



Smart Electrode Information Guide

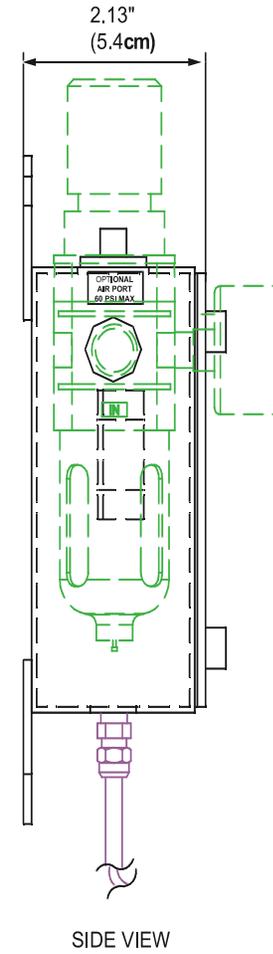
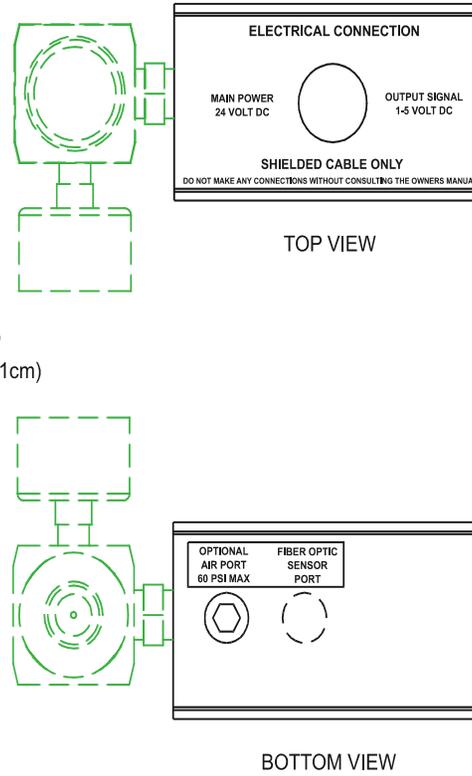
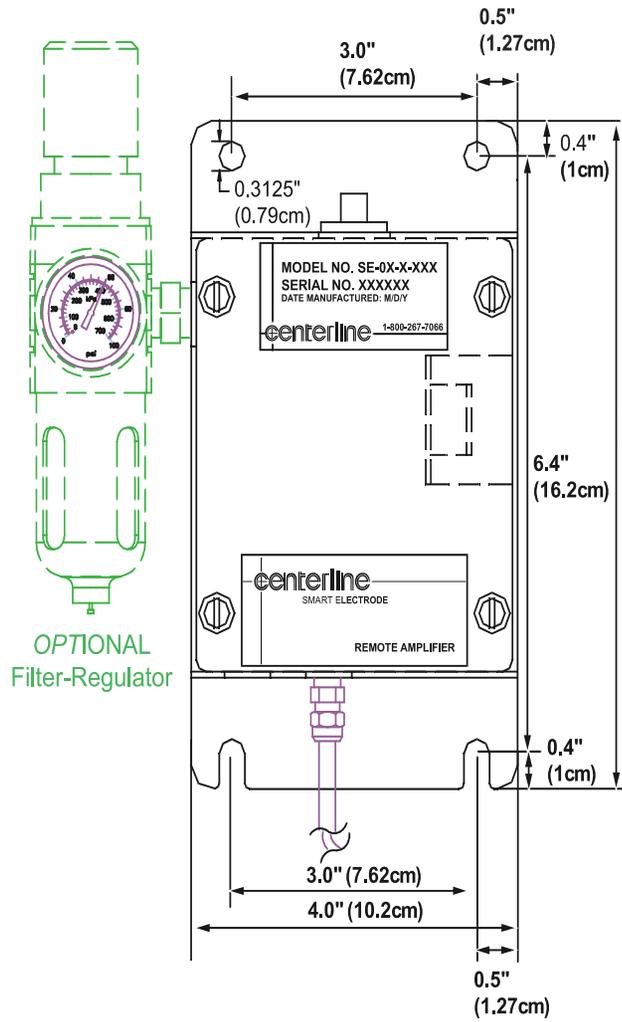
SE-03-XXX-PRL, Version 1.1

Contact:

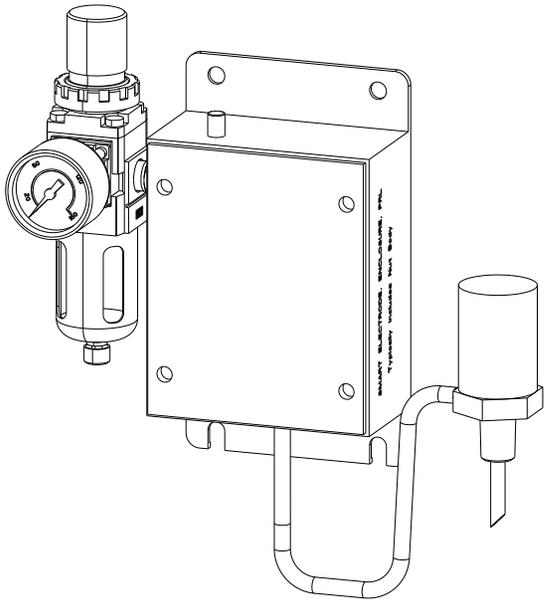
Automation Components Div.
655 Morton Dr., Windsor, ON N9J 3T9
Tel 519-734-8330, Toll free: 800-268-8330
Email: info@cntrline.com

Reference Only

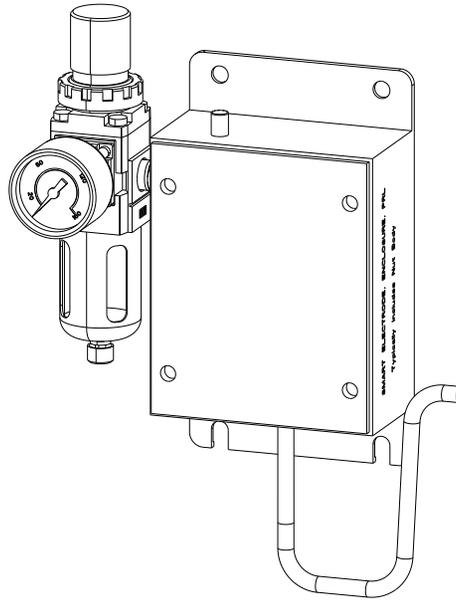
SE-03



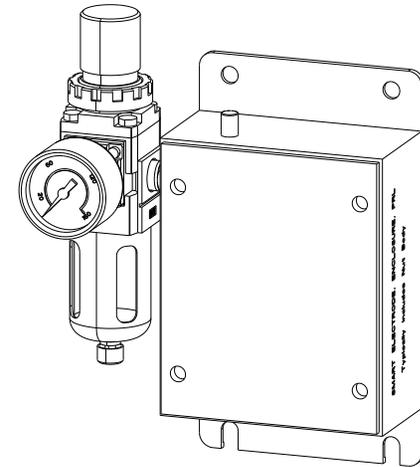
3 different scenarios when applying this Remote version SE-03 PRL unit
(based on the original smart electrode)



Example Part Number:
SE-03-A-UC3-PRL
- includes the Enclosure
c/w amplifier (ref. se-02-1w)
- fiber optic cable (original SE style)
- body NHP



Example Part Number:
SE-03-A-300-PRL
- includes the Enclosure
c/w amplifier (ref. se-02-1w)
- fiber optic cable (original SE style)



Example Part Number:
SE-03-A-000-PRL
- includes the Enclosure
c/w amplifier (ref. se-02-1w)

note: this was made to accept the
fiber optic cable from the SE2 style

Smart Electrode Model Number Breakdown

SE-03-A-XAR2*

For each of the different models there are three different size bodies.

2 - 200 Series (7/8" diameter head) (flat to flat typ)

3 - 300 Series (1 1/4" diameter head)

4 - 400 Series (1 1/2" diameter head)

There are two different pin types.

R - Retractable Pin (needs pneumatic controls)

No R - Standard Pin (spring and standard spring stop)

There are five different body styles for the nut welding unit.

A - Base Mount

B, C, D, E - Taper Mount

F, G - Thread Mount

H, J - Base Mount with Cable Lug

K - Weld-Thru Base Mount

Each size body is available in two lengths.

U - Standard Length (uses 3 mm fiber optic cable)

X - Extended Length (extended length bodies are 1/2" longer than standard) (uses 4 mm fiber optic cable for specific applications only)

There are two different options for air available.

N - Without Air

A - With Air

There are three different models of Smart Electrode Control packages available.

SE-01 - Smart Electrode Control Packages

SE-02 - Smart Electrode Package with Remote Box

SE-03 - Extra Remote Box for use with model SE-02

Or standalone analog card in PLC –

integrator's responsibility to set weld position and tolerances!

*** Note: For SE-03 series, a "PRL" extension at the end of the part number, indicates there is a "Pin Returned Light" indicator on the enclosure**

Date: _____

Requested By: _____

Company Name: _____

Contact Name: _____

Phone Number: _____

Fax Number: _____

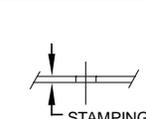
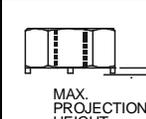
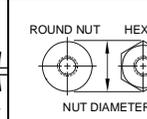
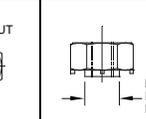
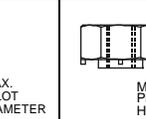
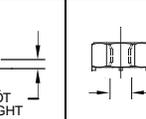
E-mail Address: _____

Delivery Date Required: _____

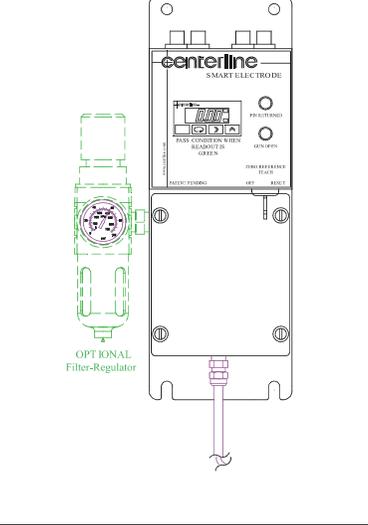
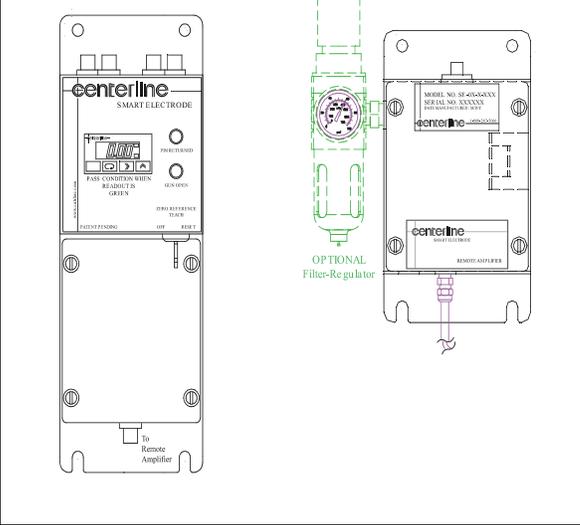
For Piloted Nuts a stepped pin is required. The major diameter of the pin must be larger than the diameter of the pilot.

For Non Piloted Nuts a stepped pin is still suggested to eliminate chamfer variables.

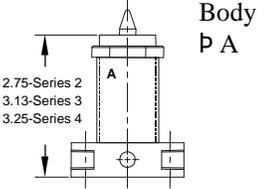
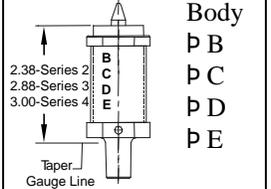
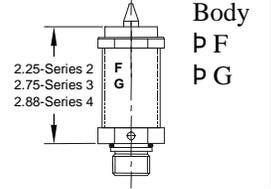
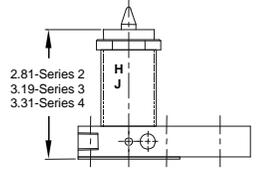
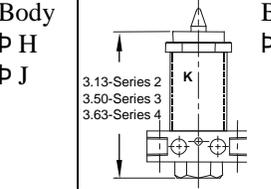
Contact CenterLine if you have special application requirements.

Please fill in the application sizes that apply.				Metric (2 Dec.)	Nut Part Number	Standard
				Imperial (3 Dec.)		
						
						

Select the control type best suited to the application.

 <p>OPTIONAL Filter-Regulator</p>	 <p>OPTIONAL Filter-Regulator</p>	Indicate the desired pin material.	
		Coated <i>(Preferred)</i>	Stainless
		Indicate how the part will be loaded into the application.	
		Robot	Hand
		Indicate how the nut will be loaded into the application.	
		Auto	Hand
		Indicate if the pin is being used to locate the stamping.	
		Yes	No
		Indicate if the orientation of the nut projections during the weld.	
		Down	Up
Integrated Control		Remote Mounted	

Select the body style best suited to the application (Check series and length below).

 <p>Body PA</p> <p>2.75-Series 2 3.13-Series 3 3.25-Series 4</p>	 <p>Body PB PC PD PE</p> <p>2.38-Series 2 2.88-Series 3 3.00-Series 4</p> <p>Taper Gauge Line</p>	 <p>Body PF PG</p> <p>2.25-Series 2 2.75-Series 3 2.88-Series 4</p>	 <p>Body PH PJ</p> <p>2.81-Series 2 3.19-Series 3 3.31-Series 4</p>	 <p>Body PK</p> <p>3.13-Series 2 3.50-Series 3 3.63-Series 4</p>
<input type="checkbox"/> 200 <input type="checkbox"/> 300 <input type="checkbox"/> 400 <input type="checkbox"/> Standard <input type="checkbox"/> Extended	<input type="checkbox"/> 200 <input type="checkbox"/> 300 <input type="checkbox"/> 400 <input type="checkbox"/> Standard <input type="checkbox"/> Extended	<input type="checkbox"/> 200 <input type="checkbox"/> 300 <input type="checkbox"/> 400 <input type="checkbox"/> Standard <input type="checkbox"/> Extended	<input type="checkbox"/> 200 <input type="checkbox"/> 300 <input type="checkbox"/> 400 <input type="checkbox"/> Standard <input type="checkbox"/> Extended	<input type="checkbox"/> 200 <input type="checkbox"/> 300 <input type="checkbox"/> 400 <input type="checkbox"/> Standard <input type="checkbox"/> Extended

Date: _____

Requested By: _____

Company Name: _____

Contact Name: _____

Phone Number: _____

Fax Number: _____

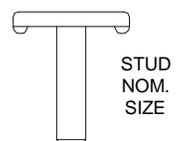
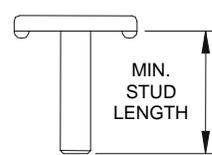
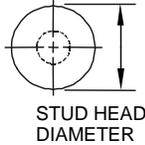
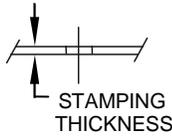
E-mail Address: _____

Delivery Date Required: _____

Please fill in the application sizes that apply.

Metric (2 Dec.)
Imperial (3 Dec.)

Stud Part Number	Standard



--	--	--	--	--	--

Select the control type best suited to the application.

<p>OPTIONAL Filter-Regulator</p>	<p>OPTIONAL Filter-Regulator</p>
Integrated Control	Remote Mounted

Select the body style best suited to the application (Check series and length below).

 Body P A	 Body P B P C P D P E	 Body P F P G	 Body P H	 Body P K
<input type="checkbox"/> 200 <input type="checkbox"/> 300 <input type="checkbox"/> 400 <input type="checkbox"/> Standard <input type="checkbox"/> Extended	<input type="checkbox"/> 200 <input type="checkbox"/> 300 <input type="checkbox"/> 400 <input type="checkbox"/> Standard <input type="checkbox"/> Extended	<input type="checkbox"/> 200 <input type="checkbox"/> 300 <input type="checkbox"/> 400 <input type="checkbox"/> Standard <input type="checkbox"/> Extended	<input type="checkbox"/> 200 <input type="checkbox"/> 300 <input type="checkbox"/> 400 <input type="checkbox"/> Standard <input type="checkbox"/> Extended	<input type="checkbox"/> 200 <input type="checkbox"/> 300 <input type="checkbox"/> 400 <input type="checkbox"/> Standard <input type="checkbox"/> Extended

Check stud thread – reduced diameter lead on threads requires proper consideration and program adjustment.

Assembly of Standard Nut Electrode Unit (Standard Unit Shown)

The following are all of the components that make up the Smart Electrode:

- Nut Weld Body
- Pin Return Spring (Standard unit only)
- Spring Stop Bushing (Standard unit only)
- Spacer Sleeve (Standard unit only)
- Air Fitting
- Pipe Plug
- Fiber-optic Sensor with Sensor Mounting Disc
 - 1 piece white nylon for standard units
 - 2 piece aluminum for retractable units
- Anti-rotate Pin
- Poly Flow Tubing



STEP 1

Insert the anti-rotate pin into the Fiber-optic sensor mounting disc with the excess pointing out of the bottom. This pin is required to prevent the mount from rotating in the nut weld body and damaging the fiber-optic cables. The sensor head is usually flush for standard units and may extend past nut on retractable units. **Always ensure the spring stop will not hit the sensor head.**



STEP 2

The cables are inserted through one of the two air holes in the middle of the nut weld body until the nylon Fiber-optic sensor mount can be easily brought tightly to the bottom of the hole in the nut weld body. To accomplish this it is also necessary for the roll pin to be oriented properly so the holes on the sensor mount line up with the holes in the electrode.

Reminder: Be very gentle with the fiber-optic cables when fishing them through the nut weld body. Put tension on the fiber optic as the sensor mount is pushed down so cable binding cannot occur. To insert the cable make 2 bends approximately 45 degrees at the end of the cable about 3/8" apart. This will allow the cable to slide through the hole easily. A fine wire can also be used to fish the cable through the holes. Once the cable is installed the bends must be cut off.



STEP 3

The fiber-optic cables will exit the nut weld body from one of the two air port holes (some bodies may have only one air port hole).

In retractable units the sensor mounting disk assembly is made up of two aluminum parts and an O ring. The sensor head is tightened once the disk is in the nut weld body. This extrudes the O ring and holds the disk in place. The spacer sleeve is not included for retractable units.



STEP 4

Insert the spacer sleeve into the body.

This sleeve ensures that the sensor mount stays properly positioned against the bottom of the hole in the nut weld body.

* NA for retractable pin units. Retractable sensor mounting disc consists of 2 aluminum pieces and an O ring to hold it in place.



STEP 5

Place the pin return spring on the fiber-optic sensor mounting disc. The spring should be centered so that it is around the sensor and the light from the sensor will be able to transmit through the center. The spring stop bushing with white reflector should be fitted over the spring. If a standard spring insulator is used instead, the spring pocket side should be faced downward.

* NA for retractable pin units. The spring stop is eliminated and the white reflector is included in the construction of the retractable pin.



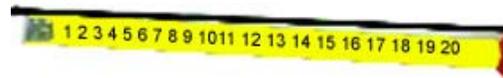
STEP 6

The tubing that will cover the fiber-optic cable should be measured and cut to length. It is a good idea to plan to leave at least 14" of fiber-optic cable outside of the tube for terminating at the Smart Electrode control.

While poly flow tubing is usually adequate, the tubing can be made of any material desired such as soft copper or hydraulic tubing.

In all cases, including poly flow tubing, it is necessary to ensure there are no burrs on the inside of the tubing that will damage the fiber-optic cable coating.

There is also a hydraulic hose option to protect fiber optic cables. Call CenterLine for details.



STEP 7

Slide the air fitting over the fiber-optic cables and thread it into the port. Then slide the tubing over the Fiber-optic cables and push it onto the air fitting.



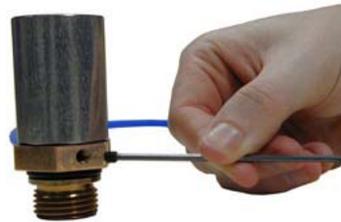
STEP 8

Completed fiber-optic installation.



STEP 9

Insert the supplied 10-32 pipe plug into the unused air port hole.



STEP 10

To attach the head to the body insert the pin into the head and then thread the head into the body. Be sure to tighten the head with no threads showing to prevent leakage or thread damage.

Use of conductive oil or grease is not recommended in this application. If it is applied to the threads prior to assembly, care must be taken to ensure there is not excess material that could contaminate the reflective fiber-optic sensor lens or the target surface. For retractable units ensure the pin has the white reflector inserted in the pin head pocket.



For Piloted Nuts a stepped pin is required. The major diameter of the pin must be larger than the diameter of the pilot.

STEP 11

This is a completed view of the Smart Electrode.

Note: The electrode assembly is quite heavy and should not be manipulated by the tubing or the fiber-optic cables may be damaged.



Note: When servicing the unit turn air off before you remove the nut weld head.

Assembly of Extended Nut Electrode Unit (Standard Unit Shown)

STEP 1

Remove the old unit by removing the nut on the fiber optic and pull the rest of the assembly with needle nose pliers. Remove the 1/4" poly flow and barb fitting.



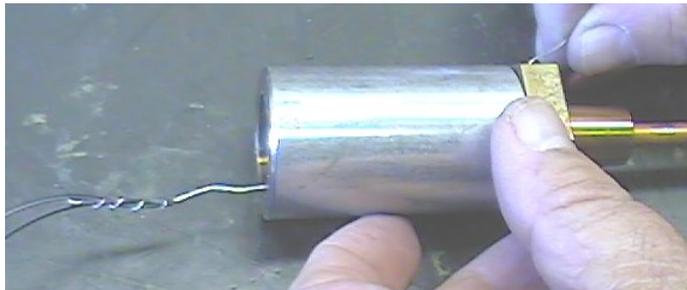
STEP 2

New Unit assembled from CenterLine. The nut on the bottom plate should be flush to fiber optic head bottom and tight with the bottom base plate.



STEP 3

Insert new fiber optic; feed it by hand or use a thin flexible wire for guide to pull through the body.



STEP 4

This end should be trimmed prior to install into the amplifier, use the proper cutter supplied.



STEP 5

Place the body up side down if possible to reduce friction as you pull the fiber optics through the body carefully not to cut or scrape the skin of the fiber optics.



STEP 6

Make sure pin is in and has to be aligned to the hole in at the bottom inside of the body. Remove upper nut, washer, top plate and "O" ring for this process for ease of installation. Check the bottom nut to be tight to base.



STEP 7

This view shows proper orientation when pin is lined up in the body and the bottom plate flat to the bottom.



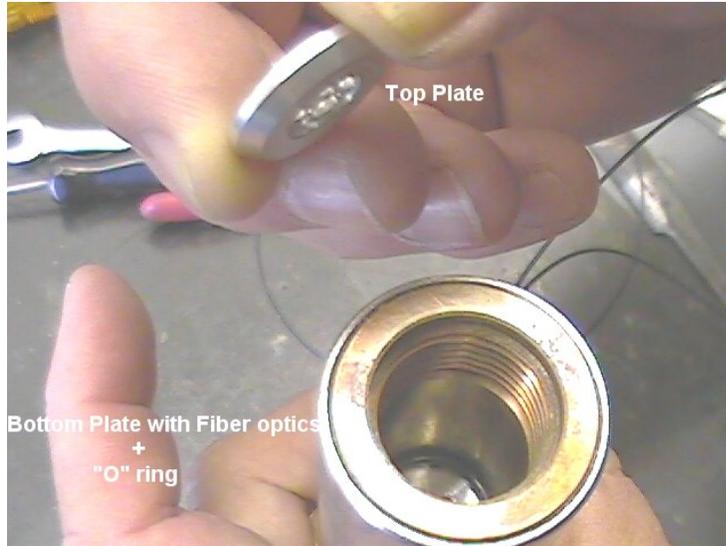
STEP 8

Components in place. Add "O" ring. No lubrication required.



STEP 9

Make sure that the bottom plate; “O” ring and pin are all in place and flat to the bottom of the nut weld body.



STEP 10

Hold the top plate with needle nose as you put it over the fiber optic head, and pressing the “O” in place.



STEP 11

Make sure that the holes on the two plates line up for proper airflow.



STEP 12

Place lock washer and nut over Fiber optic head. Start the nut by turning the body if you can.



STEP 13

Use a 7/32" nut driver or socket to tighten unit as you press down on the assembly. This process will compress the "O" ring and hold the unit in place.



STEP 14

Test if tight by pulling the unit with needle nose. If loose repeat **13**.



STEP 15

Check for holes to line up for air to go through.



STEP 16

Final re install the barb fitting and poly flow.



Cable Installation to the Smart Electrode Control

STEP 1

Remove the nut and fitting gland (not the entire fitting) from the Smart Electrode and verify that the path between fittings is clear to receive the tubing and cable.

The Smart Electrode is supplied with a poly flow tubing connector. If you are using different tubing material, or a different size poly flow tubing, the connector should be replaced at this time.



STEP 2

Fish the fiber-optic cables through the tubing fitting, the internal manifold, and the internal seal fitting, into the Smart Electrode control. The tubing fitting can now be secured.



STEP 3

Slide the fitting gland over the two fiber-optic cables until it is seated in the fitting. The fiber-optic cable should remain relaxed inside of the air tubing so that the protective tubing will protect the cables from strain.

The nut can be installed and tightened onto the gland. Once the cables do not move in the gland that should be tight enough to prevent air from escaping into the Smart Electrode control.



STEP 4

Slide the connector insert over the cables. Note: Any bends or defects during the cable installation have been cut off prior to this step.



STEP 5

The tightening nut can be tightened finger tight to secure the cable with the cable end about 1/8" past the end of the connector.



STEP 6

Cut the Fiber-optic cables at the desired length. This is accomplished by placing the first cable connector into the small hole of the cutter when it is open. The connector will bottom out in the small hole of the cutter. Next make the cut and the cable will be slightly past the end of the connector. Repeat for the second cable in the next hole.

NOTE: The manufacturer recommends that each cutting hole be used only once to ensure the cut is very clean and the maximum sensing distance can be achieved. The large holes are meant for rough cuts and can be used more than once.

STEP 7

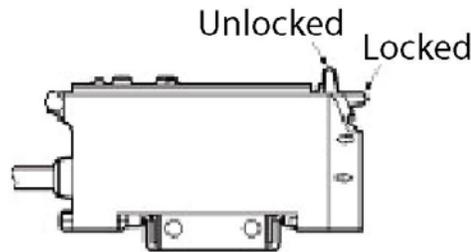
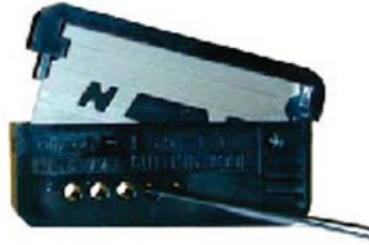
The latch on the fiber-optic amplifier should be moved to the unlocked position.

STEP 8

Once fiber optics are fully inserted into the amplifier depress the lock to secure them into place.

NOTE: There are no polarity concerns regarding the cable and sockets. Either cable end can be inserted in either socket. We suggest the bottom one is inserted first for ease of installation.

Finish cuts not shown.



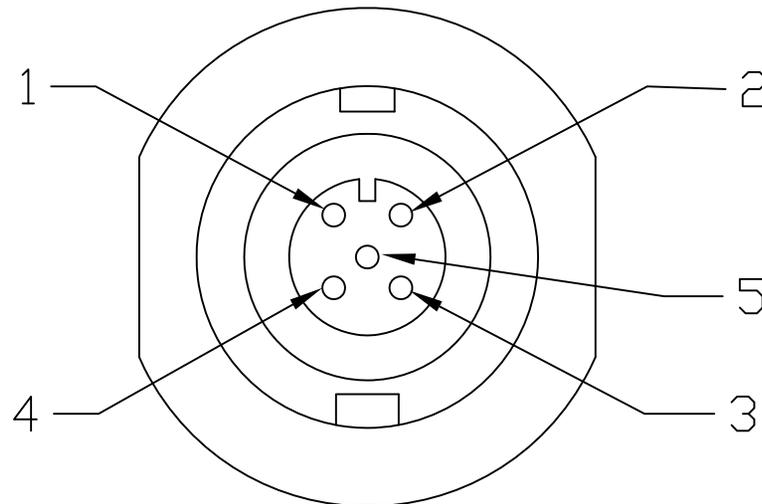
Air Regulator

Provided by CenterLine, is used to regulate the air pressure for blow-by to prevent slag buildup on the nut weld pin. It also has a filter (5 micron) to remove contaminants from the air supply. Also can be adjusted to assist the pin return spring when pin and head have wear or excessive slag buildup.

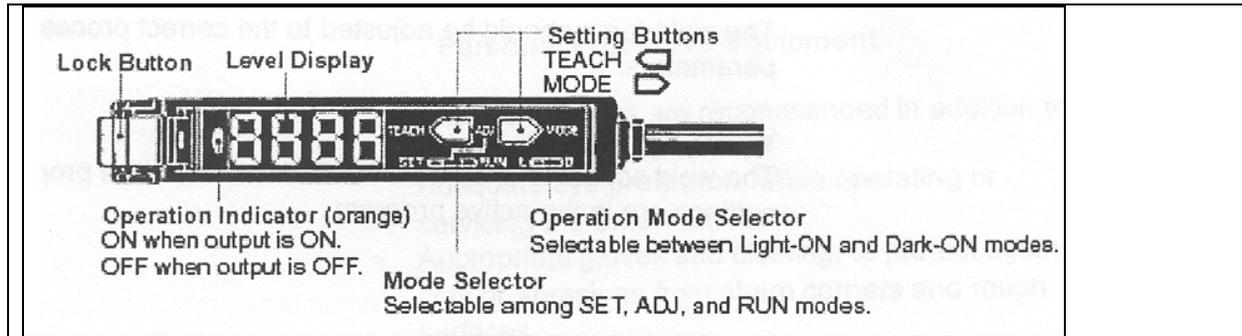
REMOTE
AMPLIFIER
CONNECTION
(24VDC PNP)

5-M12 5 PIN
FEMALE RECEPTACLE (MICRO DC-SINGLE KEY)

PIN	COLOUR	FUNCTION	CURRENT DEMAND
1	BROWN	+ 24VDC	50ma MAX
2	WHITE	ANALOG V (1-5 Vdc)	
3	BLUE	0VDC	
4	BLACK	PIN RETURNED OUT /LED	25ma MAX
5	GREY	SHIELD / GROUND	



Configuring the Amplifier



Change Display Type

1. Set the mode selector to "RUN".
2. Depress and hold the "Mode" button for 3 seconds to change the display format. Repeat as necessary until the desired read-out is displayed. The options are: Bar Graph (display is bars), Digital - Actual (display is ###), and Digital - Percent Full Scale (display is ###P).
3. Smart Electrode setup we require the Digital - Percent Full Scale display (###P).

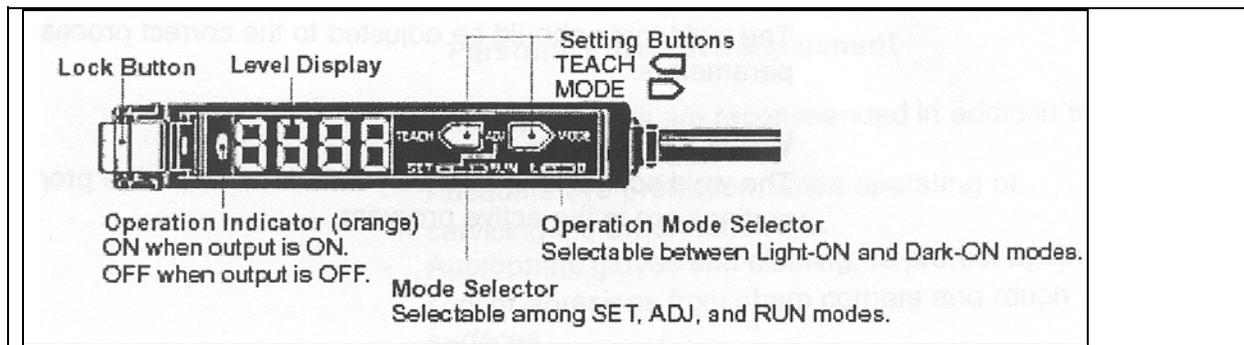
Change Sensitivity Setting

1. Set the mode selector to "ADJ".
2. Depress and hold the "TEACH" button until the value increments to 999P.
3. Return the mode selector to "RUN".
4. As noted above, the display type can be reset to Bar Graph by depressing the "Mode" button for 3 seconds.

Check Amplifier Default Settings

1. Set the mode selector to "SET".
2. Depress the MODE button until the long range sensing function " F LD" is displayed.
3. If the amplifier has been set to a different sensing function it can be returned to proper operation by pressing the "TEACH" button. The function display will cycle through the options " F LD", " F HS", and "F ST".
4. Depress the MODE button to confirm default of t0 setting.
5. Depress the MODE button until LOFF is displayed. Lon is another option but LOFF is the correct setting.
6. Depress the MODE button until HOFF is displayed. HPE and HbO are the other options, HOFF is the correct setting.
7. Depress the MODE button until d123 or 123P is displayed, both settings are correct so set as user preference.
8. Depress MODE button again until A-UP/4000 is displayed; 4000 is the default setting. The Analog.Upper limit can be adjusted to any value 4000 → 100 and must be larger than the number displayed on the amplifier at the maximum pin travel (or at 8mm displacement in the case of a retractable pin). Values above 2500 at maximum pin travel are not always required to be scaled.
9. Depress the MODE button until A-LO/0 is displayed. 0 is the correct setting.
10. Return mode selector back to "RUN".

Setting Pin Return



Setting Pin Return

1. Set "Operation Mode Selector" to "Dark On".
2. Set the mode selector to "SET".
3. Depress the "TEACH" button for approximately 3 seconds until the display changes from red bars to green bars.
4. Set the mode selector to "RUN".
5. Return the mode selector to "SET".
6. Depress the nut weld pin the amount of tolerance that will be allowed for the pin returned position. A pin returned tolerance of approximately of 1/2 to 2 mm is reasonable for most applications. It should be set so the pin returned output is not "ON" with the weld gun closed on parts in the correct orientation.
7. Pulse the "TEACH" setting button to define this position. The display will indicate with red bars.
8. Return the nut weld pin to its returned (extended) position.
9. Pulse the "TEACH" setting button again to complete the window definition. If successful, the display will light green. If not successful, the display will flash red; repeat steps 4 to 9.
10. Once successful return the mode selector back to the "RUN" position. The output light on the amplifier and the PIN RETURNED light on the Smart Electrode control should illuminate.

Note: If the control is configured for GUN OPENED switch, a valid signal from this switch will be required in order for the PIN RETURNED to be output to PLC. The PIN RETURNED light may be "ON" but unless the GUN OPEN bypass switch is also "ON" the signal will not be recognized by PLC monitoring equipment.

Amplifier Analog Scaling

Amplifier scaling may be used to improve marginal signals from the fiber optic cable. It is not always required or recommended.

Scaling the Analog Upper Limit / Lower Limit for Better Resolution in Sensing Range

1. The first step to amplifier analog scaling is to push and hold the teach button while the mode selector is in the run position. This "zero's out" the digital display.
2. Next, fully depress the weld pin to display the maximum signal strength, record this value on a piece of paper. When using retractable pin units, press nut weld pin down 8mm.
3. Now set the mode selector to the set position.
4. Next, hold the mode button for 2 seconds or longer until "A-UP" is displayed.
5. Next, hold the teach button until the displayed value is within the 300th value higher to that you previously recorded. ie: if 1433 was displayed, then "A-UP" should be set to 1800.
6. Next, hold the mode button until "A-LO" is displayed.
7. Using the teach button, set "A-LO" to 0.
8. Set the mode selector to run to complete the procedure.

You should now have an acceptable range.

It will be necessary to re-enter the parameters for inP1, inP2 and verify the dSP2 is correct for the nut weld body being used. If inP2 values is less than 5.1V, A-UP can be reduced again but must never be lower than the value recorded at maximum pin travel (in our example 1433).

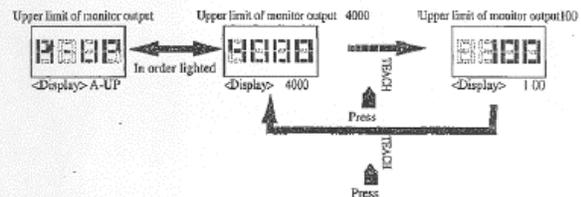
What we expect is better resolution between the two voltage values to give a more stable displayed number.

When teaching inP2 fully depress the weld pin OR in the case of the retractable pin, depress the weld pin 8mm. dSP2 for the retractable pin unit is 800.

6.7 Focusing output range of the monitor. (only for type having monitor output)

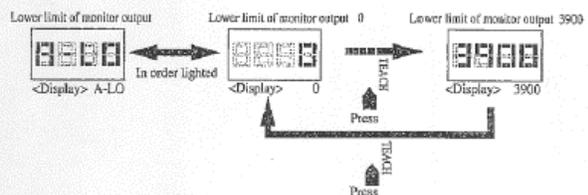
Monitor output (1~5V) can set any two points and narrow range to control and improve the precision of it.

(1) Set the upper limit. If the light amount is more than this, monitor output will be 5V. Setting this function, [A-UP] (Analog UPPER) and established amount is digitally displayed by turns. Pressing  key to set this. The range is from 100 to 4000, it can be set every 100. (4000 is default setting.)



(2) Set the lower limit. If the light amount is less than this, monitor output will be 1V. Setting this function, [A-LO] (Analog LOWER) and established amount is digitally displayed by turns. Pressing  key to set this. The range is from 0 to 3900, it can be set every 100. (0 is default setting.)

The lower limit can not be set more than the upper limit.



(3) Once this function is set, it stays in the same status even after the power is turned off and on again.

Reference Sheet

Setting the Fiber Optic Amplifier

1. Press and hold the “**Mode**” key until the display changes to **XXXXP**. You may have to do this twice to get to the proper parameter.
2. If the number “**XXX**” is less than **999** move the slide switch under the “**Teach**” key to **ADJ**. Press and hold the “**Teach**” key until **999P** is displayed.
3. Move the slide switch under the “**Teach**” key back to **RUN**.
4. Move the slide switch under the “**Teach**” key to **SET**.
5. the “**Mode**” key to show **F St**. Change this to **F Ld** by pressing the “**Teach**” key.
6. Move the slide switch under the “**Teach**” key back to **RUN**.
7. To initialize the amplifier, move the slide switch under the “**Teach**” key to **SET**.
8. Press and hold the “**Teach**” key until the red bars change to green bars. (~3 sec)
9. Move the slide switch under the “**Teach**” key back to **RUN**.
10. To set the pin returned output with a tolerance, move the slide switch under the “**Teach**” key to **SET**.
11. Push the pin down approximately 1.0 mm and pulse the “**Teach**” key. (should get red bars)
12. Allow pin to return and pulse the “**Teach**” key. (should get green bars). If this fails the red bars will be flashing.
13. Move the slide switch under the “**Teach**” key back to **RUN**. The output light on the amplifier should be **ON**, and green pin returned light on enclosure should be **ON**.

Note: This is what may be referred to as a cheat sheet after you get accustomed to the equipment however this is not complete for all functions: I.E. Scaling

Conditions:	Smart Electrode Displays:	Possible Cause:
Power on but no response from Smart Electrode Unit	No lights on front panel, display is dark	Check 24VDC power supply.
No Pin Returned output to PLC	Pin Returned light on front panel is "OFF"	Check amplifier setup in this manual. Check for weld slag preventing full return of pin. If part is welded, unclamp and remove part from pin. Check air supply if no spring installed. Check that nut weld pin does not move parts are loaded.
No Pin Returned output to PLC	Pin Returned light on front panel is "ON"	Check wiring from the SE-03-A-XXX-PRL to the machine electrical input.
Pin Returned signal is lost before weld gun closes	Green LED goes off when parts are loaded	Check I.D. of the hole in the stamping and O.D. of the nut weld pin. Check position of the part to the nut weld pin. Is the hole centrally located or touching on the side of the pin? Adjust part position to the pin or call Centerline to discuss possible dimensional changes to nut weld pin diameter for additional clearance.
No change when pin is pressed down	Numeric display is unchanged with pin travel	Check amplifier set-ups as outlined in this manual.
Smart Electrode not function properly	Amplifier display flashing	Check the parameters in the amplifier, in particular HOFF. If set to HPE the display will be flashing. HOFF is the correct setting.
Pin moving but display not changing	Amplifier displayed value does not change with pin motion	Verify the amplifier is in the "Run" mode. Verify amplifier settings A-UP and A-Lo. The analog upper limit (A-UP) must be set higher than the number on the amplifier at its maximum pin travel or at 8mm pin travel in the retractable pin applications. The analog lower limit (A-Lo) must always be 0.
Some good parts do not weld due to nuisance faults	Pin Returned displayed value is very close to pass value	Check amplifier scaling for A-UP value. If the pin shoulder height is correct, resolution and tolerance settings should improve. If necessary increase shoulder height on major diameter of nut weld pin. Call Centerline for details.
No PASS condition when gun closes on correct parts	Analog displayed values do not change when the weld gun closes.	Check that the head and pin combination are correct for your application. Pin shoulder height is based on part thickness and projection heights and is critical for correct operation. Check fiber optic cable for damage if the amplifier numbers do not change with pin motion.
Some fasteners get welded even if the displayed value is not correct	The numbers change from bad to good to bad during the weld sequence	Pin at correct height (PASS) should be a timed function to allow an over travel to occur if the parts and conditions will allow it. Sometimes an incorrect condition will cause the nut weld pin to move through the PASS window, so if the PASS condition remains on for a specific time interval (20 msec) the parts should be OK to weld.