HUMIDITY CHAMBER

SHC10 SHC10-2
SHC10R SHC10R-2
SHC28 SHC28-2
SHC28R SHC28R-2

PREVIOUSLY DESIGNATED AS :
HC9 HC9-2/ HC9R HC9R-2
HC30 HC30-2 / HC30R HC30R-2
WITH MICRO PROCESSOR CONTROL
INSTALLATION AND OPERATION INSTRUCTIONS

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These units are Humidity Testing Incubators for professional, industrial or educational use where the preparation or testing of materials is done at approximately atmospheric pressure and no flammable, volatile or combustible materials are being heated. These units are not intended for hazardous or household locations or use.

Section 1

RECEIVING AND INSPECTION

Your satisfaction and safety require a complete understanding of this unit, including its proper function and operational characteristics. Read the instructions thoroughly and be sure that all operators are given adequate training before attempting to put the unit into service. NOTE: This equipment must be used only for its intended application; any alterations or modifications will void your warranty.

1.1 **Inspection:** The carrier, when accepting shipment, also accepts the responsibility for safe delivery and is liable for loss or damage claims. On delivery, inspect for visible exterior damage, note and describe on the freight bill any damage found, and enter your claim on the form supplied by the carrier.

1.2 Inspect for concealed loss or damage on the unit itself both interior and exterior. If any, the carrier will arrange for official inspection to substantiate your claim.

1.3 **Return Shipment:** Save the shipping crate until you're sure all is well. If for any reason you must return the unit, first contact your dealer for authorization and supply nameplate data, including the serial number. For information on where to contact Customer Service please see the manual cover.

1.4 **Accessories:** Make sure all of the equipment indicated on the packing slip is included with the unit. Carefully check all packaging before discarding. The SHC10 (HC9) and SHC10-2 (HC9-2) are equipped with 3 shelves, 12 shelf clips and 4 leveling feet. The SHC10R (HC9R) and SHC10R-2 (HC9R-2) are equipped with 3 shelves, 12 shelf clips and 4 leveling feet. The SHC28 (HC30) and SHC28-2 (HC30-2) are equipped with 6 shelves, 24 shelf clips and 4 leveling feet. The SHC28R (HC30R) and SHC28R-2 (HC30R-2) are equipped with 6 shelves, 24 shelf clips and 4 leveling feet.

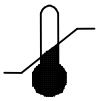
Section 2

GRAPHIC SYMBOLS

Your incubator has been provided with a display of graphic symbols which is designed to help in identifying the use and function of the available user adjustable components.

2.1  Indicates that you should consult your manual for further description or discussion of a control or user item.

2.2  Indicates **"Temperature"**.

2.3  Indicates **"Over-temperature safety"**.

2.4 **°C** Indicates **"Degrees Centigrade"**.

2.5  Indicates **"AC power ON"**.

2.6  Indicates **"Humidifier Water Low"**.

2.7  Indicates **I/ON and O/OFF**.

2.8  Indicates **"Relative Humidity"**.

2.9 **%RH** Indicates **"Percent Relative Humidity"**.

2.10  Indicates **"Potential Shock Hazard"** behind this protective partition.

2.11  Indicates **"Protective Earth Ground"**.

2.12  Indicates "**Unit should be recycled"** (Not disposed of in land-fill)

Section 3

INSTALLATION

Local city, county or other ordinances may govern the use of this equipment. If you have any questions about local requirements, please contact the appropriate local agency. Installation may be performed by the end user. It is unnecessary for this unit to be installed by a technician.

Under normal circumstances this unit is intended for use inside, at room temperatures between 5°C and 40°C, at no greater than 75% relative humidity (at 25°C) and with a supply voltage that does not vary by more than 10%. Customer Service should be contacted for operating conditions outside of these limits.

3.1 **Power Source:** See the unit's serial data plate for voltage, cycle, wattage and ampere requirements. If matched to your power source, plug the power cord into a grounded outlet. VOLTAGE SHOULD NOT VARY MORE THAN 10% FROM THE SERIAL PLATE RATING. These units are intended for 50/60 Hz application. A separate circuit is recommended to preclude loss of product due to overloading or circuit failure. Note that electrical supply to the unit must conform to all local and national electrical codes.

3.2 **Location:** In selecting a site, consider all conditions which may affect performance, such as extreme heat from steam radiators, stoves, ovens, autoclaves, etc. Avoid direct sun, fast moving air currents, heating/cooling ducts and high-traffic areas. To ensure air circulation around the unit, allow a minimum of 5cm between the unit and any walls or partitions which might obstruct free air flow.

Caution: Position and level the apparatus before connecting to water supply.

3.3 **Lifting and Handling:** These units are heavy and care should be taken to use appropriate lifting devices that are sufficiently rated for these loads. Units should only be lifted from their bottom surfaces. Doors, handles and knobs are not adequate for lifting or stabilization. The unit should be completely restrained from tipping during lifting or transport. All moving parts, such as shelves and trays should be removed and doors need to be positively locked in the closed position during transfer to prevent shifting and damage.

3.4 **Leveling:** The unit must sit level and solidly. Leveling feet (supplied) are to be installed at the holes in the base of the unit. Turn them counterclockwise to raise level. If the unit must be moved, turn the leveling feet in all the way to prevent damage.

3.5 **Cleaning:** The incubator was cleaned at the factory, but not sterilized. It should be disinfected prior to use. Remove all interior parts including shelves and shelf assembles. Clean the chamber with a disinfectant that is appropriate to your application. Similar periodic cleaning is strongly recommended. DO NOT USE chlorine-based bleaches or abrasives as this will damage the stainless steel interior. DO NOT USE spray cleaners that might leak through openings and cracks and get on electrical parts or that may contain solvents that will harm the coatings. A similar periodic cleaning is recommended.

WARNING: Never clean the unit with alcohol or flammable cleaners with the unit connected to the electrical supply. Always disconnect the unit form the electrical service when cleaning

and assure all volatile or flammable cleaners are evaporated and dry before reattaching the unit to the power supply.

3.6 **Humidification Water Supply:** On the back of the body there is a 1/4" compression fitting marked WATER IN. This fitting should only be plumbed to a DISTILLED WATER supply source. Please note that when attaching the water supply line to the fitting on the unit, two wrenches must be used: one to hold the fitting from turning in the panel, while using the other to tighten the compression fitting. The supply source should be gravity fed or pressure can be regulated to no more than 2 psi with a water pressure regulator valve. **Deionized or tap water should NOT be used. They will have a detrimental effect on the unit causing corrosion or obstructions and premature failure of this assembly, and VOID your warranty.**

3.7 **Fill the Vapor Generator:** It takes approximately 880cc (.88 Liter) to initially fill the vapor generator, after that a continuous supply is required to maintain the operating level. If the supply is disconnected or in some other manner cut off from the vapor generator, the level will drop and the float switch in the vapor generator will shut the vapor generator off.

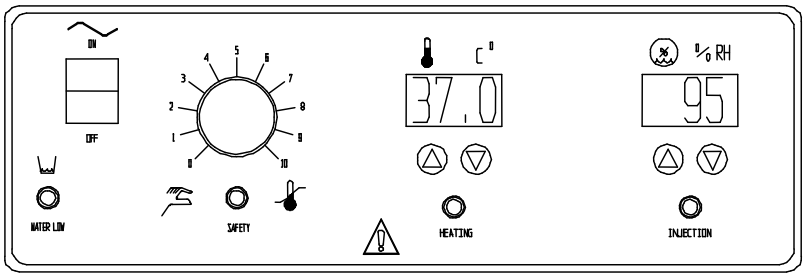
3.8 **Water Drain Line:** On the external back of the test chamber, at the bottom, there is a copper drain line for excess condensation to drain from the bottom of the chamber. Ideally, this line would be run into a floor drain, but could be run to a shallow pan with an automatic sump pump. Under no circumstances should this line be plugged. If the line is plugged the condensation will pool on the floor of the test chamber and flow out when the door is opened.

3.9 **Vapor Trap:** Located in the water drain line, this must be filled with approximately ½ cup of DISTILLED WATER. This will prevent the chamber humidity from escaping and still allow any condensation to drain away. If the unit is not used for a long period of time this trap should be flushed and refilled with distilled water.

3.10 **Pressure Relief Valve:** Marked RELIEF, this valve is located just to the right of the WATER IN fitting at the back of the unit. It provides pressure relief for the vapor generator system. The cracking pressure is 5. psi. The protective shipping cap must be removed before operation as this valve should never be plugged or covered.

Section 4

CONTROL OVERVIEW



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4.1 **Power Switch:** The main power I/O (On/Off) switch controls all power to the unit, and must be in the I/On position before any systems are operational.

4.2 **High Limit Safety Thermostat:** This control is marked SAFETY and is adjacent to the power switch. It is completely independent of the Main Temperature Controller and guards against any failure which would allow the temperature to rise past set point. If the temperature rises to the safety set point, the Safety takes control of the heating element and allows continued use of the unit until the problem can be resolved or service can be arranged. Please note that it is not recommended that the unit be allowed to operate using only the Safety Thermostat as temperature uniformity will suffer.

4.3 **High Limit Indicator:** This pilot light, located on the Main Control Panel just above the word SAFETY, comes ON when the High Limit Safety Thermostat is activated. Under normal operating conditions this pilot light should never come on.

4.4 **Main Temperature Controller:** This control is marked C° and consists of the digital display and UP/DOWN arrow pads for inputting set point temperatures and calibration.

4.5 **Heating Indicator:** This pilot light is marked HEATING and is on when the heating elements have been activated to reach and maintain set point.

4.6 **Relative Humidity Controller:** This control is marked **%** RH, and consists of the digital display and UP/DOWN arrow pads for inputting set point percents and calibration. The Relative Humidity Controller maintains internal humidity through a direct set point of 1% increments and the digital display indicates in 1% increments. This control is solid state and proportional. The controller utilizes a solid state thin film capacitive humidity sensor to sense the humidity within the chamber.

4.7 **Injection Indicator:** This pilot light is marked INJECTION and is on when water vapor is being injected into the chamber from the vapor generator.

4.8 **Water Low Indicator:** This pilot light is marked WATER LOW and is on when the water level drops in the vapor generator. The float switch is tripped, the vapor generator is turned off, and water is released from the supply. When the vapor generator becomes full, the float switch is tripped again, the vapor generator is turned on, and the WATER LOW pilot light turns off.

4.9 **Chart Recorder:** Adjacent to the control panel is a cover plate that can be removed if a chart recorder is to be installed. Chart recorders are available from your dealer. For further information see Section 7.0, Chart Recorder Installation.

Section 5

THEORY OF OPERATION

These humidity chambers are designed to maintain temperature and relative humidity at set points controllable by the operator at the front panel. Air is constantly being circulated through the chamber, monitored for comparison to set points and treated if necessary.

On all units, heating is done by electric resistance heaters that turn off and on for temperature control. On the R units with cooling (SHC10R (HC9R), SHC10R-2 (HC9R-2), SHC28R (HC30R), SHC28R-2 (HC30R-2)) the refrigeration compressor is continuously active.

Chamber humidification is achieved by means of a low-pressure vapor generator injecting water vapor into the chamber through a small orifice. The water vapor is introduced into the chamber at the blower discharge.

It should be noted that even though the unit does incorporate an exhaust system to assist in achieving humidity close to ambient, the unit has no way of achieving humidity lower than that which the ambient environment will allow.

Section 6

OPERATION

It is recommended that your unit be allowed to reach operating temperature before engaging the humidifying system. This requires setting the RH set point to 0 (zero) until the unit is at operating temperature. See Section 6.6 for changing the RH set point.

6.1 Turn the power switch to the I/ON position. Turn the High Limit Safety thermostat to its maximum position, clockwise and place the shelves in the chamber.

6.2 Place a reference thermometer in the chamber where it can be easily viewed, and so that it is not touching any shelves or chamber walls. Taping the thermometer to a petri dish is a method that works well.

6.3 **Set Main Temperature Control:** To enter the set point on the control, push and release either the UP or DOWN arrow pad one time and the digital display will start to blink from bright to dim. While blinking, the display is showing the set point, which can be changed to the desired temperature by pushing the UP or DOWN arrow pads. If the arrow pads are not pushed within five (5) seconds, the display will stop blinking and will read the temperature in the chamber. Allow at least twenty- four (24) hours for the temperature to stabilize. It is recommended that set point adjustments are made again after the calibration procedure is completed.

6.4 **Calibrating Temperature Control:** Compare the reading on the reference thermometer with the digital display. If there is an unacceptable difference, put the display into calibrate mode by pressing both the UP and DOWN arrow pads at the same time and holding them in until the two outside decimal points start to flash. When the decimal points are flashing, the display can be calibrated to match the reference thermometer by pressing the UP or DOWN arrow pad until the display reads the correct value. Allow the unit to stabilize again until five (5) consecutive readings at five (5) minute intervals read a constant value.

6.5 **Set the High Limit Safety Thermostat:** After the Main Temperature Control is set and calibrated the High Limit needs to be set. First turn the control knob counterclockwise just until the Safety Indicator light comes on. Then slowly turn the knob clockwise just until the Safety Indicator light goes off. The Safety thermostat should now be set approximately ten (10) degrees above the Main Temperature Control set point.

6.6 **Set Humidity Control:** First, place a reference hygrometer in the chamber where it can be easily viewed. To enter set point mode on the Humidity Control push and release either the UP or DOWN arrow pad and the digital display will start to blink from bright to dim. While blinking, the display is showing the set point which can be changed using the UP or DOWN arrow pads. If the arrow pads are not pressed within five (5) seconds, the display will revert to showing the process or actual parameter within the chamber. Allow at least twenty four (24) hours for the unit to stabilize.

CAUTION: When opening the door there is a danger from the steam/high humidity escaping. The door should be opened a small amount (2" - 3") then paused until the steam cloud dissipates.

6.7 **Calibrating Humidity Control:** Compare the reading on the reference hygrometer with the digital display. If there is an unacceptable difference, put the display into calibrate mode by pressing both the UP and DOWN arrow pads at the same time until the display begins to blink. When the display is blinking it can be calibrated to match the reference hygrometer by using the Up/Down arrow pads until it reads the correct value. If the arrow pads are not pressed within five (5) seconds, the display will revert to showing the process or actual parameter within the chamber. Allow the unit to stabilize again.

Section 7

CHART RECORDER INSTALLATION

Please note that the following information is a general guide for installation. Before attempting installation please read the instructions provided with your chart recorder thoroughly for specific installation instructions.

NOTE: Unplug unit from the power supply before installing the Chart Recorder.

7.1 Remove cover for Chart Recorder, located on the right side of control panel.

7.2 Remove steel plate from the back of the Chart Recorder.

7.3 Open the front glass door on the Chart Recorder and loosen the two screws on the face of the recorder. (Screws are on the top and bottom right of the face.)

7.4 Inside the unit, behind the cover plate, you will see two wires that say “Recorder Power”. Cut off the butt connectors and strip the wires about 3/8 inch.

7.5 Put the Recorder Power wires through the hole in back of your Chart Recorder and connect the Recorder Power wires to the terminal inside.

7.6 Run the Chart Recorder probe through the probe hole and slide into probe clips provided inside the chamber of the unit.

7.7 Inside the Chart Recorder you will see a piece of masking tape and a metal clip; remove these; screw face bolts back in; screw in the Chart Recorder; shut the glass door on the Chart Recorder; plug unit into the power supply; then turn on your unit.

7.8 In removing or mounting a chart, the pen arm and stylus must be raised by pressing on the tab at the uppermost end of the arm. Even if the recorder is not to be used, a fresh chart should be mounted or some sort of padding placed under the stylus to protect the sapphire tip.

7.9 To remove and replace a chart, unscrew the hub knob and swing it 90° clockwise, or to the 3 o’clock position. Press the upper tab on the pen arm; lift the chart forward off the hub and slide down and away. DO NOT release the pen arm, but install a new chart.

7.10 Now the pen arm may be gently released and the chart knob rotated counterclockwise back to the hub. Align the proper chart time with chart plate index.

Section 8

MAINTENANCE

NOTE: Prior to any maintenance or service on this unit, disconnect power cord from the power supply. Service of any electrical components should only be performed by personnel who are qualified and familiar with the use and function of these components.

8.1 Clean the chamber interior. Remove and clean shelves and shelf clips on a periodic basis using a disinfectant that is suitable to your application. DO NOT USE chlorine-based bleaches or abrasives as this will damage the stainless steel interior. DO NOT USE spray cleaners that might leak through openings and cracks and get on electrical parts or that may contain solvents that will harm the coatings. A similar periodic cleaning is recommended.

WARNING: Never clean the unit with alcohol or flammable cleaners with the unit connected to the electrical supply. Always disconnect the unit form the electrical service when cleaning and assure all volatile or flammable cleaners are evaporated and dry before reattaching the unit to the power supply.

8.2 When washing interior of unit, handle the gasket carefully, as not to impair the positive seal. **NOTE: DO NOT REMOVE TEFLON TAPE FROM DOOR, IT IS THERE TO PREVENT THE DOOR FROM STICKING TO THE GASKET.**

8.3 All electrical components are accessible from the top of the unit. Remove nuts around edge of top and lift top off.

8.4 There is **NO** maintenance required on the Main Temperature Controller, Over Temperature Safety, Main Temperature Probe, Humidity Control, or Humidity Sensor.

8.5 If the chamber fails to maintain temperature, review Section 8.0 before calling for service.

Section 9

TROUBLESHOOTING

Always make a visual inspection of the unit and control console when troubleshooting. Look for loose or disconnected wires which may be the source of the trouble.

The incubator is designed so that no internal electrical servicing should be required under normal conditions. If electrical servicing is necessary, it should be performed by qualified service personnel. For information on where to reach technical service please see the manual cover. FOR PERSONAL SAFETY, ALWAYS DISCONNECT THE POWER BEFORE SERVICING.

TEMPERATURE	
Temperature too high – display and actual match	
	1/ controller set too high-see see section 6.3 2/ controller failed on – call Customer Service 3/ wiring error – call Customer Service
DISPLAY reads "HI" or "400"+	
	probe is unplugged, is broken or wire to sensor is broken – trace wire from display to probe; move wire and watch display to see intermittent problems
Chamber temp goes way over set point and then settles to set point	
	Recalibrate – see section 6.4
Temperature too low – display and actual match	
	1/ high limit set too low – see section 6.5 2/ controller set too low – see section 6.3 3/ unit not recovered from door opening – wait for display to stop changing 4/ unit not recovered from power failure or being turned off – incubators will need 24 hours to warm up and stabilize 5/ element failure – see if heating light is on; compare current draw to data plate 6/ controller failure – confirm with front panel lights that controller is calling for heat 7/ high limit failure – confirm with front panel lights that Safety is operating correctly 8/ wiring problem – check all functions and compare wiring to owners manual - especially around any areas recently worked on 9/ loose connection – check shadow box for loose connections
Display reads "LO"	
	1/ sensor is plugged in backwards – reverse sensor wires to controller 2/ if ambient temperature is lower than range of unit – compare set points and ambient temperature to rated specifications in owners manual
Unit will not heat over some temperature that is below set point	
	1/ confirm that fan is moving and that amperage and voltage match data plate – check fan motor motion in shadow box and feel for air movement in chamber 2/ confirm that set point is set high enough –turn Safety Thermostat all the way clockwise and see if heating light or safety light comes on 3/ check connections to sensor 4/ check calibration – using independent thermometer, follow instructions in section 6.4
Unit will not heat up at all	

	1/ verify that controller is asking for heat by looking for Heating light – if pilot light is not on continuously, there is a problem with the controller 2/ check amperage – amperage should be virtually at maximum rated (data plate) amperage 3/ do all controller functions work? 4/ is the Safety Thermostat set high enough? – for diagnostics, should be turned fully CCW with the pilot light never on 5/ has the fuse/circuit breaker blown?
Indicated chamber temperature unstable	
	1/ ±0.1 may be normal 2/ is fan working? – remove top panel and verify movement of cooling fan in center of shadow box 3/ is ambient radically changing – either door opening or room airflow from heaters or air conditioning ? – stabilize ambient conditions 4/ sensor miss-located, damaged or wires may be damaged - check mounts for control and Safety Thermostat sensors, then trace wires or tubing between sensors and controls 5/ calibration sensitivity – call Customer Service 6/ high limit set too low – be sure that Safety is more than 5 degrees over desired set point; check if Safety pilot is on continuously; turn controller knob completely clock-wise to see if problem solved then follow instructions in section 6.4 7/ electrical noise – remove nearby sources of RFI including motors, arcing relays or radio transmitters 8/ bad connection on temperature sensor or faulty sensor – check connectors for continuity and mechanical soundness while watching display for erratic behavior; check sensor and wiring for mechanical damage 9/ bad connections or faulty solid state relay – check connectors for mechanical soundness and look for corrosion around terminals or signs of arcing or other visible deterioration 10/ Water jacket empty or low – check indicator warning light or water level at fill port in back of unit.
Will not maintain set point	
	1/ assure that set point is at least 5 degrees over ambient 2/ see if ambient is fluctuating
Display and actual (from reference thermometer) don't match	
	1/ calibration error – see operator's manual 2/ temperature sensor failure – evaluate if pilot light is operating correctly 3/ controller failure – evaluate if pilot light is operating correctly 4/ allow at least two hours to stabilize 5/ see if reference thermometer is certified
Reference thermometer does not match digital display	
	See Temp-10
Can't adjust set points or calibration	
	1/ turn entire unit off and on to reset 2/ if repeatedly happens, call Customer Service
Calibrated at one temperature, but not at another	
	This can be a normal condition when operating temperature varies widely, e.g., 30C°. For maximum accuracy, calibration should be done at close to the set point temperature.

HUMIDITY LEVEL

Can't achieve rated humidity/temp	
	1/ relative humidity sensor or controller failure 2/ check for bad door seal 3/ check for leaking water around steamer 4/ confirm a sufficient and distilled water source 5/ calibrate humidity sensor with independent reference 6/ assure that pressure relief valve is closed 7/ assure that steamer is working (see Humid-4) 8/ leaks in air intake flapper
Can't decrease humidity to set point	

	1/ assure that exhaust fan is working 2/ assure that exhaust fan blower casing is free of pooled water 3/ check solid state relay 4/ set point has to be 10 percentage points below reading on control to turn exhaust fan on 5/ injection valve stuck open 6/ condensate drain tube plugged and pool of water in bottom of chamber
Can't adjust set points or calibration	
	1/ confirm all wire connections 2/ confirm software revision 3/ call Customer Service
Steam generator not working	
	1/ check if fill solenoid, injection valve, relief valve, float switch and relays are working – see schematic in manual 2/ check for water leaks around steamer 3/ verify that relays are working 4/ verify that float switch is working 5/ confirm that heater is working a- power to coil b- is unit burned/shorted out 6/ pressure switch is working 7/ plumbing leak
Humidity unstable	
	1/ circulating fan failure a- motor failure or no voltage to motor b- fan not turning c- ducts blocked 2/ relative humidity is lower than the unit can achieve at that operating temperature 3/ chamber leaks a- motor shaft seals b- door seal c- air intake flapper

REFRIGERATION

SHC10Rs (HC9Rs) & SHC28Rs (HC30Rs) ONLY

Temperature will not reach set point	
	1/ assure that power is going to heating coils 2/ if the displacement is erratic, see if air is being circulated 3/ confirm that controller is calling for heat (check front panel light) 4/ if light not coming on, check control set point and High Limit set point 5/ confirm that fan is operating and airflow is not blocked 6/ reset by turning unit off and on
Unit won't cool	
	If the compressor is running: 1/ see if condenser is cold but free of ice 2/ be sure that fan is circulating air in the chamber and over the compressor 3/ confirm proper sensor location and operation 4/ look for leaks in the chamber or around the door gasket 5/ assure ample room around the unit as described in manual –5cm minimum 6/ adjust calibration on controller 7/ compare ambient specifications to specs in the manual 8/ call customer service If compressor isn't running: 9/ check for non-operating solid state relay 10/ confirm that motor is operable 11/ check if motor has voltage to it 12/ see if refrigeration is running too hot and thermal cutoff activated: a- dirty coil or poor circulation b- coil next to heat source c- ambient temperature too high
Making noise	
	1/ assure that fan is not miss-aligned 2/ Steady internal clicking may be broken spring or valve – call Customer Service

MECHANICAL

Door not sealing	
	1/ adjust hinge blocks or twist the door. 2/ Confirm that unit has not been damaged and body is not square.
Motor doesn't move	
	1/ if shaft spins freely: check connections to motor and check voltage to motor; 2/ if shaft rubs or is frozen, relieve binding and retest
Motor makes noise	
	1) Make sure that the fan or blower wheel is not contacting its housing. Adjust the motor mounting bracket position to re-center the fan or blower wheel, if necessary. 2) Check the fan or blower wheel for damage or out of balance condition. Replace the fan or blower wheel if it is damaged or out of balance. 3) Turn the motor shaft to make sure that it spins freely. If it binds or the bearings make a rubbing or scrapping sound then replace the motor.
Water leaking	
	1/ If leaking inside: dry chamber, run at temperature with door open. Check all seams with flashlight including front face. 2/ If leaking outside: dry out and see if leak repeats and find source of leak. Sources may include: fittings that need tightening, condensation due to missing insulation or a leak developed in humidity generator.
OTHER	
Controller on at all times - "locked-up"	
	1/ Adjust set point to room temperature. If the light goes out but is still heating, replace the solid state relay. 2/ turn unit off and on to reset 3/ if cannot change any condition on the front panel, call Customer Service
Front panel displays are all off	
	1/ Check for wire damage.
Unit or wall fuse/circuit breaker is blown	
	1/ check wall power source 2/ compare current draw and compare to specs on data plate 3/ see what other loads are on the wall circuit
Unit will not turn on	
	1/ check wall power source 2/ check fuse/circuit breaker on unit or in wall 3/ see if unit is on, e.g., fan or heater, and just controller is off 4/ check all wiring connections, esp. around the on/off switch
Condensate appears on chamber walls of humidity chamber	
	1/ Some condensation may be normal 2/ Minimize the movement of air around the unit and reduce the number of door openings
Contamination in chamber	
	1/ see cleaning procedure in operator's manual 2/ develop and follow SOP for specific application; include definition of cleaning technique and maintenance schedule

Section 10

PARTS LISTS

SHC10 and SHC10-2 (HC9 and HC9-2)
SHC10R and SHC10R-2 (HC9R and HC9R-2)

DESCRIPTION	SHC10 (HC9) 115V	SHC10-2 (HC9-2) 220V	SHC10R (HC9R) 115V	SCH10R-2 (HC9R-2) 220V
Adjustable Feet	2700500	2700500	2700500	2700500
Blower Wheel, Aluminum	2600535	2600535	2600535	2600535
Blower Wheel, Plastic	2600544	2600544	2600544	2600544
Circuit Breaker	1100500	1100500	1100500	1100500
Element	2350563	2350554	2350562	2350554
Fan Blade	2600551	2600551	2600551	2600551
Fan Motor	4880564	4880563	4880564	4880563
Float Switch	7850563	7850563	7850563	7850563
Humidity Control	1750553	17560554	1750553	17560554
Humidity Sensor	4100504	4100504	4100504	4100504
Motor U.E.C.	4880512	4880512	4880572	4880512
ON/OFF Switch	7850570	7850570	7850570	7850570
Pilot Light, Green	4650554	4650554	4650554	4650554
Pilot Light, Red	4650553	4650553	4650553	4650553
Power Cord	1800516	1800537	1800516	1800537
Power Cord - European	NA	1800541	NA	1800541
Power Exhaust Assembly	9990559	9990562	9990559	9990562
Pressure Relief Valve	8600567	8600567	8600567	8600567
Pressure Switch	7850574	7850574	7850574	7850574
Refrigeration System	NA	NA	9990569	9990587
Relay	7030536	7030528	7030536	7030528
Shelf	5120525	5120525	5120525	5120525
Shelf Clip (4/Shelf)	1250512	1250512	1250512	1250512
Solenoid Valve	8600576	8600578	8600576	8600578
Temperature Controller	1750549	1750550	1750549	1750550
Thermostat, High Limit	1750861	1750861	1750861	1750861
Vapor Generator Assembly	9990663	9990664	9990663	9990664
Vapor Generator Element	2350520	2350521	2350520	2350521

SHC28 (HC30) and SHC28-2 (HC30R)
SHC28R (HC30R) and SHC28R-2 (HC30R-2)

DESCRIPTION	SHC28 (HC30) 115V	SHC28-2 (HC30-2) 220V	SHC28R (HC30R) 115V	SHC28R-2 (HC30R-2) 220V
Blower Wheel, Aluminum	2600535	2600535	2600535	2600535
Blower Wheel, Plastic	2600544	2600544	2600544	2600544
Element, Main	2350563	2350554	2350563	2350554
Fan Blower Wheel	2600504	2600504	2600504	2600504
Fan Motor	4880564	4880563	4880564	4880563
Float Switch	7850563	7850563	7850563	7850563
Humidity Control	1750553	1750554	1750553	17560554
Humidity Sensor	4100504	4100504	4100504	4100504
Motor U.E.C.	4880504	4880504	4880504	4880504
ON/OFF Switch	7850570	7850570	7850570	7850570
Pilot Light, Green	4650554	4650554	4650554	4650554
Pilot Light, Red	4650553	4650553	4650553	4650553
Power Cord	1800529	1800537	1800517	1800537
Power Cord European	NA	1800541	NA	1800541
Power Exhaust Assembly	9990559	9990562	9990559	9990562
Power Relay	7030533	7030533	7030533	7030533
Pressure Relief Valve	8600567	8600567	8600567	8600567
Pressure Switch	7850574	7850574	7850574	7850574
Refrigeration System	NA	NA	9990570	9990588
Relay	7030536	7030528	7030536	7030528
Shelf	9750531	9750531	9750531	9750531
Shelf Clip (4/Shelf)	1250512	1250512	1250512	1250512
Solenoid Valve	8600576	8600578	8600576	8600578
Temperature Controller	1750549	1750550	1750549	1750550
Thermostat, RS	1750861	1750861	1750861	1750861
Vapor Generator Assy.	9990643	9990644	9990643	9990644
Vapor Generator Element	2350520	2350520	2350520	2350520

UNIT SPECIFICATIONS

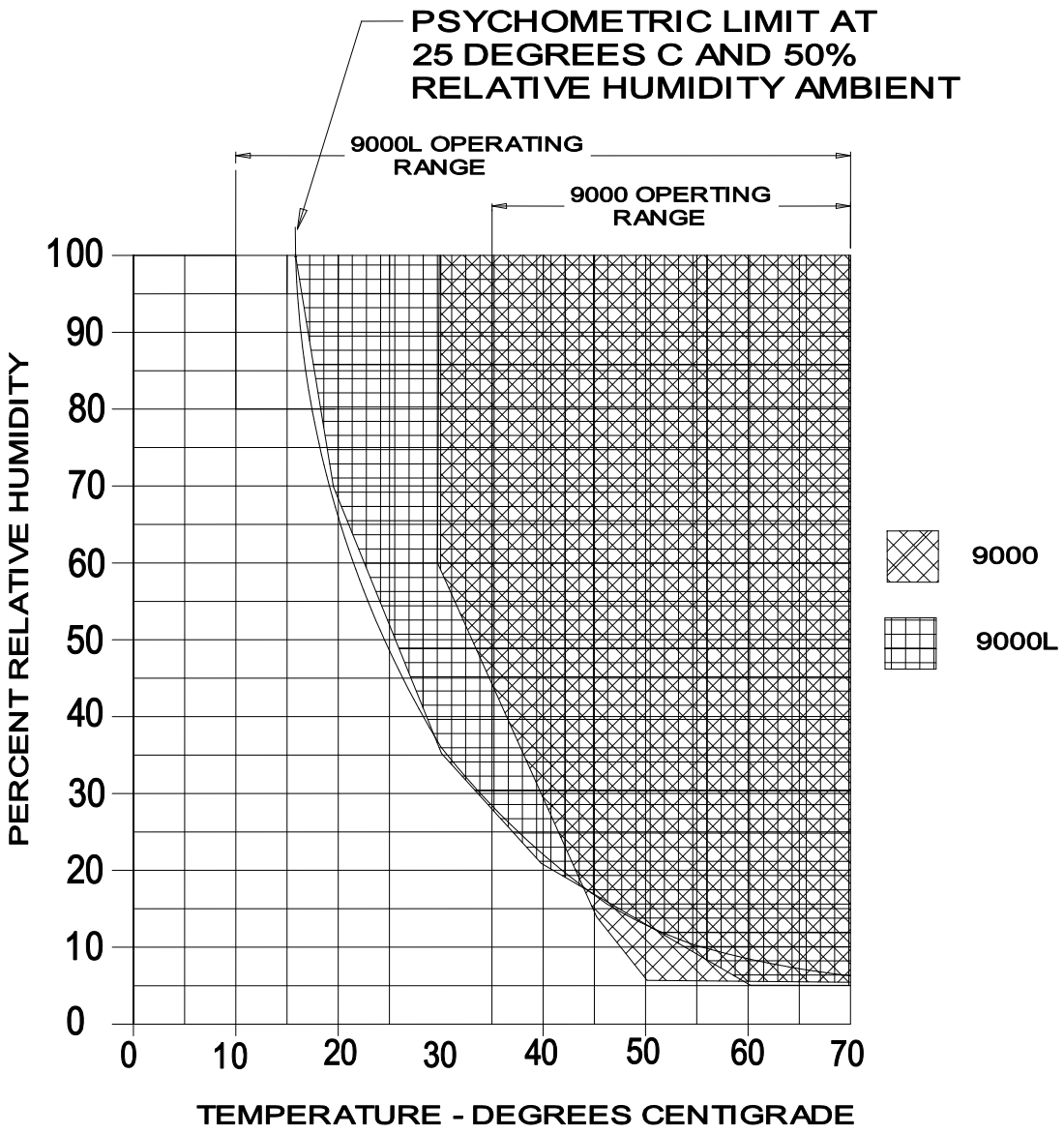
Weight	Shipping	Net
SHC10 SHC10-2 (HC9 HC9-2)	480 lbs.	341 lbs.
SHC10R SHC10R-2 (HC9R HC9R-2)	515 lbs.	401 lbs.
SHC28 SHC28-2 (HC30 HC30-2)	630 lbs.	460 lbs.
SHC28R SHC28R-2 (HC30R HCR30-2)	670 lbs.	460 lbs.

Dimensions	Exterior WxDxH (in.)	Interior WxDxH (in.)
SHC10 SHC10-2 (HC9 HC9-2)	44 x 32.75 x 57	28 x 20.25 x 26
SHC10R SHC10R-2 (HC9R HC9R-2)	44 x 32.75 x 57	28 x 20.25 x 26
SHC28 SHC28-2 (HC30 HC30-2)	42.5 x 37 x 85	30.25 x 26 x 62
SHC28R SHC28R-2 (HC30R HCR30-2)	42.5 x 37 x 85	30.25 x 26 x 62

Capacity	Cubic Feet
SHC10 SHC10-2 (HC9 HC9-2)	8.5
SHC10R SHC10R-2 (HC9R HC9R-2)	8.5
SHC28 SHC28-2 (HC30 HC30-2)	28
SHC28R SHC28R-2 (HC30R HCR30-2)	28

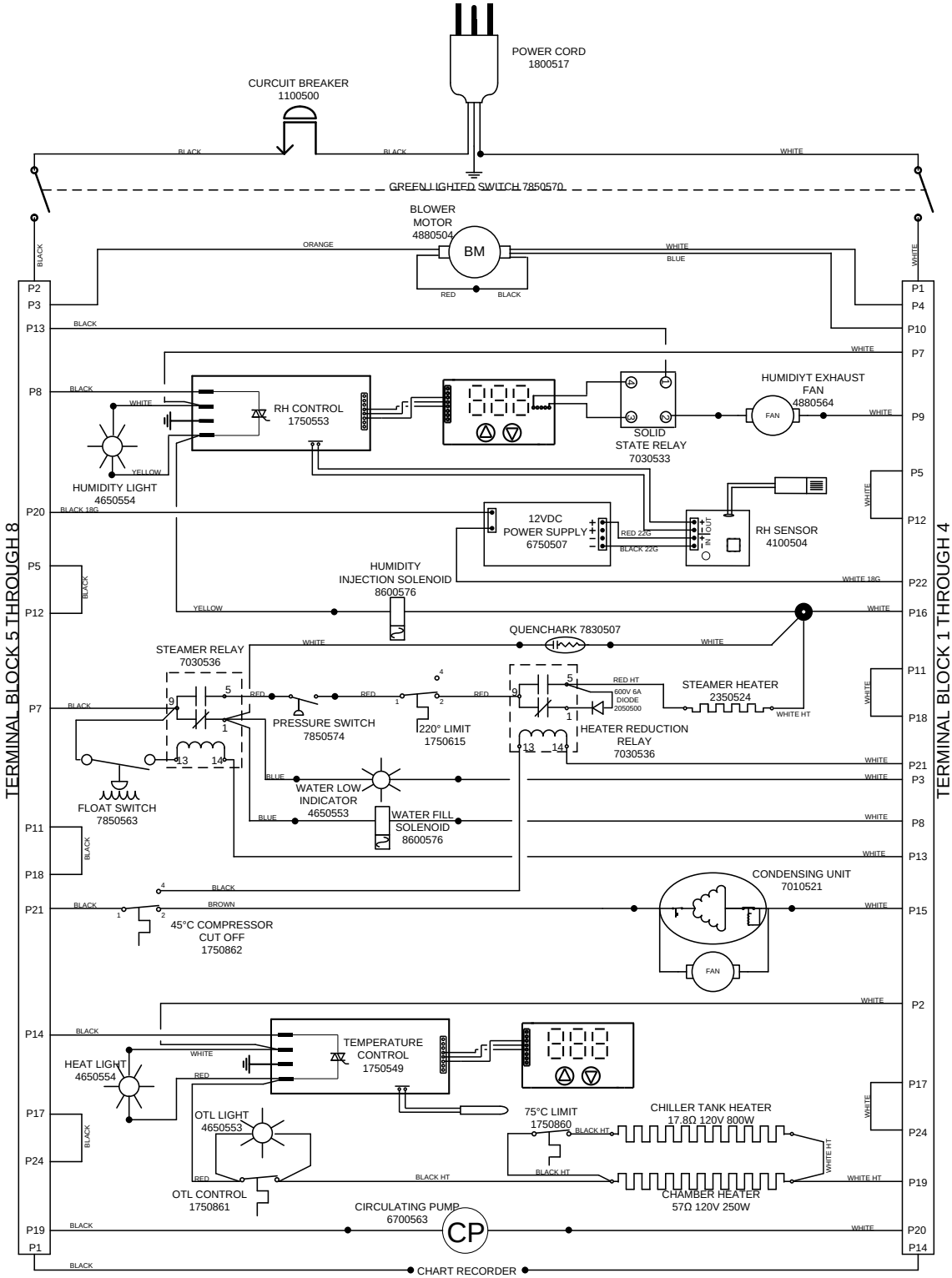
Temperature	Range	Humidity
SHC10 SHC10-2 (HC9 HC9-2)	40° to 70°	40-95%
SHC10R SHC10R-2 (HC9R HC9R-2)	10° to 70°	40-95%
SHC28 SHC28-2 (HC30 HC30-2)	40° to 70°	40-95%
SHC28R SHC28R-2 (HC30R HCR30-2)	10° to 70°	40-95%

RELATIVE HUMIDITY CHART

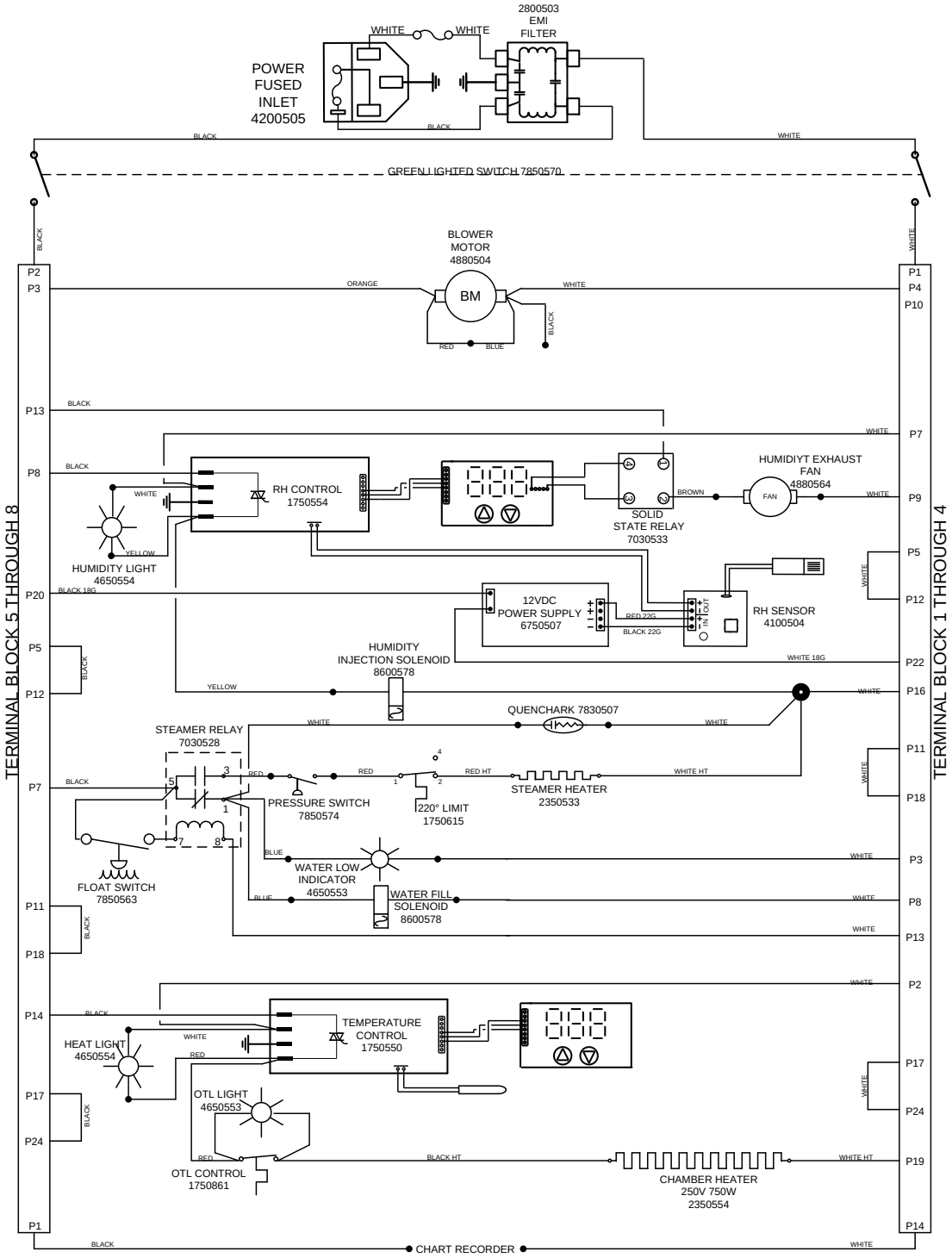


OPERATING CHARACTERISTICS FOR
AMBIENT AT 25 DEGREES C AND 50% RELATIVE HUMIDITY

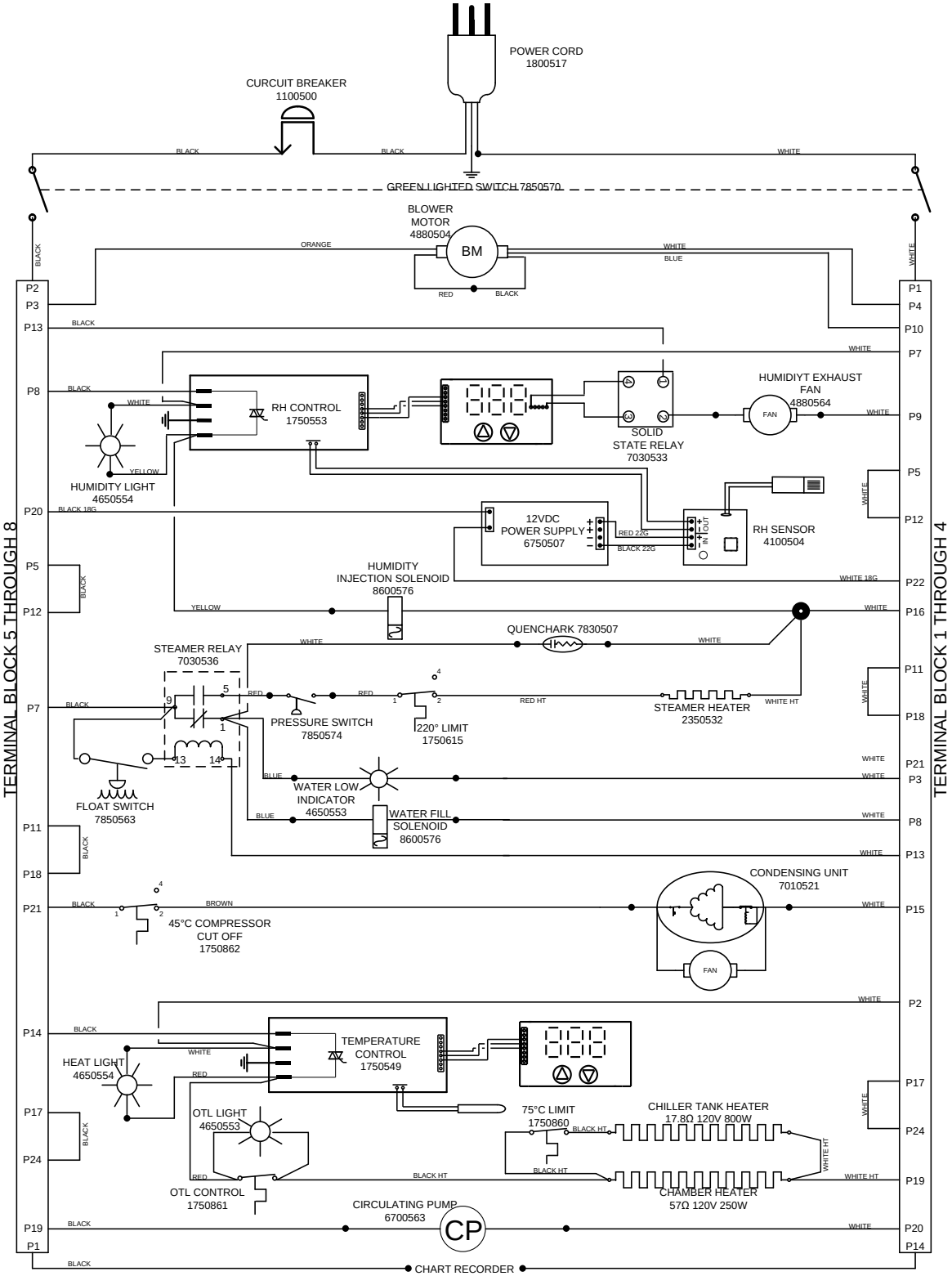
WIRING DIAGRAM
SHC10 (HC9)
(9851449)



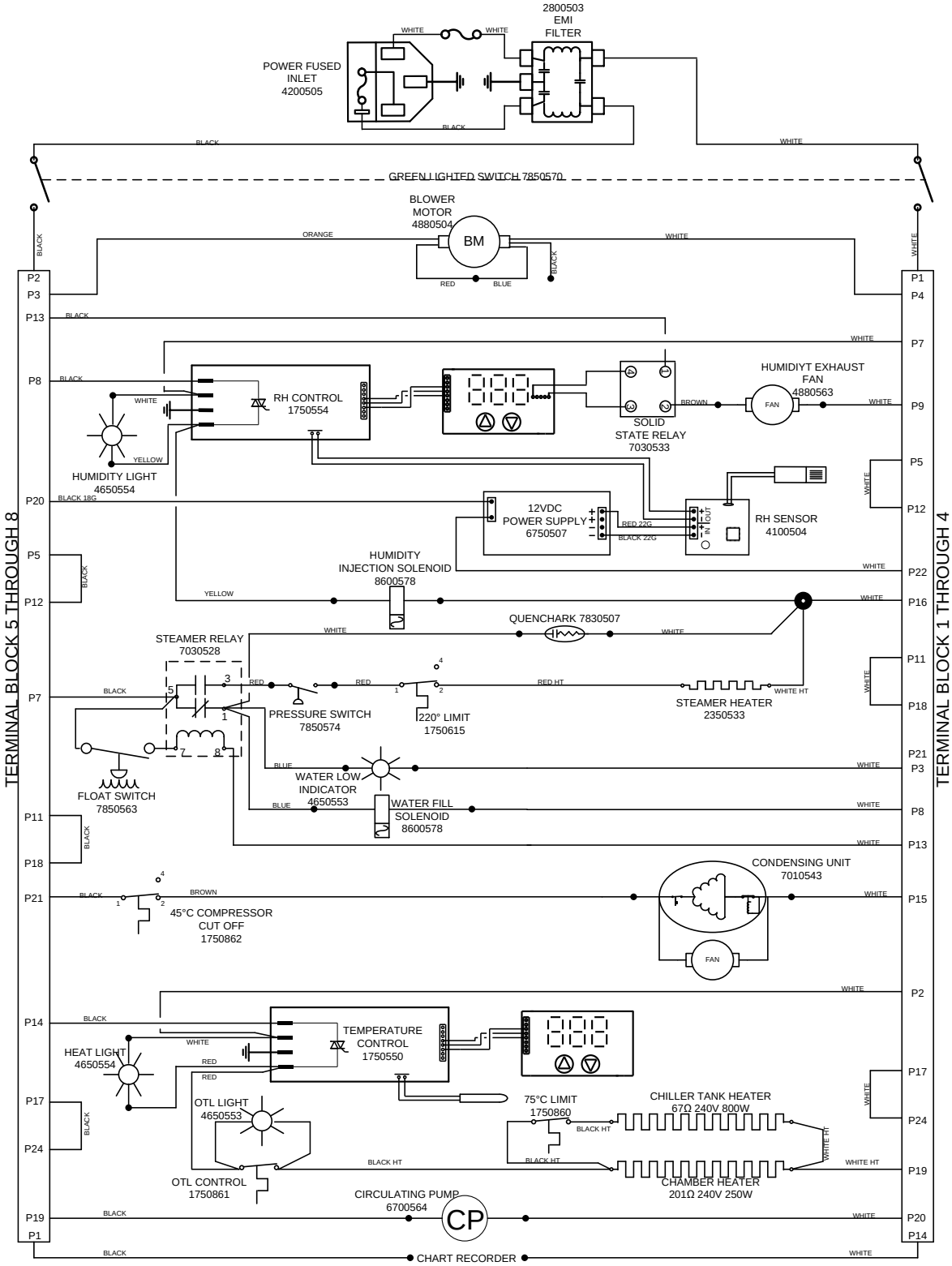
WIRING DIAGRAM
SHC10-2 (HC9-2)
(9851450)



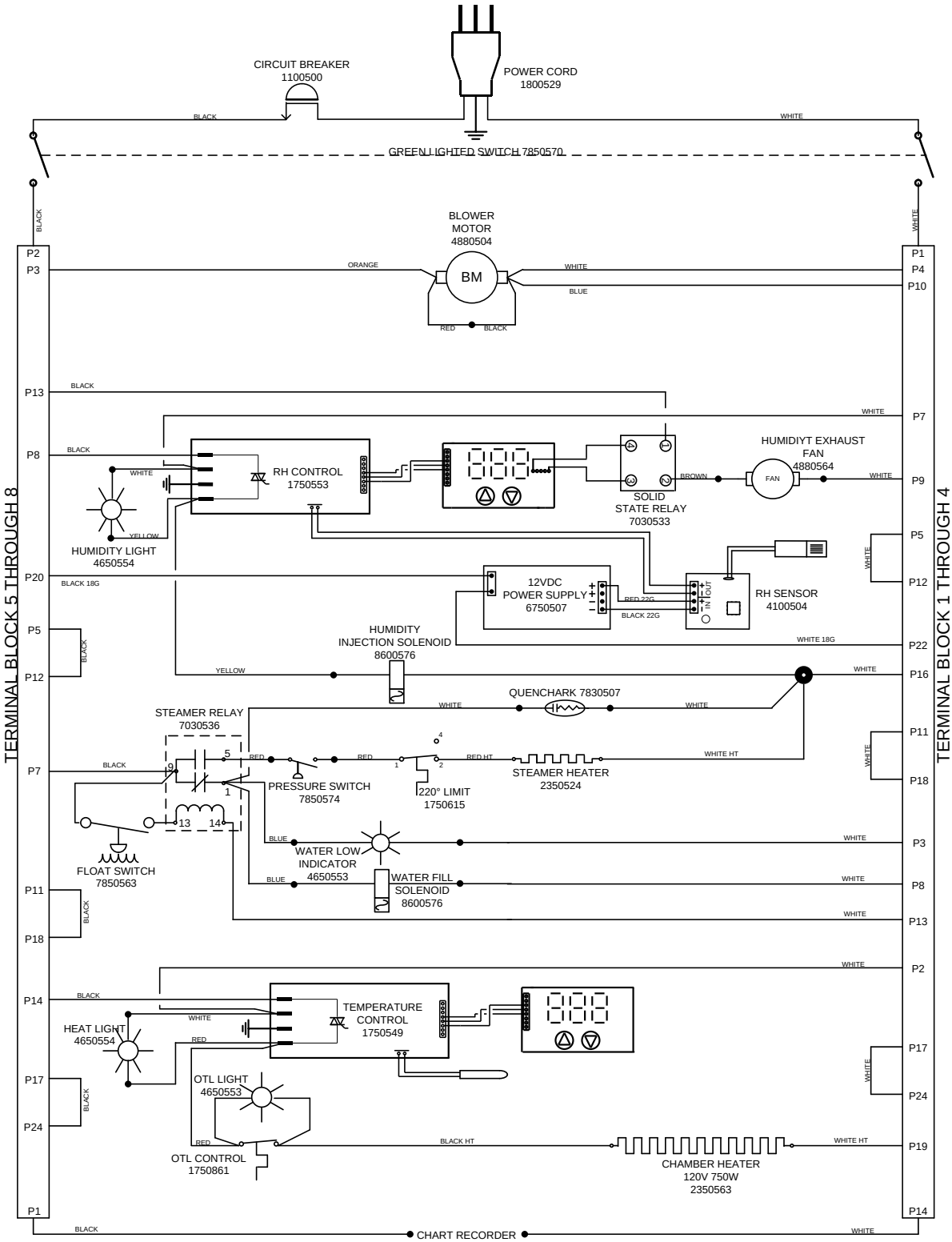
WIRING DIAGRAM
SHC10R (HC9R)
(9851451)



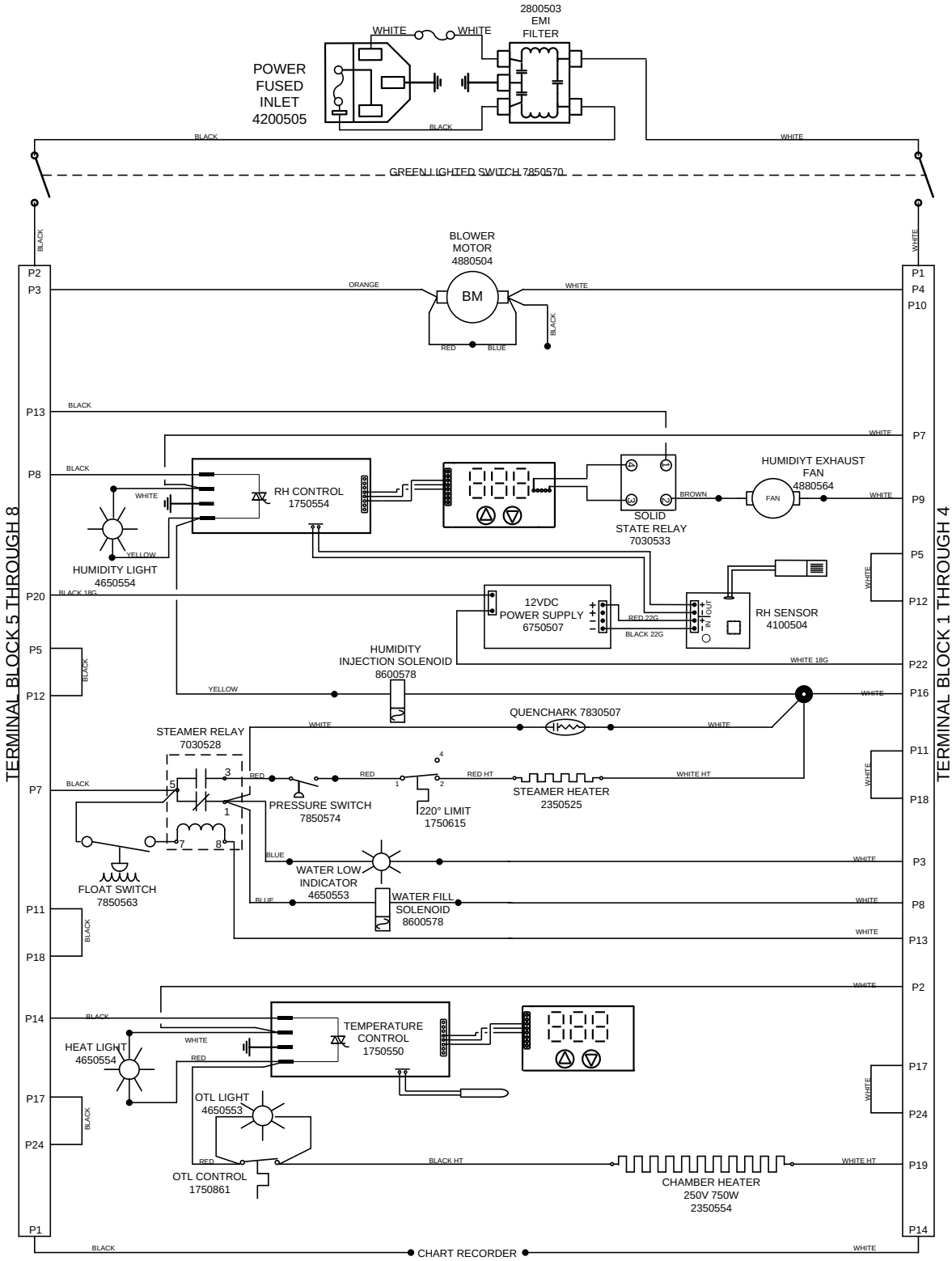
WIRING DIAGRAM
SHC10R-2 (HC9R-2)
(9851452)



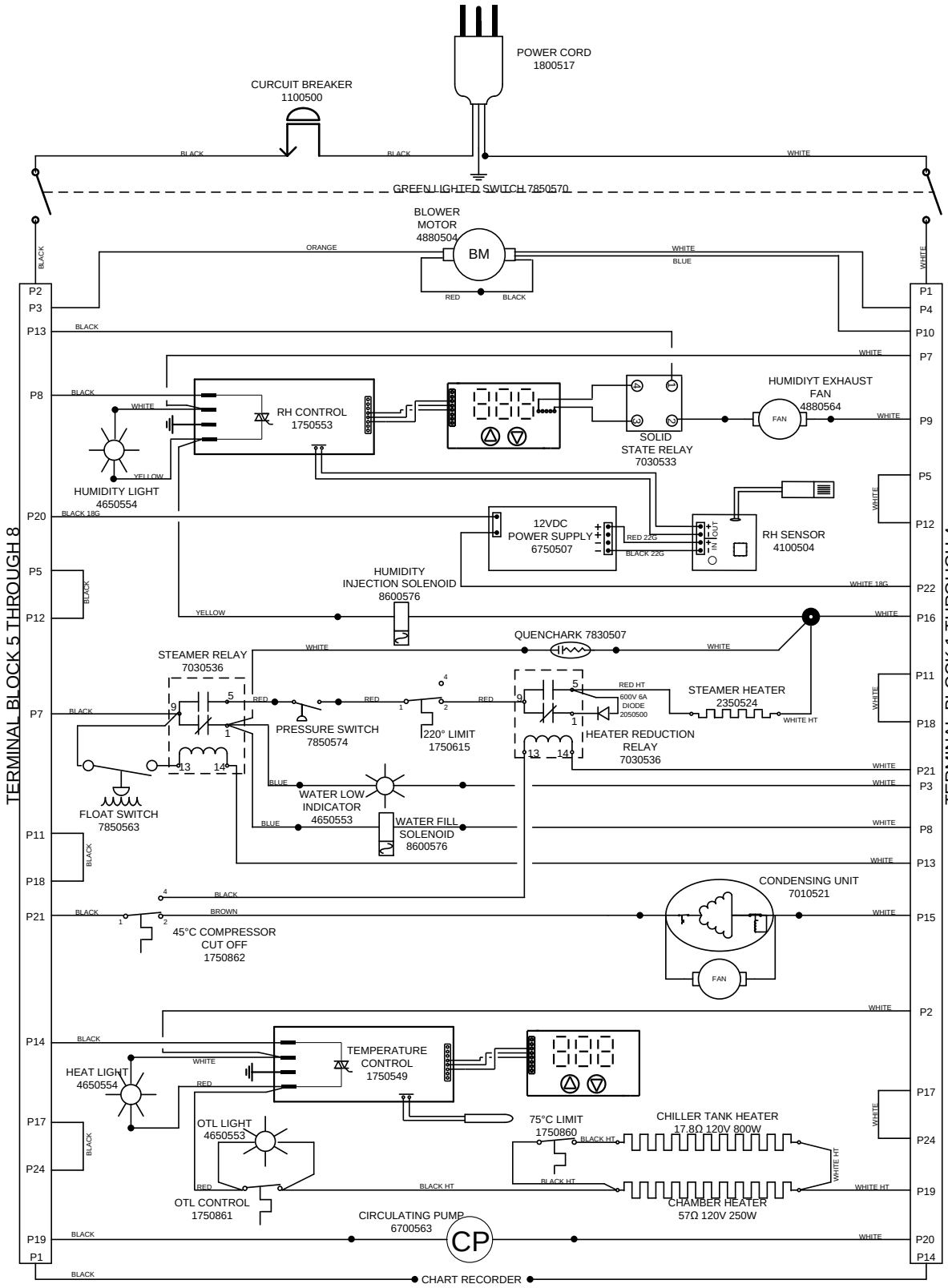
WIRING DIAGRAM
SHC28 (HC30)
(9851453)



WIRING DIAGRAM
SHC28-2 (HC30-2)
(9851454)



WIRING DIAGRAM
SHC28R (HC30R)
(9851455)



WIRING DIAGRAM
SHC28R-2 (HC30R-2)
(9851456)