



# OPERATING MANUAL

## 60,000lbf Low-Capacity Compression Machine MC-60/60F



Rev: 11/2021

**IMPORTANT – PLEASE READ BEFORE MOVING THIS MACHINE**

**WARNING!** This machine is extremely heavy and may be unstable until properly installed. Attempting to move or reposition it without using proper equipment and procedures may result in severe injury or death. Properly rigged lifting equipment of sufficient capacity must be used, the load must be secured, and lifting equipment operators must be qualified and knowledgeable in the use of the equipment.

**IMPORTANT – PLEASE READ BEFORE OPERATING TESTING MACHINE**

1. Inspect to see that no visual damage has occurred during shipping. If you see any damage, contact Gilson Company, Inc. right away.
2. Check the equipment you received with your packing list.
3. It is recommended that the machine be located in an area where the atmosphere is free from acidic or contaminating fumes, which could possibly accelerate corrosion to machine surfaces or electrical contacts.
4. Position the machine leaving sufficient space at the rear and sides for calibration or service work.
5. The machine should be leveled.
6. Clean off machined surfaces that have been coated with rust preventative using any suitable non-corroding safety solvent. Wipe machined surfaces with a clean, oil soaked rag to minimize rusting.
7. When adding or changing oil, use only Dextron II or Dextron III automatic transmission fluid.

**NOTE:** This machine has been operationally tested and calibrated at the factory. In order to fully comply with the requirements stated in ASTM C 39, the compression machine should be calibrated again "On original installation or immediately after relocation." Gilson does not provide calibration services directly, but can provide a list of calibrators in your area. Contact our Technical Department at **800.444.1508** or **techsupport@gilsonco.com**.

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## 1.0 CONTROLLER INTRODUCTION

LXI is a low cost versatile indicator designed for a variety of materials, product, remote on-site and force calibration testing applications. Features include an Auto-Test-Reset mode for hands free operation, bar graph load rate display, permanent storage of test data and easy transfer of results into data base programs. It's accuracy, which exceeds ASTM E4, ease-of use and ruggedness results in a system of unrivaled price/performance.

LXI is ideal for:

- Tension/Compression Testing
- Beam Testing
- Concrete Cylinder Testing
- Cement Cube Testing
- Remote On-Site Testing
- Quality Control
- Product Evaluation
- Proof Testing

### 1.1 LXI FEATURES

- Display Live Load, Maximum Load, Live Stress and Maximum Stress numerically.
- Activate average load rate analysis to calculate and report actual test speeds.
- Select between force units of Lb, N, KN, Kg and stress units of psi, MPa, KPa, ksc.
- Define specimen geometries as cylinder, cube, beam center point loading, beam-3rd point loading, round and general area.
- Activate/De-Activate Cylinder ASTM C39 correction factor.
- Define cylinder break type according to ASTM C39.
- Perform beam tests according to ASTM C78 and C293.
- Store up to 2,000 test results to permanent memory. Results include Date, Time, Specimen ID#, Maximum Load, Maximum Stress, Average Load Rate plus a statistical summary of each.
- Store up to 6 test methods to permanent memory. Test methods enable the user to define and store cylinder, beam and cube test procedures to memory.

With the press of a key they can be quickly recalled for fast efficient testing.

- Activate Auto-Store to automatically store the results of each test.
- Auto-Test-Reset is standard and automatically enables the indicator for the start of the next test without requiring operator interaction.
- Define and detect the end of test with the Sample Break Detector.
- Digital output activates at sample break or machine overload.
- Transmit via the USB communications port results, XY data, test methods and calibration data to a remote computer running the optional GageSafe™ Data Exchange Program.
- Store up to 6 load cell calibrations for multiple load cell systems. The load calibration algorithm allows up to 10 calibration points per cell with piecewise linear fit between points. Accuracy exceeds ASTM E4 Standards and in general is better than 0.5% from 1 % of full scale to full scale.
- LXI comes standard with one analog input for measuring force and stress. Optional digital encoder and analog inputs can be installed to measure displacement or strain. Ideal for measuring Modulus or Poisson's ratio according to ASTM C469.
- With the servo control option LXI can be used with the MegaForce Automatic Loading System to ensure that all tests are performed according to ASTM standards. The user specifies the loading rates to achieve precise closed loop control.

### 1.2 LXI OPTIONS

- GageSafe™ Data Exchange Software
- Concrete Traker Database Program.
- Battery Pack for portable applications.
- Digital position or analog strain inputs
- Servo control output for MegaForce
- Shunt Calibration.
- Pressure Transducers: 1,000; 2,500; 5,000; 10,000 psi

## 1.3 LXI REPORTING CAPABILITIES

There are two options for exchanging data with the LXI:

- GageSafe™ Data Exchange Software
- HP Compatible USB printer

Note that each of these is an option purchased separately from the LXI digital indicator.

### 1.3.1 GAGESAFE™ DATA EXCHANGE PROGRAM

GageSafe is a PC-based program for exchanging data with the LXI. It is a Windows XP/Vista/7 compatible program that is capable of viewing, printing and storing test results uploaded via the USB communications port. The LXI can also upload via the USB communications port Test Methods and Calibration Data. GageSafe can read, create, edit and store Test Methods and Calibration Data. The Test Methods and Calibration Data can then be uploaded back into the LXI via the USB Communications Port. LXI has six Test Methods permanently stored in memory.

The user can use the six Test Methods to define procedures for testing cylinders, cubes and beams. With the press of a single key, they can quickly switch between methods for fast efficient testing. GageSafe is sold separately.

### 1.3.2 HP COMPATIBLE USB PRINTER

Connect an HP compatible USB printer to the LXI and print a Single Test Report which includes an XY curve, Test Reports that include tabulated results from multiple tests, test methods and calibration data (printer sold separately).

## 2.0 THE KEYS

### 2.1 THE <ZERO/0> KEY

The ZERO key performs the following functions:

- Defines a new zero load.
- Places the Indicator Test Status in Ready Mode.
- Clears out the previous test results from the test buffer and initializes the indicator for the next test. Make sure the previous test was stored prior to pressing ZERO or it will be lost.
- Enters the number zero.

## 2.2 THE <STORE> KEY

The STORE key writes the current test result which consists of peak load, date, time and specimen ID# to permanent memory then increments the specimen ID#. All results stored to memory can be printed or download to a remote computer.

### 2.3 THE <ENTER> KEY

The ENTER key performs the following functions.

- Accepts/assigns the value in a data entry field to that field.
- Turns ON/OFF a menu option.

### 2.4 THE <ESC> KEY

The ESC key performs the following functions.

- Returns to the Live Indicating Screen from any menu.
- Clears a data entry mistake by restoring the original number in a data entry field.

### 2.5 THE <UP & DOWN ARROW> KEYS

The ARROW keys allow the operator to scroll through menu items.

### 2.6 THE <NUMBER> KEYS

The NUMBER keys are used to select a menu option from within a menu or input a numerical value in a data entry field.

### 3.0 MENU SELECTIONS FOR CONCRETE TESTING

#### 3.0.1 TEST METHOD SPECIFIC MENU SELECTIONS

The LXI can store up to 6 test methods.

These menu items apply to the current selected test method and need to be set for each test method being used.

**Test Method  
Select Test Method (1-6)**

**Setup Menu**

**Use the <Setup> key to access the Setup Menu. Use number keys and Up/Down keys to navigate the menu.**

- 1) Specimen Type - Available Geometries: Cylinder, Round, Flat, Cube, Beam Ctr, Beam 3rd, X-Area
- 2) Data Logging - Start logging data threshold
- 3) Sample Break
  - a) Percentage of Peak
  - b) Arm Sample Break Threshold
- 4) Engineering Units
  - a) Force - Lbf, N, kN, kg
  - b) Stress- psi, kPa, MPa, ksc
  - c) Strain - in/in, %, in
  - d) Length – in, mm, cm
  - e) Age – Days, Hours
- 5) Rate Display - Available: Load/s, Load/m, stress/s, stress/m, strain/s, strain/m, strain, Posn/s, Posn/m, Posn,
- 6) Store – manual, auto
- 7) ID Prompt – off, on
- 8) Channels – Load Cell, Strain Position

**Report Options Menu**

**Use the <Report Opt> key to access the Report Options Menu. Use number keys and Up/Down keys to navigate the menu. Available test report options are:**

- 1) Report Options
  - Operator ID
  - Cylinder Cap Type
  - Specimen Age
  - Specimen Weight
  - Cylinder Break Type
  - Cylinder Correction Factor Average Rate
  - Yield by Halt of the Pointer
  - ASTM C469 Modulus (option)
  - ASTM C469 Poisson's (option)
- 2) Recalculate Results

**ID# Menu**

**Use the <ID#> key to access the ID number Menu. Follow the prompts to input the following information.**

Specimen ID  
 Specimen Dimensions  
 Operator ID (if active)  
 Cylinder Cap Type (if active)  
 Specimen Age (if active)  
 Specimen Weight (if active)

**Control Menu (Option)**

**NOTE: This menu is only active in units enabled for operating the MegaForce Automatic Pumping System. Use the <Control> key to access the Control Menu. Use number keys and Up/Down keys to navigate the menu.**

- 1) Test Rate
- 2) Preload
- 3) Preload Rate
- 4) Start Control
  - a) Start Control Load
  - b) Start Control Speed
- 5) Hold Load
- 6) Control Gains (password protected)
  - a) Proportional Gain
  - b) Integral Gain
  - c) Derivative Gain
  - d) Gain Shi ft
  - e) Shift1 (% FS)
  - f) Shift2 (% FS)

### 3.0.2 GLOBAL MENU SELECTIONS

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These menu items are not test method specific.

#### **UTILS Menu**

**Use number keys and Up/Down keys to navigate the menu.**

- 1) Clear Results
- 2) Set Date/Time
- 3) Ck Trans & IO
- 4) Install Def
- 5) Supervisor (On/Off)
- 6) Stream XY
- 7) Calibrate

#### **Print Menu**

**Use number keys and Up/Down keys to navigate the menu.**

USB Print (option to local USB Printer)

- 1) Current Test
- 2) Stored Tests
- 3) Individual Test
- 4) Print XY Plot
- 5) Test Method
- 6) Calibration

#### **Disk Menu (Option) Host PC**

**Use number keys and Up/Down keys to navigate the menu.**

- 1) XY Data -> Host
- 2) Results -> Host
- 3) Test Method -> Host
- 4) Calibration -> Host:
- 5) Traker -> Host:

### 3.1 THE SETUP MENU

Press the <Setup> key from the Indicating Screen to enter the Setup Menu. Use the <ARROW> keys to scroll through the menu items. Use the <NUMBER> keys to select the menu item. The following functions are provided in the Setup Menu.

1) **Specimen Type.** Select the specimen type for the sample to be tested. After selecting the type of specimen, the appropriate dimensions are requested.

2) **Data Logging.** Specify the Logging Threshold (Log Thresh) and the Data Logging Rate (Log Rate). Log Threshold is the force value at which data logging begins.

3) **Sample Brk.** Select the threshold for arming sample break (Brk Thresh) and sample break percent (Sample Break (%)). Sample Break is defined as a percentage of peak load and is used to define the end of a test. If Break Threshold is 1000lb, Sample Break (%) = 10 percent and Maximum Load seen during test is 100,000 Lb, then the LXI will be armed for sample break when load increases over 1000lbs and test will end (data logging stops, Max Load/Max Stress displayed) when load drops below 10,000 lbs, which is 10% of the maximum of 100,000lbs.

4) **Engineering Units.** Used to select between load units of Lb, N, KN, and Kg, Stress units of PSI, Mpa, Kpa and ksc, strain units of in/in, % and in, and rate units on a per second or per minute basis. Length units of in, mm and cm and Age units of days and hours.

5) **Rate Display.** a.) Choose type of load rate display with Rate- selection : Select between Load/min, Load/sec, Stress/min, Stress/sec, Strain/sec, Strain/min, Strain, Posn/sec, Posn/min, Posn.

6) **Auto Store.** If Store is set to AUTO, the results are automatically written to the results buffer and the specimen ID# is incremented when sample break is detected. If Store is set to MAN, it is necessary to press the <STORE> at the end of test to save the test results to memory and increment the specimen I D#.

7) **ID Prompt** – Off, On

8) **Channels** - Used to select load cell, strain and position. You can select between valid load cell calibrations set up in the calibration menu.

### 3.2 THE REPORT OPT MENU

Press the <ReportOpt> key from the Indicating Screen to enter the ReportOptions/AnalysisMenu. Use the <ARROW> keys to scroll through the menu. Press the <NUMBER> keys to select the menu item. The following items are found in the Report Opt Menu.

1) Report Options. Choose which analyses to activate. Use <Arrow> keys to scroll through items. Toggle (1) key to activate preferred option.

Available options include:

**Oper ID:** Operator ID.

**CylCapType:** Cylinder Cap Type

**SpecAge:** Specimen Age

**SpecWt:** Specimen Weight

**CylBrkType:** Cylinder Break Type

**CylCorFact:** Cylinder Correction Factor

**Statistics:** Statistics

**Avg Rate:** Average Rate Calculation

**Yld Halt:** Yield by Halt of Force

**Avg Rate:** Average Rate Calculation

**C469 Mod:** C469 Modulus of Elasticity

**C469 Pois:** C469 Poisson's Ratio

2) ReCalc Results. Recalculates all analyses.

### 3.3 THE UTILS MENU

Press the <Utils> key from the Indicating Screen to enter the Utils Menu. Use the <ARROW> keys to scroll through the menu. Press the <NUMBER> keys to select the menu item. The following items are found in the Utils Menu.

1) **Clear Results.** Erase all test results stored in the results buffer. Make sure you have printed the data before erasing memory.

2) **Set Date and Time.**

3) **Ck Trans-DOUT and I/O.** This function displays Input/Output status as well as the transducer readings in A/D counts. Possible A/D values are between -2,200,000,000 and +2,200,000,000.

4) **Install Defaults.** Used to put all setup parameters in a known default state.

## Installing defaults DOES NOT effect any of the calibration information.

5) **Supervisor.** Select Supervisor ON or OFF. This is a password-protected field. With Supervisor set to ON, the user has full access to all menus. With Supervisor set to OFF, the user has access to the ID# field only.

6) **Stream.** Toggle to ON to stream XY data to GageSafe Data Exchange program.

7) **Calibrate.** Calibrate a load cell according to ASTM E4 standards. See Section 5.0 for calibration procedures.

**Edit Calibration Points.** This function allows the calibrator to modify the load value for a given calibration point.

**NOTE:** The calibrator can also edit A/D counts in the calibration. Select Install Def from the Utility menu. The screen will read 1) Install; ESC) Exit. Press the "9" key to get into the edit A/D count screens.

### 3.4 THE ID# MENU

ID number can be 8 digits long. Input the Specimen ID number and press <ENTER> to accept . **NOTE:** The Specimen ID number will be automatically incremented after the current test result has been printed or stored. You will then be prompted to enter dimensional information for your selected specimen. Prompts for any items enabled in the Report Options menu will follow the specimen dimensions prompt.

### 3.5 THE PRINT MENU

**NOTE:** This menu is used to print hard copy printouts to an HP compatible USB printer. The USB printer option and the printer are purchased separately.

Press the <Print> key from the Indicating Screen to enter the Print Menu. Use the <ARROW> keys to scroll through the menu. Press the <NUMBER> keys to select the menu item. The following items are found in the Print Menu:

- 1) **Current Test.** Transmits the current test result to the printer.
- 2) **Stored Tests.** Transmits stored test results to the printer.
- 3) **Select Test.** Transmits one specified test result to the printer.
- 4) **Prn XY Plot.** Transmits XY plot to the printer.

5) **Test Method.** Transmits the current test method to the printer.

6) **Calibration.** Transmits calibrations to the printer.

### 3.6 THE DISK (-) MENU

#### Host PC

The Host PC menu contains options for transmitting data to the GageSafe Data Exchange Program, which is not included with the LXI and must be purchased separately.

**NOTE:** You can upload test methods and calibrations from GageSafe as well. These actions are initiated from within the GageSafe program and described in the GageSafe manual.

The following items are found in the Host PC menu:

- 1) **XY Data -> Host.** Transmit XY data from the current test to GageSafe.
- 2) **Results -> Host.** Transmit stored test results to GageSafe.
- 3) **Method -> Host.** Transmit Test Methods to GageSafe.
- 4) **Cal -> Host.** Transmit calibration to GageSafe.

## 4.0 OPERATION

### 4.1 HOW TO SETUP A TEST

You can store up to 6 test methods in the LXI. Test methods can be transferred to and from the GageSafe Data Exchange software in units that are equipped with these options.

- Section 4.1 describes how to setup for a test.
- Section 4.2 describes how to perform a test and store the results to memory.
- Section 4.3 describes how to generate test reports.
- Section 4.4 describes how to download the stored test results to a remote PC.

**Step 1:** Press <SETUP> from the Indicating Screen. From the SETUP Menu select the following and enter values for each.

**Specimen Type.** Specimen type to be tested: Cylinder, Cube, Beam Ctr, Beam 3rd, Round or Area.

**Data Logging:** Set Logging Threshold. When the logging threshold load value is exceeded, data logging begins and the test starts. Set the Data

Logging rate appropriate to your test. As data logging rate increases, total test time buffer decreases. The total test time for each data-logging rate is displayed in menu item.

**Sample Break:** Set the Break Threshold to a load value where you want the LXI to be armed for sample break. This value needs to be greater than the data-logging threshold.

Set Sample Break % to value to where you want to define the end of test. For example, if Break Threshold is 1000lb, Sample Break (%) = 10 percent and Maximum Load seen during test is 100,000 Lb, then the LXI will be armed for sample break when load increases over 1000 lbs and test will end (data logging stops, Max Load/ Max Stress displayed) when load drops below 10,000 lbs, which is 10% of the maximum of 100,000lbs.

**Rate Display:** Set Rate Display to force/sec; force/min; stress/sec; or stress/min.

**Engineering Units:** Set load units to Lb, N, KN or Kg. Set stress units to psi, kPa, MPa, or ksc. Set length units to in, mm or cm, Set Age units to Days or Hours

**Auto Store:** Select if you want to automatically store every test result.

**LoadCell:** Select the load cell number if necessary.

See Section 3.1 for more information.

**Step 2:** Press <UTILS> from the Indicating Screen. Clear results from memory.

Note: If the stored results are important, print before clearing. See Section 3.3 for more information.

**Step 3:** Press the <ID#> from the Indicating Screen. Input the specimen ID#. The specimen ID# will automatically increment after the current test is stored. If any Report Options have been turned ON, additional prompts will follow.

## 4.2 HOW TO PERFORM A TEST AND SAVE RESULTS

If the steps in Section 4.1 were followed, you are now ready to perform a test. The current test settings are saved in permanent memory and will not change unless the operator modifies them.

**Step 1:** Insert the specimen in the machine and move the cross-head to the desired starting position. If using a hydraulic machine, float the piston by moving off it's stop.

**Step 2:** Press the <ZERO> key to tare any residual load from the readout.

**Step 3:** Begin loading the specimen. Once the load exceeds the start test threshold value, the lower display line will change to the specified rate display (load/stress rate). Once the load exceeds the break threshold the Sample Break detector is armed.

**Step 4:** Once sample break is detected the test is complete and the lower display line will show peak load. If Auto Store is turned ON, the results will be saved to memory. If Auto Store is turned OFF, press <STORE> to save the current test results. Note: If you do not press <STORE> before pressing <ZERO> or the start of a new test, the results will be lost. To continue running tests, repeat Steps 1, 3, 4.

**NOTE:** The LXI is designed to operate in a "hands free" mode. This means that once it has been setup and properly zeroed, the operator should not have to touch the keypad. If a test result is stored, the specimen ID# will automatically increment.

READY and TESTING are the two possible Indicator Modes.

## 4.3 PRINTING TEST REPORTS TO A HP COMPATIBLE USB PRINTER

If the steps in Section 4.2 were followed, a test report containing all of the results stored to memory can be obtained.

**NOTE:** The USB printer is purchased separately.

**Step 1:** Press <PRINT> from the Indicating Screen to see available print options. Print current test, stored tests, one specified stored test, or XY plot to printer. More information in section 3.5

## 4.4 DOWNLOAD TEST RESULTS TO A REMOTE PC

A data transfer cable and GageSafe Data Exchange Software is required to download data to a remote PC. Refer to the GageSafe Data Exchange program manual for downloading data to a computer.

## 5.0 CALIBRATION

Refer to Section 7.1 for details on transducer connections.

### 5.1 HOW TO CALIBRATE ANALOG TRANSDUCERS

You can calibrate up to 6 load cells to the LXI. There can be up to 10 points in each calibration.

**Step 1:** Turn on the system and allow it to run for 10 minutes before calibrating.

**Step 2:** Select the Engineering Units for calibration from the SETUP Menu. See Section 3.1 for more information.

**Step 3:** Select <7> Calibrate from the Utils Menu.

**Step 4:** Enter the password. Contact Test Mark technical support if you have lost the password.

**Step 5:** Enter the load cell number. Use zero if your system has only one load cell.

**Step 6:** Input the full-scale range or the capacity of the machine. The range should be input in the currently active engineering units.

**Step 7:** Input the resolution or minimum load increment.

**Step 8:** Press <1 > Set Cal Points to enter the measure mode or <ESC> to exit.

**NOTE:** If you decide to exit the Calibration Menu at this time the values entered for Full Scale and Resolution will be saved.

#### Required Information Before Continuing Calibration

The program will enter the measurement mode if <1> is pressed in Step 8. During this mode, the technician can take up to ten calibration point readings (a minimum of 2 points is required).

**NOTE:** The first calibration point must be at zero load.

It may be beneficial to take a few more calibration readings in areas of greatest inaccuracy. The number next to "Set PT No" on the display will indicate how many calibration readings have been taken. As the calibration points are entered, write down the corresponding load value. After all ten calibration points have been taken, or the <STORE> key is pressed when using less than ten points, the LXI automatically switches to engineering input mode.

Input the load value corresponding to each calibration point reading stored. The calibration points are stored sequentially. The first point

is zero followed by the second, third and so forth. Once an engineering unit value has been entered for each calibration point stored, the unit will automatically save the calibration.

**NOTE:** Display will prompt for Set PT No 0 when setting the first point. The first point in the calibration MUST be zero load. After all of calibration points have been stored, the first Engineering unit value entered will be 0. The prompt for this will be PT(1).

**Step 9:** Unload the machine or place the transducer at its zero point. If calibrating a hydraulic machine, float the piston before taking any readings. Press

<ENTER> to take the zero reading. The left side of the display will indicate PT1 has been read.

**Step 10:** Load the machine to a desired load and press <ENTER> to set a calibration point (voltage measurement). The voltage value is NOT displayed but it has been saved to nonvolatile memory. Write down the corresponding engineering unit value for each calibration point. Repeat this step until all readings are taken.

**Step 11:** Press <STORE> to exit the measurement mode if fewer than ten calibration points are used. The program will automatically proceed from Step 10 to Step 12 after the tenth reading.

**Step 12:** Input the corresponding engineering unit value for each measurement point.

After all values have been entered, the program will automatically generate the corresponding scale factors and store them to permanent memory.

#### DONE! READY TO VERIFY CALIBRATION

**Step 13:** To verify the calibration, exit out to the Indicating Screen and apply specific loads to the machine and compare the reading on the indicator with the standard.

**Step 14:** If you choose to adjust one or some of the calibration points, use the Edit Calibration function from the Utils menu. This function will allow you to edit load values for one, some or all calibration points without forcing you to repeat Steps 2-12.

## **5.2 WHAT OCCURS DURING CALIBRATION**

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The calibration procedure allows up to ten calibration points to be entered. A straight line connects each successive pair of points and the slope of each line is the calibration scale factor used for that region. This results in a piecewise linear function which maximizes accuracy.

## **5.3 SAVING CALIBRATION DATA**

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All calibration data can be transferred to and from the GageSafe Data Exchange software.

Calibration data can also be printed to HP compatible USB printer in units that are equipped with these options.

## 6.0 TROUBLESHOOTING

LXI Troubleshooting		
Problem Description	Possible Causes	Action
<p>Not holding peak load OR Not tracking load while machine actually loading and breaking sample.</p>	<p>Sample break threshold And sample break % settings</p>	<p>NOTE: The LXI digital goes into TESTING MODE when the actual load exceeds the programmed load threshold value. When the LXI Digital is in the TESTING MODE, the live load is displayed on the upper right and the load rate is displayed in the bottom of the display. If you do not see the the numeric load rate in the bottom display then you are NOT in the testing mode and you need to look at your data logging threshold value.</p> <p>Ensure that the Break Threshold (Sample Brk menu item in the Setup menu) is set to a value that is appropriate for the test. Break Threshold is the point where the LXI digital is armed for sample break. If the break threshold is too low then a load drop in the early part of the test could trigger the LXI to detect premature specimen break (end of test) and stop logging data. For example, if the Break Threshold is set to 10lbs (much too low) and the sample break percentage is set to 50% and the load climbed to 20lbs and then dropped to 10lbs the LXI would detect sample break, stop logging data and report a peak load of 20lbs.</p> <p>Ensure that Sample Break (SETUP, End of Test menu) is set appropriately. Sample Break is defined as a percentage of peak load and is used to define the end of a test. If Sample Break = 10 percent and Peak Load = 100,000 Lb, then the test will terminate when the load drops below 10,000 Lb. Setting sample break percentage to 0 disables it so the LXI will continue logging data until the test buffer is full. If the sample break percentage is set too high then end of test can be triggered early.</p>
	<p>Applying Load too quickly after taring LXI</p>	<p>NOTE: The LXI is designed for hands-free operation. You should only need to zero the digital once. It is not necessary and NOT recommended to zero the digital prior to each test. Doing so can prevent the digital from going into Testing Mode and not recording the peak load. If you do not see the rate bar or load rate display on bottom line of the display it then the digital is not going into testing mode.</p> <p>Ensure that you are that you are waiting at least 3 seconds after zeroing digital before running a test (applying load to your break machine).</p>

<b>LXI Troubleshooting Continued</b>		
<b>Problem Description</b>	<b>Possible Causes</b>	<b>Action</b>
Load reading wrong	Calibration	Ensure that correct load calibration is selected. The Active Calibration # is displayed in the upper left of the live screen. The LXI can store up to six load cell calibrations.
	Analog/Digital Electronics	Contact Gilson technical support.
	Excitation Voltage bad	Contact Gilson technical support.
	Load Transducer Cable	Replace/fix transducer cable NOTE: refer to See Electrical/Mechanical Data section of this manual for cable wiring information.
	Load Transducer	Replace load transducer
Stress reading wrong	Specimen Information	Stress is a calculated value. It is equal to the load divided by the programmed specimen cross-sectional area.  Ensure that <b>Specimen Type</b> and specimen dimension information is correct in the <b>SETUP</b> menu.
Load reading unstable	Calibration	Ensure that there is valid calibration in selected load channel. A valid calibration has at least two points, the first point MUST be zero, appropriate full scale and resolution settings, and a good A/D count span between the points in the calibration.
	Analog/Digital Electronics	Contact Gilson technical support.
	Excitation Voltage bad	Contact Gilson technical support.
	Load Transducer Cable	Ensure that cable gain strap is properly wired for transducer being used. Replace/fix transducer cable  NOTE: refer to See Electrical/Mechanical Data section of this manual for cable wiring information.

## 7.0 ELECTRICAL/MECHANICAL DATA

### 7.1 USER CONNECTIONS

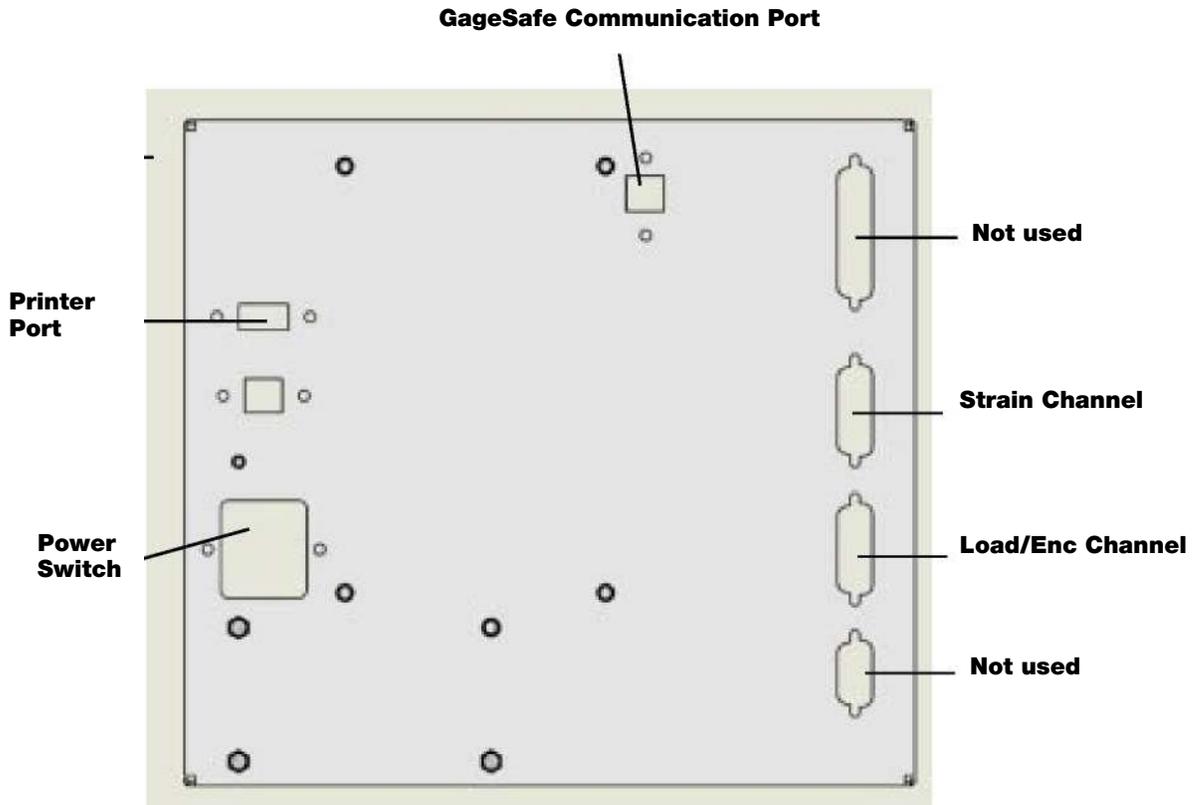
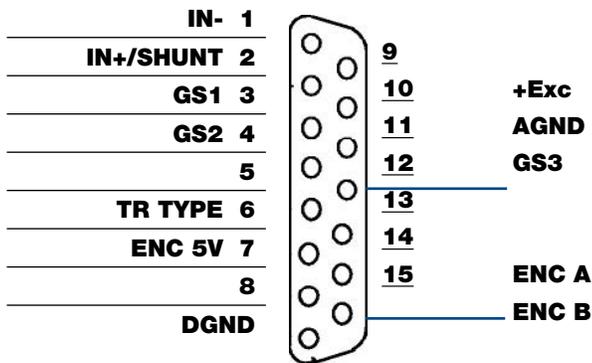


Figure 7.1.1 - LXI Rear Connection Panel

#### DB15 Female



#### Analog Channel Connections

##### Analog-Load Input

**Analog Excitation:**  
pins 9 & 10 (+Exc & AGND) 5 Vdc

**Analog Inputs:** pins 1 & 2 (+/- IN)

**Analog Input Range:**  
up to 2.5 mv/v Tie pin 3 to pin 12 up to 4.5 mv/v Tie pin 4 to pin 12 +/- 5 V No Connection  
User definable Tie <25 ppm/C resistor between pin 11 & pin 12. Gain = 1 + 50000/Rg. Connect all shields to chassis.

Transducer Identification (Contact Factory) Figure 7.1.2 - Analog Transducer Pin Designation.

## **7.2 USB PORT**

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The USB port is used to transmit exchange data with either an HP compatible USB printer, or GageSafe Data Exchange software.

## **7.3 POWER (AC) INPUT**

---

The LXI Power requirements: 85 to 265 VAC (50 - 60Hz).

## **7.4 PASSWORD**

---

Factory Password: 678

Use this for calibration and other password protected areas.

Gilson suggests removing this page from the manual and placing it in a safe place.

# **HYDRAULIC CONTROL VALVE & HYDRAULIC PUMP SECTION**

## 8.0 HYDRAULIC CONTROL VALVE

### 8.1 METERED ADVANCE POSITION

Placing Control Handle No. 1 (see Figure 1) into the metered advance position allows the operator to adjust the rate of loading through the use of Control Knob No. 2. To increase the rate of loading, turn Knob No. 2 counter-clockwise. To decrease the rate of loading, turn Knob No. 2 clockwise. **CAUTION: Do not over-tighten Control Knob No. 2.**

When testing concrete cylinders, the rate of loading must conform to ASTM C 39 specifications. For a hydraulically operated testing machine, the load must be applied at a constant rate within the range of 20—50psi/sec. Knob No. 2 controls the rate of loading. For 6in (150mm) diameter concrete cylinders, the loading rate should be 565—1,413lbs/sec., or 34,000— 84,000lbs/min.

On digital load indicating machines, please see Rate of Load in the digital manual.

For analog (dial) gauge machines, a reading of 10,000lbs on 10 seconds is a good average and is easily set through the use of Control Knob No. 2 and a watch with a second hand.

### 8.2 FULL/ADVANCE POSITION

Placing Control Handle No. 1 into the rapid advance position causes the piston to advance rapidly at an uncontrolled rate. This is normally used for pre-loading a specimen or rapidly advancing the piston to reduce the daylight opening between the specimen and the platen.

**CAUTION: When pre-loading a specimen, watch the machine's load indicator to prevent overloading, or premature failure of the specimen may occur.**

### WARNING!

DO NOT ALLOW THE MACHINE TO TRAVEL BEYOND THE MAXIMUM PISTON STROKE TAG LOCATED ON THE FRONT OF THE LOAD FRAME. OVEREXTENDING THE HYDRAULIC RAM MAY RESULT IN DAMAGE TO THE SEALS AND WILL CAUSE THE UNCONTROLLED RELEASE OF HYDRAULIC FLUID UNDER PRESSURE.

### 8.3 HOLD POSITION

Placing Control Handle No. 1 into the hold position (see Figure 1) stops the loading of the specimen and holds the pressure on the specimen at that point.

### 8.4 RETRACT POSITION

Placing Control Handle No. 1 into the retract position releases all pressure in the hydraulic cylinder allowing the piston to retract to its start position. It is not necessary to retract the piston fully between tests. A daylight opening that will allow the specimen to be inserted and removed is all that is required.

**NOTE:** During continuous operation of the machine, the Flow Control Valve will go through a significant temperature rise. This is not a cause for alarm, as the temperature rise will not affect the operation of the testing machine.

## 8.5 FIGURE 1: CONTROL VALVE

### CONTROL VALVE

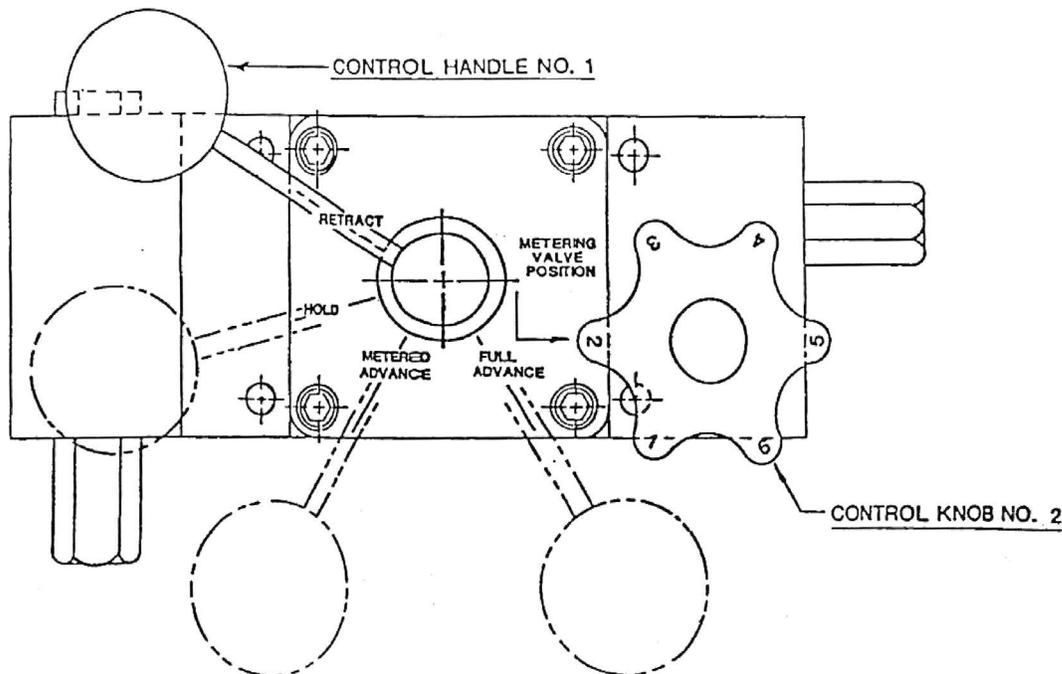


Figure 1

## 8.6 SEQUENCE OF OPERATION

1. With Pump Motor switched OFF, carefully center specimen in testing machine.
2. Turn Control Knob No. 2 clockwise to a snug position. Never over tighten. (If Knob No. 2 has already been adjusted as in Section 6.1, this step may be skipped until a specimen of different size is tested.)
3. Position Valve Control Handle No. 1 to a "metered advance" position.
4. Switch on pump motor.
5. If a preload of the specimen is desired, position Valve Control Handle No. 1 to "full advance". **Caution is required to avoid overload or failure of the specimen.**
6. Watch the display closely. When the desired preload has been attained, move the Valve Control Handle No. 1 to the "metered position".
7. To increase the rate of loading, turn Control Knob No. 2 counter-clockwise. To decrease the rate of loading, turn Control Knob No. 2 clockwise.
8. To hold pressure at any desired point, position Valve Control Handle No. 1 to the "hold" position.
9. To release pressure so that the platen will return after a test has been completed, position Valve Control Handle No. 1 to the "retract" position.
10. For repetitive testing of identical specimens, Control Knob No. 2 can be preset with a stopwatch, then locked in position by tightening the thumb-screw located beneath the knob.

## 8.7 MAINTENANCE & SAFETY PRECAUTIONS

### 8.7.1 HYDRAULIC PUMP & FLOW CONTROL VALVE

This two-stage hydraulic pump incorporates precision design and engineering features. Peak efficiency for either continuous or intermittent operation is assured at the full range of pressures up to 10,000psi. You will have uninterrupted, trouble-free service if you keep it clean and free of dust.

## 8.7.2 SAFETY PRECAUTIONS

### **WARNING!: To avoid possible injury:**

- Disconnect the pump from its electrical supply before performing maintenance or repair procedures.
- Repairs and maintenance should be performed in a dust-free area by a qualified technician.
- Should a hydraulic hose ever rupture, burst or need to be disconnected, immediately shut off the pump and shift the control valve to the retract position to release all pressure and allow the machine piston to return to the at-rest position. Cycle the control valve twice to its retract position to make sure all pressure is released. **Never attempt to grasp a leaking hose under pressure with your hands. The force of escaping fluid could cause serious injury.**
- Do not subject the machines hydraulic hoses to potential hazard such as fire, extreme heat or cold, sharp surfaces or heavy impact. Do not allow the hose to kink, twist, curl or bend so tightly that oil flow within the hose is blocked or reduced.
- Periodically inspect the hoses for wear because any of these conditions can damage the hose and possibly result in personal injury. Should a hose need replaced, contact Gilson Company, Inc. with your machine model number and capacity for replacement parts.

## 8.7.3 HYDRAULIC FLUID LEVEL

- When checking the oil level, fully retract the machines hydraulic cylinder to the at-rest position and disconnect the power supply. Clean the area around the filler plug and remove the plug.
- For machines supplied with 3/4hp pump, maximum capacity is when the oil is 1-1/2in (38mm) below the cover plate with the cylinder retracted.
- For machines supplied with 1/2hp pump, maximum capacity is when the oil is 2in (50mm) below the cover plate with the cylinder retracted.
- When adding oil, use only **Dextron III Automatic Transmission Fluid**. To fill, insert a clean funnel with filter, add oil slowly being careful not to overfill the pump. Check oil level when finished and remove any oil if pump is overfilled. Check to see that the breather-hole in the filler cap is open to

prevent the build up of excessive air pressure in the reservoir, and to assure that the cylinder retracts smoothly, then replace filler cap.

- The frequency of oil changes will depend upon the general working conditions, severity of use and overall cleanliness and care given to the testing machine and the hydraulic pump. An air hose should never be used to clean the machine or pump as it will blow dust into the hydraulic system and cause damage to the hydraulic pump and load control valve. The oil should be changed at least every three hundred (300) hours of use under severe working conditions, where dust contamination of the oil is quite likely to happen. When changing the oil drain, flush and refill the reservoir with Dextron III Automatic Transmission Fluid.

## 8.7.4 HOW TO OPERATE THE PUMP

1. Make sure all valve and hose fittings are tight. Plug in electric motor.
2. Set valve in the retract position, set switch on run, and let pump idle for a few minutes.
3. Place a concrete test cylinder in the machine and run piston out to its full travel several times to eliminate air from the system. The pump is now ready to be put into regular operation.

## 8.7.5 TROUBLESHOOTING

### Correcting Minor Hydraulic Problems

The hydraulic unit should be observed constantly for out of the ordinary performance and unusual noises. If any of these are present, shut off pump and take corrective steps immediately to avoid possible expensive repairs later on. Some of the most common minor problems and their remedies are listed:

PROBLEM	CAUSE	REMEDY
Improper advance or return.	Air in circuit, oil supply low.	Add oil.
Improper advance or return.	Dirt in system causing valves to lock open.	Flush out entire oil system and fill with new oil.
Improper advance or return.	If trouble is not cleared up by above remedies, trouble may be due to dirty or plugged up strainer screen.	Drain oil. Next remove pump base cover and clean or replace screen.

**CAUTION:** Do not operate pump without screen, as particles of dirt will be sucked into pump and valve mechanisms, seriously damaging valve seats.

PROBLEM	CAUSE	REMEDY
Unable to reach pressure.	Same as above.	Same as above.
Necessary to add oil often.	Oil leaks.	Check for broken lines, loose fittings or connections.
Noise in hydraulic system.	Air in system. Low on Oil.	Add oil. Run pump to work out air.

If the above corrective measures fail to make the pump function properly, it is recommended that you notify Gilson Company, Inc. or a qualified service representative. Under no conditions allow unqualified personnel to attempt to repair the pump, particularly the pump block unit or control valve unit, as serious and irreparable damage may result.

## 9.0 ELECTRICAL HYDRAULIC PUMP

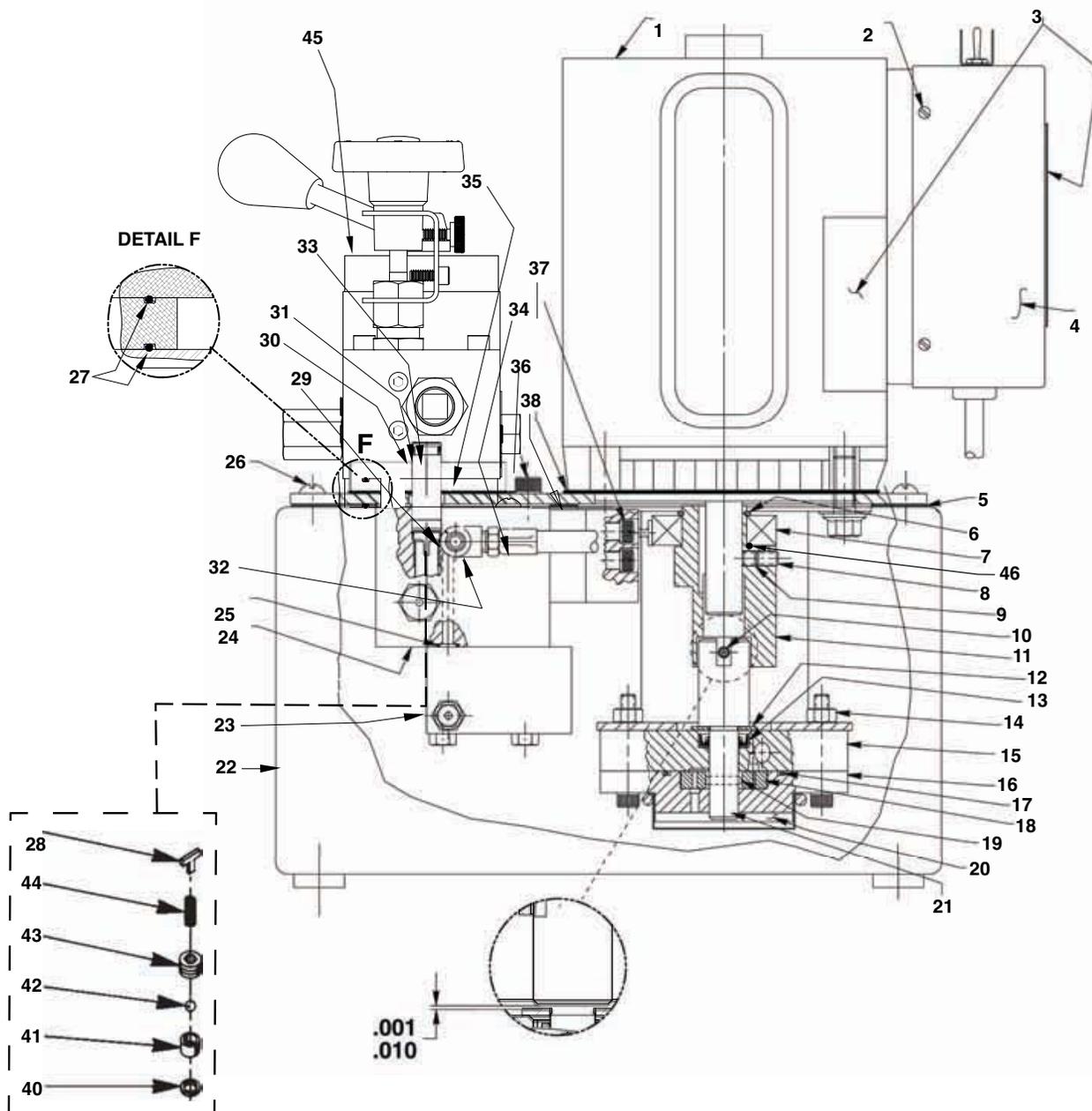


SPX Corporation  
5885 11th Street  
Rockford, IL 61109-3699 USA

Tech. Services: (800) 477-8326  
Fax: (800) 765-8326

### 9.1 PUMP DIAGRAM

## ELECTRIC HYDRAULIC PUMP Model B



**9.2 PUMP PARTS LIST**

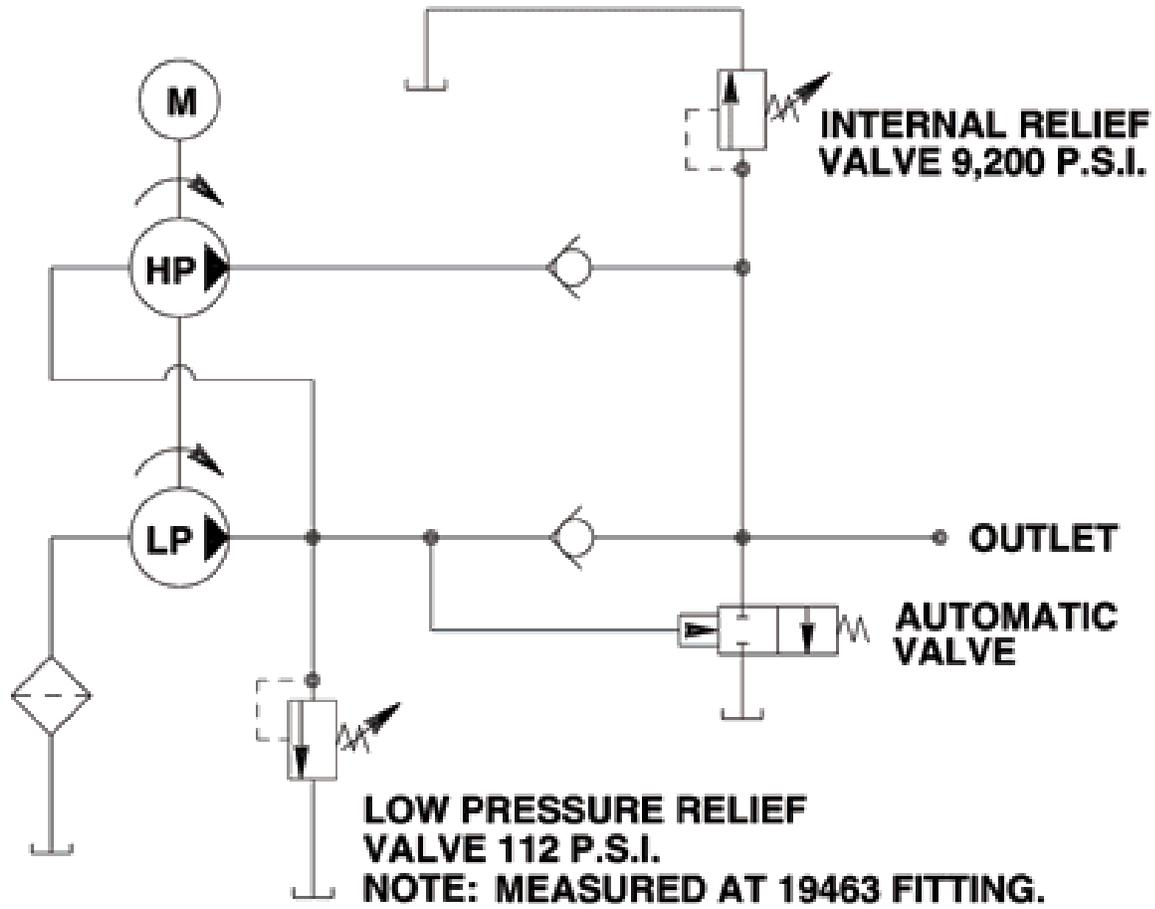


Item No.	Part No.	No. Req'd	Description
1	58196WH2	1	Electric Motor (For PE17-FORN & PE17-TEST)
	303912	1	Electric Motor (For PE17N-TEST)
2	11141	4	Machine Screw (#6-20 X 3/8 Lg.)
3	*200188	1	Decal (IMPORTANT portion is on electric motor; <b>WARNING</b> portion is on control box cover)
4	42576WH2	1	Control Box Cover (For PE17-FORN & PE17-TEST)
	42576BK2	1	Control Box Cover (For PE17N-TEST)
5	*40164	1	Gasket
6	209798	1	Retaining Ring
7	209805	1	Ball Bearing
8	10519	1	Set Screw (1/4-20 UNC X 3/8 Lg.; Torque to 60/80 in. lbs.)
9	10136	1	Set Screw (1/4-20 UNC x 1/4 Lg.; Torque to 60/80 in. lbs.)
10	10973	1	Slotted Spring Pin ( <b>NOTE:</b> Locate slot as shown.)
11	45596	1	Eccentric
12	12595	1	Washer (1-1/8 X 1/2 X .077 Thk.)
13	*304830	1	Oil Seal
14	10199	2	Hex Nut (1/4-20 UNC)
15	61170	1	Housing
16	61169	1	Gerotor Housing
17	*10922	1	O-ring (2-1/8 X 1-15/16 X 3/32)
18	304826	1	Gerotor
19	209794	1	Gerotor Drive Pin
20	21846	1	Filter Support
21	304835	1	Drive Shaft
22	40063GY15	1	Reservoir (2 gal.; For PE17-FORN)
	40063BK2	1	Reservoir (2 gal.; For PE17-TEST & PE17N-TEST)
23	52167	1	Block
24	61167	1	Body
25	*10266	1	O-ring (3/8 X 1/4 X 1/16)
26	10177	10	Mach. Screw (1/4-20 UNC X 3/4 Lg.)
27	*18669	2	O-Ring
28	209795	1	Outlet Ball Stop
29	10427	1	Pressure Plug (1/8 NPTF)
30	*10268	2	O-ring (1/2 X 3/8 X 1/16)
31	*11863	2	Backup Washer (1/2 X 3/8 X 1/16)
32	19463	1	Tee
33	209809	1	Coupling
34	304819	1	Hose Assembly
35	52165	1	Manifold
36	10030	1	Cap Screw (5/16-18 UNC X 3/4 Lg.; Torque to 220/240 in. lbs.)
37	10022	4	Screw (1/4-20 UNC X 1-1/2 Lg.; Torque to 180/200 in. lbs.)
38	351060	1	Gasket
39	2007916	1	O-Ring
40	*10442	1	Copper Washer (1/4 Bolt)
41	*209787	1	Replaceable Seat
42	*12223	1	Steel Ball (3/16 Dia.)
43	209797	1	Hollow Lock Screw (7/16-20 UNF-3A; Torque to 110/130 in. lbs.)
44	*14431	1	Compression Spring
45	64529	1	Valve
46	2007916	1	O-Ring

Part numbers marked with an asterisk (\*) are contained in Repair Kit No. 300430.

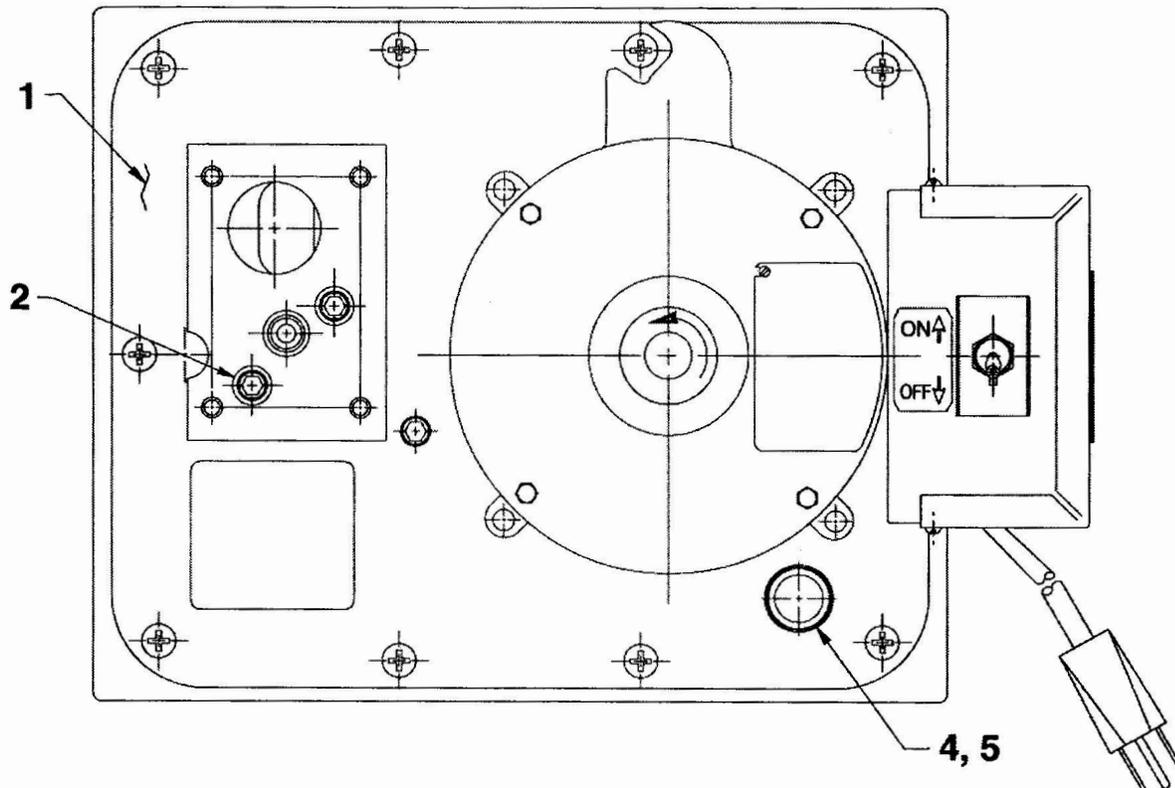
**9.3 HYDRAULIC SCHEMATIC DIAGRAM**

# HYDRAULIC SCHEMATIC



## 9.4 TOP VIEW & PARTS LIST

### TOP VIEW



### PARTS LIST

Item No.	Part No.	No. Req'd	Description
1	66218BK	1	Cover Plate
2	10030	2	Cap Screw (5/16-18 UNC x 3/4 Lg.)
4	20937	1	Vent Cap
5	200415	1	Rubber Gasket

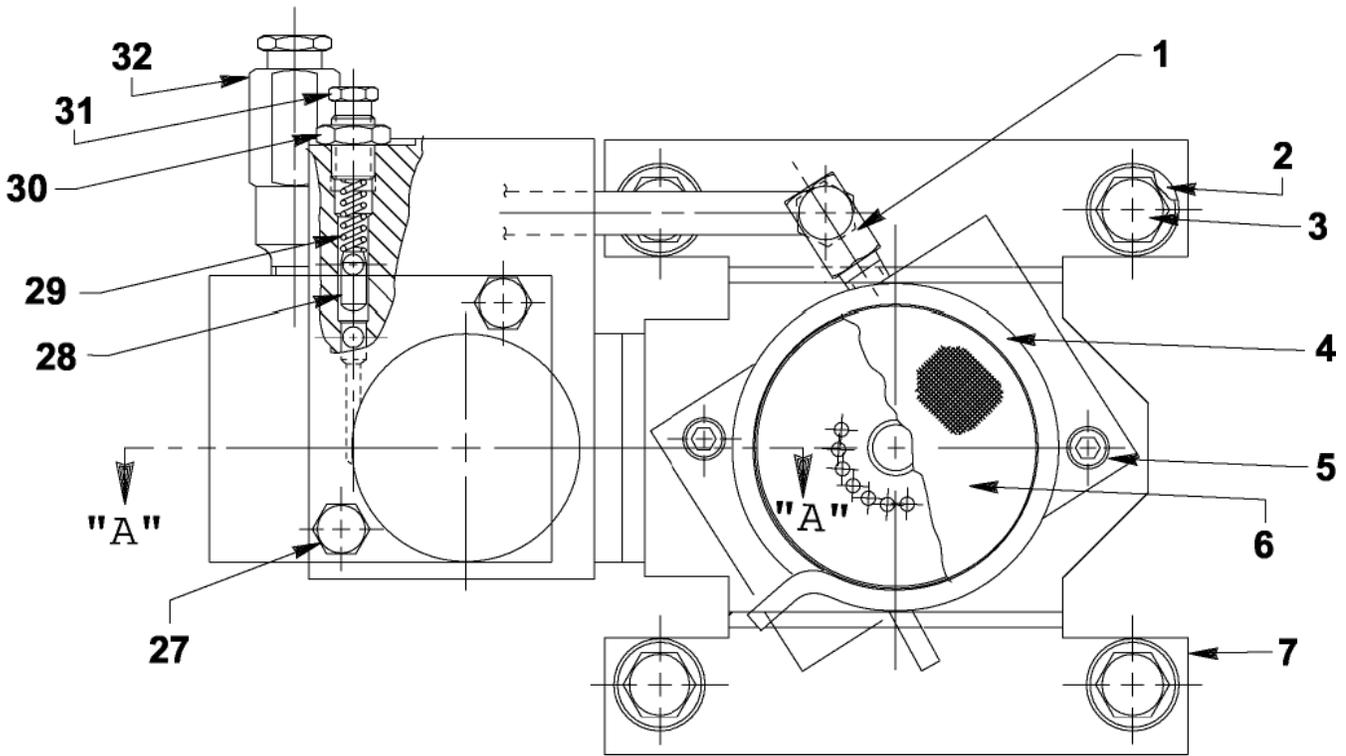
Refer to any operating instructions included with this product for detailed information about operation, testing, disassembly, reassembly, and preventive maintenance.

Items found in this parts list have been carefully tested and selected. **Therefore: Use only genuine Power Team replacement parts!**

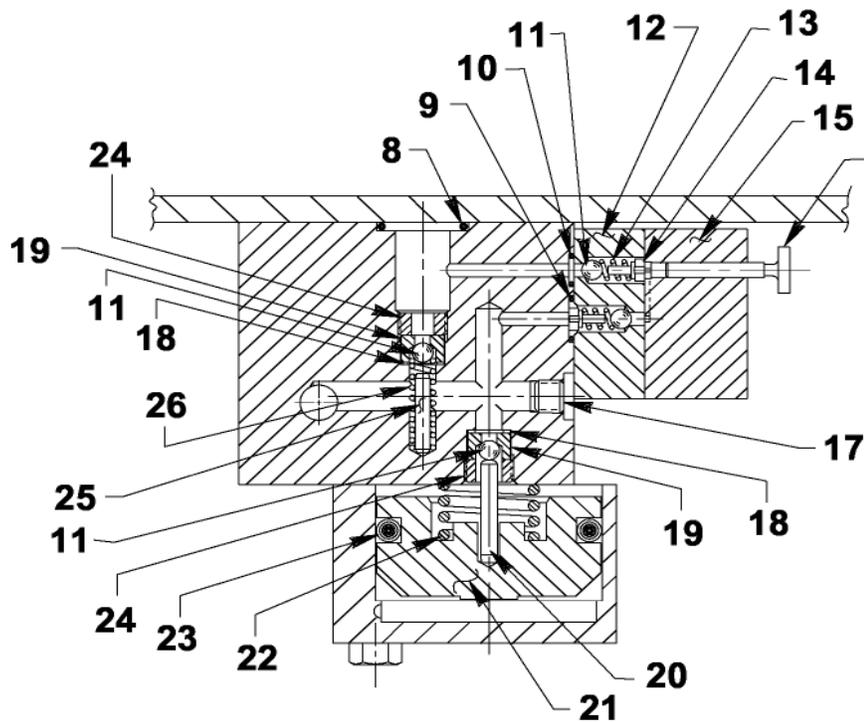
Additional questions can be directed to our Technical Services Department.

9.4.1 BOTTOM VIEW & SECTION A-A

**BOTTOM VIEW & SECTION A-A**



**SECTION A-A**



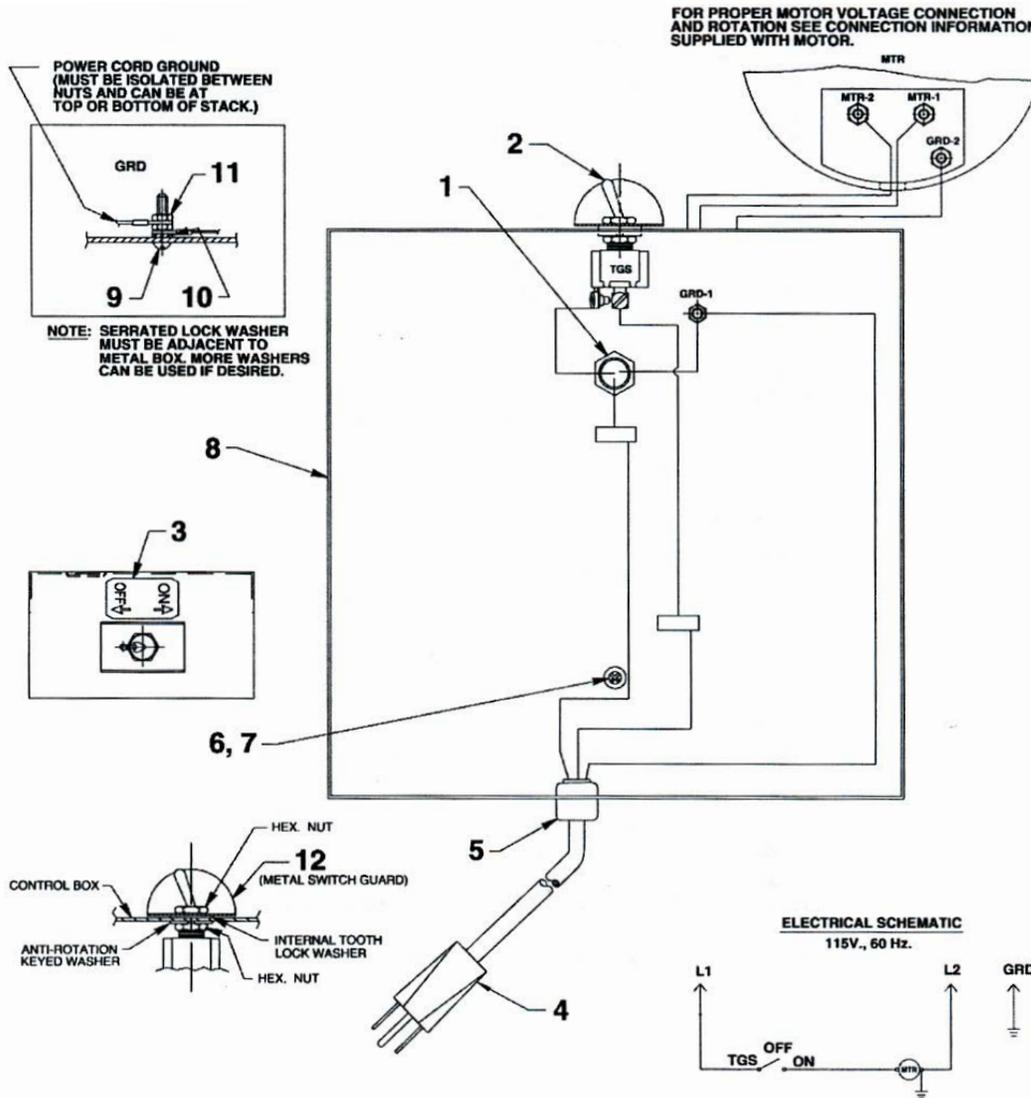
## 9.4.2 BOTTOM VIEW PARTS LIST

Item No.	Part No.	No. Req'd	Description
1	14440	1	90° Elbow Fitting
2	10258	4	Washer (For 3/8 bolt)
3	213663	4	Cap Screw (3/8-16 UNC x 1 in Lg.); (Torque to 230/250 in. lbs.)
4	11461	1	Hose Clamp
5	10854	2	Cap Screw (1/4-20 UNC x 1-3/4 Lg.); (Torque to 60/80 in. lbs.)
6	21608	1	Filter
7	52174	1	Pump Mounting Bracket
8	*10273	1	O-ring (13/16 x 5/8 x 3/32)
9	*14763	1	O-ring (7/16 x 5/16 x 1/16)
10	*10265	1	O-ring (5/16 x 3/16 x 1/16)
11	*12223	4	Ball (3/16 Diameter)
12	45559	1	Block
13	*10445	2	Compression Spring (5/32 O.D. x 3/4 Lg.)
14	24549	2	Ball Guide
15	45560	1	Block
16	304820	1	Piston
17	15130	1	Plug (1/16 NPTF)
18	*10442	2	Washer (3/8 x 1/4 x 1/32)
19	*209787	2	Replaceable Seat
20	211843	1	Dowel Pin ( <b>NOTE:</b> Install with radius end out.)
21	46063	1	Piston
22	*16346	1	Compression Spring (1 in O.D. x 7/8 Lg.)
23	*10283	1	O-ring (2 in x 1-5/8 x 3/16)
24	209797	2	Hollow Lock Screw (7/16-20 UNF-3A; Torque to 180/200 in. lbs.)
25	12149	1	Pin
26	*16057	1	Compression Spring (3/16 O.D. x 1 in Lg.)
27	13037	2	Cap Screw (1/4-20 UNC x 2 in Lg.); (Torque to 40/50 in. lbs.)
28	15156	1	Pin
29	*11221	1	Compression Spring (1/4 O.D. x 1 in Lg.)
30	10386	1	Nut (3/8-24 UNF)
31	*29786	1	Valve Adjusting Screw
32	21278-88	1	Relief Valve Assembly (Set at 8,900/9,500 PSI)

Part numbers marked with an asterisk (\*) are contained in Repair Kit No. 300430.

9.4.3 MOTOR CONTROL ASSEMBLY & PARTS LIST

# MOTOR CONTROL ASSEMBLY



## PARTS LIST

Item No.	Part No.	No. Req'd	Description
1	11202	1	Nipple
2	12301	1	Toggle Switch
3	205409	1	On/Off Label Decal
4	24733	1	Cord Set
5	15993	1	Strain Relief Bushing
6	252253	1	Screw (#8-32 x 1/2 Lg.)
7	12355	1	Washer (For #8 bolt)
8	42575WH2	1	Electrical Control Box (For PE17-FORN & PE17-TEST)
8	42575BK2	1	Electrical Control Box (For PE17N-TEST)
9	10167	1	Screw (#10-24 UNC x 3/4 Lg.)
10	11108	1	Lock washer (#10 External Tooth)
11	10197	2	Nut (#10-24 UNC)
12	35206	1	Metal Switch Guard

## 10.0 TECHNICAL SUPPORT & POWER TEAM SERVICE CENTERS

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If a problem should occur with your testing machine:

Call Gilson Company, Inc. Technical Support line at 800.444.1508 (8AM - 5PM EST) Monday - Friday or email us at [techsupport@gilsonco.com](mailto:techsupport@gilsonco.com)



SPX Corporation  
5885 11th Street  
Rockford, IL 61109-3699 USA

Tech. Services: (800) 477-8326  
Fax: (800) 765-8326  
[www.powerteam.com](http://www.powerteam.com)

## 11.0 STATEMENT OF WARRANTY

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### STATEMENT OF WARRANTY

Gilson Company, Inc. warrants new compression testing machines manufactured by Gilson Company, Inc. against defects in workmanship and materials for a period of 12 months from the original date of shipment, provided the equipment has been properly installed, maintained and operated in accordance with installation and operating instructions. This limited and exclusive remedy does not cover normal wear and tear. The Gilson Company, Inc. product must be free from accident, damage by fire, water or act of God to be eligible for warranty.

Gilson Company, Inc. will repair, replace or credit, at our option, defective product or component parts. When repair can be accomplished by exchange of a component part, the customer may be required to remove the part or modular component and install the exchanged part.

Warranty does not cover expenses, either direct or indirect, that may arise from the use or the inability to use Gilson Company, Inc. products, or the secondary owner in the event of resale.

Products not manufactured by Gilson Company, Inc. will carry the warranty of the original manufacturer. Under no circumstances shall Gilson Company, Inc. be liable for any injury, loss, or damages, whether direct or indirect, incidental or consequential, arising out of the use of, or inability to use the products described herein.

This exclusion of liability for loss or damages, whether direct or indirect, incidental or consequential, shall apply to all claims whether sounding in contract, warranty, tort including both negligence and strict liability, or any other basis of liability.