Instruction Manual

SC-20
DIGITAL SYSTEM CONTROL

Software Version _____

Serial Number:_____

Eddy Company
13590 Niabi Road
Apple Valley, CA 92308

Phone: 760-961-8457 Fax: 760-961-8458
Internet address: www.eddyco.com

eddyco.com

TABLE OF CONTENTS

ENGINEERING DRAWINGS

BASIC DESCRIPTION

The SC-20 is a stand alone vacuum system controller that incorporates several functions common to most coating processes. In addition to controlling substrate rotation, substrate heating, ion processing and pressure control (gas bleed), it can run user selected sub-routines to supervise, monitor and analyze performance. Error signals can be generated due to abnormal system performance and simple command inputs provide for the action to be taken when an alarm is triggered.

A combination of RS-232 and bits in/bits out provides communication to external subsystems. An example would be the SC-20 combined with a LMC-20, XYC-20, crystal rate and deposition controller plus an electron beam power supply and source which would provide an automatic multilayer metallization system.

The SC-20 is available in configurations for diffusion pumped, turbo-pumped and two types of cryo-pumped systems. A simple exchange of E-proms allows the SC-20 to be reconfigured in your facility. Multiple RS-232 communication and I/O ports enable the SC-20 to interface with other system components to make a totally automatic coating system. The standard software will communicate with CTI and APD onboard electronics or with an internal board with CTI and APD systems without electronics.

LIMITED WARRANTY

This SC-20 System Controller is warranted against defects in materials and workmanship for a period of one year from the date of shipment to the original purchaser. This warranty will be void if the instrument is not properly operated under conditions of normal use and if normal and accepted maintenance protocols are not performed.

Defects resulting from, or repairs necessitated by, improper installation, misuse, negligence, accident or corrosion of the equipment or any cause other than defective materials or workmanship are not covered by this warranty. No other warranties are expressed or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Eddy Company is not liable for consequential damages resulting from the use of its equipment.

Purchaser's sole and exclusive remedy under the above warranty is limited to Eddy Company, at its option, repairing or replacing any item which proves to be defective during the warranty period provided the item is returned to Eddy Company together with a written statement of the problem encountered. Any such obligation on the sellers part is subject to the following requirements: 1) defect must be promptly reported to the seller, 2) if so advised by the seller, component must be returned to the seller, no later than seven (7) days after the end of the warranty, and 3) on examination by the seller the part or component must be found to comply with the above warranty. Any item claimed to be defective during the warranty period must be returned to the builder with the transportation charges prepaid. The purchaser will pay return trip transportation charges. In the event that the seller elects to refund the purchase price, the instrument shall be the property of the seller and shall be promptly shipped back to the seller at the seller's expense. Eddy Company reserves the sole right to determine whether service is covered by the warranty.

If there are any questions about any of the equipment, parts or service call EDDY Company. For all repairs, whether or not they are covered by the warranty, call EDDY Company service line or contact our Internet address.

Phone number: 760-961-8457
Internet: www.eddyco.com

If the equipment needs to be returned for any reason you will be given a Return Material Authorization (RMA) number.

DANGER

Potentially lethal voltages may exist in the unit, even with the power switched off. Service should be attempted only by experienced personnel. Failure to observe safety protocols that are standard for high voltage equipment could result in personal injury.

UNPACKING

1. Completely unpack the instrument. Your SC-20 was released to the carrier in good condition and properly packed. It is essential to examine the contents of the shipment to ensure that no damage occurred during transit.

2. Compare the shipped materials to the packing list. Items included with your SC-20 are:
   a. SC-20 System Controller.
   b. Operation and service manual.
   c. Power cord.
   d. Installation kit: 1 - 37 pin AMP male system connector, 37 pin strain relief, 2 – 14 pin AMP male connector, for I/O and tooling drive, 2 – 14 pin strain reliefs, 3 – 9 pin female D-sub connectors for TC 1,2, and 3, 3 – 9 pin strain reliefs, 65 – male pins (24AWG), 2 – 8 amp SB fuse, and 2 - 2 amp SB fuse, 2 – 1 amp SB fuse.

3. Call EDDY Company first if there are any problems.

Phone: 760-961-8457
Fax: 760-961-8458

USER RESPONSIBILITY

This equipment will perform in accordance with the instructions and information contained in the user's manual when the equipment is installed, operated and maintained in compliance with the instructions. Equipment should be checked periodically, routine maintenance performed and broken or non-working parts replaced immediately.

The user/purchaser shall have sole responsibility for any malfunctions resulting from their improper use or lack of maintenance of the equipment.

INITIAL STARTUP

1.   Read the manual.

2.   Connect all shipped parts.

3.   After reading the manual, establish that all the connected instruments are working properly.

4.   Connect power, check that line cord matches the line voltage and turn the SC-20 on.

5.   The main menu will appear.

6.   Adjust the brightness and contrast for optimum viewing.

FRONT PANEL (description)

Brightness

Contrast

Programming switches

Increase/decrease highlighted values

DIGITAL SYSTEM CONTROL SC-10

E
D
D
Y

ENTER

PAGE

EXIT

INC +

POWER

DEC -

INC +

DEC -

HEAT

VACUUM

STAND BY

VENT

SHUT DOWN

THE EDDY CO.

Power ON/OFF

LCD screen

Sequence select switches

Moves highlight
Up / Down
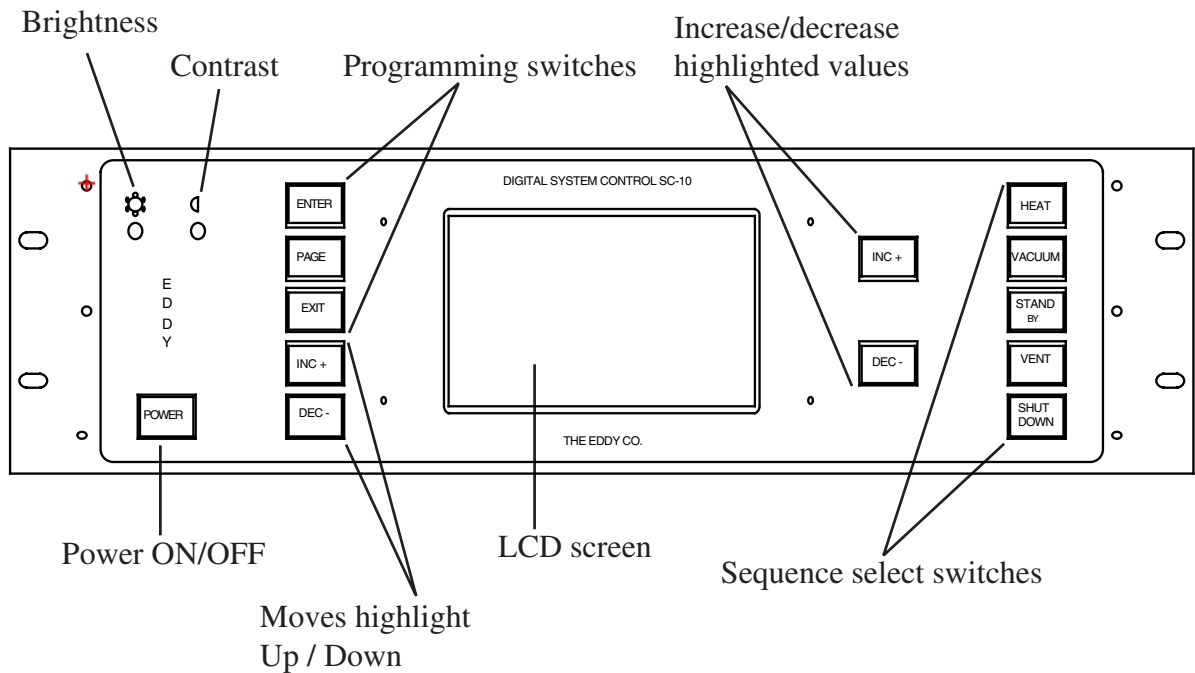
ENTER	This key starts the selected program or edits selected programs.
PAGE	Will change the display page.
EXIT	Returns to the initial display.
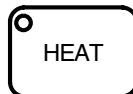
HEAT — While flashing, the controller:
1. Brings system to high vacuum.
2. Turns on ion gauge and enables the E-gun interlock.
3. When the specified pressure is met, heats the substrates for the prescribed time.
4. Turns on planetary.

When HEAT stops flashing itsends a signal via the RS-232 line to enable the coating process.

VACUUM

Brings the system to high vacuum, starts the ion gauge and enables the E-gun interlock.

STAND BY

Turns off heaters, planetary, ion gauge, and E-gun interlock, then closes high vacuum.

VENT

Opens slow vent for programmed time, then vent valve

SHUT DOWN

Closes high vacuum valve, and turns off cryo pump or diffusion pump, then if applicable, stops the mechanical pump.

REAR PANEL
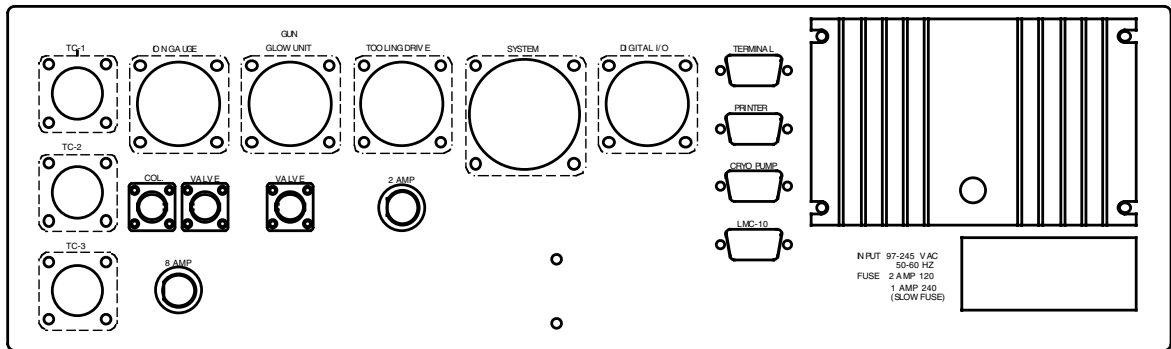
POWER INPUT: Plug/fuse/volt/sw
DATA PORTS-RS 232:
                    TERMINAL PORT: This port allows you to communicate via
                    EddyLog and EddyLink software with the computer.
                    PRINTER: Not enabled with V 6.2
CRYO PUMP: Communicates to either CTI (on board) computer, or APD (on board)
                    computer or our internal cryo control board.
LMC-10:   Not enabled with V 6.2
TC 1:   Thermocouple 1 connects to a pressure sensor at the mechanical pump.
TC 2:   Thermocouple 2 connects to a pressure sensor at the cryo pump.
TC 3:   Thermocouple 3 connects to a sensor in the chamber.
ION GAUGE: Connects to the Ion gauge with a supplied Log Amplifier.
GUN GLOW UNIT: Provides cryo control signals
TOOLING DRIVE: Connects to the planetary motor
SYSTEM: Provides complete system control signals
DIGITAL I/O: Provides alarm signals and input for 02 bleed enable
COL.:   Not enabled with V 6.2
VALVE: Not enabled with V 6.2
VALVE: Signal lead for the 02 bleed valve

The 2-amp fuse is for the planetary motor and the 8-amp fuse is for the ion filament.

REAR PANEL (pin outs)

With CRYO-REGEN BOARD (ASYCSCRYO65A)

SYSTEM   J-10

SIGNAL	RETURN	DESCRIPTION
1	14	MECHANICAL PUMP
2	14	CRYO PUMP
3	14	FORELINE
4	14	ROUGHING
5	15	HIGH VAC VALVE
6	15	VENT
8	15	SLOW VENT
7	12	SLOW ROUGH
9	14	HOT WATER
10	15	SUBSTRATE HEATER
11	NOT PGMD	GLOW BLOCK
16	12	PLATE VALVE
17	12	CHAMBER DOOR
18	21	AIR
19	21	WATER
20	NOT PGMD	
29	NC*	
30	31	SUBSTRATE-RTD
32	33	HEATER POWER +10V
34	NC*	
35	NC*	
36		OK TO COAT
37	15	VACUUM INTERLOCK

DIGITAL I/O   J-11

SIGNAL	RETURN	DESCRIPTION
1	3	02 INPUT #1
2	3	02 INPUT #2
4	5	ALARM 1
6	7	ALARM 2

* NC- NOT CONNECTED

REAR PANEL (pin outs)

With CRYO-REGEN BOARD (ASYCSCRYO65A)

GUN GLOW (misnamed)   J-7

SIGNAL	RETURN	DESCRIPTION
2	1	CRYO PUMP PURGE
3	1	HEATER (CRYO PUMP)
4	1	CRYO ROUGH
5	NC*	
6	NC*	
8	NC*	
7	NC*	
9	NC*	
10		CRYO DIODE (-) 100 ma
11		CRYO DIODE (+) 100 ma
12		RSTX (TO RS232 CRYO PUMP P14)
13		RX (TO RS232 CRYO PUMP P14)
14		RSCOM (TO RS232 CRYO PUMP P14)

TOOLING DRIVE   J-9

1	FIELD 2
2	FIELD 1
3	ARMATURE 1
4	ARMATURE 2
5	TOOL DRIVE GROUND

BNC   J-6

CONNECTS TO THE 02 BLEED VALVE

* NC – NOT CONNECTED

SC-10 SYSTEM CONTROLLER SPECIFICATIONS

All inputs and outputs are optically isolated for noise immunity. The SC-10 uses a motherboard which communicates with analog signals between the input/output boards and the main processor board. It is possible to trouble shoot the SC-10 with a digital voltmeter.

CABINET:	5.25" x 19" x 16" deep includes mounted parts on rear panel
DISPLAY:	Fluorescent backlit LCD
WEIGHT	22 lbs
SHIPPING WEIGHT	28 lbs
AC INPUT VOLTAGE RANGE:	97 to 245 VAC. 50/60 Hz
	Power: 250 VA
	Fuse: 120V - 2 amp slow fuse
	Fuse: 240V - 1 amp slow fuse
POWER OFF MEMORY LIFE:	60 months
PLANETARY CONTROL:	3 AMP. D.C. motor:
	armature......0-120 VDC
	field.............110VDC
	typical motor: ....Bodine 33 Series Baldar 2318P
	2 amp SB fuse on back panel.
ION GAUGE:	Bayard Alpert, typically 563, with platinum coating and iridium filament. Dunaway Stockroom, 1-100-NC, with platinum coating and thoria coated iridium filament.
	8 amp SB fuse on back panel
THERMOCOUPLE VACUUM GAUGE TUBE:	Varian 531 or equivalent
TEMPERATURE SENSOR SPECS:	100 ohm rtd
HEATER OUTPUT:	0-10 VDC
REAR CONNECTORS:	
Digital I/O port:	14-pin twistlock
System:	37-pin twistlock
Tooling drive:	14-pin twistlock
Gun/Glow unit:	14-pin twistlock
Ion Gauge:	14-pin twistlock
TC Pressure Transducer:	4 -pin twistlock (3x)
Piezoelectric valve:	BNC (2x)
Col:	BNC
DATA PORTS-RS-232:	
Terminal:	9600 baud
Printer	Not enabled with V 6.2 software
Cryo pump	Depending on software connects to CTI,APD or our control board
LMC-10	Not enabled with V 6.2 software

OPERATOR SAFETY

DANGER:

Potentially lethal voltages may exist within this unit, even with the power shut off. Only qualified personnel should attempt service. Failure to observe all safety precautions may result in personal injury.

Observe the following precautions when servicing this instrument because of the potential high voltage.

1. Make sure HIGH VOLTAGE WARNING signs are posted in the service area.

2. Remove rings, watches, bracelets, and any other metal jewelry before working around high voltage.

3. DO NOT WORK ALONE.

4. Be sure all equipment is connected to a power source that has the correct polarity and grounding, as prescribed by the local electrical codes.

5. Before servicing equipment be sure it is switched off at the main power switch. This switch should have a lock out feature.

6. Use a grounding hook to discharge any electrical parts that hold a lethal voltage after shutoff. Be sure these parts are discharged before attempting any repairs.

7. Do not touch any high voltage leads unless the power is off and a grounding hook is connected to the parts being serviced.

8. This instrument's high-voltage components are equipped with electrical interlocks to protect personnel from injury. DO NOT ATTEMPT TO DEFEAT, OVERRIDE, OR BYPASS THESE PROTECTIVE DEVICES.

9. Never leave loose ends on high voltage devices.

HEALTH HAZARD

The nature, as well as the form, of the condensates deposited on the tank walls and the materials used in the coating processes can pose health hazards. Some precautions to take include the following:

1. To prevent inhaling the fine particles and prevent damage to the lungs, wear a protective respirator mask that has been approved for this use by the National Institute for Occupational Safety.

2. Some of these materials are toxic. Inhaling them could prove to be deadly. Be sure to know the toxic qualities of each material being worked with.

3. Certain materials can cause flash fires when exposed to oxygen. (Example: Titanium). When opening the chamber door after running a process use extreme caution.

SYSTEM INTERCONNECT
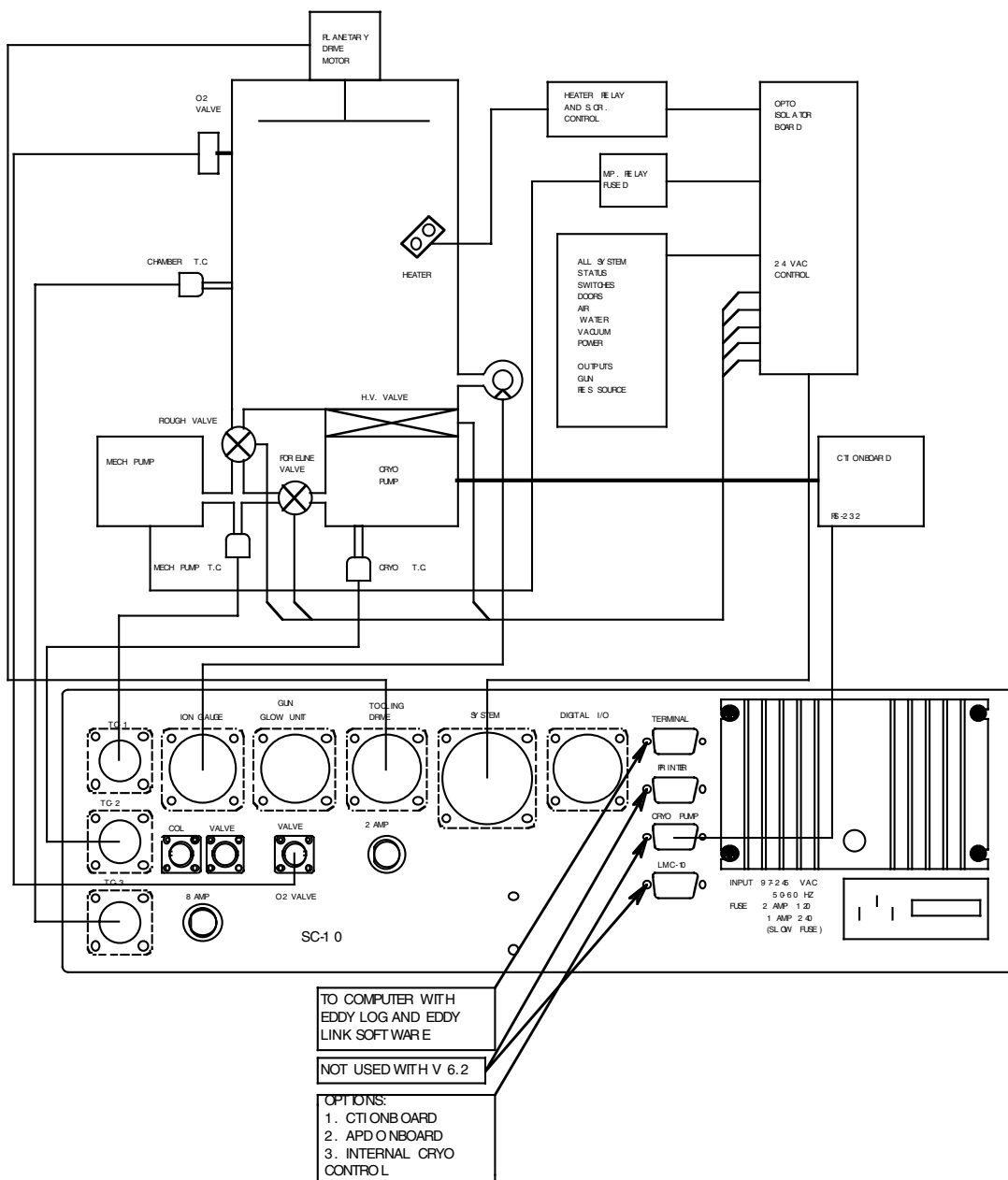
INSTALLATION INSTRUCTIONS
REAR PANEL

DANGER
POTENTIALLY LETHAL VOLTAGES MAY EXIST WITHIN THIS UNIT, EVEN WITH THE POWER SHUT OFF. ONLY QUALIFIED PERSONNEL SHOULD ATTEMPT SERVICE. FAILURE TO OBSERVE ALL SAFETY PRECAUTIONS MAY RESULT IN PERSONAL INJURY.
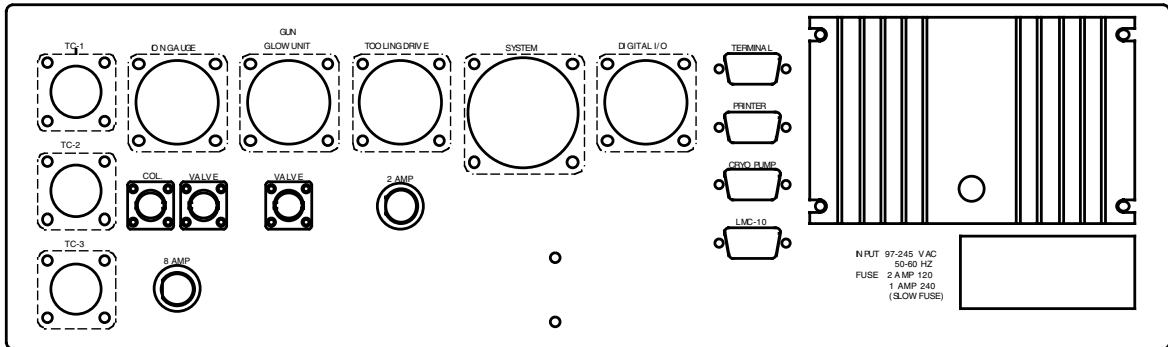
POWER INPUT and FUSE HOLDER:

        The SC-20 can be configured to use either 120 VAC or 240 VAC. The voltage selected is controlled by the CORCOM power card which is installed in the slot below the fuse holder. To remove the card use a pair of needle nosed pliers and pull out. To configure for 120 volts turn card so the 120 is right side up and facing you. For 240 volts turn the card over so 240 is right side up and facing you. Insert card into slot. Make sure the fuse is the right one for the voltage selected. 120 volts requires the 2 amp SB fuse and 240 v requires the 1 amp SB fuse.
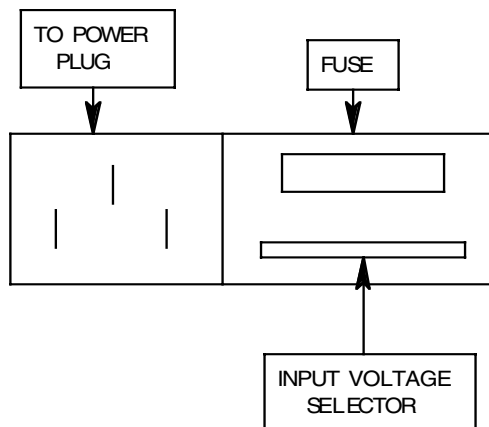
SYSTEM:

Wiring for the system hookup is user supplied. A 37 pin AMP connector with a strain relief is supplied by the EDDY Company. Using the following pin descriptions to construct a cable for the hook up. EDDY Company suggests using 24-gauge wire no longer than 30 feet. We recommend using 1 male and 1 female and wiring pin for pin at the electrical box.

SYSTEM   J-10

SIGNAL	RETURN	DESCRIPTION	SIGNAL	RETURN	DESCRIPTION
1	14	MECH. PUMP	19	21	WATER
2	14	CRYO PUMP	20		NOT PGMD.
3	14	FORELINE	29		NC
4	14	ROUGHING	30	31	SUBSTRATE-RTD
5	15	HIVAC VALVE	32	33	HEATPOWER+10V
6	15	VENT	34		NC
7		NC	35		NC
8	15	SLOW VENT	36		OK TO COAT
9	14	HOT WATER	37	15	VAC INTERLOCK
10	15	SUBSTRATE HEAT			
11		NOT PGMD			
16	12	PLATE VALVE			
17	12	CHAMBER DOOR			
18	21	AIR			

TOOLING DRIVE:

Wiring for the tooling drive is user supplied, EDDY Company suggests using 22-gauge wire, no longer than 30 feet for the cable. Using the supplied 14 pin AMP connector construct a cable using the following descriptions:

TOOLING DRIVE   J-9

1	FIELD 2
2	FIELD 1
3	ARMATURE 1
4	ARMATURE 2
5	TOOL DRIVE GROUND

GUN GLOW UNIT (Used for cryo pump control):

Wiring for the Gun Glow Unit is user supplied, EDDY Company suggests using 22-gauge wire, no longer than 30 feet for the cable. Use the following table to construct a cable.

GUN GLOW   J-9

SIG.	RET	DESCRIPTION	SIG	DESCRIPTION
1			8	NC
2	1	CRYO PUMP PURGE	9	NC
3	1	HEATER (CRYO PUMP)	10	CRYO DIODE (-)100MA
4	1	CRYO ROUGH	11	CRYO DIODE (+)100MA
5	NC		12	RSTX(TO RS232 CRYO PUMP P14)
6	NC		13	RX(TO RS232 CRYO PUMP 14)
7	NC		14	RSCOM(TO RS232 CRYO PUMP P14)

ION GAUGE:

The cable for the Ion Gauge is supplied by EDDY Company with a Log Amplifier connected.

DIGITAL I/O:

The wire for the I/O connection is user supplied. EDDY Company supplies a 14 pin AMP connector and the required pins.

DIGITAL I/O   J-11

SIGNAL	RETURN	DESCRIPTION
1	3	02 INPUT #1
2	3	02 INPUT #2
4	5	ALARM 1
6	7	ALARM 2

To connect the instrument's I/O ports to another device make a list of the outputs and related inputs for the device being used.

Organize into sets of I/O connections and assign wire colors for each connection. Cut each wire to the desired length and crimp the supplied pins to them. Do not solder the wires to the pins.

Gather the wires that will be connected to the I/O port and insert into the tapered strain relief portion of the plastic AMP connector. Using the list of I/O connections and the AMP connector portion that plugs into the back of the instrument insert the individual wires into the holes with the corresponding numbers.

After securing the wires in the AMP connector with the tabs for that purpose, plug the assembled connector into the appropriate I/O port in the back panel. Make similar connections for the other end of the wires for the other device's port. Wire and test for correct connections with an ohm meter against original design.

TC 1,2,3

Thermocouple 1 connects to a pressure sensor at the mechanical pump
Thermocouple 2 connects to a pressure sensor at the cryo pump.
Thermocouple 3 connects to a pressure sensor in the chamber.

The wire for the cables is user supplied. A 4 conductor, 22 gauge wire is suggested. Using the supplied 9 pin female-D sub connectors and the following diagram construct cables to connect to the associated devices.

COL.:
Not enabled with V 6.2
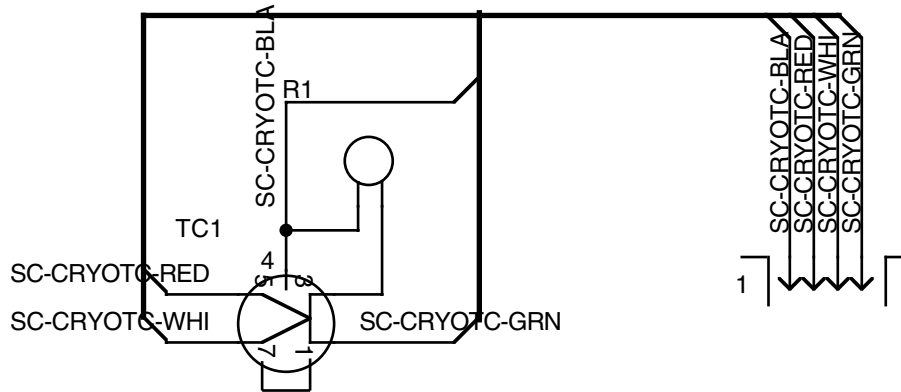
VALVE:
Not enabled with V 6.2

VALVE:
This has a BNC connection using a coaxial cable to the 02 bleed valve.

FUSES:
The 2 amp fuse is for the planetary motor and the 8 amp fuse is for the Ion filament. There are fuses included in the installation kit

SYSTEM STARTUP

The power switch lights and startup screen is displayed. RUN is highlighted.
Note: Allow screen to fully draw. It displays at 8 mHz.

```
RUN        EDIT       ALARMS      MAINTENANCE




                              
                              
                              
                              
                              
                              
                              
                              
                              
                              
                              
         SC-20                  V7.x                 EDDY CO.
```

EPROM HEADER   SOFTWARE VER. AND PRODUCTION VER.
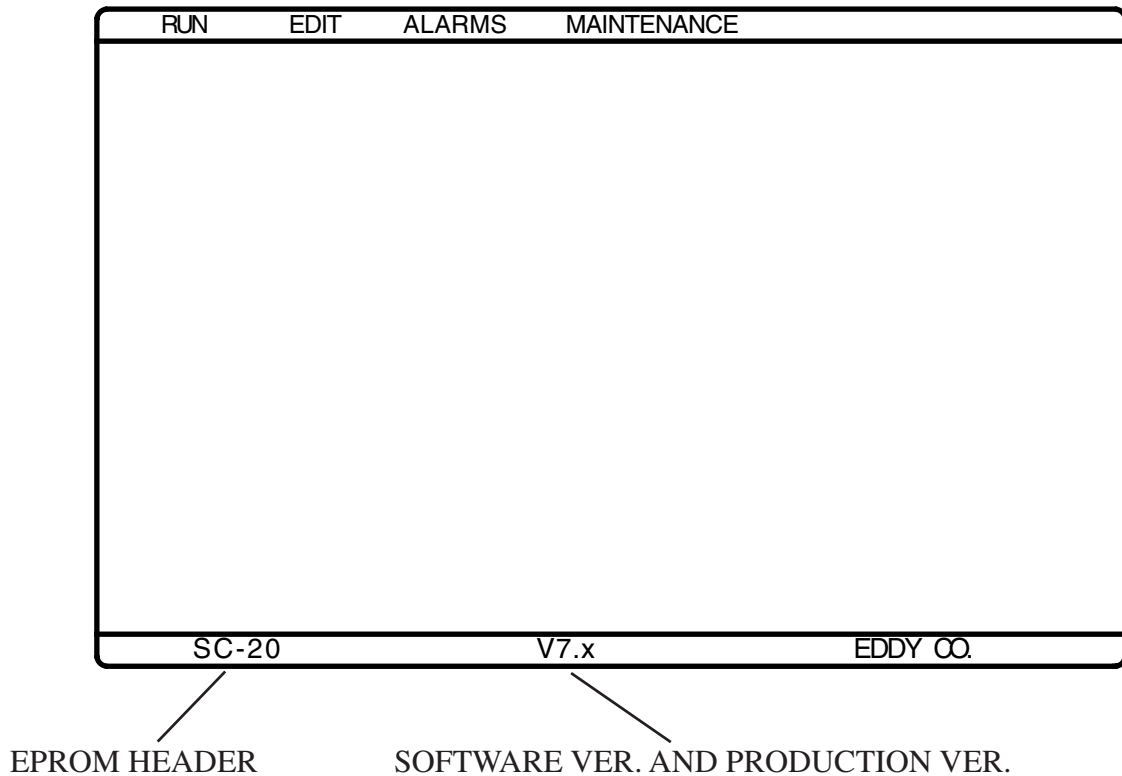
Press PAGE to highlight MAINTENANCE.

Press ENTER to show MAINTENANCE page options. Use UP ARROW or DOWN
ARROW key to highlight SET CLOCK. Press ENTER to show SET CLOCK screen.

SET CLOCK

```
┌───────────────────────────────────────────────────────────┐
│                                                             │
│      - SET  CLOCK -                    - AUTO START -       │
│                                                             │
├────────────────────────────┬────────────────────────────────┤
│   1 8   =   SECONDS        │   1 8   =   SECONDS            │
├────────────────────────────┼────────────────────────────────┤
│   3 7   =   MINUTES        │   3 7   =   MINUTES            │
├────────────────────────────┼────────────────────────────────┤
│   1 7   =   HOURS          │   1 7   =   HOURS              │
├────────────────────────────┼────────────────────────────────┤
│   0 5   =   DATE           │   0 5   =   DATE               │
├────────────────────────────┼────────────────────────────────┤
│   0 5   =   MONTH          │   0 5   =   MONTH              │
├────────────────────────────┼────────────────────────────────┤
│   9 2   =   YEAR           │   9 2   =   YEAR               │
├────────────────────────────┼────────────────────────────────┤
│                            │   OFF                          │
├────────────────────────────┼────────────────────────────────┤
│                            │                                │
├────────────────────────────┴────────────────────────────────┤
│                                                             │
│     S C - 2 0          V7.x              EDDY CO.           │
└───────────────────────────────────────────────────────────┘
```

⬆   Moves highlight up (will roll over) to select values.
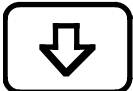
⬇   Moves highlight down (will roll over) to select values.

PAGE   Toggles you from one column to the other.

Values that are highlighted can be changed.
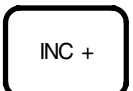
INC +   Will increase selected value.
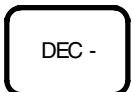
DEC -   Will decrease selected value.

AUTO START:

> To set up AUTO START do the following.
> 1. Push the PAGE key to move you from the CLOCK column to the AUTO START column.
> 2. Set the Date and Time in which you want the system to start.
> 3. Now highlight OFF and push the + key.
> 4. Push EXIT and now select a PROGRAM and run it.
> 5. There are three ways in which the AUTO START can run. You can leave the system in STANDBY and the system will AUTO START at the specified time and date. It will also check to see if the main chamber needs roughing. Or once you run your PROGRAM you can push VACUUM and put the system into high vacuum and the system will AUTO START at the specified time and date. The third way is it can start the system from the begining meaning it will start the cryo pump, wait till it is at temerature, and go into HEAT at the specified time and date. The section below describes the steps the system take to

EXIT: Returns the system to the main menu.

Use arrow keys and INCR+ and DECR – to select the current date. Press EXIT to return to the main menu.

HOW IT WORKS:

> Sets up time for system to start up automatically.
> 1. System will check to see if cryo chamber pressure is below 100 mtorr, then will proceed to next step. (If chamber is not at this pressure it will start mechanical pump).
> 2. System will check temperature, It must be 20K or below to proceed. If not, it will wait until cryo pump lowers the temperature.
> 3. If main chamber pressure is below crossover (example: 80 mtorr) and the temperature is met, it will open the hivac valve. (If chamber is not below 80 mtorr then it will start mechanical pump.)
> 4. After it reaches the right pressure the system will go ito high vacuum and proceeds to turn on heater, planetary starts and the system is ready to run.

MAINTENANCE

```
┌──────────────────────────────────────────────────────────┐
│  RUN      EDIT     ALARMS       MAINTENANCE                │
│                              ┌─────────────────┐           │
│                              │ PUMPS           │           │
│                              │ VALVES          │           │
│                              │ ION GAUGE       │           │
│                              │ PLANETARY       │           │
│                              │ HEATER          │           │
│                              │ GLOW            │           │
│                              │ - - - - - - - - │           │
│                              │ SYSTEM PARAM.   │           │
│                              │ SET CLOCK       │           │
│                              └─────────────────┘           │
│                                                            │
│                                                            │
│                                                            │
│      SC-10                  V7.x           THE  EDDY  CO.  │
└──────────────────────────────────────────────────────────┘
```

Press PAGE to highlight MAINTENANCE option.
Press ENTER to enter the MAINTENANCE pages.

⬆️   Moves highlight up (will roll over) to select options.
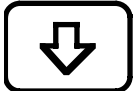
⬇️   Moves highlight down (will roll over) to select options.

With PUMPS highlighted, press ENTER to show MANUAL OPERATION / PAGE 1.
Note: When the pumps, valves, or ion gauge line is highlighted pressing PAGE
scrolls to page 2. Highlight planetary, heater or glow to go to page 3.

MANUAL OPERATION

This page displays thermocouple gauge pressures, ion gauge pressure when the gauge is turned on and high vacuum valve status.

```
┌─────────────────────────────────────────────────────────┐
│          -  MANUAL   OPERATION   /   PAGE  1  -           │
│                                                           │
│         OUTPUTS                        INPUTS             │
├────────────────────────────┬──────────────────────────────┤
│  -  MECH   PUMP            │  MECH   PRS   =   100        │
├────────────────────────────┼──────────────────────────────┤
│  - CRYO   PUMP             │  CRYO   PRS   =   100        │
├────────────────────────────┼──────────────────────────────┤
│  -  ROUGHING  VALVE        │  SYST  PRS   =   100         │
├────────────────────────────┼──────────────────────────────┤
│  - SLOW  ROUGH  VALVE      │  ION   GAUGE   =   5.5   -6  │
├────────────────────────────┼──────────────────────────────┤
│  -  FORELINE   VALVE       │  HIGH   VAC   OPEN           │
├────────────────────────────┼──────────────────────────────┤
│  -  HIGH   VAC  VALVE      │                              │
├────────────────────────────┼──────────────────────────────┤
│  -  MAIN   VENT   VALVE    │                              │
├────────────────────────────┼──────────────────────────────┤
│  -  SLOW   VENT   VALVE    │                              │
├────────────────────────────┼──────────────────────────────┤
│  -  HEAT/EGUN INTLK        │                              │
├────────────────────────────┴──────────────────────────────┤
│      SC-20            V7.x          EDDY CO.              │
└─────────────────────────────────────────────────────────┘
```
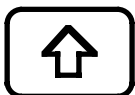
⬆   Moves highlight up (will roll over) to select options.
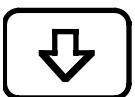
⬇   Moves highlight down (will roll over) to select options.
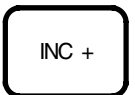
INC +   Will turn on device or open selected valve.

DEC -   Will turn off device or close selected valve.

The + and – indicate whether highlighted item is enabled or disabled.

CAUTION: THESE OPERATIONS ARE NOT PROTECTED. INAPPROPRIATE TEST-ING/DIAGNOSTIC ACTIONS MAY RESULT IN SYSTEM FAILURE. The standby light on the front panel is on during MAINTENANCE page display.

```
┌─────────────────────────────────────────────────────────────┐
│              -  MANUAL   OPERATION  /  PAGE  2  -             │
│                                                               │
│          OUTPUTS                          INPUTS              │
├───────────────────────────────┬───────────────────────────────┤
│ -EMISSION   LOW               │ FILAMENT   IS  OFF            │
├───────────────────────────────┼───────────────────────────────┤
│ -EMISSION   HIGH              │ ION   GAUGE  =   5.5  - 6     │
├───────────────────────────────┼───────────────────────────────┤
│ -DEGAS                        │                               │
├───────────────────────────────┼───────────────────────────────┤
│  PRESS.   =   1.0  -5         │                               │
├───────────────────────────────┼───────────────────────────────┤
│ TIME   CONSTANT  =  0         │   VALVE   VOLTS  =  100       │
├───────────────────────────────┼───────────────────────────────┤
│                               │ O2   # 1   OFF               │
├───────────────────────────────┼───────────────────────────────┤
│                               │ O2   #2   OFF                │
├───────────────────────────────┼───────────────────────────────┤
│                               │                               │
├───────────────────────────────┴───────────────────────────────┤
│                                                               │
│                                                               │
├───────────────────────────────────────────────────────────────┤
│     SC-20                    V7.x              EDDY CO.        │
└───────────────────────────────────────────────────────────────┘
```

⬆ Moves highlight up (will roll over) to select options.
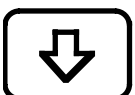
⬇ Moves highlight down (will roll over) to select options.
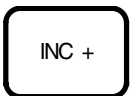
INC + Will turn on device or increase selected value.

DEC - Will turn off device or decrease selected value.

EMISSION LOW:
        This is used for normal coating operations. The emission is factory set
        for 1 MA.

EMISSION HIGH:
        Not enabled with V 6.2.

DEGAS: This is an I2 R heater control.

PRESS.:   INCR + / DECR - will select the target pressure for 02 bleed valve.

TIME CONST.:   INCR + and DECR – will change the time constant for the 02 bleed valve.

This page displays the filament status, ion gauge pressure reading, voltage to servo valve and the status of the external 02 bleed signals.

Testing the ion gauge servo valve control system:

1. First set time constant to 3 or 4.
2. Select emission low and press INCR+.
3. Ion gauge should read system pressure, valve volts should increase and system pressure should match required pressure.
4. Set pressure to 5.0 – 5.
5. Observe real pressure is near 5.0 10-5.

Press PAGE to display page 3

```
┌────────────────────────────────────────────────────────────────┐
│              -  MANUAL   OPERATION   /   PAGE   3  -             │
│                                                                  │
│            OUTPUTS                        INPUTS                 │
├───────────────────────────────┬──────────────────────────────────┤
│  -PLANETARY   LOW             │  DOOR   OPEN                     │
├───────────────────────────────┼──────────────────────────────────┤
│  -PLANETARY   HIGH            │  AIR   ON                        │
├───────────────────────────────┼──────────────────────────────────┤
│  -PLANETARY   REVERSE         │  WATER   ON                      │
├───────────────────────────────┼──────────────────────────────────┤
│  -HOT WATER                   │                                  │
├───────────────────────────────┼──────────────────────────────────┤
│   HEATER   PWR   =   0        │  SUBSTRATE   =   300   C         │
├───────────────────────────────┼──────────────────────────────────┤
│  -GLOW   BLOCK                │  GLOW   =   2.0   K.V.           │
├───────────────────────────────┼──────────────────────────────────┤
│   GLOW   POWER   =   0        │  GLOW   250   MA                 │
├───────────────────────────────┼──────────────────────────────────┤
│   TIME   CONST   =   0        │  GLOW   INTLCK   ON              │
├───────────────────────────────┴──────────────────────────────────┤
│                                                                  │
│                                                                  │
├──────────────────────────────────────────────────────────────────┤
│     SC-20              V7.x              EDDY CO.                 │
└──────────────────────────────────────────────────────────────────┘
```

⬆   Moves highlight up (will roll over) to select options.
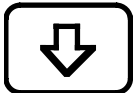
⬇   Moves highlight down (will roll over) to select options.
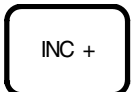
INC +   Will turn on selected device or open selected valve.

DEC -   Will turn off selected device or close selected valve.

The + and – indicate enabled or disabled.

PLANETARY LOW:
        Will slow start planetary to operate at low speed for heating substrates.

PLANETARY HIGH:
        Will slow start planetary to operate at high speed for coating.

CAUTION   *CAUTION*   *CAUTION*

PLANETARY REVERSE:
> Will hard reverse the planetary with no ramp up or down (this must only be used when planetary is completely stopped).

HOT WATER:
> Controls the system heater used to control condensation during venting on some vacuum systems.

HEATER POWER:
> Increasing this value above zero will enable the heater units and selecting a value between 1 and 100 will give an output ranging from .1 volts DC to 10.0 volts DC.

GLOW BLOCK:
> Not enabled with V 6.2.

GLOW POWER:
> Not enabled with V 6.2.

TIME CONST.:
> Not enabled with V 6.2.

This page displays the door, air and water status, the temperature of the substrate and the glow discharge status.

EXIT   Will return system to the original screen with maintenance highlighted.

Press ENTER to select maintenance options. Use down arrow to select SYSTEM PARAM., then press ENTER.

SYSTEM PARAMETERS

```
┌─────────────────────────────────────────────────────────────────┐
│                                                                   │
│              SYSTEM   PARAMETERS  -   PAGE  1                      │
│                                                                   │
├───────────────────────────────────────────────────────────────────┤
│  ION   GAUGE   HIGH   FILAMENT   PRESS.  =   0.0   -7              │
├───────────────────────────────────────────────────────────────────┤
│  ION   GAUGE    RESTART   LIMIT  =     4                          │
├───────────────────────────────────────────────────────────────────┤
│  PRESS.  CONTROL  TIME  CONSTANT  =  0                            │
├───────────────────────────────────────────────────────────────────┤
│  HOT   WATER   ON   TIME  =  0  MINUTES                           │
├───────────────────────────────────────────────────────────────────┤
│  GLOW  CONTROL  TIME  CONSTANT  =  0                              │
├───────────────────────────────────────────────────────────────────┤
│  TEMPERATURE  CONTROL  TIME  CONSTANT  =  0                       │
├───────────────────────────────────────────────────────────────────┤
│  TEMPERATURE  CONTROL  ERROR  RANGE  =  0  C                      │
├───────────────────────────────────────────────────────────────────┤
│  TEMPERATURE  CONTROL  ERROR  TIME  =  0  SEC                     │
├───────────────────────────────────────────────────────────────────┤
│  CRYO   PUMP   COMMUNICATIONS   OFF                               │
├───────────────────────────────────────────────────────────────────┤
│       SC-20               V7.x                EDDY  CO.           │
└─────────────────────────────────────────────────────────────────┘
```
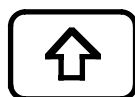
⬆ Moves highlight up (will roll over) to select options.

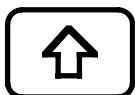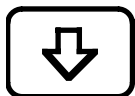⬇ Moves highlight down (will roll over) to select options.
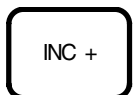
INC + Will increase the highlighted options.

DEC - Will decrease the highlighted options.

ION GAUGE HIGH FILAMENT PRESS.:

> The system will change filament emission if the pressure is lower than this set point. This pressure is normally left at 0.0 – 7
> (not enabled in V6.2).

ION GAUGE RESTART LIMIT:

> Selects the number of times the program will try to restart the ion gauge before alarm is initiated. Suggested setting is 4.

PRESS. CONTROL TIME CONSTANT:
> Sets the adjustment rate for the O2 bleed valve. Recommended setting " - 3".

HOT WATER ON TIME:
> Set in minutes the amount of time the system hot water heaters will be on before the system is vented.

GLOW CONTROL TIME CONSTANT:
> Sets the rate for the bleed valve adjustment. This rate must match the pumping speed of the system while in glow mode. Not enabled with V6.2.

TEMPERATURE CONTROL TIME CONSTANT:
> Sets the rate to which the substrate heaters are adjusted to come up to required temperature. Press INCR + or DECR - for adjustment.

TEMPERATURE CONTROL ERROR RANGE:
> Sets the temperature limits that have to be exceeded before the alarm signal sounds. The time will reset at less than error limits.

TEMPERATURE CONTROL ERROR TIME:
> Sets the time required for the system to be out of the temperature range before the alarm signal sounds.

CRYO PUMP COMMUNICATIONS OFF/ON:
> Selects whether communication to the cryo pump is enabled.

EXIT
> Will return system to the original screen with MAINTENANCE highlighted.

Press PAGE to go to page 2 "Regen Parameters"

REGEN PARAMETERS

```
┌─────────────────────────────────────────────────────────┐
│              REGEN  PARAMETERS  -  PAGE  2                │
│                                                           │
├───────────────────────────────────────────────────────────┤
│   PURGE TIME   =  0                                       │
├───────────────────────────────────────────────────────────┤
│   CRYO  ROUGH  PRESSURE  =  0                             │
├───────────────────────────────────────────────────────────┤
│   ROR MAX PRESSURE  =  0                                  │
├───────────────────────────────────────────────────────────┤
│   ROR TIME  =  0                                          │
├───────────────────────────────────────────────────────────┤
│   ROR RETRIES = 0                                         │
├───────────────────────────────────────────────────────────┤
│   REGEN  =  OFF                                           │
├───────────────────────────────────────────────────────────┤
│                                                           │
├───────────────────────────────────────────────────────────┤
│                                                           │
├───────────────────────────────────────────────────────────┤
│                                                           │
├───────────────────────────────────────────────────────────┤
│      SC-20              V7.x            EDDY  CO.          │
└───────────────────────────────────────────────────────────┘
```
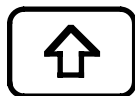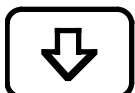
⬆ Moves highlight up (will rollover) to select options.

⬇ Moves highlight down (will roll over) to select options.
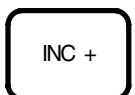
INC + Will increase the number in the highlighted line.

DEC - Will decrease the number in the highlighted line.

This operation warms the cryo pump and expels the accumulated material (water vapor and gasses) to prepare for a new cycle.

PURGE TIME:

Time set, in minutes, to backfill and heat the cryo pump (at least one hour).

CRYO ROUGH PRESSURE:

After roughing chamber, the pressure required to close roughing valve and test for ROR in mtorr. (Example: 50 mtorr)

ROR MAX PRESSURE:

        Pressure level selected for Rate of Rise test in mtorr.

ROR TIME:

        The amount of time, in minutes, given to achieve selected pressure. If the test is failed the system will pump down again for a retry.

ROR RETRIES:

        Maximum retries before alarm sounds.

REGEN:

        This needs to be off to use RUN command.

EXIT   EXIT to return to main menu.

HOW IT WORKS:

        Set up the Auto Regeneration for the Cryo Pump.

1. Set your parameters. For example, set PURGE TIME to 60 min., CRYO ROUGH PRESSURE to 20 mtorr, ROR MAX PRESSURE to 100 mtorr, ROR TIME to 2 min., and ROR RETRIES to 2.
2. Now highlight the REGEN line and press the INC + button to turn it ON.
3. Exit to the main menu. Press PAGE till RUN is highlighted. Press ENTER, highlight a program and press ENTER.
4. Once in a program press VACUUM or HEAT. This will start the regen cycle. (Note: You may also use the AUTO START feature to regen at a given time. Just remember that when you go into your program to leave the system in STANDBY.)
5. The first thing to happen will be the shutting down of the cryo pump. Then the system will vent the main chamber. The vent valve is on a 15 min. timer.
6. After 15 min. the cryo purge valve will open and the cryo heating blanket will turn on. The cryo will purge for the time you speci fied.
7. When the purge is complete the system will then rough out the cryo chamber.
8. The system will now start the ROR test. If it fails the test, meaning that the pressure exceeds the max set pressure, it will then pump out the cryo chamber again before running another ROR test. If it passes, the system will start the cryo pump and proceed to go through the sequences to get to which ever state you specified (VACUUM or HEAT)

ALARMS

Press PAGE to highlight ALARM option

```
┌──────────────────────────────────────────────────────────────┐
│   RUN      EDIT      ALARMS      MAINTENANCE                    │
│  ┌────────────────────────────────┐                            │
│  │            ROUGH/HIVAC          │                            │
│  │            START  PRESS         │                            │
│  │            HIVAC  VALVE         │                            │
│  │            ION GAUGE            │                            │
│  │            CRYO PUMP            │                            │
│  │            HEATER               │                            │
│  │            GLOW INTRLK          │                            │
│  │            DOOR                 │                            │
│  │            AIR                  │                            │
│  │            WATER                │                            │
│  │            PRESSURE             │                            │
│  │            RATE OF RISE         │                            │
│  │            HEATER PRESS         │                            │
│  └────────────────────────────────┘                            │
│                                                                │
│                                                                │
│      SC-20              V7.x              EDDY  CO.             │
└──────────────────────────────────────────────────────────────┘
```

All the devices that make up the system are connected to alarms that initiate if the parameters programmed are not met. They can be programmed for the number of beeps per second, the action to be taken by the SC-10 and how the operator is made aware of the alarm; by phone, audible alarm or a light.

⬆ Moves highlight up (will roll over) to select options.
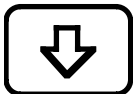
⬇ Moves highlights down (will roll over) to select options.

ROUGH/HIVAC:
Alarms if roughing time is exceeded to bring the pressure down to crossover to Hivac.

START PRESSURE:
Alarms if pressure isn't reached in the time set to begin the coating process.

HIVAC VALVE:

Position alarm, if hivac valve does not achieve position when signaled within 30 seconds time. (opening or closing)

ION GAUGE:

Will alarm if ion gauge has failed. If there is a failure in the system, it puts system on standby (recommended setting).
Note: The ion gauge alarm must be set before the system is run in automatic. Suggested setting is 3 tries before alarm initiates.

CRYO PUMP:

Alarms if temperature exceeds software set temperature of 20 degrees Kelvin.

HEATER:

Alarm sounds if temperature is out of range for time set. An example would be if the temperature was 20 degrees over the set temperature past a two minute time period.

GLOW INTERLOCK:

Alarms if interlocks aren't enabled. Not used with V 6.2.

DOOR:

Alarms if vacuum chamber door is not closed.

AIR:

Alarms if the air pressure falls below the set point of the low pressure sensor at the switch (typically 30 psi).

WATER:

Alarms if water pressure falls below the set point of the low pressure sensor at the switch (typically 30 psi).

PRESSURE:

When you set the #1 and #2 oxygen pressures this alarm will initiate if the set pressure range (high and low-pressure amounts) is exceeded for the set control time. An example would be 2.0 for 20 seconds. Set these parameters within the needs of your process.
(See program 1, page 3).

RATE OF RISE:

Alarms if pressure exceeds the limit pressure inside the time paraeters on the final retry on the Rate of Rise test.

HEATER PRESSURE:

Alarms if over set pressure limit during heat cycle.

THIS SCREEN IS TYPICAL FOR ALL LISTED ALARMS.

With ROUGH/HIVAC highlighted press ENTER
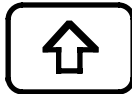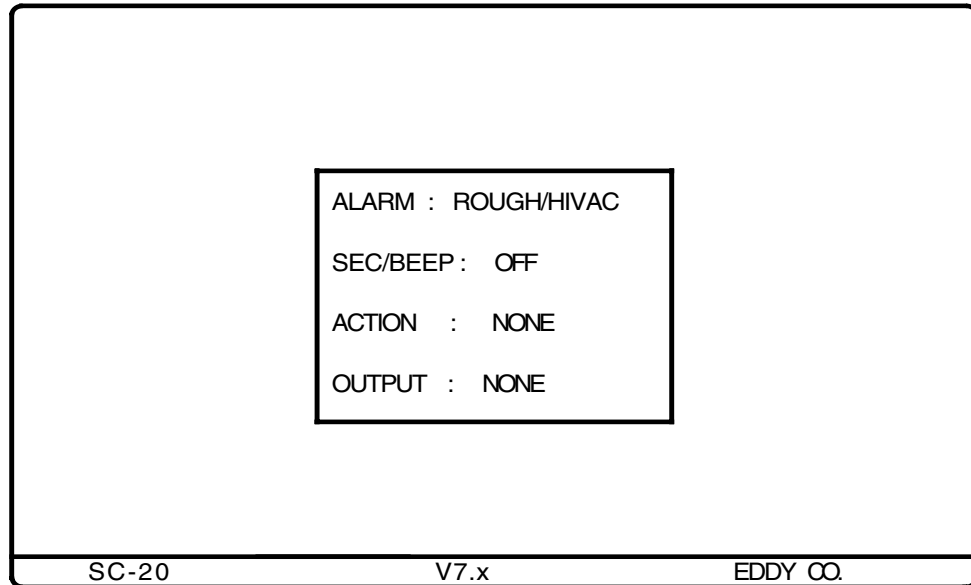
```
ALARM  :  ROUGH/HIVAC

SEC/BEEP :  OFF

ACTION  :  NONE

OUTPUT  :  NONE
```
```
SC-20              V7.x            EDDY CO.
```

⬆ Moves highlight up (will roll over) to select options.
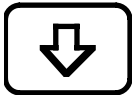
⬇ Moves highlight down (will roll over) to select options.

With SEC/BEEP highlighted:
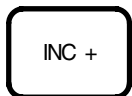
INC + Will increase the interval (in seconds) for beeps in the highlighted line.

DEC - Will decrease the interval (in seconds) for beeps in the highlighted line down to 1, then to off.

With ACTION highlighted

OPTIONS: NONE-SHUTDOWN-VENT-STANDBY-VACUUM.
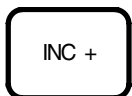
INC + Will increase the option with VACUUM as the limit.

33

| DEC - | Will decrease the option with NONE as the limit. |

OUTPUT: Alarm may be enabled to phone safety number, initiate an audible alarmor turn on a light.

OPTIONS: None
Output alarm 1
Output alarm 2
Both alarms.

The alarm outputs are common. An example would be (in order of Importance) to set alarm 1-system failure, alarm 2-process stop and less important would be alarm-none.

| INC + | Will increase the selection with BOTH as the limit. |

| DEC - | Will decrease the selection with NONE as the limit. |

| PAGE | Will cycle through the list of alarms. |

| EXIT | Returns program to main menu. |

EDIT

```
┌─────────────────────────────────────────────────────────┐
│  RUN      EDIT     ALARMS      MAINTENANCE                │
│         ┌──────────────┐                                  │
│         │ PROGRAM  1   │                                  │
│         │ PROGRAM  2   │                                  │
│         │ PROGRAM  3   │                                  │
│         │ PROGRAM  4   │                                  │
│         └──────────────┘                                  │
│                                                           │
│                                                           │
│                                                           │
│                                                           │
│                                                           │
│                                                           │
│                                                           │
│                                                           │
│                                                           │
│──────────────────────────────────────────────────────────│
│     SC-20                V7.x              EDDY CO.       │
└─────────────────────────────────────────────────────────┘
```

Press PAGE to highlight EDIT. There are four programs that can be stored in the SC-20.

⬆   Moves highlight up (will roll over) to select program.
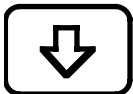
⬇   Moves highlight down (will roll over) to select program.

ENTER   Press to edit the highlighted program.

```
┌─────────────────────────────────────────────────────────────┐
│              -  PROGRAM  1  /  PAGE  1  -                      │
│                                                               │
├─────────────────────────────────────────────────────────────┤
│ ROUGH  /  HIGH   VAC   CROSSOVER   =   70 M TORR              │
├─────────────────────────────────────────────────────────────┤
│ ROUGHING   TIME   LIMIT  =   20   MINUTES                     │
├─────────────────────────────────────────────────────────────┤
│ PLANETARY   ON   (1)   OR  OFF  (0)  =   1                    │
├─────────────────────────────────────────────────────────────┤
│ PROCESS  START  PRESSURE  =   2.0  -5                         │
├─────────────────────────────────────────────────────────────┤
│ PROCESS  START  TIME  LIMIT  =  20  MINUTES                   │
├─────────────────────────────────────────────────────────────┤
│ SUBSTRATE   TEMPERATURE  = 240    C                           │
├─────────────────────────────────────────────────────────────┤
│ TEMPERATURE   RAMP  UP  =    5    MINUTES                     │
├─────────────────────────────────────────────────────────────┤
│ TEMPERATURE   SOAK   TIME  = 30    MINUTES                    │
├─────────────────────────────────────────────────────────────┤
│ MAXIMUM  HEATER   PRESSURE  =   0.0  -7                       │
├─────────────────────────────────────────────────────────────┤
│                                                               │
│     SC-20                V 7.x              EDDY CO.           │
└─────────────────────────────────────────────────────────────┘
```

⬆️   Moves highlight up (will roll over) to select line.
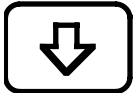
⬇️   Moves highlight down (will roll over) to select line.
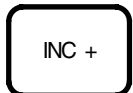
INC +   Will increase the number in the highlighted line.

DEC -   Will decrease the number in the highlighted line.

PAGE   Press to change to the next program page (total of three).

ROUGH/HIGH VAC CROSSOVER:

> Selects the pressure the system is roughed to before changing from the mechanical pump to the cryo pump. Recommended setting 50 mtorr to 90 mtorr.

ROUGHING TIME LIMIT:

> Normally set for 15 minutes more than average roughing time. When this time is exceeded the roughing alarm is activated.

> NOTE: 10% of this time is for the Soft Rough feature (optional). Here, if set to 15 minutes, a delay of 90 sec will occur before main rough valve opens.

PLANETARY ON (1) OR OFF (0) = 1:

> Selecting 0 leaves planetary stationary during coating. Selecting 1 turns planetary at low speed during heating cycle and automatically increases to high speed during coating process.

HEAT START PRESSURE:

> Sets the pressure required to start the heat cycle. Alarm is activated if pressure isn't met.

PROCESS START PRESSURE:

> Sets the pressure required at end of heat soak before allowing an external signal to be made. HEAT light blinks until pressure limit is met.

PROCESS START TIME LIMIT:

> Sets the maximum time allowed before the process alarm is activated.

SUBSTRATE TEMPERATURE:

> Sets target temperature for the substrate heater.

TEMPERATURE RAMP UP:

> Sets the target time to reach the substrate temperature setting.

TEMPERATURE SOAK TIME:

> The time required for the substrate to be held at the required temperature before starting the coating process.

MAXIMUM HEATER PRESSURE:

> The pressure above which the heater is turned off and the heater pressure alarm is initiated.

PAGE   Press to display page 2.

```
+--------------------------------------------------+
|              -  PROGRAM  1  /  PAGE  2  -         |
|            - RATE  OF  RISE  TEST  PARAMETERS -   |
+--------------------------------------------------+
|  TIME  LIMIT  =  1.0  MINUTES                     |
+--------------------------------------------------+
|  START PRESSURE  =  5.0   -6                       |
+--------------------------------------------------+
|  LIMIT PRESSURE   =  5.0   -4                      |
+--------------------------------------------------+
|  RETRIES  =  2                                    |
+--------------------------------------------------+
|                                                  |
+--------------------------------------------------+
|                                                  |
+--------------------------------------------------+
|                                                  |
+--------------------------------------------------+
|                                                  |
+--------------------------------------------------+
|                                                  |
|                                                  |
+--------------------------------------------------+
|    SC-20              V7.x            EDDY  CO.   |
+--------------------------------------------------+
```

⬆   Moves highlight up (will roll over) to selected line.
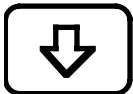
⬇   Moves highlight down (will roll over) to selected line.
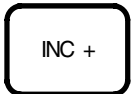
INC +   Will increase the number in the highlighted line.

DEC -   Will decrease the number in the highlighted line.

Once the appropriate parameters are entered the "rate of rise" test is used by the SC 10 to establish the general vacuum integrity of the system before the automatic coating process begins. If you want to bypass the test set retries to 0. If the test fails the alarm will control the action to be taken. Note: See alarm section.

To manually check the system select a pressure to start the test (50 mtorrs is suggested). Once pressure is reached, close the valve, observe the pressure and wait. If the pressure stays within the set limits, vacuum integrity is correct.

TIME LIMIT: The maximum time before a retry or an alarm is initiated.

START PRESSURE:
         The pressure required before the "rate of rise" test starts.

LIMIT PRESSURE:
         If the pressure is exceeded a retry is initiated.

Press PAGE to display page 3.

```
┌─────────────────────────────────────────────────────────────┐
│                                                               │
│            -  PROGRAM   1  /   PAGE  3  -                      │
│                                                               │
├─────────────────────────────────────────────────────────────┤
│  GLOW    POWER   =   0   MA                                   │
├─────────────────────────────────────────────────────────────┤
│   GLOW    TIME  =  0  MINUTES                                 │
├─────────────────────────────────────────────────────────────┤
│ # 1  02   PRESSURE   =   0.0  -8                              │
├─────────────────────────────────────────────────────────────┤
│ # 2  02   PRESSURE   =   0.0  -8                              │
├─────────────────────────────────────────────────────────────┤
│ PRESSURE  CONTROL   RANGE   =   0.0 -X                        │
├─────────────────────────────────────────────────────────────┤
│ PRESSURE  CONTROL    TIME 3  SECONDS                          │
├─────────────────────────────────────────────────────────────┤
│ TEMPERATURE   RAMP   DOWN   =  0   MINUTES                    │
├─────────────────────────────────────────────────────────────┤
│ END  OF   PROCESS   TEMPERATURE  =  0   C                     │
├─────────────────────────────────────────────────────────────┤
│                                                               │
│                                                               │
├─────────────────────────────────────────────────────────────┤
│   SC-20                    V7.x                EDDY  CO.       │
└─────────────────────────────────────────────────────────────┘
```

⬆ Moves highlight up (will roll over) to select line.
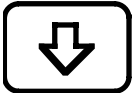
⬇ Moves highlight down (will roll over) to select line.
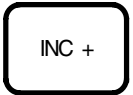
INC + Will increase the number in the highlighted line.

DEC - Will decrease the number in the highlighted line.

GLOW POWER:

       Sets the required current for glow. Not enabled in V 6.2.

GLOW TIME:

       Sets the time in minutes. The glow discharge will take place before coating. Not enabled in V 6.2.

#1 02 PRESSURE:

       Sets oxygen target pressure for process. User definable.

#2 02 PRESSURE:

       Sets oxygen target pressure for process. User definable.

PRESSURE CONTROL RANGE:

>Sets the limit of pressure deviation from required pressure before the alarm is set. Note: do several trial runs to determine stability of run and run parameters. Outgassing, O2 valve malfunction, air pockets and water vapor can all influence this setting.

PRESSURE CONTROL TIME:

>Is the time required for the pressure to be continuously out of the control range before the alarm is initiated.

TEMPERATURE RAMP DOWN:

>Sets the rate for the substrate temperature to be decreased before the end of process.

END OF PROCESS TEMPERATURE:

>The substrate temperature must be lower than the set temperature to initiate the end of process.

PAGE   Press to display page 4.

END OF PROCESS

```
┌─────────────────────────────────────────────────────┐
│              PROGRAM 1  /    PAGE   4                 │
│                                                       │
├───────────────────────────────────────────────────── │
│   -   HOLD AT HEAT                                    │
├───────────────────────────────────────────────────── │
│   -   HOLD AT HIGH VACUUM                             │
├───────────────────────────────────────────────────── │
│   -   HOLD AT STANDBY                                 │
├───────────────────────────────────────────────────── │
│   -   HOLD AT VENT                                    │
├───────────────────────────────────────────────────── │
│       SLOW VENT TIME = 0  MINUTES                     │
├───────────────────────────────────────────────────── │
│   -   SHUT DOWN SYSTEM                                │
├───────────────────────────────────────────────────── │
│                                                       │
├───────────────────────────────────────────────────── │
│                                                       │
├───────────────────────────────────────────────────── │
│                                                       │
├───────────────────────────────────────────────────── │
│                                                       │
├───────────────────────────────────────────────────── │
│      SC-20              V7.x            EDDY CO.       │
└─────────────────────────────────────────────────────┘
```
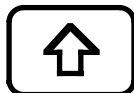
⬆   Moves highlight up (will roll over) to selected line.
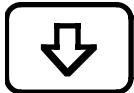
⬇   Moves highlight down (will roll over) to selected line.
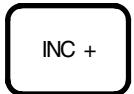
INC +   Will increase the number in the highlighted line.

DEC -   Will decrease the number in the highlighted line.

The + and – indicate enabled or disabled.

Highlighting the line and pressing INCR+ will select the system status required at end of process.

SLOW VENT TIME:
>
> Determines the amount of time slow vent will be on before fast vent is initiated.

EXIT   Returns to startup display.

Press PAGE which will select the RUN column.
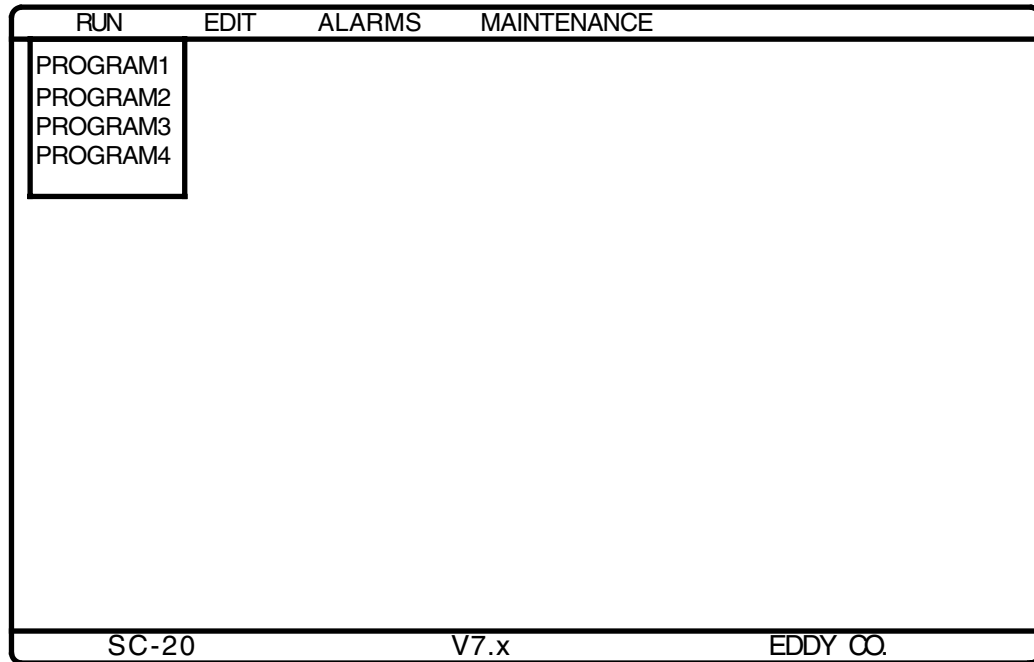
41

RUN MODE

```
┌─────────────────────────────────────────────────────────────┐
│   RUN      EDIT     ALARMS     MAINTENANCE                    │
│ ┌─────────────┐                                               │
│ │PROGRAM1     │                                               │
│ │PROGRAM2     │                                               │
│ │PROGRAM3     │                                               │
│ │PROGRAM4     │                                               │
│ └─────────────┘                                               │
│                                                               │
│                                                               │
│                                                               │
│                                                               │
│                                                               │
│                                                               │
│     SC-20              V7.x            EDDY CO.               │
└─────────────────────────────────────────────────────────────┘
```

⬆   Moves highlight up (will roll over) to select program.
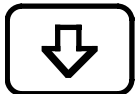
⬇   Moves highlight down (will roll over) to select program.

ENTER Press ENTER to start highlighted program.

The following buttons are activated in the run mode:

HEAT (FULL PROCESS):
          Brings the system to high vacuum, turns on the planetary and ion
          gauges, enables the E-Gun interlock, heats the substrates for the
          prescribed time and brings the OK to coat signal up.

VACUUM: Brings the system to high vacuum, starts the ion gauge and enables
          the E-Gun interlock.

STANDBY: Turns off heaters, planetary, ion gauge and closes high vacuum.

VENT: Vents system to air.

SHUT DOWN: Closes high vacuum valve, opens vent valve and turns off cryo pump.

SAMPLE RUN SCREEN

PLANETARY ROTATION STATUS

MAIN CHAMBER PRESSURE SWITCHES TO ION GAUGE WHEN PLATE VALVE IS OPEN

HIGH VACUUM VALVE

```
PLANETARY  OFF
  MAIN VENT                                       -  HEATER  -
                       999 TORR                  TEMP: 022  C
  S. VENT                                         PWR :    00  %

              50   TORR                    0   TORR
                                           11   K
         MECH.  PUMP  OFF                CRYO  PUMP  ON

PROGRAM  1              -  STATUS-                        09:10
SHUT DOWN



ALARM: WATER
     SC-20              V7.x            EDDY CO.
```

ROUGHING VALVE

MECHANICAL PUMP PRESSURE 0-1000 MTORR

MECHANICAL PUMP STATUS

STATE OF PROGRAM

ALARM OUTPUT DISPLAYED IN SEQUENCE

SUBSTRATE HEATER OFF / ON / POWER SUBSTRATE TEMPERATURE

READS PRESSURE TEMPERATURE AND OPERATING STATUS OF CRYO PUMP

ALARMS DISPLAYED:

ROUGH/HIVAC
START PRESSURE
HIVAC VALVE
ION GAUGE
CRYO PUMP
HEATER
GLOW INTERLOCK
DOOR
AIR
WATER
PRESSURE
RATE OF RISE
HEATER PRESSURE

EDDY-20 BUS LIST

BRAIN BOARD IC SIGNALS			SIGNAL NAMES
A/D	IC-26	J-1	SC-20
0	26	50	MECH PUMP PRESS
1	27	20	CRYO PUMP PRESS
2	28	51	SYSTEM PRESS
3	1	21	SUBSTRATE PRESS
4	2	52	VALVE VOLTAGE
5	3	22	ION GAUGE
6	4	53	GLOW VOLTAGE
7	5	23	GLOW CURRENT
D/A	IC-28		
0	2	24	PRESSURE SETTING
1	1	55	HEATER POWER
2	20	25	GLOW POWER
3	19	56	
BIT	IC-18		
0	4	3	I/O BD AD 0
1	3	33	I/O BD AD 1
2	2	2	I/O BD AD 2
3	1	32	I/O BD AD 3
4	37		LAMP 1
5	36		LAMP 2
6	35		LAMP 3
7	34		LAMP 4
BIT	IC-18		
0	18	38	PLANET LOW
1	19	8	PLANET HIGH
2	20	39	PLANET REV
3	21	9	HEAT WATER
4	22	40	GLOW BLOCK
5	23	10	GLOW ENABLE
6	24	41	HEATER ENABLE
7	25	11	READY TO COAT
BIT	IC-18		
0	14	36	I/O BD DATA 4
1	15	6	I/O BD DATA 5
2	16	37	I/O BD DATA 6
3	17	7	
4	13	5	FIL. ON
5	12	35	
6	11	4	
7	10	34	

EDDY-20 BUS LIST

BRAIN BOARD IC SIGNALS   **SIGNAL NAMES**

BIT	IC-17	J-1	SC-20
0	4		LAMP 5
1	3		LAMP 6
2	2		LAMP 7
3	1		LAMP 8
4	37		LAMP 9
5	36		LAMP 10
6	35		LAMP 11
7	34		LAMP 12

BIT	IC-17		
0	18	15	GLOW TC0
1	19	45	GLOW TC2
2	20	14	GLOW TC4
3	21	44	GLOW TC8
4	22	13	PRESS TC0
5	23	43	PRESS TC2
6	24	12	PRESS TC4
7	25	42	PRESS TC8

BIT	IC-17		
0	14	19	I/O BD DATA 0 OUT
1	15	49	I/O BD DATA 1OUT
2	16	18	I/O BD DATA 2 OUT
3	17	48	i/O BD DATA 3 OUT
4	13	17	I/O BD DATA 0 IN
5	12	47	I/O BD DATA 1 IN
6	11	16	I/O BD DATA 2 IN
7	10	46	I/O BD DATA 3 IN

FRONT PANEL

IC-33 BRAIN BOARD DECODER

0	ENTER
1	PAGE
2	EXIT
3	UP ARROW
4	DOWN ARROW
5	SHUT DOWN
6	VENT
7	STAND BY
8	VACUUM
9	HEAT
10	DECR -
11	INCR +

EDDY-10 BUS LIST

POWER DISTRIBUTION EDDY-10 BUS

BUS	J-1	SC-20
	31	GROUND
	1	GROUND
	61	5
	30	5
	60	15
	29	-15
	59	24
	28	120
	57	I/O ENABLE

SC-10 I/O ASSIGNMENTS

I/O BOARD ADDRESS (PROGRAMS 1, 5)

SIGNAL	BIT
OUTPUTS	
MECHANICAL PUMP	0
CRYO VALVE	1
FORELINE VALVE	2
ROUGHING VALVE	3
HOT WATER	4
GLOW BLOCK	5
ALARM 1	6
INPUTS	
#1 02	0
#2 02	1
HI VAC VALVE SW	2
DOOR SWITCH	3

I/O BOARD ADDRESS (PROGRAMS 2, 6)

SIGNAL	BIT
OUTPUTS	
HEATER ENABLE	0
READY TO COAT	1
VENT VALVE	2
HIGH VACUUM VALVE	3
SLOW VENT VALVE	4
HEAT/EGUN/PRESS INTL	5
ALARM 2	6
INPUTS	
AIR SWITCH	0
WATER SWITCH	1
GLOW INTERLOCK	2
SPARE	3

SC10ASY0063C

INITIAL BOARD ALIGNMENT PROCEDURE
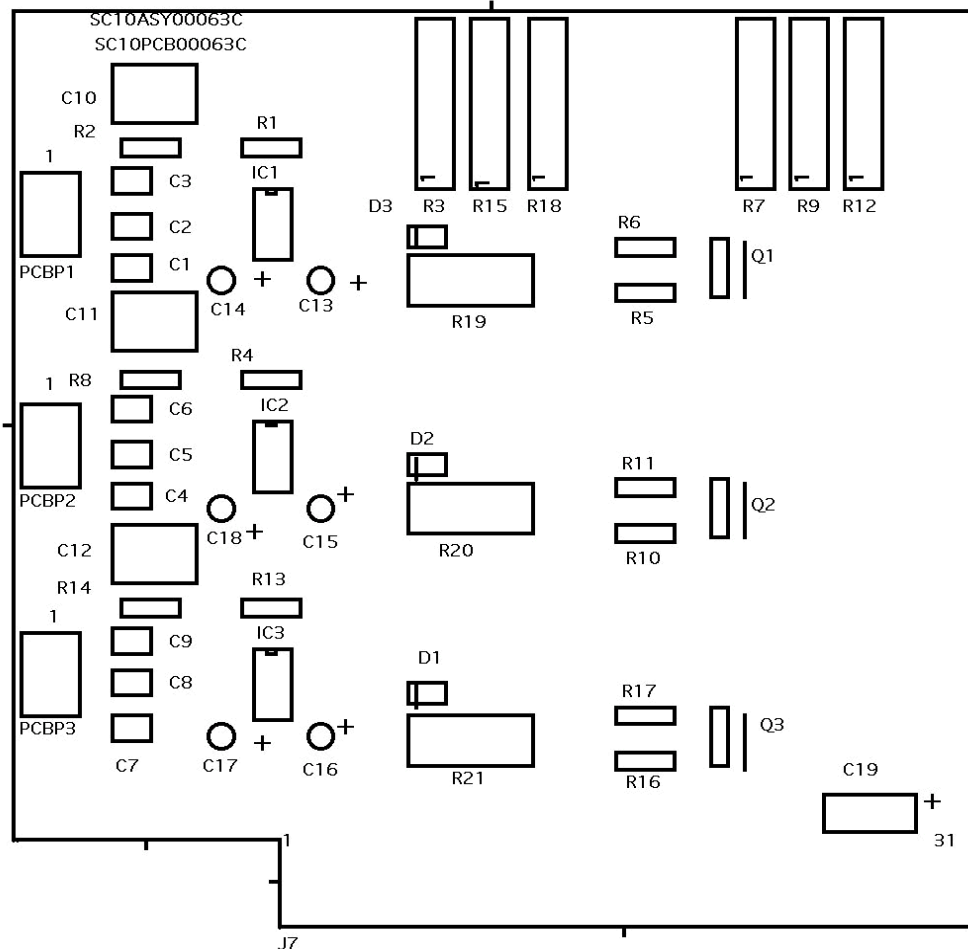
SC10ASY00063C
SC10PCB00063C

C10
R2
C3
C2
C1
PCBP1
C11
R8
C6
C5
C4
PCBP2
C12
R14
C9
C8
PCBP3
C7
R1
IC1
C14 + C13 +
R4
IC2
C18 + C15 +
R13
IC3
C17 + C16 +
D3 R3 R15 R18
R19
D2
R20
D1
R21
R6
R5
R11
R10
R17
R16
R7 R9 R12
Q1
Q2
Q3
C19 +
31
1
J7

1. Connect TC 1, TC 2 and TC 3 to the back of the instrument.
2. With diffusion pump or cryo pump, mechanical pump and chamber at atmospheric pressure:
   1. Set R3 to give 0.0 VDC at IC1 pin 6.
   2. Set R15 to give 0.0 VDC at IC2 pin 6.
   3. Set R18 to give 0.0 VDC at IC 3 pin 6.
   4. Start the vacuum system, pump chamber down to high vacuum and observe ion gauge(< 1.0 10-4 torr).
   5. Adjust R9 to make cryo pump reading 000 torr.
   6. Adjust R18 for the chamber pressure to read 000 torr.
   7. Turn off diffusion pump or cryo pump, wait 20 minutes, open roughing , foreline and plate valves.
   8. Wait 5 minutes and then adjust R7 to make the mechanical pump reading the

SC10 ASY00 4 00

SKT 2060 43-1

CNT T 0 9MND
BUS10ASY066C
SKT J-6A

BOARD 60E
R5   SET PLANETA RY LOW SPEED
R6   SET PLANETA RY HIGH SPE ED
R11 SET FOR CORRECT TEMP. READING

BOARD 62E
R1 8 SET TO GIV E O2 PRES SURE SAME
AS SET PRESSURE
R30 C ALIBRA TE ION GA UGE READING

MOT750 118

SC1 0PLT0010
SC1 0ASY 0 068C
TRN LSC100 010
DDR13 30

BOARD6 3C
R3   MECH PUMP
      SET FOR AT MOSPHERIC END OF SCALE
R7   MECH PUMP
     SET FOR LOW END OF S CALE
R15   CRYO PUMP
      SET FOR AT MOSPHERIC END OF SCA LE
R9   CRYO PUMP
     SET FOR LOW END OF SCALE
R18 CHAMBER
      SET FOR AT MOSPHERIC END OF SCA LE
R1 2   CHAM BER
     SET FOR LOW END OF S CALE

R5
R18
R6
R3
R15
R11
R18
R7
R30
R9
R12

LCDEG/5 0 1DLS
BRA IN ASY069 E
A SYBUS I/ O 64 F
A SYBUS I/ O 64 EF
SC10 ASY 0 06 3C
SC1 0ASY0 062D
SC1 0ASY 0 06 0E
SC1 0ASY0 061A
SWI1 3 1 12 10 25
SWI1 3 1261 0 25

J 1
EDGE CARD

+5V

R2
1K 1/4W 5%

B C Q1
MPSA20
E

R1
220 1/4W 5%

IC1
VTL-5C2

R5
10K

+5V

R4
1K 1/4W 5%

B C Q2
MPSA20
E

R3
220 1/4W 5%

IC2
VTL-5C2

R9
4.7K 1/4W 5%

R6
10

PCBP1
8 PIN CONN

S - 3
S - 2
S - 1
A - 2
A - 1
F - 1
F - 2

PCBP2
5 PIN CONN

+15V

K1
2P DT

D1
1N4002

ROT LOW

IC4.A
74LS08

ROT HIGH

PLA REV

IC4.B
74LS08

WITH 110 OHMS I
SET R11 TO GIV
.550 V AT TP1
SUBSTRATE TEMP 2

IC4.C
74LS08

R7
10K 1/4W 5%

B Q3
MPSA14
E

R8
10K 1/4W 5%

SUB TEMP

IC4.D
74LS08

R14
10K 1/4W 1%

R13
40.2K 1/4W 1%

+15V

IC3 741

NULL
V+
IN-
IN+
OUT
NULL
V-

R12
10K 1/4W 1%

R10
2.73K 1/4W 1%

15V

PCBP3
4 PIN CONN

R15
10K 1/4W 1%

D2
8.2V ZENER

C2
.1UF 35V TA

-15V

C3
.1UF 35V

C1
1UF 50V

-15V
+15V

+5V

R16 10K 1/4W 1%

	EDDY c o
SC-20	APPLE VALLEY CA. 760-961-8457
	PLANETARY HEATER CONTROL
	A SCHSC10060E A
	WER - C -
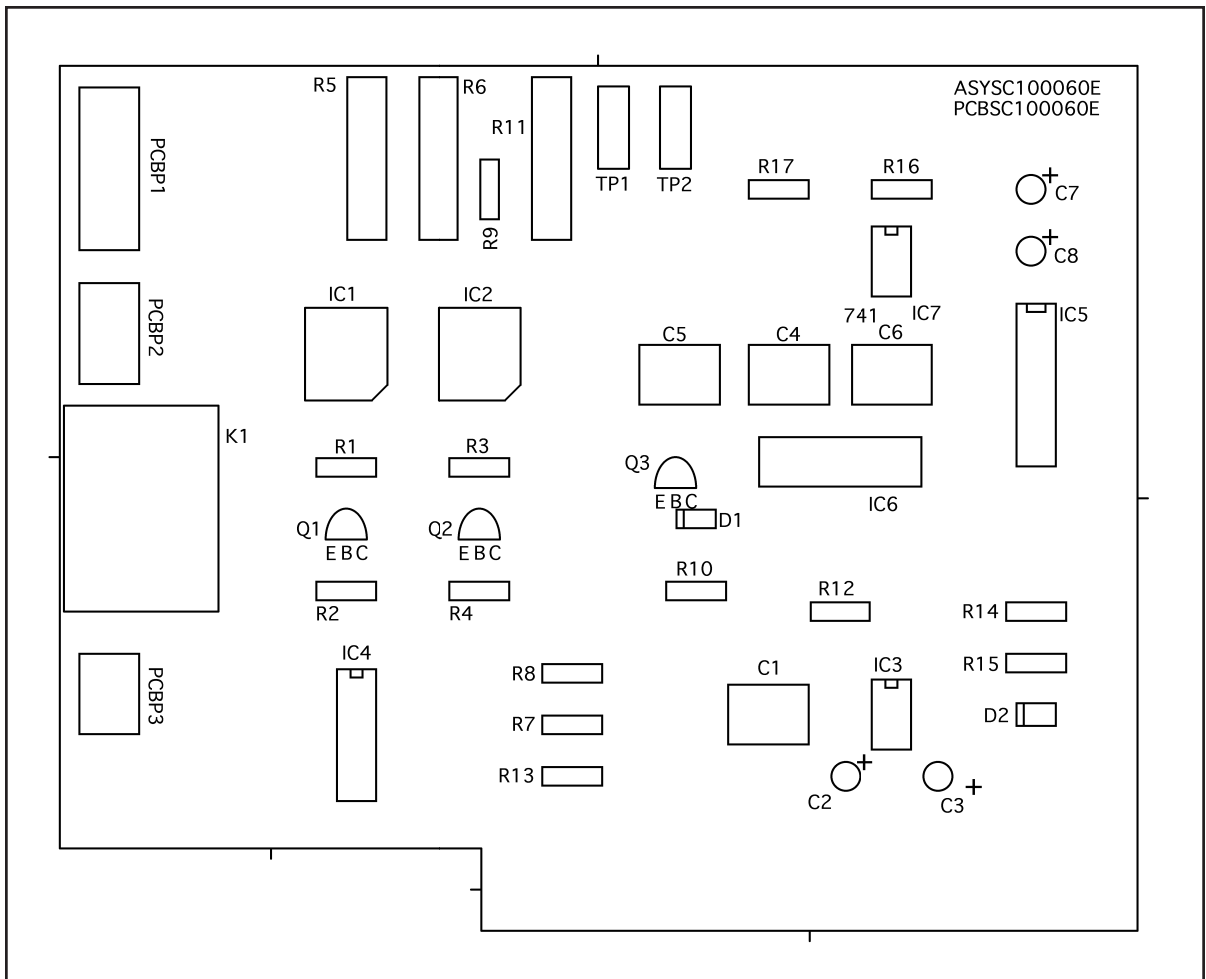
R 5 - Factory set to give 20V to the motor armature. This controls power to the motor in heating mode.

R 6 - Factory set to give 60V to the motor armature. This controls power to the motor in the coating mode.

R 11 – With 110 ohms for the RTD it is set to give 0.5V at TB 1 and will indicate a substrate temperature of 23 degrees C.

SC-20	**EDDY** c o		
	APPLE VALLEY CA. 760-961-8457		
	PLANETARY HEATER CONTROL		
	A	ASYSC10060C	A
	WER		- D -
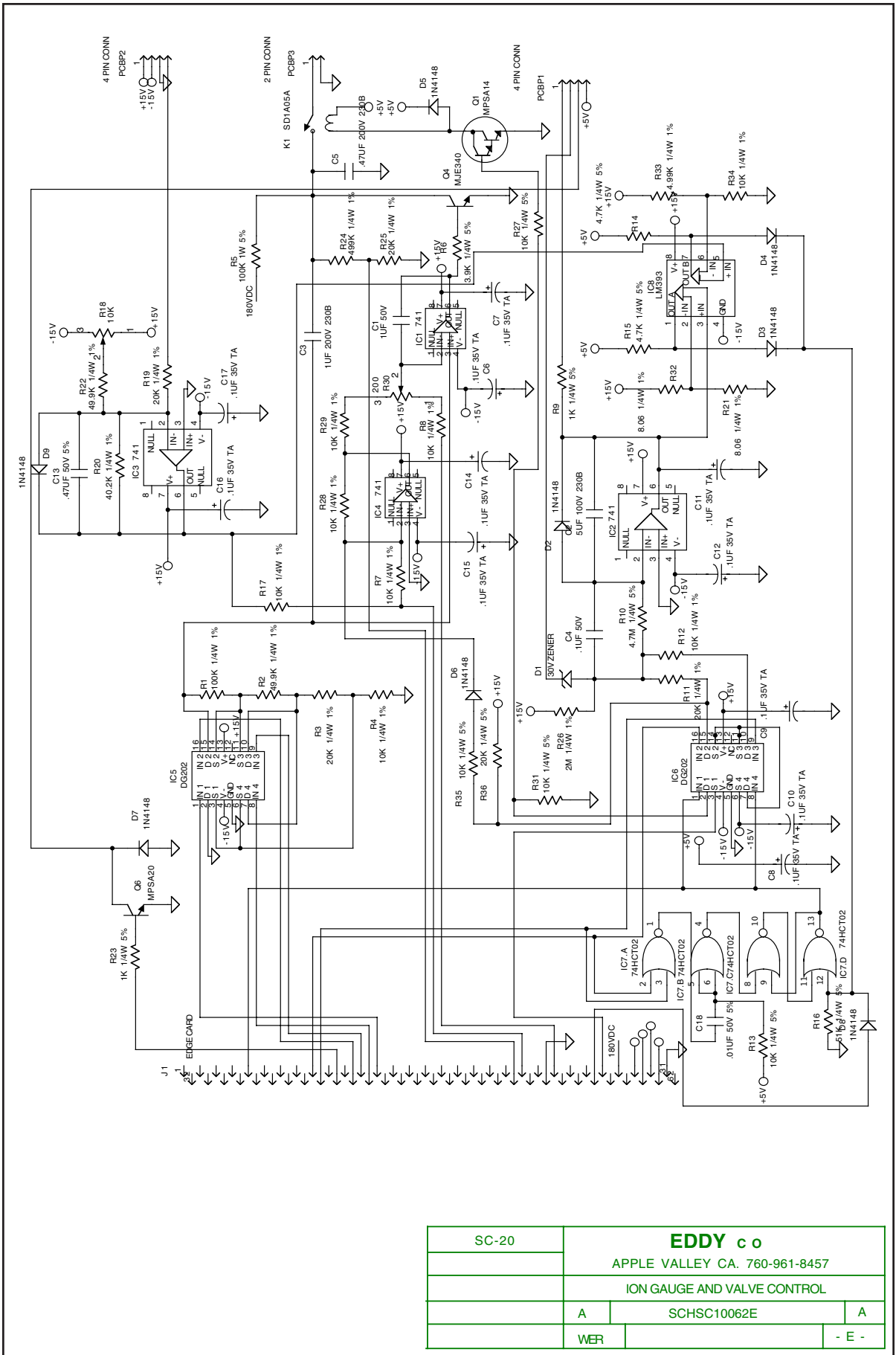
SC-20	**EDDY** c o	
	APPLE VALLEY CA. 760-961-8457	
	ION GAUGE AND VALVE CONTROL	
A	SCHSC10062E	A
WER		- E -

SC10ASY0062F
SC10PCB0062F

Component labels on board: R15, R18, D5, R27, Q4, C1, IC1, C3, K1, C6, C7, C12, C11, D1, R9, IC2, C2, D2, C4, R5, R35, R36, R32, IC8, R33, R34, D6, R21, C8, D9, R16, Q6, C13, R4, R3, R6, R10, R22, R20, R17, D7, R26, R2, R19, D8, R29, R25, R1, R12, D4, R28, R13, R11, D3, R14, R7, R24, C9, C18, R23, R8, R31, IC6, C10, IC7, IC5, IC3, IC4, Q1, C5, C17, C16, C15, C14, PCBP1, PCBP2, PCBP3, R30
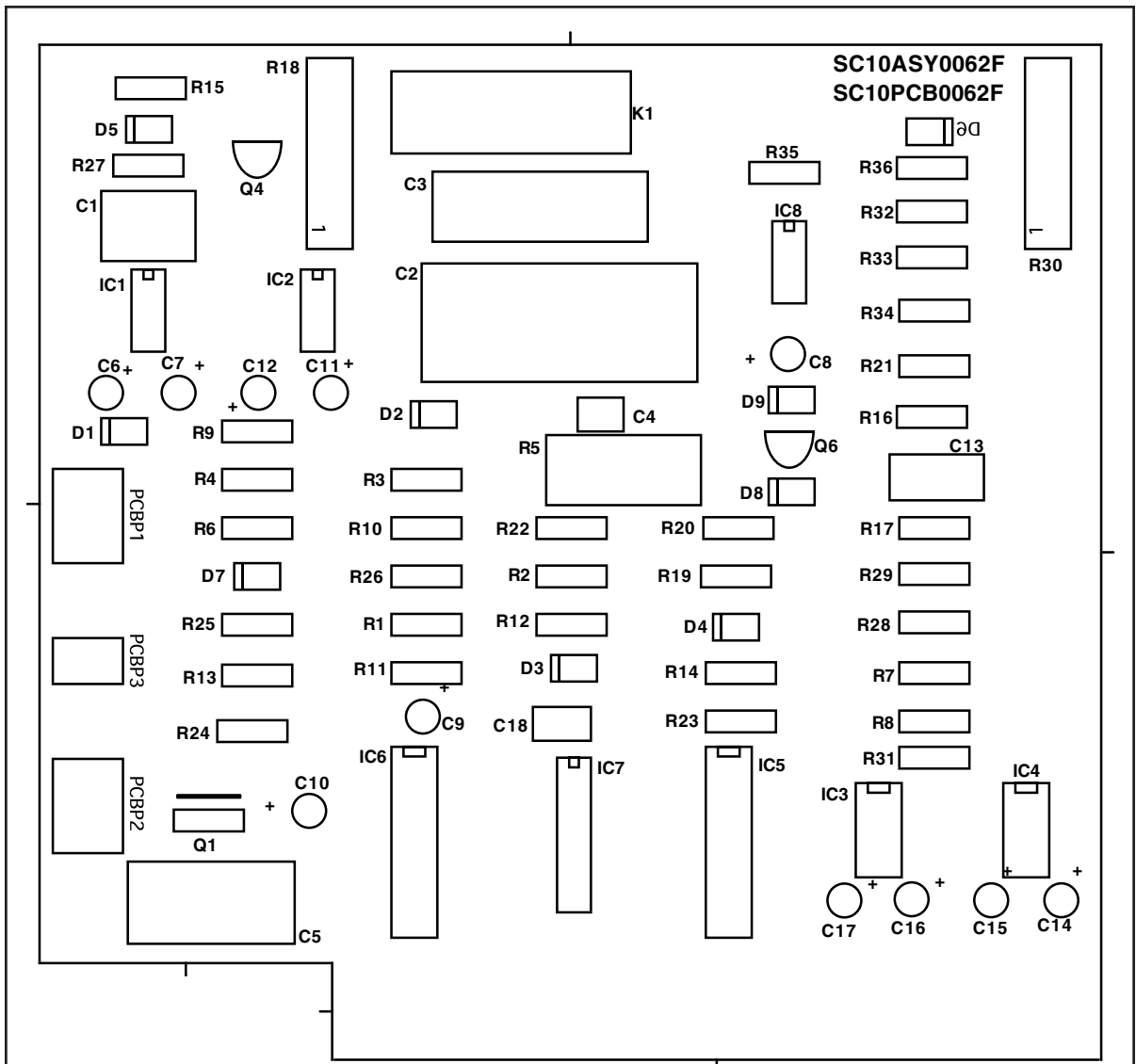
R 18 - Calibrates the SC-10 ion gauge reading to a known vacuum.

R 30 - Used to match the pressure set to the pressure indicated.

SC-20	**EDDY** c o		
	APPLE VALLEY CA. 760-961-8457		
	ION GAUGE AND VALVE CONTROL		
	A	SC10ASY062E	A
	WER		- F -

C10
1UF 50V

WITH T.C. CONNECTED
SET R3 TO GIVE 0.0 VDC AT IC1 PIN 6
SET R15 TO GIVE 0.0 VDC AT IC2 PIN 6
SET R18 TO GIVE 0.0 VDC AT IC3 PIN 6

R1
249K 1/4W 1%

PCBP1
4 PIN CONN
MECHANICAL PUMP
R2
1K 1/4W 1%

IC1   741
1 NULL
2
3 IN-
4 IN+   V+
        OUT
        NULL

8
7   +15V
6
5

-15V

C2
.1UF 50V

C3
.1UF 50V

C14
.1UF 35V TA

R3
10K

-15V

C13
.1UF 35V TA

D3
4.3V ZENER

R6

J7 EDGE CARD
1

40

45

R19
16 2W 5%

R5
100 1/4W 5%

R7
100

R6
100 1/4W 5%   +5V

C1
.1UF 50V

Q1
TIP31

+5V

C11
1UF 50V

R4
249K 1/4W 1%

PCBP2
4 PIN CONN
CRYO PUMP
R8
1K 1/4W 1%

IC2   741
1 NULL
2
3 IN-   V+
4 IN+
        OUT
        NULL

8
7   +15V
6
5

-15V

C6
.1UF 50V

C5
.1UF 50V

C18
.1UF 35V TA

R15
10K

-15V

C15
.1UF 35V TA

D2
4.3V ZENER

R20
16 2W 5%

R10
100 1/4W 5%

R9
100

R11
100 1/4W 5%   +5V

C4
.1UF 50V

Q2
TIP31

+5V

C12
1UF 50V

R13
249K 1/4W 1%

4 PIN CONN
PCBP3
CHAMBER
R14
1K 1/4W 1%

IC3   741
1 NULL
2
3 IN-   V+
4 IN+
        OUT
        NULL

8
7   +15V
6
5

-15V

C9
.1UF 50V

C8
.1UF 50V

C17
.1UF 35V TA

R18
10K

-15V

C16
.1UF 35V TA

D1
4.3V ZENER

23

-15V
+15V
+5V

C19
10UF 25V ELECT

31

WITH T.C. CONNECTED
SET R7 TO GIVE 3.1 VDC AT R5 R19 JUNCTION
SET R9 TO GIVE 3.1 VDC AT R20 R10 JUNCTION
SET R12 TO GIVE 3.1 VDC AT R21 R16 JUNCTION

R21
16 2W 5%

R16
100 1/4W 5%

R12
100

R17
100 1/4W 5%   +5V

C7
.1UF 50V

Q3
TIP31

+5V

1.   Connect TC 1, TC 2, and TC 3 to the back of the instrument.
2.   With diffusion pump or cryo [pump, mechanical pump and chamber at atmospheric pressure:
   a. Set R3 to give 0.0 VDC at IC1 pin 6.
   b. Set R15 to give 0.0 VDC at IC2 pin 6.
   c. Set R18 to give 0.0 VDC at IC3 pin 6.
   d. Start the vacuum system and pump chamber down to high vacuum.
   e. Adjust R9 to make cryo pump reading 000 torr.
   f. Adjust R18 for the chamber pressure to read 000 torr.
   g. Turn off diffusion pump or cryo pump, wait 20 minutes, open roughing, foreline and plate valves.
   h. Wait 5 minutes and then adjust R7 to make the mechanical pump reading the same as the cryo pump and chamber eadings.

SC-20	EDDY c o	
	APPLE VALLEY CA. 760-961-8457	
	THERMOCOUPLE GAUGE CONTROL	
A	DWGSC10063C	A
WER		- H -

IC5   IC4
R4 1K 1/4W 5%
R3 1K 1/4W 5%   4N33   4N33
R5 1K 1/4W 5%   IC6   IC7
R6 1K 1/4W 5%
4N33   4N33

3 PIN CONN
PCBP1

HPR100

ASYBUSI/O64F
PCBBUSI/O64F

IC15

1

REL1

D2 +
D3 +
D4 +
D5 +
D6 +
D7 +
D8 +

22UF 35V TA

C3
+
+   C2   22UF 35V TA

HPR100
IC16

1

REL2

3 PIN CONN
PCBP4

1

REL3

22UF 35V TA
C1
+

2K X8 R1

16 PIN CONN

+   C4
22UF 35V TA

REL4

C6
+

.1UF 35V TA

PCBP2

REL5

C5 .1UF 35V TA
+

IC1   S1

R2

74HCT240
IC3

+

.1UF 35V TA C7

REL6

IC2
74LS373

2K X8

REL7

74LS138   8P ST

+
C8
+

.1UF 35V TA

1

PCBP1 (input)
Jumper
1 and 2   5 volt input
2 and 3   contact closure

PCBP4   (output)
Jumper
1 and 2   5V out on pins 1-6
2 and 3   sink 50V   .5 amp

SI-Channel select
I/O A - 1,5 on   2,3,4,6,7,8 off
I/O B - 2,6 on   1,3,4,5,7,8 off

Output 7 (pins 8,9)
Sink 50V   .5 amp with any jumper
configured.

P1 P2 P3 P4 P5 P6 P7

1   32   1   32   1   32   1   32   1   32   1   32   1   32

31   62   31   62   31   62   31   62   31   62   31   62   31   62

PCBP1

GROUND
+150
+24
_15
+15
+5
+5
GROUND

C1 C2 C3   C4 C5   C6

BUS 10ASY066D   BUS10PCB066D

SC-20		**EDDY** c o		
		APPLE VALLEY CA. 760-961-8457		
		MAIN BUS BOARD		
	A	BUSI/O066D		A
	WER			- K -

PCBP3

+ DC LOAD
− DC LOAD
REL4
+ DC CONTROL
− DC CONTROL
D0061
+5V

+ DC LOAD
− DC LOAD
REL3
+ DC CONTROL
− DC CONTROL
D0061
+5V

+ DC LOAD
− DC LOAD
REL2
+ DC CONTROL
− DC CONTROL
D0061
+5V

+ DC LOAD
− DC LOAD
REL1
+ DC CONTROL
− DC CONTROL
D0061
+5V

TP2
2.2K 1/4W 5%
R8 1M 1/4W 1%
C5 1UF 50V
+15V
R5
−15V
R9 9.09K 1/4W 1%
R11 1K OHM 15T POT
R10 3.01K 1/4W 1%
R12
IC5 3140
+15V
Q1 TL430

PCBP2 3 PIN CONN

IC2 HPR100
+OUT
−OUT
+IN
−IN
C4 22UF 35V TA
C3 22UF 35V TA
22UF 35V TA
+5V

TP1
PCBP1 3 PIN CONN
IC1 HPR100
+OUT
−OUT
+IN
−IN
C2 22UF 35V TA
C1 22UF 35V TA
22UF 35V TA
+5V

R6 1K 1/4W 1%
C6 .01UF 50V 5%
D2 1N5817

TYP CT1
10 UA
R8 1 MEG
SET R11 TO GIVE 10.00 VDC FROM TP1 TO TP2

TYP APD
100 UA
R8 100K
SET R11 TO GIVE 10.00 VDC FROM TP1 TO TP2

IC6 74HCT373
8D 7D 6D 5D 4D 3D 2D 1D
8Q 7Q 6Q 5Q 4Q 3Q 2Q 1Q
OE EN1 GND VCC
+5V

R1 1K 1/4W 5%
R2 1K 1/4W 5%
IC3 4N33
IC4 4N33
R3 2K 1/4W 5%
R4 2K 1/4W 5%
+5V

IC7
TX RX
INT 1
INT 0
p1.7
p1.6
p1.5
p1.4
p1.3
p1.2
p1.1
p1.0
ADC−
ADC−2
+5
GND

R7 10K 1/4W 1%
C8 .1UF 50V
C7 10UF 25V ELECT
+5V

D1 1N5817
−15V
C10 1UF 50V
C9 1UF 50V
+15V
+5V

J1

SC-20

THE EDDY CO.
APPLE VALLEY CA. 760-961-8457
CRYO-REGEN AND CONTROL BOARD
DWGSC100065A
A
WER
− L −

TP2

IC3

IC4

R1

R2

PCBP3

DO061   REL1

DO061   REL2

DO061   REL3

DO061   REL4

PCBP1

C2   +

IC1

C1   +

D1

C6

R3

R4

R8

R12

C5

R7

D2

IC6

ASYCSCCRYO65A
PCBSCCRYO065A

PCBP2

C4   +

R11

TP1

IC2

C3   +

C9

R9

R6

R10

C10

R5

Q1

IC5

IC7

DOMINO

C8   C7   +

5 PAD   R6 20K 1/4W 1%   IC1 ICL8048   R5 10M 1% MOX   R4 500

6 PAD

SP-GAP1
SVPB1-C90/20

Q1
D32W14

C1 100PF 160V SF

R1 2K

+15V

-15V

D32W14
Q2

IC1 ICL8048

Pin	Label		Pin	Label
1	GND		16	I REF
2	IIN		15	GAIN
3	NO		14	NO
4	A1 NULL		13	A2 NULL
5	A1 NULL		12	A2 NULL
6	V−		11	V+
7	A1 OUT		10	V OUT
8	NO		9	NO

R3 +15V

R2 9K 806 1/4W 1% 3

+15V

-15V

1 PAD
2 PAD
3 PAD
4 PAD

+15V
-15V
C2 .1UF 35V C3 1UF 35V TA

SC10ASY0067B
SC10PCB0067B

R1   R2   R4   R3

R6

R5

Q1

SP-GAP1

Q2   C1

C3 C2

+   +

IC1

D1
BR81D

R5
10K 1/4W 5%

C1 2200UF 16V ELECT

IC1
IC7805

1 PAD # 7 PAD

2 PAD # 6 PAD

5 PAD # 3 PAD

8 PAD # 9 PAD

12 PAD # 4 PAD

13 PAD # 10 PAD

14 PAD # 11 PAD

PCBP18 PIN
1

C2
10UF 25V ELECT

D2   VM28 Bridge

IC2 IC7805

C4 1000UF 35V ELECT
10K 1/4W 5%
R7

C3
10UF 25V ELECT

D3 VM28 Bridge

10K 1/4W 5%
R8 1000UF 35V ELECT

IC3 IC7915

C5

C6
10UF 25V ELECT

IC4 IC7815

D4
BR81D Bridge

10K 1/4W 5%
R9

C7
1000UF 35V ELECT

C8
10UF 25V ELECT

D5   VM68 Bridge

20UF 200V ELECT

R4
3.3K 2W 5%

D7
120V ZENER

Q2
MJE340

C13
20UF 200V ELECT

C9

R1
100K 1W 5%

D8
30V ZENER

C12
1UF 50V

IC5
VTL-5C2

D9 VJ148 Bridge

R10
10K 1/4W 5%

R3
180 1/4W 5%

PCBP2
4 PIN CONN

3   2

4   1

C10
4700UF 25V ELECT

C11
4700UF 25V ELECT

D6
5.1V ZENER

PCBP3
3 PIN
1

PCBP4
4 PIN
1

K1
SD1A05A

R2
100 1/4W 5%

R11
100 1/4W 1%

Q1
Q4015L5

R6
100 1/4W 5%
1

PCBP6
3 PIN CONN

Q4
MJE340

INV1
E1041

1 Vin +   Vout AC 4

2 Vin -   Vout AC 3

BOTTOM VIEW

C14
1UF 50V

PCBP5
4 PIN CONN
1

SC-20	**EDDY** c o		
	APPLE VALLEY CA. 760-961-8457		
	POWER SUPPLY		
A	SCHSC10068C		A
WER			- P -

SC10ASY0068C
SC10PCB0068C

C1

D1
+
C5
+
C3 C2
+   +
C6 C8
+   +
R5
C11
R7
R10
R2
IC1
PCBP1

C4

D2
C13
IC2

C7
+
IC5
IC3

D3

D4
+
K1
D7
IC4
PCBP3

D5
C9
Q2
+
D6
D8
R3
R8
PCBP4

R1
C12
2   3
PCBP2

R11
R4
1
PCBP6

C10
D9
+
4
PCBP5

INV1

Q4
Q1
R6
C14
R9
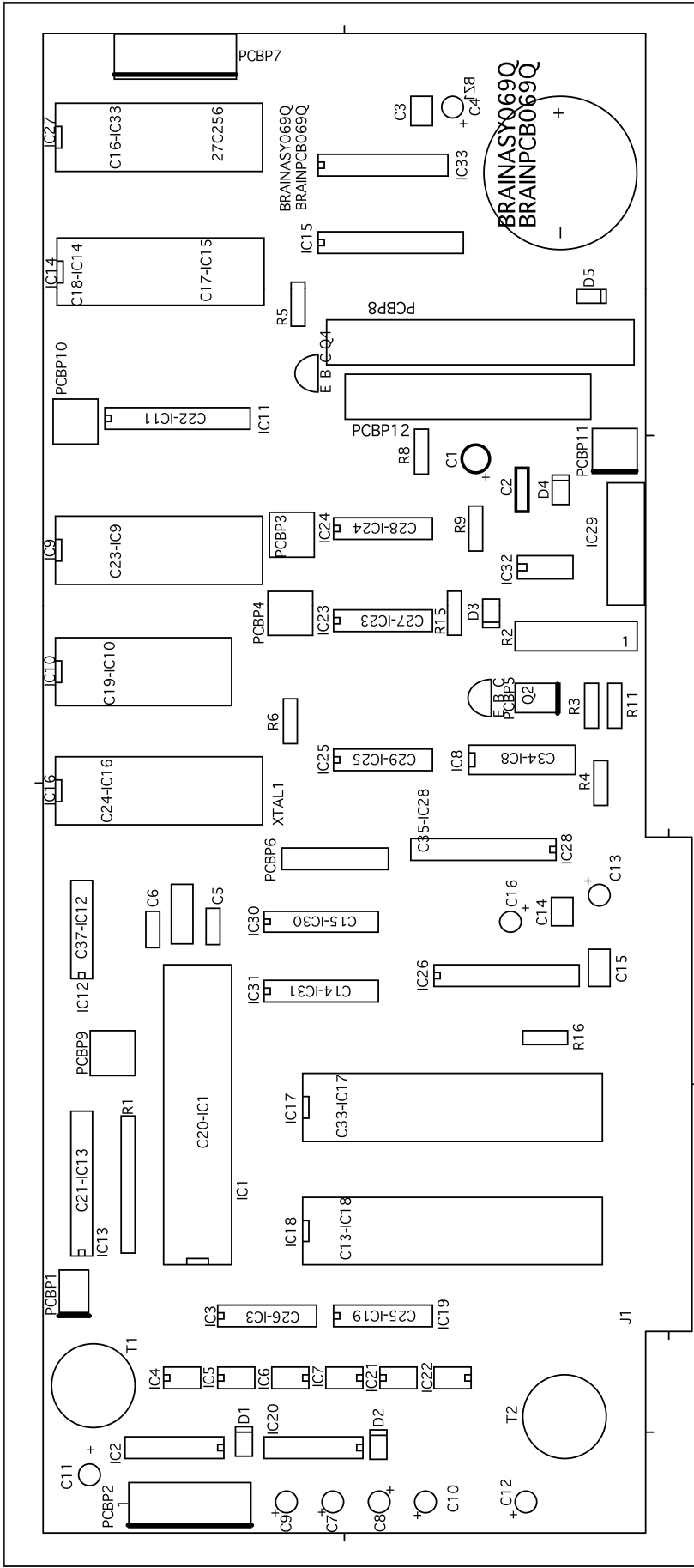
THE EDDY CO.

APPLE VALLEY CA. 760-961-8457

BRAIN BOARD

BRAINASY069Q

SC-20

A

WER

- S -

BRAINASY069Q
BRAINPCB069Q

PCBP 1 No Jumper.
PCBP 3 Jumper between 1 and 2.
PCBP 4 Jump between 1 and 2, factory set.
PCBP 5 No jumper
Adjust R12 to give 5.000 volts reference.

PCBP7
IC27
C16-IC33
27C256
IC14
C18-IC14
C17-IC15
IC15
C3
C4
BZ1
IC33
D5
R5
PCBP8
PCBP10
IC11
C22-IC11
E B C Q4
PCBP12
R8
C1
C2
D4
PCBP11
IC29
IC9
C23-IC9
PCBP3
IC24
C28-IC24
R9
IC32
C10
C19-IC10
PCBP4
IC23
C27-IC23
R15
D3
R2
1
IC16
C24-IC16
R6
XTAL1
E B C
PCBP5
Q2
R3
R11
IC25
C29-IC25
IC8
C34-IC8
R4
C35-IC28
IC28
PCBP6
C13
C6
C5
IC30
C15-IC30
C16
C14
C37-IC12
IC12
IC31
C14-IC31
IC26
C15
PCBP9
R16
R1
C20-IC1
IC17
C33-IC17
C21-IC13
IC13
IC1
IC18
C13-IC18
PCBP1
IC3
C26-IC3
C25-IC19
IC19
T1
IC4
IC5
IC6
IC7
IC21
IC22
C11
C2
PCBP2
D1
IC20
D2
T2
C9
C7
C8
C10
C12
J1