

Operator's Manual
for the
RSGz (40/90/175)
Gas Filling Machine



FDR Design, Inc.

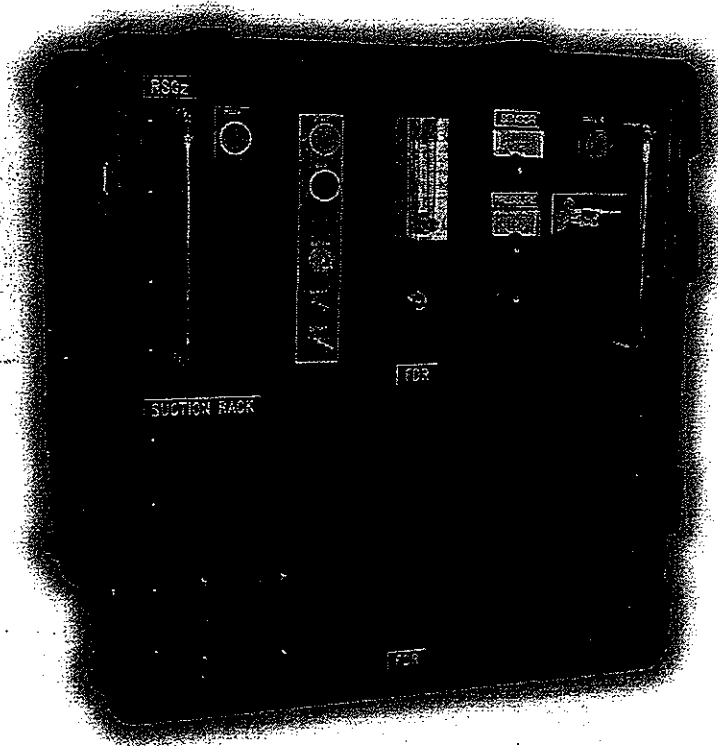
World Leaders in Gas Filling Technology

763.682.6096

763.682.6197 (fax)

www.fdrdesign.com

sales@fdrdesign.com



RSGz40...

- Single-line gas filler
- Gas and pressure sensor meters for visual display of filling process
- Automatic flow rate of 20 to 45 liters per minute*
- Two-hole filling
- Gas flow shuts off automatically when IG unit is full
- Computer control
- Complete with filling lances, sniffers, bottle regulator, and hoses
- Designed and manufactured in North America, serviced worldwide

** Flow rate dependent on exhaust hole size*

For a free guide to gas filling, please write or call!



FDR Design, Inc.

World Leaders in Gas Filling Technology

763.682.6096

763.682.6197 (fax)

www.fdrdesign.com

sales@fdrdesign.com

World Leaders in Gas Filling Technology



RSGz90...

- Single-line gas filler
- Gas and pressure sensor meters for visual display of filling process
- Automatic flow rate of 20 to 90 liters per minute*
- Two- or Three-hole filling
- Gas flow shuts off automatically when IG unit is full
- Computer control
- Complete with filling lances, sniffers, bottle regulator, and hoses
- Designed and manufactured in North America, serviced worldwide

** Flow rate dependent on exhaust hole size*

For a free guide to gas filling, please write or call!



FDR Design, Inc.

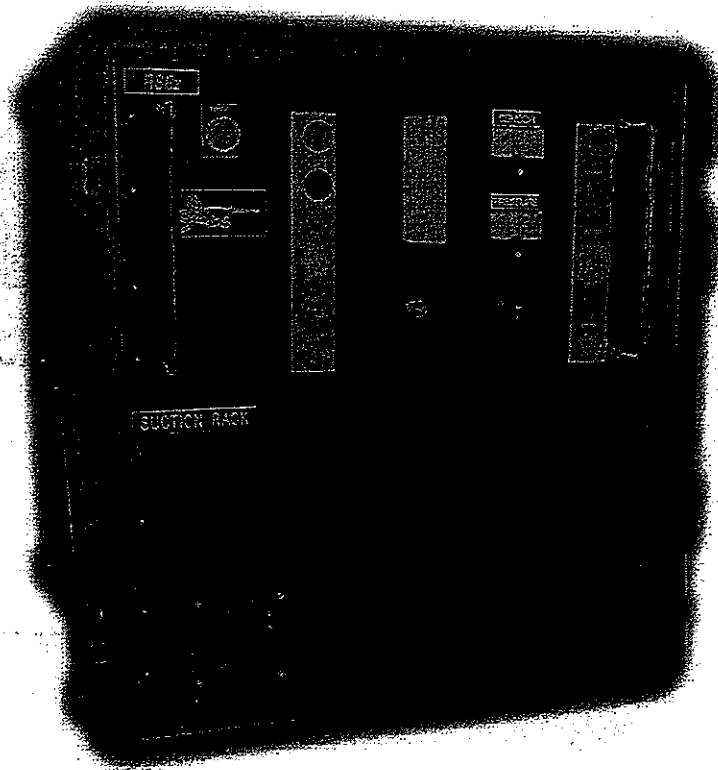
World Leaders in Gas Filling Technology

763.682.6096

763.682.6197 (fax)

www.fdrdesign.com

sales@fdrdesign.com



RSGz175...

- Single-line gas filler
- Gas and pressure sensor meters for visual display of filling process
- Automatic flow rate of 20 to 175 liters per minute*
- Two-hole filling
- Gas flow shuts off automatically when IG unit is full
- Computer control
- Complete with filling lances, sniffers, bottle regulator, and hoses
- Designed and manufactured in North America, serviced worldwide

** Flow rate dependent on exhaust hole size*

For a free guide to gas filling, please write or call!



FDR Design, Inc.

World Leaders in Gas Filling Technology

763.682.6096

763.682.6197 (fax)

www.fdrdesign.com

sales@fdrdesign.com

IT IS THE RECOMMENDATION OF FDR DESIGN, INC. THAT ALL OPERATING PERSONNEL READ THIS MANUAL TO ENSURE THE SAFE AND PROPER OPERATION OF THE MACHINE.

×WARNING× This machine is designed with specific safety features which must be monitored at all times to ensure the safety of personnel and/or the machine. This machine is also designed with specific operating procedures which must be followed to ensure safe and proper operation.

FOR THESE REASONS, FDR DESIGN, INC. PROVIDES THE FOLLOWING SIGN OFF SHEET FOR ALL OPERATING PERSONNEL TO SIGN AND DATE ONCE THEY HAVE READ THIS OPERATING MANUAL.

NAME OF OPERATOR

DATE

TABLE OF CONTENTS

Safety Precautions	1
Functional Scope	2
Functional Components	4
Machine Interface	8
To Power Up	12
Pop® Rivets & Spacers	14
To Fill A Window	16
Set Up Procedures	
Setting the Gas Sensor	17
Setting Pressure & Vacuum Flow Rates	22
Appendices	
Appendix 2: Preventive Maintenance	24
Appendix 3: Trouble Shooting Guidelines	25
Appendix 4: Spare Parts & Replacements	26
Appendix 5: Argon Regulator	27
Appendix 10: Glossary	33

Safety Precautions

Safety compliance liability (OSHA)

The seller will endeavor to make this machinery as safe to operate as possible. State and local laws and regulations designed and issued to ensure a safe place to work apply primarily to the employer, not the equipment manufacturer. The seller agrees to cooperate with the buyer in finding feasible answers to possible compliance problems. However, because the seller has little control over many factors which may significantly affect the safety of this machinery (such as installation, plant layout, building acoustics, material processed, processing procedures and supervisory training of employees), the seller does not warrant this machinery to be in compliance with OSHA or any like state or local laws or regulations. It will be the buyer's responsibility for compliance and any modifications necessary to comply will be made at the buyer's expense.

Symbols used in this manual

CAUTION!! This symbol is used to indicate that failure to observe can cause damage to equipment.

WARNING This symbol is used to indicate that failure to observe can cause damage to equipment and/or injury to personnel.
--

General precautions

WARNING This machine has been designed for safe operation. Any modification or removal of safety features should be reported to your supervisor immediately.

WARNING Be sure all personnel are clear of the machine before starting.

WARNING A shock hazard may exist if equipment is not properly grounded.

WARNING Always stop machinery before oiling, wiping, repairing, or any activity that requires the removal of the guards.

WARNING High voltage is present within the motor starter enclosure. **DO NOT** operate the machine with the cover off.

WARNING Guarding is provided to prevent accidents and should always remain in place when operating the machine.

FUNCTIONAL SCOPE

Gas to be used

The RSG 15/30 Gas Filler is calibrated to handle argon gas, but may be changed to suit other gases such as krypton or SF₆. The RSG 15/30 fills windows via two holes – one hole for the filling lance (bottom hole) and the other hole for the Sniffer™ (upper hole). The Sniffer™ is designed to release air and monitor internal cavity pressure as well as send a sample of the exhaust gas to the gas sensor.

The RSG 15/30 is compatible with liquid tanks as well as compressed tanks. Final bottle outlet pressure should be greater than 50 psi (low pressure fault is set at 40 psi).

The optional RSG cart can accommodate two different sizes of argon bottles:

- Size "S" - 4360 liters
- Size "T" - 9514 liters

Filling speed

Computer controlled flow rates:

The RSG 15 maximum flow rate is 20 liters per minute, per line.

The RSG 30 maximum flow rate is 50 liters per minute, per line.

The actual flow rate of the machine will be dependent on the size of the Sniffer™.

With a 3.5 mm Sniffer™, the average flow rates of the machines are:

The RSG 15 average flow rate is ≥ 15 liters per minute, per line.

The RSG 30 average flow rate is ≥ 30 liters per minute, per line.

Normally, the RSG 15/30 is set to yield 95% (± 2) fill rates. The RSG 15/30 can also be adjusted at the factory for various filling percentages. Fill rates are largely dependent on the operator's skill and window construction. Fill rate can be field changed by adjusting the shut off voltage on the compare board.

Gas consumption

The amount of gas used is dependent on the IG unit size and configuration. To determine the length of time your argon tank will last, multiply the liters used per window by the number of units normally filled per shift.

EXAMPLE: IG unit is 10 liters in size.

Gas loss is 100% in each IG.

Filled IG unit will use approximately 20 liters of argon.

The typical amount of gas used is 110% to 200% of cavity volume. The condition of the lance and the Sniffer™ can greatly influence the amount of gas lost in the filling process.

The RSG 15/30 Gas Filler is designed to be used with an 3.5 mm filling lance (Part #10170-A) and Sniffer™. If your IG unit requires a different filling lance size, contact FDR DESIGN, INC. for technical support.

NOTE: Failure to use the recommended filling lances will affect the performance of the RSG 15/30 Gas Filler.

FUNCTIONAL COMPONENTS

All components of the RSG 15/30 are contained in an industrial standard 19" rack enclosure. The rack is removable. The rack is mounted in stackable single enclosures or in a optional 5 rack enclosure and cart.

Flow rack

The flow rack is the heart of the RSG 15/30. It contains the operator controls, the programmable logic controller (PLC), and the control fuses. The same basic rack is used for both the 15 liters per minute machine and the 30 liters per minute machine, with minor plumbing and software differences. The 15 liters per minute rack has its own internal vacuum pump, while the 30 liters per minute machine requires a separate 30 liters per minute vacuum rack.

Each flow rack is independently intelligent, having its own computer. The face of the rack contains start and stop buttons, a horn, flow meters, an IG cavity pressure meter, and a gas sensor/argon concentration meter. Start buttons illuminate when activated. To announce when the IG is filled, a horn sounds at the end of the filling process. The horn produces different tones for different racks.

CAUTION!! When moving argon bottles, remove the regulator and attach the protective cap.

Both racks are completely independent of each other and interchangeable. It is recommended they remain in the same station for quality control purposes. The removal of these racks is accomplished by removing the screws on the front panels. Care should be taken so that lines and cables are not pinched.

Suction rack

One suction rack can support four flow racks. The removal of this rack is accomplished by removing the screws on the front panel and underneath. (Remove side screws only. The bottom screws hold the rack base to the face plate. Remove bottom edge screws if you want to remove front panel and leave rack base and pump in enclosure)

CAUTION!! The suction station provides power to the flow racks via cables. Care should be taken that lines and cables are not pinched.

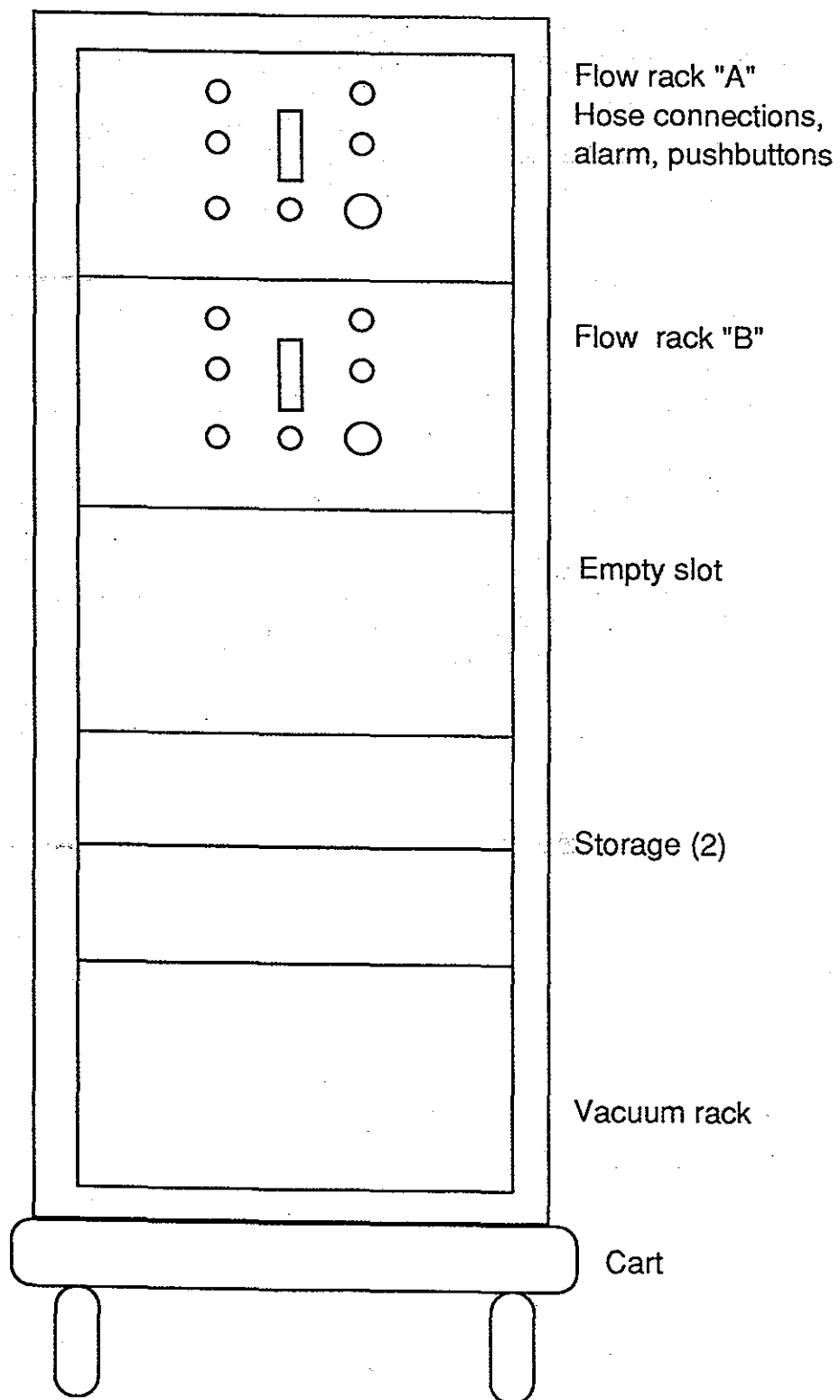
The cables are interchangeable. One cable must be connected to the left hand or "A" socket to provide pump control signals. The solid state relay for the vacuum pump is located in the suction station control box. Two fuses are also located in the box – one for the control power and the other for the vacuum pump. The vacuum pump also has a thermal protection device. The vacuum relief regulator is set at 10" Hg (mercury) with both lines running.

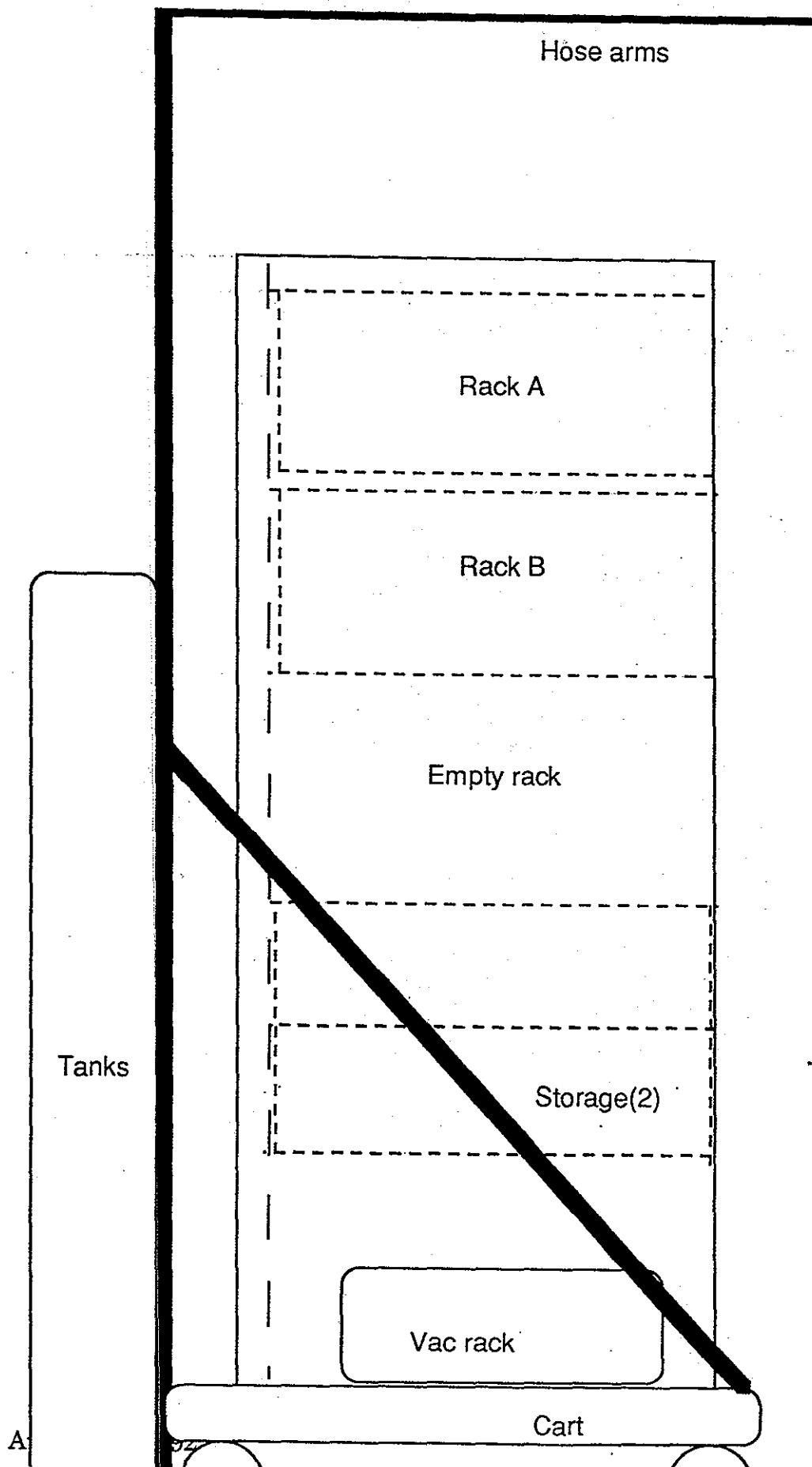
The optional enclosure is attached to the cart by four bolts. The sides of the enclosure are removable when the unit is detached from the cart.

CAUTION!! Before removing rack always disconnect all power lines and gas supply hoses.

CAUTION!! Make sure the argon tank is shut off before disconnecting the gas supply hoses.

An argon bottle regulator is provided with each machine. Refer to the instructions provided by the manufacturer in Appendix 5 for information about the installation and care of the regulator.





MACHINE INTERFACE

Controls

Controls include the following:

- Gas sensor on/off push-button
- Start & stop push-buttons to control cycle
- Power on light to signal machine is plugged in
- Green light to signal run condition
- Red stop light to signal fault condition

Service & control data

North American version:

- Incoming power: 120 vac, 60 Hz
- Power consumption: 20 amps
- Internal: 24 vdc inputs, 24 vdc outputs

Export version:

- Incoming power: 240 vac, 50 Hz
- Power consumption: 10 amps
- Internal: 24 vdc inputs, 24 vdc outputs

PLC display alarm functions

Alarms:	Meaning:
0001	Overpressure in IG; check Sniffer TM & lance
0002	Underpressure in IG; check Sniffer TM & lance
0003	Low argon pressure; check bottle
0004	Low vacuum; check suction rack

Faults are displayed by the **RED** stop light illuminating. To reset, press the **RED** stop button.

*NOTE: The faults are set on a hair trigger to prevent damage to an IG. It is not uncommon to have a random fault on odd sized IG's. If this occurs, reset the rack and try again. If an IG size gives an overpressure condition, use the "small IG" switch to instruct the computer to start the flow rate slightly lower. If the "small IG" switch is left on with a large IG, you may get an underpressure fault. Underpressure faults can also be generated if the **Sniffer™** nose seal is damaged or if the pressure sensor is out of calibration.*

Machine operation

When the RSG 15/30 gas filler is turned on, a **GREEN** light will turn on indicating that the machine is powered up. The RSG 15/30 automatically establishes the flow rate for the gas. The maximum flow rate is pre-set during assembly at the FDR DESIGN, INC. factory.

The RSG 15/30 turns on the vacuum and argon flow simultaneously. The vacuum flow rate is less than the argon gas flow rate. As the cavity pressure slowly increases, the excess pressure is measured by the **Sniffer™** thereby maintaining a stable, slightly positive cavity pressure.

When the evacuated gas matches the preset value, the RSG 15/30 will shut off. The RSG will run for an additional two seconds. This time is referred to as filling lag and ensures that the fill rate is at the proper level.

The filling process begins when the gas filler is placed in a run mode. (See the "To Power Up" section.) The gas filler racks (A - upper/red) and (B - lower/blue) run on an independent basis.

Using the information in the program, the RSG establishes a base flow rate for the argon gas.

The RSG flows a precise amount of gas into the window cavity. The RSG turns on the vacuum and argon flow simultaneously. The vacuum flow rate is slightly less than the argon (gas) flow rate. As the cavity pressure slowly increases, the processor slightly lowers the argon flow, thereby reducing the cavity pressure. It then modulates between these setpoints. The amount of change is done in very small steps. You can observe the flow rate steps taking place by watching the flow meter on the front of the rack or by watching the lights on the PLC or by turning on the flow output switch.

During this time the vacuum continues to flow at a fixed flow rate.

When the evacuated gas matches the preset value, the RSG will run for an additional two seconds. This time is referred to as filling lag and ensures that the fill rate is at the proper level.

At the end of the cycle, the RSG beeps and is ready for the next cycle.

The **GREEN** start light will be on when the gas filler is running. The **RED** stop light will be on when a fault condition exists.

A "PLC display" on the control panel provides fault information as well as some setup information.

The cycle can be started by the start button or the footswitch. The footswitch function is identical to the start cycle pushbutton.

Stop buttons are also used to reset the machine. Operating problems and the reason for their occurrence are listed in Appendix 3: Trouble Shooting Guidelines.

The start button or the footswitch can also be used to stop a filling cycle. By depressing the switch a second time, the filling cycle will stop.

The cart is designed in such a manner as to hold two argon bottles securely and to keep the hoses off the floor. Care should be taken to ensure that the hoses are not pinched or damaged in any manner.

At the end of the cycle, the RSG 15/30 beeps and is ready for the next cycle. The **GREEN** start light will illuminate when the gas filler is running. Each cycle is initiated by the start button. A "PLC display" on the control panel provides set up information.

PLC display/switch setup functions

Display Switch:	Meaning:
Sensor O-Ride	Used for setup. Overrides gas sensor signal to end the filling cycle. Machine will run until stop is pressed or switch is turned off.
Pressure Sensor	Displays the analog input.
Gas Sensor	Displays the analog input.
Flow Output	Displays the digital output.
X-6 Jumper	Used in conjunction with analog 15 to set up flow rates.

TO POWER UP

WARNING A test fill should be performed into a clean, dry plastic bottle (such as an empty antifreeze bottle) when powering up the RSG 15/30. This purges the system and ensures that the machine is running properly before actually filling a window.

- 1) Plug the RSG 15/30 power cord into a 120 volt AC outlet.
(The RSG 15/30 draws 20 amps.)
- 2) A fifteen minute warm-up phase is necessary for the RSG 15/30 to be operational.
- 3) Attach the regulator to the argon tank.
- 4) Connect the gas supply hose (white, hard hose) to the pressure regulator hose.
- 5) Open the tank valve fully for maximum flow and to prevent leakage. (Tank pressure should not drop below 50 psi.)
- 6) Turn the regulator flow control counter-clockwise to 50 psi.
- 7) Connect the gas filling hose with the filling lance attached to the argon output connectors on the gas filler. Match hose color to template color.
- 8) If a faulty condition exists, correct and press both **STOP** buttons to clear the fault.
- 9) Connect filling suction and test hose (hose set) to the RSG.
CAUTION!! (Three blue hoses to one rack, and three red hoses to the other rack.)

Hose connections are snap-in couplings or push in fittings. To detach, push the coupling ring away from you. Attach the **Sniffer™** and the filling lance to hoses. (See illustration.) Ensure the filling lance and the **Sniffer™** are clear.

- 10) Attach footswitch cable to the RSG.
- 11) Press the **START** button or footswitch. Vacuum pump should start and gas should flow. Press the **STOP** button to stop filling process.

- 12) Connect the gas sensor hose with the **Sniffler™** attached to the sensor connector on the gas filler. Match hose color to template color.
- 13) Press the **START** button. Vacuum pump should start and gas should flow. Press the **STOP** button to stop filling process.

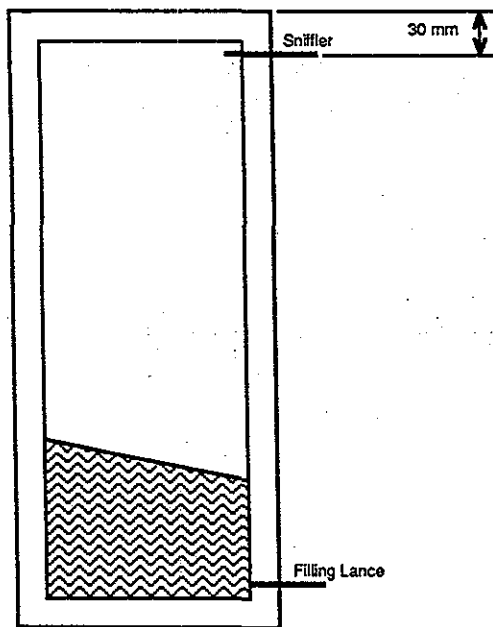
Start & stop buttons

START button (green) will light when depressed. Light will go out when filling process is complete, or if **STOP** button has been depressed.

STOP indicator (red) will not light when depressed, but will be on when machine is in a "fault" condition.

Remember to unplug the machine to remove power and shut off the argon bottle when the RSG 15/30 is not in use.

POP® RIVETS & SPACERS

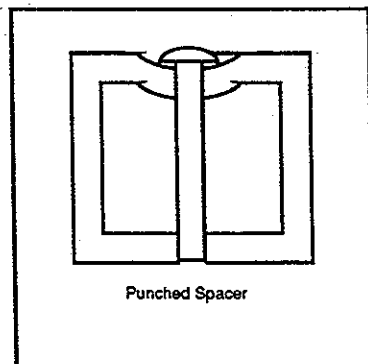


When lateral filling through one spacer leg, the spacer must have two holes, one for filling and one for venting or evacuating the gas.

The recommended hole size to accommodate FDR Design filling lances and Snifflers™ should range from 3 mm to 4 mm (.1181" to .1575"). Using a 5/32" hole with either a 1/8" or a 3.5 mm Sniffler™ and filling lance is most common.

The sizes of the rivet and hole must be matched. Typically, a 1/8" rivet will require a 1/8" hole; a 5/32" rivet will require a 5/32" hole. The 5/32" size is most common.

Both holes should be located as close to the corners as feasible. The holes should be centered and square to the spacer width to minimize the possibility of gas being deflected and possibly resulting in a poor filling degree. It is helpful to be consistent in hole location to facilitate plug location.



Holes may either be drilled with small jigs or punched with a hole punching device. If drilled, this should be done from opposing sides so the burr created remains in the center of the spacer. If punched, it should be done from the outside so the depression left by the punch is filled by the head of the pop rivet.

Inspection of the spacer after punching is important to be certain that the punch did not swell the width of the spacer creating a pressure point against the glass.

The rivet need only be long enough to engage the single layer of the outer spacer. A longer rivet is often chosen for cosmetic reasons, as the excess length allows the end of the rivet to be flush with the inner spacer wall. If longer rivets are used, be certain that the rivet does not "engage" the inner spacer wall thereby deforming it. A pneumatic rivet gun should be used since the "wobbly" motion created by squeezing the hand powered tools can create a poor seal.

If a spacer is inadvertently riveted, the rivet can usually be removed by using a needle nose pliers with a modified tip so it can grip under the head. If the rivet is drilled out, be careful not to introduce chips into the IG cavity. If it is carefully removed, a new rivet can generally be reinstalled. In these cases an improvement to the rivet such as an o-ring or extra sealant may be appropriate. If the rivet cannot be installed, the use of hot melt or some other sealing method will be necessary.

The spacer leg through which gas is filled should remain free of desiccant. If the spacer frame assembly method does not permit this, bushings have to be punched through the spacer leg or some type of blocking material must be placed in the spacer near the holes in order to prevent entry of desiccant into the cavity of the IG unit.

Narrower profile spacers (1/4" and 5/16") are difficult to punch and hence are usually drilled. Also, due to the narrow cross section, the spacer often swells when a rivet is installed. For this reason these spacers are usually sealed with hot melt or by using special corner keys and plugs.

Because the **Sniffler™** is loose fitting and the filling lance is tight fitting and acts as a plug, the top hole should always be plugged first.

After filling, the integrity of the spacer needs to be restored. This is usually done with a pop-rivet. Sealed end cup rivets provide the best seal. Cup rivets make an excellent primary seal and so far provide the neatest and fastest solution. Some manufacturers dip the rivet in PIB or add a small o-ring around the rivet, but experience shows there is not much improvement in the seal obtained.

If bent corners are used, care must be taken in handling the unit to prevent the desiccant from leaking into the window via the fill holes. Butyl or hot melt is sometimes injected into the corners to act as a block if the bending process is not sufficient to hold the desiccant in place.

In some window constructions a rivet is impractical. In this case, hot melt or butyl is injected into and around the hole. Care must be taken to be sure the material does not leak into the window cavity or prevent a good application of the final or secondary sealant.

TO FILL A WINDOW

To fill a window using a sensor filler

- 1) Insert the filling lance into the bottom hole of the window.
(The most common size hole is 5/32" (4 mm) filled with a 5/32" or 4 mm pop rivet.)
- 2) Insert the **Sniffler™** into the top hole of the window.
- 3) Depress the **START** button. Start indicator will light and filling process will begin.
- 4) Filling process is complete when the light turns off and the horn sounds.
- 5) 1 beep means the RED LINE is done.
2 beeps mean the BLUE LINE is done.
If more than one line is finished, you will hear multiple beeps.

EXAMPLE: If the red and blue lines finish at the same time, you would then hear: BEEP – pause – BEEP/BEEP – pause – BEEP – pause – BEEP/BEEP – pause. (Horn beeps for about 6 seconds.)

- 6) Remove the **Sniffler™** and close the top hole first. Proceed to remove the filling lance and close the bottom hole. (Holes are closed by pop rivets, hot melt, or metallic tape.) Seal the unit with edge seal (i.e., polysulfide, polyurethane, hot melt, silicone, etc.)

SET UP PROCEDURES

Setting the gas sensor

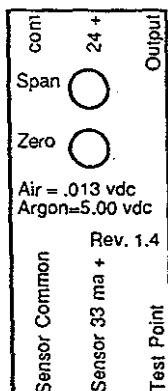


Diagram represents the gas sensor amplifier.

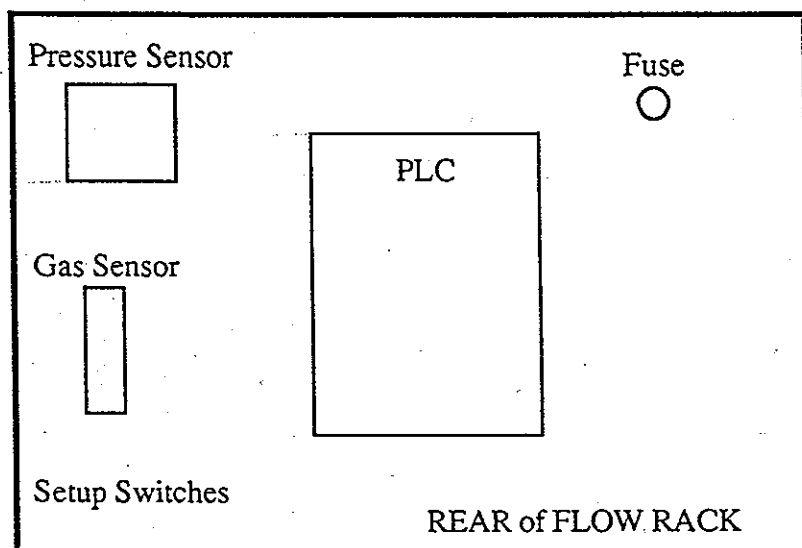
✖WARNING✖ High voltage (120 vac) is present within the enclosure. A shock hazard may exist. Equipment should be serviced by a qualified technician.

In order to set the gas sensor, the RSG 15/30 should be fully functional, meaning the argon bottle and regulator is connected, the electricity connected, and the hoses installed.

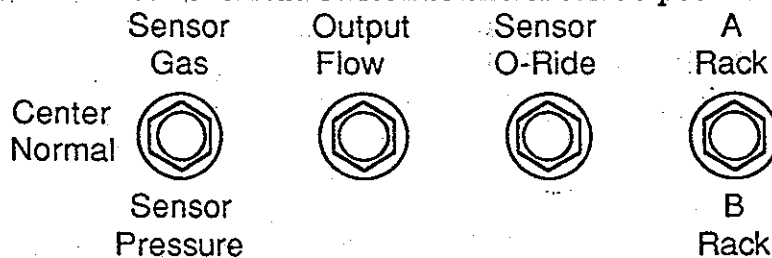
NOTE: It takes about 15 minutes for the gas sensor to reach operating temperature when the RSG 15/30 is first plugged in. The reason for this is that the gas sensor temperature block must reach 130° F.

The procedure for the set up of the gas sensor is as follows:

- 1) Turn latches on rear cover of enclosure (2).
Rear cover can now be removed. (Or open door if machine has the optional cart and enclosure.)
- 2) Locate the green gas sensor amplifier inside the enclosure. The gas sensor box has two multiple-turn potentiometers mounted on the face (pointing back towards cover).



- 3) Zero potentiometer is calibrated to read air (.013 mV).
- 4) Span potentiometer is calibrated to read 100% argon (5.00 vdc).
- 5) Set sensor override switch to the override position



- 6) The PLC will display the analog input.
 0000 = 0 VDC
 1020 = 5 VDC
- 7) Air/Zero Calibration
 - a) Set up a DC volt meter scale to read mV for zero (air) setting.
 - b) Connect the red lead of DC volt meter to terminal screw marked "test point" on the gas sensor amplifier.

- c) Connect the black lead of DC volt meter to terminal screw marked "common" on the gas sensor amplifier (white wire).
- d) Press the **START** button to start the machine running. The **Sniffler™** should be hanging free in the air so it is drawing in just air, not argon.
- e) Use the zero potentiometer on gas sensor amplifier to adjust DC volt meter to a reading of .013 v d c (13 mV).

8) Argon/Span Calibration

- a) Install the **Sniffler™** and filling lance in a small IG and wait until you are confident that the window is 100% full of argon. This will occur in approximately 1 minute on a small IG.
 - b) Set up a DC volt meter scale to read 5.00 VDC for span (argon) setting. Connect the red lead of DC volt meter to the terminal screw marked "output" on the gas sensor amplifier.
 - c) The black lead of DC volt meter stays connected to the terminal screw marked "common" on the gas sensor amplifier (white wire).
 - d) With the machine still running use the span potentiometer on the gas sensor amplifier to adjust the DC volt meter to a reading of 5.000 vdc. (100% argon.)
- 9) Periodically check gas sensor calibration every 3 to 4 weeks or if you notice unusually long fill times or final fill percentages of less than 90%.
- 10) If the gas sensor element is damaged or destroyed the output of the amplifier will stay at 100% (5 vdc).

- 11) The panel meter is basically a 0 to 5 vdc voltmeter. If a test meter is not available a quick calibration can be done using just the panel meter. In this case you will not be able to accurately set the zero reading so set only the span (100% argon) setting.
- 12) If compensation block is "cold" or the heater is not functional, the reading will be low (80%) and the machine may not shut off or may take an unusually long time to reach a fill percentage of 95%.

The computer shuts down the filling process when the gas sensor output reading is 4.55 vdc (93% argon).

This is the setting that will determine when to shut off the gas flow. By being set at 4.55 vdc, the filling machine will shut off when the exhaust gas concentration at the Sniffer™ reaches approximately 93% argon. This setting will yield a final overall window fill percentage of 95%.

In most cases, if the exhaust is 4.55 (93% argon), you will end up with an overall final window fill concentration of 95%.

There are a few window configurations that are problematic, specifically if the IG is short and wide, and if it has a wide air space.

A method to increase the final fill percentage is to calibrate the gas sensor board to a lower setting. This will move the shutoff point closer to 100%.

The following is a chart showing the effect of various sensor calibration settings and the degree of fill percentage the exhaust gas must achieve before the computer will stop the filling process.

Gas Sensor Reading: Fill Percentage:

5.00 vdc	93.00 %
4.90 vdc	94.40 %
4.80 vdc	95.80 %
4.70 vdc	97.20 %
4.60 vdc	98.60 %
4.50 vdc	100.00 %

There is nothing cast in stone about the 5.00 vdc gas sensor calibration setting. Set it where the best results are achieved.

The probability of a problem occurring due to a damaged filling lance or a gas sensor out of calibration is more likely than a problem due to the shutoff point setting.

Setting pressure & vacuum flow rates

- 1) Connect the setup test hose and the flow meter.
- 2) Insert the filling lance in the flow meter.
- 3) Press the **START** button.

Monitor the flow reading at the PLC display. Wait until the flow is at step 255. Set the flow to the following, depending on the machine's **Sniffler™** configuration.

RSG 15:	Flow rate:	Part number:
3 mm Sniffler	??	
3.2 mm Sniffler		
3.5 mm Sniffler		
4.0 mm Sniffler	??	

RSG 30:	Flow rate:	Part number:
3 mm Sniffler	??	
3.2 mm Sniffler	??	
3.5 mm Sniffler	??	
4.0 mm Sniffler	??	

RSG 15:	Flow rate:	Part number:
3 mm Filling lance	??	
3.2 mm Filling lance	??	
3.5 mm Filling lance	??	
4.0 mm Filling lance	??	

RSG 30:	Flow rate:	Part number:
3 mm Filling lance	??	
3.2 mm Filling lance	??	
3.5 mm Filling lance	??	
4.0 mm Filling lance	??	

- 4) Set the needle valve to setting per chart above. Needle valve is located near argon flow meter behind front face plate.

- 5) After adjusting the valve, tighten the lock nut.
- 6) Press the **STOP** button.
- 7) Insert special test **Sniffler™** on hose – insert in flow meter.
- 8) Press the **START** button.
- 9) Vacuum should read per chart.

RSG 15:	Flow rate:	Part number:
3 mm Sniffler	??	
3.2 mm Sniffler	??	
3.5 mm Sniffler	?	
4.0 mm Sniffler	??	

RSG 30:	Flow rate:	Part number:
3 mm Sniffler	??	
3.2 mm Sniffler	??	
3.5 mm Sniffler	??	
4.0 mm Sniffler	??	

If the readings do not agree, check the setting of the vacuum regulator on the vacuum rack. The gauge should read 10" Hg.

- 10) To adjust, turn nut on vacuum regulator valve. The vacuum regulator valve is located on vacuum pump.
- 11)
- 12) Press the **STOP** button.
- 13) Disconnect the test gear.

NOTE: Contact FDR DESIGN, INC. for information on approved flow meters to use for calibrating the machine. It should not be necessary to use this procedure in the field since the machine is set at the factory.

WARNING Failure to follow this procedure or setting the machine to a non-authorized flow rate could result in part wear, poor operation of machinery and over-pressurization of the IG cavity causing permanent damage to the IG and/or injury to personnel.

PREVENTIVE MAINTENANCE

The filling lances and the Sniffer™ should be periodically checked to ensure that they are not bent, damaged or plugged.

REMINDER: THESE ARE DELICATE LABORATORY INSTRUMENTS AND SHOULD BE HANDLED WITH CARE.

The condition of the hoses should be regularly examined for signs of kinks or holes. Care should be taken to avoid stepping on hoses or rolling equipment over them. Make certain the gas flow is not restricted during the filling process.

Maintenance procedures

✖WARNING✖ Failure to follow these procedures could result in part wear, thus causing poor operation of machinery and eventually causing permanent damage to machine and/or injury to personnel.

ITEM	INSPECTION	FREQUENCY
Filling lance	bent/damaged/plugged	per shift
Sniffer™	bent/damaged/plugged	per shift
Hoses	kinks/pinched/general integrity/make sure flow is unrestricted	per shift
Pump Fins	test vacuum capacity of pump & replace fins if vacuum drops below 10 Hg with both lines on	once per year
Filters	(2) main pump	once per year

TROUBLE SHOOTING GUIDELINES

PROBLEM	POSSIBLE CAUSES	SOLUTION
Gas filler won't shut off	Sensor out of calibration	Calibrate per procedure
Filling % erratic	Temperature compensation block	Test to see if thermostat is holding temperature at 129°F
Meter reads 100% always, machine short cycles	Defective gas sensor	Replace & calibrate
Window takes a long time to fill	Damaged filling lances, turbulent flow	Repair or replace
Window bulges	Plugged Sniffler™ Defective vacuum pump	Clean Repair or replace

SPARE PARTS & REPLACEMENTS

When ordering spare parts from FDR DESIGN, INC. please provide the part number, description, your purchase order number and your shipping preference.

If a motor is required, be sure to state its horsepower, speed, voltage, phase, and cycle. Take this information from the old motor data plate to ensure the delivery of the correct replacement.

NOTE: For quick reference when ordering replacement parts, record the following identifying information for your unit below.

Name of equipment: RSG 15/30 - Argon Gas Filler

Model number: _____

Serial number: _____

Date received: _____

Sub-manufacturer's instructions for ordering parts

Locate the needed parts on the drawings or at the back of the manual.

Send a purchase order listing the parts by PART NAME and PART NUMBER as determined from the drawings and parts list. If the needed part does not appear on the drawings, describe it in full and include the following information:

- Length
- Width
- Bore
- Diameter (inside and outside)
- Voltage

If possible, state model and serial numbers, voltage characteristics, and any other available information.

When placing orders by fax or phone, include a purchase order number, shipping address, and billing address.

ARGON REGULATOR

The following instructions are intended specifically for operators who know the general principles of operation and safety practices to be followed in operating this type of equipment. This information was provided by the regulator manufacturer. Therefore, FDR DESIGN, INC. makes no assurance regarding its accuracy or applicability.

If you are not sure you understand these principles fully, we urge you to read the booklet "Precautions and Safe Practices for Electric Welding" published by L-TEC Welding & Cutting Systems, P.O. Box F-6000, Florence, SC 29501, in addition to these instructions, or contact your argon supplier.

CAUTION!! Do NOT permit untrained persons to install, operate, or maintain this equipment. Do NOT attempt to install or operate this equipment until you have read and fully understand these instructions. If you do not fully understand these instructions, contact your supplier for further information.

NOTE: The regulator covered by these instructions has been approved by Underwriter's Laboratories only when using parts manufactured by L-TEC Welding & Cutting Systems to the exact specifications on file with Underwriter's Laboratories, Inc., and when used in the gas service for which it is designed and listed. The use of other parts voids the Underwriter's Laboratories Listing and the manufacturer's warranty.

Specifications

Gas Service	Cylinder Argon
Inlet Connection	CGA-580
Outlet Connection	CGA-032*
Flow Range (Argon)	10 to 40 cfh (5-19 L/min)
Gauges (2 in. diam.):	
Cylinder Pressure	4000 psig (27600 kPa)
Delivery Flow**	10 to 40 cfh (5-19 L/min)
Overall Length	5 in. (127 mm)
Body Diameter	2 1/4 in. (57 mm)
Weight	3 lbs. (1.4 kg)

* Formally "B"-size Inert Gas (5/8" - 18 RH female)

** Gauge calibrated in cfh with flow through metering spud installed in outlet connection.

Accessory

Gauge Guard, P/N 999901: Impact-resistant, plastic guard clamps to cap and cover gauges, and protect them for any abuse. Tough. Yellow in color.

Repair service

Regulators in need of repair should be returned to your L-TEC Welding Equipment distributor or to L-TEC Re-manufacturing Center, P.O. Box F-6000, Florence, SC 29501.

If you have your own properly equipped and staffed repair facility, repair parts information for this regulator (Form F-12-752) is available on request.

To connect

- 1) Open the cylinder valve slightly for an instant and then close it. This is known as "cracking" the valve. This blows away any dirt or dust which may have accumulated in the valve outlet.

WARNING Be sure to keep your face away from the valve outlet to protect your eyes.
- 2) Make sure the regulator flow-adjusting screw is released by turning it to the left (counter-clockwise) until it turns freely.
- 3) Attach the regulator to the cylinder valve and tighten the union nut securely with a wrench.
- 4) Open the cylinder valve slowly a fraction of a turn. When the cylinder pressure gauge pointer stops moving, open the valve fully. **Never stand directly in front of or behind the regulator when opening the cylinder valve. Always stand to one side.**
- 5) Attach the torch hose to the regulator outlet ("B"-size inert gas female connection) and tighten the connection snugly with a wrench. (A shutoff valve, such as the OX-WELD V-30 Argon-Water Shutoff Valve, P/N 16X21, may be connected between the regulator and torch if desired.)

NOTE: If the regulator is to be out of use for more than a day, turn in the flow-adjusting screw enough to move the valve stem off the seat. When the regulator is returned to service, be sure to back out the flow-adjusting screw completely before admitting cylinder pressure to the regulator.

To stop flow

If work is to be stopped for a half-hour or more, or the regulator is to be removed from the cylinder, shut down the regulator as follows:

- 1) Close the cylinder valve.
- 2) Release gas from the regulator by opening all valves downstream.
- 3) Allow flow gauge to read zero, then turn the flow-adjusting screw counterclockwise until it turns freely.

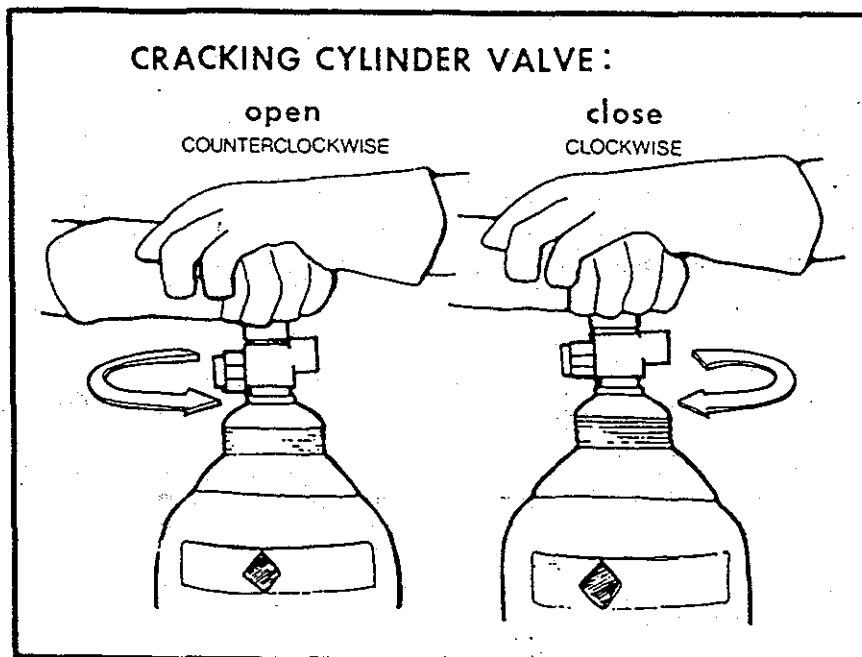
Inlet filter maintenance

Each regulator is equipped with a porous metal inlet filter, P/N 71Z33, pressed into the regulator inlet nipple. No regulator should be connected to a cylinder or station valve unless it contains this filter. You can replace the filter if you have reason to do so. To remove a filter, insert a No. 1 'EZY-OUT' or a No. 6 wood screw (about 2-in. long) into the filter and pull it out. Press the new filter into the nipple with a 1/4-in. round metal rod.

Connecting & adjusting shielding gas supply

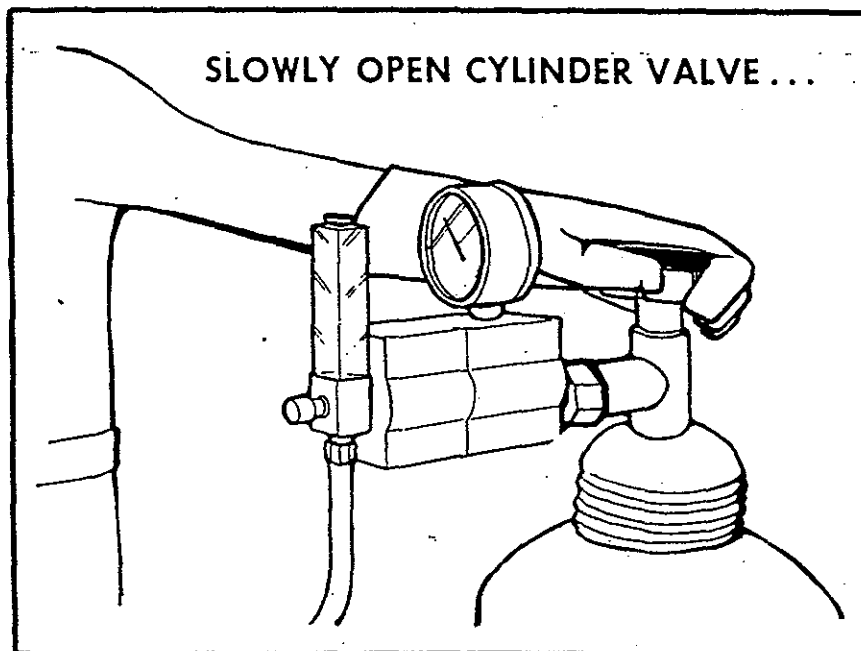
Here is a list of steps and important points to check when hooking up cylinders. These steps are intended to help prevent possible injury or death to you and your fellow workers as well as prevent possible equipment and property damage.

- 1) **Fasten the cylinders to be used in an upright position.** If cylinders are not on a suitable cylinder cart, they should be securely chained or strapped to a workbench, wall, or post so that they cannot be accidentally knocked or pulled over.
- 2) **"Crack" the cylinder valve.** Stand at one side or rear of the cylinder outlet. Open the cylinder valve slightly for an instant, and then close it. This will clean the valve of dust or dirt which may have accumulated during storage. Dirt can damage critical parts of a regulator.



- 3) **Always attach a regulator to the gas supply (and a flow meter when required).** When a single cylinder is used, a pressure-reducing regulator must be connected at the cylinder valve. Normally in electric welding and cutting, a combination regulator/flow meter is used. Make certain that the regulator is proper for the particular gas, service pressure, and flow requirements. If the shielding gas is supplied at the proper working pressure through a piping system that is regulated from a large storage unit or bank of manifold cylinders, a flow meter may be connected at the work station.
- 4) **Do not use adapters unless you follow the instructions of a manufacturer.** The various Compressed Gas Association (CGA) designated connections are designed for your protection. Refer to CGA pamphlet V-1.
- 5) **Never force connections that do not fit properly.** This can strip the threads on fittings and result in leaky connections. To prevent leakage, be sure the regulator nut is pulled up wrench-tight, not merely hand-tight. Do not tighten the connections excessively.
- 6) **Do not use lubricants or pipe fitting compound for making connections.** Connections in apparatus are designed so that they can be made up clean and leak tight. Oil or grease in lubricants and compounds tends to gum up regulating equipment torches.

- 7) **IMPORTANT: Make sure the regulator pressure-adjusting screw is released by rotating it counterclockwise until it turns freely.** This closes the regulator valve and prevents a sudden surge of pressure from possibly damaging components in the system. If the regulator is equipped with a flow meter, be certain the flow control valve is closed by turning the knob all the way in (clockwise).
- 8) **IMPORTANT: Stand to one side of the regulator or regulator/flow meter away from gauge face. SLOWLY open the cylinder valve.** NEVER open a cylinder valve suddenly. Sudden surge of high pressure gas can weaken or damage critical components in the regulator.
- 9) **Check all connections and joints for leaks.** After making all connections, close torch or downstream valve and then turn in the regulator pressure-adjusting screw to the desired operating pressure (or just open the flow meter valve). Using a suitable leak test solution, check every connection and joint from cylinder to torch for leaks. Correct any leakage before starting operations.
- 10) **Never tighten a leaky connection between a regulator and cylinder when under pressure.** Close the cylinder valve; allow the trapped gas to leak out; and then tighten the connection.



11) **Use correct pressure and gas flow.** Always be sure you are using the correct gas pressure. Refer to the manufacturer's instructions for the torch or apparatus being used. If operating properly, the regulator maintains pressure as set. The required flow rate will, of course, vary according to the type of job. Once set at the desired rate, a flow meter will give an accurate measurement of flow at all times.

12) **As soon as you have finished working, or if you are going to disconnect the regulator or regulator/flow meter combination, do the following:**

- a. Close the cylinder valve.
- b. Open the flow meter and torch valves to release all pressure from the hose and regulator.
- c. When the gauge pressure drops to zero, close the flow meter valve.

This will prevent the occurrence of an accident caused by someone removing the regulator with the cylinder valve open. Double check by observing the inlet gauge.

GLOSSARY

Argon

Chemical formula: Ar. Colorless, odorless, nonflammable, non-reactive, inert gas which is compressed to high pressures. Acts as a simple asphyxiant by displacing air. Major hazards: High pressure and suffocation. Most often used for gas filling due to low cost and ready availability. Argon performs well as an insulator and is chemically inert to UV radiation, heat, glass coatings, and spacers. Argon has a low diffusion rate, a significant property since it is imperative the gas not diffuse through sealing materials. (A 75 to 80 percent gas retention rate over the life of the IG is minimal for satisfactory performance.)

Carbon Dioxide

Chemical formula: CO₂. Colorless, odorless, nonflammable, liquefied high pressure gas which is slightly acidic and is shipped at its vapor pressure of 820 psi. Major hazards: High pressure and suffocation.

cfh

Abbreviation for "cubic feet per hour."

°F

Degrees Fahrenheit.

Hz

Abbreviation for "cycles per second."

IGU

Abbreviation for "insulated glass unit." Also IG for "insulated glass."

kPa

A measure of pressure meaning "kilo-Pascals."

Krypton

Chemical formula: Kr. Colorless, odorless, nonflammable, nonreactive, inert gas which is compressed to high pressures. It acts as a simple asphyxiant by displacing air. Major hazards: High pressure and suffocation.

lpm

Abbreviation for "liters per minute."

mm

Abbreviation meaning "millimeters."

mV

Abbreviation meaning "millivolts."

OSHA

Occupational Safety and Health Act

PIB

Abbreviation for polyisobutylene.

psi

Abbreviation for "pounds per square inch."

RSG

Abbreviation for "Rapid Single Gas."

SU

Abbreviation for "sealed unit."

Sulphur Hexafluoride

Chemical formula: SF₆. Colorless, odorless, nonflammable, liquefied high pressure gas which is slightly acidic and is shipped at its vapor pressure of 310 psi. Major hazards: High pressure and suffocation. Exposure limit of 1000 ppm. SF₆ improves an IGU's sound deadening characteristics; SF₆ accounts for a 2 to 3 decibels increase in sound reduction.

vac

Abbreviation for "volts alternating current."

vdc

Abbreviation for "volts direct current." Also DC for "direct current."



We welcome your comments and inquiries concerning gas filling. You may call or write us at:

FDR Design, Inc.
303 12th Avenue South
Buffalo, MN 55313

Ph: (612) 682-6096
Fx: (612) 682-6197

RSGz-90 Parts List copy
of RSG30

FDR RSGz-90 Assembly			
VAC RACK			
ITEM #	QTY	PART #	DESCRIPTION
1	1	10194	Face Plate
2	1	10460	Legend - SUCTION RACK
3	1	10461	Legend - FDR
4	1	10546	Vac Rail - Left
5	1	10547	Vac Rail - Right
6	1	10785	Legend - FDR (Enclosure)
7	2	10834	1/4" Support Rod
8	1	11019	3/8 Female Coupling
9	1	11033	3/8 x 2" NPT Nipple
10	2	11036	3/8 Elbow
11	3	11054	Nylon Plug 1/2 NPT
12	1	11055	1/2 x 3/8 Male Connector
13	4	11108	9 Pin Square Flange Receptacle
14	1	11114	Black Plastic Fan Guard
15	1	11115	115 VAC Mini Fan
16	2	11119	Cord Grip
17	2	11127	Fuse Holder
18	1	11136	30" Hg Steel Vacuum Gauge
19	1	11138	Vacuum Relief
20	4	11177	Vacuum Pump Vibration Mount
21	1	11195	Solid State Relay 25 Amp
22	1	11218	3/4 Hp Vacuum Pump
23	1	11340	Type 15 NS Mini-Rail - 5 Slot
24	1	11342	19" Rack Mount Case 12 Space
25	2	11343	Lock Nut
26	10	11360	Mini Terminal Block
27	2	11361	Mini Terminal End Bracket
28	1	11362	Mini Terminal End Cover

RSGz-90 Parts List copy

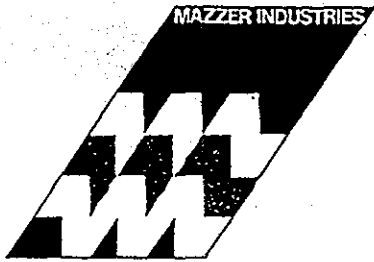
29	3	11363	Mini Terminal Jumper - 2 Pole
30	1	11433	Vacuum Connector Plate
			FLOW RACK
31	1	10054	Faceplate
32	2	10162	Side Plate
33	1	10163	Back Plate
34	4	10188	Standoff
35	1	10198	Gas Sensor Board
36	1	10199	Gas Sensor Element
37	1	10246	Base Plate
38	1	10254	Sensor Heater Block
39	1	10453	Legend - Power
40	1	10454	Legend - Small IG
41	1	10461	Legend - FDR
42	1	10530	Legend - RSGz
43	2	10571	10-32 Barbed Fitting
44	1	10630	Legend - FDR Sniffler Logo
45	1	10638	PPC Orifice Fitting
46	1	10650	Legend - 5 Hole - Red
47	1	10663	Legend - 3 Hole - Red
48	1	10770	Legend - Sensor
49	1	10771	Legend - Pressure
50	1	10802	1/4" x 1/8-27 Nylon Barbed Fitting
51	1	10814	1/8-27 x 1/8-27 Nylon Elbow
52	1	11006	5/21 x 1/8 Plastic Male Connector
53	5	11007	1/4 x 1/8 Male Connector
54	1	11008	1/4 x 1/4 Male Connector
55	7	11010	3/8 x 3/8 Male Connector

RSGz-90 Parts List copy

56	1	11015	3/8 Tee
57	2	11013	1/8 Female Tee
58	1	11023	3/8 x 1/8 Bushing
59	2	11025	1/2 x 1/8 Bushing
60	1	11027	1/2 x 3/8 Bushing
61	3	11029	1/8 Nipple Close
62	1	11034	1/8 Street Elbow
63	1	11036	3/8 Street Elbow
64	2	11042	3/8 Tee Run
65	1	11051	Heater Block Clamp
66	1	11055	1/2 x 3/8 Male Connector
67	1	11060	1/4 x 1/8 Adaptor
68	1	11064	1/2 Stem Ell Adaptor
69	2	11099	1/8 NPT Muffler
70	1	11100	Sonalert Type Buzzer
71	1	11106	14 Pin Square Flange Receptacle
72	1	11108	9 Pin Square Flange Receptacle
73	1	11127	Fuse Holder
74	1	11133	3/8 NPT Series 55 Valve
75	1	11141	Series 55 Valve
76	1	11145	Proportional Pressure Control Valve
77	1	11146	Type J Thermal Couple
78	1	11147	Gas Sensor Heater 1.25" X .25" 70W 120V
79	1	11151	Adjustable Vacuum Switch
80	1	11152	Adjustable Pressure Switch
81	1	11154	Flowmeter 10-100 Liter/Minute
82	1	11155	Power Supply 24Vdc 1.2 Amp
83	1	11157	SCX Evaluation Board
84	1	11171	1/4 NPT Needle Valve
85	2	11173	SPDT On - Off - On Toggle Switch
86	2	11174	SPDT On - Off Toggle Switch

RSGz-90 Parts List copy

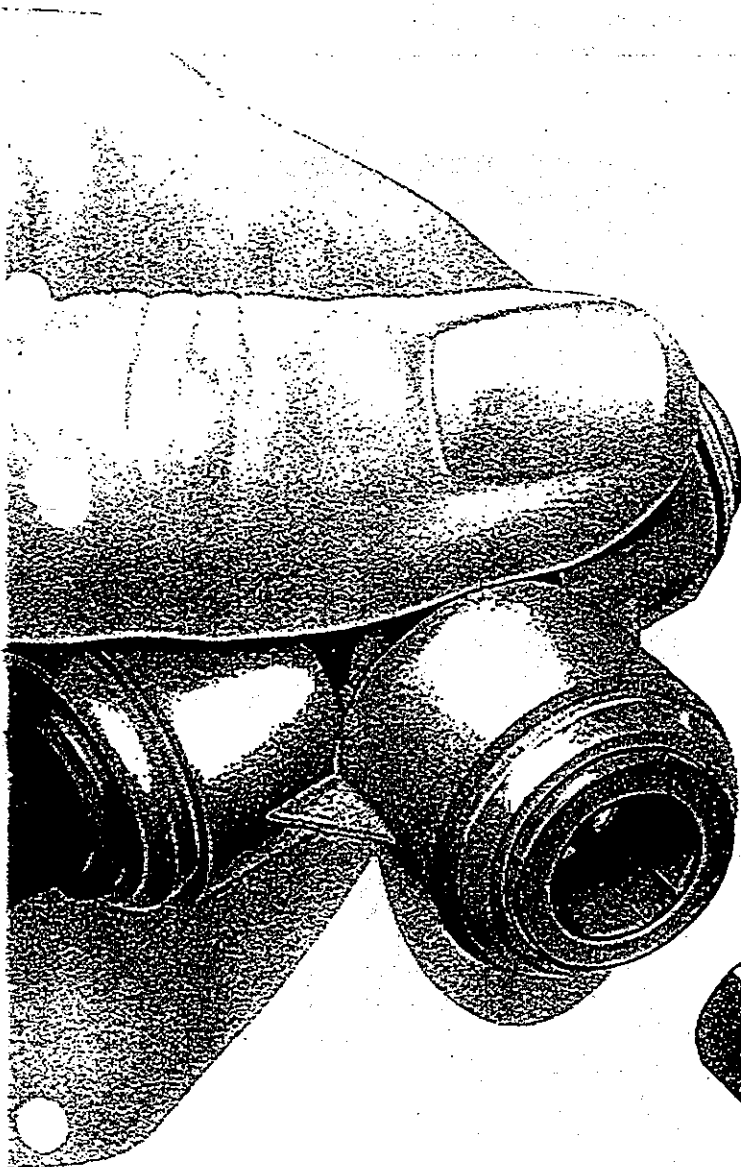
87	1	11178	Remote Regulator 1/2 NPT Ports
88	1	11179	3 Pin InLine Male Chassis Socket Connector
89	1	11184	8 Pin Octal Type Relay Socket
90	1	11196	Control Transformer 120VAC/16VAC
91	1	11208	35 Series Valve 24VDC
92	5	11241	Front Adaptor
93	5	11242	Contact Element
94	5	11243	Lamp Holder Front Mount
95	3	11244	Maintained Pushbutton Actuary Green
96	1	11245	Momentary Pushbutton Actuator Green
97	4	11246	Led Bulb Green
98	1	11250	Momentary Pushbutton Actuator Red
99	1	11291	PLC 24VDC Input/Output 0-10 VDC Out
100	2	11332	Insulation Grommet
101	1	11334	Panel Mount Hose Connector Series 21
102	1	11335	Panel Mount Hose Connector Series 20
103	1	11338	DIN Rail 1.25"
104	2	11340	Type 15 NS Mini Rail - 5 Slot & 3 Slot
105	16	11360	Mini Terminal Block
106	4	11361	End Bracket
107	4	11362	End Cover
108	6	11363	Jumper 2 Pole
109	2	11366	FDR Panel Meter 0-5Vdc Dial 0-100
110	1	11402	3/8 Conduit Locknut
111	1	11438	Sonalert Buzzer Volume Control
112	1	11474	Temperature Controller



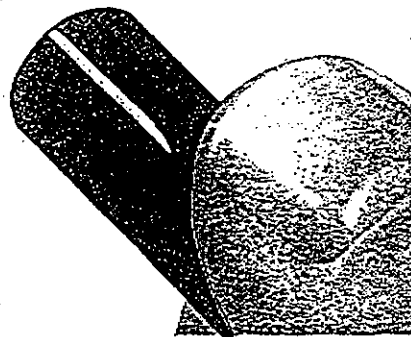
MAZZER-LOC™ JG SPEED FITTINGS

The New Generation Push-in Fittings

MAZZER-LOC™ JG Speed Fittings are made from the highest quality, chemical resistant materials. They are designed to work with most types of thermoplastic tubing without the necessity of tube supports. The patented collet with its sure gripping sharp stainless steel inserts securely holds even soft polyurethane tubing. This system is so efficient that metal tubing can be used with all the advantages of speed fittings.



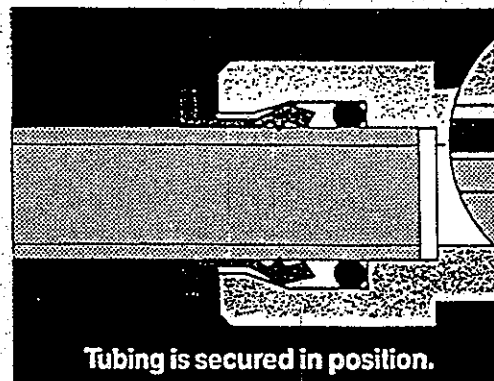
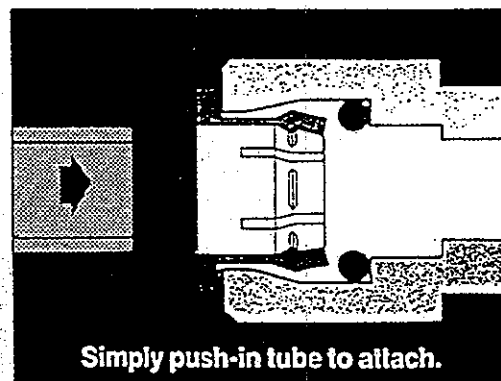
◀ MAZZER-LOC™ JG SPEED FITTINGS
TODAY'S STANDARD FOR
PLASTIC TUBE FITTINGS



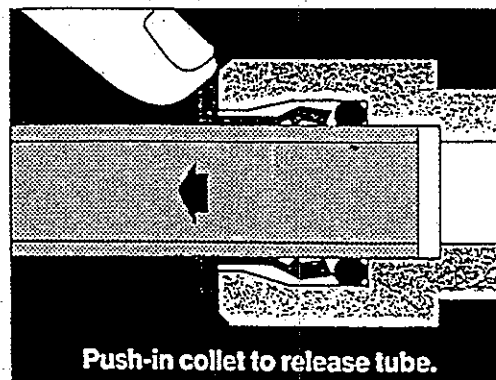


MAZZER-LOC™ JG Speed Fittings

- The quick, simple and secure way to connect plastic and other tubing.
- Easily hand inserted—no tools required
- Easy to handle
- Ideal for compressed air and carbonated liquids.
- Can be re-used many times.
- Collet cover prevents accidental removal of tubing and allows color-coding.
- FDA approved materials
- NSF listed products (NSF 51)



Note: Inserted stainless steel teeth insure tube holding efficiency.

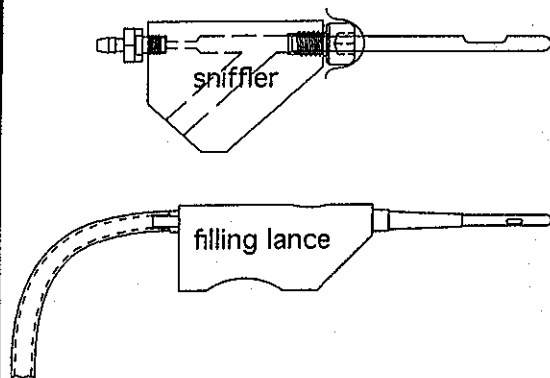


Gas Sensor Air Setting

Note: This calibration procedure is for 2 hole filling.

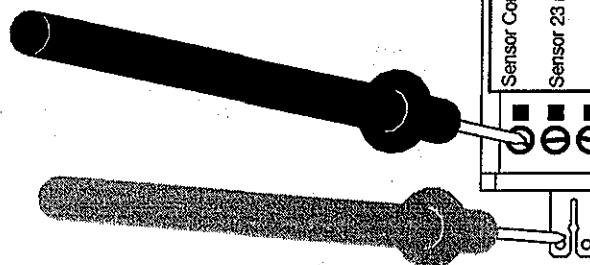
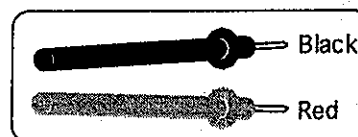
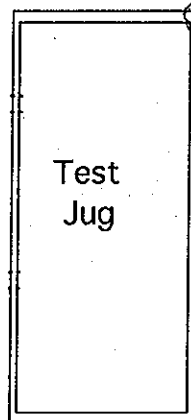
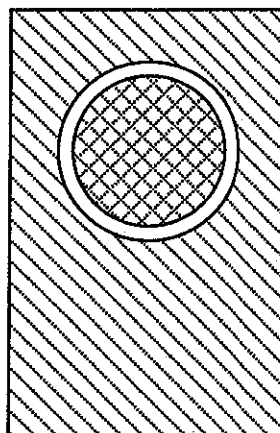
Step 1

Sniffer & filling lance in free air, not in test can.



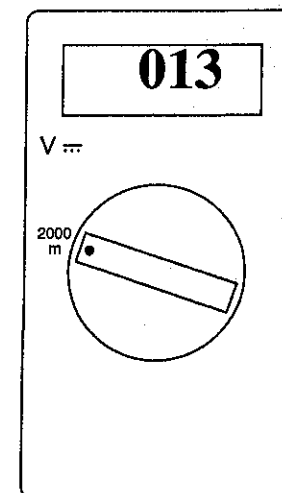
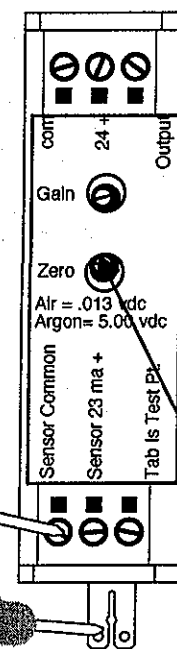
Step 2

Press and hold cycle start button (or flip Sensor O-ride to "up" or "on" position, turn off after calibration)

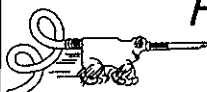


Gas Filler Air or Zero Calibration

Step 3



With lances hanging free in the air set "zero" pot between 13-20mv (0.013-0.020 vdc)



FDR DESIGN, INC.

303 12th Ave South
Buffalo, MN 55313
(763) 682-6096 Fax (763) 682-6197

Sensor Calibration
100% Argon

Created:

3/2/96

KDW

Last Modified:

9/15/05

NJR

Scale:

na

Sheet 1b

Drawing Number:

10602-B

Gas Sensor Argon Setting

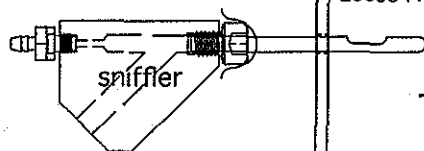
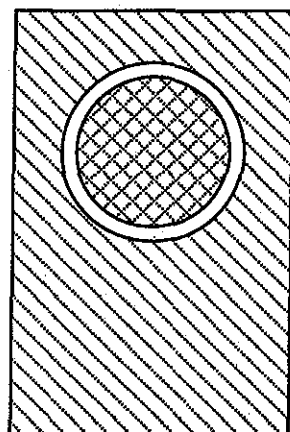
Step 2

Press and hold cycle start button
(or flip Sensor O-ride "up" or to the "on" position,
turn off after calibration is complete)

Note: This calibration
procedure is for 2 hole filling

Step 1

Insert all lances in
test can, (if using
2 sniffers insert
both of them)

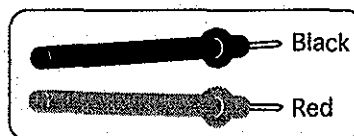


Loose Fit

Test Jug

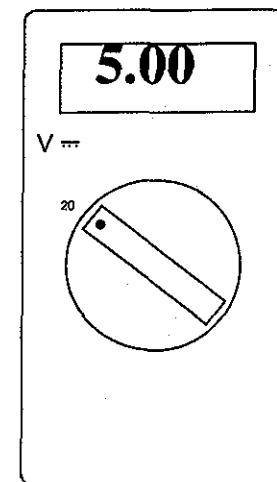
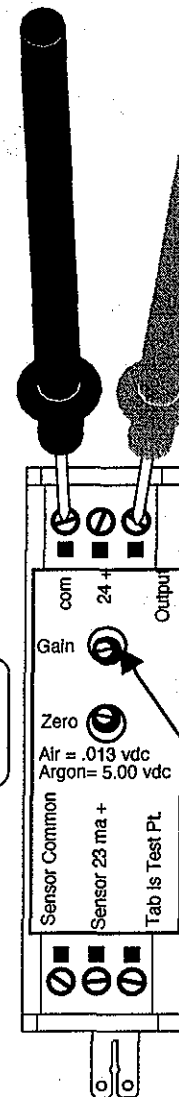
Tight Fit

filling lance

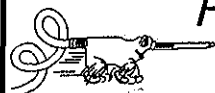


Gas Filler Argon or Gain Calibration

Step 3



With lance in the test can
adjust gain to 5.00 volts dc

**FDR DESIGN, INC.**

303 12th Ave South
Buffalo, MN 55313
(763) 682-6096 Fax (763) 682-6197

Sensor Calibration
100% Argon

Created:

3/2/96

KDW

Last Modified:

9/15/05

NJR

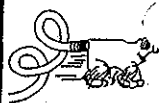
Scale:

na

Sheet 2b

Drawing Number:

10602-B



FDR DESIGN, INC.
303 12th Ave South
Buffalo, MN 55313
(763) 682-6096 Fax (763) 682-6197

SensorTechnics
Pressure Board

Created:

8/30/07

DJH

Last Modified:

Scale:

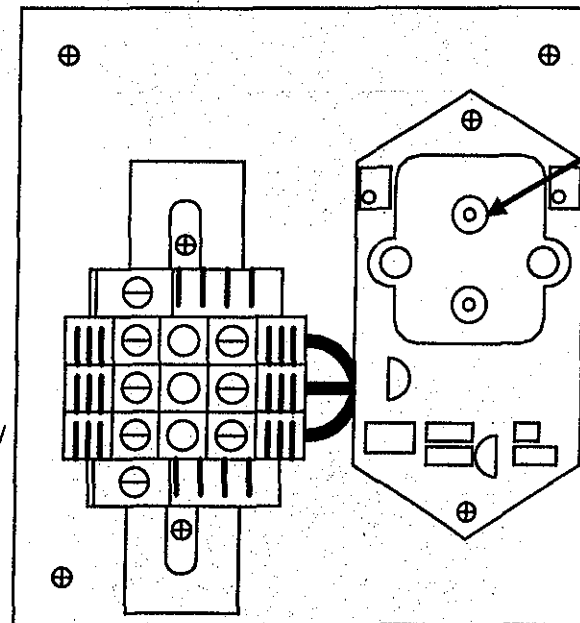
1:1

Sheet 1 of 1
Drawing Number:

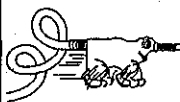
11794-A

****Calibration not required****

Red (+24v)
White (com)
Blue / Yellow
(output)



Pressure hose



FDR DESIGN, INC.
303 12th Ave South
Buffalo, MN 55313
(763) 682-6096 Fax (763) 682-6197

SensorTechnics
Pressure Board

Created:

8/30/07

DJH

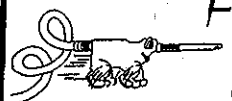
Last Modified:

Scale:

1:1

Sheet 1 of 1
Drawing Number:

11794-A



FDR DESIGN, INC.

303 12th Ave South
Buffalo, MN 55313
(763) 682-6096 Fax (763) 682-6197

**SenSym
Pressure Board Calibration**

Created:

8/30/07

DJH

Scale:

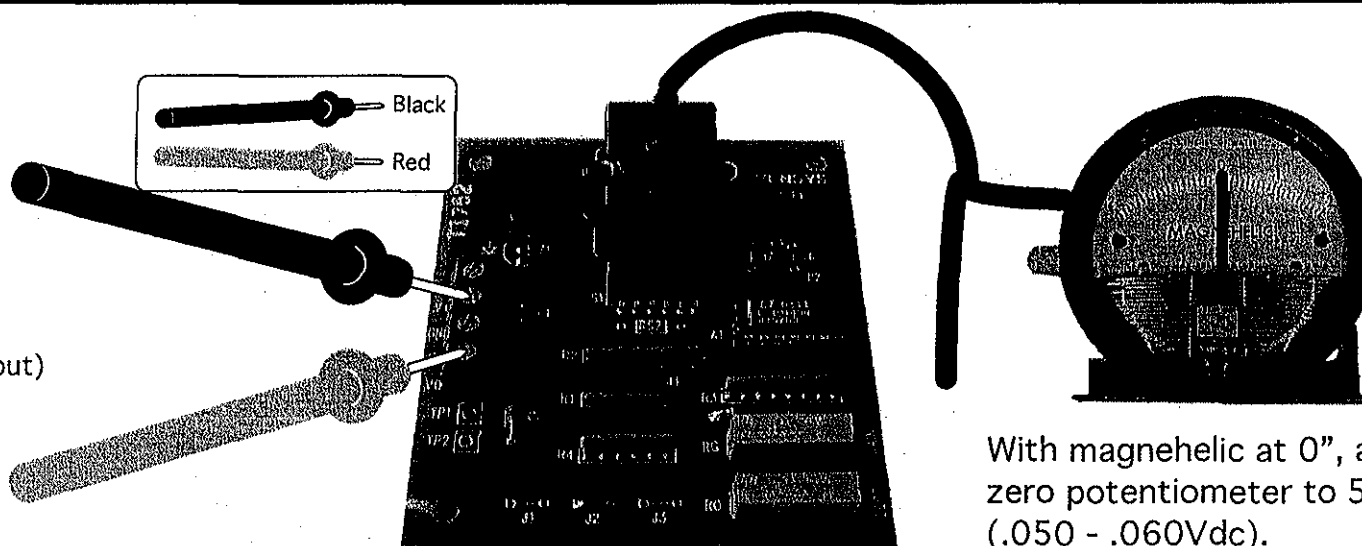
N/A

Sheet 1 of 1
Drawing Number:

Last Modified:

Step 1

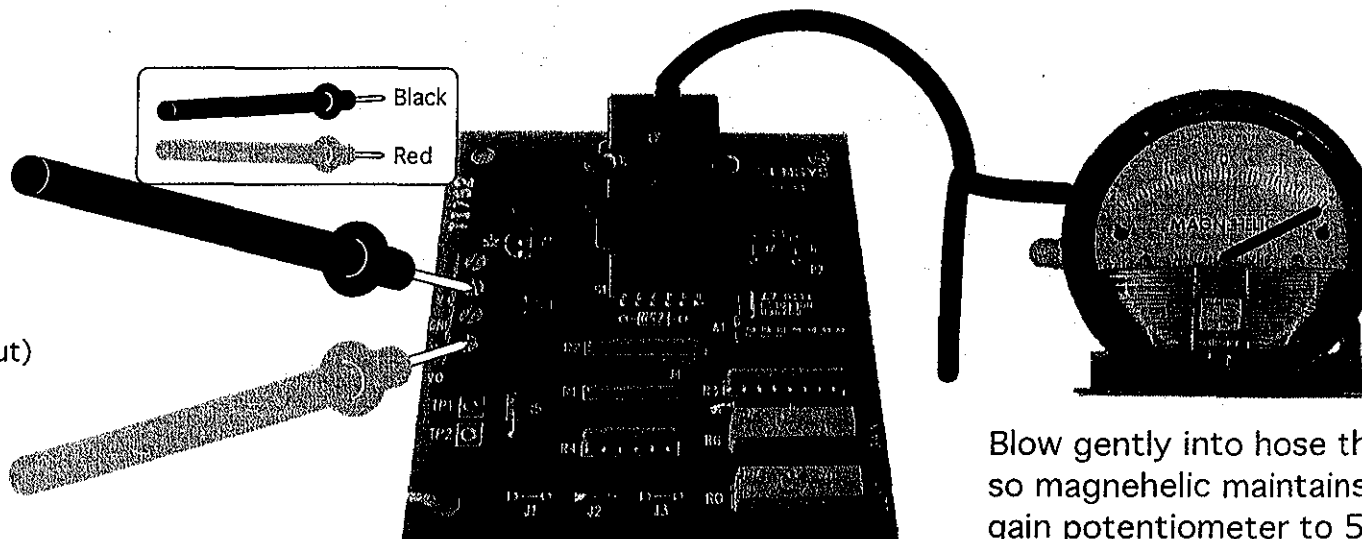
Red (24+)
White (com)
Black (-)
Blu/Yel (output)



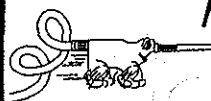
With magnehelic at 0", adjust
zero potentiometer to 50-60mv
(.050 - .060Vdc).

Step 2

Red (24+)
White (com)
Black (-)
Blu/Yel (output)



Blow gently into hose then pinch
so magnehelic maintains 2", adjust
gain potentiometer to 5Vdc.



FDR DESIGN, INC.

303 12th Ave South
Buffalo, MN 55313
(763) 682-6096 Fax (763) 682-6197

**SenSym
Pressure Board Calibration**

Created:

8/30/07

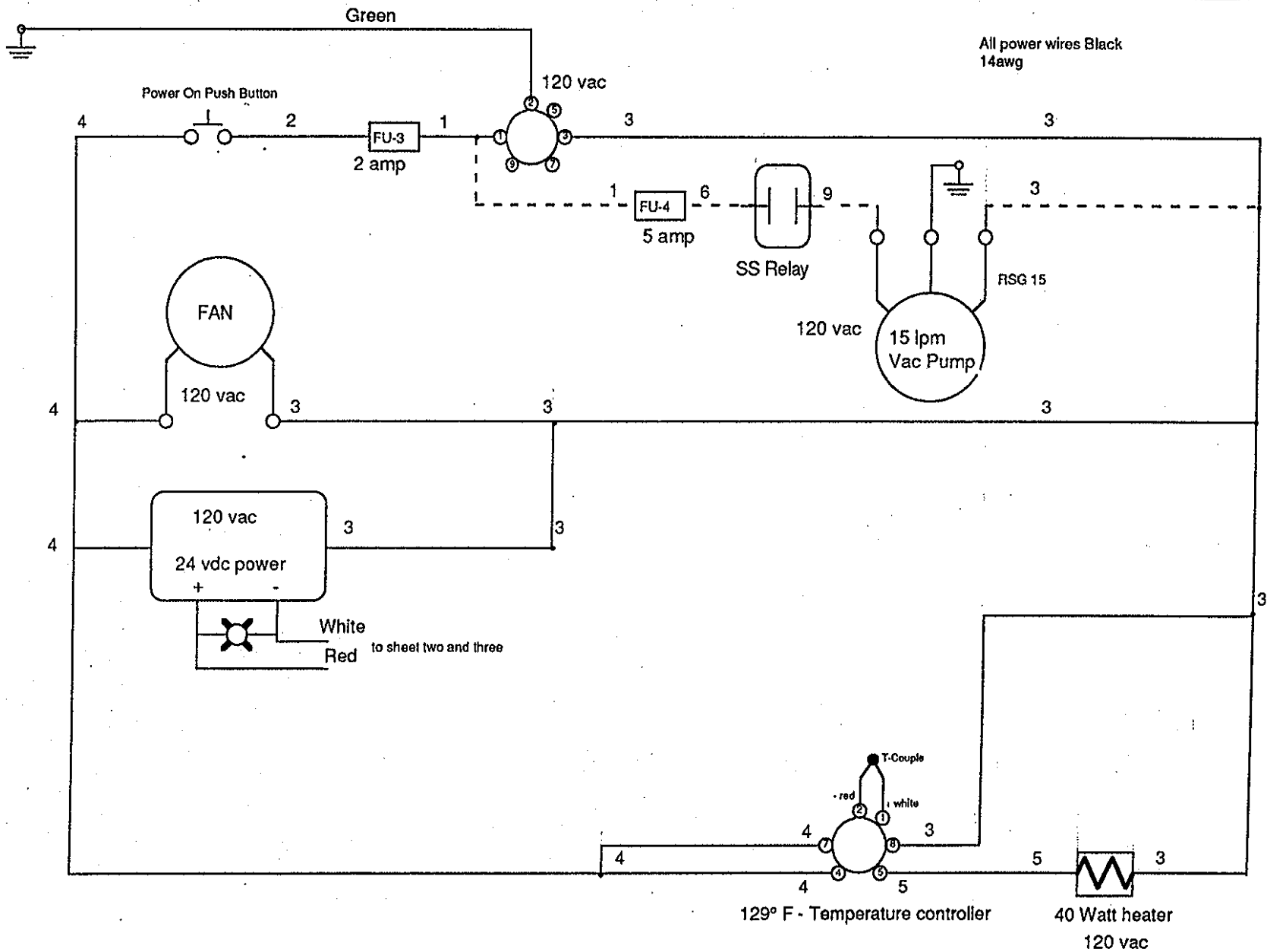
DJH

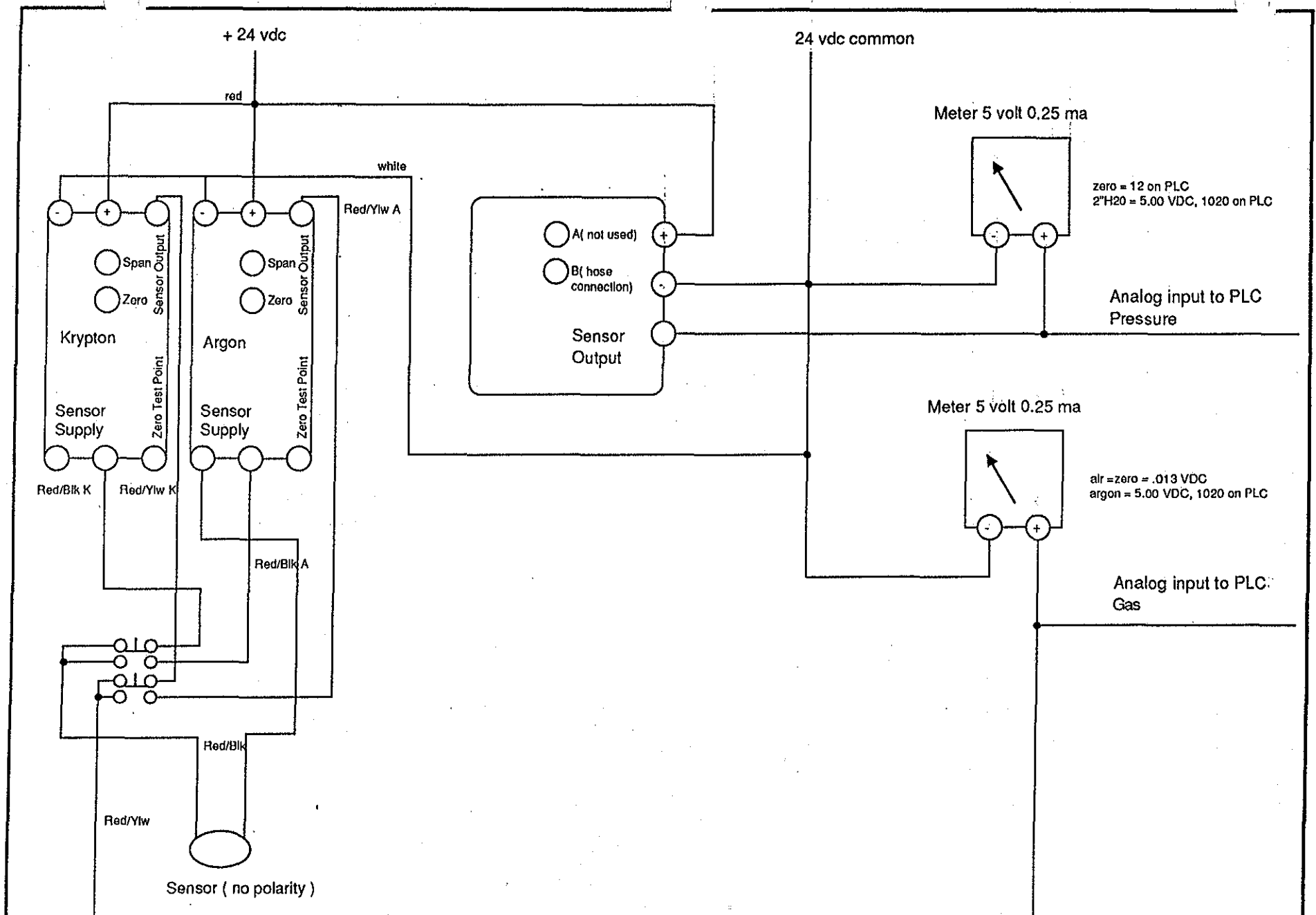
Scale:

N/A

Sheet 1 of 1
Drawing Number:

Last Modified:





FDR DESIGN, INC.

303 12th Ave. South
Mato MN 55313
2) 682-6096 Fax (612) 478-2061

RSG30 Electrical Schematic
FDR Gas Fillers

Check

LE

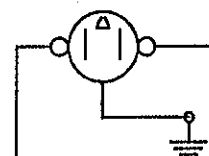
Date: 9/7/90
rev 10/93

Drawn by: RLE

Scale: na

Sheet 3 of 4
Drawing Number:

10150-B



FU-1
5 amp

FU-2
15 amp

SS Relay

30 lpm
Vac Pump

SS Relay

7 used on A rack Only

24 vdc +
Rack 1

24 vdc common
all racks

1 red
2 grn
3 blk
7 yel
8 brn
5 org

1
2
3
7
8
5

1
2
3
7
8
5

1
2
3
7
8
5

Sheet 4 of 5
Drawing Number:

101-B

FDR DESIGN, INC.

303 12th Ave. South
Fargo MN 58103
(701) 682-6096 Fax (701) 478-2061

RSG30 Electrical Schematic
FDR Gas Fillers

Checked by

E

Date:

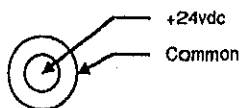
9/7/90
rev 10/93

Drawn by:

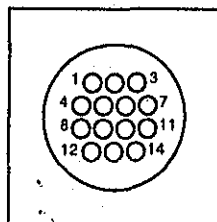
RLE

Scale:

na

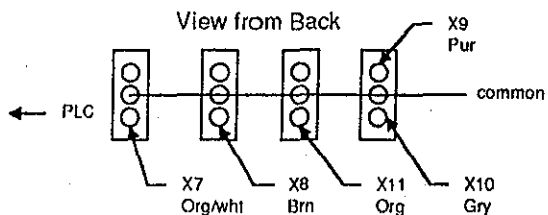


View from Back

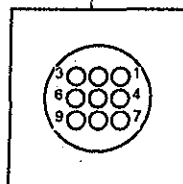


Front Panel / Remote

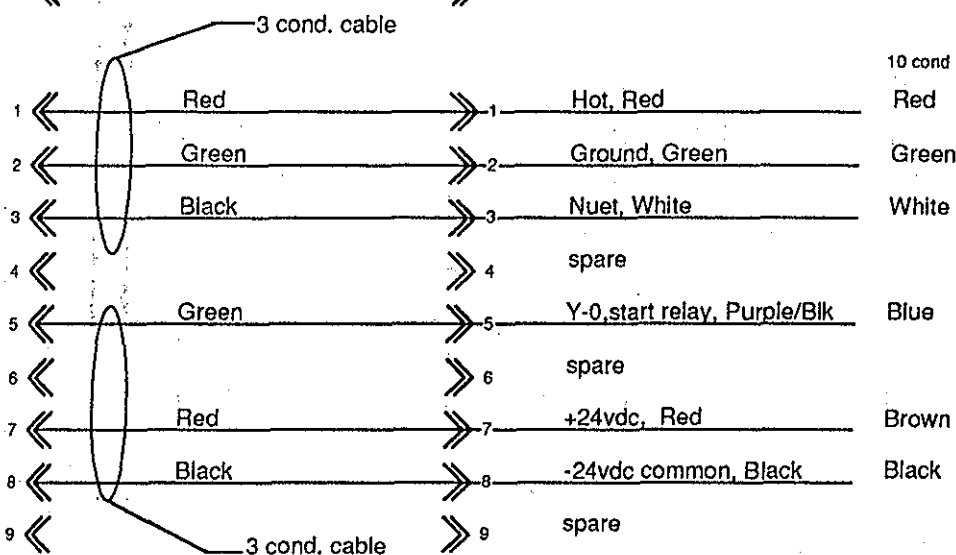
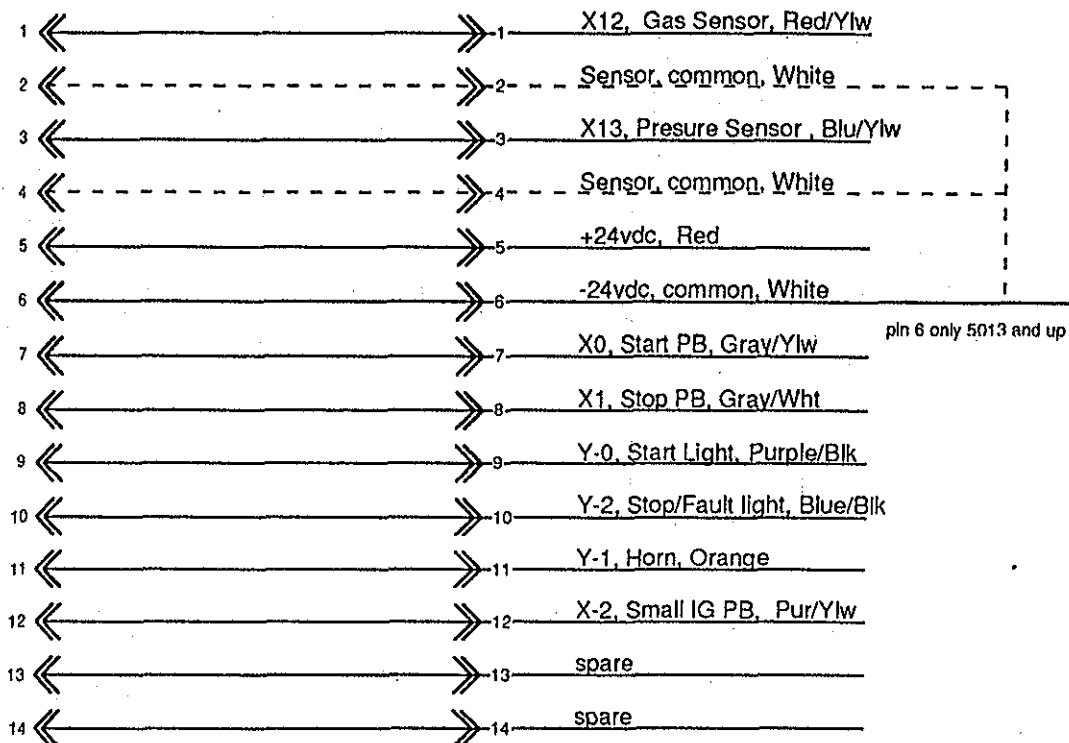
View from Back

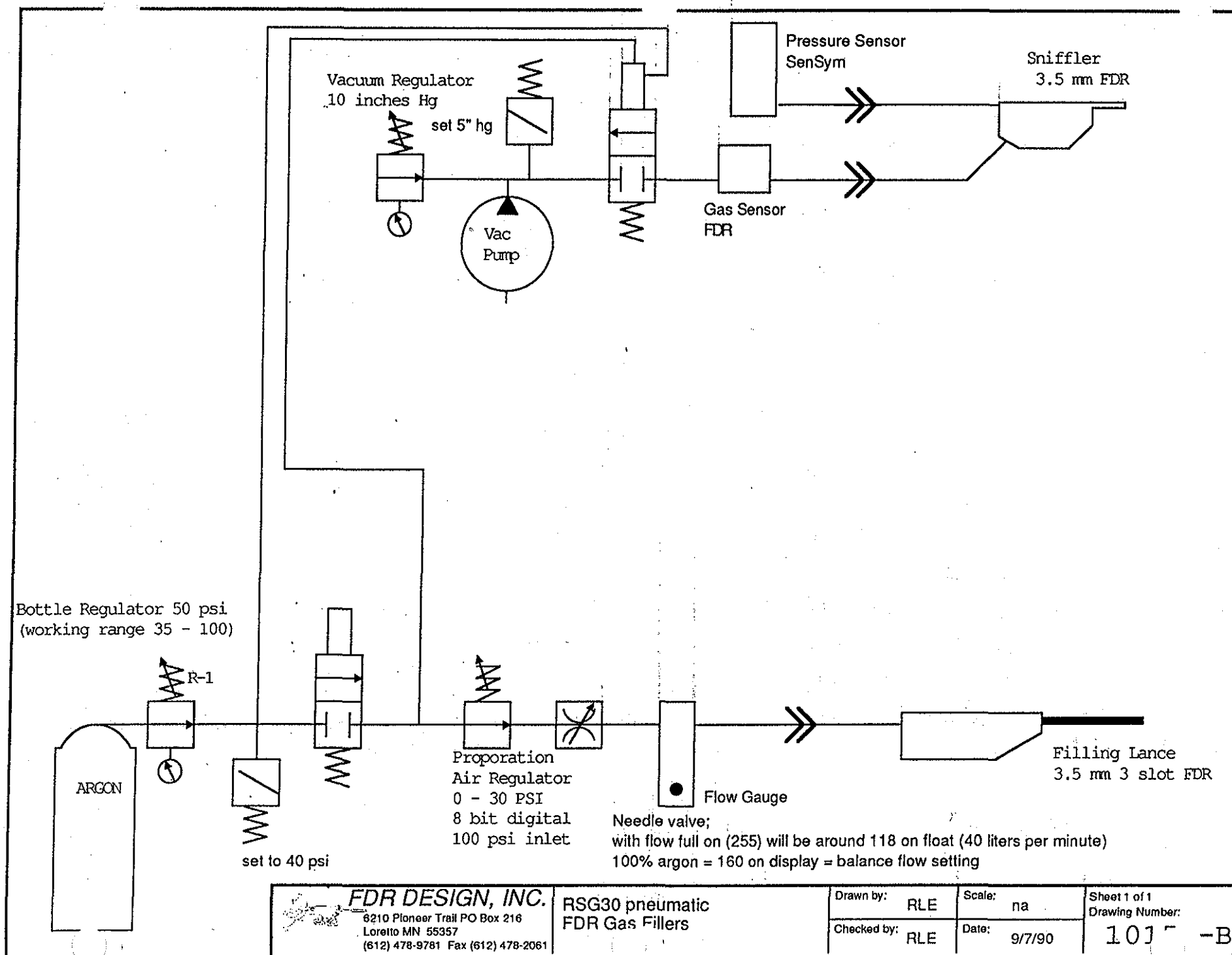


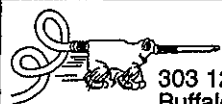
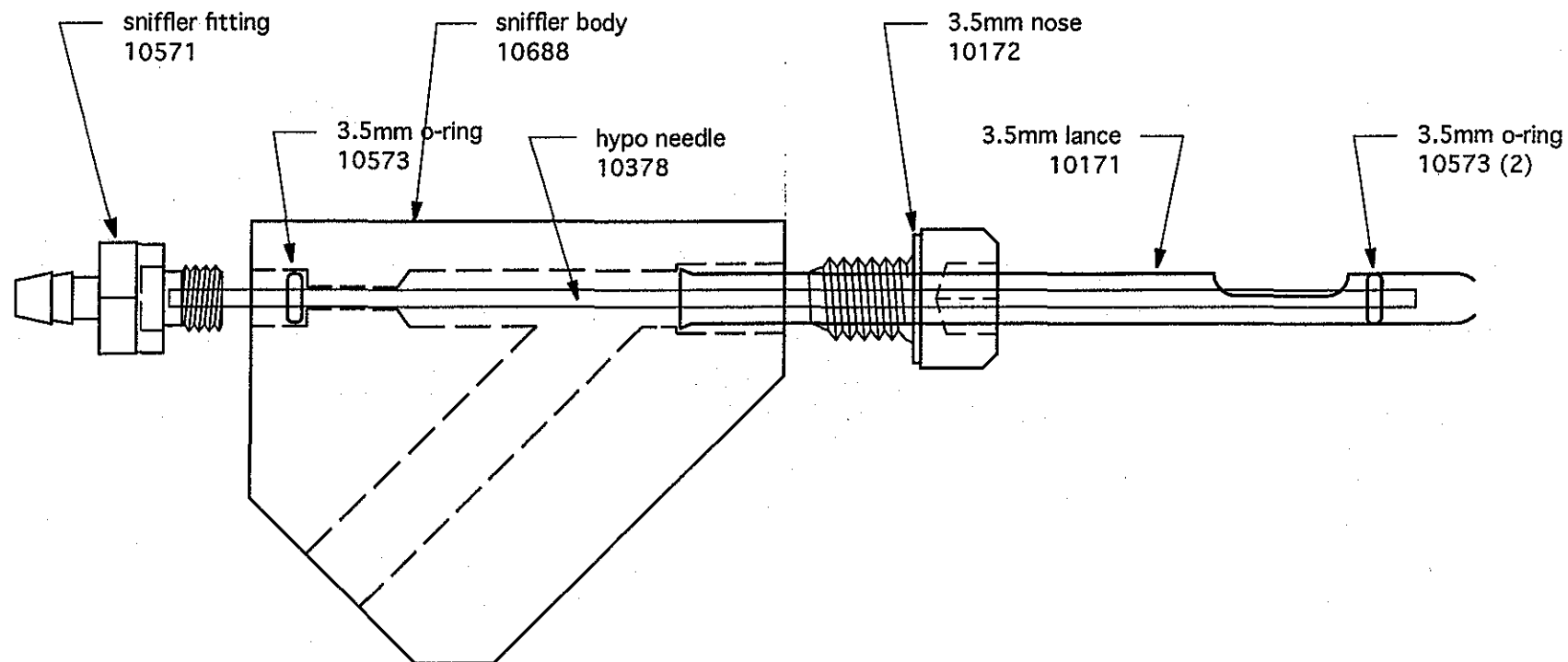
View from Back



Power cable







FDR Design, Inc.

303 12th Ave. South
Buffalo, MN 55313

phone 763-682-6096
fax 763-682-6197

3.5mm sniffer complete

Created:

6/5/91

RLE

Last Modified:

7/28/97

KDW

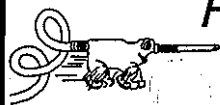
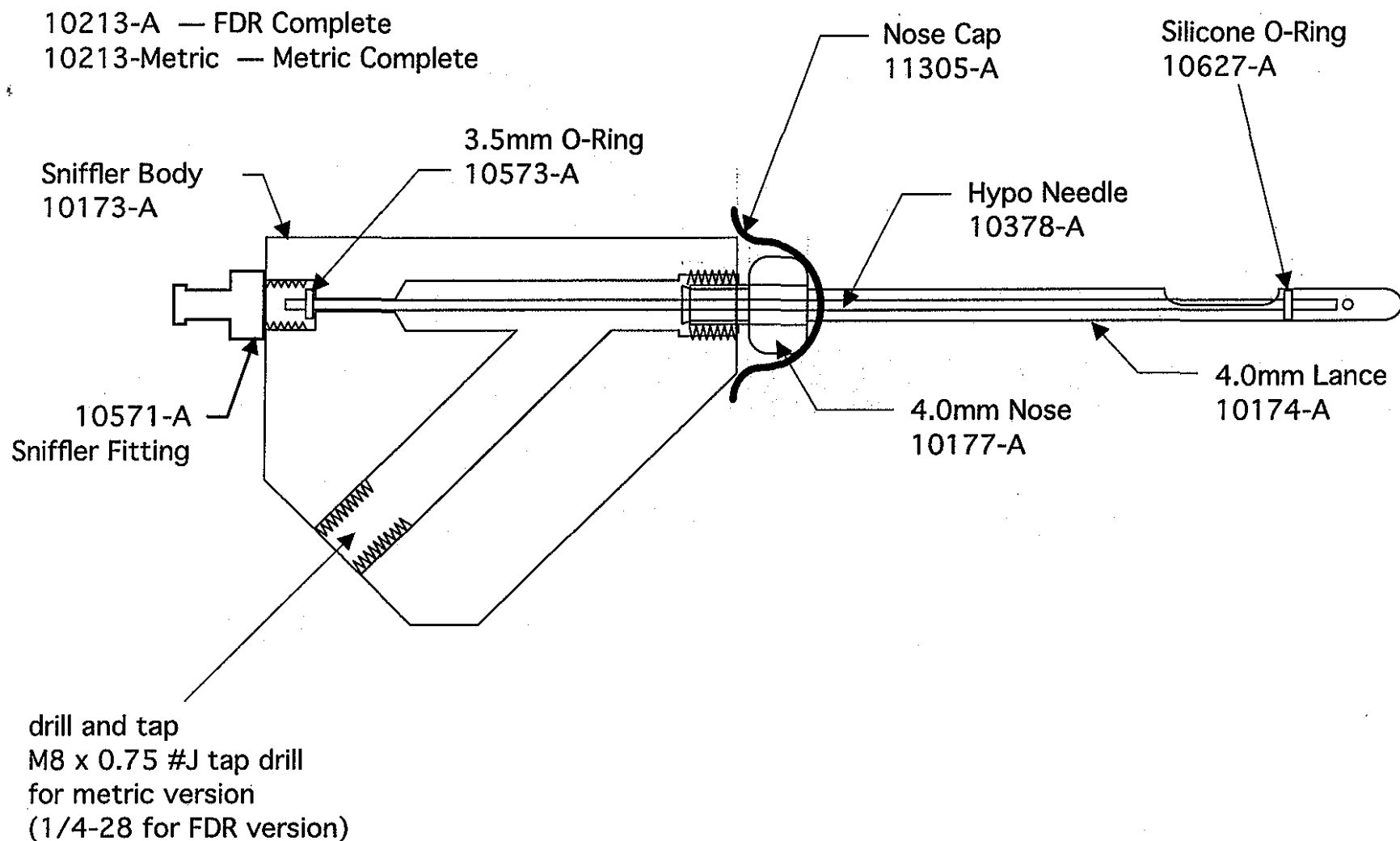
Scale:

2/1

Sheet 1 of 1

Drawing Number:

10170-A



FDR DESIGN, INC.

303 12th Ave South
Buffalo, MN 55313
(763) 682-6096 Fax (763) 682-6197

4mm sniffer complete

Created:

10/7/91

RLE

Last Modified:

3/1/97

rle

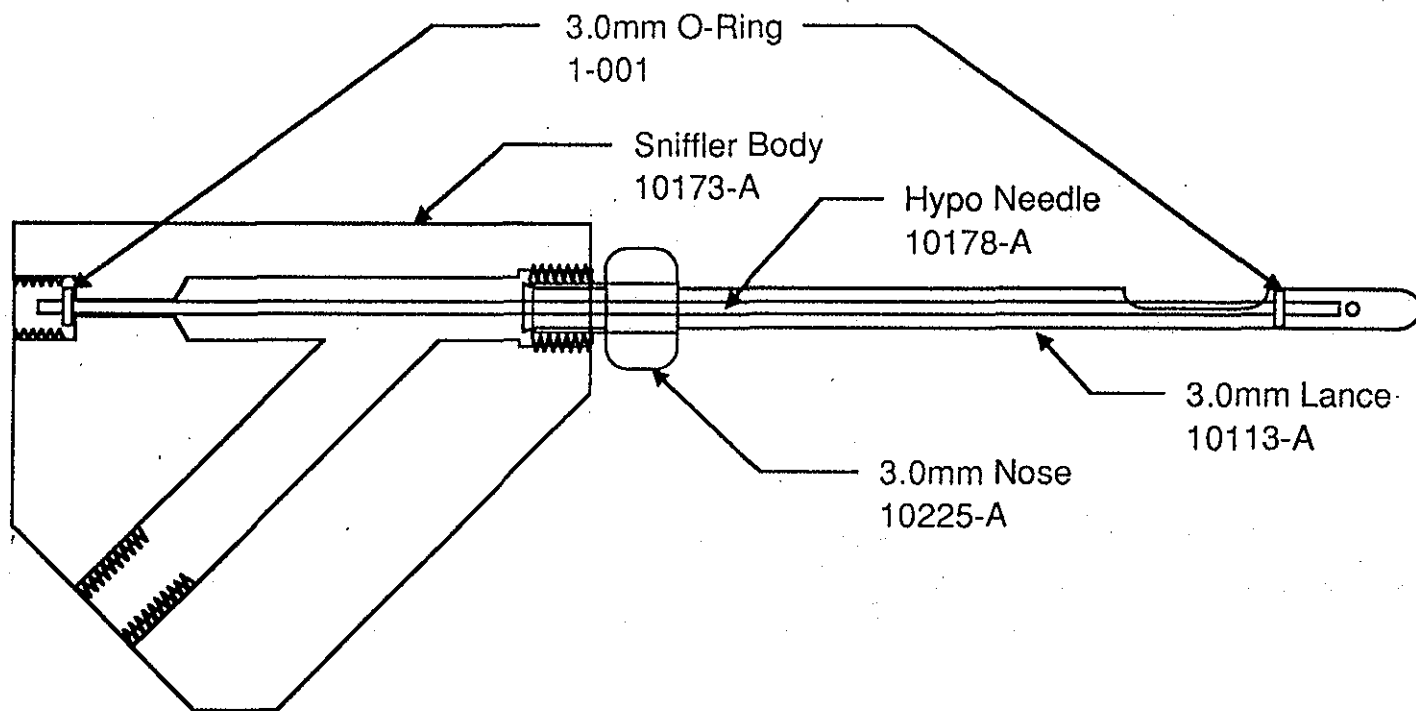
Scale:

2/1

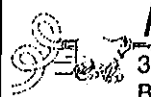
Sheet 1 of 1

Drawing Number:

102 3-B



Revised 9/18/92 DAN



FDR DESIGN, INC.

303 12th Ave. S.
Buffalo, MN 55313
(612)-682-6096 Fax (612)-682-6197

FDR 3.0 Sniffer Complete

Drawn by:
RLE

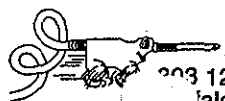
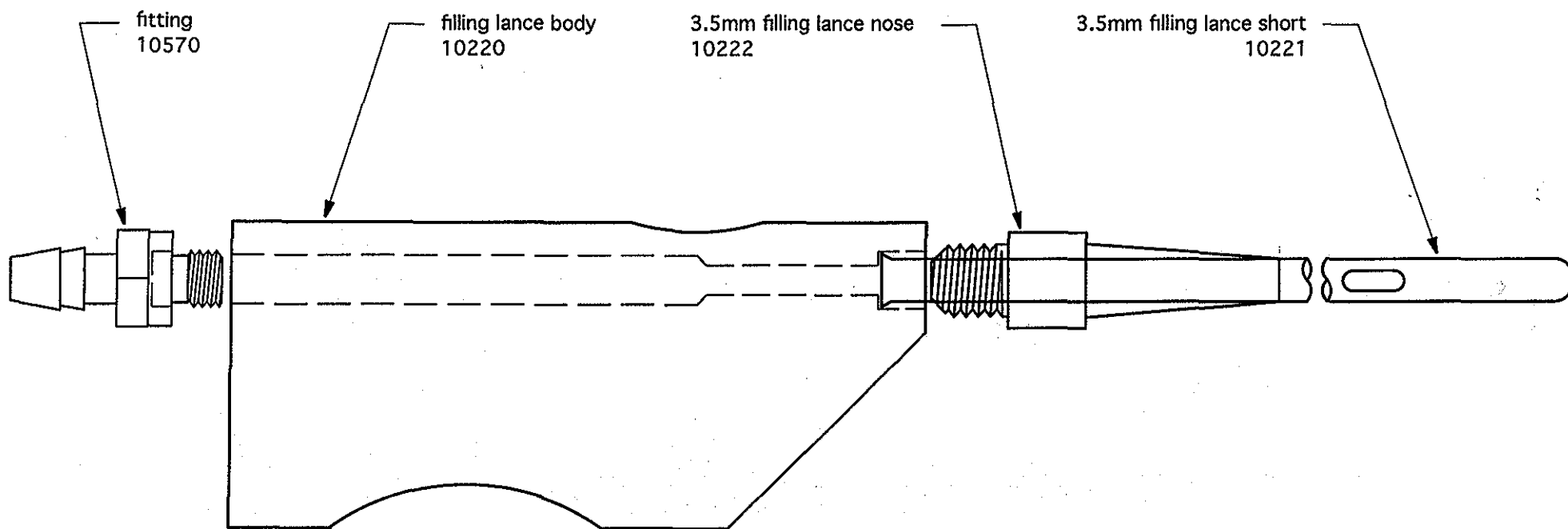
Scale: 2/1

Sheet 1 of 1
Drawing Number:

Checked by:
RLE

Date: 6/5/91

10215-A



FDR Design, Inc.

203 12th Ave. South
Malo, MN 55313

phone 763-682-6096
fax 763-682-6197

3.5mm filling lance
assembly

Created:

6/12/92

RLE

Last Modified:

8/5/97

KDW

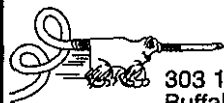
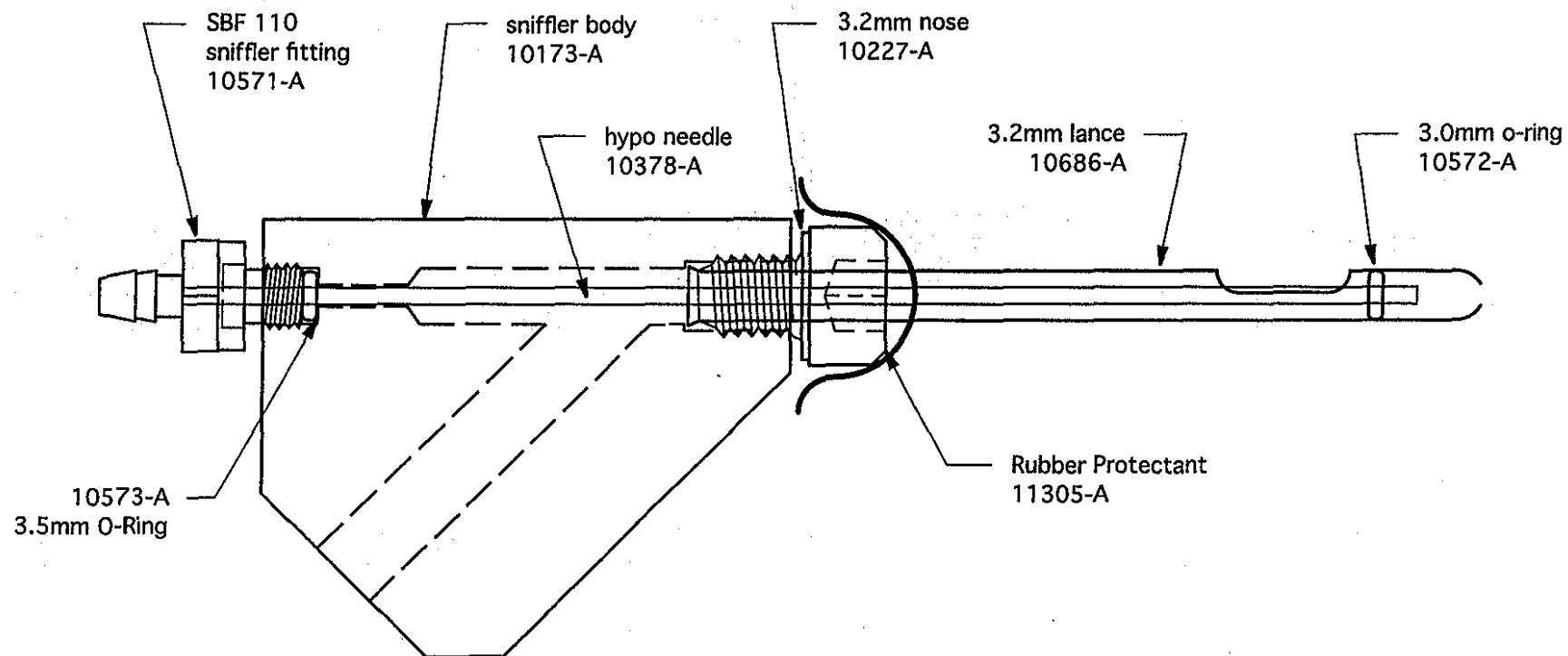
Scale:

2/1

Sheet 1 of 1

Drawing Number:

1008-A



FDR Design, Inc.

303 12th Ave. South
Buffalo, MN 55313

phone 763-682-6096
fax 763-682-6197

**3.2mm Highspeed sniffer
complete**

Created:

10/7/91

RLE

Last Modified:

11/5/97

DAN

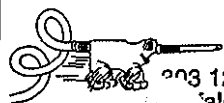
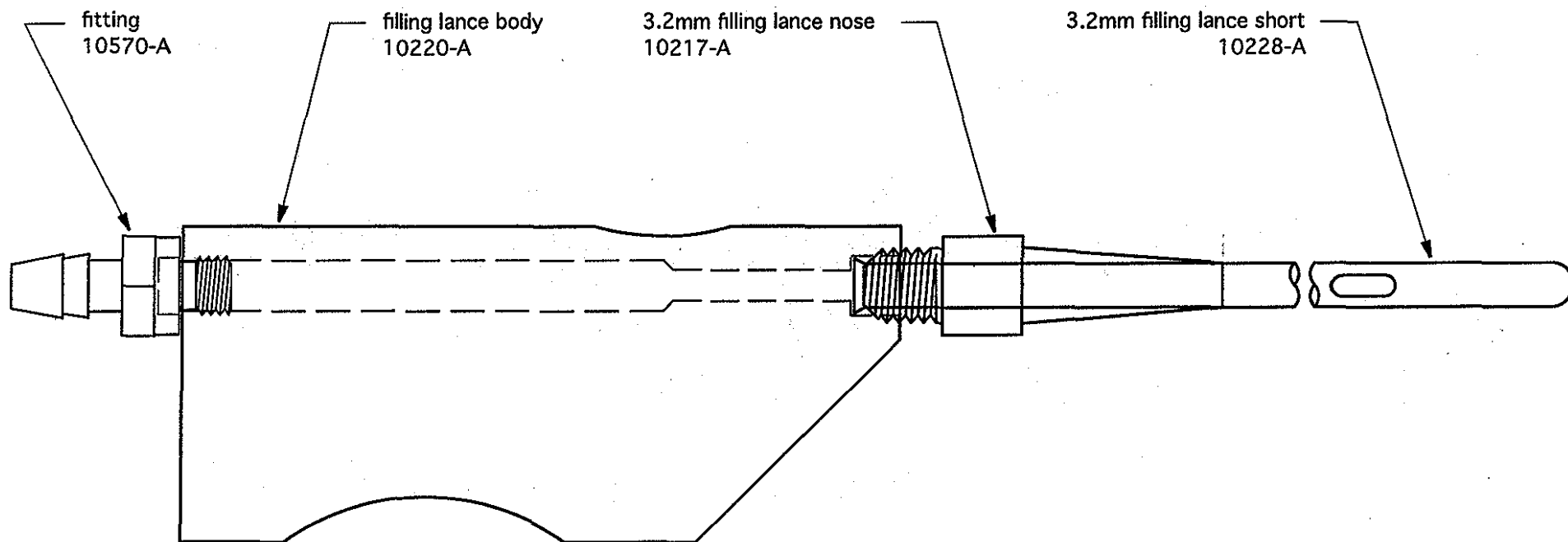
Scale:

2/1

Sheet 1 of 1

Drawing Number:

10219-B



FDR Design, Inc.

3123 12th Ave. South phone 763-682-6096
 St. Paul, MN 55313 fax 763-682-6197

3.2mm filling lance
 assembly

Created:

6/16/92

RLE

Last Modified:

7/29/97

KDW

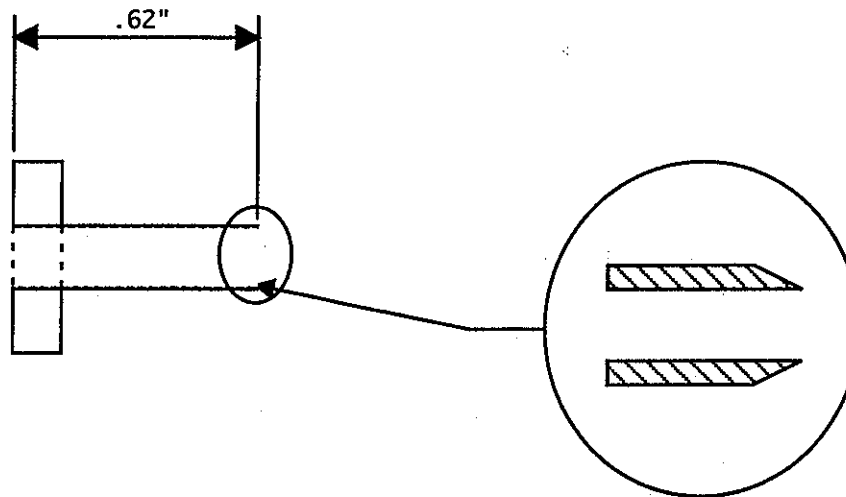
Scale:

2/1

Sheet 1 of 1

Drawing Number:

10229-A



Edgetech Bushing
Part # 10267-A

FDR DESIGN, INC.

303 12th Ave South
Buffalo, MN 55313
(763) 682-6096 Fax (763) 682-6197

EdgeTech bushing .62"

Drawn by: RLE

Scale: 2/1

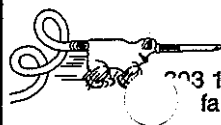
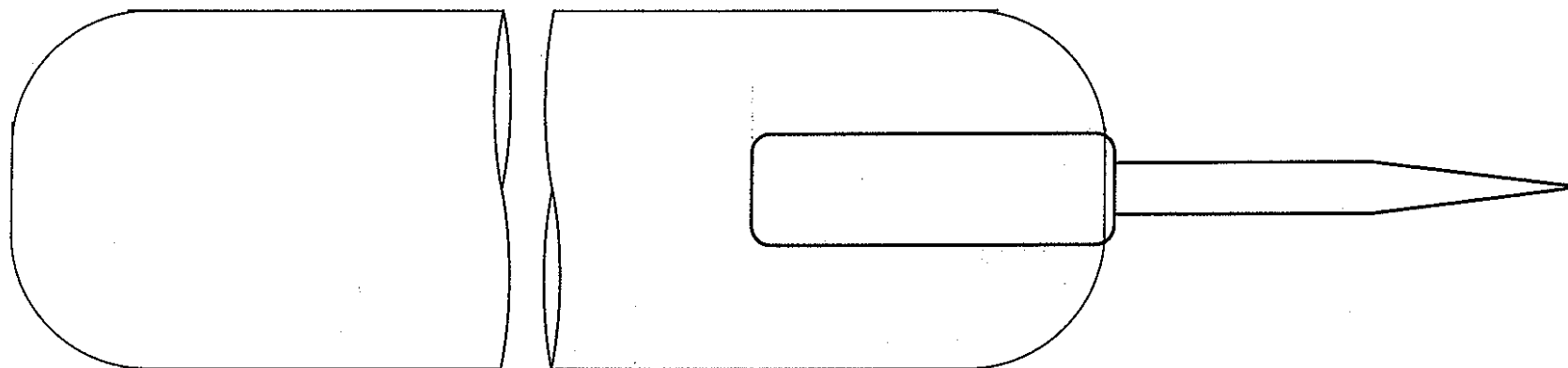
Sheet 1 of 1
Drawing Number:

Last Modified:

Date: 12/9/91

10267-A

Edgetech Insertion Tool
Part # 10268-A



FDR Design, Inc.

203 12th Ave. South
falo, MN 55313

phone 763-682-6096
fax 763-682-6197

EdgeTech Insertion Tool

Created:

12/9/91

RLE

Last Modified:

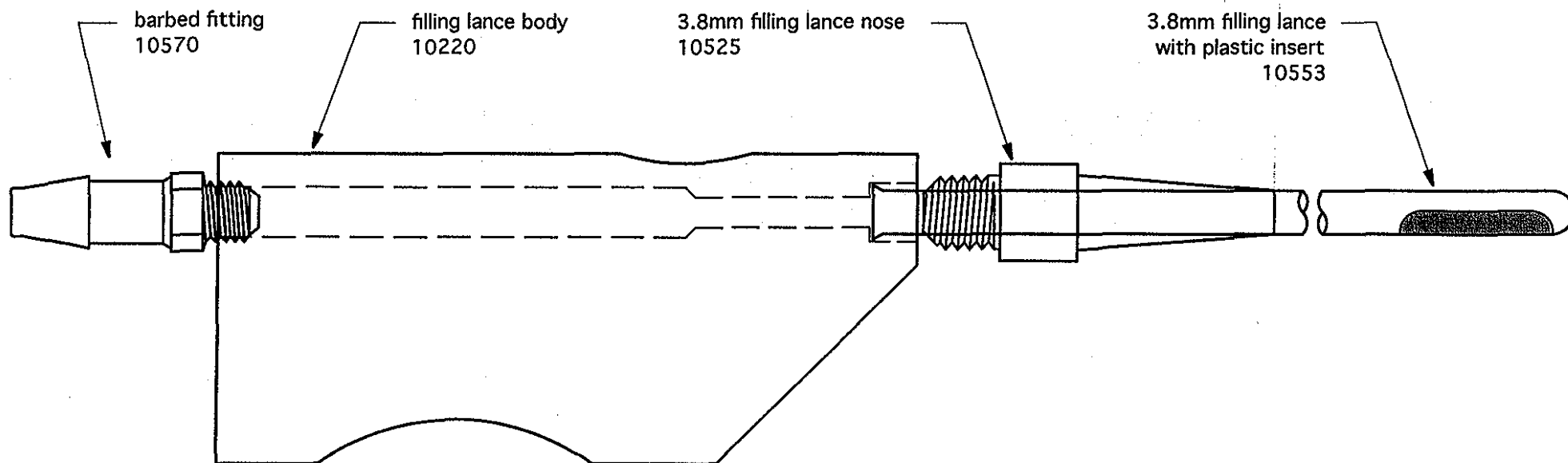
Scale:

2/1

Sheet 1 of 1

Drawing Number:

10268-A



FDR Design, Inc.

303 12th Ave. South
Buffalo, MN 55313

phone/763-682-6096
fax/763-682-6197

**3.8mm filling lance
assembly**

Created:

1/16/96

DAN

Last Modified:

2/18/03

CG

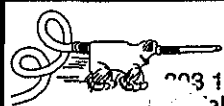
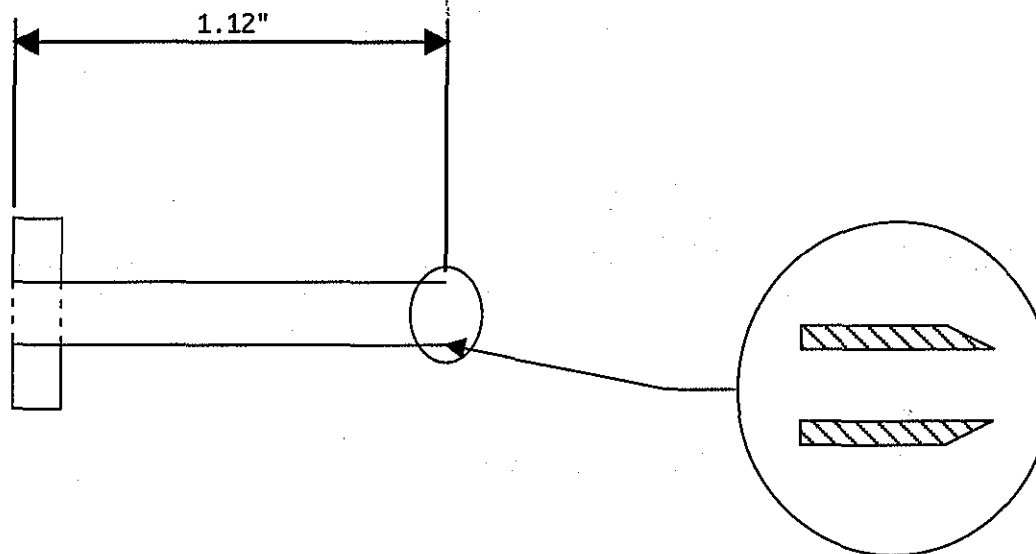
Scale:

2/1

Sheet 1 of 1

Drawing Number:

10581-A



FDR Design, Inc.

223 12th Ave. South phone 612-682-6096
 St. Paul, MN 55313 fax 612-682-6197

EdgeTech bushing 1.12"
 long

Created:

12/9/91

RLE

Last Modified:

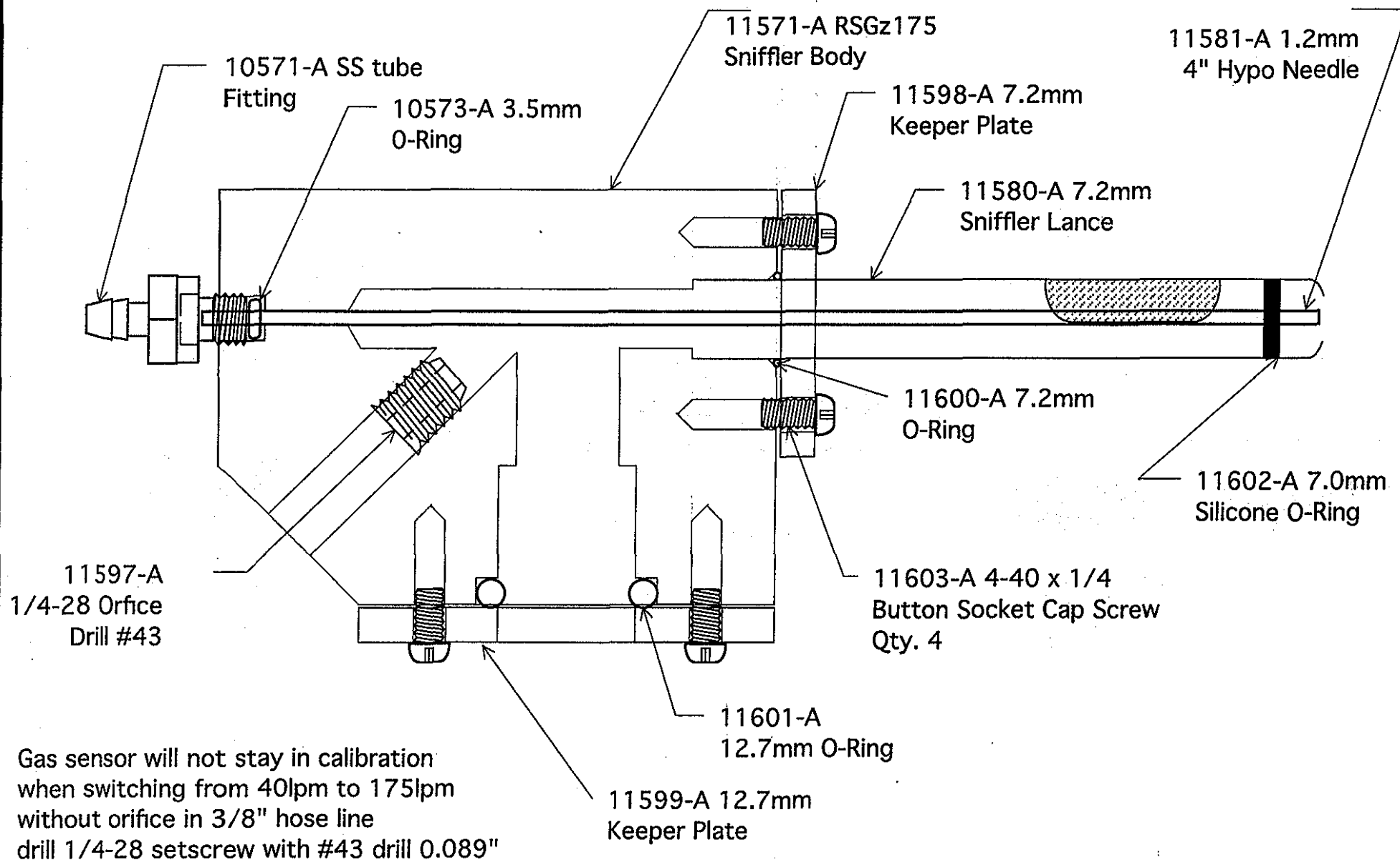
Scale:

2/1

Sheet 1 of 1

Drawing Number:

106 4-A



FDR DESIGN, INC.

303 12th Ave South
Buffalo, MN 55313
(763) 682-6096 Fax (763) 682-6197

RSGZ175 Sniffer
Complete

Drawn by: DAN

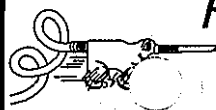
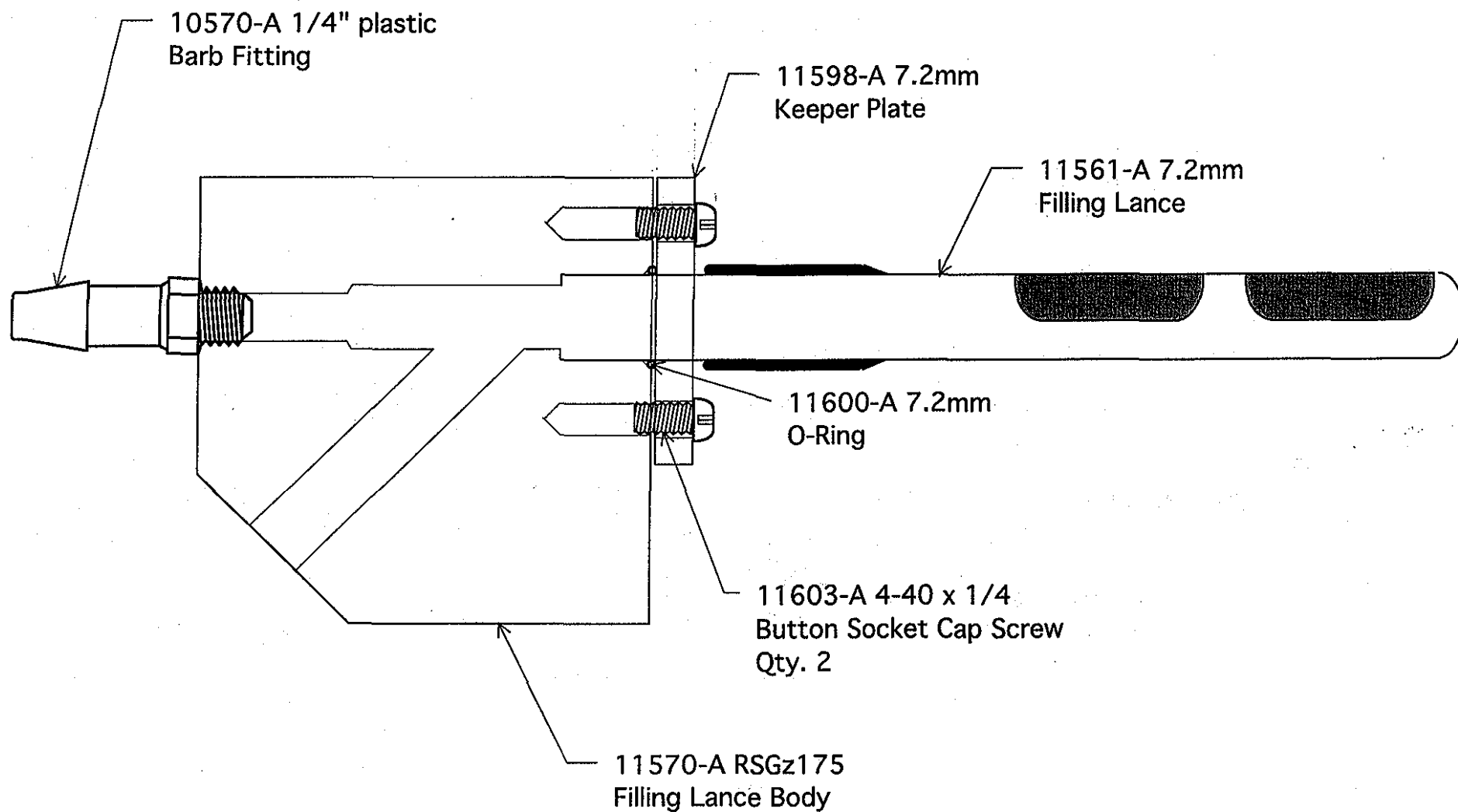
Scale: 2/1

Checked by: RLE

Date: 8/8/02

Drawing Number:

11568-B



FDR DESIGN, INC.

303 12th Ave South
Buffalo, MN 55313
(763) 682-6096 Fax (763) 682-6197

RSGz175 Filling Lance
Complete

Drawn by: **DAN**

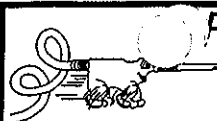
Last Modified:

Scale: **2/1**

Date: **10/16/02**

Drawing Number:

11569-B



FDR DESIGN, INC.

303 12th Ave South
Buffalo, MN 55313
(763) 682-6096 Fax (763) 682-6197

RSGz90 4.0mm.
One hole complete

Drawn by: DJH

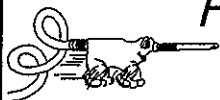
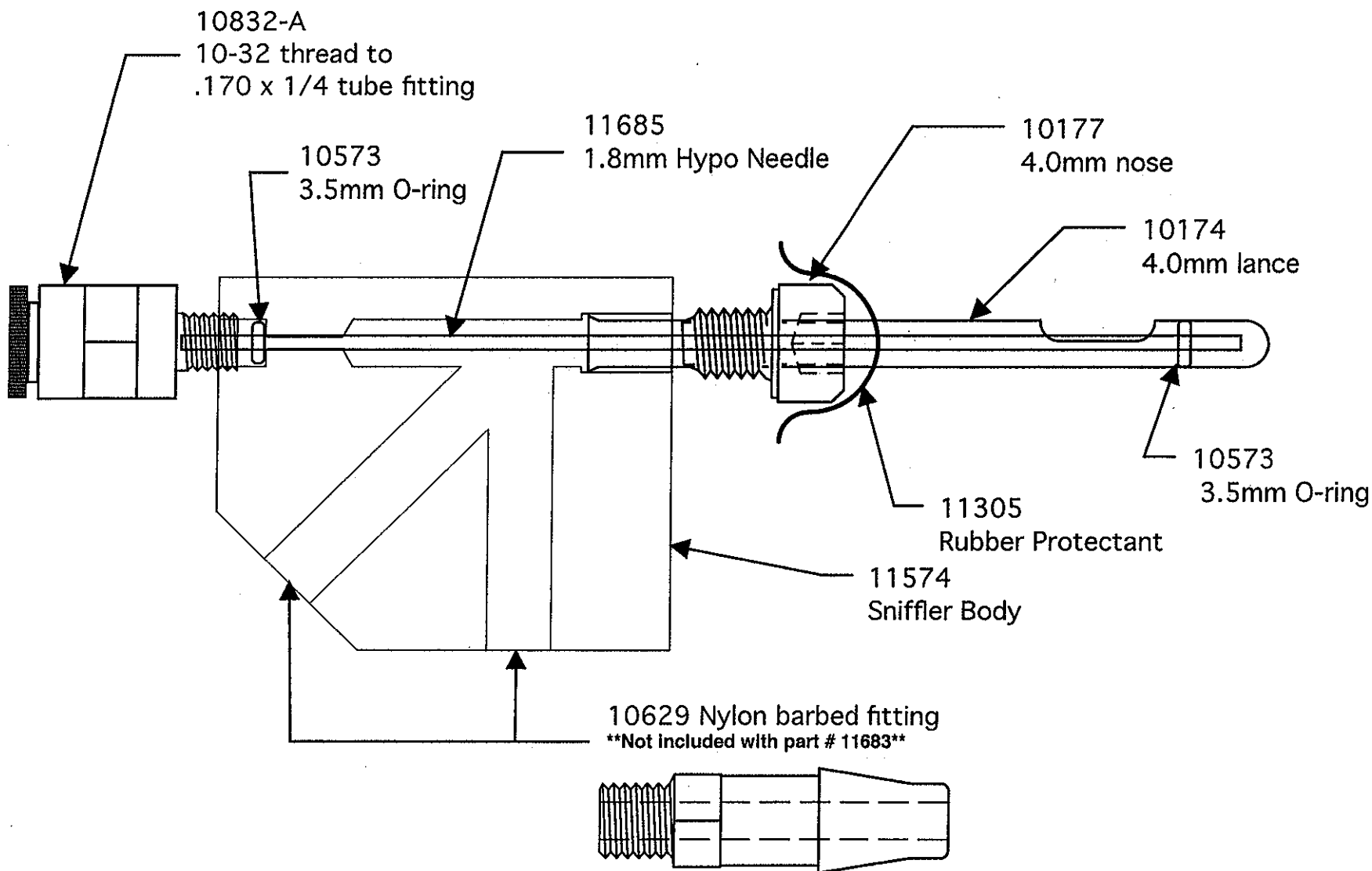
Scale: 2/1

Sheet 1 of 1
Drawing Number:

Last Modified:

Date: 5/29/07

11683-A



FDR DESIGN, INC.

303 12th Ave South
Buffalo, MN 55313
(763) 682-6096 Fax (763) 682-6197

RSGz90 4.0mm
One hole complete

Drawn by: DJH

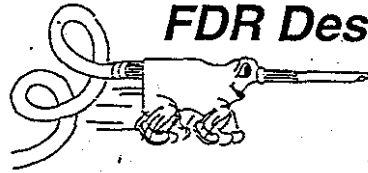
Scale: 2/1

Sheet 1 of 1
Drawing Number:

Last Modified:

Date: 5/29/07

11683-A



rlc@fdrdesign.com

www.fdrdesign.com

763-682-6096 ex 118 763-682-6197 (fax)

763-221-6143 (cell)

303 12th Avenue South
Buffalo, MN, 55313

FDR Gas Sensors

FDR gas fillers use one of several different gas sensors depending on when the machine was built and the amplifier board revision level.

We have not done this to confuse you or to make your life difficult. The key component in the fabrication of the gas sensor is a small resistive element that is suddenly no longer available from our supplier. FDR manufactures the gas sensor and the amplifier board but we depend on our suppliers for this critical component.

To make things even more exciting one of our suppliers decided to substitute (without telling us) putting us in a real bind when we discovered it during production.

We have solved the component problem and have assurances of supply, however it meant having to change some components in the amplifier board to match the new gas sensor. We do have a limited number of the old sensors still in stock but most likely what we will need to do if a gas sensor has failed in our machine is to replace both the sensor and the amplifier board.

To make things simpler in the future we strongly recommend replacing all the gas sensors and all the amplifier boards at one time so you have only the one most recent sensor style to deal with. All the components needed to make this exchange are provided by FDR at no charge. If your machine came in to FDR for repair this exchange and update was done again at no charge.

Brief history

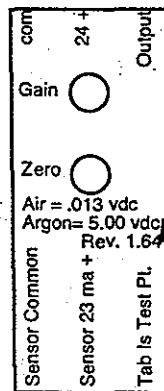
Machines with a gas sensor amplifier board with a revision level of 1.0 through 1.5 used the original FDR gas sensor which will have green or black wire leads.

Machines with a gas sensor amplifier board with a revision level 1.6 used a gas sensor which will have yellow wire leads.

- 1.61 to 1.64 Red leads
- 1.68.01A Orange leads (A= argon)
- 1.68.01K Orange leads(K= krypton)

Presently 1.68.01 Orange leaded sensors are the most recent and up to date gas sensor. This is the only gas sensor that FDR can produce today. If you have a machine with older gas sensors at some point in time they will need to be changed to the 1.68.01 Orange lead sensor. Changing to the Orange lead sensor will also require changing the amplifier board.

To determine the correct gas sensor for your machine check the Rev. level of the gas sensor board, located here.



The symptom of having the wrong gas sensor with the wrong amplifier board will be the inability to calibrate the board, specifically the gain / argon setting. It may also destroy the gas sensor.

Please save and return to FDR all failed gas sensors. Also save and return any exchanged amplifier boards.

When you order new sensors, we'll be asking that you send in your old gas sensors for exchange. If you need updated amplifier boards we also ask that you return your old amplifier boards once we have exchanged them with the new boards.

New sensors are sold at a cost of \$125.00 so it is much more economical to send us your old sensors, and we will exchange them free of charge.

If something is not working quite right with the gas filler the temptation is there to first replace the gas sensor. While the gas sensor does on occasion fail, it is fairly rare and should only be replaced when it is clear that it is indeed defective.

Much more common is for there to be damage to the sniffer or filling lances or to a hose. Or maybe just normal sensor calibration is all that is needed.

When does the sensor need to be replaced?

1) When it is "burned out"

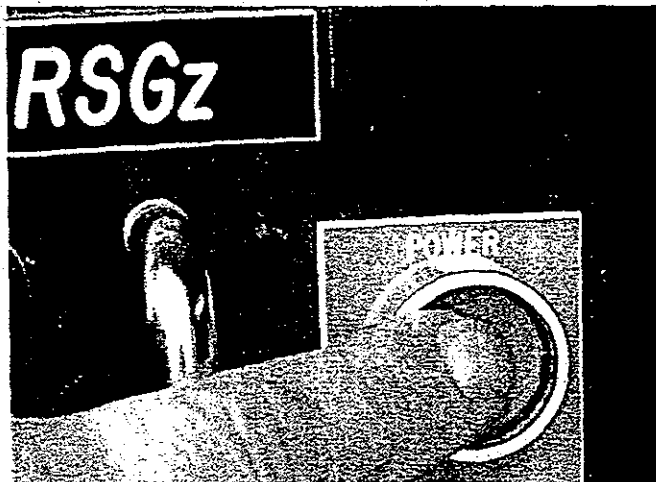
1) When the seal is damaged

OK, so how do we know?

To tell if a sensor is burned out, first look to see if the panel meter reads 100% all the time. Does the machine start, run for 4 or 5 seconds then shut off beeping that the window is filled? Even when you start the machine running with the lines hanging in the air it will read 100% and short cycle?

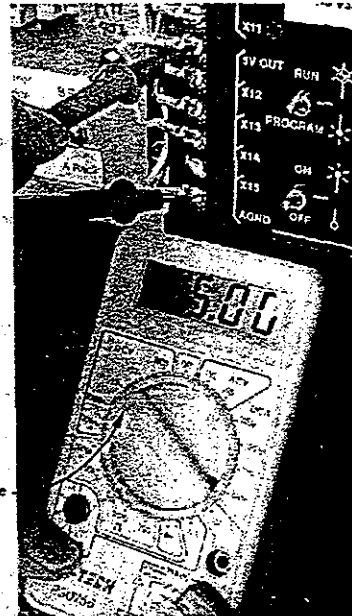
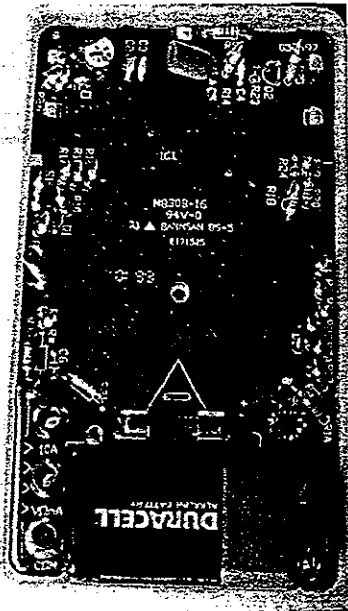
But don't replace the sensor yet let's make another inspection.

Turn off the power to the machine.



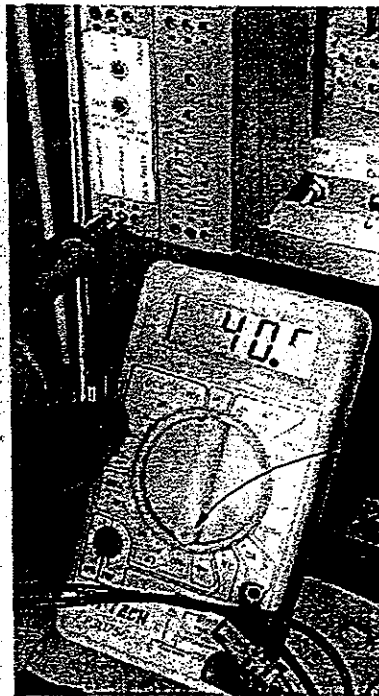
We are going to take an ohm reading of the gas sensor.

By the way, if the batteries are near death in your meter it is possible to get strange readings. It is a good idea to test the meter against the 5vdc on the PLC terminal strip, left-hand side near the bottom. One terminal is labeled "5v OUT" the other "AGND". Another sign of a dying battery is if the decimal point dims on ohm readings.



set at 20 DCV scale

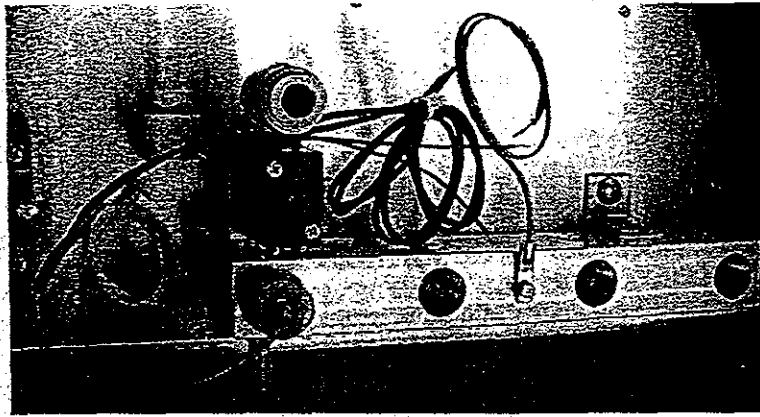
At the gas sensor amplifier board take a reading it should be 30 ohms to 50 ohms. If open or 2000 ohms the sensor may be defective; but let's test it in another location.



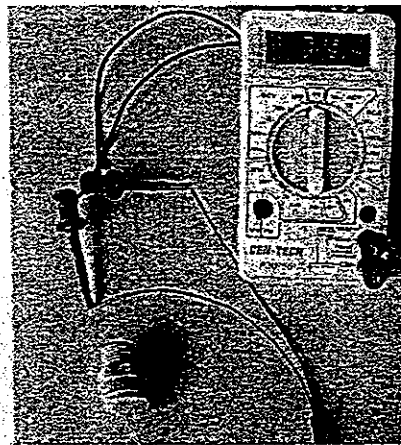
At the terminal strip near the gas sensor(s) take a reading.



Take a reading again after removing both leads. Sometimes a wire gets tightened down on the plastic insulation instead of the bare wire.

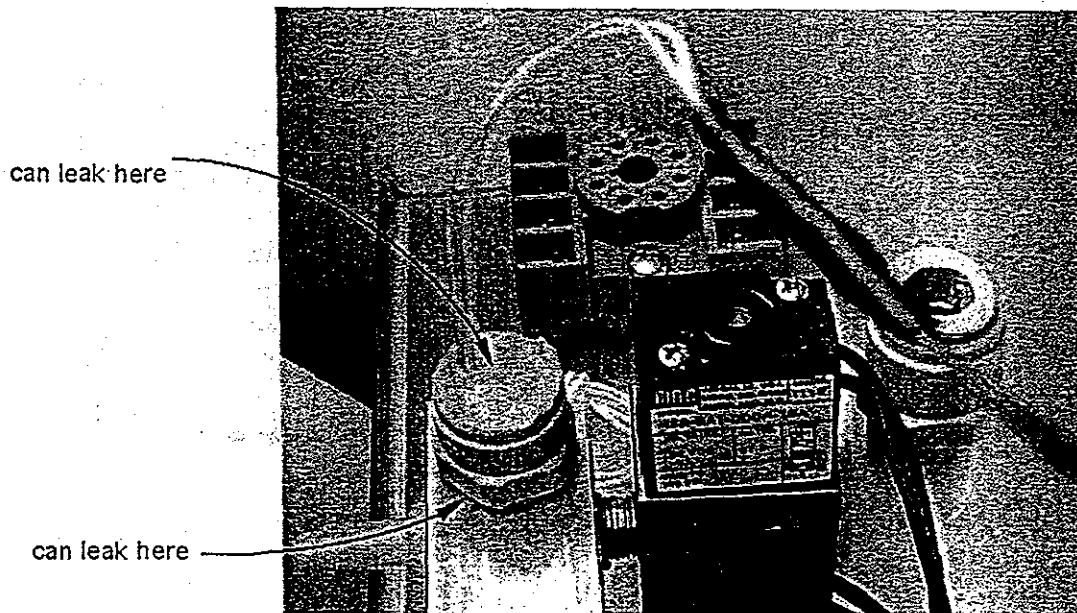


If it still reads open or 1000 ohms, grab a spare sensor or check one of the other gas sensors just to make sure your meter is working OK.



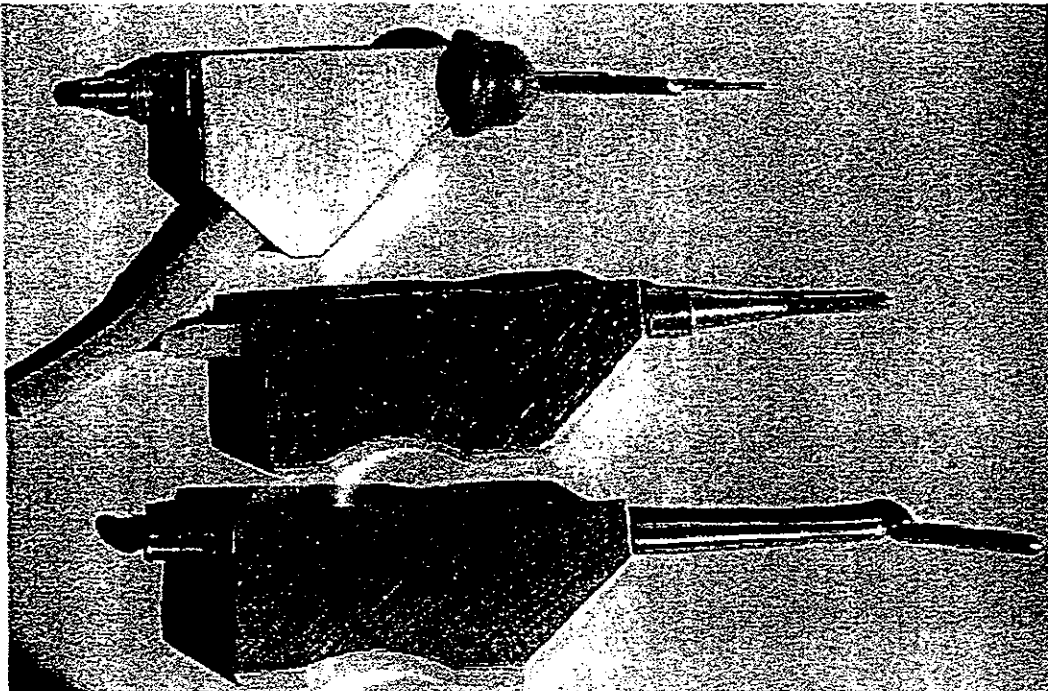
Remove and replace the gas sensor.

There is another way the gas sensor can fail. If the seal where the wires are coming out is damaged or defective, it is possible for air to sneak in along the wires and give a false low reading. In a similar manner if the sensor is not installed with Teflon tape or pipe sealant (non-hardening), it is also possible for air to sneak in by the threads.

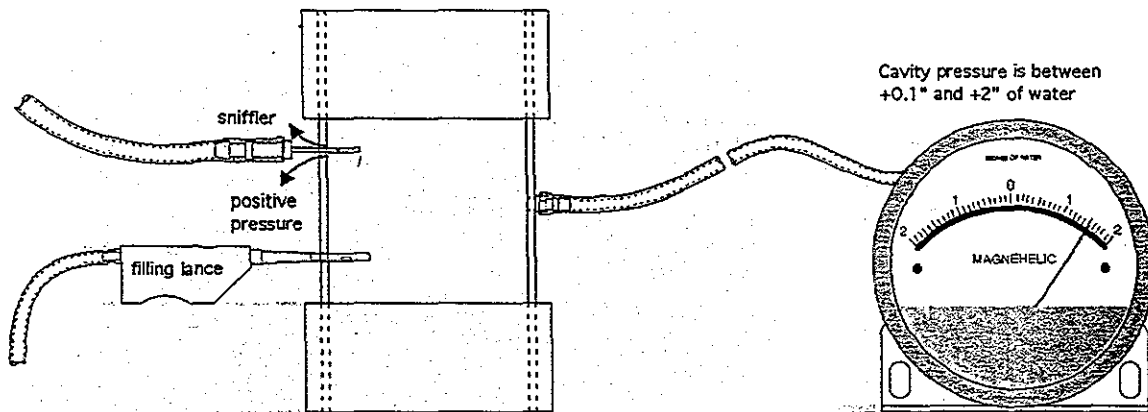


The symptom of this is inability to set the argon or high 5vdc setting.

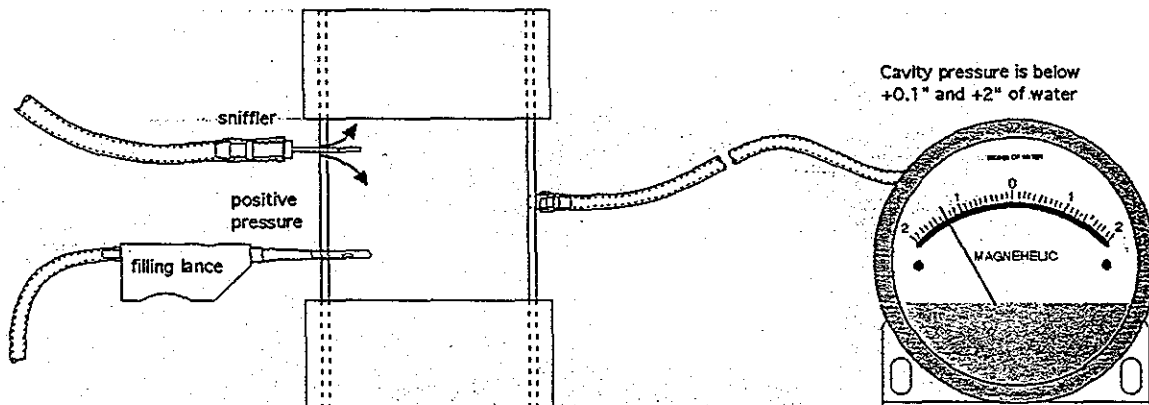
If the symptom is low final fills odds are it is not the gas sensor. 98% of the problems with a low fill are sniffer or filling lance condition.



It is also important that the flow rates are checked before trying to set the gas sensor.



If the unit has slightly negative cavity pressure or more air being pulled out of the unit than gas going in, it is possible for air to mix with the fill gas and you will never achieve the shut off point. So prior to checking the gas sensor always check the flow rate first.



We strongly urge maintenance to keep one known good set of filling lance, sniffler, and hose. We often paint them a separate color so they will not be used for production. Then when in doubt go to your known good set for testing.

So what should you do when operation or management says go check out the gas filler it seems slow.

First don't panic, don't clean out your locker, and don't book the next flight out of town.

- 1) Start the suspected line running in free air, not in a unit. Does the display meter read near zero? If reading is 100% start in on gas sensor testing.
- 2) Is the sensor over-ride switch off?
- 3) Do the lances look good, not beat up or bent? Is gas flowing out OK, can you feel it? Is the suction on?
- 4) If an RSGh — put lance in plastic test container and start line, is flow rate OK? Does machine shut off after filling the plastic container?
- 5) If a multi-line machine — swap hoses between a working line and the suspect line. Does the problem follow the hose and lances?
- 6) Check to make sure your meter is working with the 5vdc on the PLC and to the air and argon calibration of the gas sensor
- 7) If you can't set zero or argon reading swap hoses and lances and try again.
- 8) If machine still won't calibrate start gas sensor tests.

An operator told me one time that the machine was acting really strange. As long as he stood up it ran fine but if he sat down on his chair the gas filler would not run right.

I removed the hose from under his chair leg.

