Accurate
TECHNOLOGY INC.
Linear Digital Measuring Systems

DIGI
Readout

OPERATION

Firmware Version d 2.xxx & higher

WARRANTY

Accurate Technology, Inc. warrants this product against defective parts and workmanship for 1 year commencing from the date of original purchase. Upon notification of a defect, Accurate Technology, Inc., shall have the option to repair or replace any defective part. Such services shall be the customer's sole and exclusive remedy. Expenses incidental to repair, maintenance, or replacement under warranty, including those for labor and material, shall be borne by Accurate Technology, Inc. (Including freight or transportation charges during the first 30 days).

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SAFETY WARNING

**Before installing this product on any machinery:
Turn off machine and disconnect power.**

SAFETY WARNING

Table of Contents

SECTION 1 GENERAL INFORMATION

Introduction

The DIGI LCD Digital Readout is one on several Digital Readouts offered by Accurate Technology for use with its DigiScale general purpose measuring systems and other turn-key and specialized products built around and with DigiScales.

What This Manual Includes

This manual includes information for:

Digital Readout, LCD, DIGI   Part Number: 700-1600-D55
With Firmware Version d 2.xxx & higher

Specifications

Resolution	.1inch .1mm or .01inch .01mm or .001inch .01mm or 1/16, 1/32 or 1/64 inch
Repeatability:	.001inch or .01mm
Readout Range:	$\pm$ 999.999 in; $\pm$ 399 63/64 in; $\pm$ 9999.99 mm
Operating Power:	2 AA Alkaline Batteries
Operating Temp:	40 to 110°F
Warranty:	One year from date of purchase.

Mounting

The DIGI Digital Readout may be mounted:
- Using Velcro or Double sided tape
- Drilling out the 3 holes from the inside of the case
- Using any of the six holes on the back of the case which may tapped for M2 or 4-40 screws.

The LCD Display
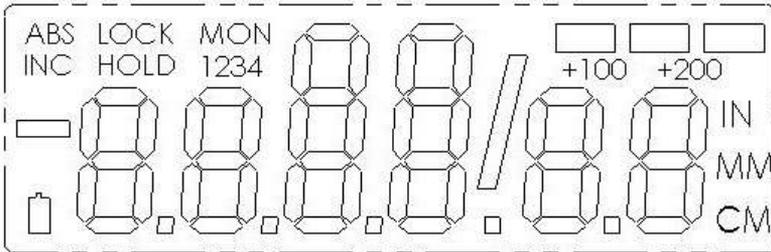
The above figure illustrates all the segments available on the LCD.
(Not all segments are used on Digi Readouts)

Pressing and holding the **ON/OFF** and **UNITS** key for 10 seconds with power off will perform a full segment LCD test, display the current firmware version, and **RESET ALL PROGRAMMING PARAMETERS TO FACTORY DEFAULTS.**

Changing the Batteries

A low battery indicator will appear in the lower left corner of the LCD. When battery voltage drops below approximately 2.6V the readout will turn itself off until the batteries are replaced.

To replace the battery remove the screws in the upper right and lower left corners. Pull the cover off. Remove the old batteries. Reinstall 2 new AA Alkaline batteries, noting the proper orientation. Replace the cover and tighten the screws.

CAUTION: DO NOT BEND THE BATTERY CLIPS!
THESE CLIPS ARE DESIGNED TO BE LOOSE WHEN THE CASE IS OPEN AND WILL COMPRESS AND SECURE THE BATTERIES IN PLACE WHEN THE CASE HALVES ARE SCREWED TOGETHER.

Calibration

There is no calibration available or necessary for the DIGI readout.
System accuaracy will depend on the accuracy of the DigiScale and the quality of the installation.

Readout Keys

Key Timing

The keys pictured above, are found on all Digi readouts, and some of them have multiple functions.

Timing, which is how long a key is depressed, and the combination of the keys pressed is important. This manual uses the term '"*momentarily*" to describe a key press of shorter than 1 second. Whereas the term *"press and hold"* is used to describe a key press of longer than 1.5 seconds. As an example; when using a PC keyboard to type a capital letter you would "*press and hold*" the SHIFT key and "*momentarily* depress the LETTER key. In addition most of the key "*functions*" are executed on <u>RELEASE</u>, not press. This is important since some of the same keys execute different functions based on how long they are pressed and when they are released. These key operations, once tried will quickly become intuitive.

On/Off

Momentarily pressing the **ON/OFF** key will cause the readout to turn on or off. The Firmware Version of the readout is displayed on power-up when **ON/OFF** key is used. While the readout is on, if the encoder is not moved for 15 minutes, the readout will automatically turn itself off to conserve battery life. While it is off if the encoder is moved as little as .002in (.05mm), or the **ON/OFF** button is pressed, the readout will automatically turn itself back on with no loss of position.

Units

The readout can display position information in decimal inches, fractions, or millimeters. To change the current display mode, momentarily press the **UNITS** key.   With each key press the readout will cycle through decimal inches, fractional inches and millimeters.

When the readout is in 1/16 or 1/32 inch fraction mode, a series of "bars" in the upper right corner of the display, each representing 1/64th of an inch, may appear. (ie. When in 1/16 inch mode and three bars are showing, the measurement displayed is rounded *down* to the closest 1/16 inch and each illuminated bar indicates an additional 1/64 of an inch of measurement.) For

better resolution, switch to 1/32 or 1/64 mode. For the best resolution and accuracy switch to a decimal mode – inches or millimeters..

When the measurement is greater than 99 63/64 inches, a **+100** and/or **+200** will illuminate in the upper right portion of the display to indicate this amount must be added to the displayed reading. ie: If the measurement is 154 5/8 inches, 54 5/8 and **+100** will be illuminated on the display. If the measurement is -307 23/64 inches, - 7 23/64, **+100** and **+200** will be illuminated on the display.

+, DATUM, and -
The **+** (plus), **DATUM** and **–** (minus) keys are used to change the currently displayed position to a different value. The **DATUM** key forces the readout to display a user programmed value. Programming Parameter Pr1

Momentarily depressing the **+** key increments the current position by one unit of measurement. Momentarily depressing the **–** key decrements the current position by one unit. Pressing and holding the **+** or **–** keys will cause the displayed position to change continuously. Holding down the key will cause the amount of change to speed up. This allows for quick adjustments over a range of large values.

NOTE: While the **DATUM** key can be used to simply "zero" the currently displayed value, it can also be programmed to force the readout to a preset value. This can be zero, or any other displayable value.
See Section 3: Readout Programming, ***Programming Parameter Pr1.***

Reverse Readings

Reverse readings means changing the direction of readings produced by moving the encoder. If the readout decrements (reduces or goes negative) when it should be incrementing (increasing or going positive), the readout will need to be re-programmed for your application.
See Section 3: Readout Programming, ***Programming Parameter Pr2.***

Readout Lock Mode

To activate the Lock function Press and hold the **ON/OFF** key and then momentarily press the **UNITS** key. The word L0CK will appear in the upper left corner of the readout. When L0CK is displayed, the **+, DATUM** and **–** keys become inactive to prevent accidental changes of the (calibrated) current displayed position. To de-activate the Lock function, press and hold the **ON/OFF** key and then momentarily press the **UNITS** key.

NOTE: The Lock function can also be enabled/disabled through programming. This allows a more permanent Lock function since programming can be disabled with a hardware jumper inside the readout thus preventing any front panel programming changes.
*See Section 3: Readout Programming, **Programming Parameter Pr3.***

Readout Resolution

The readout can be configured to display measurements in any of three different resolutions.

1. Low– the resolution is   .1in or .1mm.
2. Normal– the resolution is: .01in or .01mm.
3. High– the resolution is: .001in or .01mm

The display of fractions remains the same for all settings: 1/16, 1/32 & 1/64
*See Section 3: Readout Programming, **Programming Parameter Pr4.***

Making Incremental Measurements

The readout has two measurement modes, or indexes. One is referred to as **ABS** or Absolute, and the other as **INC,** or Incremental. The absolute measurement mode allows the operator to read the current position of the encoder referenced from a fixed or known position-usually zero.
The incremental mode allows the operator to make relative distance measurements from one arbitrary point to another. The absolute position of the DigiScale is not lost when using the incremental mode.

Absolute The readout automatically enters ABS mode when power is first applied. This is indicated by the ABS symbol in the upper left corner of the display. While in the ABS mode, all encoder positions are related to the current ABS, or absolute system reference point.

Incremental To enter the INC mode, press and hold the **UNITS** key for approximately 3 seconds. The INC symbol will appear in the upper left corner of the display. When the INC mode is entered the readout will display zero (0) or the last offset if one was entered, and may be changed by using the **+** or **-** keys to

keys to provide a different offset. Moving the encoder in either direction will display the distance moved from the initial INC starting point (plus any offset). To complete another incremental measurement from the new position, momentarily press the **UNITS** key. The readout will again change to 0 (or the previously programmed offset). To return to the ABS mode, press and hold the **UNITS** key for approximately 3 seconds.

NOTES: when the readout is in incremental measuring mode the **UNITS** key no longer functions to change the measurement units displayed.

The absolute position of the DigiScale is not lost when using the incremental mode. When the readout is switched back to the absolute mode the readout reflects the current encoder position relative to your original calibrated absolute setting.

Circuit Board Jumpers

The Digi readout has several user configurable jumpers consisting of three pins and a 'shorting block or jumper'.
The center of these three pins is 'Common'. One end pin is labeled **A** and the other end pin is labeled **B**.
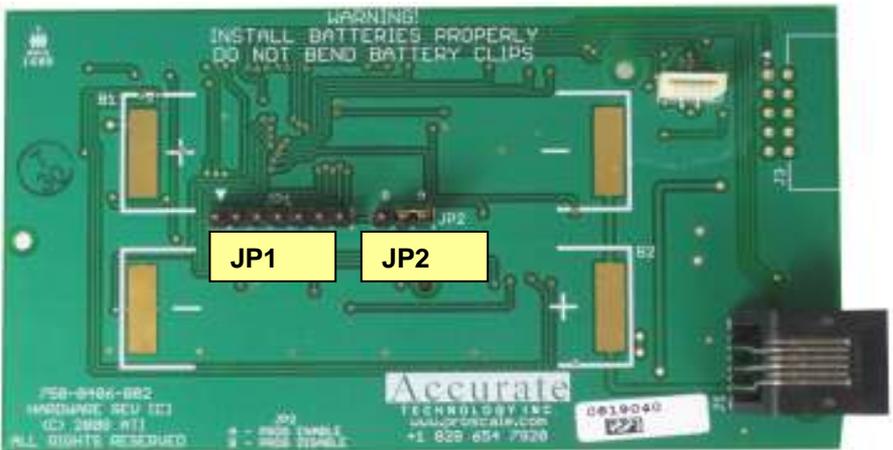
JP1	**FACTORY USE ONLY**
JP2	**Programming Lockout**
	Position **A**, Front Panel Programming is **ENABLED**
	Position **B**, Front Panel Programming is **DISABLED**

Readout Programming

Several functions of the Digi readout is user programmable. The following describes what features and functions are available and how to change the factory defaults to customize your DigiScale system.

To enter Programming Mode:

1. Press and hold the **UNITS** key then momentarily press the **DATUM** key.
2. The LCD will briefly display: **PG on** (Programming On), then **Pr 1**, (indicating Programming Parameter #1)
3. Release the **UNITS** key
4. The value stored in **Pr1** is displayed.

Press & Hold   Momentarily press
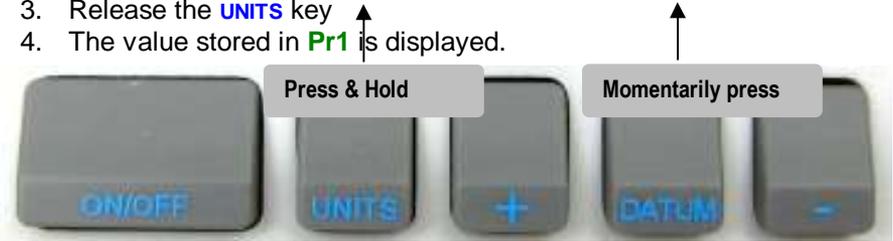
Once in the Programming Mode:

Moving up parameter list - Momentarily press the **UNITS** key to advance through the Programming Parameter list, first displaying the Programming Parameter number then the currently programmed value.

Moving down parameter list - Press and hold the **ON/OFF** key and momentarily press the **UNITS** key to move backward through the Programming list.

Increase parameter value - Momentarily press the **PLUS (+)** key while displaying a Programming Parameter Value to increase the setting.

Decrease parameter value - Momentarily press the **MINUS (-)** key while displaying a Programming Parameter Value to decrease the setting.

Reset parameter value to default setting - Momentarily press the **DATUM** key while displaying a Programming Parameter Value to reset the parameter to the factory default value.

Exit programming mode - Press and hold the **UNITS** key. Momentarily depress the **DATUM** key. The LCD will briefly display: **PG oFF** (Programming Off), then return to normal operation. **NOTE**: The system will automatically exit programming mode after 60 seconds of no key activity.

Programming Parameters

The Digi readout programming parameters are listed below.
Values in **[ ]** are the available range of values that can be entered for that parameter. Factory defaults are shown in **Bold Red**.

Pr 1 – Datum Key   **[0** to + 999.999in**]**   or   **[0** to +9999.99mm**]**
The programmed value that will be recalled whenever the **DATUM** key is pressed during normal operation.
Default = 0.00

Pr 2 – Reverse Readings   **[0** or 1**]**
This parameter controls the direction of travel (positive vs. negative) when the encoder is moved.
Default = 0

Pr 3 – Key Lockout   **[0** or 1**]**
This parameter controls the operation of the **+**, **-** and **DATUM** keys.
If enabled, (set to 1), these keys will not function and the **L0CK** symbol will appear on the display. This prevents accidental changes when pressing these keys during normal operation.
Default = 0

Pr 4 – Readout Resolution   **[**1, **2**, 3 or 4**]**
This parameter sets the number of places to the right of the decimal point on the readout.
A value of 1 – Low **-** will display x.x.
A value of **2** – Normal -will display x.xx
A value of **3 –** High **-** will display x.xxx
Default = 2

NOTES:
Millimeters have a maximum of 2 places (even if parameter is set to 3.)
This setting has no effect when displaying fractions.

Frequently Asked Questions

What F/W (Firmware) version do I have?
The display will show **d 2.xxx** on power up. This is the firmware version of your readout.

What does no Enc *mean?*
If the encoder is off the scale, or unplugged from the readout, a **no Enc** will appear on the readout. To clear the error:
1.   Be sure the encoder is on the scale.
2.   Plug the encoder into the readout.
3.   Unplug the encoder from the readout for one second then reconnect it.

The keys don't seem to do what they are supposed to do.
Timing, which is how long a key is depressed, and the combination of the keys pressed is important. This manual uses the term '"*momentarily*" to describe a key press of shorter than 1 second. Whereas the term *"press and hold*" is used to describe a key press of longer than 1.5 seconds. As an example; when using a PC keyboard to type a capital letter you would "*press and hold*" the SHIFT key and "*momentarily* depress the LETTER key. In addition most of the key "*functions*" are executed on <u>RELEASE</u>, not press. This is important since some of the same keys execute different functions based on how long they are pressed and when they are released. These key operations, once tried will quickly become intuitive.

The battery clips seem to be very loose. Is this normal?
Yes. DO NOT BEND these clips or wedge anything between them and the case. These clips are designed to expand when the two case halves are screwed together.

The readings are "backwards"?
You can change the reading direction of the system by:
1.   Reversing the orientation of the encoder on the scale.
2.   Changing the value of **Programming Parameter Pr 2.**

What does b FAIL mean?
When the readout displays this message it means the battery voltage has dropped to a level where reliable operation is no longer possible. Install new batteries to clear this message.

What does P FAIL mean?
When the readout displays this message it means the battery voltage has dropped to a level where reliable programming is not possible. Install new batteries to clear this message.

Thank you for choosing an
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