## Jumpers – Surface Mount Display

Although the ProScale display uses a keyboard-programming mode to enable and configure features in the unit, several selection jumpers are located on the circuit board for additional system configuration.

User configurable jumpers consist of three pins and a 'shorting block'.

The center of these pins is 'Common'. One end pin is labeled 'A' and the other end pin is labeled 'B'.

Surface Mount Display Circuit Board
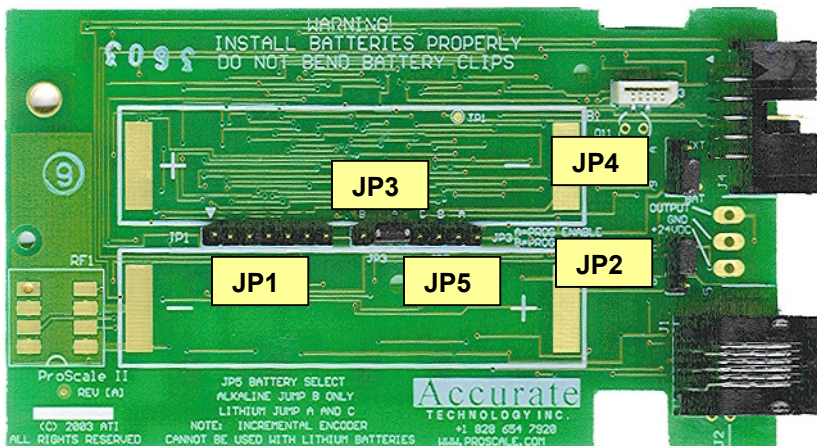
JP1   FOR FACTORY USE ONLY

JP2   Absolute/Incremental Encoder Selection
The General Purpose Digital Display supports both Incremental and Absolute style measuring systems (See Section 1: *ProScale Terminology*). To configure the display for use with absolute (*ABS*) type encoders (default), install the shorting jumper in position A. For incremental type encoders, install the shorting jumper in position B.
(ProScale Model 150 & 250 are Absolute systems. Other Accurate Technology products such as ProCaliper, ProPanel, Measurement Kits, and ProStop are Incremental systems)

NOTE: This functionality is not related to the ABS / INC measurement modes described in Section 4: *Auxiliary Keypad*.

JP3   Programming Enable/Disable
Entry to the programming mode of the ProScale display can be enabled or disabled based on this jumper setting. To enable keyboard programming (default), install the shorting jumper in position A. **To disable keyboard programming, install the shorting jumper in position B.** When programming mode is disabled, the user cannot access the programming functions via the **Mode + 0** keys as described in the Section 4: *Programming*. This provides the user with a method of configuring the display with specific parameters and prevents unauthorized configuration changes.

JP4   Display Power
This jumper configures the Digital Display to operate on either Battery or 24VDC.
This jumper will be set at the factory based on the type of display you have ordered.

**JP5   FOR FACTORY USE ONLY**

Jumpers – Panel Mount Display

Although the ProScale display uses a keyboard-programming mode to enable and configure features in the unit, several selection jumpers are located on the circuit board for additional system configuration.
User configurable jumpers consist of three pins and a 'shorting block'.
The center of these pins is 'Common'. One end pin is labeled 'A' and the other end pin is labeled 'B'.

*Panel Mount Display
Circuit Board*
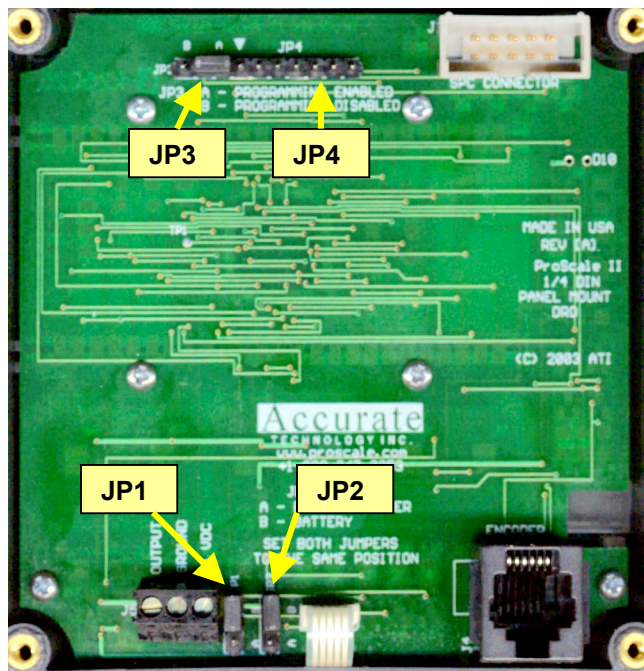
JP1 & JP2 Display Power
These jumpers set the display to operate on either 2D batteries or 24VDC.
To configure the display to operate on 24VDC power JP1 **AND** JP2 should be set to position **A** THEY MUST BE SET ON THE SAME SETTING
To configure the display to operate on battery power JP1 **AND** JP2 should be set to Position **B** THEY MUST BE SET ON THE SAME SETTING

JP3   Programming Enable/Disable
Entry to the programming mode of the ProScale display can be enabled or disabled based on this jumper setting. To enable keyboard programming (default), install the shorting jumper in position A. **To disable keyboard programming, install the shorting jumper in position B.** When programming mode is disabled, the user cannot access the programming functions via the **Mode + 0** keys as described in the Section 4:

JP4   FOR FACTORY USE ONLY

Programming Summary

Programming Parameter	Function	Factory Default	Basic	2AA	2D	24VDC
Pr0	Encoder Direction	0	◙	◙	◙	◙
Pr1	Segment Offset	1 - On	◙	◙	◙	◙
Pr2	High Speed ReadHead	0 - Off	◙	◙	◙	◙
Pr3	Zero, Offset Entry	1 - Enable	◙	◙	◙	◙
Pr4	Display Resolution	1 - Normal	◙	◙	◙	◙
Pr5	mm or cm	0 - mm	◙	◙	◙	◙
Pr6	Fractions, mm, in	0 - all	◙	◙	◙	◙
Pr7	Scaling	1.000 (none)	◙	◙	◙	◙
Pr8	Auto off	15 - 15 min.	◙	◙	◙	◙
Pr9	Auxiliary Keypad	7 - all keys		◙	◙	◙
Pr10	Offset Addition	0 - disabled		◙	◙	◙
Pr11	Offset Addition 1	1.000 Inch		◙	◙	◙
Pr12	Offset Addition 2	1.500 Inch		◙	◙	◙
Pr13	Offset Addition 3	2.000 Inch		◙	◙	◙
Pr14	Output Mode	0 - drift				◙
Pr15	Output Polarity	0 - N/O				◙
Pr16	Lower Limit	0.000	◙	◙	◙	◙
Pr17	Upper Limit	5.000 Inch	◙	◙	◙	◙
Pr18	Drift Tolerance	.01 Inch		◙	◙	◙
Pr19	Auto Monitor ON	0 - disabled		◙	◙	◙
Pr20	Auto Monitor OFF	0 - disabled		◙	◙	◙
Pr21	Auto Monitor Distance	.500 Inch		◙	◙	◙
Pr22	Backlight On	1 - 3 seconds				◙
Pr23	FUTURE FEATURE	1				
Pr24	FUTURE FEATURE	0				
Pr25	FUTURE FEATURE	0				

Jumpers and Key Press Summary

Circuit Board Jumpers

JUMPER	SURFACE MOUNT DISPLAY	PANEL MOUNT DISPLAY
JP1	Internal Use Only	Power Selection (set same as JP2)
JP2	Absolute (ABS) or Incremental System	Power Selection (set same as JP1)
JP3	Programming Enable/Disable	Programming Enable/Disable
JP4	Display Power – Battery or 24VDC	Internal Use Only
JP5	Internal Use Only	N/A

Key Press Functions:

ON/OFF (*Press & Hold) +* MODE (*Momentarily)*
> Enable/Disable LOCK mode ('**0', '+**' & '**-**' keys).

MODE (*Press & Hold) +* '**0**'(*Momentarily)*
> Enter or Exit Programming Mode

While in Programming mode:
> MODE (*Momentarily)*
>> Advances through the Programming Parameter list.
>
> ON/OFF (*Press & Hold) +* MODE (*Momentarily)*
>> Steps backwards in Programming Parameter list
>
> **+** (*Momentarily)* while displaying a Programming Parameter
>> Increases the Parameter setting.
>
> **-** (*Momentarily)* while displaying a Programming Parameter
>> Decreases the parameter setting.
>
> **0** (*Momentarily)* while displaying a Programming Parameter
>> Reverts the parameter to its Factory Default setting.

MODE (*Press & Hold +* '**+**' or '**-**'(*Momentarily)*
> Apply Segment Offset Adjustment

ON/OFF (*Momentarily)*
> Turn Display power on or off

ON/OFF (*Press & Hold*) for 5 seconds
> Display Battery Voltage

ON/OFF + MODE (*Press & Hold Both keys*) for 10 seconds (with display power off)
> LCD Segment Test & sets ALL Programming parameters to factory defaults

How long a key is depressed, and the combination of the keys pressed is important. The term (*Momentarily)* describes a key press of typically less than 1 second. Whereas (*Press & Hold*) is used imply a key press of typically longer than 1.5 seconds.
For 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, a key(s) "*function*" is executed on the key RELEASE, not the key DEPRESS of that key(s). This is important since some keys execute different functions based on how long they are depressed. These key operations, once tried, quickly become intuitive.

Frequently Asked Questions

What does "*no Enc*" mean?

If the readhead is off the scale, or the readhead cable is unplugged from the digital display, an "no Enc" will appear on the display. To clear error:
1.   Be sure the readhead is on the scale.
2.   Unplug the connector from the display for one second.
3.   Reconnect the readhead cable to the digital display.

The battery clips seem to be very loose. Is this normal?

Yes. DO NOT attempt to 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.

Can I mount the scale/readhead without the connector link/guide clip?

The connector link and guide clip serve to provide an accurate method of transferring the movement of the moving part to the readhead or scale, while also absorbing any stresses that may occur. If they are not used, the warranty could be voided.

The display reads numbers but they seem to be random.

Be sure the readhead is oriented correctly on the scale. One end of the scale is black. Be sure that the arrow on the readhead is pointed in the correct direction.

The display does not change as the scale/readhead moves.

The display is in the HOLD mode. Press & release the Hold button.

Product Communication

ProScale's electrical interface allows the readhead position to be read directly or through the digital display by a computer or other data acquisition device. Interface diagrams are available upon request.

Abbe Error

Abbe error is a condition that may not be visible to the human eye, but will affect linear measurements. Be sure to take precautions when installing ProScale in order to eliminate the possibility for Abbe error.

Abbe error refers to a linear error caused by the combination of an angular error and a
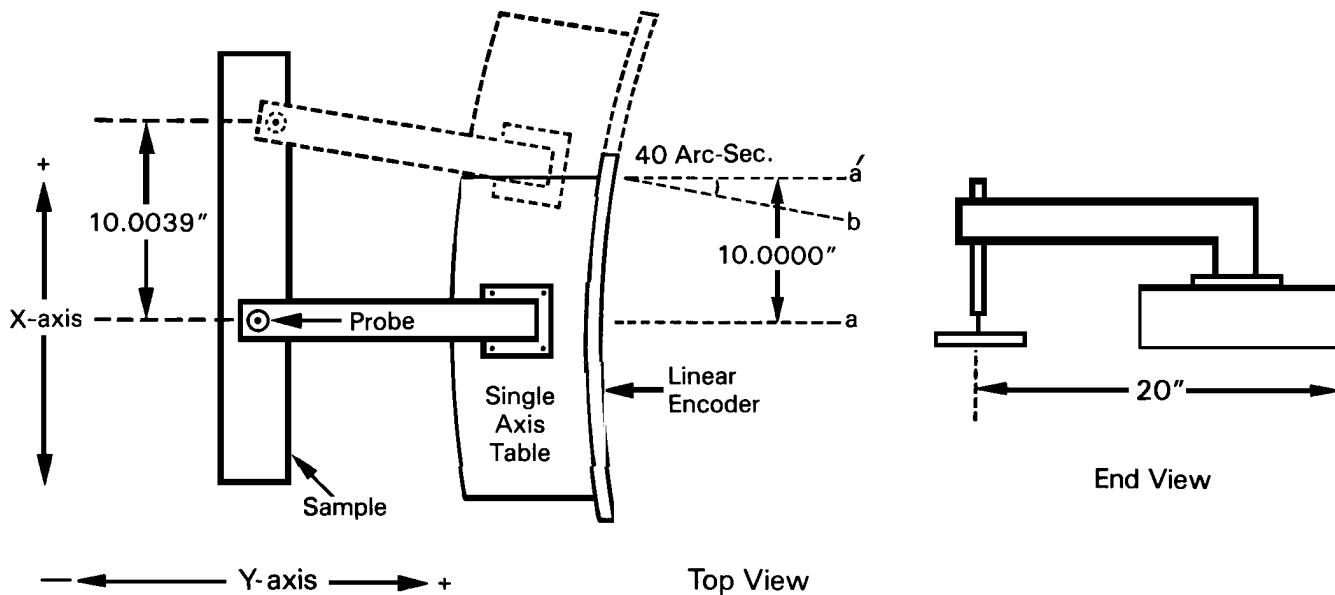
dimensional offset between the sample and the measuring system. It is important to understand that the information the encoder is providing is **only the position of the readhead on the scale**. To illustrate this, see the figure, which shows a linear measuring device. (The apparent distortion in the measuring device is intentional - for this example - to show the measuring device with a curvature in its mounting.)

Suppose the curvature in the figure is sufficient to produce an angle of 40 arc-seconds. If the measuring device moves 10 inches, the probe will be found to have moved 10.0039 inches, resulting in an error of +0.0039 inches. Abbe error could be lessened by moving the measuring system closer to the sample. This effectively solves one half of the Abbe error problem (offset) and leaves only the angular mounting problem to be solved. Angular error can best be countered through proper design and placement of the linear scale. Sources of angular error include:

1. Mounting the linear scale to an imperfectly flat surface.
2. Mounting the linear scale to an imperfectly straight surface.
3. Curvature of ways (or linear bearings) used to measure the sample.
4. Contaminants between the probe and item being measured.
5. Friction in any part(s) of the measuring device.