

Accurate

TECHNOLOGY INC.

Linear Digital Measuring Systems

DIGI LCD Readout



Firmware Version d 2.100 & higher

Installation & Operation

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SAFETY WARNING

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

SAFETY WARNING

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Table of Contents

SECTION 1	GENERAL INFORMATION.....	4
INTRODUCTION		4
WHAT THIS MANUAL INCLUDES		4
SPECIFICATIONS.....		4
MOUNTING THE READOUT		5
CHANGING THE BATTERIES		5
THE LCD DISPLAY.....		6
MAINTENANCE.....		6
SECTION 2	OPERATION	7
READOUT KEYS.....		7
Key Timing.....		7
On/Off.....		7
Units Key.....		7
+, DATUM, and -		8
REVERSE THE MEASUREMENT READINGS		8
READOUT LOCK.....		9
READOUT RESOLUTION.....		9
MEASUREMENT UNITS		9
AUTO ON/OFF.....		10
MAKING INCREMENTAL MEASUREMENTS.....		10
CIRCUIT BOARD JUMPERS.....		11
READOUT PROGRAMMING.....		12
PROGRAMMING PARAMETERS		13
FREQUENTLY ASKED QUESTIONS.....		15

Introduction

This Digital Readout, (DRO), is one of two available from Accurate Technology for use with DIGI Family measuring systems and products.

The following pages describe the set-up and operation of the **Digi LCD Readout** when used with DIGI Family products.

What This Manual Includes

This manual includes information for:

Digital Readout, LCD, DIGI
Part Number: 700-1600-D55
Firmware Version d 2.100 & 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:	± 999.999 in; $\pm 399 \frac{63}{64}$ in; ± 9999.99 mm
Operating Power:	1 CR123 Lithium Battery.
Operating Temp:	40 to 110°F

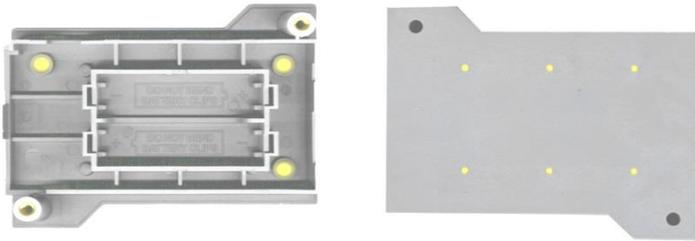
This Product was MADE IN USA

Mounting the Readout

Consult the *Installation* document you received for installation of other components of your measuring system.

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 be tapped for M2 or 4-40 screws.

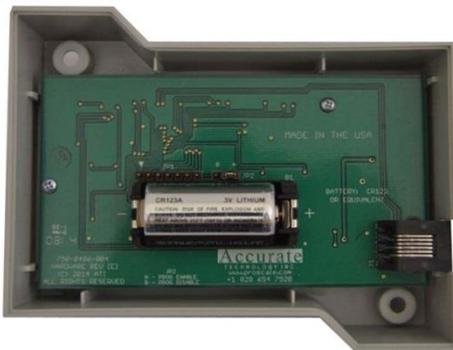


Changing the Battery

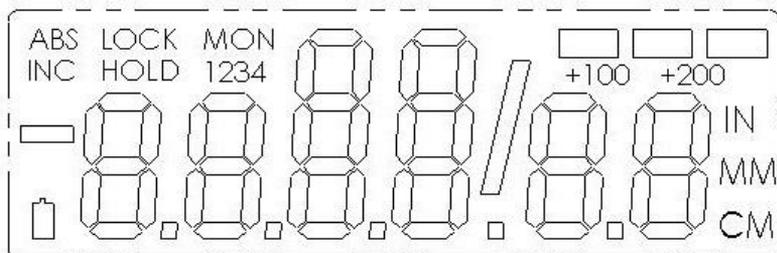
A low battery indicator will appear in the lower left corner of the LCD. *When battery voltage drops below approximately 2.6V the readout will turn itself off until the batteries are replaced.*



To replace the battery remove the screws in the upper right and lower left corners. Pull the cover off. Remove the old battery and install a new CR123A (or equivalent) Lithium battery. Replace the cover and tighten the screws.



The LCD Display



The above figure illustrates all the segments available on the LCD.
(Not all segments are used on Digi-Fence Systems)

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.**

Maintenance

The Digital Readout should be cleaned periodically with compressed air to remove any dust on the lens and keys.

All installation fasteners should be checked occasionally for tightness.

Readout Keys



Key Timing

The keys pictured above, are found on all Digi-Fence Readouts. 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 RELEASE, not depress. 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 the **ON/OFF** key is used. While the readout is on, if it does not detect movement or a keypress for 15 minutes, it will automatically turn itself off to conserve battery life. While it is off if it 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 Key

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, millimeter and fractions. When the readout is in 1/16 or 1/32 inch fraction mode, a series of 'bars' in the upper right corner of the LCD, each representing 1/64th of an inch, may appear. For example; the LCD pictured below left is set to display 32nds of an inch. As you can see there is one 'bar' in the upper right

corner of the LCD indicating an additional 1/64 of an inch measurement making the true, full resolution measurement $2 \frac{13}{64}$ ths.

Some users find this resolution unnecessary and prefer the 16ths or 32nds mode instead. For better resolution, switch to 64ths mode. For the best resolution switch to a decimal mode – inches or millimeters.



When the measurement is greater than $99 \frac{63}{64}$ 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. For example; the LCD pictured above right is indicating a measurement of $151 \frac{39}{64}$ inches. If the measurement was $351 \frac{39}{64}$ inches, the +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 a user programmed value. **Programming Parameter Pr1** (default is zero 0.00)

Momentarily depressing the **+** key increments the current reading by one unit (fractions, decimal or mm depending on the current mode selected by the **UNITS** key) of measurement. Momentarily depressing the **-** key decrements the current reading by one unit. Pressing and holding the **+** or **-** keys will cause the displayed reading 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 reading, 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 the Measurement Readings

Reverse the readings means changing the direction of measurement produced by movement. If the Digi-Fence decrements (reduces or goes negative) when it should be incrementing (increasing or going positive), the readout will need to be re-programmed for your installation.

*See Section 3: Readout Programming, **Programming Parameter Pr2.***

Readout Lock

To activate the Lock function Press and hold the **ON/OFF** key and then momentarily press the **UNITS** key. The word **LOCK** will appear in the upper left corner of the readout. When **LOCK** 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 Digital 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**.

Measurement Units

The measurement units displayed on the Readout are user configurable. The table below provides a matrix for selecting the measurement units that may be displayed when pressing the **UNITS** key.

See Section 3: Readout Programming, **Programming Parameter Pr11**

Programming Parameter Pr 11 Value	Measurement Units Displayed
0	All inch units, and millimeters
1	Millimeters only
2	Decimal inches and millimeters
3	Decimal inches and centimeters
4	All inch units, and centimeters
5	Centimeters only
6	Decimal inches only

Auto on/off

To prolong battery life, the Readout has a built-in function that turns off the Readout after a period of no movement or key activity. The Auto On/Off function is programmable from 0 (always on), to 240 (minutes) before entering sleep mode.

Press the **ON/OFF** key or move the measurement system to wake up the Readout. Any key press or system motion while the Readout is awake restarts the Auto On/Off timer.

See [Section 3: Readout Programming](#), [Programming Parameter Pr12](#).

Making Incremental Measurements

The Digital 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 System referenced from a fixed or known position.

The incremental mode allows the operator to make relative distance measurements from one arbitrary point to another. The absolute position of the System 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 System 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 provide a different offset. Moving the System 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.

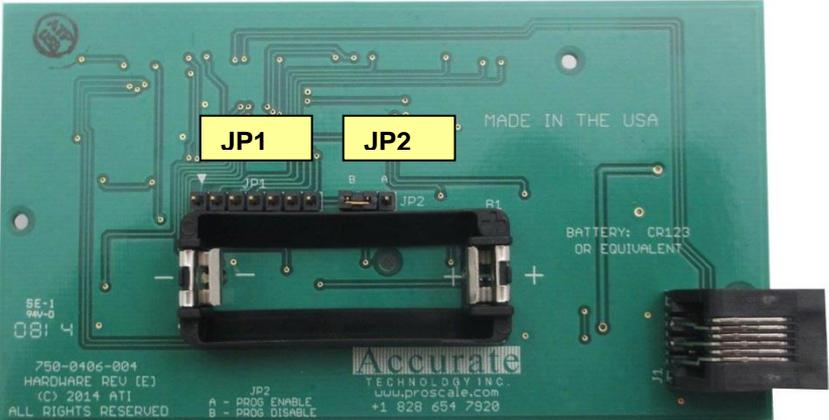
NOTES: when the readout is in incremental measuring mode the **UNITS** key no longer functions to change the measurement units displayed.

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

Circuit Board Jumpers

This 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
JP2

FACTORY USE ONLY
Programming Lockout

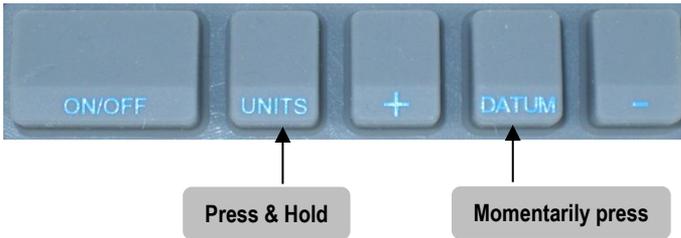
Position **A**, Front Panel Programming is **ENABLED**
Position **B**, Front Panel Programming is **DISABLED**

Readout Programming

Several functions of the Digi-Fence readout are user programmable. The following describes what features and functions are available and how to change the factory defaults to customize your Digi-Fence system.. Review KEY TIMING described earlier before proceeding.

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.



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 if no key activity is detected.

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**.

NOTE: Programming parameters are not sequentially numbered due to firmware differences between measurement systems and the provision for future enhancements, functions and custom features.
Some Parameters are not applicable to all Digi systems.

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 **LOCK** 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

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

Pr 5 – Wake Up Movement [0.10 to 10mm]
This parameter sets the amount of encoder/sensor movement required to automatically wake up the Readout (when it is turned off or in sleep mode).
Default Value = 0.10mm

Pr11 – Readout Measurement Units [0 to 6]

This parameter controls the type of measuring units the Readout displays when the **UNITS** key is pressed. The table below illustrates the possible combinations of measuring units that will be displayed by changing this parameter.

Default Value = 0

Pr 11 Setting	Displayable Units
0	All inch units and millimeters
1	Millimeters only
2	Decimal inches and millimeters
3	Decimal inches and centimeters
4	All inch units and centimeters
5	Centimeters only
6	Decimal inches only

Pr12 – Readout Auto-Off Time [0 to 240]

This parameter changes the amount of time before the display turns off to conserve battery power. The value is the number of minutes of idle operation (no movement or key presses) before the display turns off. When this parameter is enabled ($\neq 0$), pressing the **ON/OFF** key or movement of the encoder or system will wake up the Readout.

A value of '0' disables the Auto Off feature (the Readout is always on).

Default Value = 15 (minutes)

Pr13 – Linear Compensation [0.00001 to 9.99999]

This parameter invokes a linear multiplier correction in the Readout that is applied to the actual measurement prior to any offsets. This adjusted measurement is then displayed on the Readout. This is useful, for instance, if you would like to display half, double, or other values that can be achieved by multiplying the actual measurement by the value of the parameter setting.

Use care when enabling this function. It will force the readout to display a value different from the actual measurement or position.

This Programming Parameter does not apply to all Digi Systems and products. *DO NOT change this value unless instructed to do so by a factory technician!*

Default Value = 1.00000

Frequently Asked Questions

What F/W (Firmware) version do I have?

The readout will display **d 2.xxx** on power up.
This is the firmware version of your readout .

The readings are “backwards”?

You can change reading direction of the Digi-Fence by changing the value of **Programming Parameter Pr 2**.

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 RELEASE, 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.

What does no Enc mean?

If the encoder cable is unplugged from the readout , **no Enc** will appear on the display. To clear: Be sure the encoder is on the scale and plugged into the readout.

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
AMERICAN MADE PRODUCT**



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