# OPERATOR'S MANUAL

# FOR THE

RSGq

# GAS FILLING MACHINE

FDR Design Inc.

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Buffalo, MN 55313 USA
763-682-6096
763-682-6197 (fax)
www.fdrdesign.com
tech@fdrdesign.com

### 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 supervisional 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.

  May 2000

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
DATE:

May 2000

# 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 it's 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 CGA-580
Inlet Connection	
Tourier Connection	: CGA-032*
Flow Range (Argon)	10 to 40 cfh (5-19 L/min)
(Gauges (2 in. diam.):	
Cylinder Pressure	
Denvery Flow	
Overall Length	
Body Diameter	2 1/4 in (57 mm)
Weight	
<del></del>	

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

<sup>\*\*</sup> Gauge calibrated in cfh with flow through metering spud installed in outlet connection.

#### 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.

- 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.

# SPAREPARTS & 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: RSGa - Argon Gas Filler		
Model number:		
Serial number:	•	
Date received:		
		- 1

# 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.

May 2000

## Setting the gas fill percentage

The computer shuts down the filling process when the gas sensor output reading is 4.55 vdc (93% argon). The filling machine will shut off when the exhaust gas concentration at the Sniffler™ reaches approximately 93% argon. This setting will yield a final overall window fill percentage 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.

as 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 the gas sensor 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.



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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.

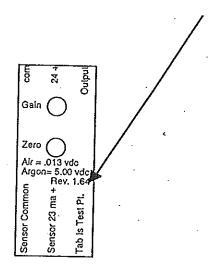
1.61 to 1.64 Red leads

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 ga's 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 sniffler 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?

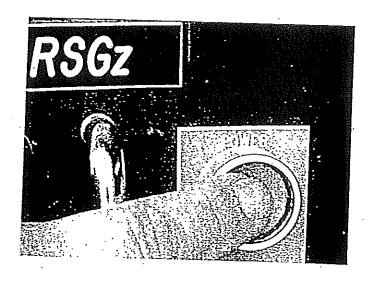
- 1) When it is "burned out"
  - 1) When the seal is damaged

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?

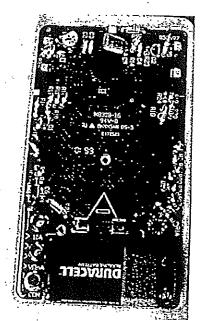
But don't replace the sensor yet let's make another inspection.

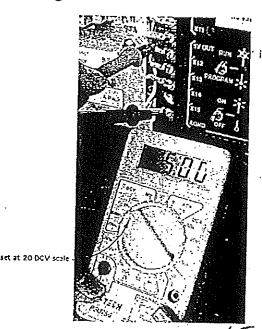
Turn off the power to the machine.



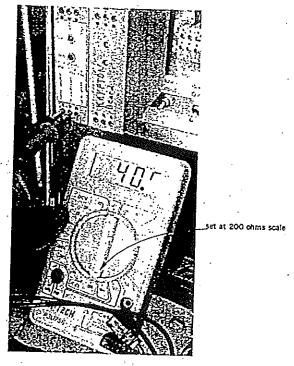
We are going to take an ohm reading of the gas sensor.

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.

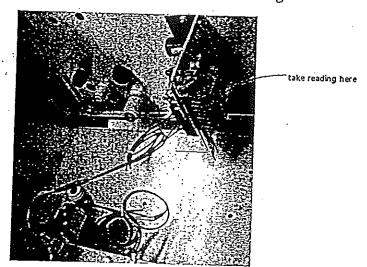




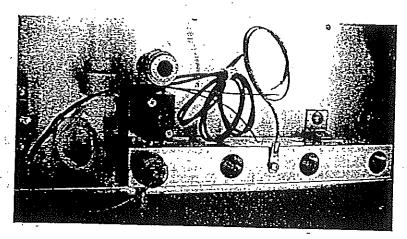
At the gas sensor amplifier board take a reading it should be ohms to ohms. If open or 2000 ohms the sensor may be defective, but let's test it in another location.



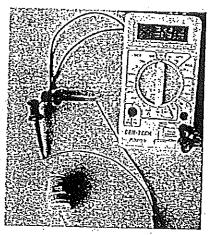
At the terminal strip near the gas sensor(s) take a reading.



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

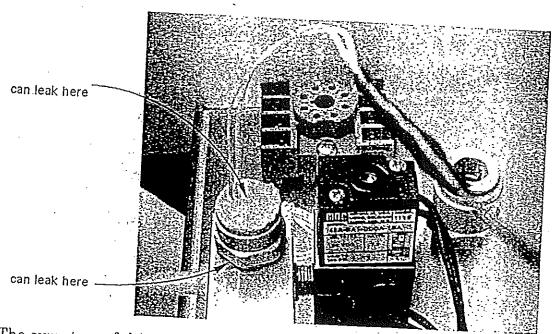


If it still reads open or 1000 ohms, grab a spare sensor or check one of the other gas sensors just to make sure your meter is working OK.



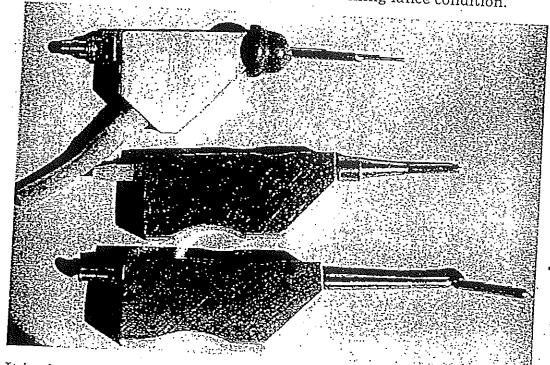
Remove and replace the gas sensor.

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.

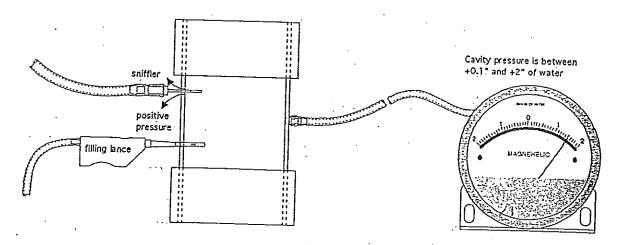


The symptom of this is inability to set the argon or high 5vdc setting.

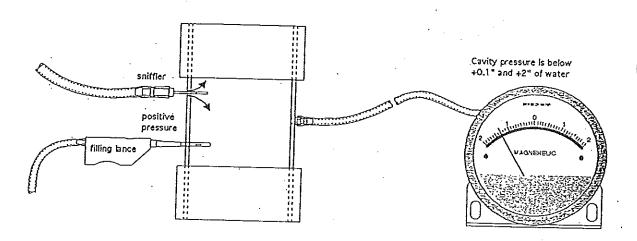
If the symptom is low final fills odds are it is not the gas sensor. 98% of the problems with a low fill are sniffler or filling lance condition.



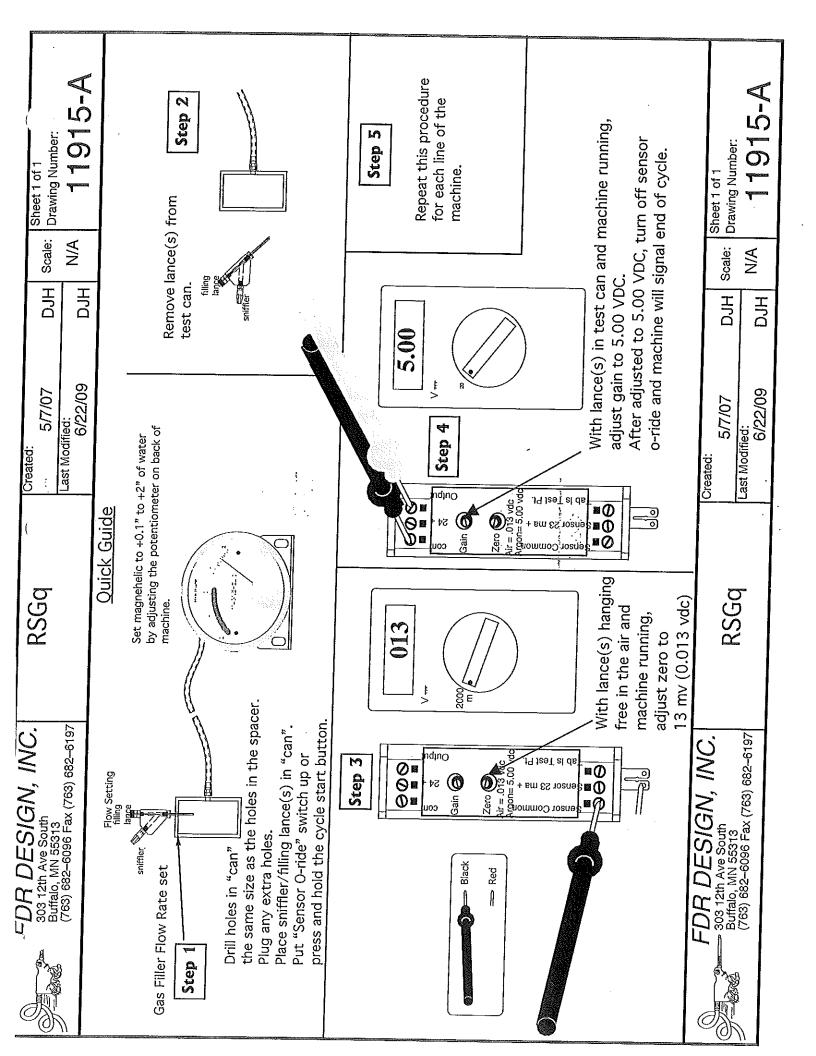
It is also important that the flow rates are checked before trying to set the gas sensor.



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.

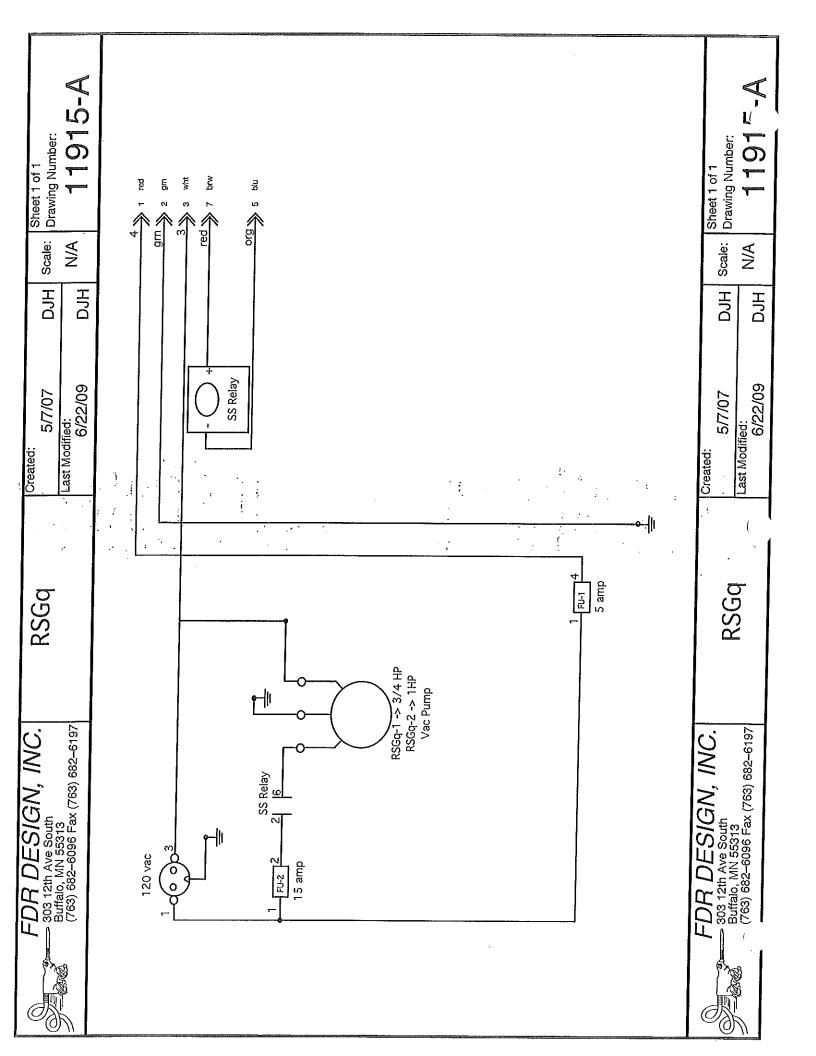
First don't panic, don't clean out your locker, and don't book the next flight out of town.

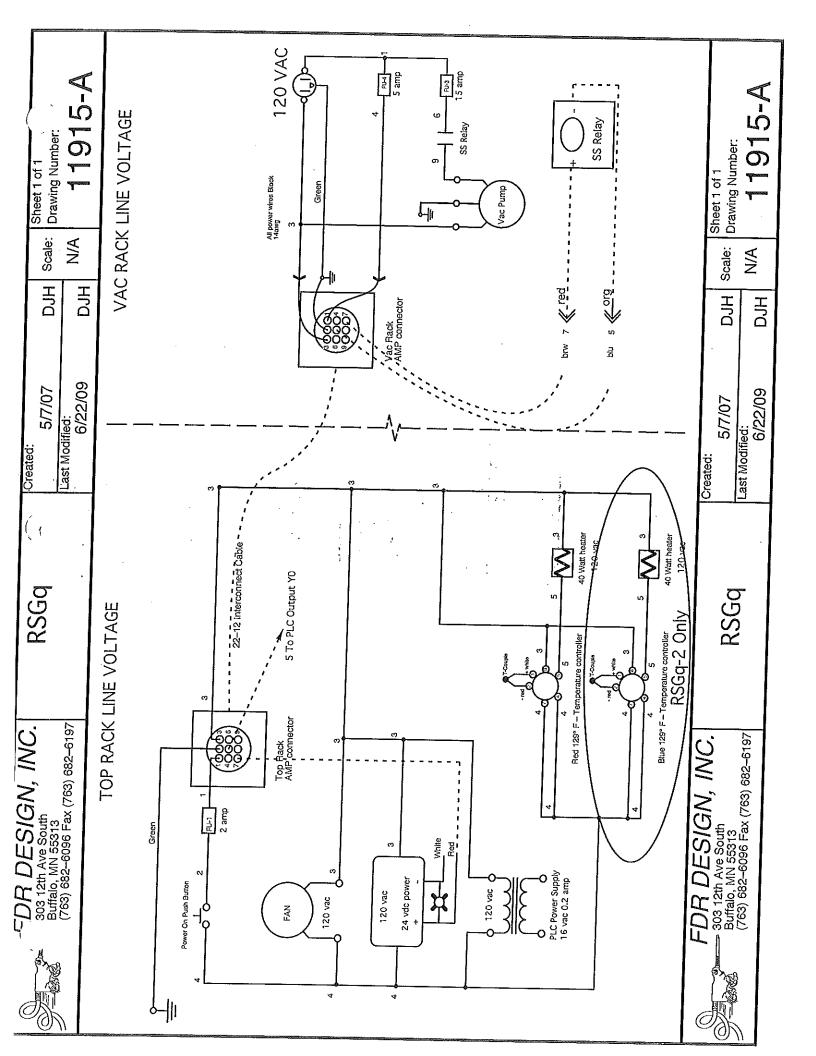
- 1) Start the suspected line running in free air, not in a unit. Does the display meter read near zero? If reading is 100% start in on gas sensor testing.
- 2) Is the sensor over-ride switch off?
- 3) Do the lances look good, not beat up or bent? Is gas flowing out OK, can you feel it? Is the suction 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.

A-010-A 1915-A 0-60 analog MAC (Blue) Drawing Number: Drawing Number: Sheet 1 of . Sheet 1 of 1 White ဝု<sup>ခ်္</sup> Black Q Gas filler alive and well Start / fault light Blue Start / fault light Red Scale: ¥ red/bir Scale: + red/bik X X - green Unit A being filled Unit B being filled 24vdc common 24vdc common 24vdc common 24vdc common Valve Blue Start relay Valve Red DUH D'H E E HA 0-60 analog MAC (Red) red/biu + red/blk green To Vac Rack O via AMP conn pin 5 5/7/07 6/22/09 Last Modified: 6/22/09 5/7/07 Last Modified: Og P Created: Created Yellow/White Green/White Orange/Blk Blue/White Purple/Blk Green/Blk Yellow/Blk Red/White Red/White Red/White Orange Blue/Blk White White White White ì . 4. Y 72 <u>ر</u> χ9 돥 OX OX (analog) Y10 X12 (analog) (analog) Y11 gND IP 1612 A RSGa X15 (analog) X13 (analog) X14 (analog) 5V out Gray/Wht Grey/Black Gray/Yel Pur/Wht Pur/Yel OrgAWht Bm/wht Org/Yel Brn/yel Org/Yel Red/Yel Blu/Yel Gm/Yel 10k ohm Wht/Yel White Grey grande common - while LDR DESIGN, INC. 303 12th Ave South Buffalo, MN 55313 (763) 682-6096 Fax (763) 682-6197 Ó Ò FDR DESIGN, INC. = 303 12th Ave South Buffalo, MN 55313 (763) 682-6096 Fax (763) 682-6197 10k ohm 24 do + red Start PB Red (n.o.) Start CR Red (n.o) Pressure Switch (n.o.) Vacuum Switch (n.o.) 24 vdc + Start PB Blue (n.o.) Start CR Blue (n.o) On for sensor Red 24 vdc + On for override On for flow Red On for sensor Blue On for flow Blue Gas sensor analog Red Set flow Red Set flow Blue Gas sensor analog Blue Analog 5vdc + 24 vdc common





4-10-10-1 Scale: Drawing Number: Sheet 1 of 1 Ϋ́ DJH DH Last Modified: 6/22/09 5/7/07 Created: RSGq FDR DESIGN, INC. = 303 12th Ave South Buffalo, MN 55313 (763) 682-6096 Fax (763) 682-6197

View from Back

Y0, start relay (Purple/Blk) +24vdc(Red) Ground spare spare spare 4, AC 3, AC spare ဖ တ Green Brown White Blue Red Ŋ

Power cable

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

RSGq

Created:

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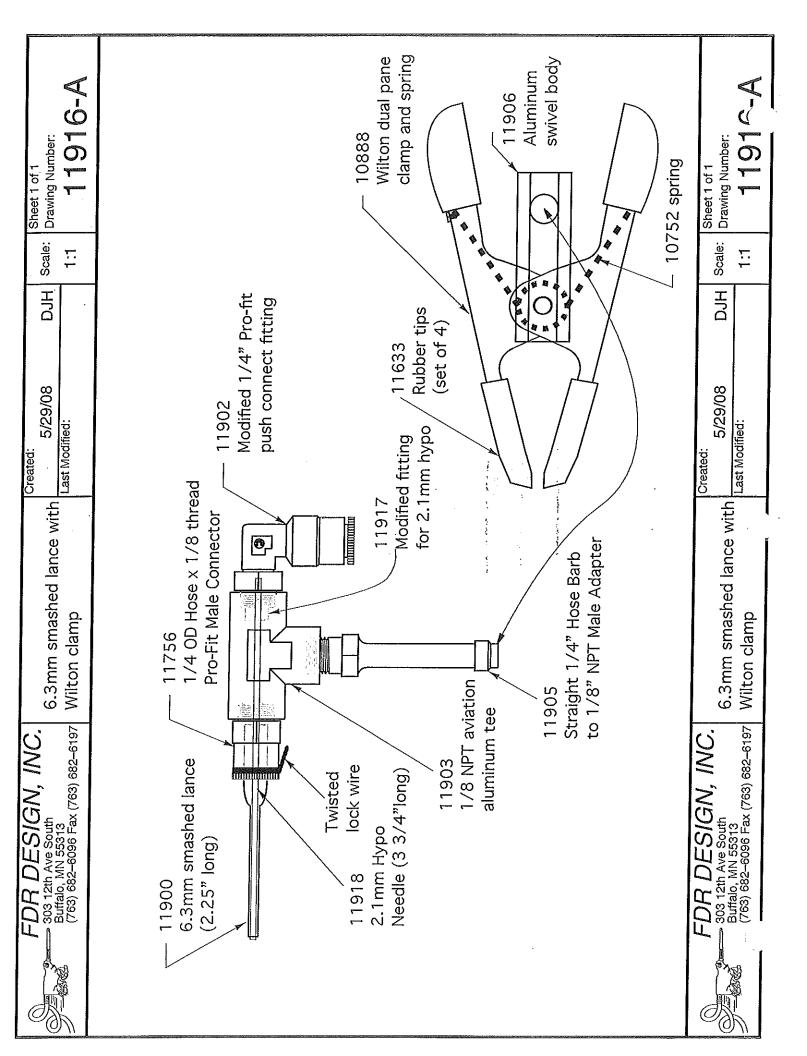
.12 cond. cable 2' long

Scale: Sheet 1 of 1

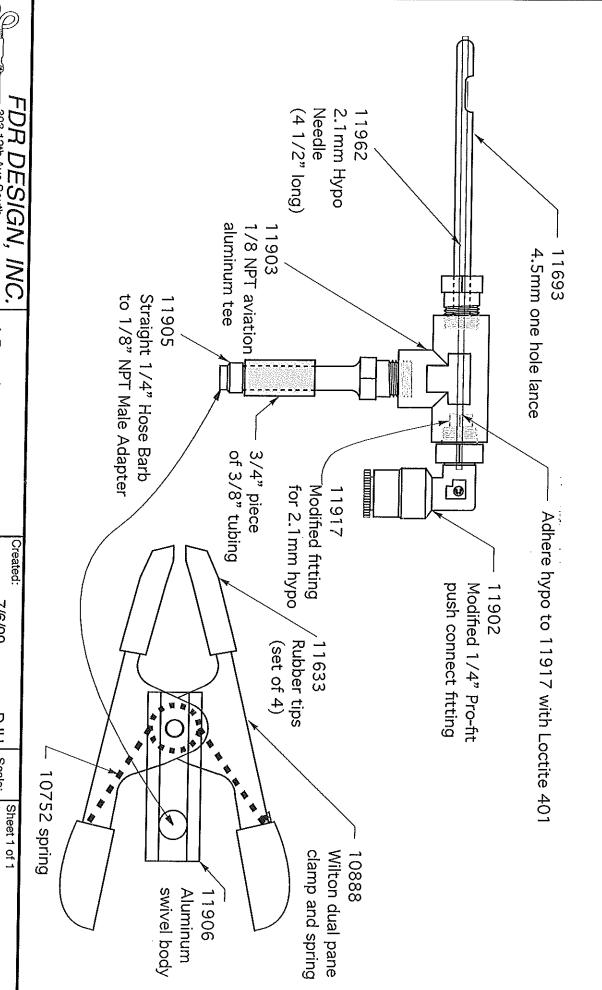
N/A 1 0 1

A-71011

1-010-A 11915-A Drawing Number: Sheet 1 of 1 Drawing Number: Sheet 1 of 1 Scale: Ϋ́ Scale: ¥ alr =zero = .013 VDC argon=span = 5.00 VDC HNO DH SE 吕 Red/Ylw Blu/Ylw 9 Red/Ylw Blu/Ylw Last Modified: 6/22/09 Last Modified: 6/22/09 5/7/07 2/1/02 Created: Created: RSGq RSGq white 24 vdc common Zero Test Point \*\*DH DESIGN, INC. 303 12th Ave South Buffalo, MN 55313 (763) 682-6096 Fax (763) 682-6197 Red/Ylw Blu/Ylw FDR DESIGN, INC. 303 12th Ave South Buffalo, MN 55313 (763) 682-6096 Fax (763) 682-6197 Sensor Output Into Is Test Point Red/Blk Blu + 24 vdc Argon Sensor ( no polarity ) sensor 23mg+ Sensor Supply ő กิดภากเจว เจะกระ



EDR DESIGN, INC. 303 12th Ave South Buffalo, MN 55313 (763) 682–6096 Fax (763) 682–6197 4.5mm one hole lance 11693 Wilton clamp 4.5mm lance with Adhere hypo to 11917 with Loctite 401 Last Modified: Created: 11902 7/6/09 E D D Scale:  $\vec{\Xi}$ Drawing Numbe. Sheet 1 of 1 1961-4



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

Wilton clamp

Last Modified:

7/6/09

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11961-A

4.5mm lance with

12006-A Sheet 1 of 1 Drawing Number: DJH | Scale: | Drawing Numbe. 3.2mm filling lance short 10228-A Scale: 2/1 2/1 PUH 8/31/10 8/31/10 ast Modified: ast Modified: Created: 3.2mm filling lance nose 7 3.2mm High Speed filling 3.2mm High Speed til – lance assembly 10227-A lance assembly filling lance body 10220-A FDR Design, Inc. 1th Ave. South phono/763-682-6096 p. MN 55313 haz/63-682-6197 FDR Design, Inc. 33 12th Ave. South phono763-682-6096 uffalo, MN 55313 12763-682-6197  $.170 \times 1/4$  tube fitting 10-32 thread to 303 12th Ave. South Buffalo, MN 55313 South 303 12th Ave. South Buffalo, MN 55313 10832-A

clamp and spring Wilton dual pane swivel body Aluminum 7-200Z 12007-A 11906 Sheet 1 of 1 Drawing Number: 10888 Scale: | Drawing Numb 10752 spring Sheet 1 of 1 • Scale: <del>---</del> Ξ B  $\Xi$ DH Rubber tips 1/8" NPT nylon plug (set of 4) 11633 8/31/10 8/31/10 Last Modified: ast Modified: 10810 Created: Created; of 3/8".tubing-3/4" piece to 1/8" NPT Male Adapter Straight 1/4" Hose Barb 4.5mm sniffler with 4.5mm sniffler with Wilton clamp Wilton clamp 4.5mm one hole lance 1/8 NPT aviation 11905 aluminum tee FDR DESIGN, INC. = 303 12th Ave South Buffalo, MN 55313 (763) 682-6096 Fax (763) 682-6197 -DR DESIGN, INC. = 303 12th Ave South Buffalo, MN 55313 (763) 682-6096 Fax (763) 682-6197 11693 11903 (4 1/2" long) 2.1mm Hypo Needle 11962