80442791
Revision E
September 2012

Nirvana Cycling Refrigerated Dryer
Models 1000-1600

Operator's Manual

EN Operator's Manual
ES Manual Del Operador
FR Manuel De L'opérateur
PT Manual do Operador

Save These Instructions

Ingersoll Rand®

1.0 CONTENTS

2.0 INTRODUCTION

The **Ingersoll Rand** Nirvana Cycling refrigerated air dryer removes moisture, oil vapor, and other contaminants from compressed air. These contaminants are detrimental to pneumatically operated appliances, controls, instruments, machinery and tools. This is accomplished by cooling the air with a refrigeration unit to a temperature at which moisture in the air is condensed and separated from the airstream. The temperature the air is cooled to, normally between 36 and 40°F, is known as dew point. This dryer can be easily installed into various pneumatic systems in which dry air is required or desired. Please refer to Principles of Operation for complete operating details.

3.0 WARRANTY

The Company warrants that the equipment manufactured by it and delivered hereunder will be free of defects in material and workmanship for a period of twelve months from the date of placing the Equipment in operation or eighteen months from the date of shipment from the factory, whichever shall first occur. The Purchaser shall be obligated to promptly report any failure to conform to this warranty, in writing to the Company in said period, whereupon the Company shall, at its option, correct such nonconformity, by suitable repair to such equipment or, furnish a replacement part F.O.B. point of shipment, provided the Purchaser has stored, installed, maintained and operated such Equipment in accordance with good industry practices and has complied with specific recommendations of the Company. Accessories or equipment furnished by the Company, but manufactured by others, shall carry whatever warranty the manufacturers have conveyed to the Company and which can be passed on to the Purchaser. The Company shall not be liable for any repairs, replacements, or adjustments to the Equipment or any costs of labor performed by the Purchaser or others without Company's prior written approval.

The effects of corrosion, erosion and normal wear and tear are specifically excluded. Performance warranties are limited to those specifically stated within the Company's proposal. Unless responsibility for meeting such performance warranties are limited to specified tests, the Company's obligation shall be to correct in the manner and for the period of time provided above.

THE COMPANY MAKES NO OTHER WARRANTY OR REPRESENTATION OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE HERBY DISCLAIMED.

Correction by the Company of nonconformities whether patent or latent, in the manner and for the period of time provided above, shall constitute fulfillment of all liabilities of the Company for such nonconformities whether based on contract, warranty negligence, indemnity, strict liability or otherwise with respect to or arising out of such Equipment.

The Purchaser shall not operate Equipment which is considered to be defective, without first notifying the Company in writing of its intention to do so. Any such use of Equipment will be at Purchaser's sole risk and liability.

Note that this is **Ingersoll Rand** standard warranty. Any warranty in force at the time of purchase of the equipment or negotiated as part of the purchase order may take precedence over this warranty.

4.0 REFRIGERATED DRYER NOMENCLATURE

PREFIX	NOMINAL* FLOW (SCFM)	CONDENSER TYPE	POWER	RATING
NVC	1000 - 1600	A = AIR	4 = 460-3-60	1 = NEMA 1
		W = WATER	5 = 230-3-60	H = NEMA 4
			6 = 575-3-60	
			7 = 380-3-50	
			8 = 220-3-50	

* Nominal Flows indicated are for 100 °F inlet temperature, 100 °F ambient temperature and 100 psig compressed air pressure pressure.

5.0 RECEIVING AND INSPECTION

5.1 UNPACKING

Upon receiving your **Ingersoll Rand** air dryer, please inspect the unit closely. If rough handling has been detected, please note it on your delivery receipt, especially if the dryer will not be immediately uncrated. Obtaining the delivery person's signed agreement to any noted damages will facilitate any insurance claims.

5.2 UNPACKING AND HANDLING

⚠ WARNING

Under no circumstances should any person attempt to lift heavy objects without proper lifting equipment (i.e., crane, hoist, slings or fork truck). Lifting any unit without proper lifting equipment, can cause serious injury.

All dryer packages have been mounted on a base which provides for forklifting between the two base channels to facilitate handling during shipment. Forks should extend all the way through forklift channels to reduce unnecessary forces to the dryer during moving. Slings can be used to lift the crates, but spreader bars must be used to prevent the slings from exerting a force against the sides of the crates.

6.0 SAFETY AND OPERATION PRECAUTIONS

Because an air dryer is pressurized and contains rotating parts, the same precautions should be observed as with any piece of machinery of this type where carelessness in operation or maintenance could be hazardous to personnel. In addition to obvious safety rules that should be followed with this type of machinery, safety precautions as listed below must be observed:

1. Only qualified personnel shall be permitted to adjust, perform maintenance or repair this air dryer.
2. Read all instructions completely before operating unit.
3. Pull main electrical disconnect switch and disconnect any separate control lines, if used, before attempting to work or perform maintenance on the unit.
4. Do not attempt to service any part while machine is in an operational mode.
5. Do not attempt to remove any parts without first relieving the entire air system of pressure.
6. Do not attempt to remove any part of the refrigeration system without removing and containing refrigerant in accordance with the EPA and local regulations.
7. Do not operate the dryer at pressures in excess of its rating.
8. Do not operate the dryer without guards, shields and screen in place.
9. Inspect unit daily to observe and correct any unsafe operating conditions.

OSHA
Heading Descriptions

⚠ WARNING

"Warning" is used to indicate a hazardous situation which has some probability of death or severe injury. Warning should not be considered for property damage accidents unless personal injury risk is present.

⚠ CAUTION

"Caution" is used to indicate a hazardous situation which may result in minor or moderate injury.

⚠ NOTICE

"Notice" is used to indicate a statement of company policy as the message relates directly or indirectly to the safety of personnel or protection of property. Notice should not be associated directly with a hazard or hazardous situation and must not be used in place of "Danger," "Warning," or "Caution."

⚠ NOTICE

The user of any air dryer manufactured by Ingersoll Rand, is hereby warned that failure to follow the above Safety and Operation Precautions may result in personal injury or equipment damage. However, Ingersoll Rand does not state as fact, nor does it mean to imply, that the preceding list of Safety and Operating Precautions is all inclusive, and further, that the observance of this list will prevent all personal injury or equipment damage.

WARNING

Air Under Pressure Will Cause Injury, Death Or Property Damage.
- Do Not Exceed Pressure Rating.
- Relieve Press. Before Servicing.
- Do Not Modify/Repair/Rework ASME Coded Pressure Vessels As Insurance Rating Affected.

READ TECHNICAL MANUAL

WARNING

Removing fuses will not disconnect power from dryer. Always disconnect power from ALL sources before performing service.

READ TECHNICAL MANUAL

WARNING

FAN MAY AUTOMATICALLY START AT ANY TIME

WARNING

Air Under Pressure Will Cause Injury, Death Or Property Damage.
- Relieve Press. Before Servicing.
- Condensate Drain Discharges Under Pressure.
- Drain Requires Periodic Cleaning (Service).

READ TECHNICAL MANUAL

WARNING

HIGH VOLTAGE

WARNING

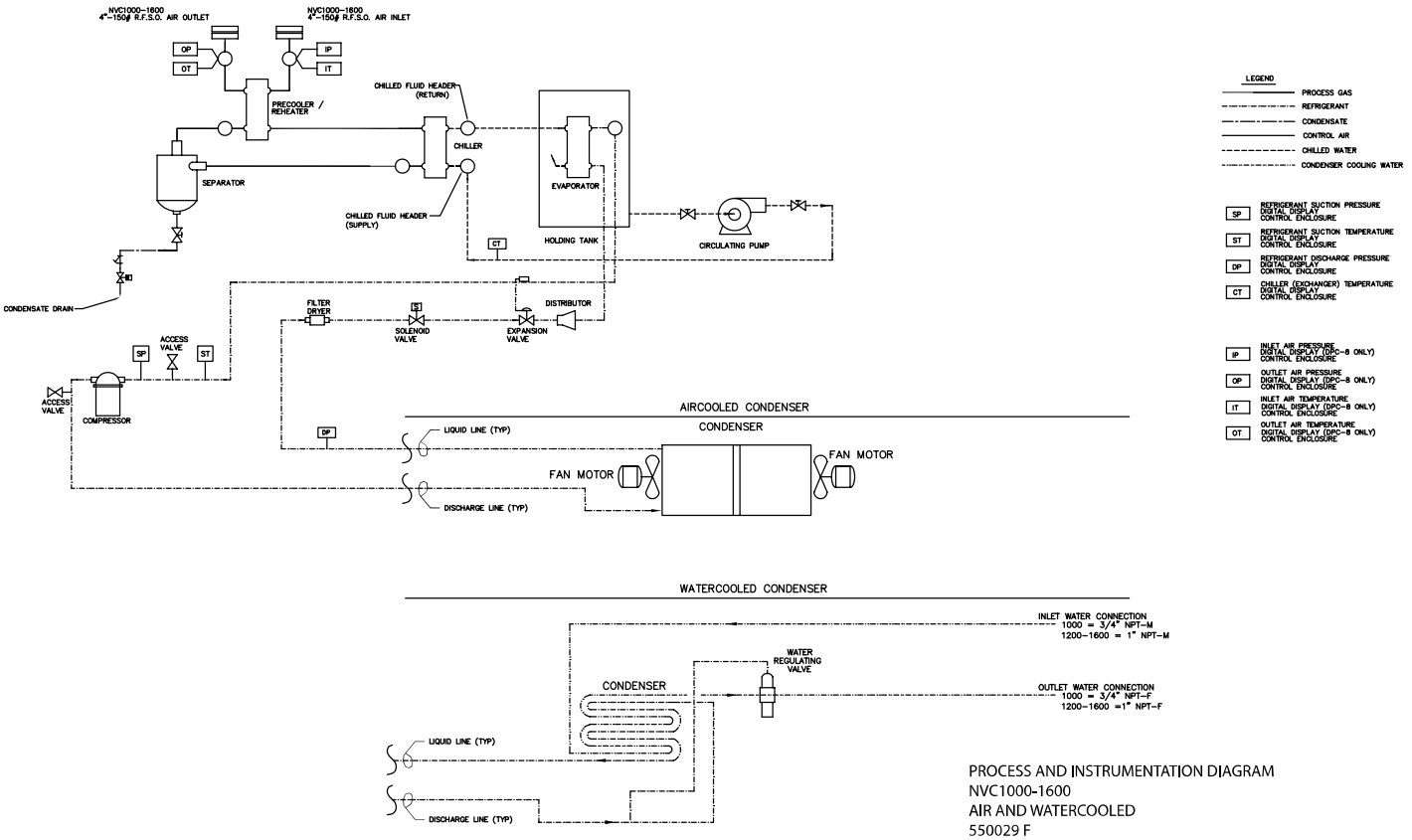
This unit is charged with refrigerant under high pressure.

7.1 INTRODUCTION

Ingersoll Rand Nirvana™ Cycling dryers remove moisture from compressed air by cooling the air temperature to between 36° and 40°F (2 and 4°C). This causes vapors to condense into liquid droplets which can then be easily removed from the air. The major systems of the dryer which contribute to its operation are the Air System, the Moisture Removal System, the Refrigeration System, the Thermal Mass Circulating System and the Controls. The following paragraphs describe each of the systems in greater detail.

7.2 AIR SYSTEM

The air system consists of the dryer components which are in contact with the compressed air. Referring to Figure 1 and following the bold "AIR FLOW," hot saturated air from the compressor enters the precooler/reheater where the air temperature is reduced prior to entering the chiller by the cool air exiting the air/moisture separator. This precooling allows for the use of a smaller refrigeration system. The air then goes into the chiller section where it is further cooled to the desired dew point by a thermal mass fluid. The temperature of the thermal mass fluid is maintained by the refrigeration circuit and controls. The air continues to the separator where moisture is removed, thereby, allowing the cool, dry air to return back to the precooler/reheater to be heated by the incoming moist hot air. The air exiting the "reheater" portion of the dryer should be approximately 15°- 20°F lower than the inlet air temperature based on standard conditions at full rated flow.



PROCESS AND INSTRUMENTATION DIAGRAM
NVC1000-1600
AIR AND WATERCOOLED
550029 F

7.3 MOISTURE REMOVAL SYSTEM

Ingersoll Rand condensate drains discharge condensed moisture and lubricants (condensate) from compressed air equipment.

Liquid droplets are removed from the air stream in the separator. As the air and liquid mixture passes through the separator it spins, slows down and then changes direction. This causes condensate to fall out of the air stream and collect in the bottom of the separator. The collected liquid is removed from the separator by a timed electric drain(standard) which is controlled by the Controller OR an optional No-Air Loss drain.

7.3.1 SOLENOID DRAIN (STANDARD)

The Drain Open time and Drain Closed time are accessed by depressing the appropriate button and using the up and down arrows to change the value. The Drain Open value is seconds; the Drain Closed value is minutes.

- To obtain the optimum time values for operation of the electric drain valve, set the drain closed time to five minutesand the open time to ten seconds.
- After running the unit under full rated flow for approximately 30 minutes, verify that when the electric drain opens, all of the accumulated liquid is discharged and then followed by a small burst of air.
- If a small amount of liquid and a large amount of air is discharged, decrease the on-time setting or increase the offtime setting. If there is all liquid and no air has been discharged, increase the on-time setting or decrease the offtime setting.
- The on/off-time settings will vary accordingly to seasonal conditions. During the summer when more moisture is present in the air system, a shorter ontime that increases the valve opening frequency is required. A longer off-time may be used during the winter months when moisture levels are lower.

7.3.2 NO AIR LOSS DRAIN (OPTIONAL)

The condensate drain operates as a zero-air-loss drain, returning air that is displaced in the drain bowl back into the compressed air system. Consistent discharging of condensate from compressed air equipment is essential for proper equipment operation and performance.

The condensate drain uses a unique sensing method to determine the level of condensate in the drain bowl. A transducer located in the drain bowl continuously sends out a signal 50 times per second. Once the transducer determines that the level of condensate has reached a predetermined level within the drain bowl, a signal is sent to the no-loss drain valve to open. This operation permits removal of condensate of up to 80 gallons per hour.

The drain also features a test button that permits manual operation of the no-loss drain valve. Depressing the test button illuminates the LED and energizes the solenoid valve. The LED illuminates to indicate "POWER ON" and goes off when the no-loss drain valve is operated by the transducer or manual test button.

The condensate flows through the feed line into the drain unit and accumulates in the container. A capacitive sensor continuously registers the liquid level and passes a signal to the electronic control as soon as the container is filled. The pilot valve is then activated and the diaphragm opens the outlet line for discharging the condensate. When the drain unit has been emptied, the outlet line is closed again quickly and tightly without wasting compressed air."

7.4 REFRIGERATION SYSTEM

The Refrigeration System consists of all the components which handle R-404A. This is a hermetically sealed closed-loop system. Referring to Figure 1 and following the phantom "REFRIGERANT" line, refrigerant is shown leaving the evaporator section where, in the process of removing heat, it is changed from a low pressure liquid into a low pressure gas. This gas enters the suction side of the compressor where it is compressed into a high pressure gas. The high pressure gas is cooled in the air cooled or water cooled condenser section until it becomes a high pressure liquid. It then goes through a permanent filter dryer that ensures the refrigeration system is free of contaminants. A thermostatic expansion valve meters the refrigerant for introduction into the evaporator. The refrigerant pressure is reduced upon entering the evaporator where as it evaporates, heat is removed from the thermal mass fluid. A solenoid valve in the liquid line eliminates the possibility of flooded starts.

7.5 THERMAL MASS CIRCULATING SYSTEM

The thermal mass fluid in a **Ingersoll Rand** Nirvana™ Cycling dryer is continuously circulated in a closed pump loop system. Referring to Figure 1 and following the dashed "THERMAL MASS FLUID" line, the heat is removed from the fluid in the evaporator by the refrigeration system. The thermal mass reservoir is sized to minimize refrigeration cycles during reduced air load periods. The thermal mass fluid is pulled from the bottom of the reservoir and pumped through the chiller, removing heat from the air and returned to the evaporator. The pump utilized on **Ingersoll Rand** Nirvana™ Cycling dryer is a maintenance-free, quiet cartridge circulator pump similar to those used in residential water systems. While the refrigeration system cycles on and off based on loading conditions, the circulating pump runs continuously to maintain flow through the chiller at all times.

7.6 CONTROLS

Ingersoll Rand 2000-2400 Refrigerated Compressed Air Dryers are equipped with the Microprocessor Control. This advanced microprocessor-based controller has been engineered by **Ingersoll Rand** exclusively for use with **Ingersoll Rand** Compressed Air Dryers.

The Microprocessor Control cycles the refrigeration system based on the dryer's Chiller Temperature. A temperature sensor samples the thermal mass temperature as it enters the chiller exchanger. The Chiller Temperature Set point is a user adjustable set point that is used to set the Refrigeration Compressor Off temperature. Once the Chiller Temperature has fallen below the Chiller Temperature Set point, the refrigeration compressor will de-energize. The Operating Temperature Differential is factory set at 4 °F above the Chiller Temperature Set point. Therefore, if a user adjusts the Chiller Temperature at 36 °F, the Refrigeration Compressor On temperature will be 40 °F.

In addition to the operation of the Nirvana™ Cycling dryers as described above, the Microprocessor Control permits monitoring of dryer parameters and enunciation of alarm conditions.

The list below summarize the features the Microprocessor Control:

- 2 X 16 Character Backlit LCD Display - Easy-to-read display provides continuous indication of dryer default parameter. Standard backlight permits viewing of critical information in low light environments.
- Remote Start / Stop: Microprocessor Control-equipped dryers offer a unique remote start / stop feature. This feature allows the dryer to be operated via a remote user-supplied switch.
- Remote Alarm Contact: Microprocessor Control-equipped dryers include a remote alarm contact to provide indication of any of the dryers alarms described later in this manual. Contact rated for 2A / 120V max.

The Microprocessor Control features three levels of access. The default level CUSTOMER MODE permits adjustment of dryer parameters to address seasonal variations for drain timing and pressure dew point temperature. A protected TECHNICIAN MODE permits access to and manipulation of additional parameters. A password protected FACTORY MODE is also included for use with **Ingersoll Rand** Service Personnel for troubleshooting the dryer.

The Microprocessor Control includes a digital readout for monitoring the discharge pressure of the refrigerant gas exiting the compressor. This reading will vary dependent upon condenser type as indicated below:

- For air-cooled applications, condensing fans are cycled on and off by the DPC based on the refrigerant discharge pressure. The primary fan is cycled on at 235 psig and off at 195 psig. Should the discharge pressure continue to climb above 265 psig, the secondary condensing fan will cycle on. As discharge pressure is reduced below 210 psig, the secondary fan will cycle off.
- Water cooled condensers utilize a water regulating valve (Note Figure 2). The water regulating valve comes pre-adjusted from the factory at 250 psig discharge pressure. To compensate for water temperature variation, it may be necessary to adjust the water regulating valve to maintain a 250 psig discharge pressure. Adjustment can be done by rotating the adjusting screw counterclockwise for an increase in discharge pressure. For conditions where low water temperature and/or high water pressure are expected it is advisable to install a water pressure regulator ahead of the condenser.

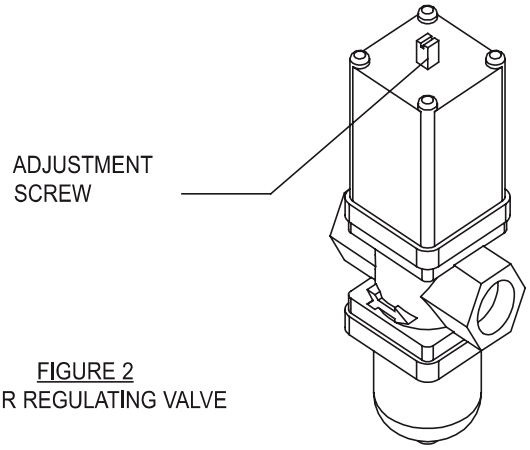
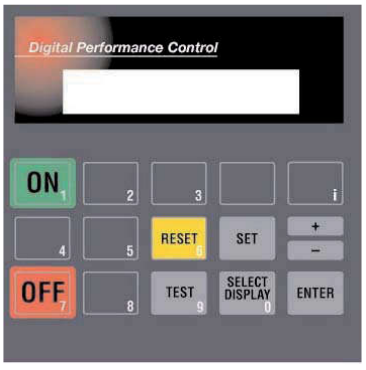


FIGURE 2
WATER REGULATING VALVE

7.6.1 BASIC USER INTERFACE

The Microprocessor Control display provides the user with the operating parameters and their corresponding values. When power is supplied to the dryer, the Microprocessor Control will illuminate and default to the "Standby" mode, displaying the "Press ON" prompt.

The following illustration summarizes the keypad functions:



BUTTONS

- **ON**
  Places the dryer "On Line"; Energizes glycol pump on Nirvana™ Cycling dryers. For Nirvana™ Cycling models, the compressor will operate based on temperature.
- **OFF**
  Places the dryer "Off Line"; Stops all automatic functions, including circulating pump operation on Nirvana™ Cycling dryers.
- **SELECT DISPLAY**
  Allows the user to cycle through the available displays. The last display selected will remain displayed as the default display.
- **+ / -**
  Allows user to modify set point values. Set point values cycle through a fixed range. Also allows entering negative numbers in FACTORY MODE.
- **TEST**
  Allows user to manually activate the drain valve.
- **RESET**
  Pressing once clears the local alarm indication and de-energizes the remote alarm contact. Should the alarm condition persist, the alarm will return after the alarm inhibit time has expired.
- **SET**
  Permits the adjustment of parameters in TECHNICIAN and FACTORY MODES. In CUSTOMER MODE, allows user to back through displays.
- **ENTER**
  Used to accept changed parameters and set point values
- **i**
  Restricted Level access for factory use only. Not used for basic dryer functions. Not to be used by customer or service technician.

7.6.2 DISPLAY PARAMETERS

The Microprocessor Control is capable of displaying a number of system parameters. The following summarizes the parameters that can be accessed by the user from the Microprocessor Control:

- Chiller Temperature (CHLLR TEMP): For Nirvana Cycling Dryers, the Chiller Temperature is the temperature, in degrees Fahrenheit, of the thermal mass fluid.
- Compressor Status (CMPRSSR): Displays whether the refrigeration compressor is "ON" or "OFF".
- Discharge Pressure (P disch): Displays the discharge pressure of the refrigeration system.
- Suction Temperature (T suction): Displays the suction temperature, in deg. F, of the refrigeration system. This value is useful in determining superheat of the refrigerant.
- Suction Pressure (P suction): Displays the suction pressure, in psig, of the refrigeration system.
- Percent Savings (% SVGS): Displays the length of time the compressor has been operating versus the length of time the dryer has been on.
- Cumulative Dryer Hours (CUM DRYER HR): Displays the length of time, in hours, that the dryer has been operational.
- Cumulative Compressor Operating Hours (CUM CMP HR): Displays the length of time, in hours, that the refrigeration compressor has been energized.

Depressing the SELECT DISPLAY button repeatedly scrolls through the above non-adjustable displays. The Customer Set Points appear at the end of the list and may be adjusted by the end user to match seasonal refrigeration and drain operation. These settings are as follows:

- Chiller Temperature (CHLLR TEMP).

7.6.3 DRYER SET POINTS AND ALARMS

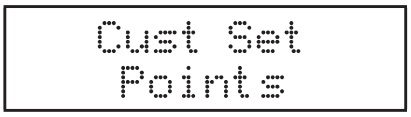
The Microprocessor Control has several user adjustable set points that are displayed at the end of the display parameter list. These set points allow the user to configure the dryer to operate according to site conditions. The controller is shipped from the factory with each parameter having its own default value. The following chart summarizes the parameters that may be adjusted by the user:

SETPOINT	Display description	Parameter Range	Factory Setpoint
			Nirvana Cycling
Chiller Off Temperature	CHLLR TEMP	32 °F - 50 °F; 1 °F increments	34 °F

7.6.4 ADJUSTING SET POINTS

Accessing and manipulating each of the set points in the CUSTOMER MODE is accomplished as follows. The parameter is selected using the SELECT DISPLAY button. After scrolling through the displays, the "Cust Set Points" screen is displayed. The parameters after this screen may be adjusted by the user. Once the desired parameter is displayed, depressing the "+/-" button changes the set point. Once the new set point is displayed, depressing ENTER saves the set point. Exiting the Customer Set Point routine is accomplished by depressing the SELECT DISPLAY button until the END CUST SET PTS screen is displayed. The following example illustrate the keystrokes required to change the Chiller Temperature Set Point from 36 F to 38 F.

Pressing SELECT DISPLAY will increment the display through the available display parameters.



Continue pressing SELECT DISPLAY until the Customer Set point screen is displayed. The parameters that follow are the User Adjustable Parameters for the controller.

Press SELECT DISPLAY until "CHLLR TEMP" is displayed.

Depress " + / -" as required to change the CHLLR TEMP to 38 degrees.

Pressing "ENTER" saves the set point.

Press SELECT DISPLAY as necessary to display the End Customer Set points Screen.

Press SELECT DISPLAY as necessary to return the Microprocessor Control to the desired display parameter.

7.6.5 ALARMS AND THEIR FUNCTIONS

There are several alarms detected by the Microprocessor Control to alert the user of an out of tolerance condition. Once each alarm is detected, a description of the alarm will appear in the screen and the remote alarm contact will close. Note that during the alarm condition, the SELECT DISPLAY button may be depressed to scroll through the available parameters. After approximately 30 seconds, the alarm screen will reappear, provided the alarm condition persists.

The alarm names and a brief description of each are described in detail below.

Alarm	Display	Alarm Set Point
HIGH PRESSURE CUTOUT	HI PRESS CO	See Table 1
LOW PRESSURE CUTOUT	LO PRESS CO	See Table 1
HIGH TEMPERATURE ALARM	HITEMP ALRM	55 °F
LOW TEMPERATURE ALARM	LOTEMP ALRM	30 °F

HIGH TEMPERATURE ALARM (HITEMP ALARM)

When the thermal mass (glycol) temperature in a Nirvana™ Cycling dryer reaches the factory alarm set point, after an alarm delay, the alarm will be activated. This alarm condition may not necessarily damage the dryer when subjected to long-term exposure. It may, however, have a significant impact on downstream processes and thus should be investigated upon detection. Note that this alarm will not shut down the dryer. This alarm will activate the remote alarm contact and reset automatically once the alarm condition is rectified.

LOW TEMPERATURE SAFETY ALARM (LOWTEMP ALARM)

If the dryer chiller temperature falls to or below the factory set point and remains at or below this set point for the factory delay time, the alarm routine will activate. This alarm condition may cause damage to the dryer when subjected to continuous or long-term exposure. Note that this alarm will shut down the dryer after a response time delay. This alarm will activate the remote alarm contact and reset automatically once the alarm condition is rectified.

HIGH PRESSURE CUTOUT ALARM (HPCO ALARM)

If the discharge pressure of the refrigerant is determined to be above the set point, the alarm routine will activate. This alarm condition may cause damage to the dryer when subjected to continuous or long-term exposure. Note that this alarm will shut down the dryer after a response time delay. The operator must depress the RESET button in order to clear the alarm and restart the refrigeration system.

LOW PRESSURE CUTOUT ALARM (LO PRESS CO)

If the suction pressure of the refrigerant is determined to be below the set point of the LPCO alarm, the Microprocessor Control alarm routine will activate. This alarm condition may cause damage to the dryer when subjected to continuous or long-term exposure. Note that once cleared, the compressor will restart automatically. However, if two successive lowpressure conditions are determined, this alarm will shut down the dryer after a response time delay and will display the alarm condition. The operator must depress the RESET button in order to reinstate the compressor.

Parameter	R-404A
FAN 1 ON	275 psig
FAN 1 OFF	195 psig
FAN 2 ON	335 psig
FAN 2 OFF	235 psig
HPCO (Air Cooled)	450 psig
HPCO (Water Cooled)	320 psig
LPCO	20 psig

Table - 1

7.6.6 START MODES

Ingersoll Rand dryers are capable of starting in one of three start modes. Note that to protect the refrigeration compressor from repeated rapid starts, the Microprocessor Control is equipped with an an anti-short cycle (ASC) delay. The ASC delay will countdown from the factory set point. Only after the ASC delay has timed out will the refrigeration system operate. Below are brief descriptions of these various start modes.

7.6.6.1 Manual Mode

Ingersoll Rand dryers are shipped from the factory in the Manual Mode. After power is supplied to the dryer, the user will be presented with the ASC delay, followed by the "PRESS ON BUTTON" display. After the ASC delay has timed out, the dryer will only start once the ON button is depressed. In this configuration, to restart the dryer, the user must manually depress the ON button on the dryer's control panel.

7.6.6.2 Auto Restart Mode

After power is applied to the dryer, and once an anti-short cycle delay has timed out, the dryer will start automatically. In addition, this mode of operation allows manual control of the dryer via the ON & OFF pushbuttons. This is useful for applications where automatic restarting of the dryer is desired after a power failure has occurred..

7.6.6.3 Remote Automatic Mode

This mode of operation allows the user to control the dryer remotely and requires the installation of a customer-supplied contact. With power applied to the dryer and once the antishort cycle delay has timed out, the dryer will start automatically once the switch is closed. In addition, this mode of operation still permits manual control of the dryer via the ON & OFF pushbuttons. Note that the signal to the Remote Alarm Contact must be 24V.

8.1 LOCATION AND MOUNTING

The dryer should not be located in an area where ambient temperature is likely to exceed 113°F (45°C) or be less than 50°F (10°C). The dryer must be located in an area that provides sufficient clearance from walls and other adjoining equipment to allow easy access for servicing and maintenance requirements. A minimum of 18 inches is required to allow free flow of air to the condenser inlet.

If loads fluctuate widely, the dryer should be positioned ahead of the receiver and sufficient storage capacity downstream is necessary to prevent excessive air flow through the dryer.

When installed after any compressor that causes significant vibration or air pulsation, such as reciprocating compressors, proper vibration isolation and pulsation dampening devices should be added to protect the dryer.

⚠ NOTICE

Failure to comply to the above instructions may result in equipment malfunction and will void warranty.

⚠ NOTICE

Always use a backup wrench when making any threaded connection to the dryer. Failure to use a backup wrench may result in damaged tubing and components internal to the cabinet.

8.2 PIPING AND VALVES

Install piping, fittings and accessories as required for specific site conditions and requirements. Figure 3 indicates a typical piping arrangement for a refrigerated dryer, including dryer and filter bypasses. This figure can be used as a guide for valve and accessory placement in the system.

Ingersoll Rand 1000 through 1600 models come factory installed with a drain isolation valve (D). The isolation valve permits maintenance of the automatic drain without isolating air flow to the dryer. To operate dryer, all valves shown in Figure 3 are to be closed except valves (B), (C) and (D). Valve (A) is used for bypass purposes and valve (E) is for test and manual drain purposes.

8.3 FILTRATION

To protect the air dryer from gross contamination associated with compressor oil and debris and ensure maximum dryer performance, a pre-filter is recommended. Pre-filters and post-filters sized to your drying application can be provided by **Ingersoll Rand** and are available factory installed. Call your local distributor to select the filter that best suits your filtration requirements. In addition to air filtration, condensate discharge oil/water separators are also available to address stringent EPA regulations.

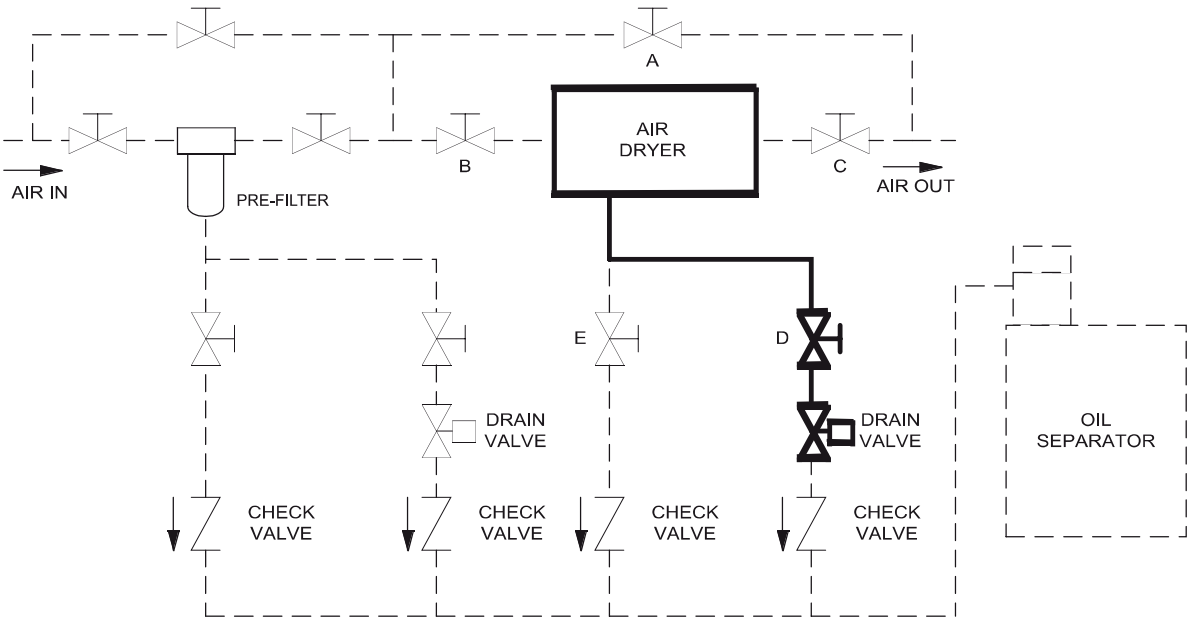


FIGURE 3: TYPICAL PIPING ARRANGEMENT

8.4 ELECTRICAL CONNECTION

Equipment is available in various electrical configurations. All customer connections can be made at the terminal connections located in the customer electrical connection box on the rear of the dryer. (Refer to General Arrangement and appropriate Wiring Diagrams.)

A suitable fused disconnect switch or circuit breaker, in accordance with national and local code requirements, is recommended for all **Ingersoll Rand** equipment. Refer to the Engineering Specifications Section for voltage requirements and load.

⚠ CAUTION

Never wire directly or connect any additional wires to the compressor junction box. This will cause severe system malfunction.

Ingersoll Rand dryers can be configured for three variations of start modes: Manual Mode, Automatic Mode and Remote Mode. Refer to Section 10 for instructions on how to change the dryer's start settings. The instructions below describe the methods to configure the dryer for a particular Start Mode.

a. Manual Mode (Factory Default) - No modification required to operate dryer in Manual Mode. Once power is applied, dryer can be started or stopped by depressing the local ON / OFF pushbuttons located on the front panel.

b. Auto Restart Mode - Auto Restart Mode permits the dryer to start after a brief delay once power is applied to the dryer. Note that the dryer's touch pad will still affect dryer operation. Depressing the OFF button will de-energize the refrigeration compressor and all other electrical components. After the OFF button has been depressed, the user must depress the ON button to permit the dryer to operate.

c. Remote Mode - Remote Mode allows the dryer to be turned ON or OFF via a remote switch supplied by the customer. This mode will work regardless of the setting for Auto Restart. The dryer must be powered on for this feature to take effect. To enable this feature:

- Install N.O. remote switch as indicated on the appropriate wiring diagram.
- Customer-supplied contact should be rated at 1A at 24V. To operate dryer, close switch or contact and allow dryer to start after an initial delay. The local On / OFF pushbuttons may also be used at any time after contact closure.

8.5 INITIAL START-UP

⚠ NOTICE

For water cooled models, the water valve must be manually opened to ensure that the condenser is full of water prior to start-up.

⚠ CAUTION

Allow 8 hours of warm-up time for the crankcase heater prior to start up. Crankcase heater is connected directly to the incoming power and is energized at all times.

8.5.1 START- UP SEQUENCE

Apply power to dryer. LCD Panel will illuminate. The Anti-Short Cycle delay will commence counting down. Remaining time on the Crankcase heater will also countdown.

⚠ NOTICE

After installation or a prolonged shutdown, start the dryer with no air load (no air flow). This enables the dryer to reach its proper operating temperature in the shortest time possible (typically within 30 minutes for Nirvana™ Cycling dryers).

- Start Dryer, using one of the following methods, depending on Start Mode setting:
  1. Manual Mode - Press the ON pushbutton.
  2. Auto Restart Mode - No additional action required.
  3. Remote Automatic Mode - Close the remote contact.
- For Nirvana™ Cycling dryers, the circulating pump will be energized and will run continuously. Provided the CHILLER TEMPERATURE is greater than the Compressor Off Set point plus 4° F and the anti-short cycle delay and crankcase heater delay have timed out, the refrigeration system will energize. As the system operates and thermal mass temperature drops, the suction pressure will be lowered to between 50 and 65 psig.

  After the alarm delay, provided the Chiller Temperature is greater than the HIGH TEMPERATURE ALARM set point, the dryer will go into HIGH TEMPERATURE ALARM. The LCD panel will indicate the alarm and the refrigeration system will continue to operate. Pressing the SELECT DISPLAY button will permit viewing of the available dryer parameters during this alarm condition. Note that the alarm condition screen will reappear after approximately 30 seconds until the alarm condition is cleared.

  The CHILLER TEMPERATURE will gradually drop as indicated on the display. Once the temperature falls below the HIGH TEMPERATURE ALARM set point,

the alarm will reset and the LCD panel will return to its default display. After the refrigeration system shuts off, air flow may be slowly introduced to the dryer.

⚠ NOTICE

If power is removed from the dryer for less than two hours, the crackcase heater delay will be automatically bypassed. If, however, the power is removed from the dryer for more than two hours, the full crankcase heater delay must be observed.

9.0 SCHEDULED MAINTENANCE

9.1 INTRODUCTION

Ingersoll Rand Nirvana™ Cycling refrigerated air dryers require little maintenance. These dryers utilize hermetically sealed compressors which do not require any lubrication. Fan motors require lubrication at both oil ports every six months. **Ingersoll Rand** recommends component inspection and service at regular intervals to obtain maximum performance from your dryer.

9.2 REFRIGERANT CONDENSER

For standard dryers, regular inspection and cleaning of the condenser is recommended. **Ingersoll Rand** dryers may be equipped with an optional ambient air filter designed to protect the condenser from dirt and debris that can accumulate on the condenser. For proper operation with this option, it is imperative that this filter be inspected and cleaned on a regular basis. Annual replacement of the filter is recommended. For applications where excessive dirt, dust or debris is encountered, more frequent inspection and cleaning may be required.

9.3 CONDENSATE DISCHARGE SYSTEM

9.3.1 SOLENOID DRAIN (STANDARD)

On a minimum of a monthly basis, the operation of the drain should be checked. Periodically, the drain should be removed and cleaned to ensure no debris from the system is trapped inside. **Ingersoll Rand** dryers are equipped with a drain isolation valve, enabling the valves to be cleaned during dryer operation after the drain isolation valve has been manually closed. The drain valve is located near the solenoid valve and requires a quarter turn to isolate the drain from system pressure.

9.3.1.1 CLEANING INSTRUCTIONS-SOLENOID DRAIN

- Be sure dryer is depressurized or isolation valve is closed.
- Disconnect drain body from filter stop.
- Loosen connector screw to allow the electrical connector assembly to be removed from the D.I.N. unit solenoid.
- Remove retainer nut and separate the valve body from the D.I.N. unit solenoid. Unthread the plunger tube assembly in a counterclockwise direction until plunger separates from valve body.
- Clean beveled washer, thread gasket, spring assembly and strainer with soap and water. Do NOT use solvents of any kind, as failure to the seals will occur. Be especially careful to clean the center brass orifice and the rubber gasket orifice on the orifice cup with a straight pin.
- Reassemble all drain components after the drain has been cleaned and inspected. Reposition the orifice hole on the rubber gasket of the orifice cup in the line and closest to the arrow indicated on the valve body.
- Reassemble valve and install in reverse order as described above.

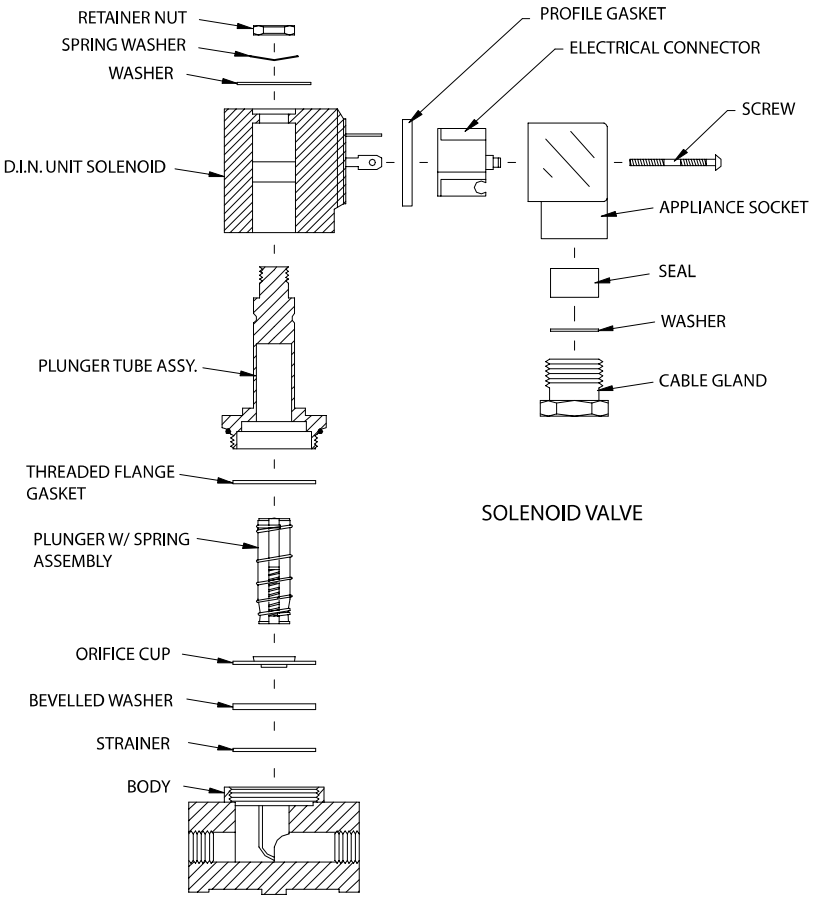


FIGURE-4 SOLENOID DRAIN ASSEMBLY

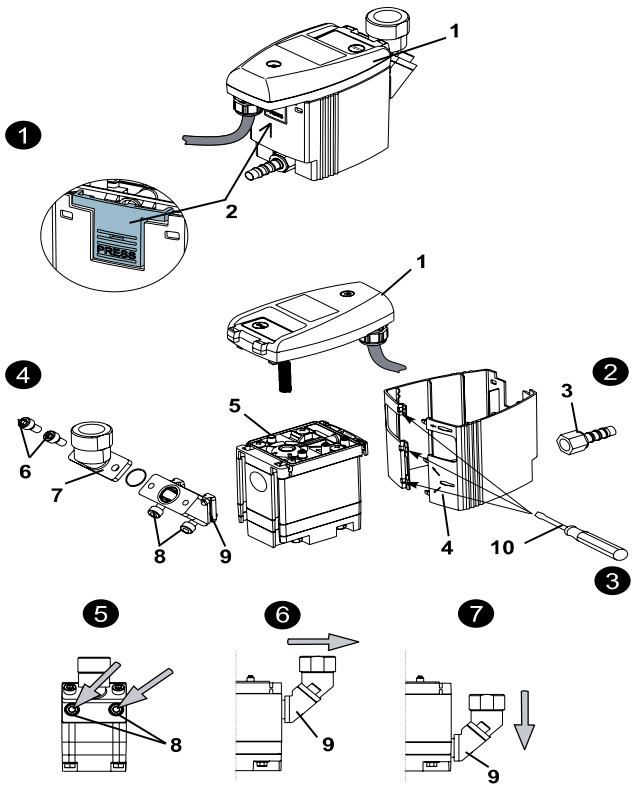


FIGURE-5 NO AIR LOSS DRAIN

9.3.2 NO AIR LOSS DRAIN (OPTIONAL)

⚠ WARNING

Before drain maintenance work, always close the drain isolation ball valves and ensure that the device is pressureless and de-energized.

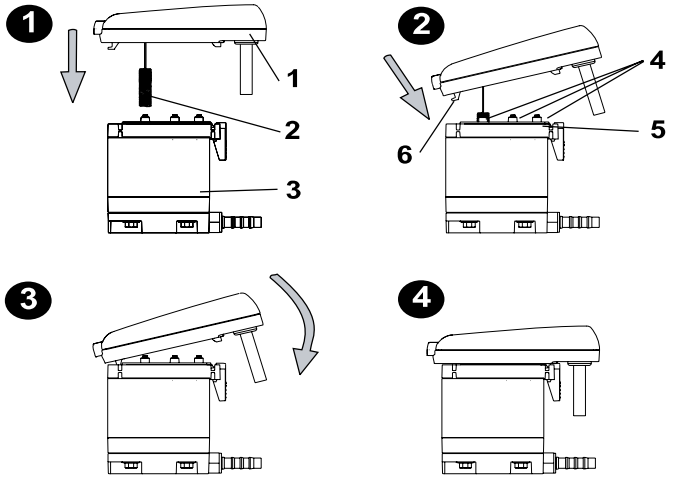
Maintenance recommendations

Replace service unit (5) annually.

1. Remove control unit (1) by pressing latching hook (2).
2. Detach Drain from outlet (3).
3. Remove design shell (4) (where applicable) using a screw driver (10).

   Remove service unit (5) from pipe at inlet by undoing union nut.
4. **or** by undoing screws (6) at elbow connector (7).
5. **or**
6. by undoing screws (8) at intermediate adapter (9)
7. which is then detached from the service unit by downward movement.

- Check if new service unit (5) matches control unit (1) - type designation and colour of latching hook (2).
- Fit new service unit (5) in reverse order.
- Open drain isolation ball valve. Press drain test button to verify proper drain operation.



Assembly Control unit onto service unit:

Check if service unit (3) matches control unit (1) (type designation and colour of latching hook)

1. Check if sensor tube plate (5) with contact springs (4) is clean, dry and free from foreign matter.
2. Insert sensor (2) into sensor tube plate (5).
3. Fit latching hook (6) of control unit (1) into sensor tube plate (5).
4. Press control unit (1) against service unit (3) and snap into place.

- Open drain isolation ball valve. Press drain test button to verify proper drain operation.

10.0 TECHNICIAN MODE

The Microprocessor Control provides a protected TECHNICIAN MODE to manipulate several parameters not accessible by the typical operator. This mode also permits viewing of the factory settings to aid in troubleshooting of the dryer. Below is a list of parameters that can be accessed and manipulated by the technician in the TECHNICIAN MODE.

Parameter	Display	Set Point
DRAIN VALVE ENABLE	DRAIN ENABLE	ON (or OFF)
CRANKCASE HEATER DELAY	CCH DLY	8 (or 0,2,4,12 hours)
AUTO RESTART ENABLE	AUTO RESTART	N (or Y)

In TECHNICIAN MODE, the following parameters can be viewed but not changed:

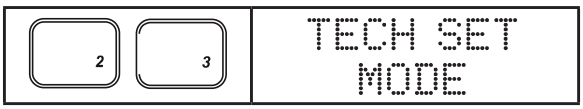
Parameter	Display	Set Point
CONFIGURATION (# of sensors)	CONFIG #:	1, 2, 4, 8
OPERATING MODE	OP MODE:	HS or NC
REFRIGERANT	REFRIG:	404
CONDENSER TYPE	COND:	AC OR WC
OPERATING TEMPERATURE DIFFERENTIAL	T OP DIFF:	4
SHORT CYCLE DELAY	SHT CYC DLY:	3
HIGH PRESSURE CUTOUT	HPCO:	See Table-1
HIGH PRESSURE CUTOUT DELAY	HPCO DLY:	10
LOW PRESSURE CUTOUT	LPCO:	See Table-1
LOW PRESSURE CUTOUT DELAY	LPCO DLY:	00:10
HIGH TEMPERATURE ALARM	HITEMP ALRM:	55
LOW TEMPERATURE ALARM	LOWTEMP ALRM:	30
LOW TEMPERATURE ALARM DELAY	LOTEMP DLY:	2:00
FAN 1 ON PRESSURE	FAN1 ON:	See Table-1
FAN 1 OFF PRESSURE	FAN1 OFF:	See Table-1
FAN 2 ON PRESSURE	FAN2 ON:	See Table-1
FAN 2 OFF PRESSURE	FAN2 OFF:	See Table-1
ALARM LIST	BEGIN ALARM LIST	N/A

10.1 ENTERING TECHNICIAN MODE

⚠ WARNING

TECHNICIAN MODE should only be entered by qualified service personnel. Altering the set points in TECHNICIAN MODE will have a significant effect on the operation of the dryer. Incorrect set points may damage dryer and cause potential serious injury.

To enter the TECHNICIAN MODE, perform the following keystrokes:



Pressing the "2" and "3" buttons simultaneously enters the TECHNICIAN MODE.

Depressing SELECT DISPLAY scrolls through the available parameters. The first three parameters viewed are adjustable in TECHNICIAN MODE.

The DRAIN ENABLE parameter determines whether the Microprocessor Control shall control the drain valve. A value of "ON" will permit the Microprocessor Control to control the drain valve. A value of "OFF" will disable this feature. **Ingersoll Rand** dryers are equipped with a solenoid drain as standard equipment. As such, DRAIN ENABLE must remain "ON"

For **Ingersoll Rand** dryers equipped with a NO AIR LOSS DRAIN as equipment, DRAIN ENABLE must remain "OFF"

Depressing the SELECT DISPLAY button advances to the next adjustable parameter for the Crankcase Heater Delay. This parameter must not be altered unless instructed by **Ingersoll Rand** Service personnel.

⚠ NOTICE

The Crankcase Heater Delay set point must not be altered unless directed by Ingersoll Rand Service Personnel. Improperly altering the set point may result in damage to the dryer. Contact Ingersoll Rand Compressed Air Solutions before altering the default set point.

The AUTO RESTART feature permits the dryer to operate once power is applied to the dryer without requiring operator intervention. This would be desirable should the user wish to have the dryer restart automatically after a power outage. To change the AUTO RESTART set point from "N" (NO) to "Y" (YES), perform the following. Otherwise, depress the SELECT DISPLAY button to advance to the next display:

Depressing the SELECT DISPLAY button advances to the next adjustable parameter for the Auto Restart feature.

Depressing the SET button changes the AUTO RESTART parameter from "N" to "Y".

Depressing ENTER saves the selected set point.

⚠ WARNING

Changing the AUTO RESTART feature to "Y" will permit the dryer to operate automatically once power is applied and after a brief delay. Proper warning signs should be affixed to the dryer to alert users and service personnel that dryer may start without warning. Failure to do so may result in serious injury.

Depressing the SELECT DISPLAY button displays the END TECH SET PTS display.

The remaining non-adjustable parameters may be viewed by depressing the SELECT DISPLAY button as required to arrive at the desired display.

⚠ NOTICE

To exit the TECHNICIAN MODE at any time, depress the button located above the SET button to return to the CUSTOMER MODE.

10.2 ALARM LIST

At the end of the list of non-adjustable parameters, the Microprocessor Control displays a list of the most recent 20 alarm conditions. This list can facilitate troubleshooting the dryer.

At the end of the list of parameters, depressing the SELECT DISPLAY button displays the beginning of the ALARM LIST.

Depressing the SELECT DISPLAY button displays the alarms that the dryer has experienced, with the most recent alarm displayed first. The actual display will depend on the most recent alarm detected by the Microprocessor Control.

The list of alarms can be scrolled by depressing the SELECT DISPLAY button as needed. At the end of the alarm list, the END ALARM LIST screen is displayed.

Depressing the SELECT DISPLAY list displays the ALARM LIST screen at the top of the ALARM LIST.

The Alarm List will repeat as many times as the SELECT DISPLAY button is depressed. To EXIT the ALARM LIST, perform the following:

Depressing the BLANK button (located above the SET button) returns the controller to the top of the TECHNICIAN MODE.

Depressing the BLANK button again returns the controller to the default display of the CUSTOMER MODE.

11.0 TROUBLESHOOTING

11.1 INTRODUCTION

Ingersoll Rand Nirvana™ Cycling dryers are designed for reliable, trouble-free operation. In the event of any dryer malfunction, the guide below has been developed to facilitate problem identification and corrective actions.

⚠ WARNING

An air dryer always operates under pressure. Any maintenance procedure that involves disassembly of pipe fittings, valves or any other components requires the dryer be isolated from the compressed air stream and fully depressurized.

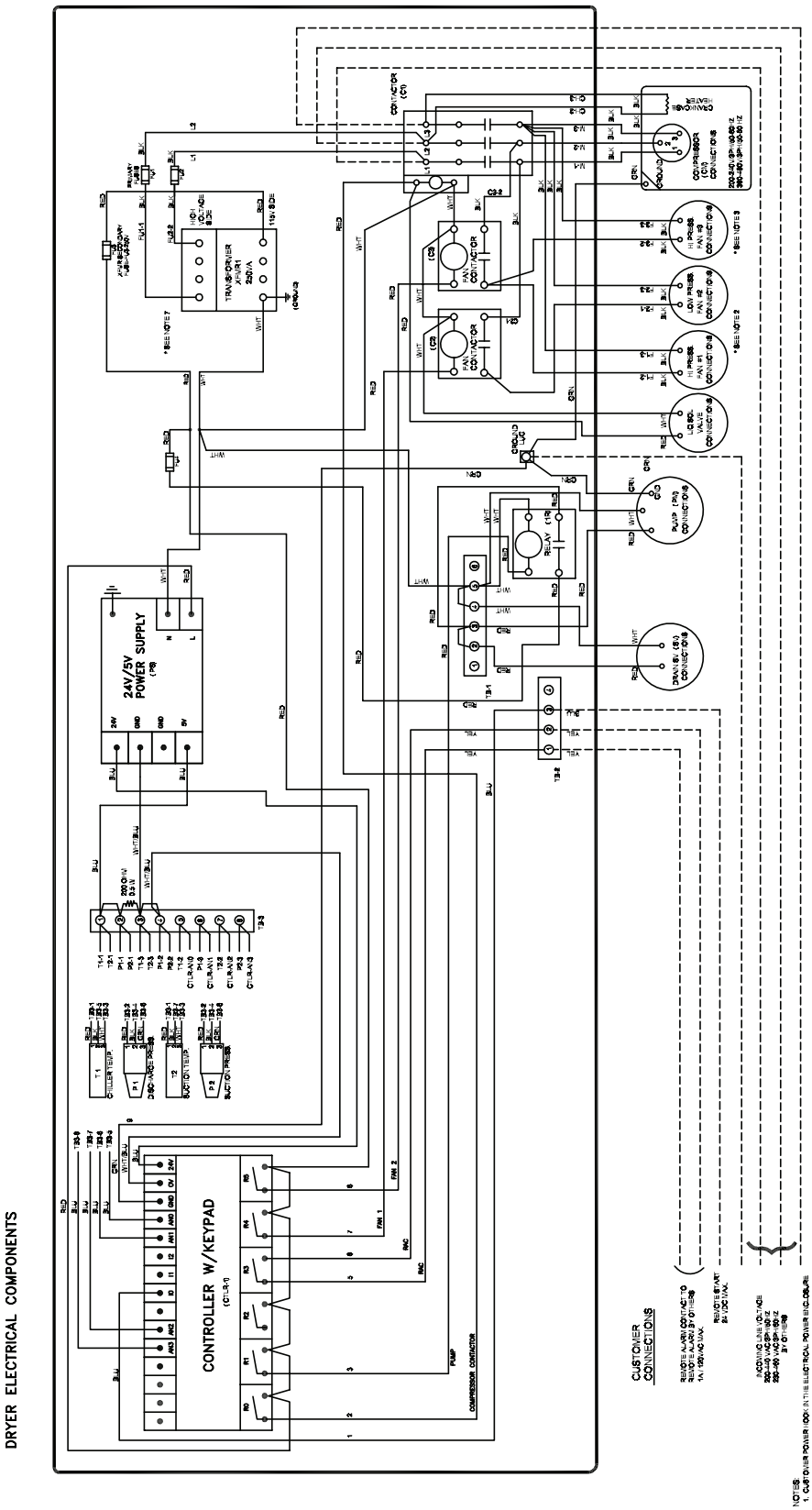
⚠ WARNING

Prior to working on the unit, make sure that all circuit breakers or disconnected switches are tagged "Out of Service."

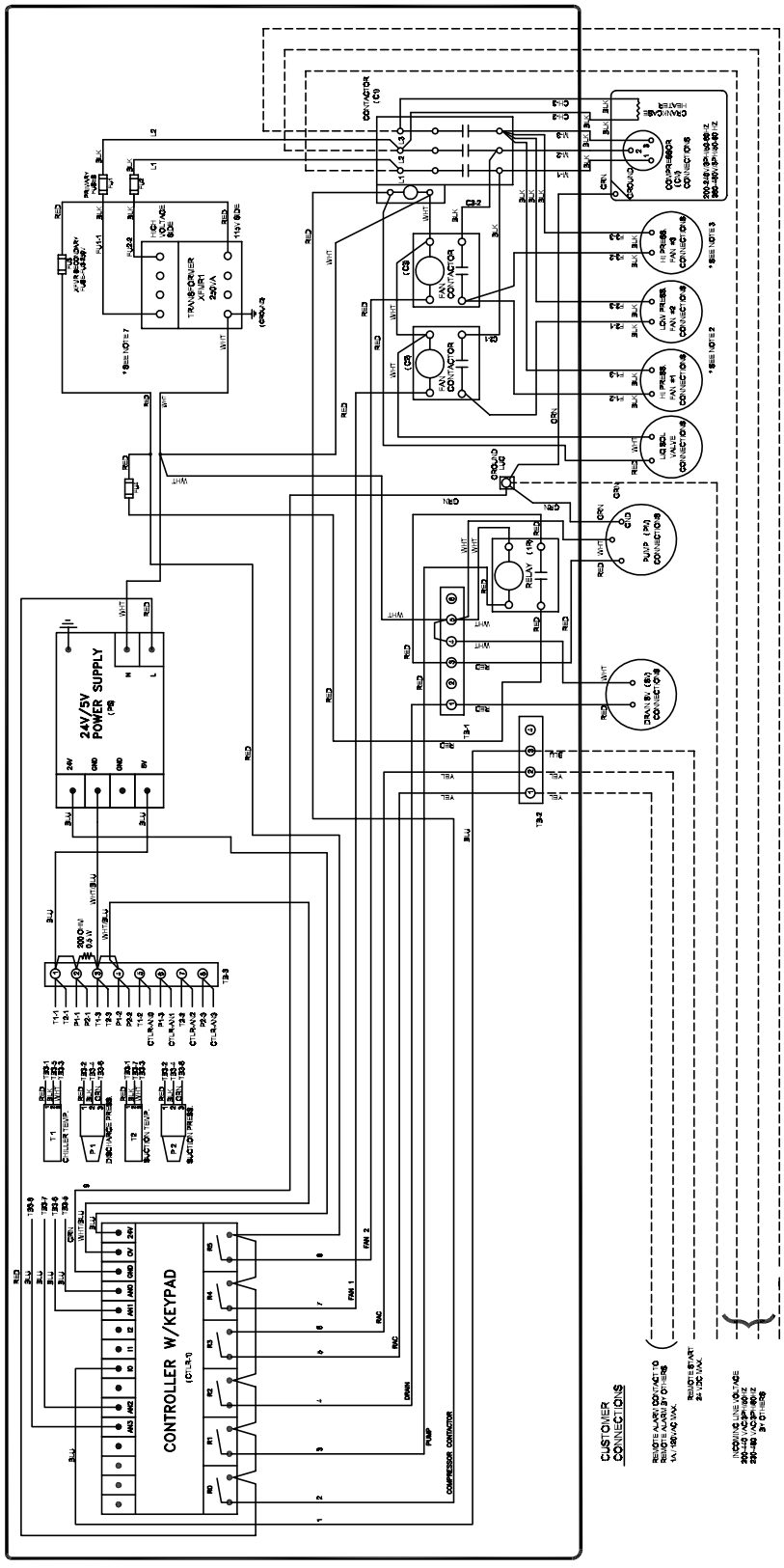
11.2 PROBLEM / ACTION GUIDE

PROBLEM	SYMPTOM(S)	POSSIBLE CAUSE	CORRECTIVE ACTION
Moisture down stream.	Dryer is properly cooling air stream (Check Chiller. Temp on controller).	Condensate drain failure caused by defective service unit.	Replace service unit.
		Excessive flow.	Check inlet and outlet pressure and system design capacity. Correct cause of excessive flow.
		Dryer by-pass valve not closed.	Close by-pass valve.
	Inlet and outlet temperatures are the same.	No power to the dryer.	Check power supply and fuses/circuit breakers.
		High suction pressure.	Check and clean condenser.
		Refrigerant leak.	Check suction pressure gauge if reading is 0 psig, turn dryer off and contact your distributor.
		Compressor not running and fan is running.	Check and clean condenser.
			Check ambient temperature and reduce below 113 °F.
Moisture down stream.	Inlet and outlet temperatures are the same.	Compressor and fan not running.	Check Chiller Temperature.
			Check MAIN CONTROL fuse.
		Compressor and fan not running. Controller indicates compressor is ON.	Compressor relay may be bad, replace relay.
			Check for loose wire connections at contactor or loss of power at control board.
			Defective control board - replace as necessary.
			Contact your local distributor for further assistance.
	Compressor and fan are running, exchanger temp high, pump not running.	Defective Pump.	Contact your local distributor for further assistance.
Apparent controller display malfunction.	Display Blank.	Blown Fuse.	Check Fuses.
		Board Failure.	Contact your local distributor for further assistance.
	Unrealistic temperature displayed.	Probe loose,off connection or defective probe.	Inspect probe cable and terminal connection, Replace probe.
	Erratic or inaccurate temperature readings.	Probe not completely in thermal well.	Inspect probe and check readings against independent source (eg. temperature analyzer/pyrometer/ice bath) both in temperature well and to ambient.
		Defective probe.	Replace probe.
	Unrealistic pressure displayed.	Transducer loose, off connection or defective transducer.	Inspect transducer cable and terminal connection.
			Replace transducer.

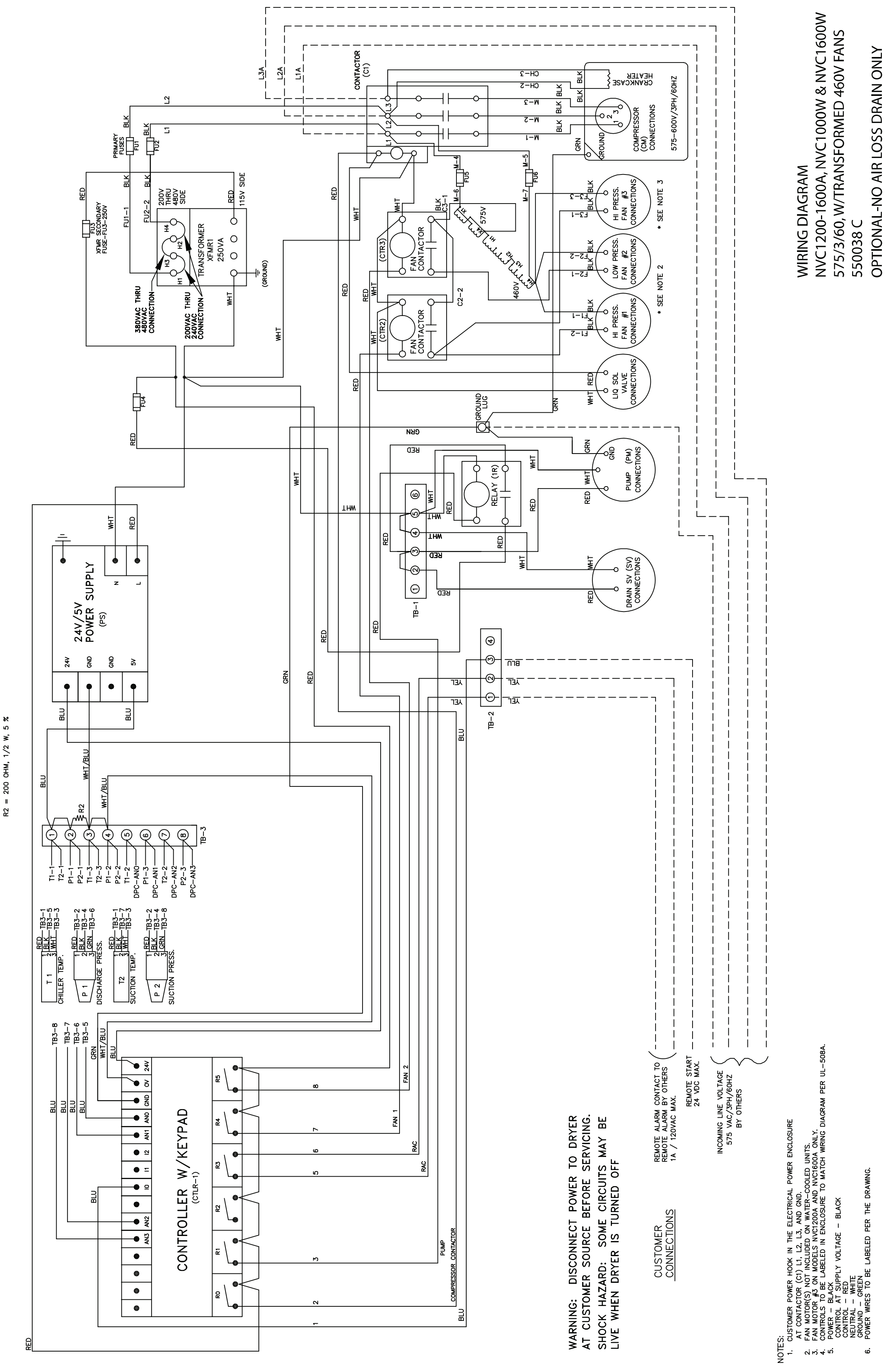
High pressure drop across dryer.	Outlet pressure substantially lower than inlet pressure System operating temperature is above 32 °F.	Inlet and outlet valves not completely open.	Open valves.
		Inlet and outlet filters blocked up.	Change filter elements.
	Outlet pressure substantially lower than inlet pressure System operating temperature is below 32 °F.	Compressor relay / contactor stuck.	Replace relay / contactor.
		Microprocessor Control relay bad.	Replace relay.
		Probe not completely in thermal well.	Inspect probe and check readings against independent source (eg. temperature analyzer/pyrometer/ice bath) both in exchanger well and to ambient.
		Problem persists.	Turn dryer off and consult your local distributor for further assistance.
Condensate drain does not fire.			Check installation is in accordance with this manual. Revise installation accordingly.
		Inlet / outlet pipe internal diameter too small causing air-lock or back pressure.	Replace with larger diameter piping.
		Excessive use of bends / elbows in inlet / outlet pipe work causing air-lock/ back pressure.	Reduce the amount of bends and elbows.
		Outlet pipe too long / too high causing back pressure.	Reconfigure condensate piping.
		More than one condensate source connected providing alternative path for condensate.	Reroute condensate to eliminate secondary path. Install check valves as required.
Condensate drain LED is off (Optional-No Air Loss Drain).			Check power supply. Press test button for minimum 2 seconds and observe. Locate and eliminate supply fault.
Air bleed from condensate drain outlet port (Optional-No Air Loss Drain).		Debris trapped under seal. Damage to seal.	Press and hold the test button to clear (drain valve will open). Replace seal with Service Kit.
Condensate drain bowl does not seem to fill with condensate, drain does not seem to work due to air locking (Optional-No Air Loss Drain).			If bottom inlet is used, top port must be used as air bleed. Make sure Connect the top inlet to a higher point in system, which will function as an air bleed for the drain.

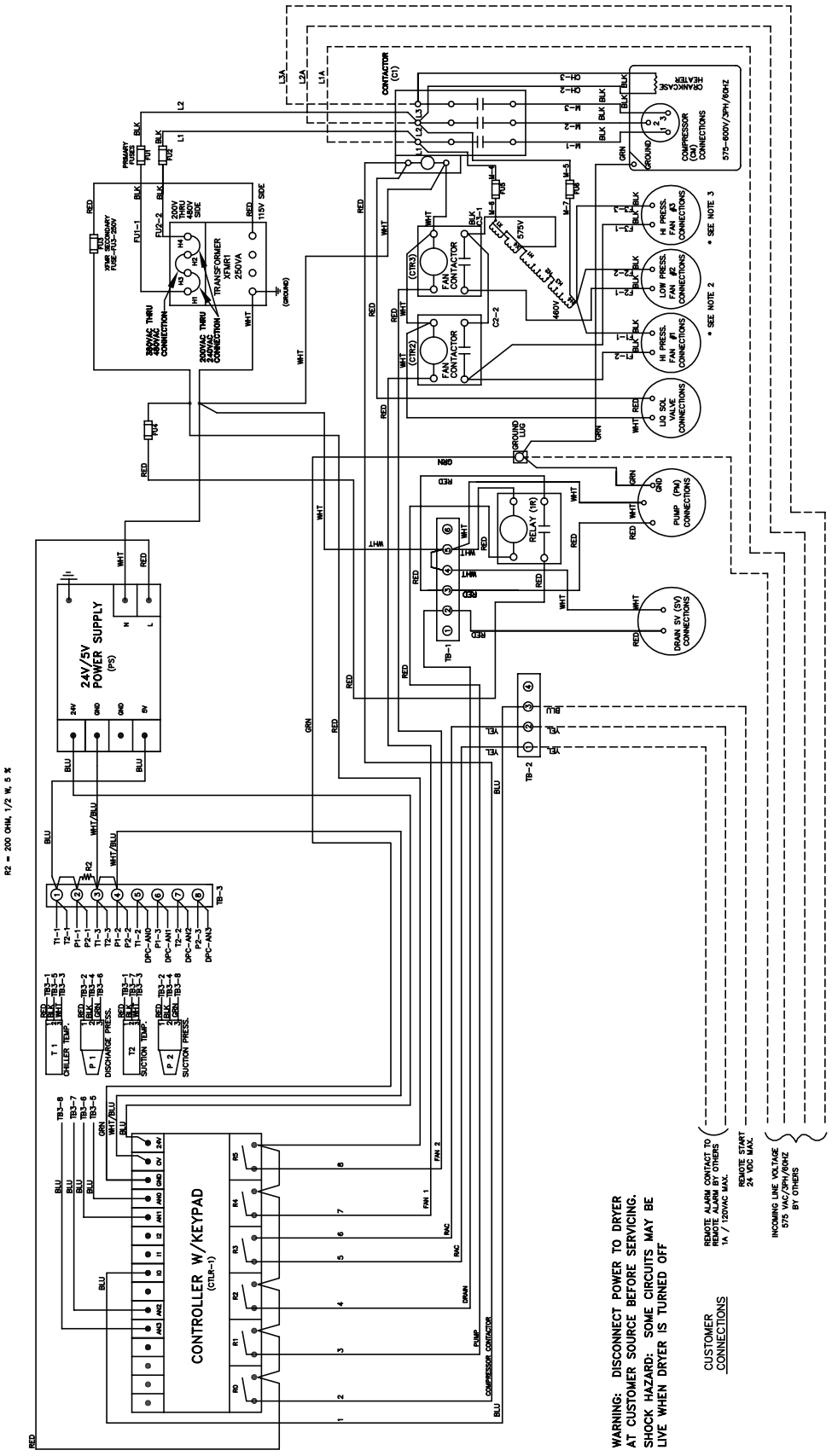


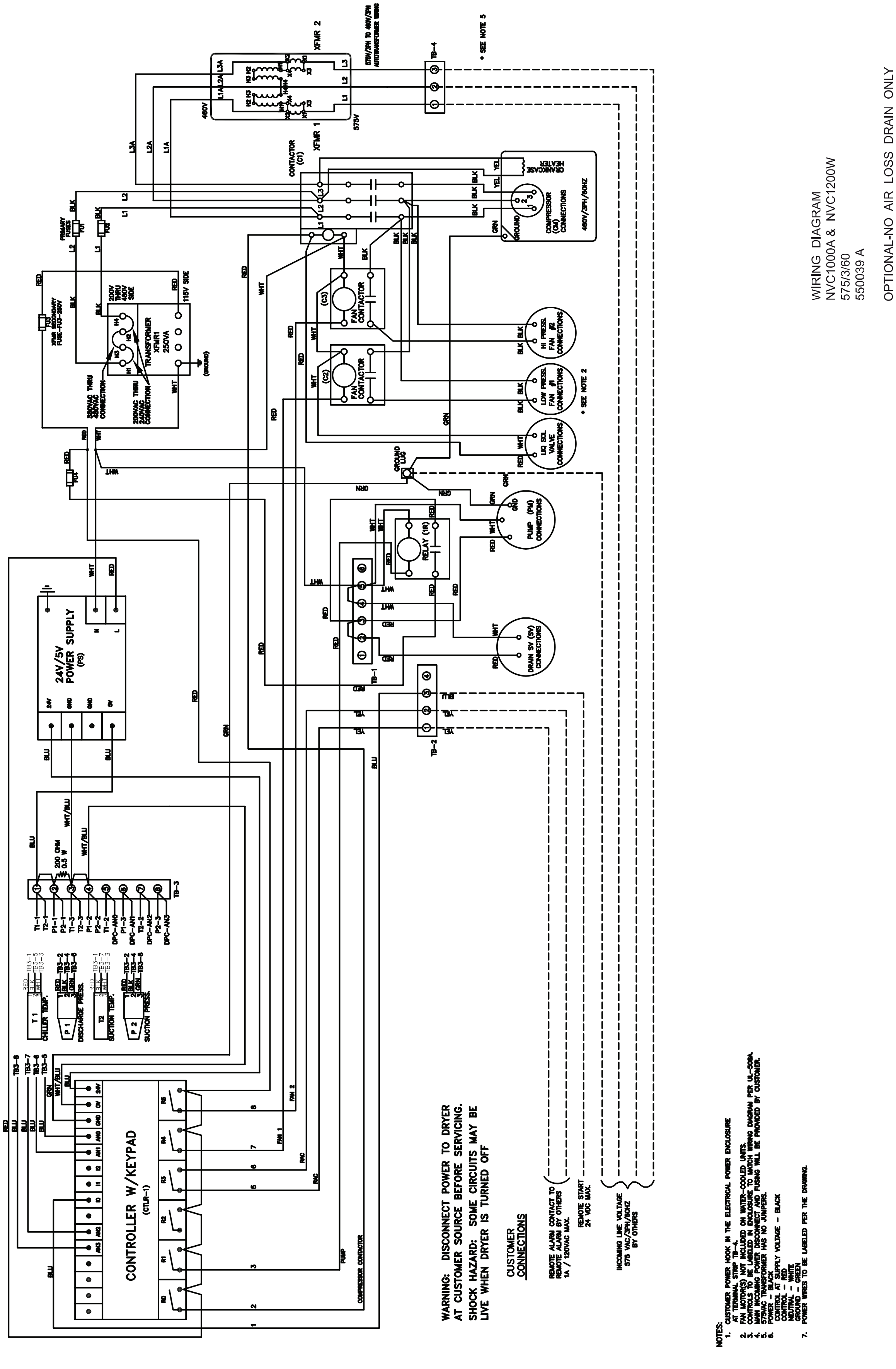
WIRING DIAGRAM
NVC1000-1600 AIR AND WATERCOOLED
230-460V/3/60, 200-440V/3/50
550028 E
OPTIONAL-NO AIR LOSS DRAIN ONLY

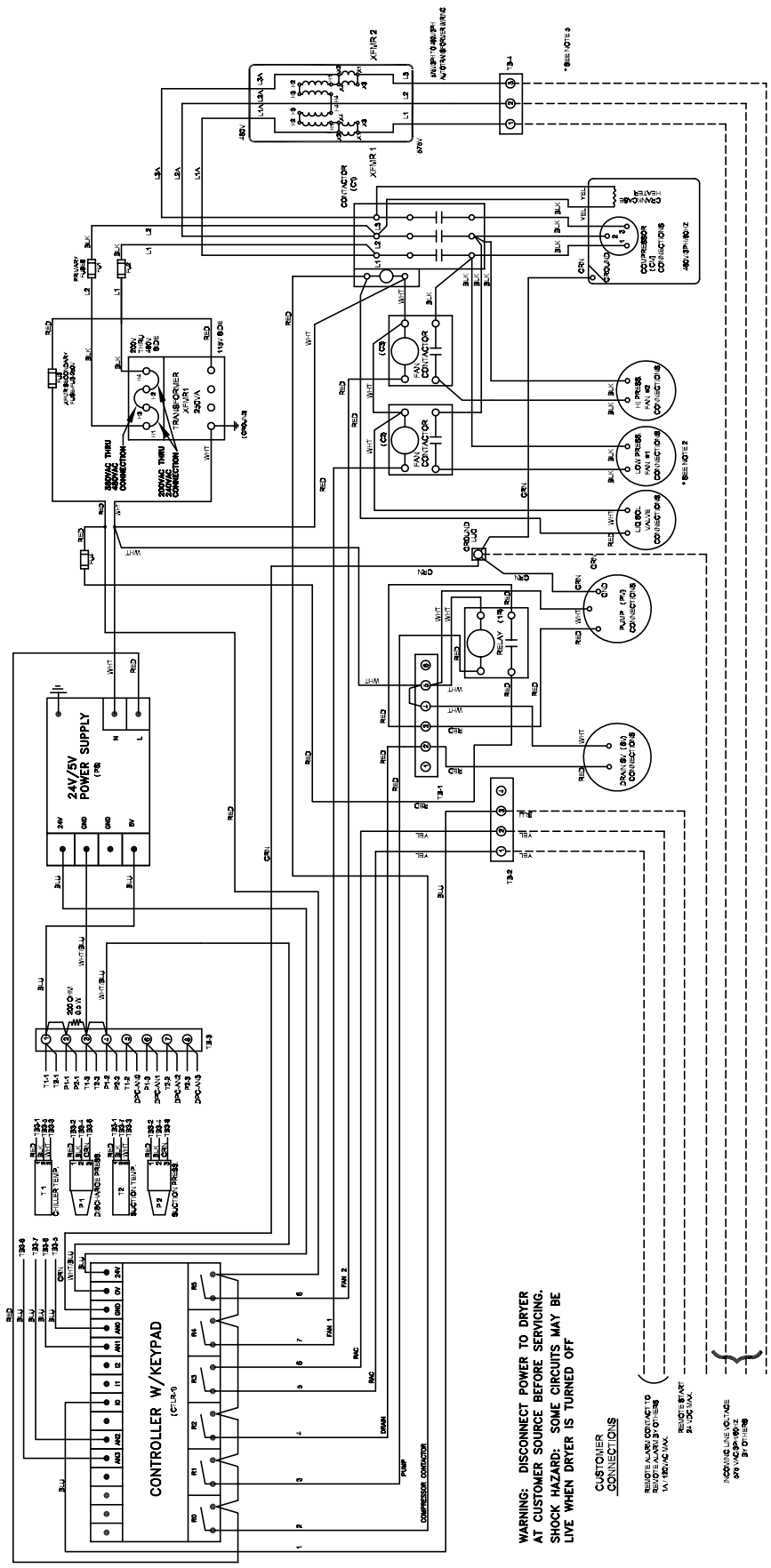


WIRING DIAGRAM WITH SOLENOID DRAIN VALVE
NVC1000-1600 A & 460V/3/60, 440V/3/50
NVC1000-1200 A & 230V/3/60, 200V/3/50
550184


WIRING DIAGRAM
NVC1200-1600A, NVC1000W & NVC1600W
575/3/60, W/TRANSFORMED 460V FANS
550038 C
OPTIONAL-NO AIR LOSS DRAIN ONLY
WARNING: DISCONNECT POWER TO DRYER AT CUSTOMER SOURCE BEFORE SERVICING.
SHOCK HAZARD: SOME CIRCUITS MAY BE LIVE WHEN DRYER IS TURNED OFF
CUSTOMER CONNECTIONS
REMOTE ALARM CONTACT TO REMOTE ALARM BY OTHERS 1A / 120VAC MAX.
REMOTE START 24 VDC MAX.
INCOMING LINE VOLTAGE 575 VAC/3PH/60HZ BY OTHERS
CONTROLLER W/KEYPAD (CTLR-1)
24V/5V POWER SUPPLY (PS)
TRANSFORMER XFMR1 250VA
CONTACTOR (C1)
COMPRESSOR (CM) CONNECTIONS
CRANKCASE HEATER
HI PRESS. FAN #3 CONNECTIONS
LOW PRESS. FAN #2 CONNECTIONS
HI PRESS. FAN #1 CONNECTIONS
LIQ SOL VALVE CONNECTIONS
PUMP (PM) CONNECTIONS
DRAIN SV (SV) CONNECTIONS
RELAY (1R)
FAN CONTACTOR (CTR2)
FAN CONTACTOR (CTR3)
GROUND LUG
R2 = 200 OHM, 1/2 W, 5 %

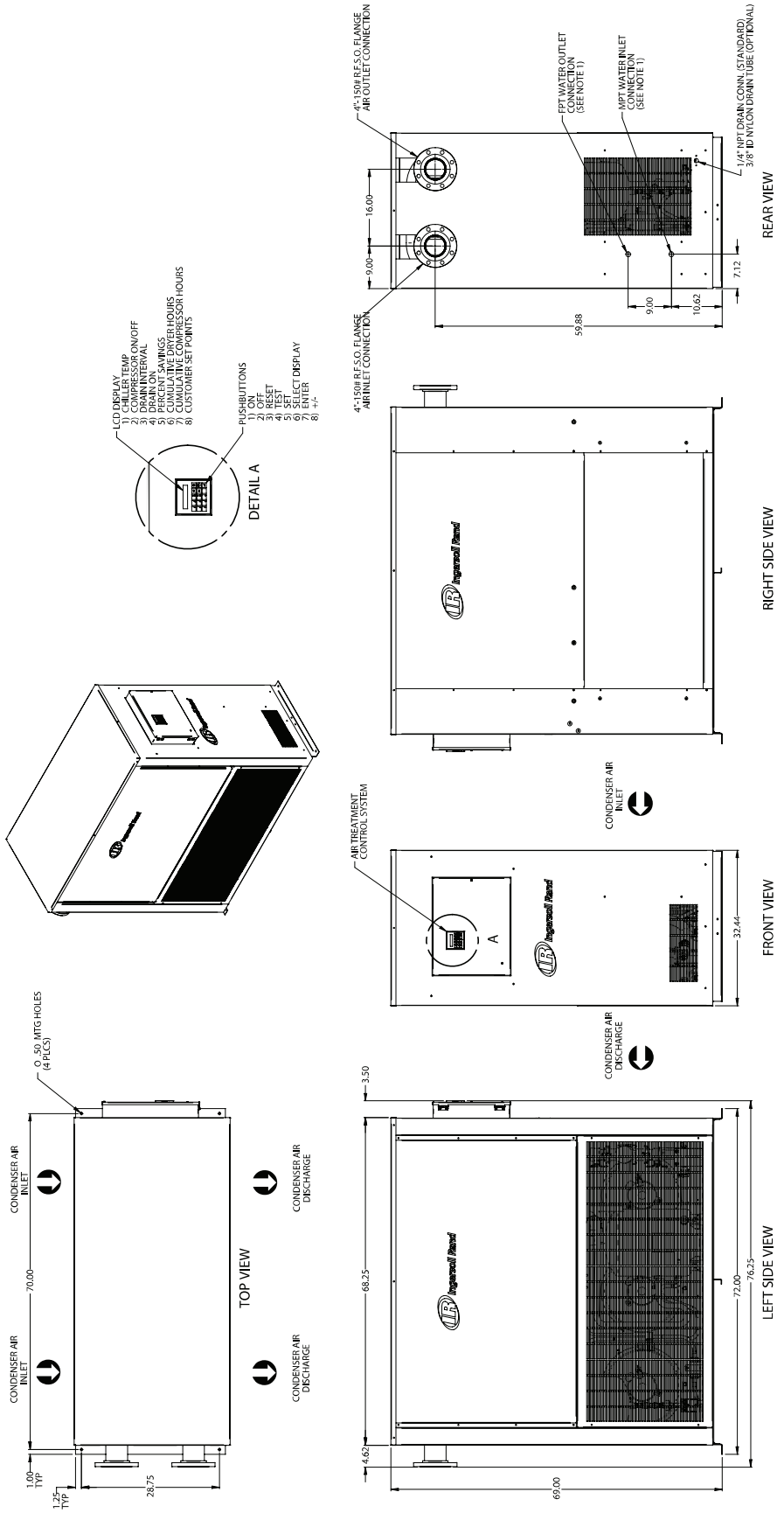

WIRING DIAGRAM WITH SOLENOID DRAIN VALVE
NVC1200-1600 A, NVC1000W & NVC 1600W
575/3/60, W/TRANSFORMED 460V FANS
550187 A
CONTROLLER W/KEYPAD
(CTLR-1)
24V/5V POWER SUPPLY
(PS)
CONTACTOR (C1)
TRANSFORMER XFMR1 250VA
R2 = 200 OHM, 1/2 W, 5 %
WARNING: DISCONNECT POWER TO DRYER AT CUSTOMER SOURCE BEFORE SERVICING.
SHOCK HAZARD: SOME CIRCUITS MAY BE LIVE WHEN DRYER IS TURNED OFF
CUSTOMER CONNECTIONS
REMOTE ALARM CONTACT TO REMOTE ALARM BY OTHERS
1A / 120VAC MAX.
REMOTE START 24 VDC MAX.
INCOMING LINE VOLTAGE 575 VAC/3PH/60HZ BY OTHERS
NOTES:
1. CUSTOMER POWER HOOK IN THE ELECTRICAL POWER ENCLOSURE AT CONTACTOR (C1) L1, L2, L3, AND GND.
2. FAN MOTOR(S) NOT INCLUDED ON WATER-COOLED UNITS.
3. FAN MOTOR #2 ON MODELS NVC1200A AND NVC1600A ONLY.
4. CONTROLS TO BE LABELED IN ENCLOSURE TO MATCH WIRING DIAGRAM PER UL-508A.
5. POWER - BLACK
CONTROL AT SUPPLY VOLTAGE - BLACK
CONTROL - RED
NEUTRAL - WHITE
GROUND - GREEN
6. POWER WIRES TO BE LABELED PER THE DRAWING.


WIRING DIAGRAM
NVC1000A & NVC1200W
575/3/60
550039 A
OPTIONAL-NO AIR LOSS DRAIN ONLY
WARNING: DISCONNECT POWER TO DRYER AT CUSTOMER SOURCE BEFORE SERVICING.
SHOCK HAZARD: SOME CIRCUITS MAY BE LIVE WHEN DRYER IS TURNED OFF
CUSTOMER CONNECTIONS
CONTROLLER W/KEYPAD
24V/5V POWER SUPPLY



NOTES:
1. CUSTOMER POWER HOOK IN THE ELECTRICAL POWER ENCLOSURE AT TERMINAL STRIP TB-4.
2. FAN MOTOR(S) NOT INCLUDED ON WATER-COOLED UNITS.
3. CONTROLS TO BE LABELED IN ENCLOSURE TO MATCH WIRING DIAGRAM PER UL-508A.
4. MAIN INCOMING POWER DISCONNECT AND FUSING WILL BE PROVIDED BY CUSTOMER.
5. 575VAC TRANSFORMER HAS NO JUMPERS.
6. POWER - BLACK
   CONTROL AT SUPPLY VOLTAGE - BLACK
   CONTROL - RED
   NEUTRAL - WHITE
   GROUND - GREEN
7. POWER WIRES TO BE LABELED PER THE DRAWING.

WIRING DIAGRAM WITH SOLENOID DRAIN VALVE
NVC1000A AND 1200 W,
575/3/60
550188



GENERAL ARRANGEMENT
NVC1000-1600
AIR AND WATERCOOLED, NEMA-1
55023 D

MISCELLANEOUS PARTS

PART#	DESCRIPTION	QTY/ UNIT	SPARES		
			1	2	3
682946	CABLE, TRANSDUCER 10 FT LEAD	2			
697290	CONTACTOR, COMPRESSOR 3P 600V (EXCEPT NVC1600 AIR COOLED)	1	1	1	1
698343	CONTACTOR, COMPRESSOR 3P 600V (NVC1600 AIR COOLED)	1	1	1	1
699621	CONTACTOR, CONDENSER FAN	2	2	2	2
800029	DRYER CONTROLLER, TYPE 4 WITH REFRIGERATED PROGRAM, (Dryer model and serial number must be provided with order to ensure proper configuration)	1	1	1	1
684350	DISTRIBUTOR, REFRIGERANT (NVC1000)	1			
683918	DISTRIBUTOR, REFRIGERANT (NVC1200)				
683876	DISTRIBUTOR, REFRIGERANT (NVC1600)	1			
684234	DRAIN, CONDENSATE (OPTIONAL-NO AIR LOSS DRAIN)	1			
38448239	DRAIN, SERVICE UNIT (OPTIONAL-NO AIR LOSS DRAIN)				
23391071	DRAIN, SOLENOID VALVE 1/4" (STANDARD)"	1			
600386	DRYER, REFRIGERANT FILTER (NVC1000)	1			
600388	DRYER, REFRIGERANT FILTER (NVC1200, NVC1600)	1			
682646	FUSE, GLYCOL PUMP 2A 250V	1	1	1	2
682651	FUSE, TRANSFORMER PRIMARY 0.75A 600V	2	2	2	4
698770	FUSE, TRANSFORMER SECONDARY 3A 250V	1	1	1	2
682245	HEATER, COMPRESSOR CRANKCASE (Excludes Compressor # 684300)	1			
684605	HEATER, COMPRESSOR CRANKCASE (Excludes Compressor # 684300 only)	1			
683956	POWER SUPPLY 24V DC	1			
682955C	PROBE, EXCHANGER / SUCTION TEMPERATURE	2	2	2	2
698262	RELAY, PUMP	1			
683968	RESISTOR, CONTROL PANEL DUMMY LOAD 200 OHM 0.5W 250VAC	1			
683739	STRAINER, CONDENSATE DRAIN	1			
682943	TRANSDUCER, REFRIGERANT DISCHARGE PRESSURE 0-500 PSIA (EXCEPT NVC1000)	1	1	1	1
682942	TRANSDUCER, REFRIGERANT SUCTION PRESSURE 0-300 PSIA	1	1	1	1
699640	TRANSFORMER, CONTROL 0.25 KVA (EXCEPT NVC1000)	1			
684061	VALVE, GLYCOL PUMP ISOLATION	1			
684304	VALVE, REFRIGERANT EXPANSION	1			
683919	SOLENOID VALVE, REFRIGERANT LIQUID LINE (NVC1000 WATER COOLED, NVC1200)	1			
683338	SOLENOID VALVE, REFRIGERANT LIQUID LINE (NVC1600)	1			
800868	FAN GUARD KIT NVC1000A-NVC1600A	1			
698156	FAN BLADE FOR NVC1000A	2			
698156	FAN BLADE FOR NVC1200A	3			
684324	FAN BLADE FOR NVC1600A	3			

Spare: Quantities under this heading reflect the number of each item which we recommend be kept on hand for maintenance or repair. The appropriate quantity for your application will depend on how critical interruptions in service are to your operation.

Class	Quantity	Suggested for
1	Minimum	Domestic service where interruptions in service are acceptable.
2	Average	Domestic service where some interruptions in service are acceptable.
3	Maximum	Export service or for domestic service where interruptions in service are unacceptable.

PARTS FOR AIR COOLED DRYERS

NVC MODEL	CONDENSER	FAN MOTOR		380/3/50	COMPRESSOR	575/3/60
		NEMA 1/460V	NEMA 4/460V		460/3/60	
1000	698478	698152	698274	682248	684300	684300
1200	684309	698152	698274	682346	682248	684290
1600	684323	684325	684325	684296	682346	684189

PARTS FOR WATER COOLED DRYERS

NVC MODEL	CONDENSER	VALVE	380/3/50	COMPRESSOR 460/3/60	575/3/60
1000	682403	600563	684193	682578	684292
1200	698202	698204	684300	684193	684193
1600	698202	698204	682346	682248	684290

MISCELLANEOUS PARTS FOR NEMA 4 DRYERS

PART#	DESCRIPTION
632207	N4 INDICATOR - BULB
632210	N4 INDICATOR - RED LENS
632208	N4 INDICATOR - GREEN LENS
630611	N4 SWITCH- ON/OFF
633378	N4 SELECTOR SWITCH

GLYCOL PUMPS, AUTOTRANSFORMERS & SOLENOIDS

NVC MODEL	GLYCOL PUMP	AUTOTRANSFORMER WHOLE UNIT	SOLENOID VALVE N1	SOLENOID COIL N4
1000	683724	698994	683919	684079
1200	683724	698994	683919	684079
1600	683724	-	683338	699614

NOTE: NVC1200 AND 1600 AIRCOOLED HAVE AUTOTRANSFORMER

GROUP FOR FANS ONLY:

NVC1200A600 - PART # 681637

NVC1600A600 - PART # 682435

15.0 ENGINEERING SPECIFICATIONS

		WEIGHT	REFRIGERANT - R404A		MAX. FUSE	MIN. CIRCUIT AMPACITY	COMPRESSOR RATINGS			FAN RATINGS			
MODEL NO.	VOLTS/ PH/HZ	WEIGHT	LBS	OZ			HP	RLA	LRA	QTY	HP	RLA	LRA
NVC1000A	460/3/60	2000	11	0	30	18.4	7	12.8	80	2	1/4	0.95	2.4
NVC1200A	460/3/60	2300	15	0	35	23.0	9	15.7	78.5	3	1/4	0.95	2.4
NVC1600A	460/3/60	2200	14	0	45	29.5	10.5	19.3	105.0	3	1/2	1.6	4.0

		WEIGHT	REFRIGERANT - R404A		MAX. FUSE	MIN. CIRCUIT AMPACITY	COMPRESSOR RATINGS		
MODEL NO.	VOLTS/PH/ HZ	WEIGHT	LBS	OZ			HP	RLA	LRA
NVC1000W	460/3/60	2000	6	8	15	11.3	5	8.6	60.0
NVC1200W	460/3/60	2300	8	0	25	14.4	6	11.1	68.0
NVC1600W	460/3/60	2300	11	0	35	20.2	9	15.7	78.5

MAXIMUM ALLOWABLE WORKING PRESSURE: 220 psig

⚠ NOTICE

Specification information above accurate at time of publication. Refer to equipment serial label for actual refrigerant charges and specifications for units.