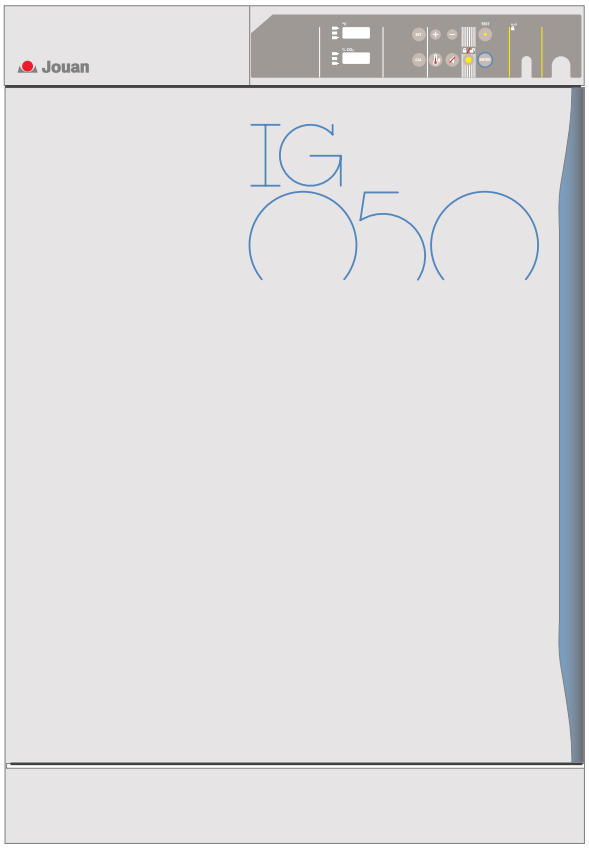
Microprocessor Controlled Automatic Water Jacketed CO_2 INCUBATOR

IG 050

USER AND SERVICE MANUAL



JOUAN
170 Marcel Drive
Winchester, VA 22602
USA
Phone: 540-869-8623
Toll Free: 800-662-7477
FAX: 540-869-8626

Manual P/N 36100160
Rev. C Dated 18AUG04

Microprocessor Controlled Automatic Water Jacketed CO_2 INCUBATOR

IG 050

USER AND SERVICE MANUAL

36100160-c

CAREFULLY READ THIS MANUAL BEFORE OPERATING YOUR INSTRUMENT.

THE VALIDITY OF THE GUARANTEE IS SUBJECT TO THE OBSERVATION OF THE INSTRUCTIONS AND PRECAUTIONS DESCRIBED IN THIS DOCUMENT.

REVISION STATUS

INDEX	DATE	AMENDED PAGES	NOTES
a	OCT2001		Initial release
b	MAY2002	32-34, 44-45	Update for coved corners
c	AUG2004	45	Add door kits

CONTENTS

1 USE AND FUNCTION

1.1. GENERAL PRESENTATION

The Jouan water-jacketed microprocessor controlled CO_2 incubator is ideal for applications requiring :

- sterility of the chamber
- temperature stability
- CO_2 control
- high relative humidity level.

Sterility of the chamber

The chamber is hermetically isolated from the external atmosphere. The injected gas passes through a 0.22 µ filter.

Temperature stability

The proportional integral derivative temperature control allows precise temperature control from 5°C above ambient to 50°C.

CO_2 control

This is the specific purpose of this type of incubator.

The culture media are buffered with bicarbonate. The CO_2, which is present in a predetermined volume (partial pressure) dissolves in these media and thus prevents their spontaneous alkalinization, which is toxic for the cells.

$$\text{Excess } CO_2 \rightarrow CO_2 + H_2O \rightleftharpoons H_2CO_3 \rightleftharpoons \boxed{H+} + HCO_3\text{-}$$

The excess CO_2 "pushes" the reaction to form protons which gradually reduce the pH of the media until equilibrium is achieved.

High Relative Humidity level

To avoid drying of the media due to evaporation, chamber atmosphere is almost saturated in water vapor (created by the patented vapor generator and/or by natural evaporation of the water placed in the water pan).

1.2. GENERAL DESCRIPTION

IG 050 is fitted with 1 patented device :

- An internal heater

The heat generator combined with PID regulation and water jacket ensures the best performances regarding :

- temperature stability
- regulation accuracy
- recovery time
- homogeneity

The solid state digital control panel houses all functions necessary to operate the incubator. The push button switches and individual LED displays allow the operator to adjust temperature, CO_2, and calibrate via a single set of controls.

A digital high-limit safety switch is provided which can be easily set through the control panel to prevent thermal runaway in the event of temperature control failure.

Visible and audible Hi and Lo alarms are provided for temperature and CO_2. Contacts are also provided on the rear of the unit for connection to a central monitoring system.

Your incubator is supplied with five shelves and can hold a maximum of ten shelves. The entire stainless steel shelf system can be assembled and disassembled without the use of tools, for ease of cleaning.

Single chamber units are easily stacked without a stacking kit.

2 INSTALLATION PROCEDURE

2.1. LIFTING AND TRANSPORT

Due to the weight of the machine, use proper equipment when lifting or moving. Lifting and moving should be done only by trained personnel.

The machine must be supported from underneath. If it has to be transported without its pallet, for example on a staircase, professional handling assistance is required.

2.2. UNPACKING

Material packing list:

Description	Quantity
User manual	1
CO_2 supply hose	2
CO_2 filter	2
Shelf	5
Shelf standard, right front	1
Shelf standard, left front	1
Shelf slide	10
Humidity pan	1
Water fill hose assembly	1
Hose clamp (external supply)	8
6.3 AMP spare fuse (120V model)	1
0.8 AMP spare fuse (120V model)	1
Mains cable	1
Germicidal solution	1

2.3. POSITIONING

You must set the incubator in its final place before filling the water jacket since the incubator cannot be moved once filled, unless mounted on the caster kit.

The best operating conditions and results will be obtained by placing the incubator on a level surface in an area away from drafts, ventilating outlets and other areas where rapidly changing conditions may be present.

You must leave at least 1/2 inch above the incubator.

If at all possible, leave at least 2 inches of space around the incubator, to allow access to power, gas inlets, and remote alarms located on the back of the unit.

The incubator is fitted with four levelling feet to accommodate any unevenness of the floor.

2.4. ENVIRONMENTAL CONDITIONS

The incubator is designed to be safe in the following working conditions :

- Indoor use
- Temperature from 5°C to 40°C
- Maximum relative humidity 80% for temperatures under 22°C
- Maximum altitude : 2000 m

Optimum performance is ensured in the following temperature range : 15°C to 25°C

2.5. STACKING OF 2 UNITS

The water jackets of both single chamber units must be empty. If not, drain the water from the units using the water fill/siphon assembly which came with the unit. Remove shelves, shelf slides, shelf slide brackets, water pan and air ducts from both units prior to stacking.

Position the bottom chamber unit in the desired location following the guidelines in section 3. Level the bottom chamber by adjusting the four levelling feet on the bottom of the unit.

Verify that the intended power source is capable of supporting two incubators.

Remove the control panel from the bottom chamber unit. Disconnect the nut from the gas sample port and remove three screws from the bottom of the control panel. Pull the control panel slightly out from the housing (a small amount of force may be required).

Disconnect the keyboard ribbon cable connector and completely remove the control panel.

Remove the insulation from the top of the incubator chamber

Remove the four black plastic plugs from the top of the chamber.

Remove the two large black plugs from the top rear of the incubator.

Remove the 4 levelling feet from the top chamber unit.

Position the top single chamber onto the top of the bottom chamber. Align the top chamber's levelling feet screws holes with the four holes located on top of the bottom chamber.

Reach inside the bottom chamber control panel housing area and fasten the top chamber's four levelling feet . Tighten the levelling feet by hand. This will secure the top chamber to the bottom.

Replace the insulation in the top housing of the bottom chamber.

Replace the bottom chamber control panel. Remember to reconnect the keyboard ribbon cable and gas sample port prior to installing the control panel.

Replace the two large black plugs in the top rear of the incubator.

Install the air duct and shelving system following the guidelines in section 2.8.

Fill the water jackets with water.

WARNING: the bottom chamber water jacket must be filled first.

2.6. ELECTRICAL CONNECTION

Important : please read the following instructions carefully. Failure to follow instructions may result in personal injury.

WARNING : For personal safety, and for best performance, this apparatus must be properly grounded.

The power cable provided on this unit is equipped with a three connector (grounding) plug, which mates a standard grounding mains receptacle to minimize the possibility of electric shock hazard from this apparatus.

In order to protect against indirect electrical contact, the supply of power to the instrument must be via a power receptacle fitted with a protection device ensuring automatic cut-off in the case of an insulation fault. A power line fitted with a circuit breaker of the correct rating complies with this requirement.

2.7. CLEANING AND DECONTAMINATION

The incubator delivered is not sterile. It has to be cleaned before using.

Remove any packaging, accessory items from the chamber. Remove the air duct :

- Loosen wing nut
- Carefully tilt top of air duct forward and toward either side
- Remove air duct from the chamber

Thoroughly clean and disinfect chamber, air duct, shelves, shelf slide brackets, shelf slides, humidity pan, and any other objects which will be placed inside the chamber. All stainless steel parts may be autoclaved for thorough sterilization. There are two small plastic spacers on the bottom of the air duct that must be removed before autoclaving the parts.

The blower wheel may be removed and cleaned. The blower wheel is fastened to the motor axle by a firm press fit. Some force may be required for removal.

Note : Handle all sterilized parts carefully to reduce possibility of introducing contaminants into the incubator.

Reinstall blower wheel and air duct:

Press the blower wheel firmly onto the axle until the blower wheel rests against the axle stop. Place the plastic spacer on the long stud located on the fan motor plate. Re-install the two plastic spacers on the air duct. Re-install the air duct and fasten the plastic wing nut. Check for free rotation of the blower wheel by turning the wheel clockwise using a finger. If the blower wheel rubs against the air duct : verify that wheel is pushed back against the axle stop and loosen the wing nut slightly.

2.8. SETTING UP / SHELF INSTALLATION

Ensure the incubator is levelled. Adjust the 4 corner levelling feet as needed.

Ensure that the incubator is plugged into a properly grounded outlet of the correct supply voltage, and that the power switch is in the OFF position.

Ensure that the blower wheel and air duct are properly installed.

Install front shelf slide brackets by sliding the keyed slots of each bracket into place over the button located near the bottom of each side wall of the chamber (Fig. 1).

The incubator is provided with 5 shelves. Each shelf rides on a pair of shelf slides for ease of access to samples. Shelf height may be adjusted by installing the slides into the proper keyways in the shelf slide brackets.

Insert the shelf slide into a rear keyway of your choice on the rear shelf slide bracket on either side of the chamber (Fig. 2). Next insert the shelf slide onto the matching front keyway. Attach another slide on the opposite side of the chamber at the same elevation. Repeat for the remaining shelf slides.

The shelves are designed so that they may be used with the lip facing either up or down.

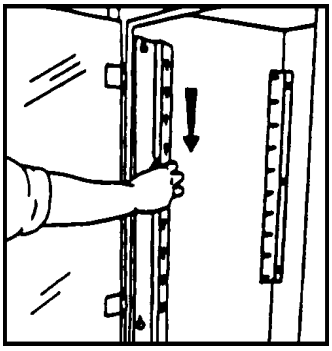


FIG.-1.

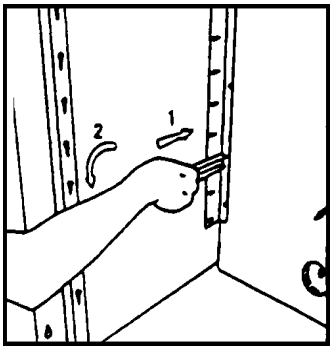


FIG.-2.

2.9. FILLING OF THE WATER JACKET

CAUTION : to avoid build-up of mineral deposits and to prevent corrosion, use only distilled water (50 kohms to 1 megohms) in the water jacket. Do not use ultra pure or deionized water. Do not use tap water.

Turn the power switch on. The digital displays will light up, and the "H_2O" low water jacket water level indicator will be illuminated. Verify that all set points are set to "off".

Unscrew the cap from the water jacket fill port and replace the cap with the threaded hose barb connector provided in the accessories kit.

Connect one end of the clear vinyl tubing provided in the accessory kit to the hose barb connector. If desired, an antifungal additive may be added to the water. Use the Oakite Sanitizer provided or contact your laboratory supply dealer.

Connect the other end of the vinyl tubing to a source of distilled water. A tap adapter is provided in the accessory kit for your convenience in connecting to an in-house central distilled water system.

CAUTION : When filling the water jacket, be careful not to obstruct the water chamber vent port.

Fill the water jacket until the associated "H_2O" indicator lamp extinguishes (approximately 11 gallons).

2.10. CONNECTING TO THE GAS SUPPLY

The incubator is equipped with shuttle valves for connection to the CO_2 supply.

For CO_2 supply, the shuttle valve automatically switches from a primary cylinder to a secondary cylinder.

Only medical grade 100% CO_2 should be used as the CO_2 supply for this incubator. The source may be either a cylinder or an in-house central CO_2 system equipped with shut-off valves and pressure regulator.

CO_2 pressure regulation

When using two cylinders for CO_2, the primary (Tank 1) cylinder should be set 3-5 PSIG (.2 - .4 BAR) higher than the secondary (Tank 2) cylinder. This will allow proper operation of the gas shuttle valve.

In-house central CO_2 supply

When using an in-house central CO_2 supply, either a 1 stage or 2 stage pressure regulator will be required, depending on the pressure level of the in-house source. The regulator should be placed near the incubator. Use the "tank 1" connector.

The incubator is delivered with filters and tubing.

WARNING : USE THE RED TUBE FOR CO_2 .

Cut the CO_2 supply hose to length as required, and slide an adjustable hose clamp over each end of the hose. Connect the hose to both the incubator and the pressure regulator and clamp securely.

Cut the hose 1 inch from the incubator. Insert a clamp at each end of the tubing. Insert the CO_2 filter, observing gas flow direction on the filter.

2.11. ACCESSORY INSTALLATION

2.11.1. RS232C COMMUNICATION

An optional RS232C accessory kit is available for the IG 050. This allows two-way serial communication between the incubator and a computer or printer. This feature is quite useful for data-logging or remotely controlling the incubator.

Connections

The RS232C port is a standard female DB 25 connector.

Print formats

The incubator is capable of outputting two separate print formats and a special diagnostics output.

Print format 1 is tabular style format designed for easy viewing. The format is shown below :

SELECTION	DESCRIPTION
1	Used for a multi-line format with English headings with continuous screen DATE: 18:47 24/June/1998 TEMP: 37.00°C 37.0 CO2: 5.0 % 5.0% R.H.: 97% 97% O2: 10% 10% Actual Set point
2	Used for a raw, one-line status output suitable for importing into a spreadsheet 20:36 22.0 37.0 5.6 10.0 43.0 50.0 21.5 25.0 ALARM TIME ACTUAL TEMP SET TEMP ACTUAL CO2 SET CO2 ACTUAL RH SET RH ACTUAL O2 SET O2 ALARM
3	Is an extension of 2 and is not recommended for customer use

"Sensor" will appear to the right of the output is a failed sensor is suspected.

"Alarm" will appear to the right of the output if an alarm condition exists.

Diagnostic format

The following diagnostic format is output every time TEST is pressed.

Table 1 : Diagnostic format

Function	Display	Set value	Probe	Offset	Alarm delay		Alarm condition
					high	low	
Temp	37.0°C	37°C	5247	0.0°C	0M	0M	none
CO_2	5.0 %	5.0 %	16730	0.0 %	0M	15M	none

Printer set-up

A serial printer is required for operation. Connect the printer to the incubator. Set the serial communication parameters on the incubator to match the printer (see in the following sections : "setting communication parameters").

Computer set-up

Communications software is required for incubator/computer interface. Any standard software such as Procomm or Crosstalk will suffice. Connect the computer to the incubator. Start the communications software. Set the serial communication parameters on the incubator to match the software (see following section).

Setting communication parameters

The communication parameters on the incubator must match those of the printer or computer. Table 1 below lists the parameters available for the incubator.

Table 2 : Communication parameters

Display	Parameter	Default value	Value Range
bAU	Baud Rate (00's)	9600	192, 96, 48, 24, 12, 3, off
PAr	Parity	No	No, odd, even
bPC	Word Length	8	8, 7
StP	Stop Bits	1	1, 2
Prt	Print Rate	10	0 - 999 seconds
PFt	Print Format	2	0, 1
thh	Time - hours		0 - 24 hours
tnn	Time - minutes		0 - 60 minutes
ddA	Date - day		0 - 31 days
dnn	Date - month		0 - 12 months
dYY	Date - year		0 - 99 years

To enter communication set-up :

Press ⊕ , ⊖ , and Enter simultaneously. Adjust the value with ⊕ and ⊖ . Press Enter to store the value and proceed to the next parameter.

Pressing ● (test) will return the unit to normal operating mode.

Controlling the incubator

The incubator may be remotely controlled by via the RS232C option. A computer with communication software is required. The incubator can be queried or controlled via the RS232C. To query the incubator, type the appropriate command, a question mark, and press Enter. To control the incubator, type appropriate command, the new value, and press Enter. For a listing of available commands, see table 3.

Example : To change CO_2 set point to 10% type CS10 <Enter> : CO_2 set point will change to 10%

Example : To query actual temperature type TA ? <Enter> : the actual temperature of the incubator will be displayed on the computer monitor.

The incubator will accept both upper case and lower case commands.

Typing <?> <Enter> will display a help screen on the monitor showing all available commands. The help screen is reproduced below :

Table 3 : Communication commands

Temperature :	Actual	TA	display
	Set point	TS	display and control
	Offset	TO	display and control
	Safety	TF	display and control
	H delay	TW	display and control
	L delay	TL	display and control
CO_2 :	Actual	CA	display
	Set point	CS	display and control
	Offset	CO	display and control
	H delay	CW	display and control
	L delay	CL	display and control
System (S) :	Hours	SH	display and control
	Minutes	SM	display and control
	Day	SD	display and control
	Month	ST	display and control
	Year	SY	display and control
	Print rate	SR	display and control
	Print format	SF	display and control

3 SPECIFICATIONS

3.1. DIMENSIONS AND WEIGHT

External dimensions (H x W x D) :	38 x 24.5 x 29 inches
Chamber dimensions (H x W x D) :	25 x 17.5 x 17.3 inches
Chamber capacity :	5.4 ft^3 / 154 liters
Number of shelves :	10 (provided with 5 shelves)
Total usable surface :	20 ft^2 / 1.84 m^2 with 5 shelves
Height between 2 shelves :	2 inches / 50 mm
Maximum load per shelf :	22 lbs / 10 kg
Jacket volume:	11 gal. / 40 liters
Weight (jacket empty):	276 lbs / 85 kg
Weight (crated) :	125 kg
Weight (jacket filled up):	125 kg

3.2. ELECTRICAL SPECIFICATIONS

IG 050	120 V ± 10 % - 50/60 Hz
Power consumption :	550 W - 4.7 A

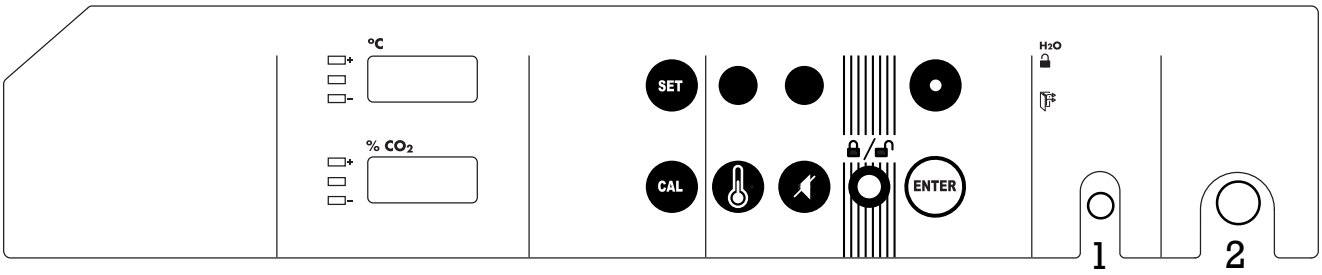
3.3. PERFORMANCE

Temperature :	Range :	Ambient + 5°C to 50°C
	Accuracy :	0.1°C
	Stability :	± 0.1°C
	Homogeneity :	± 0.25°C
CO_2 :	Range :	0 to 20 %
	Accuracy :	0.1 %
	Stability :	± 0.1 %
	Homogeneity :	± 0.25 %
Relative humidity :	Range :	Ambient to 98 %
	Source :	Water pan

4 INSTRUCTIONS FOR USE

4.1. CONTROL PANEL

4.1.1 FRONT PANEL



FRONT PANEL IG 050

Indicators	Function
Set	Changes temperature control or CO_2 set point.
Cal	Matches displayed value of temperature or CO_2 to actual measured chamber conditions.
	Sets chamber high temperature limit.
	Temporarily silences audible alarm.
	Locks set point and calibration values to protect against unauthorized or inadvertent changes, and to unlock controls once locked.
	Increases displayed value.
	Decreases displayed value.
	Initiates a self diagnostic check of the microprocessor controller.
Enter	Stores the new set point.

Display	Function
°C	Displays actual chamber temperature or CO_2 to actual measured chamber conditions.
% CO_2	Displays actual chamber CO_2 during operation.

These displays are also used during programming and calibration procedures.

Connectors	Function
1.	CO_2 sample - provides a direct connection for sampling the chamber calibration of the CO_2 displayed value.
2.	Fill port - used to fill or siphon drain the chamber water jacket.

For connector numbers refer to control panel (4.1.1).

Indicator lamps	Function
H_2O	Indicates that water in the water jacket is below normal operating level.
	Illuminates when control panel settings have been locked.
	Indicates that the chamber door is opened or has recently been opened. It will go out a short time after the door is closed.
	Indicates that the current displayed value is above the set point.
	Indicates that controller is regulating this parameter
	Indicates that the current displayed value is below the set point.

4.1.2. REAR PANEL

Connectors	Function
CO_2 inlet	Connection to CO_2 supply.
Tank N° 1	The tubing connector for the primary CO_2/N_2 supply cylinder.
Tank N° 2	The tubing connector for the secondary CO_2/N_2 supply cylinder.
Auxiliary outlet	This mains power outlet provides electrical power for connection of low power electrical devices 75 Watts maximum.

Fuses	Function
Line	This fuse provides protection for the primary incubator power line. Fuse current rating varies, depending on supply voltage.
Outlet	This fuse provides protection for the auxiliary power outlet. Fuse current rating varies, depending on supply voltage

4.1.3. LEFT SIDE PANEL

Power - Primary electrical power switch.

Mains input - IEC standard connectors for connection to electrical service line.

Temp recorder - Used to connect a recording device to monitor chamber temperature if desired.

CMS alarm output - Used to connect to a central monitoring system, if desired. May be wired Normally Closed (NC) or Normally Open (NO) with isolated ground (“COM” connection).

RS232C - This accessory port (optional on IG050) provides two way serial communications for printer or other computer devices.

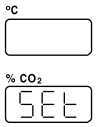
4.2. PROGRAMMING - CALIBRATION

The calibration procedure must be carried out when installing the incubator or if the incubator has been switched off for more than 24 hours.

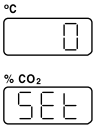
You must let the incubator operate for a minimum of 24 hours before attempting to calibrate.

- Fill the water pan with distilled water and place it in the chamber, 2 inches in front of the fan duct.
- Place a reference thermometer on the center shelf. The thermometer should be positioned such that it can be easily read through the incubator's inner glass door.
- Check that the temperature is set to zero.
- Check that all other set points are set to zero.

Press Set



Press ⊖ until zero appears



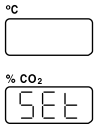
Press Enter .

Repeat the operation for the other parameters by pressing Set until each display is active.

4.2.1. PROGRAMMING OF TEMPERATURE SET POINT

WARNING : Do not connect CO_2 before temperature has been stabilized and calibrated.

Press Set .



Select desired temperature set point using ⊕ and ⊖ .

Press Enter .

The display will flash and a beep tone will confirm that the new value has been stored.

The incubator will begin heating as indicated by the green "ON" led indicator to the left of the temperature display window.

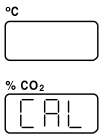
WARNING : Never operate unit without water in the water jacket. This may result in poor performance from the incubator or may damage incubator components and will void warranty.

Do not turn on the CO_2 until temperature has been calibrated and allowed to stabilize.

4.2.2. TEMPERATURE CALIBRATION

After the incubator has stabilized at the desired operating temperature (at least 24 hours), open the exterior door only. Do not open the glass door. Compare the temperature of the digital display with the reference thermometer inside the chamber. If these readings match, the temperature display is calibrated. If the displayed temperature does not match the thermometer temperature, it will be necessary to calibrate the temperature display.

Press Cal



Match displayed temperature with reference thermometer reading using ⊕ and ⊖ .

Press Enter . The display will flash and beep tone will confirm that the new value has been stored.

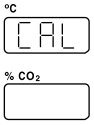
Allow 1 hour for temperature to stabilize for each 0.5°C of correction made before proceeding.

Check that displayed temperature matches the reading of the thermometer within the chamber.

4.2.3. CO_2 CALIBRATION

Open the glass door and let the ambient air fill the chamber (at least 5 minutes).

Press Cal twice

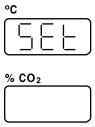


Select 0,0 % using ⊕ and ⊖ .

Press Enter .

4.2.4. CO_2 PROGRAMMING

Press Set twice



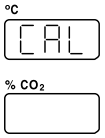
Enter selected value using ⊕ and ⊖ .

Press Enter .

Let the incubator stabilize for 30 minutes. Collect a sample (port located on the front panel) and measure CO_2 using a Fyrite analyzer. Measure at least two samples and average the results.

If the displayed CO_2 level does not match the measured actual chamber CO_2 level, it will be necessary to calibrate the CO_2 display.

Press Cal twice.



Use ⊕ and ⊖ to enter actual CO_2 level.

Press Enter .

4.3. OPERATION

Each control has 3 states :

- OFF : the parameter is not controlled.

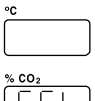
- O : the actual value of the parameter is displayed but not controlled.

- Set point : the parameter is regulated according to the set point.

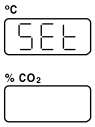
4.3.1 CHANGING OF THE SET POINTS

Press Set to display the parameter you want to modify.

Temp.



CO_2



Select desired value using ⊕ and ⊖ keys.

Store the value pressing .

Press • (test) to quit the programming mode.

4.3.2. CALIBRATION

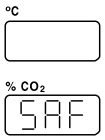
Always follow this order : temperature calibration, then CO_2 (see 4.2).

4.3.3. HIGH-LIMIT TEMPERATURE SAFETY

The high-limit temperature safety limit has a range of 26°C to 57°C and cannot be set less than 0.5°C above set point.

The high-limit temperature safety limit tracks upward changes in temperature set point to maintain the previous safety/set point temperature differential. The high limit temperature safety does not track downward changes in temperature set point and should therefore be reset after a downward change in temperature set point.

Press 



Select the desired value using ⊕ and ⊖ .

Press Enter to valid.

4.3.4. ALARM

Audible and visual alarms warn the operator in any case of malfunctioning.

High and low alarm

Each display is fitted with 2 red LEDs above and below the regulation green LED. If the controlled parameter goes beyond the normal operating set point band, the alarm activates. The alarm remains active until the actual value returns to within the normal operating band.

Alarm band and delay time

Parameter	Fixed threshold	Preset delay	Delay range
Temperature	high : + 0.5°C low : - 0.5°C	5 min 10 min	0 to 5 min 0 to 20 min
CO_2	high : + 0.5 % low : - 0.5 %	5 min 10 min	0 to 5 min 0 to 20 min

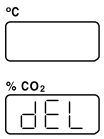
Each alarm has an associated delay to prevent nuisance alarms . The alarm delays have been optimized and factory preset to prevent alarm nuisance under normal operating conditions. If these alarm delays are not suitable for your application you may modify them through the keyboard.

Changing alarm delays :

The alarm delays are located at the end of the communicating parameter set-up.

Press ⊕ , ⊖ and Enter simultaneously.

Press Enter several times to scroll through the communication parameter setup until the alarm delays are reached. The display will show "dEL" and the red high light (+) will come on.



Using ⊕ and ⊖ select the new high alarm delay.

Press Enter to store the value and proceed to the next parameter.

Repeat for temperature low alarm delay.

Repeat for CO_2 high and low alarm delays.

Muting audible alarm

To silence any audible alarm press 🔇 . Muting will silence the audible alarm for 15 minutes. The red "high" or "low" indictor will continue to be displayed until the alarm condition is corrected.

If the condition is not corrected within 15 minutes, the audible alarm will sound again.

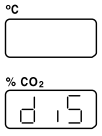
If an alarm is currently muted, the presence of an additional alarm condition will override the MUTE and the audible alarm will sound.

If an alarm has been muted and the alarm condition is removed and returns, the audible alarm will sound again regardless of when 🔇 was pressed.

Alarm disable

Alarms cannot be disabled when keyboard is locked. All alarms may be disabled for a period of up to 99 hours. To disable alarm :

Press 🔇 twice



Using ⊕ and ⊖ select the alarm disable time in hours. Press Enter to store the value.

The display will flash and a beep tone will confirm that the new value has been stored.

To change the alarm disable time :

Press Enter twice. Using ⊕ and ⊖ keys, select the new alarm disable time in hours.

Press Enter . To check alarm disable time remaining press 🔇 twice at any time.

4.3.5. USING THE KEYBOARD LOCK

To lock the keyboard

Press  .

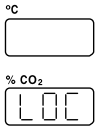
Using ⊕ and ⊖ , enter a numerical password of your choice.

Press (Enter) . The display will flash and a beep tone will confirm that the value has been stored.

The red 🔒 illuminates to indicate the locked condition.

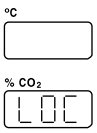
While the keyboard is locked, set points, calibration and high-limit safety values may be observed but not changed.

If an attempt is made to change a set point, calibration, or high temperature safety limit while the keyboard is locked , the keyboard will beep and the temperature display will show :



Temporarily unlock the keyboard

The control panel can be temporarily unlocked to change a set point, calibration or High-Limit safety. The control panel will automatically re-lock after a new value has been entered.

Press  . Display will show : 

Enter your numerical password using ⊕ , ⊖ then (Enter) .

The red 🔒 light will now blink on and off.

Set point, calibration and High-Limit safety may now be changed. The keyboard will re-lock after a new value is entered.

The keyboard will re-lock after any of the following actions :

- Ten seconds elapse with no buttons pressed.

- After (Enter) is pressed whether a value was changed or not.

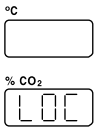
- After ● (test) is pressed.

Permanently unlocking the keyboard

The control panel can be permanently unlocked to allow operation without restricting keyboard entry.

When the control panel is unlocked, the incubator will accept changes to set point, calibration, and High-Limit values at any time.

To permanently unlock the incubator :

Press  . Display will show : 

Press (Enter) to temporarily unlock the keyboard.

The red "lock" light will now blink on and off.

Press  a second time.

Using ⊕ and ⊖ , re-enter your numerical password.

Press (Enter) .

The red "LOCK" light will extinguish and the incubator will be permanently unlock.

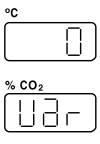
4.3.6. DOOR HEATING REGULATION

It is possible to program the duration of the activation of the door heating resistance from 1 to 3 .

Value 1 : the door resistances works at the same time as the water heating resistance.

Value >1 : the door resistance is activated for a longer period of time than the water heating resistance (the activation period is multiplied by the value)

To change this factor :

- Press ● (test).
- Press ⊕ and ⊖ then (Enter).
- Press ⊕ until 7 is displayed in °C display.
- Press (Enter) 

Select desired value using ⊕ and ⊖ . Validate pressing (Enter) .

Displays are blinking then come back to their normal operating mode

5 HAZARDS, PRECAUTIONS AND LIMITATIONS OF USE

5.1. ELECTRICAL HAZARDS

Be careful of the voltage inside the control compartment of the incubator.

Never take off the cover of this compartment prior to disconnecting the incubator.

5.2. HAZARDS DUE TO CO_2

CO_2 is a toxic gas. Close CO_2 supply to the incubator, next to the external pressure regulator :

- Before any long servicing period when chamber has to be opened (cleaning, decontamination).
- Before any servicing on the fluids, in the part between CO_2 cylinder and the incubator and between the CO_2 inlet into the incubator and the chamber.

5.3. OVER TEMPERATURE HAZARDS

In case of failure of the heating regulating device, the temperature increase of the accessible parts does not exceed 40°C

6 SERVICING AND PREVENTATIVE MAINTENANCE

6.1. CLEANING

Wipe and clean the shelves every time a liquid has been spilt (culture medium, blood).

Once a month (or 2 to 3 times a month according to the laboratory activity) :

- Shelves, water pan, shelf slides : remove, clean and autoclave (121°C, 20 min) or sterilize in an oven (30 min at 180°C, or 1 hour at 170°C)
- Chamber : clean the chamber walls using a disinfectant agent (70° alcohol, alkaline glutaraldehyde) taking care of eliminating the deposits that may have built-up. Do not use chlorinated products.
- Microbiological filters : check them regularly. Change them as soon as they become yellow or wet ; do not forget the filters located at the rear of the incubator.

In case of general bacteria or fungal contamination :

Disinfect the chamber with a high range activity product as formalin (active on viruses, bacterial spores, mushrooms).

CAUTION : Formic para formaldehyde is very irritative for breathing mucosas and conjunctiva.

Formalin vapors can be made the following way : On one of the shelves of the incubator, place in a 500 ml beaker 20 ml of formalin (10%) mixed with 4 g of potassium permanganate. Close the door at once and seal the incubator with tape. The incubator must be stopped to prevent the vapor from reaching the electronic parts. The chamber temperature should be between 25 and 37°C.

Leave for at least 1 hour (max 4 hours).

The previous operation requires a long break in the use of the incubator. Thus some users may prefer using a disinfectant agent, like LYSOFORMINE or PURSEPT : wipe the chamber wall and ceiling and on the access. Leave the incubator open for a long time before using it.

Water pan :

The anti-fungal, anti-bacterial additives uses for thermostatic baths are not suitable for incubators : they are very harmful to stainless steel.

We recommend the following solution :

For 10 litters of water :

- $CuSO_4$: 10 g
- EDTA : 0.2 g

This solution must be changed as soon as a blue deposit appears in the water pan.

6.2. REPLACING THE FILTERS

The filters must be checked periodically or at least every 6 months. If the filter surface is grey, change the filter.

6.3. CONTROL OF THE CO_2 INCUBATOR ANALYZER

The long term drift of the CO_2 analyzer is very weak. However, it is advised to check that the value displayed be compared to the value measured by a specific chemical analyzer at least every 6 months.

A sample port is located on the front panel. Be sure to replace the black plastic cover after sampling.

CAUTION : Do not forget to replace the cap, otherwise it may cause a permanent leakage.

6.4. WATER JACKET EMPTYING

The emptying of the water jacket is carried out by pumping from the fill tube.

Connect the tube supplied with the machine. Start pumping and wait until water jacket is empty.

When the jacket is nearly empty, tip the incubator forward to allow all the water to be removed.

6.5. FUSE REPLACEMENT

Changing of the fuse should not be carried out by the operator. A qualified service person who will diagnose the fault before replacing the fuses is recommended.

7 DIAGNOSTICS AND REPAIRS

WARNING : REFER SERVICING TO QUALIFIED SERVICE PERSONNEL. WHEN POWER IS APPLIED DANGEROUS VOLTAGES EXIST WITHIN THE CHASSIS COMPONENTS. USE EXTREME CARE WHEN MEASURING VOLTAGES ON A LIVE CIRCUIT.

Problem	Procedure
1. No Heat Poor Temperature Control Non-Uniform Temperature Slow Temperature Recovery	1.1. Verify that set point temperature is greater than actual temperature.
	1.2. Check heaters. A. Disconnect power cord. Remove rear cover. B. Disconnect connectors J16 (bottom left) and J17 (bottom) from power supply board. C. Check heater resistances with an ohmmeter. Approximate heater resistances (at ambient temperature) are shown below : Heater — Connections — Resistance (in ohms) 115V Air — J16 Pins 6 & 8 — 476- 555 Water #1 — J17 Pins 6 & 7 — 129 - 151 Water #2 — J17 Pins 7 & 8 — 129 - 151 Aux. — J17 Pins 9 & 10 — 502 - 583 J17 Pins 10 & 11 — 502 - 583 Door — J17 Pins 1 & 2 — 114 - 132 D. Replace any heater that does not match the approximate resistances above.
	1.3. Check TRIAC. A. Turn power on. B. Place an AC voltmeter between pins 6 & 7 (115V-units) on wire side of connector J16 on power supply board. C. Set temperature set point below actual chamber temperature. Voltmeter should read 0 VAC. D. Set temperature set point to at least 5°C above actual chamber temperature. Voltmeter should read line voltage. E. If voltmeter does not show correct values in either C or D, replace power supply board.
	1.4. Check Safety Relay. A. Turn power on. B. Place an AC voltmeter between chassis ground and right hand side of R53 on power supply board. C. Set temperature set point to at least 5°C above actual chamber temperature. D. Voltmeter should read line voltage. If voltmeter does not read line voltage, replace power supply board.
	1.5. Check temperature sensor. The temperature sensor used in this unit is a solid state style which does not lend itself to simple ohmic testing. Problems with the temperature sensor are identified by characteristic codes on the temperature display. An open sensor creates "n n n" on the display and short circuit conditions create "U U U" on the display. The audible alarm for Hi temperature and Lo temperature visible alarm prompt or the Lo temperature visible alarm prompt in the absence of theseactual conditions in the chamber may also indicate the need for temperature sensor replacement. A. Turn power on. B. Place a DC voltmeter between pins 1 and 3 on temperature sensor connector (J7) on power supply board. C. Voltage should read 5 VDC. If not, replace power supply board. D. Place a DC voltmeter between pins 2 and 3 on temperature probe connector. Verify that the output of the temperature probe is 10 MV/°C.

Problem	Procedure
2. Poor CO_2 Control (IR - CO_2 Sensor)	2.1. After following the CO_2 calibration procedure Section 4.2.7, if a problem continues the sensor or Power PCB may be defective. Test the 5 VDC supply at the Power PCB (between TP2 and TP3). After eliminating the power supply as a potential problem check the signal output at the IRCO_2 sensor. Connect a digital voltmeter "NEG" lead to jack J1 lead labeled "COM" (ground). There are 2 "COM" leads, either lead can be used. Connect the digital voltmeter "POS" lead to jack J1 lead labeled "LINEAR" (signal output). This linear function gives 0.0 VDC to 1.0 VDC output which equates to 0.0% CO_2 to 20.0% CO_2.
	2.2. With the temperature and humidity stable for at least two (2) hours and with a CO_2 set point of 0.0% CO_2 and no CO_2 in the chamber, adjust the "FINE ZERO" potentiometer until the digital voltmeter reads 0.0 VDC+ 0.01 VDC. Enter a CO_2 set point between 5.0% CO_2 to 10.0% CO_2 and allow it to stabilize for about ten (10) minutes. Measure the CO_2 with a Fyrite. Multiply the measured CO_2 percentage by a factor of 0.05 and the value obtained will be the IRPCB output voltage. e.g : 5.5% - CO_2 measured X 0.05 0.275 VDC IRPCB volts out Slowly adjust the "SPAN" potentiometer until the proper output voltage is obtained. After completing the above procedure, follow the CO_2 calibration procedure in Section 4.2.7.

Problem	Procedure
3 .Excessive Condensation	3.1. Check magnetic door gasket. A. Does the gasket fit evenly along the incubator body? There should be no distortions in the gasket that could cause air to flow between the gasket and the incubator. B. If distortions exist, remove door liner and reposition or replace gasket.
	3.2. Check glass door gasket. A. Check for gasket tears or imperfections. Replace gasket, if imperfections found. B. Verify that the gasket is completely adhered to the incubator chamber. If not, apply RTV Silicone sealant (Dow Corning #732) to gasket and chamber. Allow to cure for 24 hours. C. Shut and latch the glass door firmly in place. The gasket/glass door interface should be completely sealed around the entire perimeter of the glass door. Try to place a business card between the glass door and gasket in any suspect areas. If a business card can be placed between the gasket and glass door, replace the gasket or check glass door alignment.
	3.3. Check glass door alignment. A. Check that the two plastic nuts are secured tightly to the two stainless steel hinges. B. If the door does not appear to be properly aligned, loosen the four cap nuts holding the hinges onto the incubator and realign the glass door. C. Repeat step 4.2.C. to verify the glass door alignment. Humidity within the chamber can vary with changing temperature, ambient conditions, and the nature of the sample. The condensation, or lack thereof, on the glass door is by no means a proper way to measure the relative humidity within the chamber, but as a general rule there will be a very slight amount of condensation near the edges of the glass door during normal operation or sometimes no condensation whatsoever. If all of the glass or greater than half the surface area of the glass is covered with moisture, this may indicate that the door heater may require an adjustment of the pulse rate to the heater. Refer to Section 1.1.C. to adjust the heater on time.
	3.4. Check door heater and auxiliary heater. A. Turn power off. B. Disconnect connector J17 from the power supply board. C. See section 4 for pin numbering and resistance values.
4. Noisy Fan	4.1. Noise inside the incubator chamber, above what would normally be expected, is usually an indication of fan blade or fan motor trouble. Problems with excessive humidity and poor temperature uniformity can also signal fan motor or fan blade trouble. The fan blade mounts to the fan motor shaft by friction. The proper rotation of the fan blade, observing the blade from within the chamber, is clockwise. Air is drawn into the fan and is blown out tangent to the fan blade. Buzzing noises can be isolated by checking the fan blade position on the shaft; it may be too close to the plenum, or pushed too far back against the fan motor plate.

8 REPLACEMENT PROCEDURES

WARNING : DISCONNECT POWER CORD BEFORE PERFORMING ANY OF THE FOLLOWING PROCEDURES.

Replacement of parts and their adjustment are carried out by the standard means normally available to laboratory service engineers. A guide list is supplied in the appendix. When the operations require more accurate or specific tools. These are indicated in the paragraph concerned.

Only trained and qualified engineers are permitted to carry out maintenance and repairs other than those operations described in the user manual.

8.1. TEMPERATURE SENSOR

1. Disconnect incubator from power source.
2. Remove the six (6) screws which secure rear cover plate.
3. Locate jack J7 on the main PCB and disconnect.
4. Pull out sensor from fan motor plate.
5. Reinstall new sensor, reversing above procedure.

NOTE : WHEN INSTALLING NEW PROBE MAKE CERTAIN THE FLARE AT THE CABLE END OF THE PROBE STOPS AT THE BLACK GROMMET ON THE FAN MOTOR PLATE.

6. Re-calibrate temperature control, if necessary. Follow procedure in Section 4.2.2.

8.2. CO_2 SENSOR

1. Disconnect incubator from power source.
2. Remove the six (6) screws which secure rear cover plate.
3. Locate jack J5 on the main PCB and disconnect.
4. Remove the four (4) screws which fasten the CO_2 sensor to the fan motor plate.
5. Reinstall new sensor, by reversing the above procedure.
6. Allow the temperature and humidity to stabilize for at least two (2) hours. Re-calibrate the CO_2 control following the procedure in Section 4.2.7.

8.3. FAN MOTOR

1. Disconnect incubator from power source.
2. Remove the six (6) screws which secure rear cover plate.
3. Locate jack J16 on the main PCB and remove the leads, remove the ground lead from the motor as well.
4. Remove the shelves and plenum from the chamber. Pull fan blade off shaft, remove retaining ring and two (2) screws which secure motor to fan motor plate.
5. Reinstall the new motor, carefully noting the rotation of the shaft. Reverse the above procedure.

NOTE : THE MOTOR IS MULTIPLE VOLTAGE. THERE ARE FOUR (4) LEADS FROM THE FIELD WINDINGS.

Attach leads as follows :

220 VAC and 240 VAC - White to neutral. Red and brown together with wire nut. Black to hot.

8.4. AIR HEATER

1. Disconnect incubator from power source.
2. Remove the shelves, supports, and plenum from within the incubator chamber.
3. Remove the six (6) screws which secure rear cover plate. Note: It is not necessary to remove the fan motor plate to change the air heater.
4. Disconnect the spade terminals leading from the main PCB at heaters ends.
5. Remove the two (2) nuts which secure the heater to the fan motor plate and pull heater out through the front of the fan motor plate.
6. Reinstall new heater, reversing the above procedure.

8.5 WATER JACKET HEATERS

1. Disconnect incubator from power source.
2. Remove the six (6) screws which secure rear cover plate.
3. Locate the water jacket heaters, one left, one right at rear, near the bottom of the jacket. Remove the nut and retaining washer which secure the heater in the thermo-well.
4. Locate jack J17 on the main PCB and disconnect the heater leads.
5. Remove the heaters from the thermo-wells.
   Note : Grasp the heater sheath with pliers if heater will not easily slide out. Do not pull them out by the leads, as they may rip out and leave the heater sheath stuck on the thermo-well tube.
6. Reinstall new heaters, reversing the above procedure.

8.6. DOOR HEATERS

1. Disconnect incubator from power source.
2. Remove the screws which secure control panel.
3. Disconnect leads connected with wire nuts which pass through door hinge.
4. Remove screws which secure inner liner of outer door. These screws are under the outer door gasket.
5. Peel off defective heater from door liner.
6. Install a new door heater, reversing the above procedure.

8.7. AUXILIARY HEATER

1. Disconnect incubator from power source.
2. Remove the screws which secure control panel.
3. Remove insulation.
4. Disconnect leads connected with wire nuts.
5. Peel off defective heater from top of chamber.
6. Install a new heater, reversing the above procedure.

8.8 POWER SUPPLY/CPU PCB

The power supply and CPU circuit board must be replaced together as a matched set.

WARNING : DISCONNECT POWER CORD BEFORE PERFORMING THIS SERVICE PROCEDURE.

1. Disconnect incubator from power source.
2. Remove the screws which secure the rear cover plate.
3. There are two jumpers on the power supply - JP2 and JP3. These jumpers configure the power supply to match the A/C line input voltage. Remove the replacement board from its pouch and configure the jumpers to match the board in the unit. Note the location of each connector going to the power supply board. Carefully remove each connector from the board.
4. Remove the screws which secure the Power Supply PCB.
5. Install new Power Supply PCB reversing steps 3, 4.
6. Remove the ribbon cables connected to J1 and J2 on the CPU PCB.
7. Remove the screws which secure the CPU PCB to the chassis.
8. Install new CPU PCB reversing steps 6, 7. Replace rear cover plate.

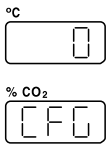
The unit now needs to have the new CPU PCB configured for the model in which its placed. Find the model number of the incubator on the id tag on the outer door liner, then match it to the model in table ???. Note the unit id code for your model.

1. Reapply power to the incubator.

2. Press ● (test).

3. Press ⊕ , ⊖ , and (Enter) at the same time.

4. Display will show :



5. Enter configuration password 37 (use ⊕ and ⊖)

6. Press (Enter) . If the value is not entered within 1 (one) minute, the unit automatically times out. If this occurs, repeat the setup starting at item 2.

7. Using ⊕ and ⊖ , enter the unit I.D. number for your model.

   52210001 ID code : 6f-
   52210002 ID code : 6f-

8. Press (Enter) .

9. Press ● (test) to return to normal display. To check unit, press ● again and unit will scroll through a series of verifications :

   - Software revision level.
   - Unit id - this should match value you have selected.
   - CO_2 sensor type (T/C or IR)
   - LED segment check

Press ● (test) again to exit.

Calibration of the unit must be performed. See Section 4.

8.9. CO_2 SOLENOID VALVE

1. Disconnect incubator from power source.
2. Remove the six (6) screws which secure the rear cover plate.
3. Locate jack J12 and unplug connector.
4. Disconnect hoses from defective valve assembly.
5. Remove valve assembly.
6. Install new valve assembly, reversing the above procedure.

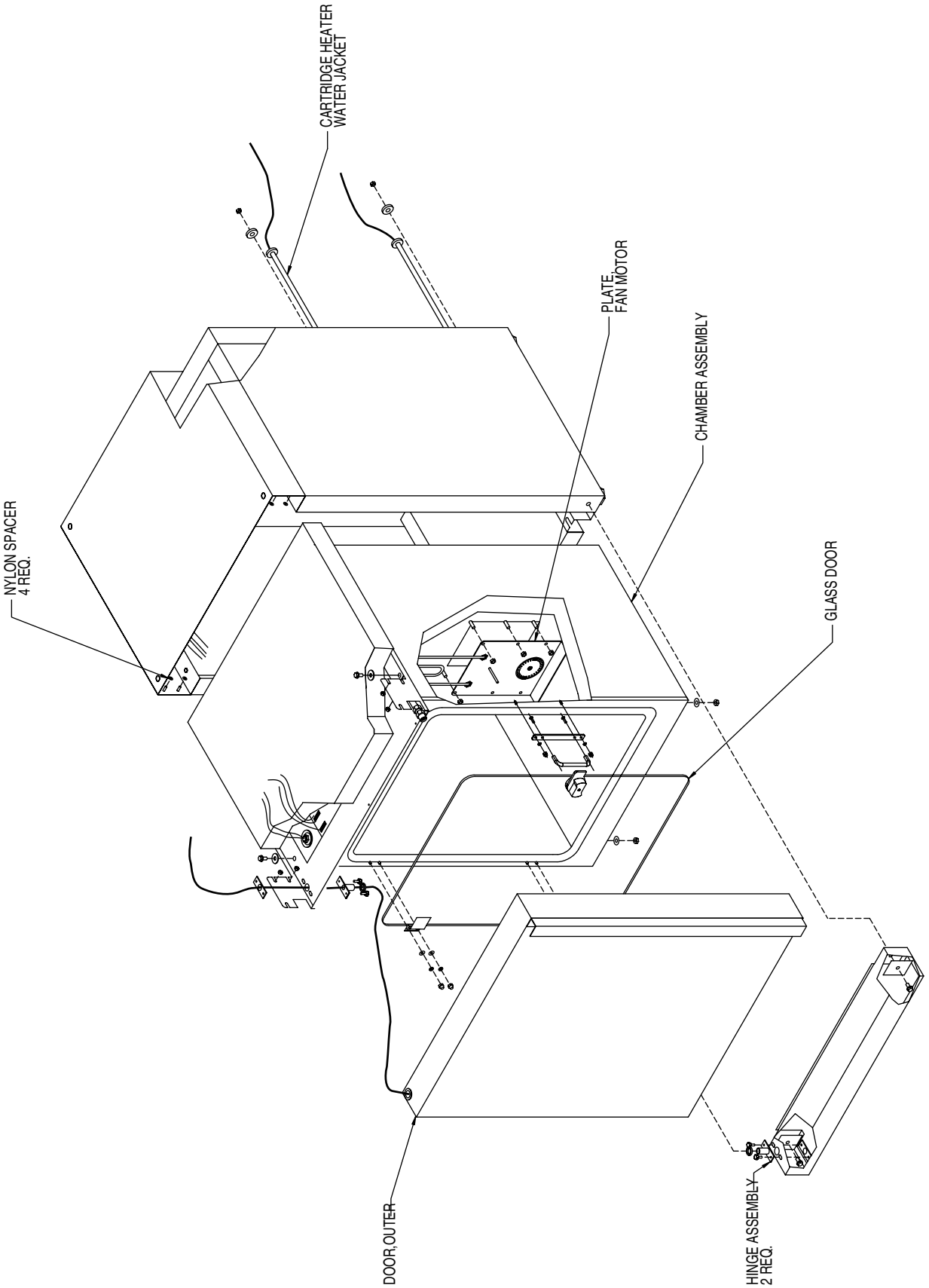
8.10. DISPLAY/KEYBOARD PCB

1. Disconnect incubator from power source.
2. Remove the screws which secure the control panel to the body of the incubator. These four (4) screws are located on the underside of the control housing and can be seen when you open the door.
3. Disconnect the CO 2 gas sample hose and water fill hose.
4. Disconnect the ribbon cable(s) from the circuit board.
5. Remove 11/32" nylon nuts which fasten the circuit board to the panel. Do no use metal nuts or metal washers in place of these nylon nuts as they may short the solder traces on the board or crack the board.
6. Install new Display/Keyboard PCB reversing above procedure.

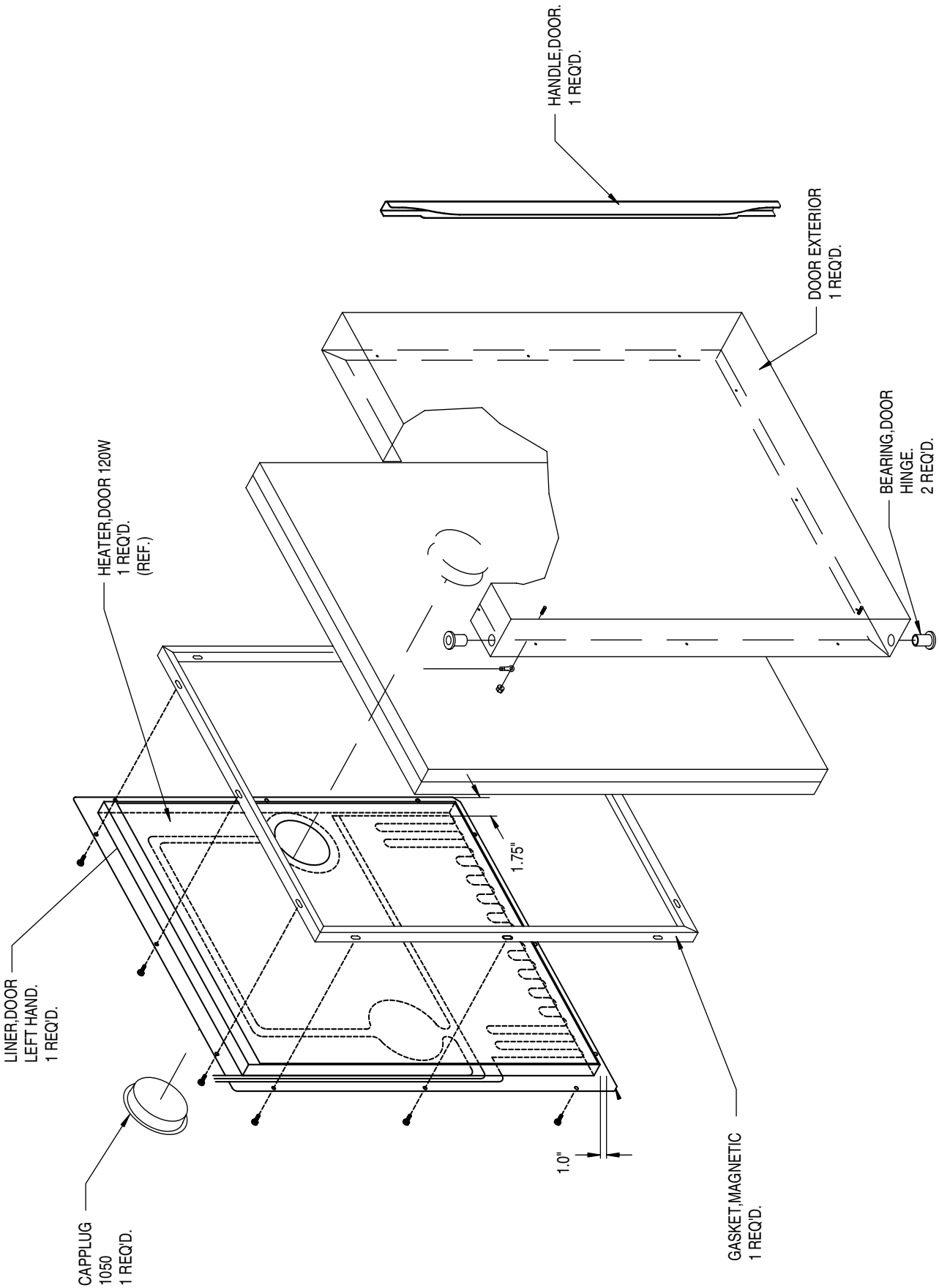
8.11. IR CO_2 SENSOR

1. Disconnect power from incubator.
2. Remove the screws which secure the rear cover plate.
3. Locate jack J1 on Power PCB and disconnect.
4. Remove front shield covering sensor and remove the screws which secure the sensor and rear shield.
5. Install new sensor, carefully replace the metal shield near the sensor, reversing the above procedure.
6. Allow temperature and humidity to recover for at least four (4) hours and follow the CO_2 Calibration Procedure in Section 4.2.7.

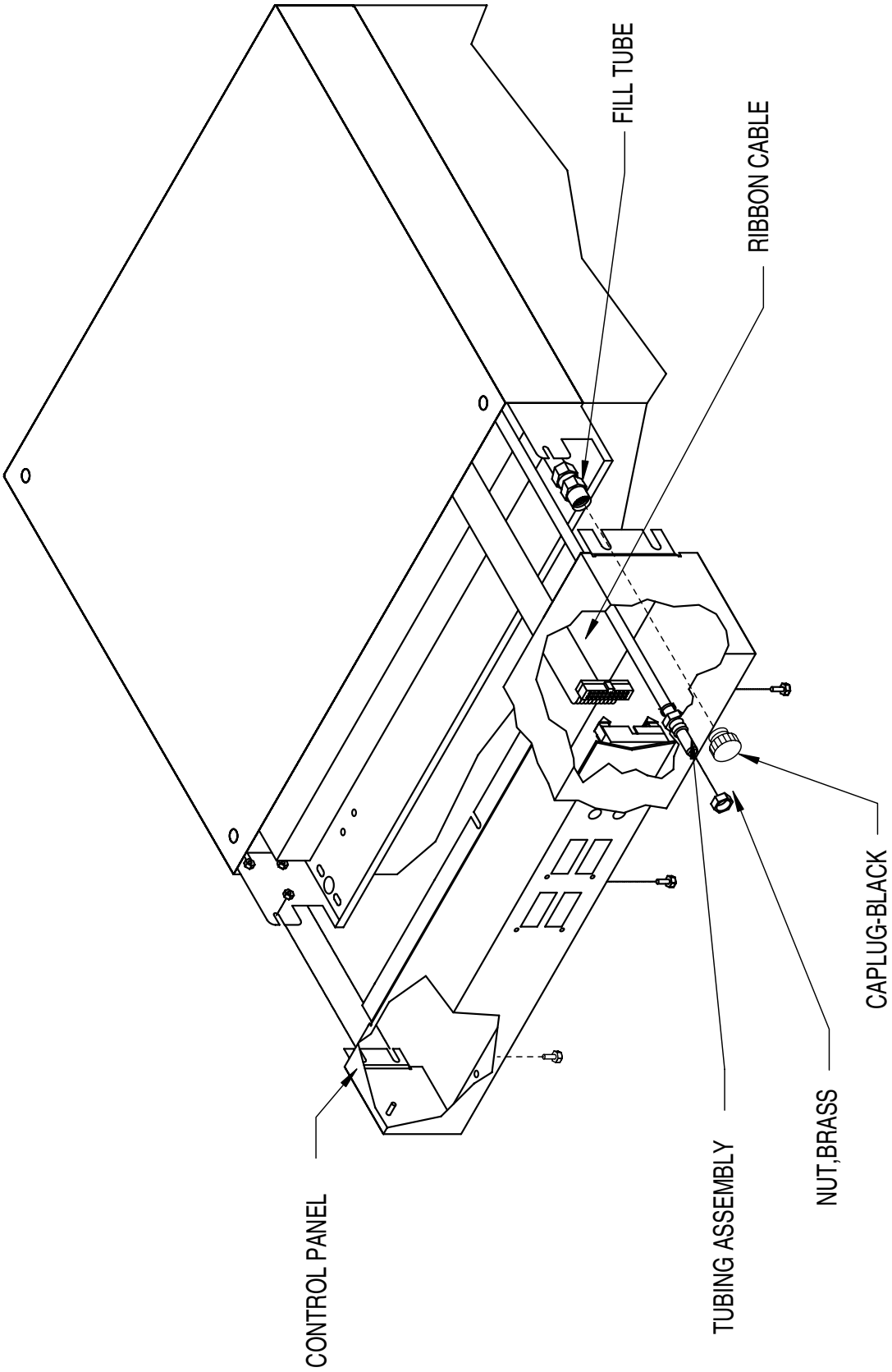
9 SPARE PARTS - DIAGRAMS



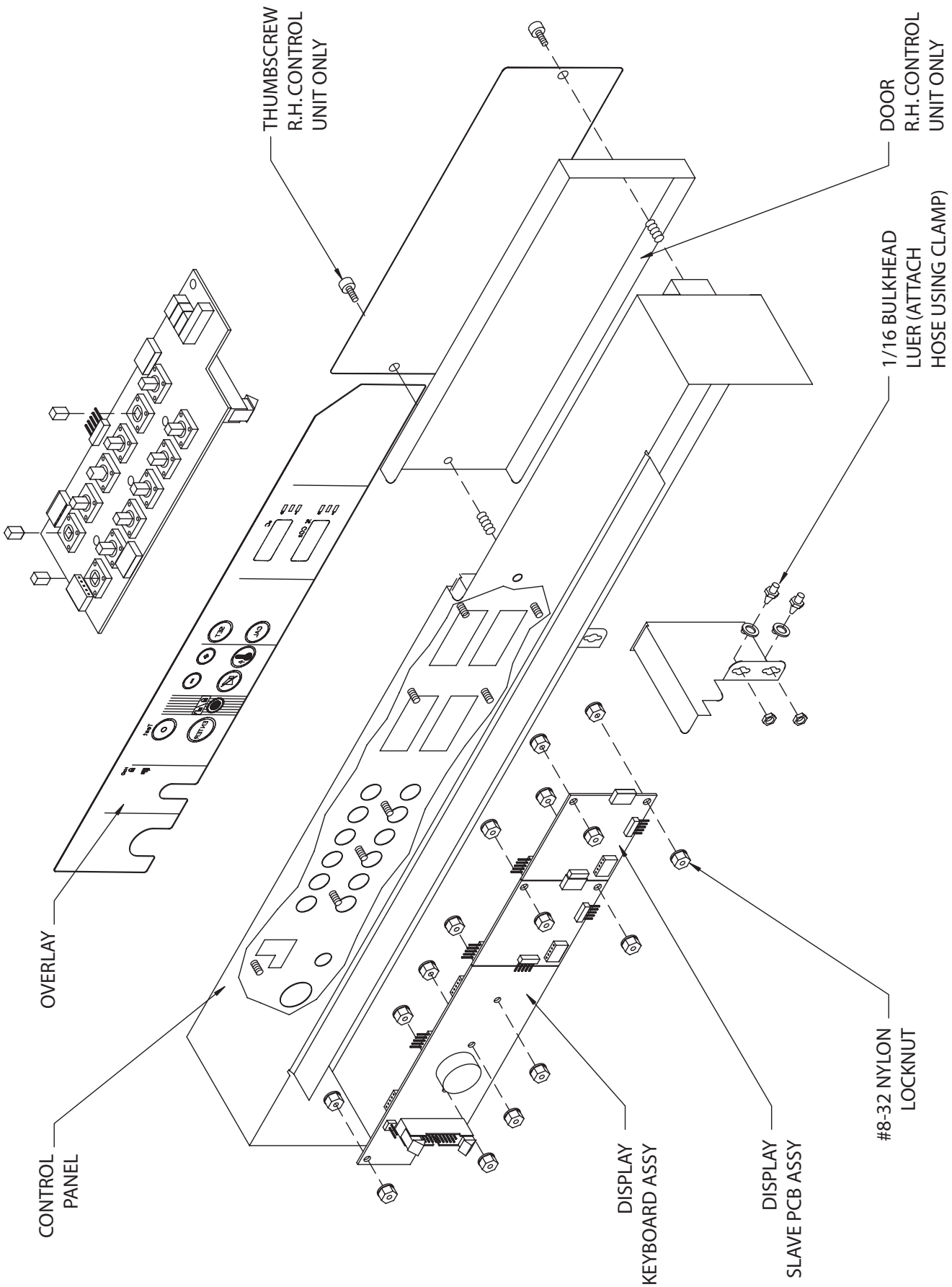
UNIT ASSEMBLY, SINGLE



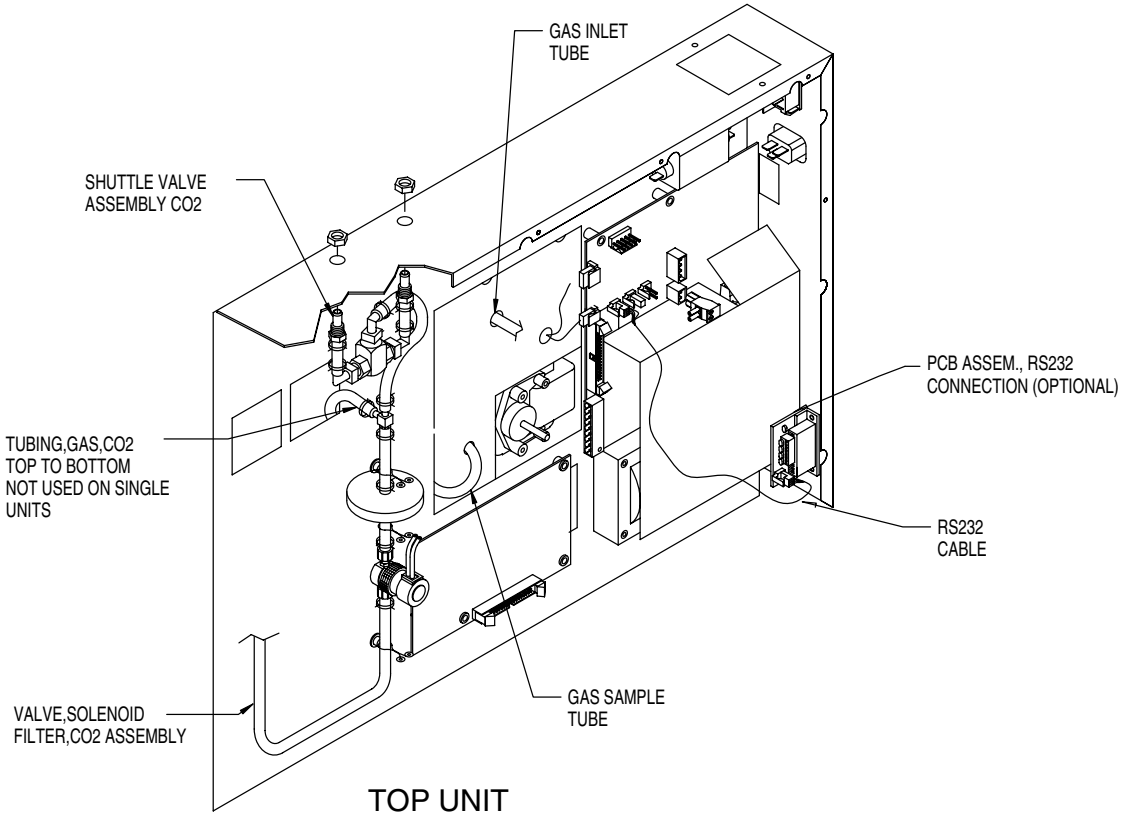
DOOR MODULE - LEFT HINGED



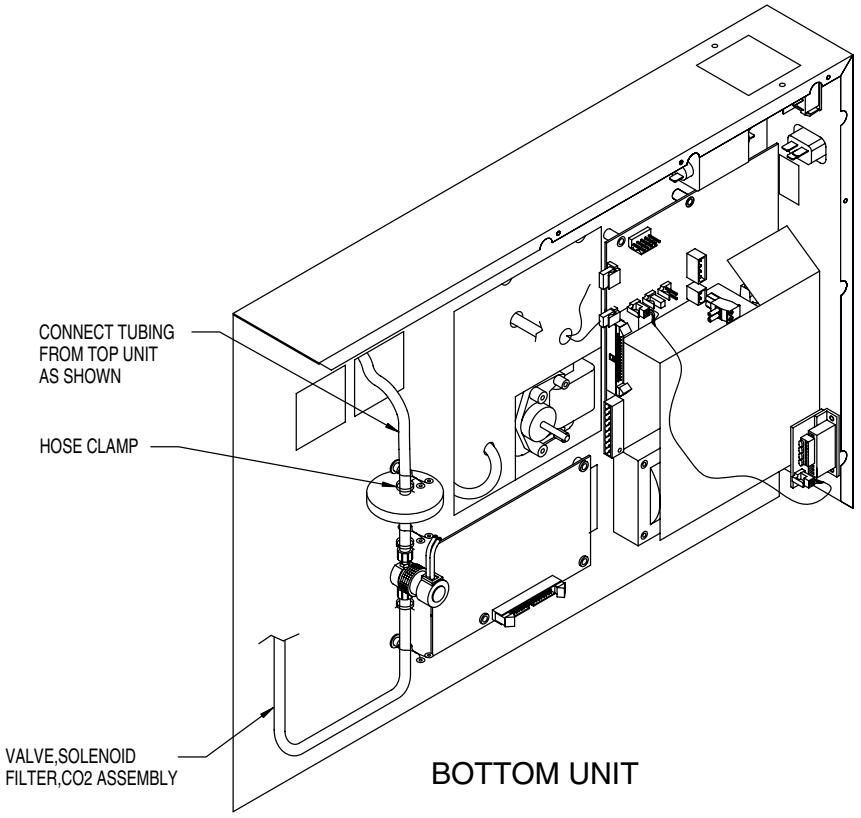
CONTROL PANEL CONNECTIONS



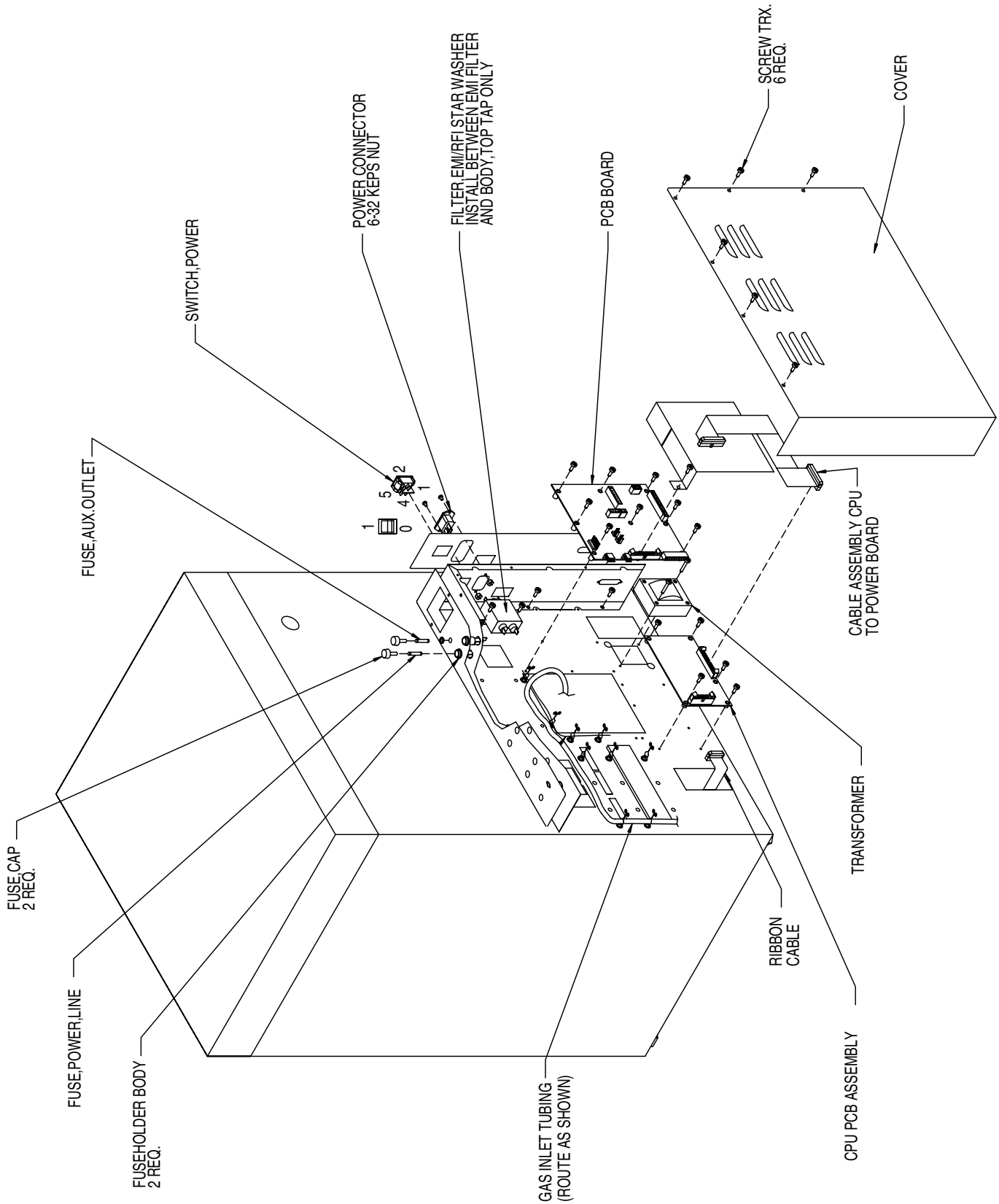
CONTROL PANEL



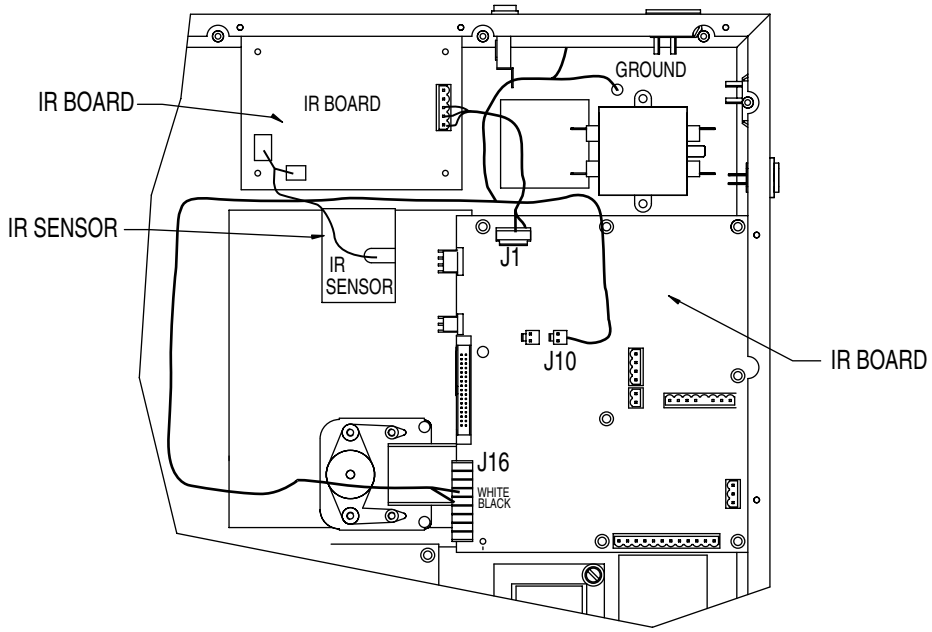
SINGLE CHAMBER & DOUBLE CHAMBER TOP UNIT CO2 GAS TUBING CONNECTIONS



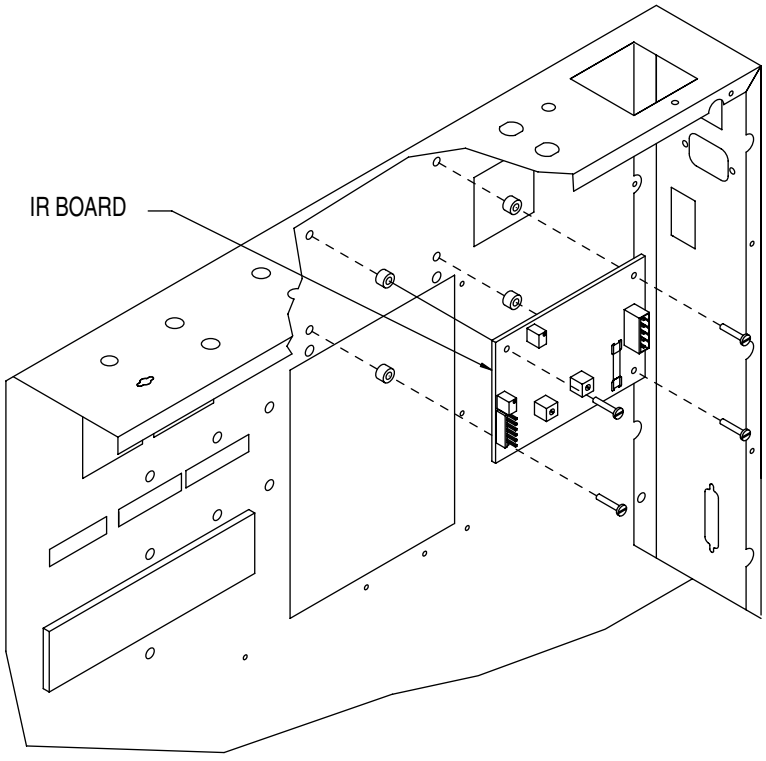
DOUBLE CHAMBER BOTTOM UNIT CO2 GAS TUBING CONNECTIONS



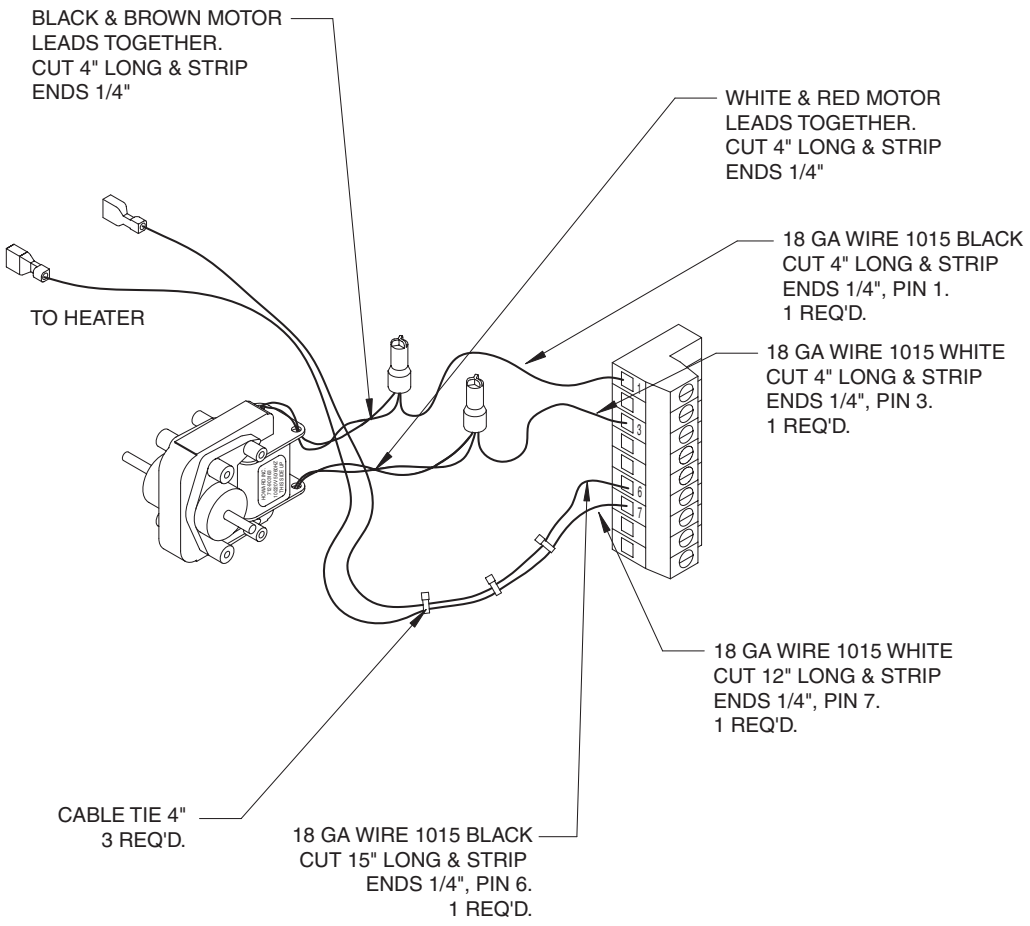
UNIT ASSEMBLY, SINGLE, REAR 120 VOLTS



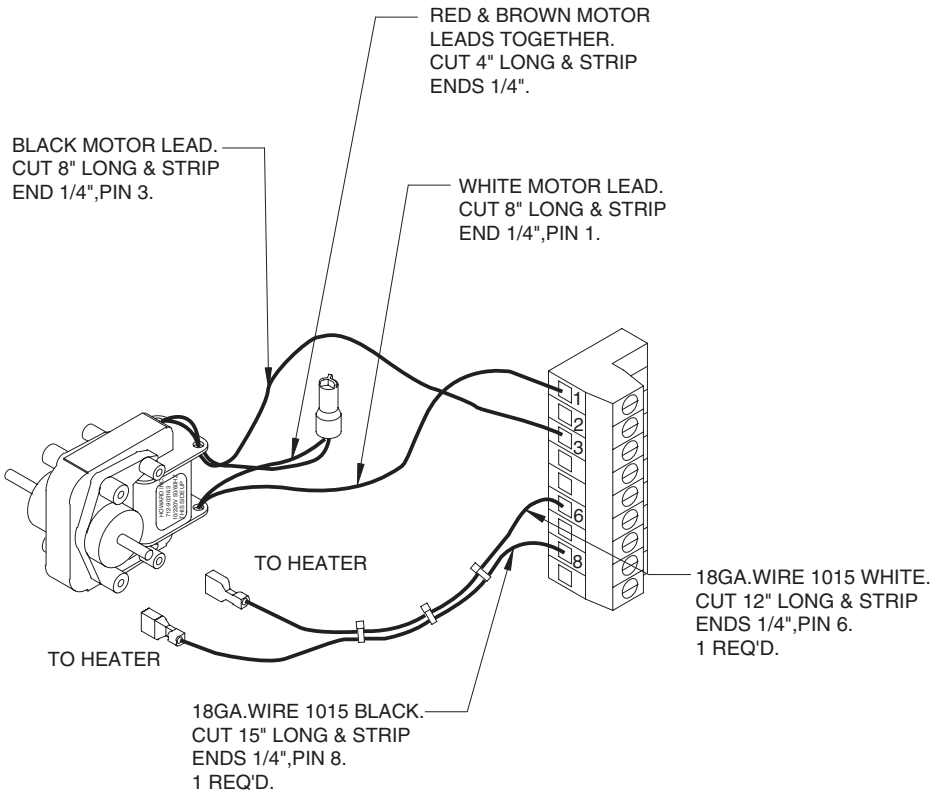
IR CO2 CONNECTIONS



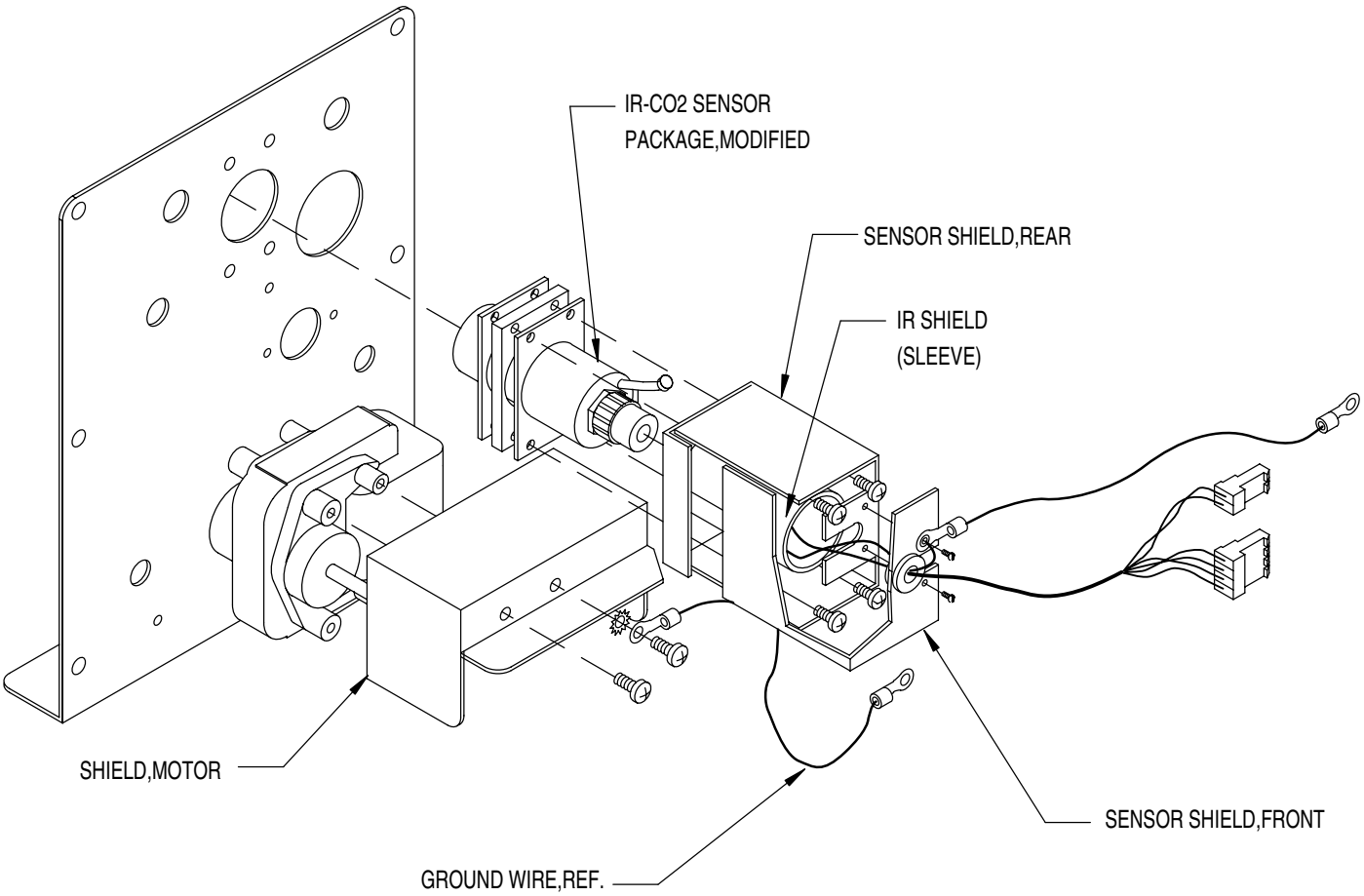
IR CO2 SENSOR ASSEMBLY



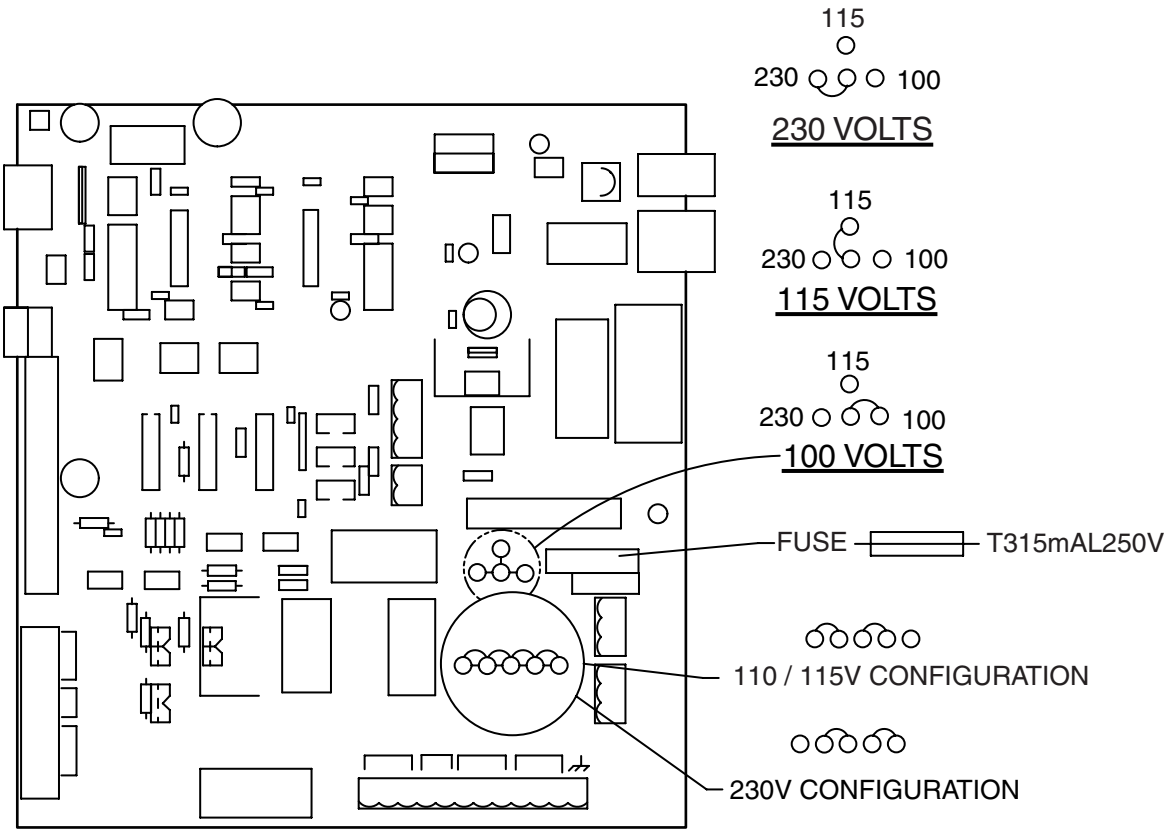
120V FAN MOTOR WIRING DETAIL



230V FAN MOTOR WIRING DETAIL



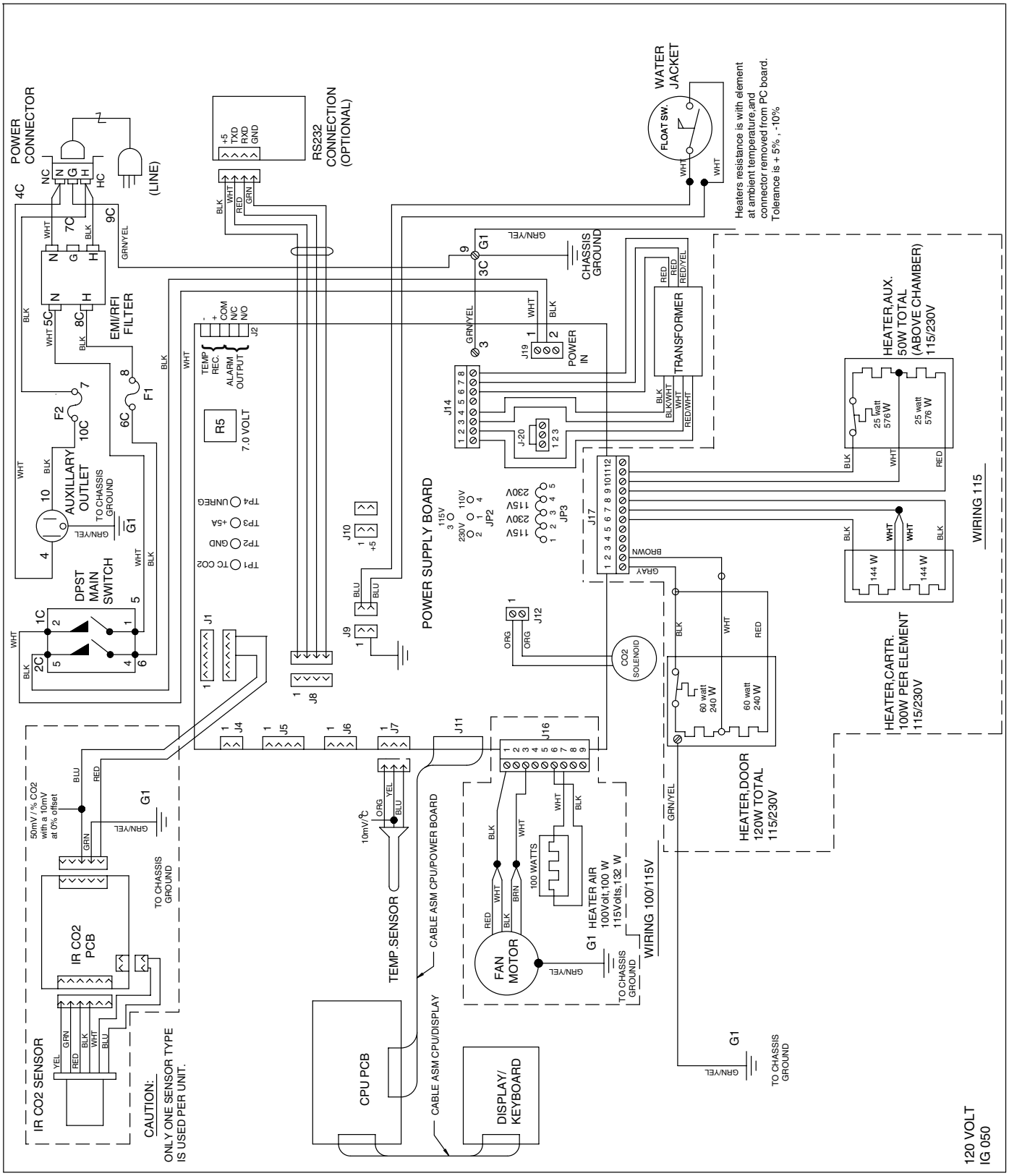
IR CO2 SENSOR ASSEMBLY OPTIONAL



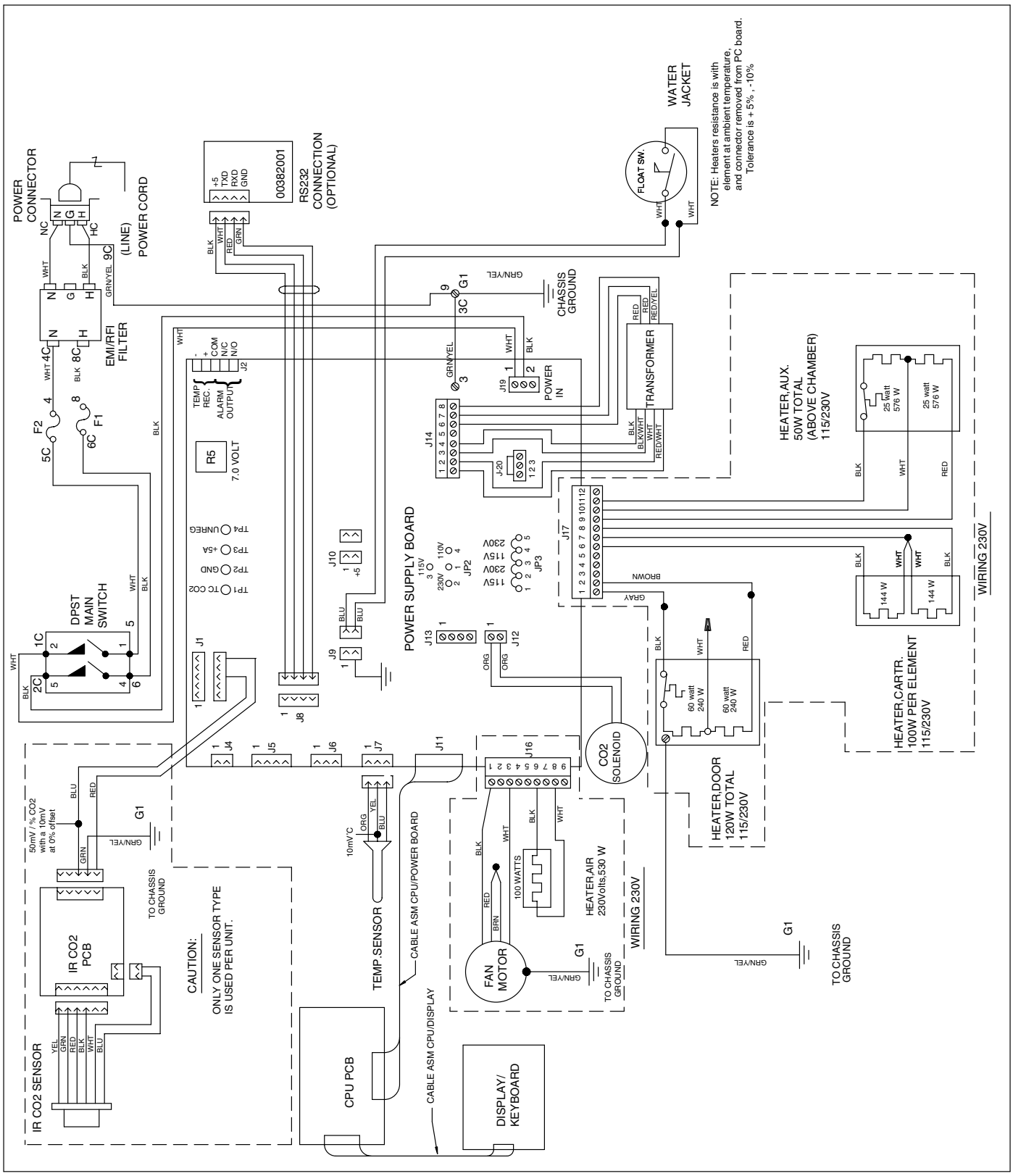
CAUTION:

JUMPERS JP1 AND JP2 ON POWER BOARD MUST BE SET FOR CORRECT LINE VOLTAGE OR DAMAGE TO THE ELECTRICAL CIRCUIT COULD RESULT.

PCB POWER BOARD JUMPERS



ELECTRICAL DIAGRAM - IG050 120 VOLT



ELECTRICAL DIAGRAM - IG050 230 VOLT

SPARE PARTS LIST

Cat. N° (Units built pre 6/1/2002	Cat. N° (Units built post 6/1/2002	Description
51200912		Ammonium, Quaternary
Available Locally		Battery, Lithium CR2330 (For CPU PCB)
34000002		Blower Wheel
34542345		Cable ASM, CPU/Display
34542362		Cable ASM, CPU/Powerboard
34221123		Caplug (for Door Liner)
51200816		Caster Kit
51200904		Clean Start Kit
51200901		CO2 Tank Regulator
34000039		Connector, Power
51245040	51245479	Door Assembly, Glass
51245401		Duct, Blower Kit
51200834		Filter Kit, HEPA Gas
26365012		Filter, EMI/RFI
34004942		Filter, Water
34001528		Fyrite CO2 Analyzer
34232338		Gasket, Glass Door
34167341		Gasket, Magnetic Outer Door
34000027		Heater, 100 W Cartridge (Water Jacket)
34247450		Heater, 50 W Auxiliary (Above Chamber)
34247431		Heater, Air
34247448		Heater, Door
51200905		Hose Assembly, Water Fill (8 ft. with Fitting)
51200822		Hose, CO2 Supply (8 ft.)
34000087		Jack, R.H. Level
51245404		Kit, Fuse, 5 x 20 mm 0.8 A SLOBLO (120 Volt units)
51245394		Kit, Fuse, 5 x 20 mm, 6.3 A SLOBLO (120 Volt units)
51245408		Kit, Fuse, 5 x 20 mm 0.4 A SLOBLO (230 Volt units)
51245403		Kit, Fuse, 5 x 20 mm, 3.15 A SLOBLO (230 Volt units)
51245402		Kit, Fuse holder, 15 A

Cat. N° (units built pre 6/1/2002)	Cat. N° (units built post 6/1/2002)	Description
51245526		Kit, Door, Left Hinge
51245525		Kit, Door, Right Hinge
51245032	51245482	Kit, Latch, Glass Door
51245376		Kit, Leveler, 5 /16-18 Foot
34288040		Knob, 5 x 20 mm Fuse Carrier
34000124	36500029	Liner, Left Hand Door (Hinge Left)
34000187	36500030	Liner, Right Hand Door (Hinge Right)
51245056		Motor Replacement Kit, Fan
51200900		Pan Kit, Humidity
34000313		PCB, CPU
34388301		PCB, Keypad/Disp.
34000313		PCB, Power Supply
51200906		PCB, RS232
34388601		PCB, Slave Disp.
34353025		Power Cord, 120 Volt
34353049		Power Cord, 230 Volt
34542382		Sensor Assembly, Temperature
51245036		Sensor Kit, Infrared CO2 (Sensor & PCB)
51200826		Shelf Kit (One Shelf & Two Slides)
34000071	36500047	Shelf Standard, Left Front
34000070		Shelf Standard, Rear
34000072	36500042	Shelf Standard, Right Front
34221172		Stopper, #6 Solid Green (For Rear Port)
51245181		Switch Assembly, Float
34240618		Switch, Power
34000103		Thumbscrew, Front Panel
34003436		Transformer Assembly, Power
37001233		Tubing, Clear Gas
34542406		Valve Asm, Shuttle
51245085		Valve Assembly, Solenoid (CO2)

CE EC DECLARATION OF CONFORMITY

We,

Jouan Incorporated
170 Marcel Drive
Winchester, VA 22602
USA

declare under our sole responsibility that our IG050 series incubators to which this declaration relates are in conformity with:

The provisions of the ***Low Voltage Directive 73/23/EEC*** of February 1973 as amended by ***93/68/EEC, Article 13*** of 22 July 1993.

And meets the requirements of Standard EN 61010-1 (Underwriters Laboratories Inc. File E181656).

The provisions of the ***Electromagnetic Compatibility Directive 89/336/EEC*** of 3 May 1989 as Amended by ***92/31/EEC*** of 28 April 1992 and ***93/68/EEC, Article 5*** of 22 July 1993.

And meets the requirements of Standards EN 55014, EN 50082-1 (Underwriters Laboratories Inc. File NC3108).

The technical documentation required by Annex IV(3) under the Low Voltage Directive is maintained by:

Jouan Incorporated
170 Marcel Drive
Winchester, VA 22602
USA

By: Donald A. Gillette Date: 4 JAN 99

Donald A. Gillette
Technical Manager
Jouan Incorporated
Winchester, VA 22602

WARRANTY

JOUAN guarantees that this unit is free from defects in materials and workmanship when it leaves the factory, and undertakes to replace or repair the unit if it proves defective in normal use or during servicing for a period of **ONE YEAR** from the delivery.

Our liability under this guarantee is limited to repairing the defective unit or any part of the unit providing it is sent, carriage paid, to an authorized service centre or the SAINT-HERBLAIN office.

This guarantee is invalidated if the unit is incorrectly used, poorly serviced or neglected, mis-used or accidentally damaged.

There is no explicit guarantee other than as stated above.

FOR FURTHER INFORMATION, ASSISTANCE OR SERVICING

USA :	WINCHESTER, VIRGINIA	Tel. (540) 869 8623 - Fax. (540) 869 8626
ENGLAND :	ILKESTON, DERBYS	Tel. (0115) 944 7989 - Fax. (0115) 944 7080
GERMANY :	UNTERHACHING	Tel. (089) 611 4038 - Fax (089) 611 3087
OTHER COUNTRIES :		Your local representative

or our CUSTOMER SERVICE CENTRE :

SOCIETE JOUAN
Service Assistance Technique
10, rue Duguay Trouin
44800 SAINT HERBLAIN
Tel. +33 (0) 2 28 03 20 20
Fax. +33 (0) 2 28 03 20 03

A APPENDIX

RECOMMENDED LIST OF TOOLS FOR STANDARD MAINTENANCE

1 Tool case (metric)
1 Welding station for copper brazing
1 Manifold LP (0-116 PSIG) HP (0-435 PSIG)
1 True RMS Ammeter 0 to 6 A and 0 to 20 A
1 Multimeter/frequency-meter :
- AC/DC voltmeter 0 - 500 V
- ampmeter 0 - 10 A
- ohmmeter 0 - 1 M
- frequency-meter 0 - 2 KHz

1 Thermo-electric couple thermometer or similar with an accuracy of ± 1°C in the range 0 - 40°C