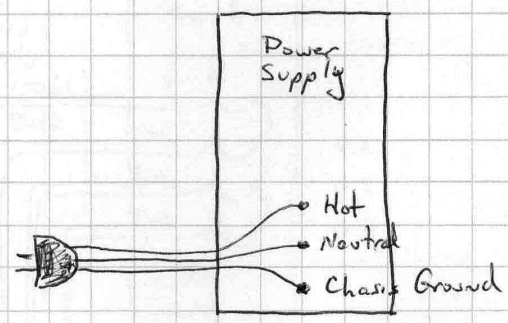
From Page No.

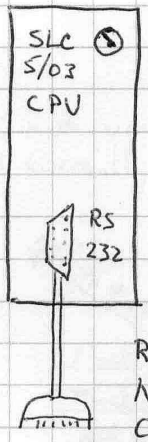
12/2/99

Allen Bradley Wiring Diagrams

Old Diagrams on pages 9-11

Gas Room



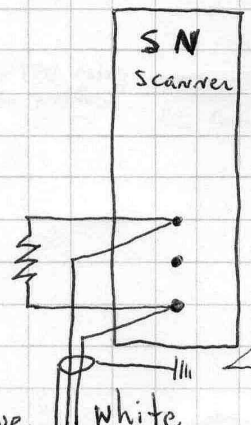


Set Key switch to "Run" for normal operation

Set Key switch to "Remote" for remote programming from PC

R/S 232 Null Modem Cable To IBM PC for Programming. See Page 14.

9 Pin Din Connector



[See Page 47 for Fiber Optic Module on the platform. It is the same]

Terminate with resistor for 57.6 kbaude

Ground ~~wire~~ goes to chassis ground. Do Not connect to shield on scanner

Blue Hose goes to Fiber Optic Module

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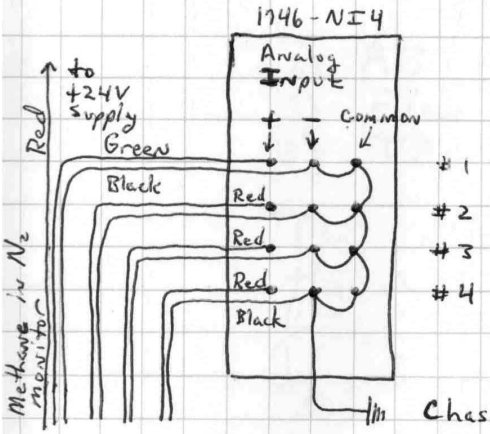
rom Page No.

More Gas Room Modules in Gas Room Crate (master)

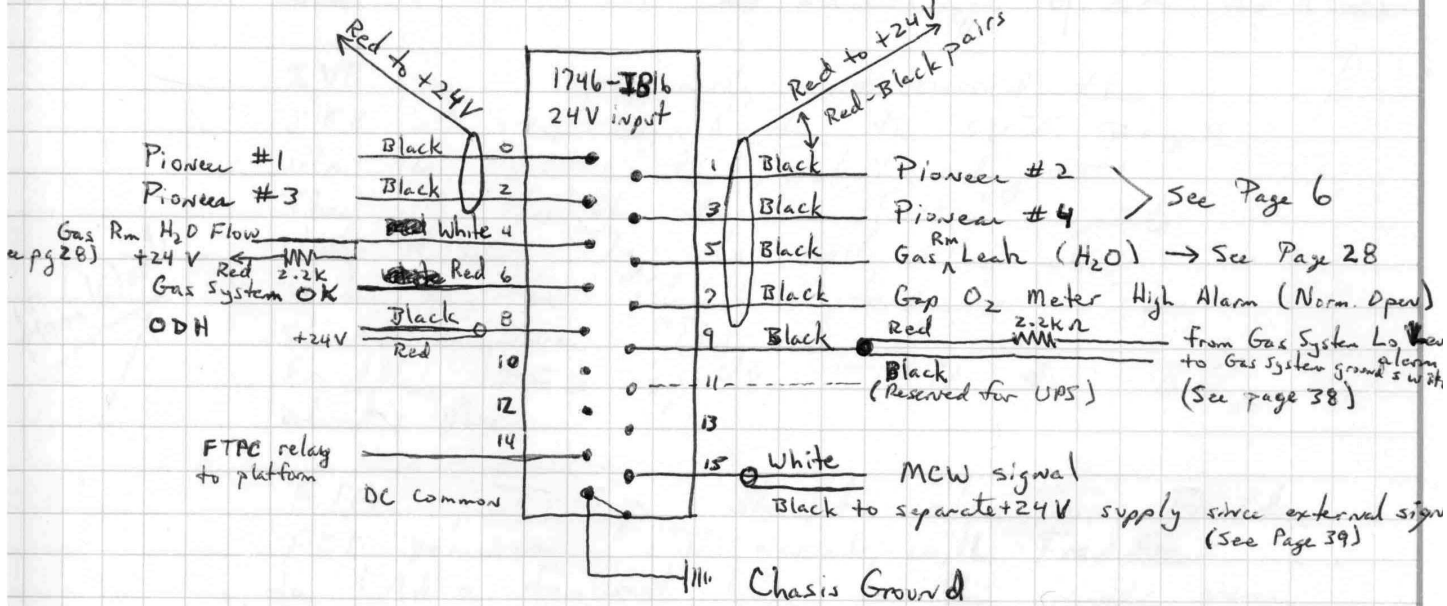
(See Page 55 for more modules)



4-20 mA current Loop into 16384 count ADC full scale. So "zero" is at 3277 counts.

H2O3 H2O2

Water skid (not used as of 12/99)
diagnostics (currently go to fixed resistors to +24 Volts)



See Page 6
→ See Page 28
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4/20/2001

AB Wiring Diagrams - Gas Room Crate (Continued from Page 44)

slot 4

1746-NI4
Analog Input
+ - Common

Currently not used (4/20/2001)
Reserved for Water System Temp etc.
Dip Switches set for 4-20 mA

slot 5

1746-OW16
24V Output

+24V
To Buzzer inside Rack IV
Monitor Chamber
AC Relay
+24V
Hot Wire (See Page 40)
To Gas System 3Ø Solid state Relay Behind Rack II
+24 V
OFC OK to Run
To Gas Room Water Valves - solid state Relay outside gas room

Green Light on back panel is a Quad-LED Lamp that runs on 24V through a 680Ω resistor to Ground

To Green Light on back panel of Rack 4
Indicates that skid is running & no leaks

Note: 24 V enable for 3Ø breaker behind Rack III enables the power to rack III. But it goes through the Pioneer detector first, via the Alarm level 2 relay "NO" (See Page 2)

24 Volt Buzzer is mounted inside Rack IV for water or gas alarm. See Page 40 for comments on reversed Log

24V Power to solid state relay outside the gas room door is not isolated power. It should be because it is far away.

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Slot 6

1746-OXB
Isolated DC OUTPUT

0
1 — Gas Alarm (24V=OK) to Control Room via phone lines
2 — Pioneer Alarm relayed to RICH using cc
3 — Global #2 - OFC OK to Run - relayed to RICH using cc
4 — Global #1 - TPC Purge - relayed to RICH using cc
5 — Global #4 - Detector Leaks - relayed to RICH using cc
6 — Gas 'OR' Water alarm to Bell outside Gas Rm (Uses a solid state relay to switch AB)
7 — Water Alarm to Control Room via phone lines

+24V
Separate Power Supply (see Page 39)

Slot 7

1746-IB16
24V Input

Channels 0-7 on separate 24V supply.
Channels 8-11 use the regular 24V supply

Key switches on Front Panel of Rack 4 go to separate +24V supply to distribute load (See Page 39)

0 — Gas system Power Over-ride key switch on Front Panel
1 — Gas OK signal to Control Room over-ride
2 — Gating Grid overriride
3 — Laser over-ride
4 — Anode over-ride
5 — Monitor Chamber overyride
6 — Cathode Over-ride key switch on Front Panel of Rack 4
7 — Water system Alarm Over-ride key switch on Front Panel
8 — Water skid Over-ride keyswitch on Back of Rack 4
9 — TPC Flow switch over-ride on Back of Rack 4
10 — Gas Room Flow swith over-ride on Back of Rack 4
11 — Platform Alarm silence switch and reset on Front Panel of Rack 4
12
13
14
15

Slot 8

1746-IB32
Input

Cable to Input of AB RediPanel Keypad

Slot 9

1746-OB32
Output

Cable to Output of AB RediPanel Keypad

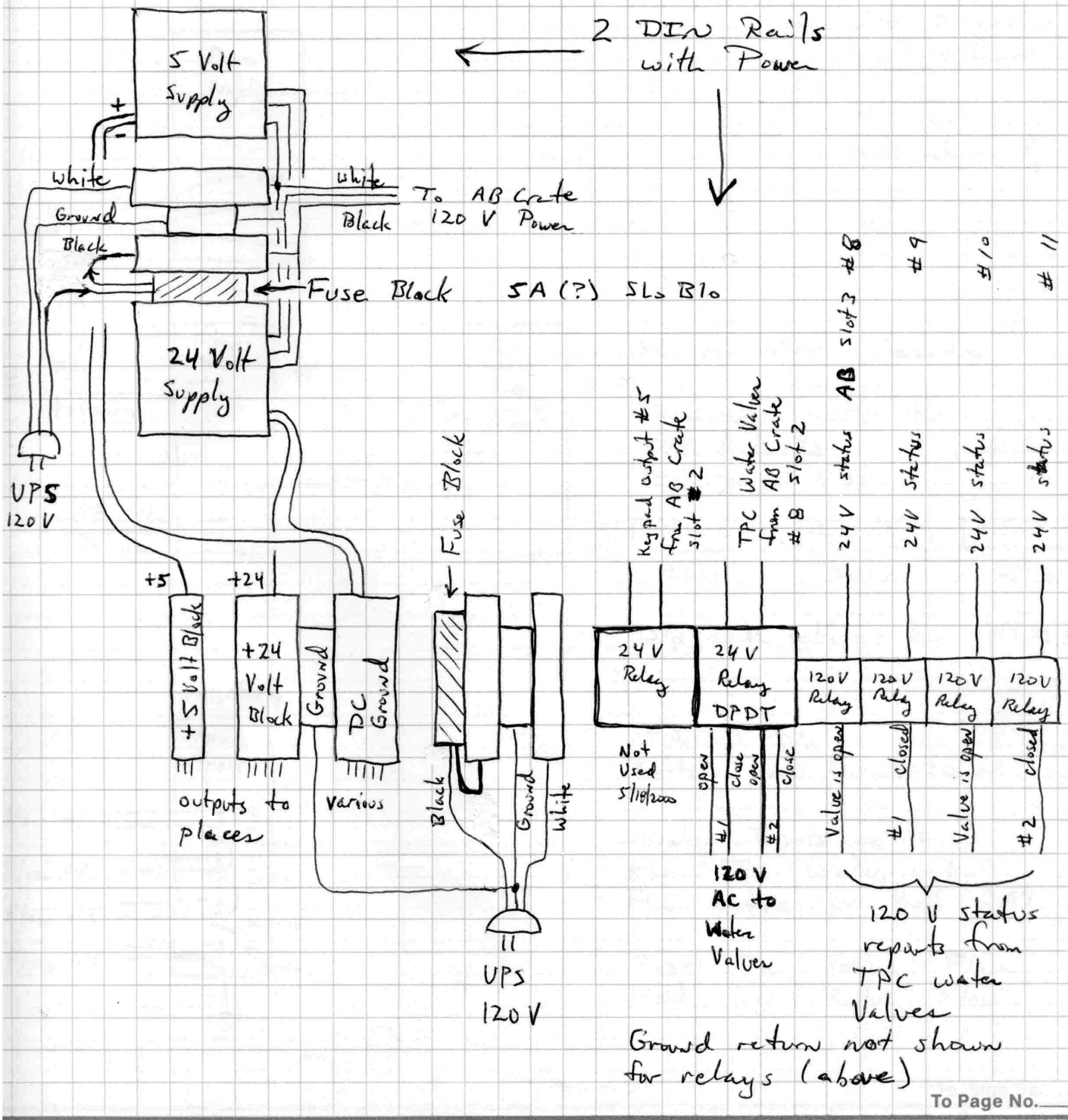
Redi-Panel Connector Viewed from the back of the Redi Panel

+24V supply > ½ Amp

Redi Panel is powered by the Seperate 24V supply (See Pg 39)

To Page No.

5/18/2000 Slave Crate on Platform



Witnessed & Understood by me,	Date	Invented by	Date
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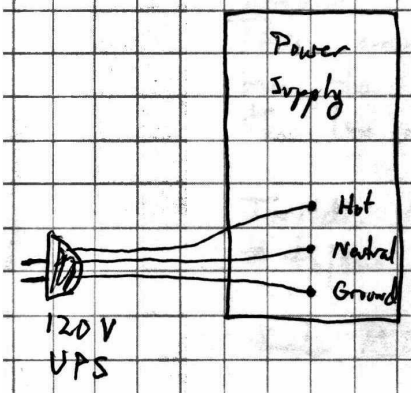
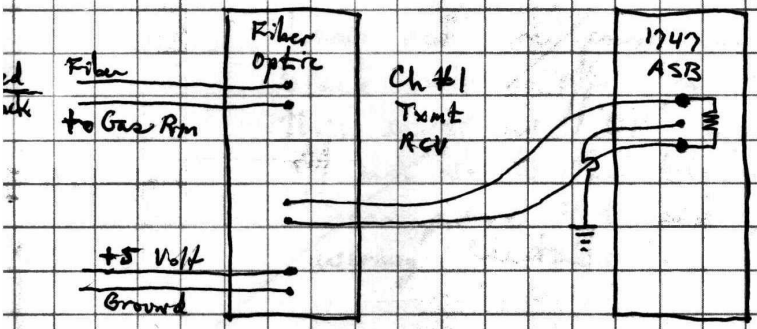
Allen Bradley Wiring Diagrams - Slave Crate on Platform

Old Diagrams on Page 11

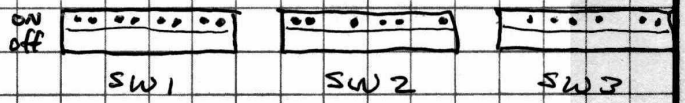
This work continued on Pg 52



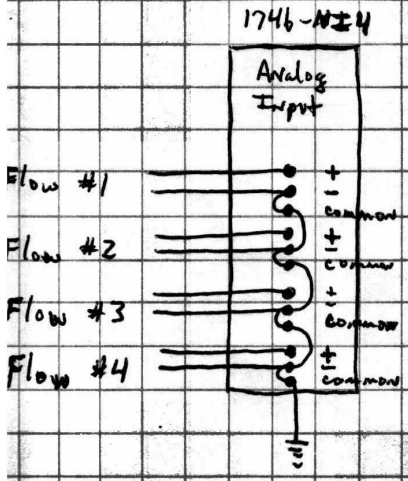


Scanner adapter / receiver

Termination resistor for 57.6 k baude (See page 11)



Dip switch settings for 1747 ASB



Internal Dip Switches set for 4-20 mA

Analog Inputs go to the TPC Cooling water Flow meters in Rack 2A9

East Top & Bottom Flow
West Top & Bottom Flow

To Page No.

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Allen Bradley Wiring Diagrams – Slave Crate on Platform (Cont'd)

See Page 47

1746-OW16

Output
24 Volt

+24 Volt from local supply in Rack 2A8

+24 Volt from remote supply in Rack 2A9

0 Gas Alarm to DIN #16 in Rack 2A9
1 Gating Grid Enable & Pad Plane Pulser Enable (Split)
2
3
4
5 To Potter Brumfield Relay on Din Rail ... not used (pg 46)
6
7 Water Alarm to DIN #16 (same as above) in 2A9
8 OFC OK to run$_{20}$ – to DIN #20 in rack 2A9
9 TPC water valves open – to Potter Brumfield AC Relays on Din Rail See Page 46
10
11 IFC OK to run$_{21}$ – to DIN #21 in rack 2A9
12
13
14 FTPC signal Relay from Gas Room – $_{22}$ to DIN #22 in 2A9
15

Note that the Pulser enable (above) sends +24V through a 330 Ω resistor to a pin on the front panel of the Wiener VME crate. The GG enable seems to put the +24V through one or more Zener diodes (?)

1746-OX8

Output
Isolated

0 Black / Red — MCW Relay Signal from Gas Room to Global Cable #1 Red/Black +24V from Global
1 Gas system Alarm to Horn (R/B)(14/15) to Din Rail in 2A9
2 GG enable (not used)
3 Laser enable (cc)
4 Anode enable (cc)
5 Yellow (Not used due to Jumper to 0) — TPC Flows OK to Global Cable #2 Yellow (only)
6 Cathode enabled on cc
7 Water System Alarm to Horn (G/W)(13/12) to DIN Rail in 2A9

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Witnessed & Understood by me,	Date	Invented by	Date
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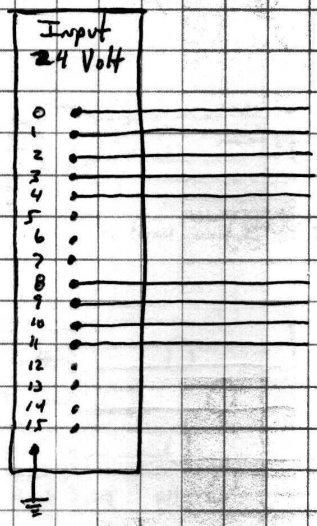
Allen Bradley Wiring Diagrams – Slave Crate on Platform

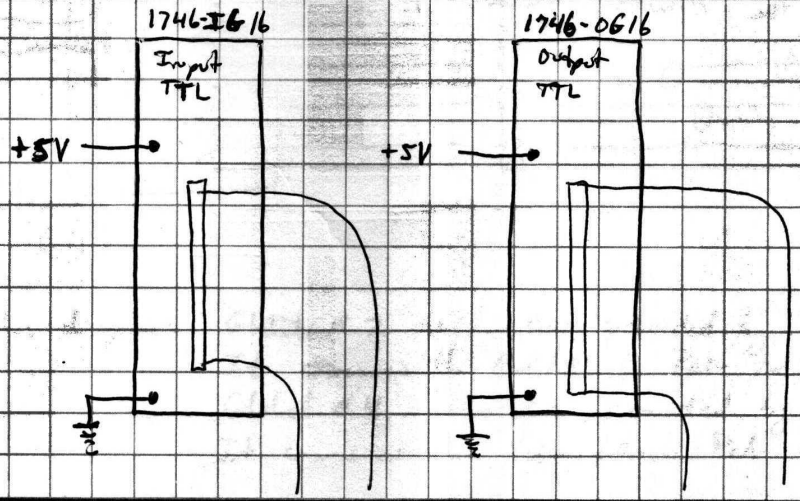


Global Purge #1 Blue wire on Global Cable #1
Global OFC OK to Run #2 Brown Wire on Global cable #1
OFC Flow in Rack 2A9 ... Using cc in 2A9 and 24V from 2A8
Global OFC OK to Run #3 Blue wire on Global Cable #2
Global Leaks #4 Orange Wire on Global Cable #2

TPC Water Valve Status (Open) (Closed) (Open) (Closed) See page 46 from Potter Brumfield AC Relays on DIN Rail in 2A8

Yellow / Orange on Global Cable #1 go to +24V in 2AB

Note that due to a lack of wires going between Global and the TPC interlocks, we do not send pairs of wires for the Blue / Orange Wires on Global Cable #2 ... we assume that they will jumper the +24V from 2AB that comes over on the Yellow / Orange cables on Global Cable #1 to the other side of the cc for the Blue / Orange wires (#2)



TTL input / output on Ribbon Cable to I/O modules in slow controls crate in 2A7 (AVME 948X)

See Page 33 for wiring map to Ribbon cable

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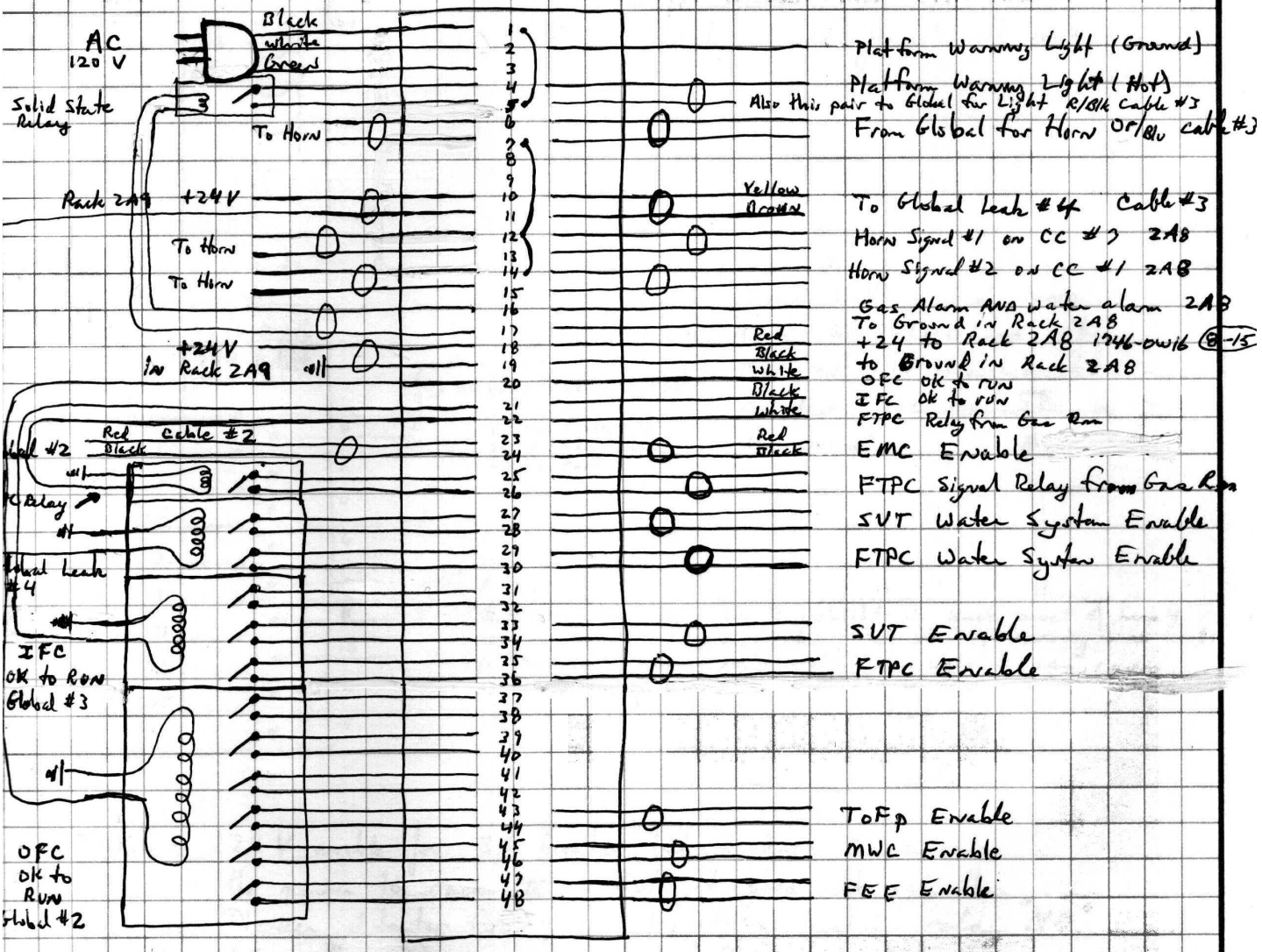
20/2001

AB Wiring Diagrams – DIN Rail in 2A9
(Flop down panel in back)



In this diagram: Global #2 is a CC provided by Global Interlocks
It comes on the Red/Black Pair in Global Cable #2
Global #4 is a CC provided by Global Interlocks
It comes on the Yellow/Brown Pair in Global Cable #3

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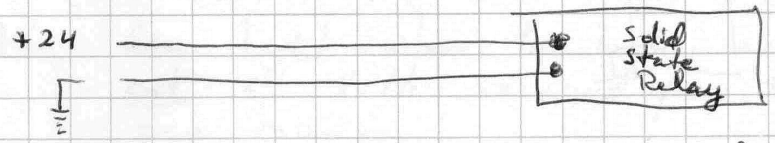
8/3/98 B.S. L.R.

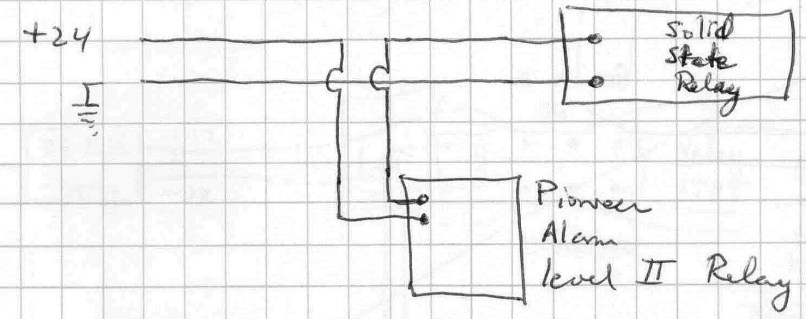
Modified Wiring between the Allen Bradley system, and the 3Ø solid State Relay. Asher Ethan requested that the Pioneer hardware force the 3Ø relay off if ~~it trips~~ the Pioneer heads trip off.

We accomodated this request by putting the Pioneer level 2 alarm relay in series with the 24 Volt power to the 3Ø relay.

The 3Ø relay requires +24 Volts to stay open. Previously this was provided by the Allen Bradley and its Logic.



Now, the Pioneer is part of the circuit



All four Pioneer heads must be "OK" for the relay to be energized.

Tested the circuit modification by placing the AB in forced or mode. We then tripped one Pioneer head with 20% LEL methane gas and observed that the gas system power (3Ø) shut off.

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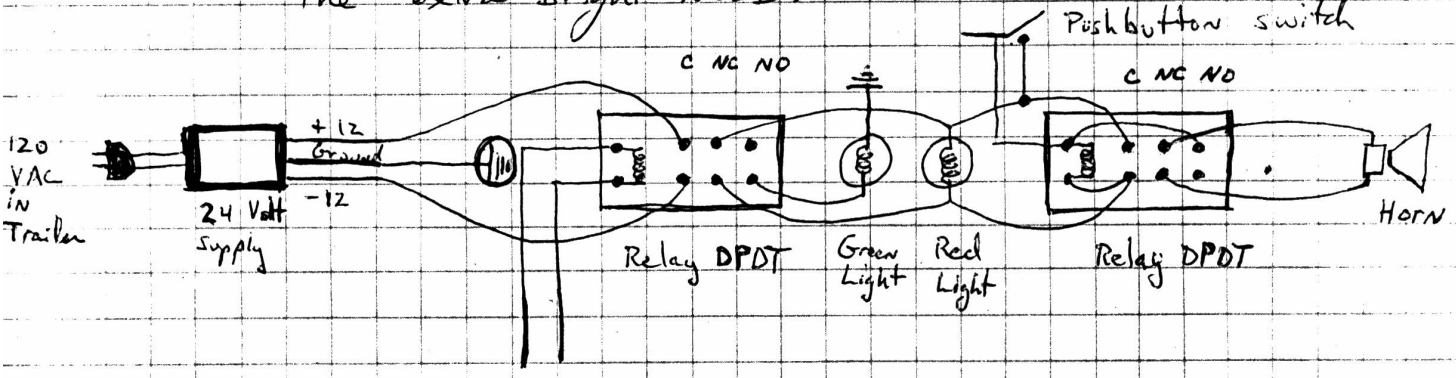
3/10/98

Add Push Button to system for announcing the gas alarm in the Trailer to kill the (See page 3) audible alarm but leave the red light on.

Also changed the green light to run off of 12 Volts rather than 24 Because if it was running hot (temperature). Red light is still 24 volt since we need the extra bright ness.



+24 Volt signal from Gas Room over Telephone Line

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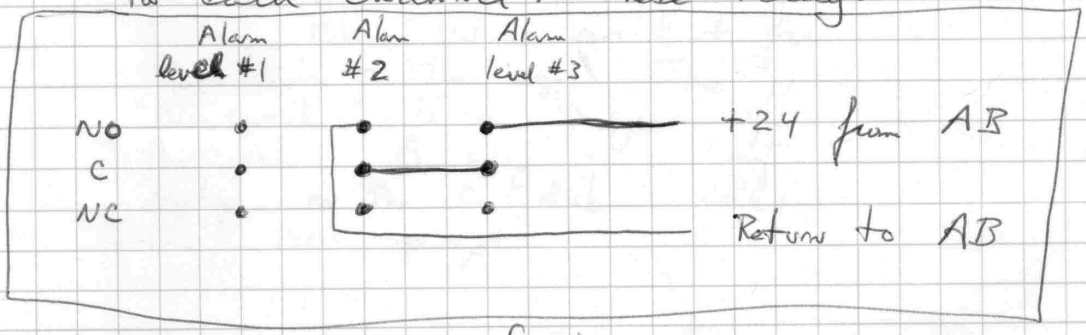
8/10/98

Pioneer Gas System Configuration.

In set up mode, I have configured alarm level three (for the individual channels) to become the "Fail" Relay. These ~~will~~ are "NO" relays that are closed when the sensor head is connected and working properly. If the sensor head is disconnected (such as by driving a bull dozer through the connecting wire) the relay will open.

I use this to protect the signal to the Allen Bradley interlock system.

The Allan Bradly system sends 24 volts to the Pioneer level two relay for each channel. These relays



will be closed if the sensor is OK and P10 is below the level two threshold. If either fail, then the 24 volts is not returned to the AB and it goes into an Alarmed state.

The alarms ring on power failure, too.

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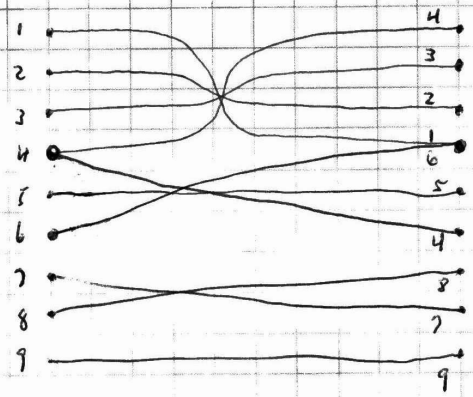
0/9/98

Pioneer head #2 has drifted so "zero" reads -4 on front panel.

Readjust "zero" at head. (ie set tp to 100.0 mV)
Readjust "zero" Programming inside the Pioneer box (Press (enter + year) three times) (and follow your nose to set zero)

3/8/99



Null Modem cable for PC to AB communication

5 to 5
9 to 9
swap 7 & 8
(1 & 6) goes to 4
4 goes to (1 & 6)
swap 2 & 3

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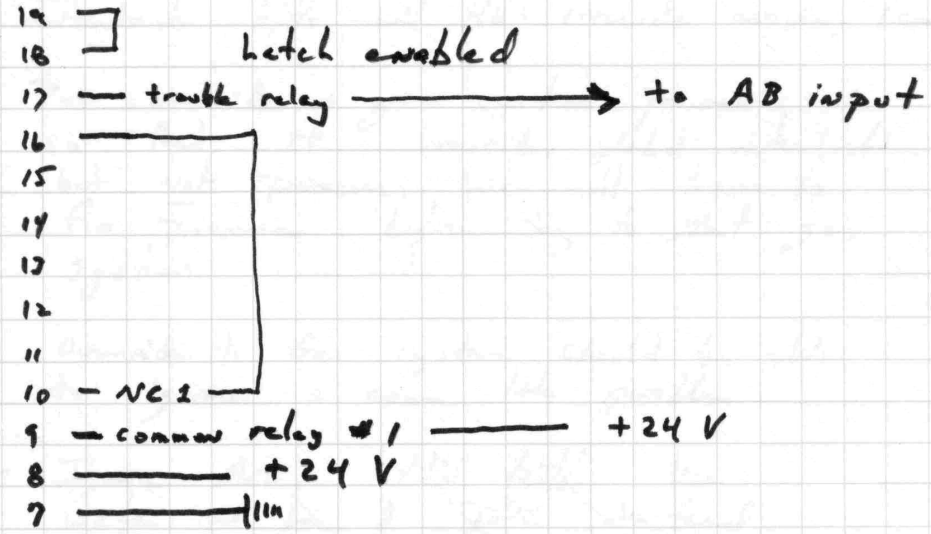
4/15/99

Wafer
Leak detector in gas Room 4
TraceTek in Rack

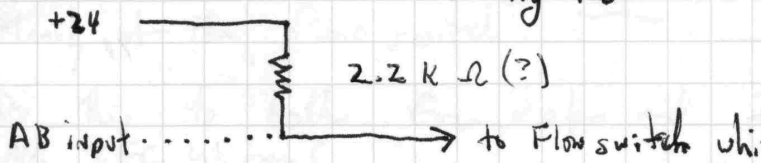


Note: must push latch reset button on leak detector after a leak has occurred.

jumper signal through trouble relay to set off alarm if the leak cable is disconnected.

Flow switch - white wire is a true ground (Black wire equiv)
when flow switch is off. It is open circuit when water is flowing
So try this

See pg 29 Bottom



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4/15/99 Possible Program changes

ok done 4/25/99 - Change logic so HV kill from Global Interlock kills all HV including anodes, I com etc.

- Put override on gas system power so that it overrides global interlock but not pioneer. We will have to fix pioneer before trying to start gas systems.

- Override to Gas system should be able to ignore a comm link problem

- ~~Ignore Arlene HV kill. Use water on face of TPC interlock as an HV kill.~~

OK done 4/25/99 - Put our system on UPS on platform

4/16/99

✓ Connect ODH meter to AB main crate input # 8

~~(What about the UPS? Weren't we going to add this to Slow C data stream)~~

Additional Program Changes

Fixed 4/25/99 - Flow switches currently work but broken cable is "on" state. We can fix this by reversing the logic inside the AB and also changing polarity at the flow switch.

Do this to both Gas water and IFC vent gas
Also IFC Water?

- IFC Water switch doesn't exist for 2-3 months, hot wire it!!

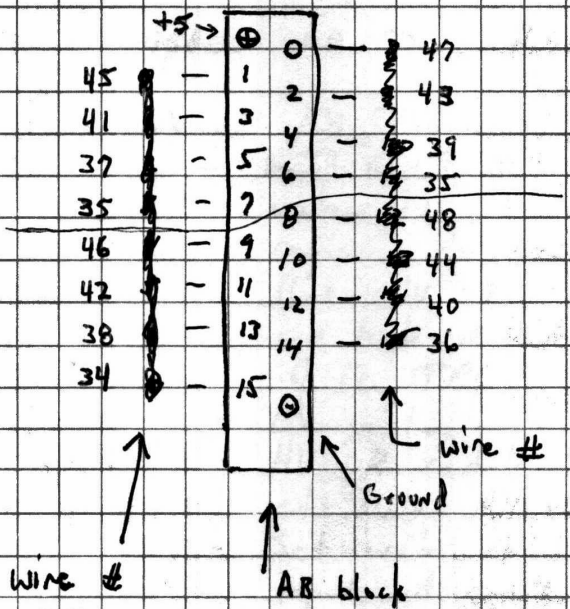
4/28/99 Install Cables to enable each sub-system

- Anode - BNC cable provides cc to LeCroy
- Cathode - Gray cable to Provide cc to Pins 2 & 3 on back of Supply
- Laser - Gray Cable to rack 149 - CC
- GG - Gray cable to Valvis crate

5/3/99 Archer educated me with respect to the Ribbon Cable wiring scheme. It was wrong. Now it is correct

TTL input block to Allen Bradley

Output Block is the same



Red on top (ie near # 0)

Red ≡ wire # 50 on ribbon from IO module

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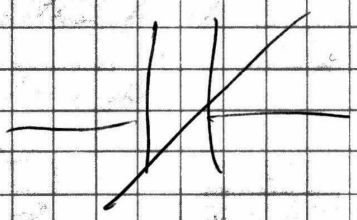
/10/99

03:30 Called Leavitt to restart gas system
Called MCR @ 4662 to restart water

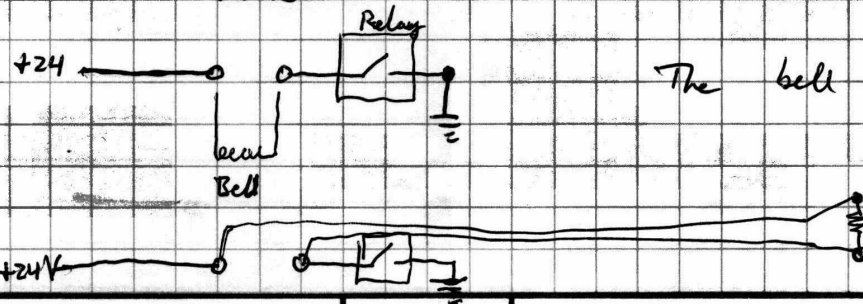
03:40 Disconnect green light on back panel near over-ride keys. It is redundant with "Water Alarm" light.

We should change program so water alarm light does not go green until TPC flows are OK, etc. etc.
Currently it goes green with the over-ride. But this would make it hard to run long term with the gas room bypassed, for example.



/14/99

Historical note: The Gas system "bell" has a very strange relay to enable it. The relay switches the ground side of the circuit. So... I used a 2.2 kΩ resistor across the [redacted] +24V to switch side of the bell. This gives a Lo: Hi: at the AB input... but not 0: 24V It is something else but at least it works.



The bell circuit

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6/24 Wish List for Program Changes

1.) Skid status Light - when is it OK to go out of over-ride. Use light on Back panel

2.) Fix Horn ! time - remove the intermittent on the horn for water ! gas

3.) ~~Change~~ change Blink rate to 1/sec

4.) Light for status of horn in the hall

5.) Replace bell with small horn in the gas room.

6.) Put bell (or horn) outside the gas room.

6/22/99 The alarm circuits for the trailer ! control room go through the CC relay output on the master crate I Did this so they can be given a separate 24V supply.

Currently the alarms use the keypad Power supply. Should go to a separate supply someday.

No.____

Witnessed & Understood by me, | Date | Invented by | Dat
Recorded by

1/25/99 Wired up the Buzzer in the gas room.
It is connected to the Master Crate 24V output for both Ch #1 and Ch #7 (gas and water)

However, the AB program logic is expecting to send 24V = OK to the trailer / control room.

The buzzer needs 24V = fail
So I reversed the logic on the output to ch 1 & ch 7.

1/17/99 We powered down the platform in order to move the detector. This killed the power to the remote AB crate on the platform with the consequence that the AB master crate faulted and shut down the gas system.
In order to restore operation, I built a hot wire for the gas system

16:00 Use channel #1 of the patch panel on the back of Rack 4 to provide 24 Volts directly to the gas system breaker. A jumper on the back of rack 4 can be removed to disable the hotwire.

The gas system is permanently on without any protection.

To Page No.