

Gen6 Desktop Compression

Operation Manual

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INTRODUCTION

Thank you for your purchase of the GEN6 Desktop Compression Test System, powered by MechLab. Every effort has been made to ensure that your new tester is a high-quality, easy to use precision instrument. This Operation Manual contains instructions for using your system.

MechLab is ADC's common platform for universal testing machines and, as such, should be compatible with other MechLab-based devices in use by your facility or partners. MechLab devices share common interface elements. As such, you may already be familiar with the operation of this system due to experience with other MechLab systems. It is recommended to read this manual in its entirety, regardless of experience, to fully understand the GEN6 system.

Before continuing with any physical installation, carefully inspect the machine to determine if any damage has occurred to the cabinet and remove any packing and all documentation included with the system. If any damage is discovered, discontinue installation and notify Automated Design Corporation immediately. Contact information for ADC can be found below.

Your ADC system is designed to rugged industrial standards, but is intended to measure sensitive data. The system should be handled with care and installed into a controlled environment to ensure consistency of data results.

A keyboard, mouse and monitor are required for operation. These items are not supplied with the system.

SPECIFICATIONS

Input Voltage	120-220VAC, 60Hz, 2 Phase
Input Current	1.5A max
Pneumatic	NONE
Pneumatic Connection	NONE
Temperature	20-25°C (68-77°F) Recommended
Dimensions	23 x 12 x 21 inches (58 x 34.4 x 53 cm)

SAFETY PRECAUTIONS

While every effort has been made to make the GEN6 as safe as possible, one should always operate the system with caution. Adhering to the following safety guidelines should minimize the risks of injury:

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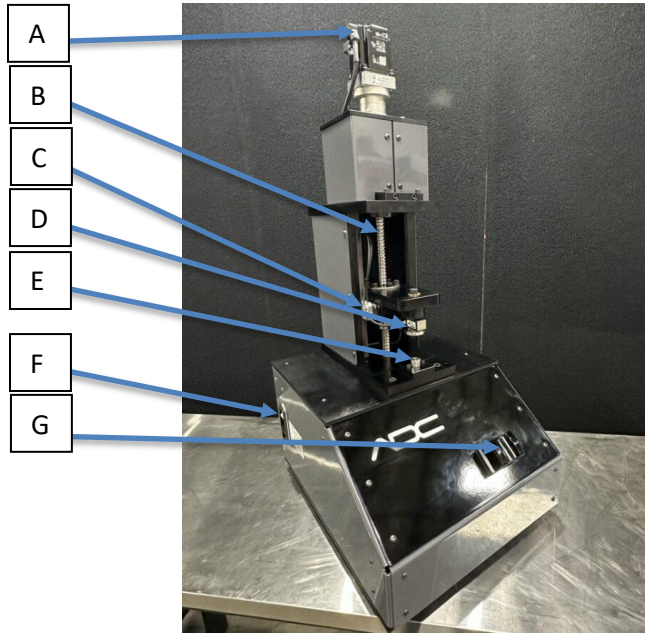
READ ALL MANUALS BEFORE ATTEMPTING TO OPERATE THE SYSTEM!

- The control panels should be closed and locked while the system is in operation.
- Disconnect all electrical power to the system while performing any maintenance.
- Avoid the dust, humidity and temperature extremes. Do not place the system in any area where it may become wet.
- Be mindful of any additional regulations or safety procedures your facility may have.

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System Features

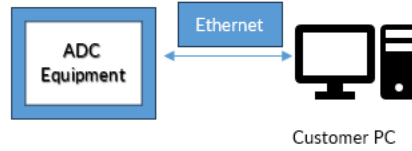
Front



- A. Motor
- B. Drive Screw/Ball Screw
- C. Linear Encoder
- D. Load Cell and Upper Platen
- E. Pedestal/Lower Platen
- F. On/Off Switch
- G. Pushbutton and Status Indicator

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Connections



The GEN6 is designed to be controlled by an external computer. Connect your PLC to the Network port on the rear of the system. Note: DO NOT PLUG CONNECT THE GEN6 DIRECTLY TO YOUR NETWORK. THE GEN6 RUNS A DHCP SERVER THAT WILL INTERFERE WITH THE OPERATION OF YOUR NETWORK.



Use any Chrome-based web browser to connect to the Gen6. That includes:

- Brave Browser
- Microsoft Edge
- Google Chrome

Note: There are no known issues with using Mozilla Firefox, but testing with Firefox is limited and not officially supported.

The Gen6 includes a DHCP Server that should configure the network port of your PC automatically.

The IP Address will be labeled near the Network port of the unit. The default IP Address is 192.168.127.1. In your browser, navigate to <http://192.168.127.1> to view the user interface.

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Installation

The system is designed to be installed into a temperature controlled, laboratory environment. Excessive temperatures or humidity will affect the results of the system. This system requires connection to electrical power for operation, and should be leveled before use.

Requirements for Ground Connection

FOR PROPER SAFETY AND OPERATION, this system must be properly grounded. Have a qualified electrician check your wall outlet to ensure that the plug is grounded properly. This system must always be plugged to its own outlet which is adequately grounded.

Electrical Requirements

The electrical current should only be 120 - 220VAC, 60 Hz and fused at 15 or 20A. This provides the best performance and prevents an overload which could cause a fire from the overheating of the cables. It is recommended that a separate circuit be used for this system, as well as a receptacle that cannot be disconnected with a switch. Do not use an extension cable.

A medical-grade IEC-320-C19 power cord is supplied with the system for use. Insert the matching end of the power cord into the system's power receptacle, then plug into NEMA 6-15P-HG receptacle.



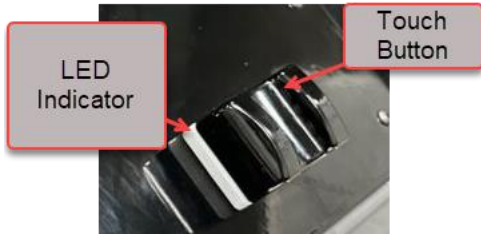
If your facility does not have 120-220VAC available, a 100VAC to 200VAC step-up transformer can be used. ADC offers this as an available accessory.

ADC-GEN6-XFR-110X220	Isolation transformer, step up 120 to 240VAC, 1500VA
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The transformer provides a receptacle that is compatible with the standard GEN6 power cord.

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Touch Button and Status Indicator



The GEN6 features a touch button with Red/Green LED indicator for improved operator workflow.

Status Indicator Codes

Solid Red	Calibration required.
Fast Blink Green	Calibration cycle running.
Blinking Green	Test cycle running.
Slow Blinking Green	Manual control enabled.
Solid Green	Ready for test cycle.

Using the Touch Button

If the system is ready for a Test Cycle, which is to say that the system is calibrated, a project sequence is loaded and the system is in a ready state (solid green on the Status Indicator), then pressing the Touch Button momentarily will start a test cycle.

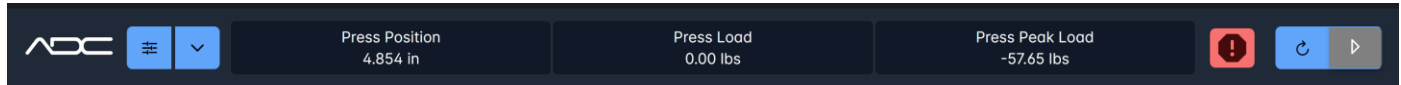
Holding the Touch Button for three seconds or more will send the press to the load position. The load position is specified in the System Configuration tab.

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User Interface

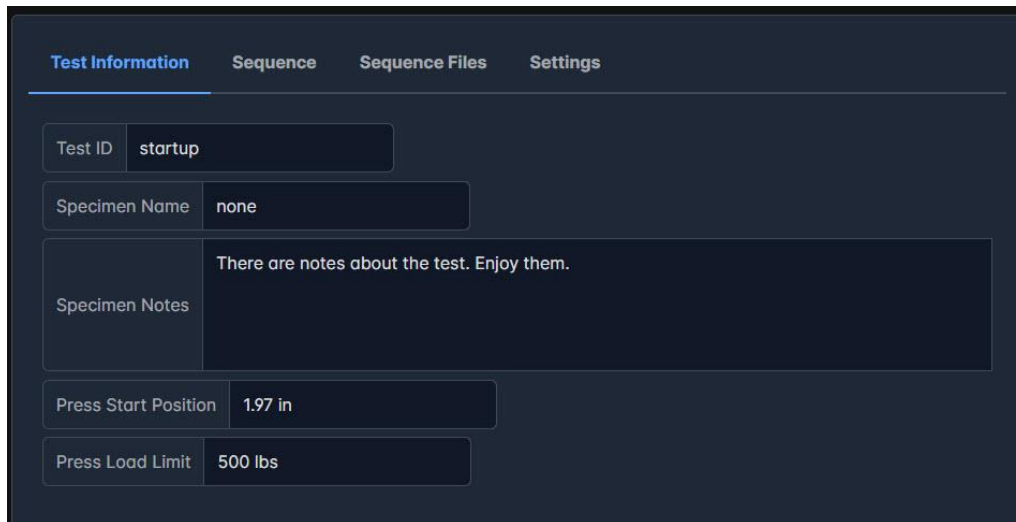
Common Footer

Each page features a common footer.



Press Position	The absolute position of the press, in inches.
Press Load	The current load of the press axis that is being read by the strain gauge, in user units. The default is pounds.
Press Peak Load	The peak of the press load.
PANIC BUTTON	All-stop and RESET button. For use in a "Panic" situation.
Reset Data	Clears out all data from the table. THIS CANNOT BE UNDONE. Export any data you wish to save before pressing this button.
Run Auto Cycle	Press to start the cycle once the sequence and test information is complete.

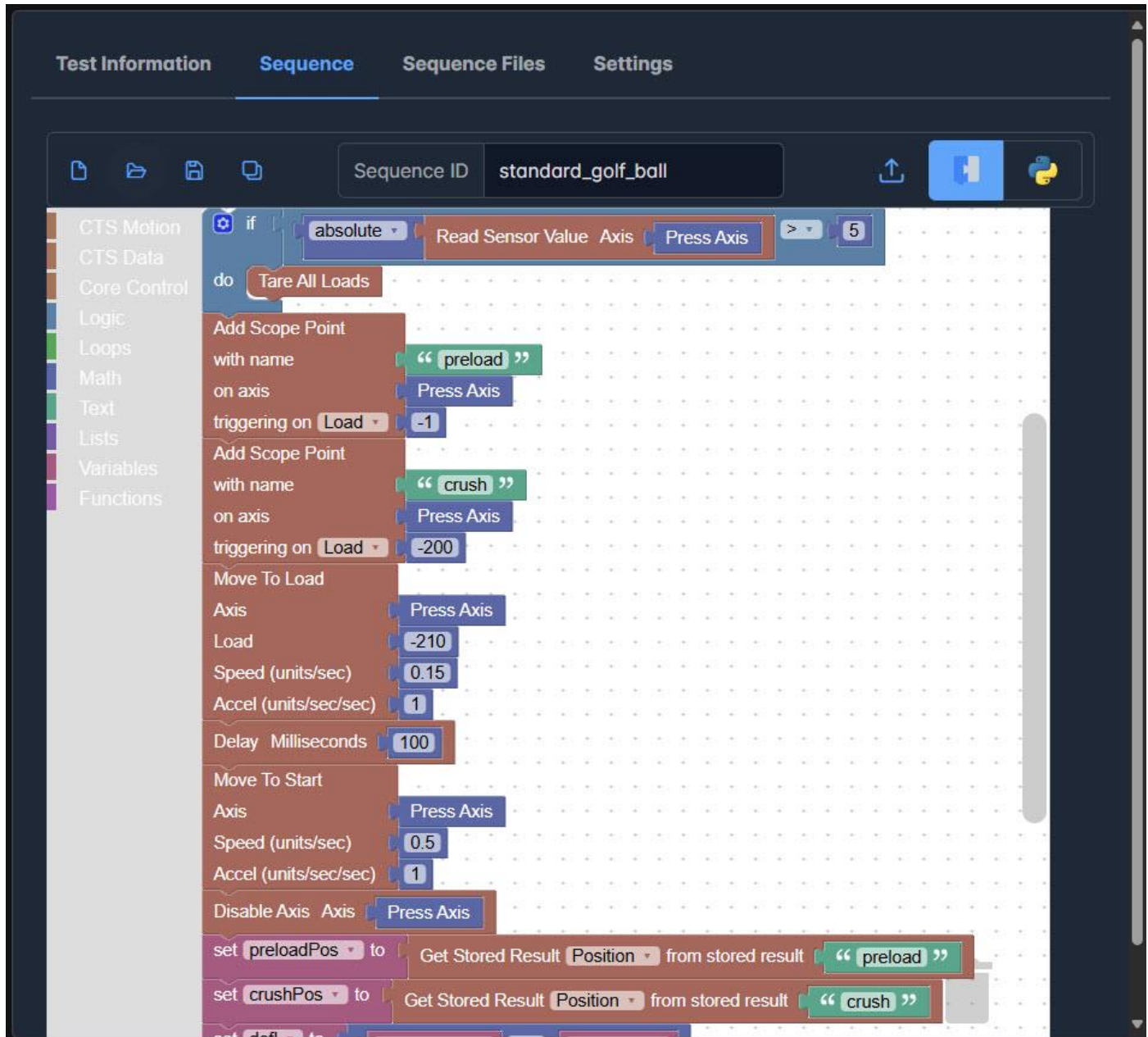
Test Information



Test ID	The absolute position of the press, in inches.
Specimen Name	Users input for a specimen name.
Specimen Notes	Users input for any notes.
Press Start Position	The position to which the press axis will return when the HOME button is pressed on the manual page. DEFAULT VALUE: 1.97
Reset Data	Clears out all data from the table. THIS CANNOT BE UNDONE. Export any data you wish to save before pressing this button.
Press Load Limit	Maximum load limit for the press.

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Sequence



The GEN6 is a flexible system that can run any sequence programmed into it. Sequences are programmed using a customized version of Google Blockly, which is a graphical programming language that is easy to learn. Sequences can be loaded, edited, and saved from the Sequence Tab.

A sequence must be entered into the sequence editor for the system to run. A sequence does not have to be saved before running. Sequences are automatically downloaded anytime the mouse is clicked outside the sequence editor or tabs are changed (like switching back to the Data Tab).

A comprehensive guide to writing sequences appears later in this manual.

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Sequence Files

Test Information
Sequence
Sequence Files
Settings

Upload, download and manage sequence files.

File Listing [/sequences]

Name	Actions
No available options	

Here is where you can upload, download, and manage sequence files.

Settings

Device

Test Information
Sequence
Sequence Files
Settings

▼ **Device**

Units

Metric

Imperial

Serial Number: 0000

Designed and built by ADC.

Website: automateddesign.com
 Email: support@automateddesign.com

Data Position Scalar: 0.0394

Refresh Connection

Here you can switch measurement systems (metric or imperial) as well as refresh your connection to the machine.

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DAQ

Test Information
Sequence
Sequence Files
Settings

> Device

v DAQ

Samples per Second

5000.00 Hz

Time Between Samples

0.0002000 s

Downsampling: 3

Hysteresis On: 10

Hysteresis Off: 10

> Press

Samples per Second	How many samples per second in Hertz.
Time Between Samples	A translation to the time between samples.
Down sampling	How much to Downsample.
Hysteresis ON	How long the values need to be above the threshold.
Hysteresis OFF	How long the values need to be below the threshold.

Press

Test Information
Sequence
Sequence Files
Settings

> Device

> DAQ

v
Press

Load Cell

Full Scale Load
500.00 lbs

Set Capacity 300 lbs

Sensitivity
2.2000 MvV

Set Sensitivity 0 MvV

Motion

Min Position Limit 0.472 in

Max Position Limit 4.854 in

NOT
CALIBRATED

CALIBRATED

RUN
CALIBRATION

DANGER! Invalid calibration can damage system!

Full Scale Load	The full-scale range of the load cell. This number must be taken from the calibration certificate matching the system’s load cell. Only enter a positive number, in Newtons. Note that load cell certificates are typically provided in pounds, but the number can be converted to the desired units. Keep in mind that sequences DO NOT automatically adjust: they use whichever load units are displayed. DEFAULT VALUE: 500.0
Set Compacity	Set the compacity of the load cell.
Sensitivity	Sensitivity in Mv/v.
Set Sensitivity	Set the sensitivity in Mv/v.
Min Position Limit	Minimum position limit.
Max Position Limit	Maximum position limit.
Run Calibration	You will need to calibrate the press plate each time the system is started up. Insert the calibration ball on the tooling and press the calibrate press plate button. This will bring the calibration ball to touch the loud cell. This allows the system to configure position.

Settings are retained in non-volatile memory on the embedded computer; it is not necessary to configure the system before every use. In general, modify these settings only under the direction of a qualified ADC technician.

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The settings in the System Config page directly affect the operation and data results of the system. Use this page carefully to setup the system as specified. Improper settings will cause damage to the system and invalid data.

CAUTION: Improper settings on this page can cause permanent and expensive damage to the load cell and the system. Only enter Load Cell values as directed by the load cell certificates and testing standards. Load cell certificates are provided with a serial number that matches the serial number on your load cell. Load cell certificates are only valid for the sensor with the matching serial number.

Please note that load cell calibration certificates are only valid for one (1) year from the date of calibration, regardless of use. You must re-calibrate or replace your system’s load cell annually.

Data

index ↑↓	preload.load ↑↓	preload.position ↑↓	crush.load ↑↓	crush.position ↑↓	deflection ↑↓
1	-1.033	1.640	-200.050	1.561	0.079
2	-1.008	1.639	-200.057	1.560	0.079

TEST ID: startup

Total Data Rows: 2

The Data Tab displays the results from a test in a tabular format. The columns of the data are defined by the sequence in use; any data kept using the Store Value or Store Results command will be pushed into the table after the sequence completes.


Data from a sequence fills horizontally; each subsequent cycle of a sequence creates a number of rows. There is no limit to the number of rows that can be accumulated. When data is exported (via the Export Icon), the entirety of the data table is exported.

NOTE: Because the columns of the data table are dynamically generated by the sequence, sometimes the first row of the Data Table does not appear after a test. Simply click the Sequence tab button, then the Data tab button and your data will be present in the table.

Data Files

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Data **Data Files**

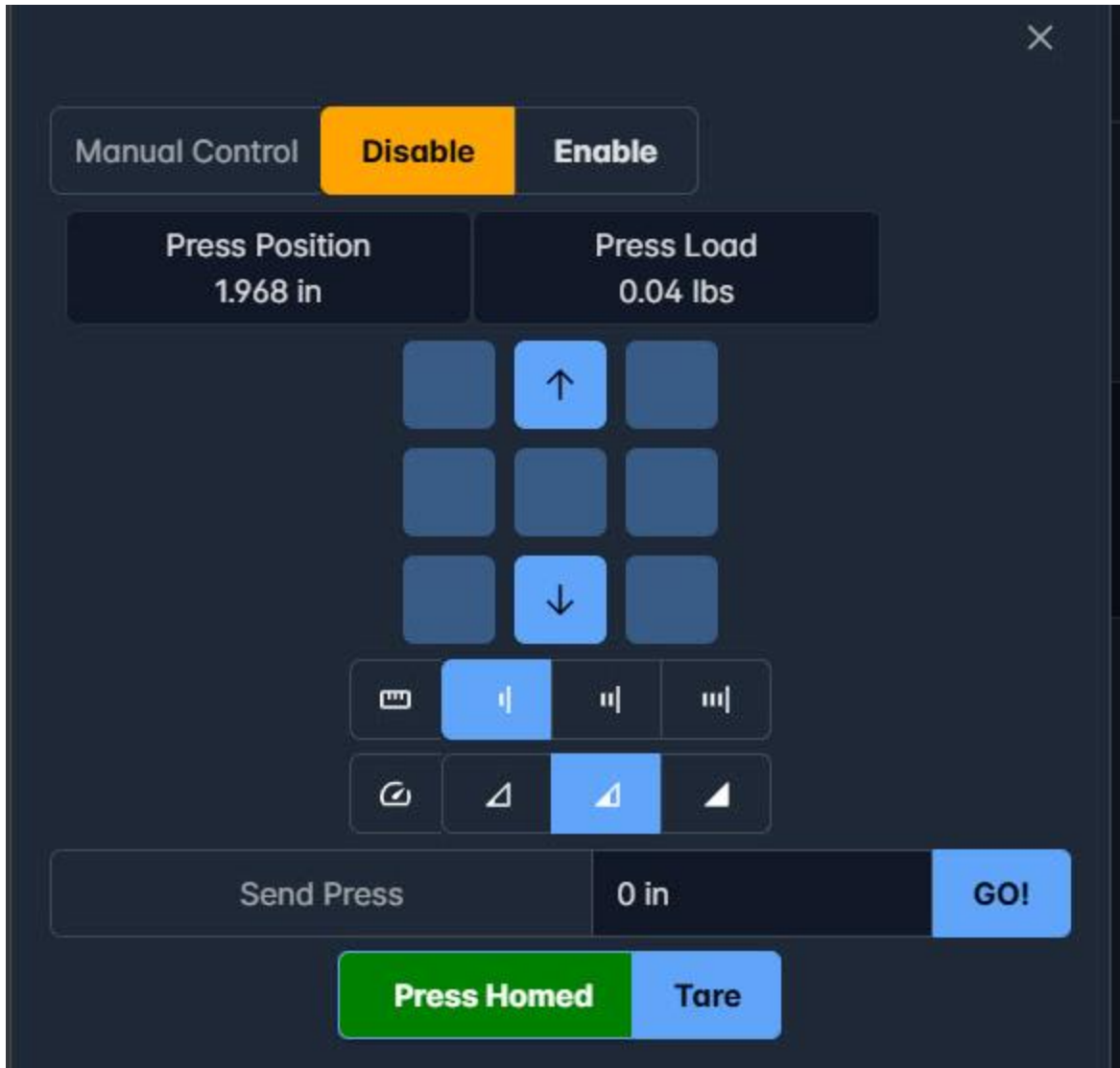
File Listing [/data] 

Name	Actions
No available options	

Here is where you can download and manage data files.

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Manual



Manual Control	Enabled or Disabled.
Press Position	Current position of the press.
Press Load	Current load.
Arrows	Move the motor in chosen direction.
Length	How far the motor will move.
Speed	Speed at which the motor moves.
Send Press	Send press to location.
Tare	Manually “Tare,” or “Zero,” the load cell. This is generally only used when servicing the system, as the load cell is automatically tared before the start of every cycle.

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Running a Test Cycle

This section describes you the sequence of operation to be performed for running a test cycle over a sample and collecting data. Before you proceed further make sure to carefully read and follow the guidelines given under the section *Safety Precautions*.

1. Plug in the power outlet and **turn on** the switch that is located on left side.
2. Wait for the system to boot into the User Interface.
3. Navigate to the System Configuration page. Insert the calibration ball onto the tooling.
4. Press the Calibrate Press Plate button. The system will calibrate position and home the press axis.
5. Navigate to the Manual Control Page and make sure that nothing is contacting the load cell, press the TARE button. The load cell will be reset to 0.
6. Disable manual functions by pressing the Manual Mode button. It should be gray.
7. Navigate to the Auto Control Page.
8. Select the Sequence tab. Open an existing sequence, or use the Blockly editor to make a new sequence.
9. When you are satisfied with the sequence displayed in the editor, click the Data tab button.
10. Enter any test information that is desired.
11. Place the sample to be tested on top of the pedestal of the system.
12. Press **Run Auto Cycle** button to start the test sequence. The Run Auto Cycle button should illuminate green.
13. The GEN6 performs the test sequence and stops after completing it. The data will be added to the data table. NOTE: Because the columns of the data table are dynamically generated by the sequence, sometimes the first row of the Data Table does not appear. Simply click the Sequence tab button, then the Data tab button and your data will be present in the table.

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TROUBLESHOOTING GUIDE

<p>The system display won't turn on.</p> <p>The system won't boot.</p>	<ul style="list-style-type: none"> • Is the system plugged into 200-220VAC, 60Hz, 1Phase electrical power? • Is the power switch on? • Make sure the power cord is fully seated. • Open the control panel and check that all circuit breakers are on and haven't tripped.
<p>The auto cycle stopped in the middle of a test and is sitting at the bottom.</p>	<ul style="list-style-type: none"> • The press reached either the minimum or maximum position limit? • The load exceeded the maximum capacity of the load cell and the test was stopped? • Press PANIC twice, go to the manual screen and attempt to home the system.
<p>The flash drive I put into the system doesn't appear.</p>	<ul style="list-style-type: none"> • Make sure that the flash drive is formatted and can be read by a Windows computer. Formatting in FAT32 is preferred.
<p>The home sequence won't complete.</p>	<ul style="list-style-type: none"> • Make sure that the Home Position in the System Config Page is between the minimum and maximum press positions.

MechLab Programming Guide

All MechLab systems are programmed using the Blockly programming language, which we have extended with commands and features for using with the UTM. Sequences can be simple or as complex as required.

Because the Blockly sequences can be exported and imported, and because they are compiled into the system’s actual run-time script language when the Start button is pressed, the sequences can be shared between systems of different types, different vendors, different customers, etc. In general, this allows for easy standardization of testing procedures and results throughout an entire ecosystem.

MechLab systems tend to include example scripts pre-installed on the system, most of which are ready for production use. Open the scripts for examples on using Blockly or as a basis for customized scripts.

Available Sequence Commands

CTS Motion

	Description
	Enable the axis for motion.
	Disable the axis.
	<p>Negative loads are compression, positive loads are tension. Compression means we are pressing down on the item in the CTS. Tension is when we are stretching the item opening the gap between the tooling.</p> <p>Accel- set the rate of any point-to-point motion commands.</p>
	<p>Is where the target position is an offset from the current position of the Press. If the press is at position 1.5, and a relative target of 0.5 is entered, then the press will end up at 2.0.</p> <p>Accel- set the rate of any point-to-point motion commands.</p>
	<p>Where the target position is a real position; no matter where the press in when the command is received, the press will move the necessary direction and distance to that real position.</p> <p>Accel- set the rate of any point-to-point motion commands.</p>

CTS Data

	Description
	Include a name and axis for the scope point feature. Either select triggering on Load or Position. Use scope point to record positions and loads in the middle of a move without needing to interrupt that move.
	Delete all stored results from memory.
	Store the current result set into memory.
	Store the current value set into memory.
	Get the current load/position value.
	Get the current load/position value from the latest stored results
	Start command for scope point recording.
	Stop command for scope point recording
	Reset command scope point recording.
	Returns the register value of the register name provided. See Bat Roll and Compression setting for register names.

Core Control

	Description
	Waits for the specified time

Values

	Description
	Returns Press position.
	Returns Shuttle position.
	Returns position. Units in degrees.
	A numerical value.
	Scale inches to the raw units for that axis
	Scale pounds to the raw units for that axis
	Scale degrees to the raw units for that axis.

Lists

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	Description
	Creates empty list
	Dynamically create list.
	List will contain item x number of times.
	Returns size of list.
	Returns either true or false if list is empty.
	Returns the index of the occurrence of such item in such list.
	Removes item from list.
	Insert specified item into list.
	Returns sub-list from specified indices.

Logic

Logic Statement	Description
	If or nested if conditions to execute “do” statements
	Comparison statements
	and - or -
	Negative of the latter puzzle.
	Boolean statements. Typically used in conditional statements and loops.
	A null value.
	Test condition. Execute statement if true or if false.

Loops

Loops	Description
	Iterate through statements x number of times.
	Iterate through statements with condition.
	Iterate through statements with counter.
	Iterate through statements for each item in a specified list.
	Exit out of a loop or continue with next iteration

Math

	Description
	Arithmetic Operators of two operands
	Trigonometric identities.
	Verification of operand type.
	Select and change register name.
	Rounding latter puzzle piece.
	Statistical functions for lists.
	Setting min and max values for variables.
	Return random value between set limits.
	Return random fraction.

Text

	Description
	Create String
	Append string text to item.
	Create text with items.
	Returns size of text string
	Returns either true or false if string is null.
	Returns the occurrence of the text selected in the list text.
	Returns the letter in the selected text
	Returns a substring of the selected text within the specified indices.

	Returns text in either uppercase, lower case or title case.
	Removes whitespace from either the start, end or both.
	Prints text
	Request a text string with given message.

Variables

	Description
	Set the select variable to the set value.
	Returns value of.
	Set the select list to the set value.
	Returns selected list.

Functions

	Description
	Void Function
	Function call with return value.
	Only be used within a function call definition. If condition statement holds true, return a value.
	Function Call
	Function Call

CONTACT ADC

For further assistance, you may contact our technical support department in the following ways:

1. Call 1(630) 783-1150 Mon-Fri 8:00am to 4:30pm Central Standard Time (CST)
2. Email: support@automateddesign.com

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Limited Warranty

This is an unofficial explanation of your system’s limited warranty. The official warranty was included with your system’s proposal. In cases where these two documents disagree, the official warranty included with your system’s proposal is correct. This operation manual does not override ADC’s Standard Terms and Conditions.

ADC will repair or at its option replace, without charge, components of your product which prove to be defective in material or workmanship, within the specifications listed in the system’s proposal, under normal use during the warranty period of one (1) year from date of shipment. This warranty is good only to the original purchaser of the system during the warranty period.

This warranty pertains only to components or software manufactured by ADC. Components purchased from a third party for the system are only covered by the warranty of their respective manufacturer.

No other express warranty is applicable to this system. THE DURATION OF ANY IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY, IS LIMITED TO THE DURATION OF THE EXPRESS WARRANTY HEREIN. ADC SHALL NOT BE LIABLE FOR THE LOSS OF USE OF THE PRODUCT, INCONVENIENCE OR ANY OTHER DAMAGES, DIRECT OR CONSEQUENTIAL, ARISING OUT OF THE USE OF OR INABILITY TO USE THIS PRODUCT OR FOR ANY BREACH OF ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY APPLICABLE TO THIS PRODUCT.

THE ABOVE WARRANTY DOES NOT APPLY TO:

1. Service trips to your facility to deliver and pickup, install, instruct, or replace house fuses or correct house wiring or plumbing, or correction of unauthorized repairs.
2. Damage to the product caused by accident, fire, floods, or acts of God.
3. Repairs when your system is used in other than its intended environment or application.
4. Damage resulting from accident, alteration, misuse, abuse, or improper installation.
5. Damages caused during and/or after delivery.

Therefore, these costs are paid by the consumer.

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