for testing large samples up to 10.2 inches (260 mm) wide. The versatile T-slots can secure unusual shaped fixtures or parts in tension. T-nuts and screws may be used to secure other fixturing.

Do not allow fluid to run into the T-slots. Tests with potential for running fluids should secure The Dillon oversized plate accessory (available separately) to the T-slot work surface and remove the side T-slot cover plates. Always unplug the stand immediately if fluid runs into the T-slot and do not reconnect until all fluid is cleared and dried.

WARNING

Do not allow fluid to run into the T-slots. This can produce an electrocution hazard. Always unplug the stand immediately if fluid runs into the T-slot and do not reconnect until all fluid is dried.

The GTS-1000 includes a handy tension base plate for in-line tension grips as well. To remove or install, remove one cover plate side screw and loosen the other. Rotate cover 90 degrees. Slide tension plate with T-nuts loosely attached in or out as desired. Rotate cover back and retighten screws.

Column

The GTS-1000 Series is a single column stand designed for vertical use. Maximum crosshead travel is 18.7 inches (475 mm).

The GTS offers exceptional working headroom of 22.8 inches (580 mm) with the GTX or GS force gauge. Over 5 inches (125 mm) of extra headroom reduces travel loss impact due to fixturing. Extension rods may be required for short samples with low profile fixturing. In compression, blocks may be used to elevate the sample as needed.

Crosshead

The crosshead has six mounting holes for attaching a gauge with twin 2.25 inch (57 mm) hole spacing. The maximum stand capacity is dependent upon which position the force gauge is mounted to.

Gauge mounting position	Throat opening	Maximum stand capacity
A (closest to column)	2.64 inch / 67 mm	1000 N / 220 lbf / 100 kgf
B (middle)	3.82 inch / 97 mm	750 N / 165 lbf / 75 kgf
C (furthest from column)	5.00 inch / 127 mm	500 N / 110 lbf / 50 kgf

Connectors

Three 15-pin connectors are on the rear of the stand.

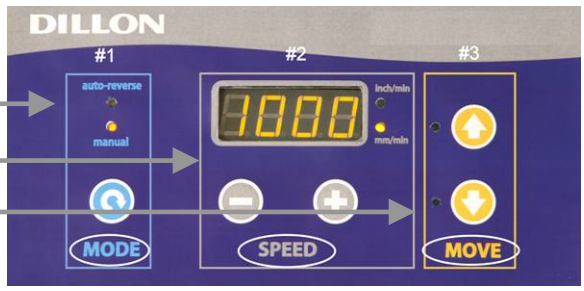
Position	Use
Top (n/c)	No connection. Factory and dealer use only.
Middle (GTX)	Connect to a Dillon GTX force gauge for stand reverse/stop control on sample break or compression overload.
Bottom (PC)	Sends the GTX serial information to a computer when the stand reverse/stop cable above is used. *The PC port eliminates Y-cables or expansion boxes required by other brands.*

OPERATION

Overview of controls

The GTS-1000 front console has three basic sections:

#1 Operating mode
#2 Test speed
#3 Move



Additional controls include:

- Emergency stop button (above console)
- Crosshead travel limit switches (on column)
- On/off power switch (at rear of stand)

#1 Operating MODE

The GTS-1000 has two operating modes, marked by an LED on the console. Press to cycle between:

1. Manual. Once UP or DOWN is depressed, the crosshead moves until any of the following occurs:
    a. Either MOVE key is pressed
    b. A limit switch is tripped (in the appropriate direction)
    c. The emergency stop button is pressed
2. Auto-reverse. This mode can speed up your repetitive batch testing. It runs at test speed until it reaches the travel limit and then automatically reverses, traveling at wide open throttle back to the other limit switch. You can stop the stand at any time by pressing the UP or DOWN key or Emergency Stop button.

CAUTION

Auto-reverse mode is not suitable for tensile testing when the sample must be removed before lowering, such as ductile metal parts.

The Dillon GTX force gauge offers increased stand control.

- In Manual mode, the GTX can stop the stand upon sample break detection.
- In Auto-reverse, it can reverse the stand upon sample break detection.

The GTX also interrupts downward travel when gauge capacity is exceeded to reduce potential for overload.

See accessories for the GTX stand reverse cable.

CAUTION

The overload detection within the GTX is intended as a backup approach to help reduce accidental overloads under slow speeds. The GTX must NOT be the primary method to prevent overload.

#2 Test SPEED

The GTS-1000 features speed selection keys and a speed display. The − and + keys adjust the crosshead speed shown on the LED display. The speed adjustment is slow initially, but then increases the rate when held down.

Speed may be adjusted while stopped or while moving. Full speed return in auto-reverse mode is not adjustable.

WARNING

Take care when adjusting speed up while crosshead is moving. Speed may rapidly increase.

The speed unit of measure is shown by an LED at right of window, either in/min or mm/min. To toggle between the units, press ⇨ and ⇩ keys at the same time.

#3 MOVE Crosshead

The GTS-1000 crosshead travel is controlled by the MOVE Keys.
To begin the crosshead in an UPWARD direction, depress ⇧.
To begin the crosshead in a DOWNWARD direction, depress ⇩.
The corresponding LED is lit while the stand is moving.
The crosshead will not move in a given direction if it is against a limit switch stop.

CAUTION

The GTS-1000 is an extremely quiet stand in operation and others may not be aware when the stand is moving. The operator must remain monitoring when crosshead is in motion.

PRECAUTION

To avoid accidental crosshead movement, power off the stand or engage the emergency stop when unattended.

To stop a moving crosshead press either ⇧ or ⇩ key or the emergency stop button.

Emergency stop button

The GTS-1000 Series features an emergency stop button conveniently located at the top of the console. This can be used as a panic switch whenever conditions are becoming a concern. Engaging the emergency stop is also a good precaution to avoid inadvertent crosshead movement when the stand is unattended.

When emergency stop button is depressed, motor control is removed from the tester. The crosshead will stop, all annunciators light and “Stop” is displayed in the speed window. To activate, press firmly downward. The stop button will latch and lock into position.

To release the emergency stop button, gently turn in a clockwise direction. This will disengage the lock and return the stop button to its normal position. You will see a green band below the red stop button and the speed will return to normal display. The stand will remain stopped until ⇧ or ⇩ is depressed.

Travel limits

The GTS-1000 Series has two adjustable mechanical travel limits that restrict the working travel range of the stand.

- Travel limits help protect your stand and force gauge from overloads by preventing fixturing from contacting when the crosshead is moving.
- Limits improve testing convenience by stopping at convenient test start and stop points.

The crosshead will stop moving (or automatically reverse) when the crosshead comes in contact with a travel limit. You need to adjust these limits to your equipment and test to attain the benefits.

To adjust, turn knob counterclockwise ½ to 1 turn. Gently lift or lower limit switch to the desired stopping point. (TIP: keep the knob face as plumb as possible for easiest sliding.) Snug the knob clockwise to lock and confirm proper stopping point by slowly moving the crosshead and checking where it stops.

On/Off switch

The GTS-1000 Power On/Off switch is located at the power entry module at the rear of the stand. When turning the machine OFF, it may take about 15 seconds for the speed indicator display to extinguish while the internal capacitor self-discharges. Do not turn power back on until the front panel lights have extinguished.

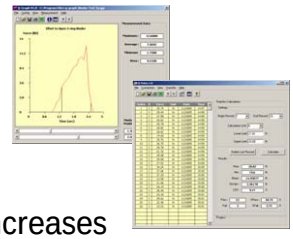
NOTICE

The console lights require about 15 seconds to completely discharge when the power is turned OFF.

ACCESSORIES

Force gauges – many styles and capacities available from Dillon.

Software – provides more information about tests and eliminates entry errors.



Adapter plate – accommodate other gauges with different hole spacing.

GTX stand reverse cable – offers additional stand control with the GTX force gauge.

Extension rods – for short/thin sample testing without using blocks.

Oversize working plate – increases depth for large samples and/or increases protection when fluid leakage may occur during testing.

Quick-couplers and adapters – change grips in seconds. Can also join two differently threaded items quickly and affordably.

PERFORMING A TEST

Force testing is fairly easy and consistent with a little experience. It generally consists of:

a) Attach the appropriate testing fixtures to the gauge.
b) Attach the appropriate testing fixtures to the base.
c) Ensure fixtures are in alignment.
d) Position lower travel limit switch so fixtures cannot contact each other.
e) Start software package such as Q-Graph or Q-Data.
f) Secure your sample to the fixture on the gauge.
g) Zero and reset the force gauge peaks.
h) Lower the crosshead and secure sample to the lower fixture.
i) Add barrier if projectile pieces may fly.
j) Reposition lower travel limit at convenient test starting point.
k) Note the starting crosshead measurement on the ruler.
l) Adjust test speed.
m) Check manual or auto-reverse mode.
n) Start test with ⇧ or ⇩ key.
o) Note crosshead measurement at point of interest.
p) Save/print Q-Graph report or send peak gauge reading to Q-Data.
q) Crosshead Return for new sample – start again at step f.

Some steps are optional depending upon test type and the information being sought.

Most force gauges will retain the peak force for the test, which is generally considered strength or effort to break the item.

The GTX Series break detection function will send a stop /reverse signal to the stand upon sample break detection. Requires a cable connection between the GTX and GTS-1000. Be certain to press RESET after each test to clear the peak values and ready the gauge for the next test.

TROUBLESHOOTING

Behavior	Problem	Action
No lights on front panel	Power switch off	Turn on power switch on rear of stand
	Power not connected	Insure cord is secure at both ends and has supply power
	Power setting	Verify supply power and power module setting
Stand does not move	Limit switch	Attempt movement in other direction. Release limit switch.
	Emergency stop	Release emergency stop button.
Stand moving at wrong speed	Incorrect speed unit-of-measure (in/min or mm/min)	Press ⊟ and ✣ together at the same time to change units of speed
Stand does not reverse at limit	Manual mode selected	Change mode to auto-reverse
No reverse upon sample break with GTX	Prior test peaks not cleared	Press RESET on the GTX prior to starting each test
	GTX configuration	Set break detect and verify peak reading is larger
Gauge not in alignment with fixture	Alignment adjustments	See 'Alignment' section of manual
Grinding noise Non smooth movement Struggling motor	Stand may have been overloaded or other problem	Contact your Dillon dealer
Console lights remain on after power down.	Normal	Allow 20 seconds for capacitor to discharge and lamps to extinguish.

Contact your Dillon dealer if these troubleshooting steps do not take care of the condition.

Specifications

Gauge mounting position	Throat opening	Maximum stand capacity
A (closest to column)	2.64 inch / 67 mm	1000 N / 220 lbf / 100 kgf
B (middle)	3.82 inch / 97 mm	750 N / 165 lbf / 75 kgf
C (furthest from column)	5.00 inch / 127 mm	500 N / 110 lbf / 50 kgf

Power consumption: 150 watts maximum
Stand weight: 54 lb / 25kg
Travel range: 18.7in / 475 mm
Maximum headroom: 22.8 in / 580 mm
Working area: 10.2 x 10.2 in / 255 x 255 mm
Tension plate: Three 10-32 UNF holes
Speed range: 0.2 – 40.0 in/min ; 5 – 1000 mm/min
Speed display: Digital LED
Direction of travel indicated on stand: Yes
Operating modes: Manual and auto-reverse
Reverse on sample break: Yes, with GTX and cable
Reverse on compression gauge overload: Yes, with GTX and cable