Temperature Control Systems

Customer Product Manual
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– English –
Issued 02/25

For parts and technical support, call the Industrial Coating Solutions Customer Support Center at (800) 433-9319 or contact your local Nordson representative.

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Table of Contents

Contact Us
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http://www.nordson.com

http://www.nordson.com/en/global-directory

Change Record

Revision	Date	Change
01	01/19	Combined single and dual systems into one manual. Updates to all sections.
02	07/19	Updated *Process Material Connections* to show straps.
03	09/21	Various manual updates.
04	04/22	Updated paint code options for remote mounting stand; added CE and UKCA marks.
05	10/22	Added additional molybdate test kit product number and procedure.
06	02/23	Corrected fault indicators component identifiers (page 8), updated Figure 3 and Table 1, updated Figure 4 and Table 2, included Figures 7 and 9, included RTD install procedure (page 23), updated “Preparation for First-Time Setup” (page 26) and included Figure 13, updated “Chiller Fault” section of Troubleshooting Table (page 37), updated “RTD Replacement” procedure (page 40), updated notes regarding “System Component” Parts Table (page 46 and 47), added heat exchanger kit (page 49), updated Nordson Factory Settings of Appendix (page 52), and modified added FNPT fitting regarding “Optional Water Cooled Condensor” table (page 59).
07	02/25	Updated control panel figures (3 and 4) and associated tables (1 and 2); updated refrigerant specification to R-513A on page 15; replaced MD406 nomenclature to Assurance 3770;updated E5EN-H controller and its associated table (figure 12); updated TCU controller part number to 1626896 (page 44); updated E5EN-H temperature controller settings (pages 54-57).

Safety

Introduction

Read and follow these safety instructions. Task- and equipment-specific warnings, cautions, and instructions are included in equipment documentation where appropriate.

Make sure all equipment documentation, including these instructions, is accessible to persons operating or servicing equipment.

Qualified Personnel

Equipment owners are responsible for making sure that Nordson equipment is installed, operated, and serviced by qualified personnel. Qualified personnel are those employees or contractors who are trained to safely perform their assigned tasks. They are familiar with all relevant safety rules and regulations and are physically capable of performing their assigned tasks.

Intended Use

Use of Nordson equipment in ways other than those described in the documentation supplied with the equipment may result in injury to persons or damage to property.

Some examples of unintended use of equipment include:

- using incompatible materials
- making unauthorized modifications
- removing or bypassing safety guards or interlocks
- using incompatible or damaged parts
- using unapproved auxiliary equipment
- operating equipment in excess of maximum ratings

Regulations and Approvals

Make sure all equipment is rated and approved for the environment in which it is used. Any approvals obtained for Nordson equipment will be voided if instructions for installation, operation, and service are not followed.

Personal Safety

To prevent injury follow these instructions.

- Do not operate or service equipment unless you are qualified.
- Do not operate equipment unless safety guards, doors, or covers are intact and automatic interlocks are operating properly. Do not bypass or disarm any safety devices.
- Keep clear of moving equipment. Before adjusting or servicing moving equipment, shut off the power supply and wait until the equipment comes to a complete stop. Lock out power and secure the equipment to prevent unexpected movement.
- Relieve (bleed off) hydraulic and pneumatic pressure before adjusting or servicing pressurized systems or components. Disconnect, lock out, and tag switches before servicing electrical equipment.
- While operating manual spray guns, make sure you are grounded. Wear electrically conductive gloves or a grounding strap connected to the gun handle or other true earth ground. Do not wear or carry metallic objects such as jewelry or tools.
- If you receive even a slight electrical shock, shut down all electrical or electrostatic equipment immediately. Do not restart the equipment until the problem has been identified and corrected.
- Obtain and read Safety Data Sheets (SDS) for all materials used. Follow the manufacturer’s instructions for safe handling and use of materials, and use recommended personal protection devices.
- Make sure the spray area is adequately ventilated. To prevent injury, be aware of less-obvious dangers in the workplace that often cannot be completely eliminated, such as hot surfaces, sharp edges, energized electrical circuits, and moving parts that cannot be enclosed or otherwise guarded for practical reasons.

High-Pressure Fluids

High-pressure fluids, unless they are safely contained, are extremely hazardous. Always relieve fluid pressure before adjusting or servicing high pressure equipment. A jet of high-pressure fluid can cut like a knife and cause serious bodily injury, amputation, or death. Fluids penetrating the skin can also cause toxic poisoning.

If you suffer a fluid injection injury, seek medical care immediately. If possible, provide a copy of the SDS for the injected fluid to the health care provider.

The National Spray Equipment Manufacturers Association has created a wallet card that you should carry when you are operating high-pressure spray equipment. These cards are supplied with your equipment. The following is the text of this card:

WARNING: Any injury caused by high pressure liquid can be serious. If you are injured or even suspect an injury:

- Go to an emergency room immediately.
- Tell the doctor that you suspect an injection injury.
- Show them this card
- Tell them what kind of material you were spraying

MEDICAL ALERT — AIRLESS SPRAY WOUNDS: NOTE TO PHYSICIAN

Injection in the skin is a serious traumatic injury. It is important to treat the injury surgically as soon as possible. Do not delay treatment to research toxicity. Toxicity is a concern with some exotic coatings injected directly into the bloodstream.

Consultation with a plastic surgeon or a reconstructive hand surgeon may be advisable.

The seriousness of the wound depends on where the injury is on the body, whether the substance hit something on its way in and deflected causing more damage, and many other variables including skin microflora residing in the paint or gun which are blasted into the wound. If the injected paint contains acrylic latex and titanium dioxide that damage the tissue's resistance to infection, bacterial growth will flourish. The treatment that doctors recommend for an injection injury to the hand includes immediate decompression of the closed vascular compartments of the hand to release the underlying tissue distended by the injected paint, judicious wound debridement, and immediate antibiotic treatment.

Fire Safety

To avoid a fire or explosion, follow these instructions.

- Ground all conductive equipment. Use only grounded air and fluid hoses. Check equipment and workpiece grounding devices regularly. Resistance to ground must not exceed one megohm.
- Shut down all equipment immediately if you notice static sparking or arcing. Do not restart the equipment until the cause has been identified and corrected.
- Do not smoke, weld, grind, or use open flames where flammable materials are being used or stored. Do not heat materials to temperatures above those recommended by the manufacturer. Make sure heat monitoring and limiting devices are working properly.
- Provide adequate ventilation to prevent dangerous concentrations of volatile particles or vapors. Refer to local codes or your material SDS for guidance.
- Do not disconnect live electrical circuits when working with flammable materials. Shut off power at a disconnect switch first to prevent sparking.
- Know where emergency stop buttons, shutoff valves, and fire extinguishers are located. If a fire starts in a spray booth, immediately shut off the spray system and exhaust fans.
- Shut off electrostatic power and ground the charging system before adjusting, cleaning, or repairing electrostatic equipment.
- Clean, maintain, test, and repair equipment according to the instructions in your equipment documentation.
- Use only replacement parts that are designed for use with original equipment. Contact your Nordson representative for parts information and advice.

Halogenated Hydrocarbon Solvent Hazards

Do not use halogenated hydrocarbon solvents in a pressurized system that contains aluminum components. Under pressure, these solvents can react with aluminum and explode, causing injury, death, or property damage. Halogenated hydrocarbon solvents contain one or more of the following elements:

Element	Symbol	Prefix
Fluorine	F	“Fluoro-”
Chlorine	Cl	“Chloro-”
Bromine	Br	“Bromo-”
Iodine	I	“Iodo-”

Check your material SDS or contact your material supplier for more information. If you must use halogenated hydrocarbon solvents, contact your Nordson representative for information about compatible Nordson components.

Action in the Event of a Malfunction

If a system or any equipment in a system malfunctions, shut off the system immediately and perform the following steps:

- Disconnect and lock out system electrical power. Close hydraulic and pneumatic shutoff valves and relieve pressures.
- Identify the reason for the malfunction and correct it before restarting the system.

Disposal

Dispose of equipment and materials used in operation and servicing according to local codes.

System Overview

The Nordson Temperature Control Unit (TCU) maintains coating material at the desired application temperature.

The temperature control unit heats or cools process water, which then circulates through an external counter-flow water-jacketed heat exchanger. The coating material passes through the heat exchanger and is heated or cooled to the desired temperature.

The temperature controller contains a process water loop and a chilled water loop.

See Figure 1.

In the process water loop, water is pumped through an immersion heater (7), out to the heat exchanger (1), and back to the pump (11). The water flow is regulated by the flowsetter (10) in the return line.

NOTE: Some systems may have two pumps connected in series in the process water loop.

The chilled water loop consists of an evaporator (20), chilled water reservoir (14), and pump (12). The pump continuously circulates the water through the evaporator and back into the reservoir. The sealed refrigeration system removes heat from the water flowing through the evaporator.

An RTD (2) at the heat exchanger material exit senses the coating material temperature.

- If the coating material is too cool, the temperature controller (3) proportionally energizes the immersion heater to warm the water flowing through the process loop and heat exchanger, warming the coating material.
- If the coating material is too warm, the temperature controller (3) opens a solenoid valve (6) on the return line to the chilled water loop. This allows chilled water to flow into the process loop, cooling the water flowing through the heat exchanger and cooling the coating material. Water from the process loop returns to the chilled water loop through the solenoid valve and a flowsetter (10), which regulates the return flow.

If the coating material temperature deviates from the process temperature setpoint by ±5°F (±2.8°C), the temperature range fault indicator on the electrical panel will light.

An adjustable thermostat in the heater assembly acts as a high water temperature safety switch. If the water temperature exceeds 140°F (60°C), the thermostat opens and power to the heater is disabled. In addition, the heater high temp fault indicator on the electrical panel will light.

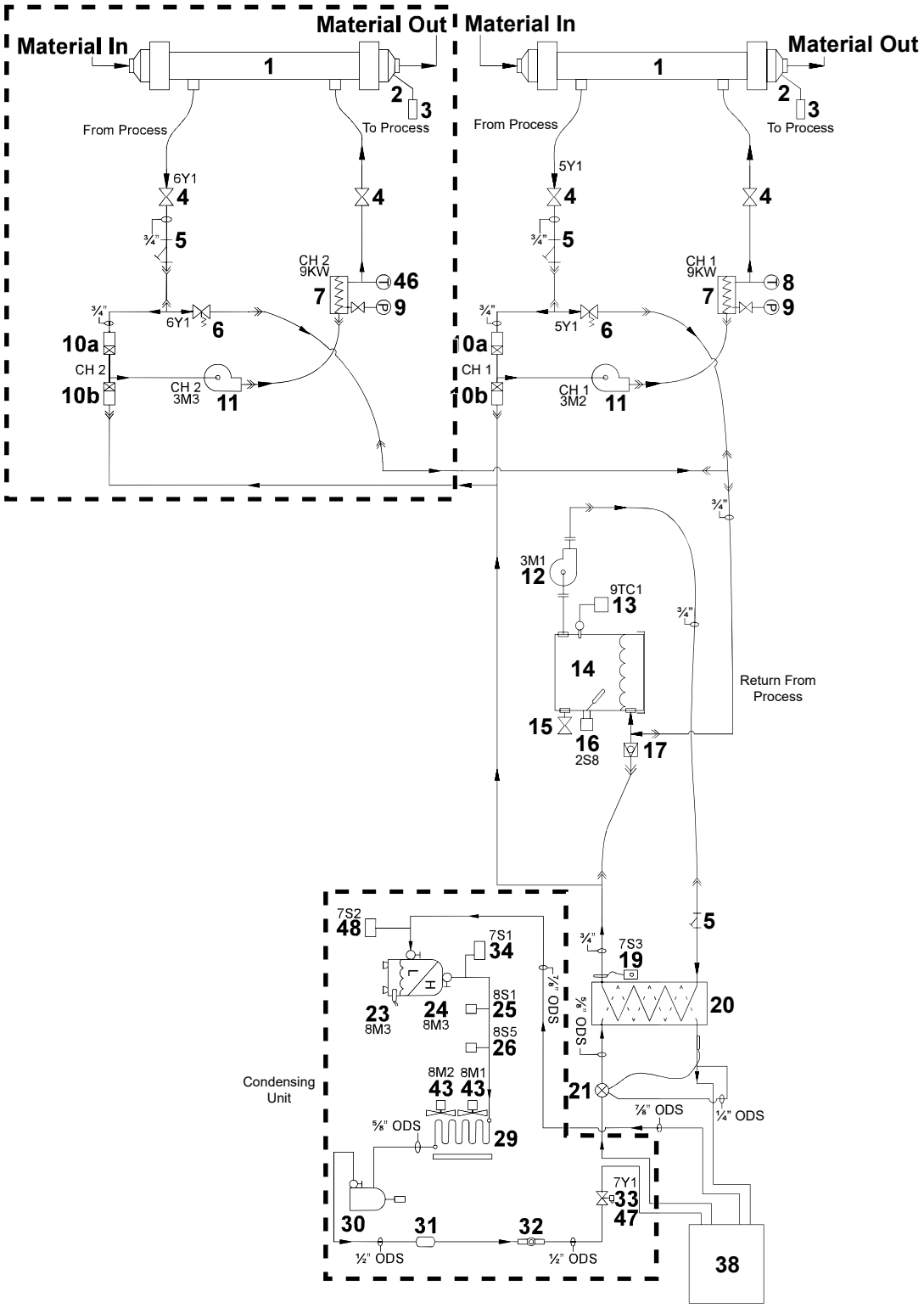

Figure 1 Temperature Control Unit Diagram – Air-Cooled Condensor

Item	Description
1	Heat exchanger
2	RTD
3	Temperature controller
4	Service valves - 3.4 in.
5	Y strainer
6	Cooling solenoid valve
7	Immersion heater
8	Thermometer
9	Pressure gauge 5-20 psi
10a	Process return water flowsetter (0-30 lpm)
10b	Chilled water supply flowsetter (0-30 lpm)
11	Process pump 7.2-10 gpm 24 psi
12	Chilled water pump 7.2 gpm 9.7 psi
13	Chilled water RTD
14	Chilled water reservoir
15	Drain valve
16	Float switch
17	Check valve
19	Freeze stat
20	Evaporator
21	Metering valve
23	Compressor heater
24	Compressor
25	Fan 2 pressure switch
26	Fan 1 variable speed control
27	Fan blade
28	Fan guard
29	Air condenser
30	Refrigerant receiver
31	Refrigerant filter drier
32	Refrigerant sight glass
33	Liquid line solenoid valve
34	High pressure switch
38	Accumulator
43	Fan motor
44	Water pressure regulator
46	Back mount termometer
47	Liquid line solenoid valve head
48	Low pressure switch

Chilled Water Loop Operation

See Figure 1.

The chilled water pump runs continuously. An RTD temperature sensor (13) senses the reservoir (14) water temperature and sends a temperature signal to the chiller controller. The water temperature is displayed as the Process Value (PV). The setpoint is preset to 55°F (12.7°C) and is displayed as the Setpoint Value (SV).

If the water temperature rises 5°F (2.8°C) above the setpoint, the controller energizes the compressor contactor. Power is provided to the compressor and condenser fan motors.

If the ambient temperature is low, a fan control switch de-energizes one condenser fan motor to maintain proper head pressure. It is normal for the fan to cycle on and off while the compressor is running.

As the water temperature decreases to 1°F (0.6°C) below the setpoint, the compressor, fan motors, and liquid line solenoid are de-energized while the crankcase heater is still energized, completing the cycle.

Refrigerant Cycle

The refrigerant in the compressor (24) is compressed to a high-pressure/high-temperature gas, which flows to the condenser (29). In the condenser, the refrigerant is changed into a high-pressure liquid as it is cooled by the air flowing through the condenser fins. The liquid refrigerant then passes through a shut-off valve, through the liquid receiver, and into the filter drier (31), which removes any moisture or other contaminants.

The high-pressure liquid then flows through the sight glass (32) to a metering valve (21) where it is reduced to a low-pressure liquid before it flows into the evaporator (20). The low-pressure liquid refrigerant absorbs the heat from the water flowing through the evaporator and is transformed into a low-pressure gas. The low-pressure gas is then drawn into the compressor to complete the cycle.

Fault Indicators

The (34) high and (48) low-pressure refrigerant switch, and low temperature thermostat (19) will disable the refrigeration system if a high or low refrigerant pressure, or low water temperature condition occurs. These conditions will turn off the chiller on indicator on the electrical panel and turn on the chiller fault indicator.

In addition, the float switch (16) located in the reservoir will disable the TCU and turn on the low water level fault indicator on the electrical panel if the water in the reservoir falls below the switch level.

Flowsetter Valves

See Figure 2.

The flowsetter valves are small throttling ball valves. They are used to control the flow of water through the system. The valves have a slotted screw head. When the screw head slot is parallel to the direction of flow, the valve is completely open. When the slot is perpendicular to the direction of flow, the valve is completely closed.

Both the chilled water supply and process return water flowsetter valves are set at the factory for maximum cooling. The capacity for each valve is 0-7.9 gpm (0-30 lpm).

Some installations may need additional optimization upon setup to provide maximum cooling. See page 29 for *Flowsetter Optimization*.

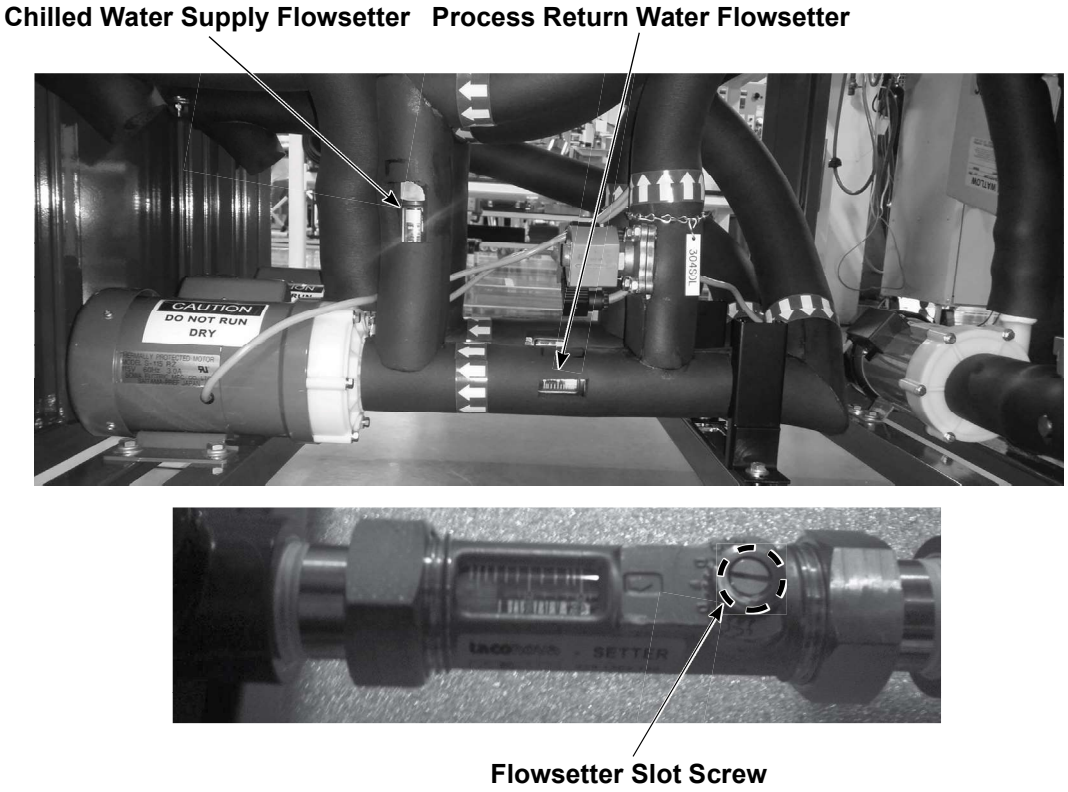

Figure 2 Temperature Control Unit Diagram – Air Cooled Condensor

Control Panel Front

See Figure 3 and refer to Table 1.

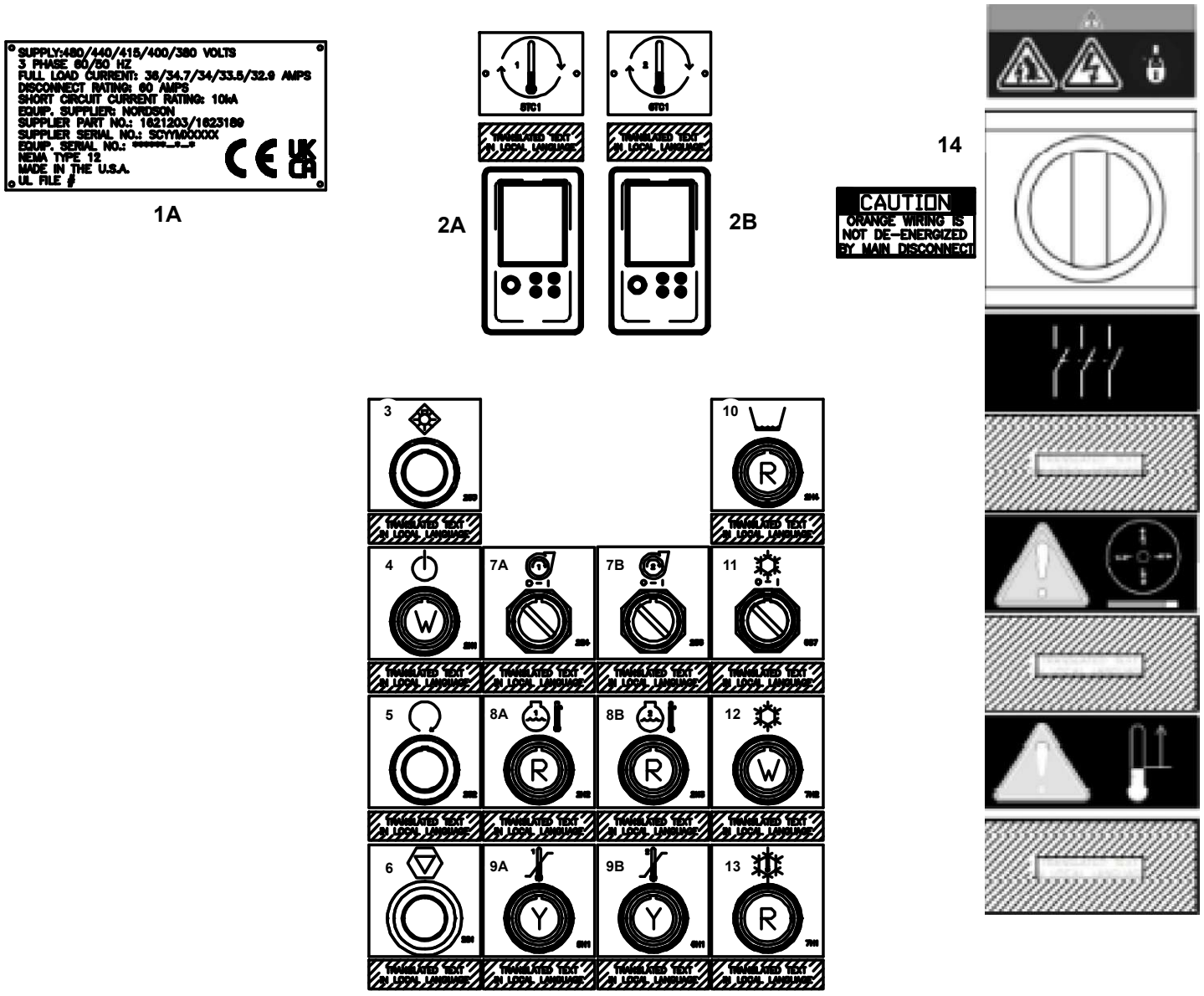

Figure 3 Control Panel Front

Table 1 Control Panel Front

Item	Control	Description
1A	CE/UKCA Compliance Requirement	CE/UKCA compliance label
2A	Temperature Controller 1	Controls coating material temperature.
2B	Temperature Controller 2	
3	Lamp Test	Press to turn on all indicator lights to ensure they are working.
4	Power On	Lights when system power is on.
5	Master Start	Starts chiller pump and provides power to rest of system.
6	Master Stop	Stops all system functions except compressor crankcase heater.
7A	System No.1 OFF/ON	Starts/stops process water pump.
7B	System No.2 OFF/ON	
8A	Heater High Temp. Fault	Lights if water temperature exceeds 140°F (60°C).
8B	Heater High Temp. Fault No.2	
9A	Temperature Range Fault	Lights if the coating material temperature deviates from the process temperature setpoint by ±5°F (±2.8°C).
9B	Temperature Range Fault No.2	
10	Float Switch Low Level	Lights if the water level in the chiller reservoir falls below the float switch.
11	Cooling OFF/ON	Enables/disables the refrigeration system.
12	Cooling ON	Lights when the refrigeration system is enabled.
13	Chiller Fault	Lights if the water flow switch senses no water flow in the chilled water loop, if the high- or low-pressure refrigerant switch is tripped, or if the low-temperature thermostat senses that the water temperature in the reservoir falls to 40°F (4.4°C).
14	Main Disconnect	Turns on and off power to unit. Leave on except when making electrical repairs or for long shutdowns. Refer to Warning placard on panel.

Control Panel Interior

See Figure 4 and refer to Table 2.

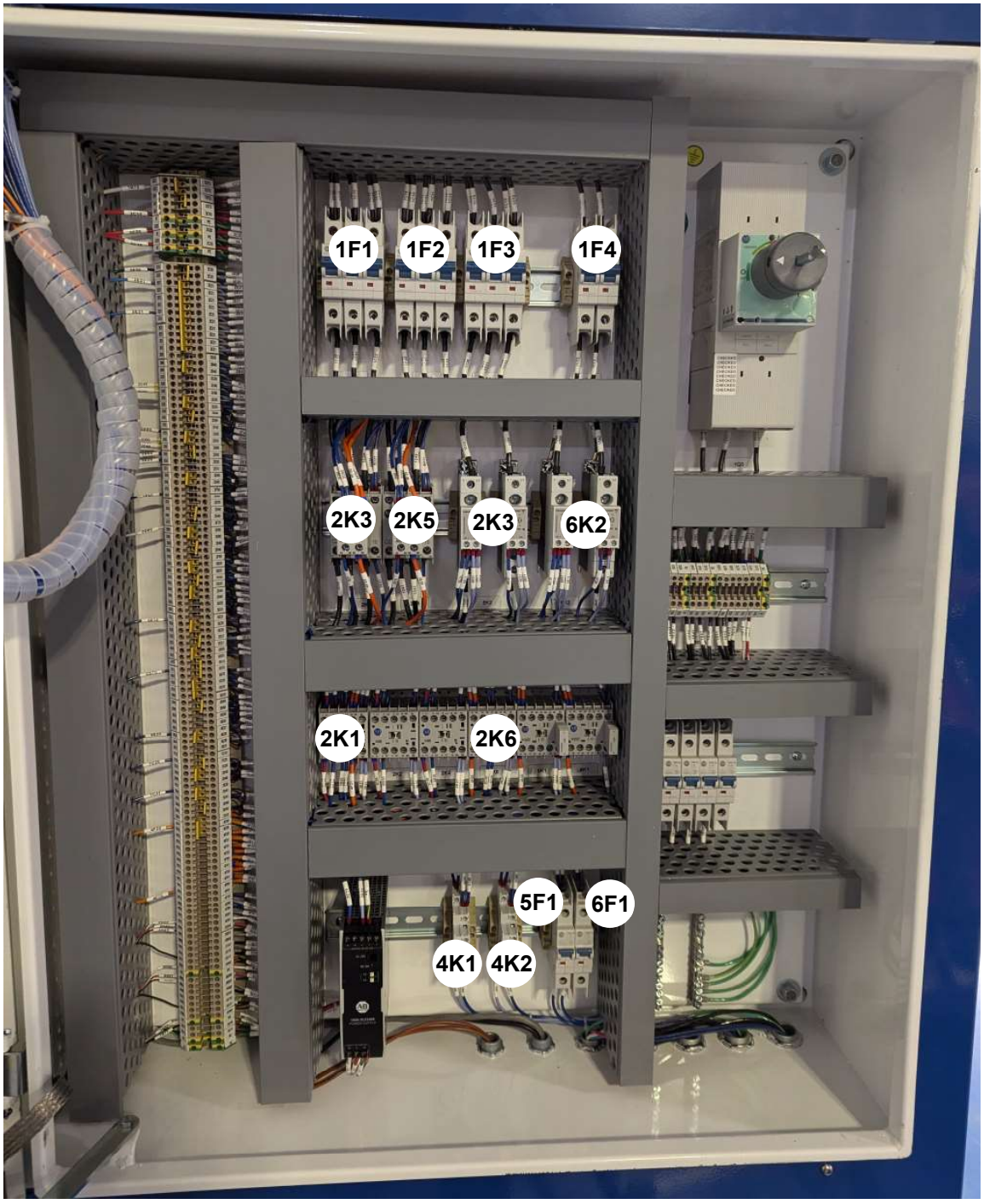

Figure 4 Control Panel Interior Fuses, Disconnects, and Controls

Table 2 Control Panel Interior

Label	Component	Function	Note
1F1	Heater 1 fuse	Heater number 1	
1F2	Heater 2 fuse	Heater number 2	
1F3	Condensor unit fuse	Condensing unit	
1F4	Transfomer	Transformer	
2K1	Master start/stop	Master start/stop	
2K3	Heater number 1 high temp	Heater number 1 high temperature	
2K5	Heater number 2 high temp	Heater number 2 high temperature	
2K6	Low water level fault	Low water level	
4K1	Coating pump number 1 interlock	Installed by default	A
4K2	Coating pump number 2 interlock	Installed by default	B
5F1	Cooling solenoid fuse 1	For process circuit 1	
6F1	Cooling solenoid fuse 2	For process circuit 2	

NOTE: A. Customer to remove jumper when coating pump 1 interlock is used.

B. Customer to remove jumper when coating pump 2 interlock is used.

Chiller Junction Box

See Figure 5 and refer to Table 3.

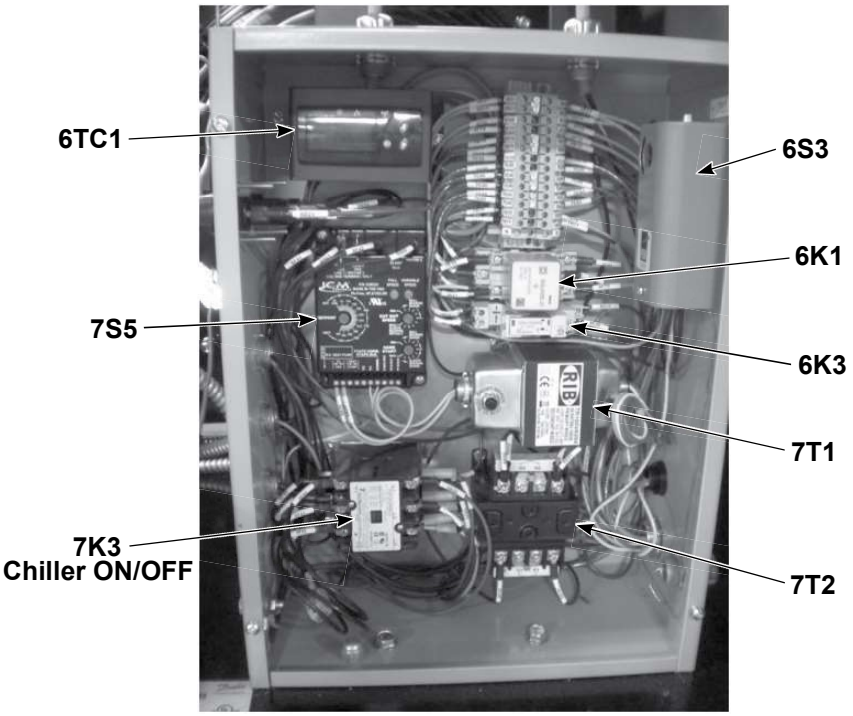

Figure 5 Chiller Junction Box

Table 3 Chiller Junction Descriptions

Label	Component	Function
6TC1	Chiller controller	Uses RTD to sense chilled water temperature. Factory settings trigger chiller when temperature reaches 60°F (15.6°C) and turns off when temperature reaches 55°F (12.8°C), keeping chilled water between 55-60°(12.8-15.6°C).
6S3	Low temperature thermostat	Shuts off refrigeration system if water temperature falls below 40 °F (4.4°C). Reset switch is on top of case.
6K1	Chiller fault relay	Chiller fault
6K3	Chiller start relay	Chiller start
7T1	Transformer	480V-24V transformer
7T2	Transformer	480V-220V transformer
7K3	Chiller on/off	Chiller on/off contact relay
7S5	Variable speed controller	Controls fan speed on the condenser

Specifications

Specification	Single	Dual
Water Reservoir (see note A)	3 ton/26 gal (98.4 L)	5 ton/26 gal (98.4 L)
Capacity	36,000 BTU/hour (10.55 kw)	60,000 BTU/hour (17.6 kw)
Operating Sound Level (Full Load Operation)	78.5 dBA	78.5 dBA
US (see note B)	60 Amps minimum, 480 Vac 3 Phase 60 Hz	60 Amps minimum, 480 Vac 3 Phase 60 Hz
CE (see note B)	60 Amps minimum, 400 Vac 3 Phase 50 Hz	60 Amps minimum, 400 Vac 3 Phase 50 Hz
Weight (see note C)	1200 lb (544 kg)	1400 lb (635 kg)
Dimensions	See Dimensions section beginning on page 16.	
Standard 6 ft Heat Exchanger Weight with Stand (see note D)	650 lb (295 kg)	
Electrical Panel Rating	NEMA 12, IP rating 66	
Ambient Temperature Range	45-95°F (7.2-35.0°C)	
Maximum Material Flow	3 gal/min. (11.4 L/min.) per heat exchanger	
Conditioning Capacity	20°F (11.1°C) Δ at 3 gpm (11.4 L/min.) 50°F (27.8°C) Δ at 1.5 gpm (5.7 L/min.)	
Heater Exchanger Ratings	Shell: 100 psi (6.89 bar) max, 45-180°F (7.2-82°C) Tube: 5000 psi (344 bar) max, 45-180°F (7.2-82°C)	
Refrigerant	R513A, 20 lb (20 lb pump down capacity). Prior to 2025, R134A refrigerant was used.	
Saturated Discharge Temp	111°F (44°C) at 150 psig (10.3 bar)	
Saturated Suction Temp	40°F (4°C) at 35 psig (2.4 bar)	
High Pressure Control	Cut out: 325 psig (22.4 bar) Cut in: 225 psig (15.5 bar)	
Low Pressure Control	Cut out: 15 psig (1.0 bar) Cut in: 30 psig (2.1 bar)	
Low Temp Thermostat	Cut out: 39°F (4°C) Cut in: Manual reset	
Fan Control #1 (variable speed control)	Setpoint: 315 psig (21.7 bar) Cut out: 50% Hard start: 75%	
Fan Control #2	Cut out: 140 psig (9.7 bar) Cut in: 180 psig (12.4 bar)	

NOTE: A. Use distilled water for water reservoir.

B. Reference system drawing set for power requirements.

C. Does not include weight of heat exchangers or water.

D. This is a dry weight with no water

Dimensions

NOTE: Refer to *Parts Section* on page 49 for a list of standard TCU systems.

Single-Air Cooling System With Heat Exchanger

See Figure 6.

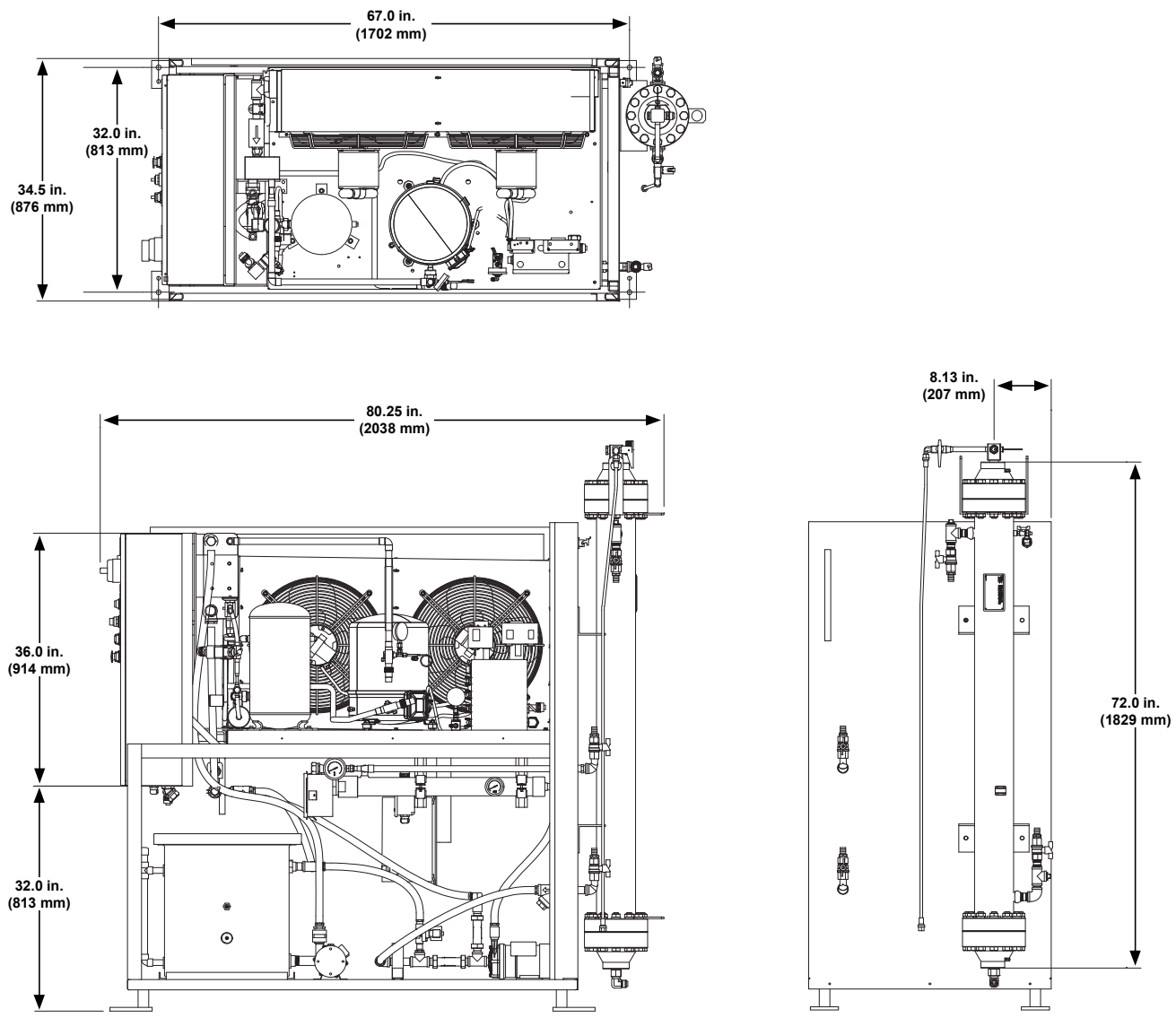

Figure 6 Single-Air Cooling System With Heat Exchanger Dimensions

Single-Air Cooled System Without Heat Exchanger

See Figure 7.

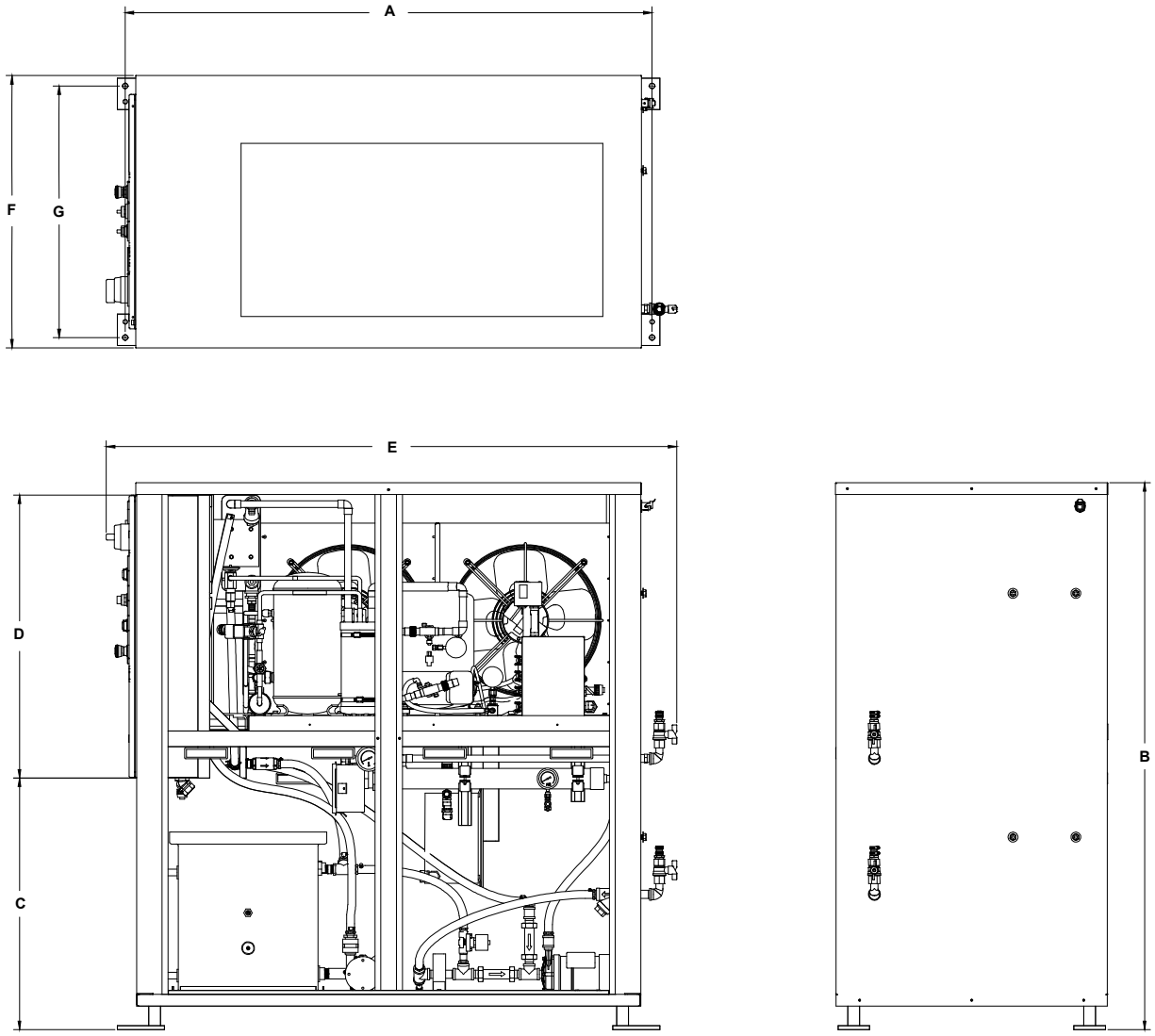

Figure 7 Single-Air Cooled System Without Heat Exchanger Dimensions

A. 67.0 in. (1,702 mm)
B. 69.6 in. (1,767 mm)
C. 32.0 in. (813 mm)
D. 36.0 in. (914 mm)
E. 72.5 in. (1,842 mm)
F. 34.6 in. (879 mm)
G. 32.0 in. (813 mm)

Dual-Air Cooling System With Heat Exchanger

See Figure 8.

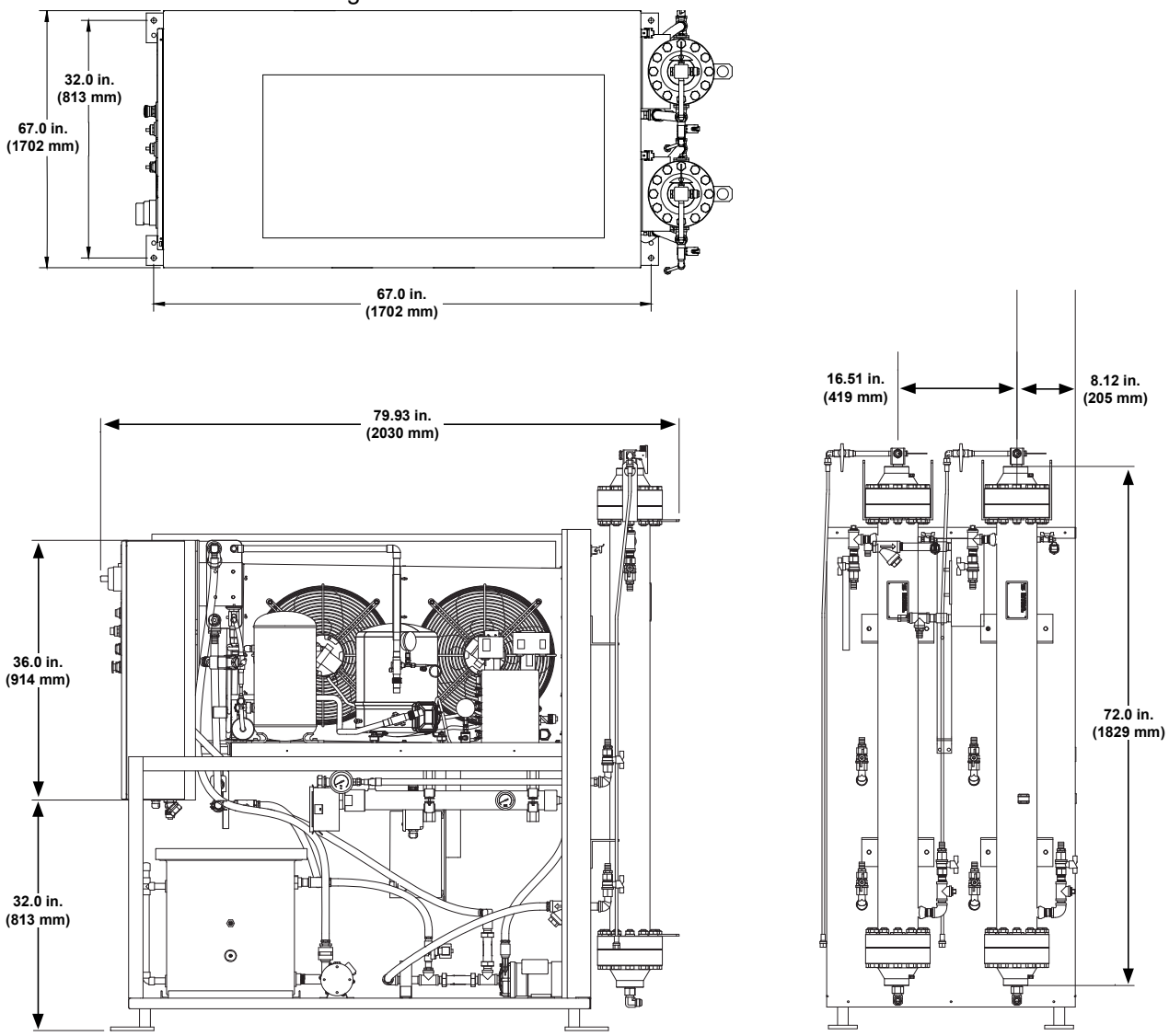

Figure 8 Dual-Air Cooling System With Heat Exhanger Dimensions

Dual-Air Air Cooled System Without Heat Exchanger

See Figure 9.

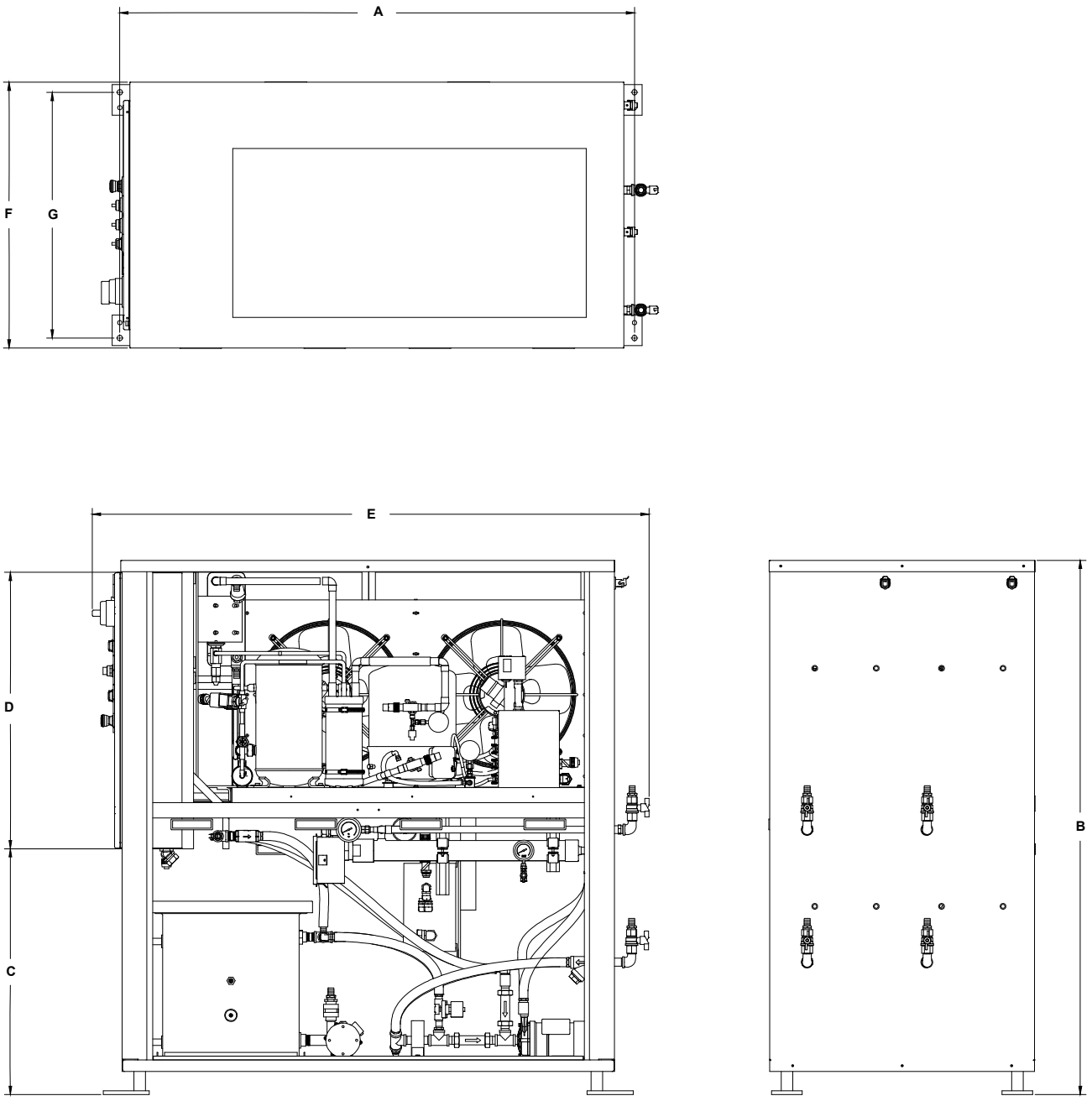

Figure 9 Dual-Air Cooled System Without Heat Exchanger Dimensions

A. 67.0 in. (1,702 mm)
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G. 32.0 in. (813 mm)

Water Cooling Systems

Refer to the respective Air Cooling System Dimensions for Water Cooling System dimensions.

Installation

WARNING: Allow only qualified personnel to install this equipment. Follow the safety instructions in this document and all other related documentation.

Location and Clearances

The heat exchanger can be mounted remotely, up to 75 ft (22.9 m) away from the temperature control unit cabinet, or can be mounted directly to the end of the cabinet, in a vertical position.

Adequate airflow through the cabinet is necessary to insure proper, trouble-free operation. In addition, the cabinet should be located where adequate clean, unrestricted air is available to prevent heat build-up.

- A minimum of 36 in. (91.4 cm) clearance should be provided on all four sides of the cabinet to provide for proper airflow and servicing.
- A minimum of 48 in. (121.9 cm) clearance should be provided above the cabinet.

Mounting

Mounting pads are provided to rigidly fasten the chiller to a suitable level mounting surface. The unit must be firmly anchored to the mounting surface.

Ambient Temperature

The temperature control unit is designed to operate at an ambient

temperature range of 45-95°F (7.2-35°C). For conditions above or below this temperature range, consult your Nordson representative.

Electrical Connections

Connect main power to the L1, L2, and L3 terminals at the top of the unit disconnect.

Optional connections are available on the interlock terminal block for the following:

- Chiller fault/interlock
- Heater high temperature fault/interlock
- Material high temperature fault/interlock
- Low water level fault/interlock

Connect transformer input power as follows. Connect wire 1C72 to terminal H1. Connect wire 1C73 to:

Input Voltage	Terminal
380 V	H2
400 V	H3
415 V	H4
440 V	H5
480 V	H6

NOTE: All wiring should be shielded multi-core, and must not run parallel to high voltage or frequency drive power cables.

Heat Exchanger Installation

See Figure 10.

The unit is shipped with the heat exchanger secured to the shipping pallet. The heat exchanger can be mounted to the cabinet or remote-mounted up to 75 ft (22.9 m) away from the cabinet.

The heat exchanger (without stand) weighs approximately 181.5 kg (400 lb). A lifting bracket is attached to the flange at the outlet end of the heat exchanger. Use the appropriate lifting equipment to move the heat exchanger and avoid damaging the foam insulation jacket.

RTD Install

WARNING: Depressurize the coating material system before removing the RTD. Failure to relieve all pressure could result in a high pressure injection injury.

1. Install the RTD into the heat exchanger manifold which plumbs into the outlet of the heat exchanger.

CAUTION: To prevent thread galling, apply PTFE tape, a continuous bead of Loctite® 577, or an equivalent thread sealant around the threads of the RTD. Do not apply product to the first thread of male fitting.

NOTE: The manifold assembly ships with each TCU unit and includes fittings and hoses for fluid connections.

2. Utilize a 11/16 in. wrench and tighten the RTD until it is snug.
3. Once the RTD has been installed into the manifold and tightened, connect it to the appropriate channel routed to the rear of the system.

Cabinet Mounting

The heat exchanger is mounted on the end of the cabinet opposite the controls in a vertical position with the material outlet on top (end with RTD). Use the supplied fasteners to secure the brackets to the tapped holes in the cabinet braces.

If cabinet mounting is specified when the unit is ordered, then the required lengths of insulated process water hose will be connected to the process water inlet and outlets at the factory.

Connect the hoses as shown to the heat exchanger process water inlets and outlets.

Use 36 in. cable to connect the RTD to cabinet.

Remote Mounting

Mount the heat exchanger with the bleed valve up, using the brackets and appropriate fasteners. Do not mount the heat exchanger more than 75 ft (22.9 m) away from the cabinet.

Use heat exchange floor mounting stand (p/n 1090988 or 1622493) and either the 75 ft (22.9 m) remote mount heat exchange kit (p/n 1621236) or the 50 ft (15.2 m) remote mount heat exchange kit (p/n 1621235) for remote mounting.

NOTE: Refer to *Appendix, Remote Mounting Stand Paint Color Options* to reference paint codes associated with the remote mounting stands.

Two process water hoses are supplied with the kits:

- Green supply hose
- Black return hose

Cut the hoses to the lengths required to reach the heat exchanger and connect to the barbed fittings at the inlets and outlets as shown.

Use the provided hose clamps to secure the hoses. Insulate the hoses to prevent heat/cooling losses.

Use the included cables to connect the RTD to the cabinet.

Process Material Connections

See Figure 10.

NOTE: This is a counter-flow heat exchanger. The coating material must flow in the opposite direction as the process water.

Connect the coating material lines to the heat exchanger. The heat exchanger threads are 1 in. NPT. Use the Velcro straps to secure the bleed off hose to the heat exchanger.

To eliminate condensation and heat/cooling losses from the coating material lines, they should be insulated with a minimum 0.5 in. (12.7 mm) thick closed-cell foam insulation or equivalent.

Make sure all coating material pipe hangers and brackets are insulated or isolated so they do not function as heat sinks.

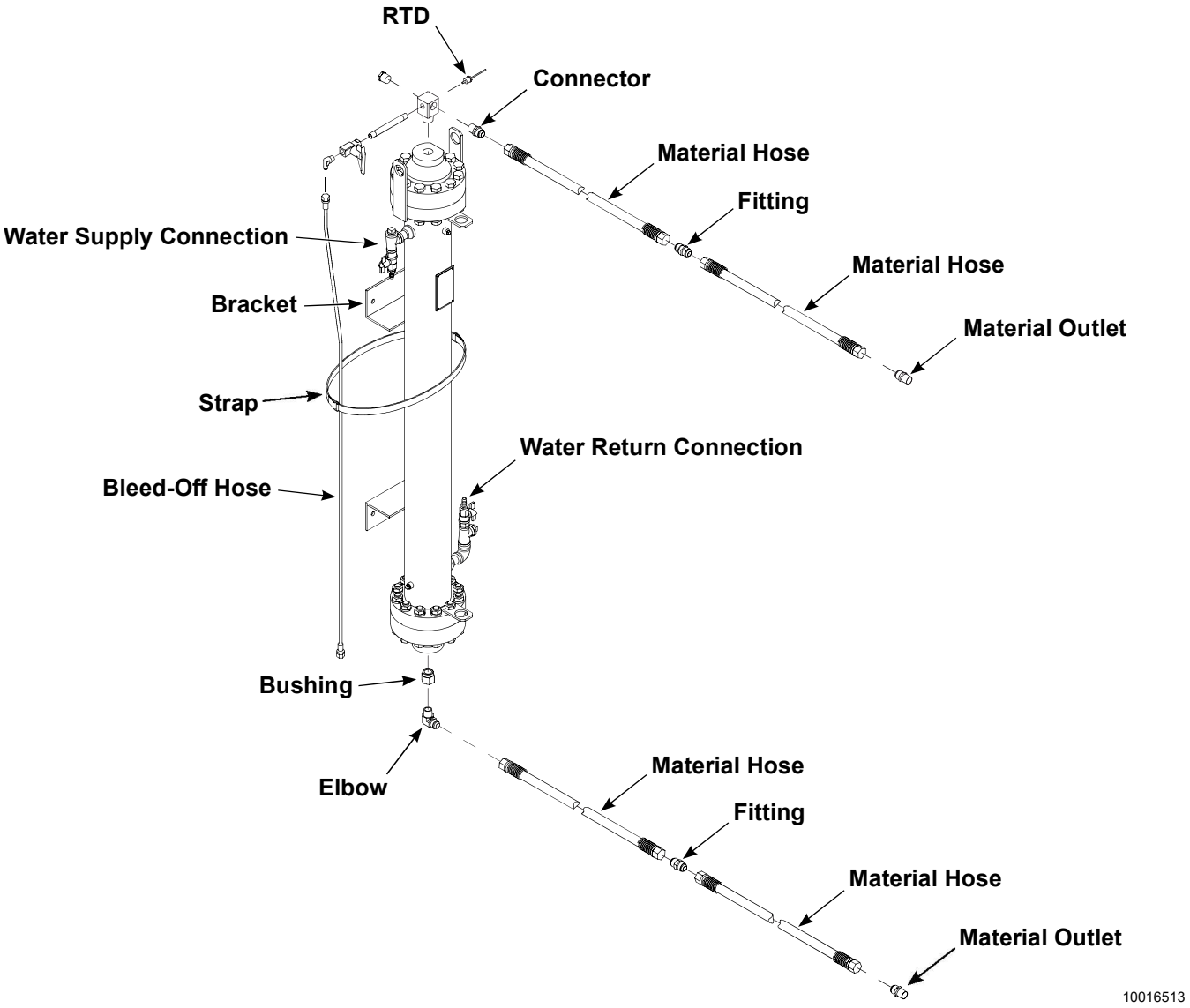

Figure 10 Connections to Heat Exchanger

Additional Temperature Control Loop

If required, an additional water loop can be connected to the system to provide temperature conditioning to water jackets on day tanks or other components of the coating system. The total combined load should not exceed the capacity of the temperature control unit. Contact your Nordson representative for more information.

Plugs are provided at the heat exchange outlet and inlet connections for ¾ in. NPT barbed hose fittings. Connect insulated hoses to the fittings and clamp the hoses securely.

Water Treatment

CAUTION: Use only distilled water or clean tap water. Do not use de-ionized water or well water. De-ionized water will corrode the system components. Well water is typically high mineralized and will shorten system component life.

To maintain proper performance of the system over its design life, corrosion must be minimized. Water should be distilled or clean tap water. De-ionized (DI) water must not be used as it is corrosive to the metals in the system.

Corrosion inhibitor must be added to the water on initial fill and each time it is changed. An original fill supply of Assurance 3770 corrosion inhibitor is included with each unit shipped. This is a molybdate-based corrosion inhibitor with an additive to protect copper. It is used in a concentration of 1.5 oz per gal of water (44.3 ml per 3.785 l). A one quart (0.95 liter) bottle of Assurance 3770 is enough to treat 21 gal (79.5 l).

To ensure that the system is protected, a Molybdate Test Kit is also included. Each time water is added to the system it should be tested to ensure that the water contains the proper concentration of corrosion inhibitor.

Biocides prevent algae and other biologicals from contaminating the water. The recommended biocide for use with Assurance 3770 is Spectrus® NX114. The recommended concentration of Spectrus NX114 is 150 ppm which is 0.017 oz/gal (0.132 ml/l).

Biocides that should not be used in the water are:

- oxidizers, such as chlorine, bromine, hydrogen peroxide, iodine, ozone
- catonic, or positively-charged biocides

The following is a list of materials used in the construction of the temperature control unit. Use this list if you are going to use a different biocide or corrosion inhibitor.

Galvanized steel pipe	Brass
Iron	Aluminum
Buna rubber	EPDM rubber
Stainless steel	PTFE
Copper	Nylon

Operation

WARNING: Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

Preparation for First-Time Startup

CAUTION: The temperature control unit main disconnect must be turned on 4 hours before starting the system to provide power to the compressor crankcase heater, which heats the compressor oil and forces the refrigerant out of saturation. Starting the system cold will cause unnecessary wear or damage to the compressor. The main disconnect should always be left on unless the unit is removed from service for repairs or movement.

NOTE: See Figure 11. Each TCU is provided with a set of language translation tags to be applied locally. The language tags match up to the symbols on the front panel of the TCU. Tag sets are provided for a dual unit. If only a single unit was purchased, please disregard the tags for the second channel.

1. Remove the panels from the right side of the cabinet.
2. Open the chiller panel and reset the low temperature thermostat next to the chiller controller. The reset switch is on top of the thermostat. Check the thermostat setting. It should be set to 40°F (4.4°C). Close the panel door when done.
3. Turn the system disconnect switch to the ON position. Do not start the system until the end of the 4-hour warm-up period required for the refrigeration system.
4. On the inside of the cabinet, open the compressor and receiver isolation valves if they are tagged closed for shipping. Close the drain valves.
5. Remove the cover from the reservoir and remove the wire tie from the float switch in the reservoir.
6. Open the process water inlet and outlet valves at the cabinet and heat exchanger.

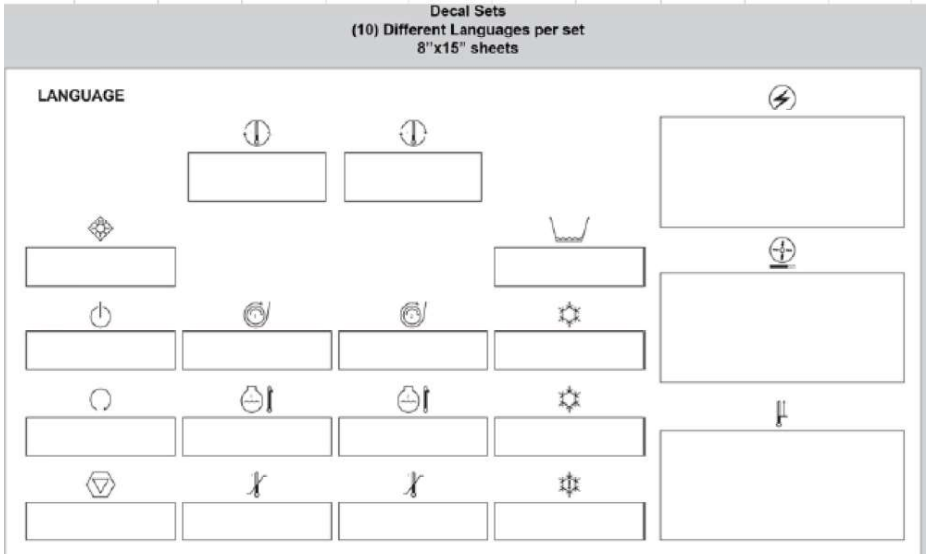

Figure 11 Decal Sets

Filling System

CAUTION: Perform the following procedure to fill the system with water and bleed air out of the system before starting production. Starting the pumps without water in the system could damage them.

1. **For new systems only:** Make sure the float level switch shipping restraint is removed before filling the tank.
2. Fill the chiller reservoir with distilled or clean tap water to about 4 in. (102 mm) from the top. Add corrosion inhibitor to the water at the recommended concentration.

   NOTE: Do not use de-ionized water as this will cause corrosion in the system.
3. Press the *MASTER START* button. This starts the chilled water pump.
4. At the heat exchanger, open the bleed valve to allow water from the chilled water loop into the process water loop and to bleed off the air in the system. When water starts flowing from the valve, turn it off.
5. Turn the *CHILLER#1* switch to the ON position.
6. Turn the first *SYSTEM* switch to the ON position. The process water pump will start and pump process water through the heat exchanger.
7. See Figure 12. Press the *DOWN* key to lower the percentage value (amber display located next to MV label) to -100. This prevents the heater contactor from energizing while opening the chilled water solenoid valve and allowing chilled water to flow into the process water loop.
8. Open the purge valve on the side of the heat exchanger, near the top, to purge the remaining air from the system. Close the valve when all air is purged from the system.
9. Check the reservoir and add water to make up for the water injected into the process water loop.
10. Check the pressure gauge at the immersion heater. Normal operating pressure is 5-20 psi (0.34-1.38 bar).
    - If the pressure is below 5 psi (0.34 bar), make sure all air is purged from the system.
    - If the pressure is above 30 psi (2.1 bar), check for a restriction in the process loop (closed or partially closed valve, pinched water line).
11. Once the system is fully charged with water and all air has been purged from the system, press the PF key on the system controller to return it to automatic operation. The amber LED on the controller should light.
12. Perform steps 4 through 12 for each system.

The system is now ready for normal operation.

Temperature Controller Settings

See Figure 12.

Two digital temperature controllers are used to run the temperature control unit: a process controller and a chiller controller.

NOTE: For information on the controller factory settings, refer to the Appendix at the back of this manual.

Chiller Controller

The chiller controller is mounted inside the *Chiller Junction Box* shown on page 14. It controls the operation of the refrigeration system.

This controller is pre-set at the factory to maintain the water in the reservoir at 50°F (10°C). The controller turns on the refrigeration system when the water temperature rises 5°F (2.8°C) above the setpoint.

NOTE: The controller settings should not need to be changed.

Process Controller

The process controller is located on the system electrical panel and labeled *TEMPERATURE CONTROLLER*. It controls the heating and cooling of the water in the main circulation loop.

Use the process controller to set the material temperature setpoint and monitor the system operation. See Figure 12 and the following table for a description of the controller displays and keys.

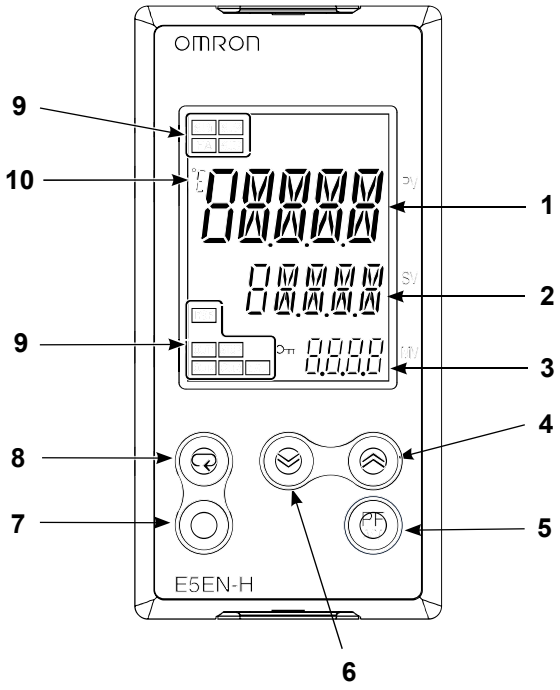

Figure 12 E5EN-H Temperature Controller Displays and Keys

Item	Description
1	PV - specified parameter (material temperature) display
2	SV - specified parameter value (material temperature setpoint) display
3	MV - manipulated value (percentage of heating) display
4	Up key
5	Programmable key function button - switches controller from auto to manual mode to enable changing heating and cooling percentages from -100 to +100
6	Down key
7	Level key - press once to go to adjustment level **OR** press for at least three seconds to go to initial setting level
8	Mode key - press mode key once to go to next parameter **OR** hold mode key to go to previous parameter
9	**Operation Indicators**
	CMW: Communication error
	HA: Heater burnout, heater short alarm, heater overcurrent detection output display
	MANU: Controller in manual mode AT: Auto Tune in progress
	OUT1: Heating
	OUT2: Cooling
	RSP: Remote setpoint
	STOP: Refers to a feature that allows you to manually halt the control process
	SUB1: Temperature range fault
	SUB2: Not used
	SUB3: Not used
10	Temperature unit - (°F or °C)
NOTE: The Display and Auto/Manual keys are for use in setting system parameters. They are not used for normal operation of the temperature control unit.	

Changing Material Temperature Setpoint

The coating material temperature is displayed on the Process Value (PV) display. The temperature setpoint is displayed on the Setpoint Value (SV) display.

For normal operations, the controller should be set to Automatic mode. The only value that should be changed is the Setpoint Value.

- To increase the Setpoint Value, press the UP key.
- To decrease the Setpoint Value, press the DOWN key.

After changing value, wait 3 seconds for value to save.

The Temperature Range Fault indicator on the control panel will light if the coating material temperature varies from the setpoint by 5°F (2.8°C) or more.

Controller Security

The controller has security levels from 0-3:

- Level 3 - no changes can be made to the settings
- Level 2 - only the Setpoint Value can be changed
- Level 1 - provides access to other settings

Access to these levels should be given only to industrial engineers or others responsible for the system settings.

Refer to the Appendix for the factory controller settings.

Auto-Tuning

Auto-tuning is a controller function that adjusts the PID settings automatically. To use auto-tuning, the system must be running normally.

Refer to the Omron manual to start the Auto-tune function. When complete, make the following changes:

- Double the Proportional setting (if 1, change to 2; if 5, change to 10)
- Change the Derivative setting to 0

System Shutdown

CAUTION: If the TCU has been off for more than two hours, after turning the TCU back on, the operator must wait for four hours for the system to be operational. Failure to observe this caution could result in damage to the refrigeration compressor.

1. Turn the *CHILLER* and the *SYSTEM* switches to the OFF position. The process water pump and refrigeration system will shut off.
2. Press the *MASTER STOP* button. The chiller pump will shut off.

   NOTE: Do not shut off the main disconnect switch unless making repairs or shutting down the system for an extended period of time or for repairs.

Flowsetter Optimization

See Figure 13.

Depending on the mounting location of the heater exchanger, the flowsetters may need adjusting. Use the following procedures in order given to balance control between the heating and cooling.

Remove Air from Water Side of Heat Exchanger

1. With the unit running, turn the *SYSTEM* switch on the control panel to OFF.

NOTE: Leave the *CHILLER* switch ON.

2. See Figure 13. Shut the ¾ in. water inlet valve at top of the heat exchanger.
3. Slowly open the ¼ in. vent valve until the air is expelled. Then, close the vent valve.
4. Open the ¾ in water inlet valve at the top of the heat exchanger.
5. Turn ON the *SYSTEM* switch.

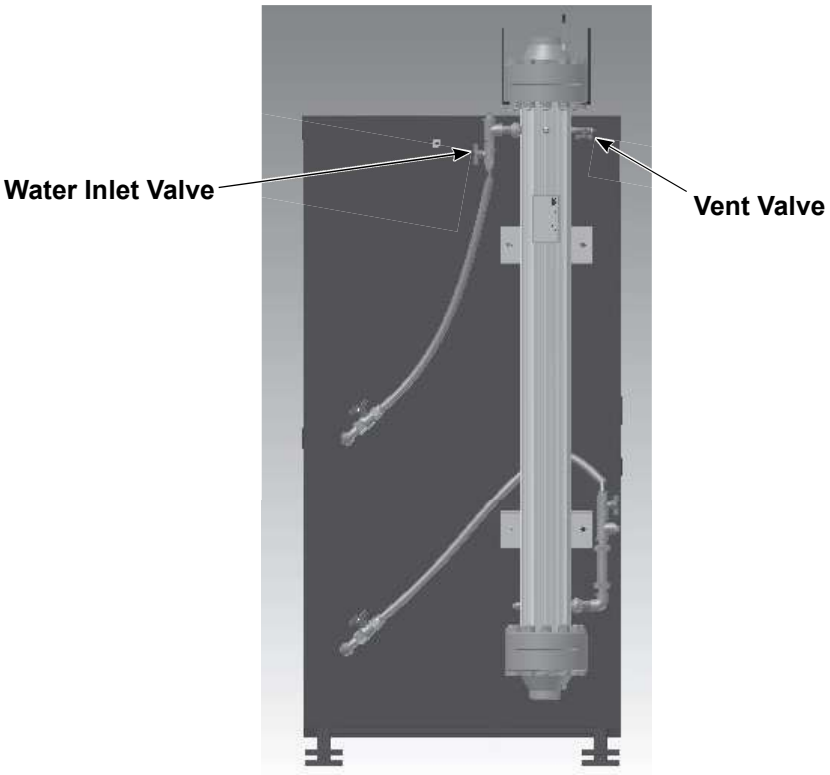

Figure 13 Inlet Valves on Heat Exchanger

Adjust Flowsetters

See Figure 14.

1. Lower the setpoint on the temperature controller to 59°F (15°C) in order to cause the solenoid valve to open.

   NOTE: System must be running and calling for chilling to make proper adjustments.

2. Adjust the chilled water supply flowsetter by turning slot screw until parallel to body of flowsetter.
3. Slowly turn the slot screw of the process return water flowsetter to reduce the flow to between 6.3-6.9 gpm (24-26 lpm).

   NOTE: Do not allow the process return water flowsetter slot screw to become perpendicular to the flowsetter body, as this will stop all water flow.

4. The white plunger of the chiller water supply flowsetter should be all the way up and almost out of view to give the optimum amount of water for both the chiller and the TCU circuit.
5. If water flow is low, check and clean the Y strainer. This should restore flow to the system.

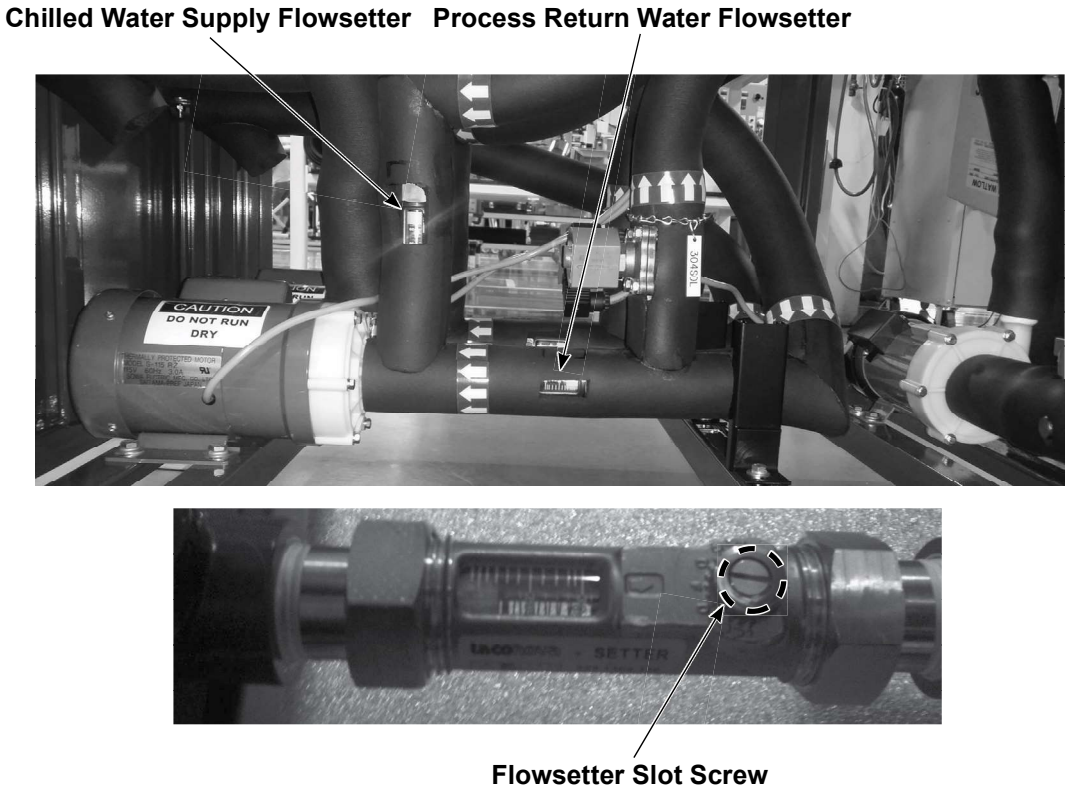

Figure 14 Flowsetters

Maintenance

The system should be inspected and cleaned every 90 days.

System Pressure

Observe the system pressure gauge. Normal operating pressure is 5-20 psi (0.34-1.38 bar). Low pressure indicates a pump problem, air in the system, or a plugged strainer or filter on the return line. High pressure indicates a flow blockage or restriction in the process loop.

Process Water Temperature

Check the temperature gauge in the cabinet. It should closely track the setpoint temperature.

Check the temperature displayed on the chiller controller. It should closely track the chilled water setpoint temperature. The refrigeration unit should turn on when the water temperature rises 5°F (2.8°C) above the setpoint.

System Condenser

The condenser fan filters should be replaced or cleaned as needed to ensure adequate airflow. The replacement cycle on the air filters depends on the surrounding air quality, ambient air temperature, and system run time. Clean the filters using compressed air.

Check and clean the condenser coils as necessary. The condenser can be cleaned by shutting down the system and brushing the condenser fins with a soft bristle brush, followed by blowing it out with compressed air. Care must be taken not to bend or flatten the condenser fins when cleaning.

In a severely contaminated area, it may be necessary to chemically clean the condenser. Contact a Nordson service representative before attempting to chemically clean the condenser.

NOTE: The green indicator should always be visible in the refrigerant sight glass. If it turns yellow, the refrigeration system has developed a leak and allowed moisture to enter.

Heat Exchanger

Over time, coating material will inevitably form deposits that restrict flow. Clean the heat exchanger tubing if any decrease in coating material flow is detected.

Before disassembling the heat exchanger, make sure you have two O-rings on hand.

Be careful not to damage the insulation around the heat exchanger. The insulation bonnets on either end can be removed to gain access to the inlet and outlet flange fasteners.

Water Level and Quality

See Figure 15.

Check the level of water in the reservoir. If lower than 4 in. (102 mm) from the top, add more water. Use only distilled water or clean tap water.

Test the corrosion inhibitor concentration and pH with the recommended Molybdate test kit. Add more corrosion inhibitor as necessary. Refer to the following pages for the test procedure.

NOTE: Always check the corrosion inhibitor concentration after adding new water.

If the system water quality is poor, it may be necessary to flush the system to remove contaminated water.

Remove the process water strainer and clean the screen periodically.

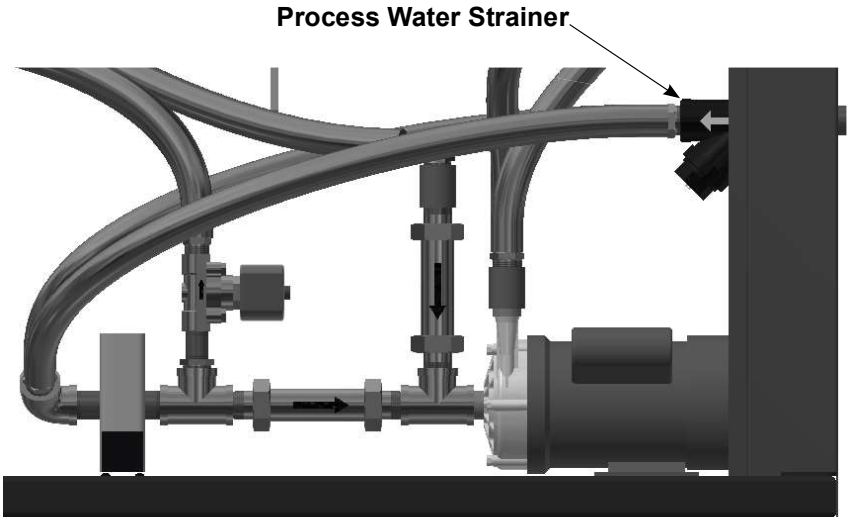

Figure 15 Process Water Strainer

Water Test Kit Instructions

Molybdate Test Procedure for PN 1068648

1. Add 5 ml of water from the reservoir to the square mixing bottle. The sample should be clear. If it is not, filter it first.
2. Add 20 ml of distilled water to the sample water.
3. Add the contents of one MolyVer 1 Molybdenum Reagent Powder Pillow to the sample. Swirl to mix.
4. Add the contents of one MolyVer 2 Molybdenum Reagent Powder Pillow to the sample. Swirl to mix.
5. Add the contents of one MolyVer 3 Molybdenum Reagent Powder Pillow to the sample. Swirl to dissolve.
6. If the Assurance 3770 corrosion inhibitor is present, a yellow color will develop. Wait at least 3 minutes, but no longer than 15, to proceed to the next step.
7. Fill one of the color viewing tubes to the 5 ml mark with the prepared sample.
8. Insert the tube into the right opening of the color comparator.
9. Add 1 ml of the sample to the second viewing tube. Add distilled water to the 5 ml mark, then insert the tube into the left side of the comparator.
10. Hold the comparator up to a light source and look through the two openings in the front while rotating the color disk until a color match is obtained.
11. Read the ppm of molybdate through the scale window of the comparator. The number from the reading using the color wheel will need to be multiplied by 10, due to the dilution process used. The multiplied value can now be compared to the ideal range of 250-350 ppm.

NOTE: 1 mg/L = 1 ppm.

NOTE: Avoid exposing the color disks to direct sunlight for extended periods of time to protect them from fading caused by ultraviolet light.

Molybdate Test Procedure for PN 1622896

1. Be sure that the corrosion inhibitor has been added to the water and completely mixed.
2. Remove a single test strip from the container.
3. Dip the test strip into the water tank for one second.
4. Remove the test strip from the water. Shake off any excess water.
5. Immediately compare the color of the test strip to the color chart on the bottle. Do this within 10 seconds of removing the test strip.
6. The color of the test strip should be in the range between the color for 300 ppm and 350+ ppm.

pH Test

The ideal pH is between 7.5 and 8.5.

1. Dip one test strip into a water sample for 10 seconds. Keep the strip motionless while it is in the water.
2. Remove the strip from the water and match the pH color, then the total alkalinity color, within 30 seconds.

Troubleshooting

WARNING: Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

Problem	Possible Cause	Corrective Action
1. Unit will not operate	Power supply	Check the power supply to the temperature control unit.
	Circuit breaker tripped	Check circuit breakers (refer to page 10). Fix problem that tripped breaker before restarting.
2. Power on indicator on but unit will not operate	Chiller ON indicator off, process water pump off	Check reservoir level and add water if below float switch. A low water level will disable the compressor and chilled water pump.
		Check float switch operation. Replace if necessary.
	Chiller ON indicator off, process water pump running	Check for proper water flow in system.
		Check the low temperature thermostat, reset if necessary.
		Reset refrigeration system with reset button on pressure control.
		Check condenser fan filters, clean or replace as necessary.
		Check condenser, clean if necessary.
3. Unit operating but no temperature control	No water circulation	Make sure inlet and outlet valves at cabinet and heat exchanger are open.
		Make sure pumps are primed.
		Make sure flowsetters are adjusted correctly.
		Check for air lock in process loop.
		Check temperature controller settings.
	SErr code on temperature controller	Defective heat exchanger RTD or RTD wiring. Check wiring.
		Depressurize system and remove RTD. Test RTD for continuity and resistance (100 Ω across device, 5 Ω across common).
	SErr code on chiller controller	Defective reservoir RTD or RTD wiring. Check wiring. Remove RTD and test for continuity and resistance (100 Ω across device, 5 Ω across common).
4. Heater High Temperature Fault	Immersion heater temperature is over 140°F (60°C)	Check for water flow through heater.
		Check temperature controller settings.
		Check solid state relays for voltage bleed.
5. Material Temperature Range Fault	Coating material temperature is outside the setpoint range of ±5°F (±2.8°C)	This fault commonly appears at startup. If it persists, make sure the controller is adjusted properly and that the heater or chiller is functioning.

Continued...

Problem	Possible Cause	Corrective Action
6. Chiller Fault	Water temperature too low	Low temperature thermostat has disabled refrigeration unit because water temperature is below thermostat setting 40°F (4.4°C).
		Check chiller controller setting.
		Check chilled water flow.
		Correct problem and reset thermostat.
	Low or no chilled water flow	Check chilled water pump.
	Refrigeration pressure control: High pressure	Check fan operation.
		Check condenser filters. Clean or replace filters.
		Check for air flow across condenser.
		Clean condenser fins with a soft-bristle brush.
		Check ambient temperature. If out of unit specifications, take steps to lower ambient temperature.
		Reset switch after correcting problem.
	Refrigeration pressure control: Low pressure	If ambient temperature out of unit specifications, take steps to increase ambient temperature.
		Chilled water setpoint is too low. Check chiller controller settings. Setpoint should be 50°F (10°C).
		Loss of refrigerant. Check refrigerant charge.
	Compressor motor overload	Check overload setting, monitor compressor current draw.
7. Low Water Level Fault	Water level in reservoir below float switch (fault disables pumps, heaters, and control circuits to prevent damage)	If this fault occurs while filling the system and purging air from the water loops, add water to the reservoir.
		If this fault occurs during production, check the water loops for leaks.

Continued...

Problem	Possible Cause	Corrective Action
8. Material too warm	Solenoid valve open but Sub 4 indicator for cooling not being energized when cooling required	Temperature controller may require reconfiguration. Refer to the temperature controller (Omron) chart in *Appendix*.
	Sub 4 lights but the solenoid valve does not open	Check circuit breaker 4K1 (refer to page 12) and the solenoid valve. Replace the solenoid valve if necessary.
	Adjustment of flowsetters	Check the return flowsetters for proper adjustment (refer to page 9).
	No water flow or pressure in the chilled water circulation loop	Check chilled water pump circuit breaker or pump (refer to page 12).
	Power is present to the chilled water pump, but there is no flow	Check the pump and water lines for restrictions or obstructions. Replace the pump if necessary.
	Refrigeration system - reservoir water temperature incorrect	The pipe at the water outlet from the evaporator should be cold. Check the reservoir water temperature. The reservoir water temperature should be 55°F (13°C). If the condenser fan #1 is not operating, check the variable speed control (refer to page 14). If the fan is operating, check the condenser coils for dirt or dust buildup. Clean the condenser fins with a soft-bristle brush and compressed air. If the fan is not operating and the circuit breaker is on, or if the fan is operating and the condenser coils are clean, then there is a problem with the refrigeration system. Refer to *Chiller Fault* on page 35. If user cannot solve the problem, contact a Nordson representative.
	Air in system	Make sure that all air is bled from the heat exchanger on the material and the water sides.
	Solid state relays are bleeding voltage by and the heaters are being energized without output 1 being on	Check heater amperage with a meter, and replace relays as needed.

Continued...

Problem	Possible Cause	Corrective Action
9. Material too cold	Output 1 not being energized when heating required	Temperature controller may require reconfiguration. Refer to the temperature controller (Omron) chart in *Appendix*.
	Output 1 lights but no heating occurs	Check the heater circuit breakers 1F1 (refer to page 12). The heater is a 3-phase device. If the heater is heating but is not at full capacity, one element may have failed or one circuit breaker could be faulty.
	Heater elements need repair	Turn off power at the main disconnect and check the continuity and resistance of the heater elements. Replace the heater elements if necessary.
	Output 1 lights and heater high temperature indicator is lit, the water temperature has exceeded the thermostat setting 140°F (60°C), which disables the heater	Make sure there are no obstructions to water flow within the heater and that the temperature controller settings are correct.
	Heater high temperature alarm on	Refer to *Heater High Temperature Fault* on page 34.
10. Water pressure too high	Valves not open	Except for the drain valve, make sure all valves in the process water loop are completely open.
	Kinked or blocked water hoses	Check water hoses for kinks or from being blocked.
	Dirty or clogged strainer screen	Shut down the system and remove the strainer screen (refer to page 32). Clean the screen. If the screen is clogged, check the water quality. If necessary, drain and flush the system.
11. Water pressure too low	Low pressure from process water pump	Make sure the process water pump is fully primed with water and the pump inlet is not blocked.
		Make sure the process water pump is fully primed with water and the pump inlet is not blocked

Repair

WARNING: Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

RTD Replacement

WARNING: Depressurize the coating material system before removing the RTD. Failure to relieve all pressure could result in a high pressure fluid injection injury.

Disconnect the RTD electrical connection from the TCU. Use a 11/16 in. wrench to unscrew and remove the RTD from the heat exchanger.

Heat Exchanger Disassembly and Cleaning

If material flow through the heat exchanger becomes restricted, it can be disassembled and cleaned.

Materials required:

- Two O-rings
- ½ in. torque wrench
- Round steel rod, ½ in. x 7 ft (12.7 mm x 2134 mm)
- Rags
- Paper towels
- Compatible solvent
- Loctite® 242 or 248 thread adhesive

Disassembly

See Figure 16.

1. Shut down the temperature control unit (leave disconnect switch ON).

WARNING: Relieve the coating material system pressure before disconnecting the coating material lines from the heat exchanger. Failure to relieve all pressure could result in a high pressure fluid injection injury.

2. Depressurize the coating material system and isolate the heat exchanger from the rest of the system.
3. Disconnect the coating material lines from the heat exchanger.

CAUTION: The head assemblies are heavy. Support them while removing the fasteners. The faces of the head assemblies and the tube sheet are machined surfaces. Be careful not to damage them.

4. Using the loosening sequence shown, remove the bolts (5), lock washers (2), and nuts (1) from the head assembly (6). Remove the head assembly.
5. Remove and discard the O-ring (8).

Cleaning

See Figure 16.

1. Clean the head assembly (6), tube sheet head (3), and O-ring groove (4) with a putty knife, clean rags, and a compatible solvent. Be careful not to damage the machined surfaces or O-ring grooves.
2. For heat exchangers with mesh disk (7), cut tack welds to remove mesh disk.
3. Push the ½ in. steel rod into each each tube (9) to remove coating material.
4. Tear strips of paper towel, approximately 3 x 12 in. (76 x 304 mm), fold into thirds, then roll into plugs. Insert the plugs into the tubes and push them through with the steel rod.
5. Make more plugs and soak them in a compatible solvent. Push the plugs through the tubes to thoroughly clean the inside of the tubes.

   NOTE: If coating material is hardened or packed into the tubes, it may be necessary to drill out the tubes. A tube drill can be made by welding a ½ or $^{17}/_{32}$ in. drill bit to the end of a ½ in x 7 ft steel rod. Use a ½ in drill motor at slow speed to drill out the tubes.

   NOTE: See Figure 17. For units with static mixers, the heat exchanger may need to be replaced.

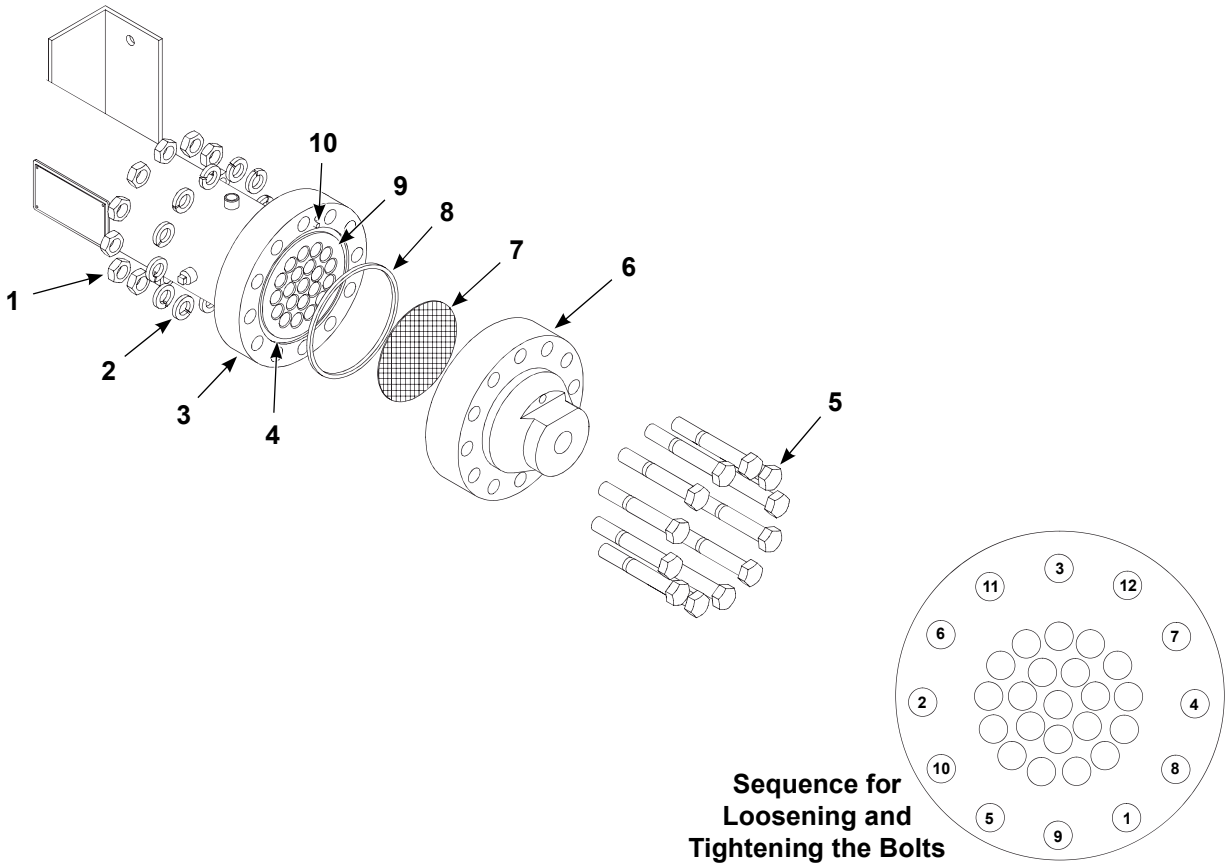

Figure 16 Heat Exchanger Disassembly

1. Nut
2. Lock washer
3. Tube sheet
4. O-ring groove
5. Bolt
6. Head assembly
7. Mesh disk
8. O-ring
9. Steel tube
10. Alignment pin

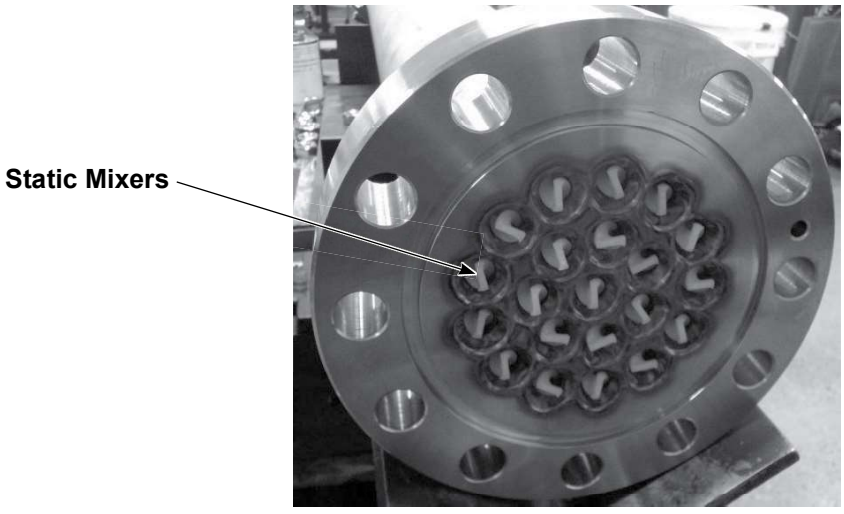

Figure 17 Heat Exchanger with Static Mixers

Assembly

See Figure 17.

1. Install a new O-ring (8) into the groove (4) on the tube sheet (3).
2. If removed during cleaning, install the alignment pin (10) into the tube sheet head (3).
3. Apply Loctite 242 or 248 thread adhesive to the threads of the bolts (5).
4. Align the head assembly (6) to the alignment pin (10). Install the head assembly onto the tube sheet (3) using the bolts (5), lock washers (2), and nuts (1). Only hand-tighten the nuts and bolts.
5. Using the tightening sequence shown, perform the following to tighten the bolts:
   a. Tighten the bolts to 80 ft-lbs (108 N●m).
   b. Next, tighten the bolts to 140 ft-lbs (190 N●m).
   c. Finally, tighten the bolts to 200 ft-lbs (271 N●m).
6. Connect the coating material lines. Check for leaks when the system is repressurized.

Parts

To order parts, call the Nordson Industrial Coating Solutions Customer Support Center at (800) 433-9319 or contact your local Nordson representative.

System Components

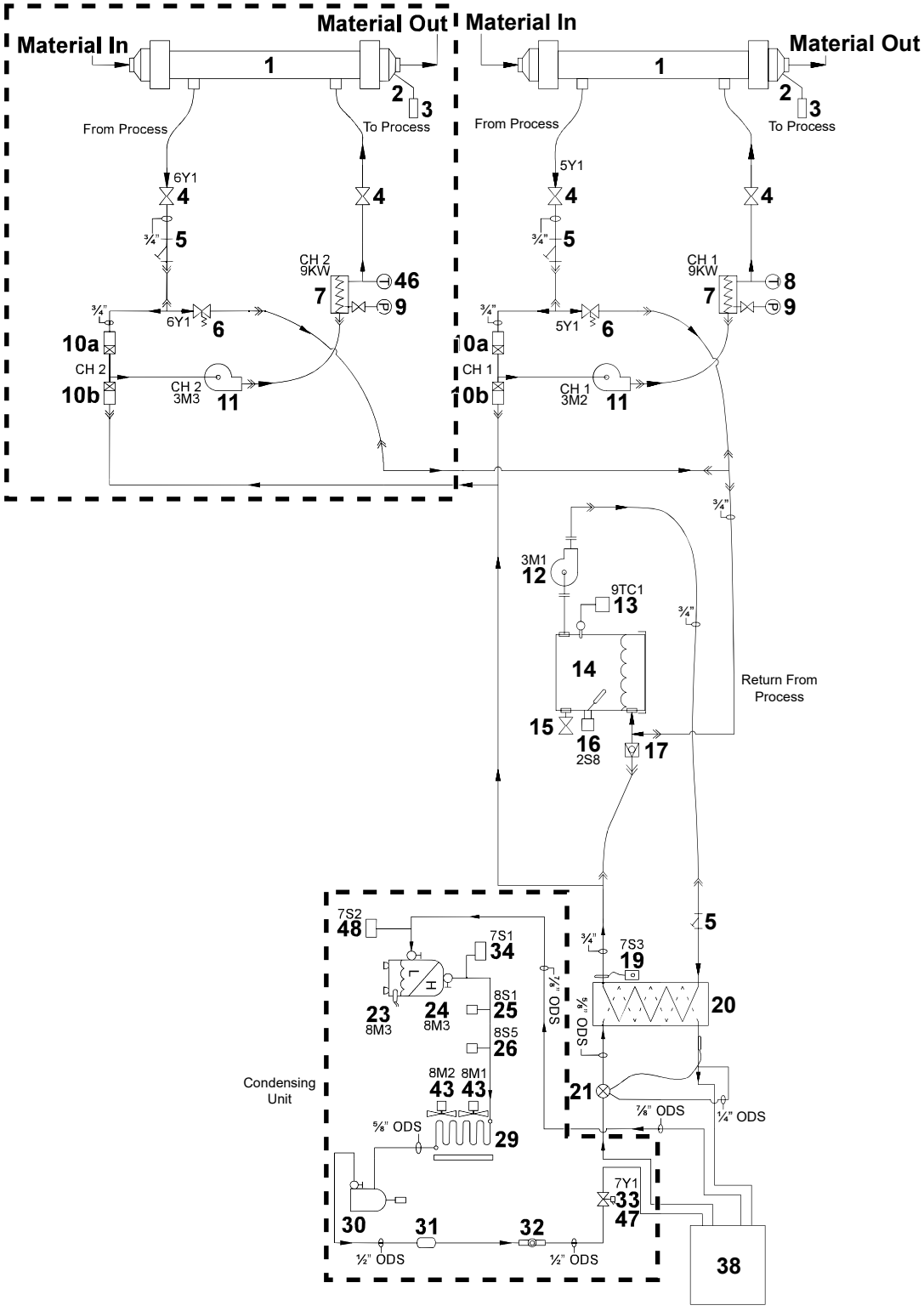

Figure 18 Temperature Control Unit Diagram – Air-Cooled Condensor

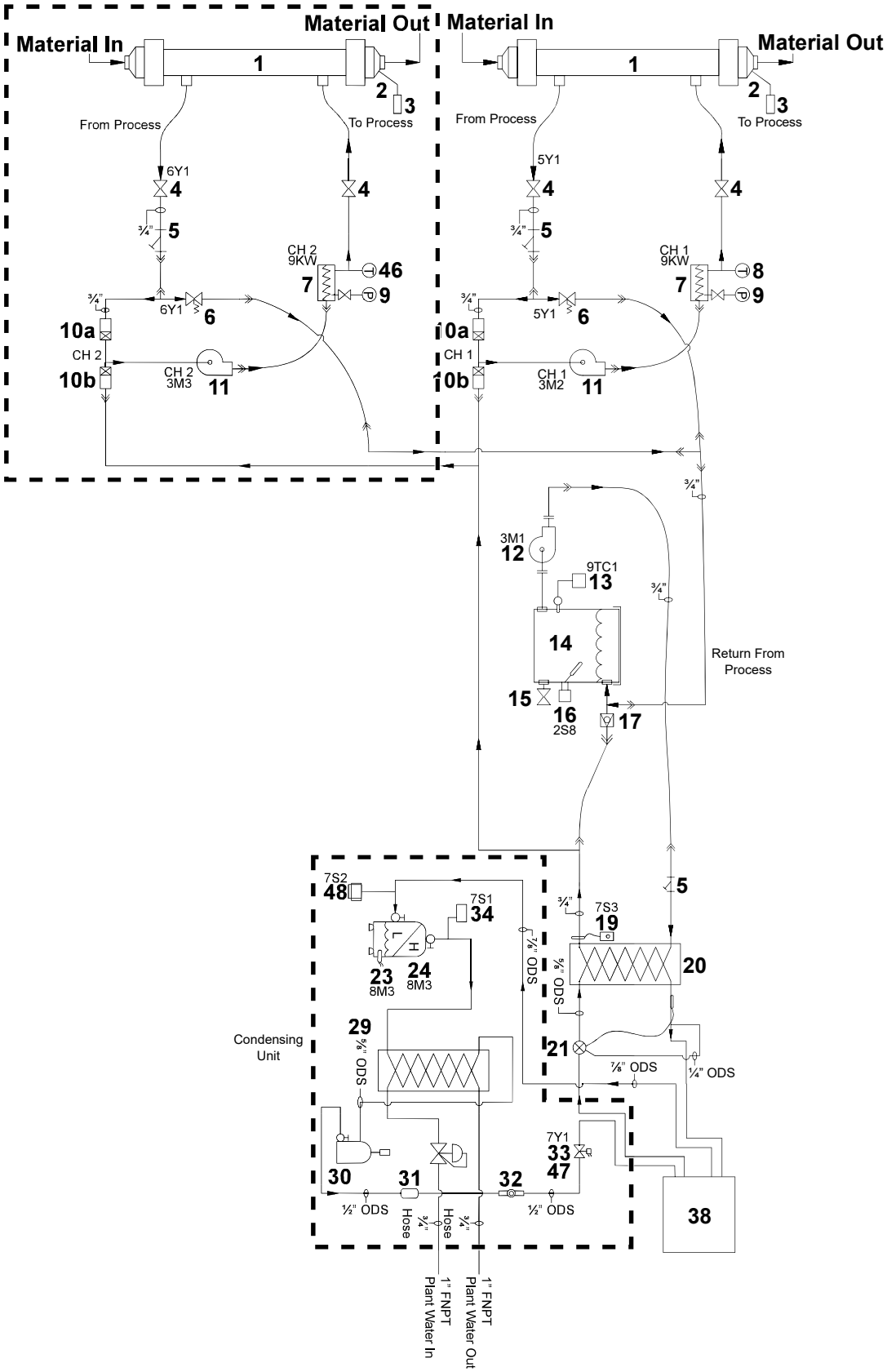

Figure 19 Temperature Control Unit Diagram – Water-Cooled Condensor

Item	Part	Description	Note
1	1621336	HEAT EXCHANGER, TCU	C, D, E, F, G
2	1612957	RTD ASSEMBLY, 100 Ohm, 36 in., 3-pin hart, ⅜ NPT	C, D, E, F, G
3	1626896	CONTROLLER, TCU, digital, 24 Vdc	C, D, E, F
4	1621365	VALVE, service, heat exchanger, TCU	C, D, E, F
5	1050805	STRAINER, ¾ in., with 20 mesh screen	C, D, E, F
6	282519	VALVE, solenoid	A, C, D, E, F
	1614619	VALVE, solenoid, 24 Vdc, ½ in.	A, C, D, E, F
7	1074494	HEATER, 12 kw/480 V, TCU, CE	C, D, E, F
	1075281	HEATER, 9 kw/480 V, TCU, Non-CE	C, D, E, F
8	1027363	THERMOMETER, 0-200°, bi-metal, right hand mount	C, D, E, F
9	1614617	GAUGE, back mount pressure, 0-60 psi	C, D, E, F
10	1075284	FLO-SETTER, 1-5 gpm, taco, SX0021A	C, D, E, F
11	1078858	PUMP, process, 115 V, ⅔ HP	C, D, E, F
12	1091208	PUMP, process, 115 V, ⅛ HP	B, C, D, E, F
13	1621366	DETECTOR, RTD, chilled water, TCU	C, D, E, F
14	1621338	RESERVOIR, water, chilled, TCU	C, D, E, F
15	1621339	VALVE, drain, reservoir, water, chilled, TCU	C, D, E, F
16	1042071	SWITCH, float, with cable	C, D, E, F
17	1621340	VALVE, check, TCU	C, D, E, F
19	1621341	SENSOR, freeze stat, TCU	C, D, E, F
20	1621362	ASSEMBLY, evaporator, TCU, 3T	C, E
	1621363	ASSEMBLY, evaporator, TCU, 5T	D, F
21	1621342	VALVE, metering, TCU, 3T	C, E
	1621343	VALVE, metering, TCU, 5T	D, F
23	1621372	HEATER, compressor, TCU	C, D, E, F
24	1621234	COMPRESSOR, TCU, 3T	C, E
	1621346	COMPRESSOR, TCU, 5T	D, F
25	1621347	SWITCH, pressure, fan, 2, TCU	C, D
26	1621348	CONTROLLER, speed, variable, fan, 1, TCU	C, D
29	1621367	ASSEMBLY, condensor, air-cooled, TCU, 3T	C
	1621368	ASSEMBLY, condensor, air-cooled, TCU, 5T	D
	1621369	ASSEMBLY, condensor, water-cooled, TCU, 3T	E
	1621370	ASSEMBLY, condensor, water-cooled, TCU, 5T	F

Continued...

Item	Part	Description	Note
30	1621373	RECEIVER, refrigerant, TCU	C, D, E, F
31	1621349	FILTER DRIER, refrigerant, TCU	C, D, E, F
32	1621350	ASSEMBLY, sight glass, refrigerant, TCU	C, D, E, F
33	1621351	BODY, valve, solenoid, line, liquid, refrigerant, TCU	C, D, E, F
34	1621344	SWITCH, pressure, high-side, TCU	C, D, E, F
38	1621352	ACCUMULATOR, refrigerant, TCU	C, D, E, F
43	1614621	MOTOR, fan, 3T/5T conditioning unit	C, D
44	1621353	REGULATOR, pressure, water, TCU	E, F
46	1078870	THERMOMETER, 0-200°, back-mount	D, F
47	1621364	HEAD, valve, solenoid, lin, liquid, refrigerant, TCU	C, D, E, F
48	1621345	SWITCH, pressure, low-side, TCU	C, D, E, F
NS	1614622	BLADE, fan, 3T/5T conditioning unit	C, D
NS	1614623	GUARD, fan, 3T/5T conditioning unit	C, D
NS	1614620	CONTROLLER, love, 24 V, F, display	C, D, E, F

NOTE: A. 120 Vac solenoid used prior to 2015. Check solenoid voltage on unit before ordering.

B. Triple TCU units and quad units use a larger chilled water pump. Contact Nordson for correct part number for specific TCU model.

C. 3-ton, single, air-cooled condensor.

D. 5-ton, single, air-cooled condensor.

E. 3-ton, single, water-cooled condensor.

F. 5-ton, single, water-cooled condensor.

G. Not included with external heat exchanger units.

AR: As Required

Heat Exchanger

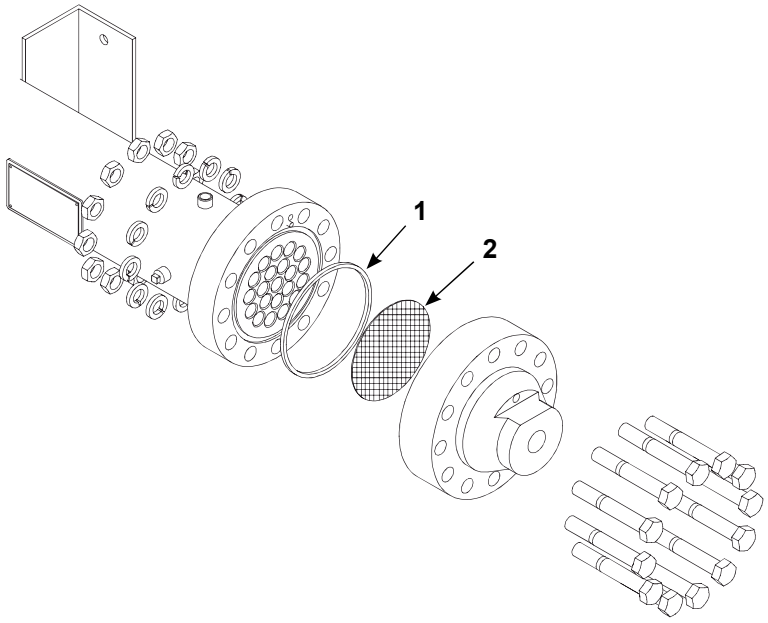

Figure 20 Heat Exchanger

Item	Part	Description	Quantity	Note
—	1611020	KIT, TCU, static mixer, 6 ft	1	
—	1611021	KIT, TCU, static mixer, 7 ft	1	
—	1611022	KIT, TCU, static mixer, 8 ft	1	
1	1613197	• O-RING, PTFE, encapsulated Viton®, 80 Duro	2	
2	1613307	• SCREEN, heat exchanger	2	
NS	973415	PLUG, pipe, socket, standard, ¼, stainless steel	1	A
NOTE: A. Only use on retrofit installations. AR: As Required				

Flushing Manifold

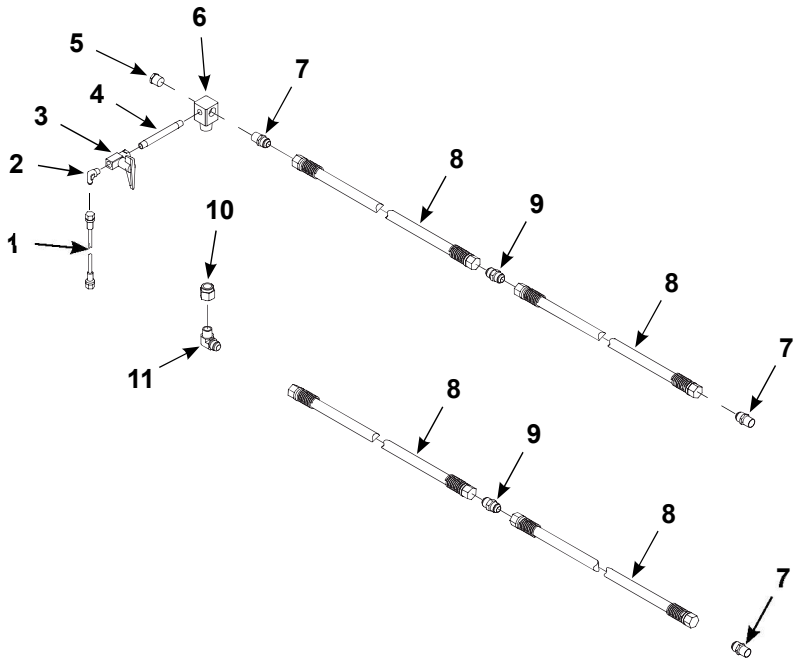

Figure 21 TCU Flush Manifold Kits

Item	Part	Description	Quantity	Note
—	1609034	KIT, flushing, heat exchanger	1	
—	1614453	KIT, flushing, heat exchanger, without hoses	1	
1	- - - - - -	• HOSE, PTFE, 0.25 ID, 6 ft	1	
2	- - - - - -	• ELBOW, male, 37, ½-20 x ⅜ NPT	1	
3	- - - - - -	• VALVE, ball, stainless steel	1	
4	- - - - - -	• NIPPLE, stainless steel, schedule 40, ⅜ x 6 LG	1	
5	- - - - - -	• PIPEFITTING, NPT, plug-socket-thread, male, ¾, stainless steel	1	
6	- - - - - -	• ADAPTER, fitting, TCU, flush kit	1	
7	972110	• CONNECTOR, male, 37, 1 1⁄16-12 x ¾, stainless steel	—	A, B
8	829072	• HOSE, siphon, ¾ ID, 6 ft	4	A
9	1609028	• FITTING, conntector, male, 37 degree, ¾ x 34	2	A
10	- - - - - -	• BUSHING, pipe, hydraulic, 1 x ¾, stainless steel	1	C
11	972603	• ELBOW, male, 37, 1-1⁄16-12 x ¾, stainless steel	1	C
NS	301866	• STRAP, Velcro, with buckle, 41 x 3 cm	2	

NOTE: A. Part not included in Kit 1614453.

B. Kit 1609034 contains three connectors. Kit 1614453 contains one connector.

C. Used on material inlet on heat exchanger.

AR: As Required

RTD Assemblies

Part	Description	Note
1612957	RTD ASSEMBLY, 100 Ohm, 36 in., 3 pin, harting, ⅜ NPT	
1612960	CABLE ASSEMBLY, extension, 50 ft, 3 pin, harting	A
Retrofits		
1614250	RTD ASSEMBLY, 100 Ohm, 36 in., 3 pin, mini, ⅜ NPT	B
1077958	RTD ASSEMBLY, 100 Ohm plat, 18 in., 3 pin, mini, ¼ NPT	B
1612961	CABLE ASSEMBLY, extension, 50 ft, 3 pin, harting, 3 pin mini	A, B

NOTE: A. Used on remote heat exchangers.

B. Only use on retrofit installations.

Air Filters

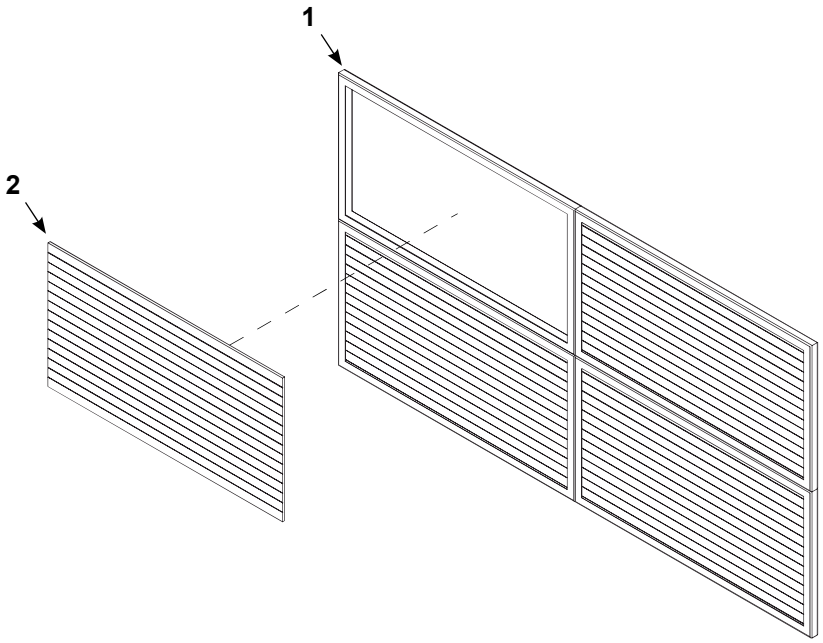

Figure 22 Air Filters

Item	Part	Description	Quantity	Note
Single and Dual Systems				
1	1615290	FRAME, filter, aluminum, 3 ton and 5 ton TCU		
2	1615291	FILTER, air, 3 ton and 5 ton TCU		
Triple and Quad Systems				
1	1615292	FRAME, filter, aluminum, 7.5 ton and 10 ton TCU		
2	1615293	FILTER, air, 7.5 ton and 10 ton TCU		

Test Kit

Part	Description
1068648	KIT, test, Corrshield MD405
1622896	KIT, test strips, Molybdate

Water Treatment

Part	Description
1030973	INHIBITOR, corrosion, Corrshield MD405 qt

TCU Standard Options

Part	Part	Description	Note
1621200	—	SYSTEM, control, temperature, 3 ton, single, water cooled	A
1621201	—	SYSTEM, control, temperature, 3 ton, single, air cooled	A
1621202	—	SYSTEM, control, temperature, 5 ton, dual, water cooled	A
1621203	—	SYSTEM, control, temperature, 5 ton, dual, air cooled	A
—	1623186	SYSTEM, control, temperature, 3 ton, single, water, without heat exchanger	B
—	1623187	SYSTEM, control, temperature, 3 ton, single, air, without heat exchanger	B
—	1623188	SYSTEM, control, temperature, 5 ton, dual, water, without heat exchanger	B
—	1623189	SYSTEM, control, temperature, 5 ton, dual, air, without heat exchanger	B

NOTE: A. Equipped with heat exchanger.

B. Not Equipped with heat exchanger.

External Heat Exchanger Kit

NOTE: If a TCU is ordered without a heat exchanger, it is possible to order heat exchanger kit 1623184 in the desired quantity.

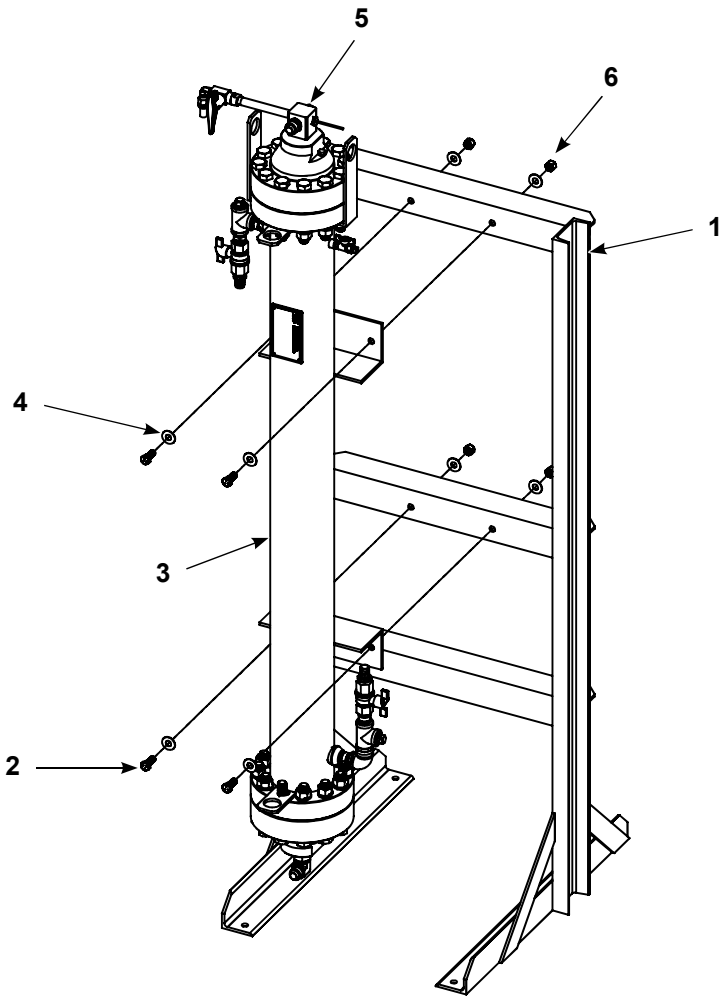

Figure 23 External Heat Exchanger Kit

Item	Part	Description	Quantity	Note
—	1623184	KIT, heat exchanger assembly, TCU	1	
1	1090988	• FLOOR MOUNTED STAND, 5 ft x 72 ft, heat exchanger	1	
2	- - - - - -	• SCREW	4	A
3	1621336	• HEAT EXCHANGER,TCU	1	
4	- - - - - -	• WASHER	8	A
5	1612957	• RTD ASSEMBLY, 100 ohm, 36 in., 3 pin, 3/8 NPT	1	
6	- - - - - -	• LOCKNUT	4	A
NS	7700519	• MIXER ELEMENT, .50 in. x 18 in.	175	
NS	1621236	• HEAT EXCHANGER KIT, remote, system, temperature, 75 ft	1	
NS	1609034	• HEAT EXCHANGER FLUSHING KIT	1	
NS: Not Shown				

Appendix

E5EC Temperature Controller Settings

Go to AMoV and set adjustment level and advanced level first.

NOTE: All parameters may or may not be available. Standard parameters for adjustment are highlighted throughout the table.

Operation Level			
Display	**Definition**	**Default Settings**	**Nordson Factory Settings**
PV	Process Value (White)		
SV	Set Value (Green)	Celcius (C)	F or C
MV	Manipulated Variable (Yellow) Heat %		
Display Key	**Set initial settings — first press menu button 3-4 seconds and go to adjustment level**	**Default Settings**	**Nordson Factory Settings**
AM	Auto Manual		
R-S	Run/Stop	Run	Run
AL1H	Alarm 1 High	0.0	5 F/2.8 C
AL1L	Alarm 1 Low	0.0	5 F/2.8 C
AL2H	Alarm 2 High	0.0	5 F/2.8 C
AL2L	Alarm 2 Low	0.0	5 F/2.8 C
0	Output % Heat		
C-0	Output % Cool		
Initial Setting Level	**Press display key and level key for 1 second**	**Default Settings**	**Nordson Factory Settings**
Ladj	Level Adjust	3000.0	3000.0
AT	Auto Tune Execute/Cancel	Off	Off
CnS	Temperature Input Shift	0.0	0.0
iNRT	Process Value Slope Coefficient	1.0	1.0
P	Proporational Band	8.0	7.0
I	Integral Time	233.0	170.0
d	Derivative Time	40.0	29.0
C-P	Cooling Proportional Band	8.0	33.0
C-I	Cooling Integral Time	233.0	232.0
C-d	Cooling Derivative Time	40.0	40.0
C-SC	Cooling Coeffients	1.0	1.0
C-db	Cooling Dead Band	0.0	0.0
SPRt	Setpoint Ramp Time Unit	Off	Off
SPRL	Setpoint Ramp Fall Value	SAME	SAME
oL-H	MV Upper Limit	100.0	100.0
oL-L	MV Lower Limit	-100.0	-100.0
Orl	MV Change Rate Limit	0.0	0.0

Continued...

Adjustment Level	Press level key initial setting level (hold bottom button down for 3-4 seconds)		
Set advanced level first			
To unlock AMOV setting hold close loop and open loop at the same time change CCPT from 1 to 0			
To get to advanced level, press and hold level key until In-T (CN-T) comes up. Then press mode key 20 times until iNiT (CNCT) is showing. Enter "-169" again press level key. To exit, press level key.			
Cn-T	Input Type	5	1
d-U	C/F Selection	C	C or F depending
SL-H	Setpoint Upper Limit	500.0/900.0	130°F/54°C
SL-L	Setpoint Lower Limit	-199.9/ -199.9	60°F/15.5°C
CntL	Control On/Off or PID	Stnd	Pid
S-HC	Standard or Heat/Cool	Stnd	H-C
PTRN	Program Pattern	Off	Off
CP	Control Period (Heat)	20.0	20.0
C-CP	Control Period (Cool)	20.0	20.0
oREV	Direct or Reverse Act	or-r	or-r
ALt1	Alarm 1 Type	2 Deviation upper limit	1 Deviation upper/ lower limit
ALH1	Alarm 1 Hysteris	0.2	0.2
ALt2	Alarm 2 Type	2 Deviation upper limit	4 Deviation upper/ lower limit
ALH2	Alarm 2 Hysteris	0.2	0.2
AMoV	Advanced Function Setting Level (see note)	0.0	
NOTE: Press mode key 20 times to get to AmoV.			

Advanced Level Settings	All parameters may or may not be there. Be concerned with highlighted ones only.	Default Settings	Nordson Factory Settings
iNiT	Parameter Initialization	Off	Off
MSPU	Number of Multi SP Points	Off	Off
SPRU	SP Ramp Time Unit	M	M
SbIN	Auxiliary Output 1 Open in Alarm	N-o	N-o
Sb2N	Auxiliary Output 2 Open in Alarm	N-o	N-o
Sb3N	Auxiliary Output 3 Open in Alarm	N-o	N-o
Sb4N	Auxiliary Output 4 Open in Alarm	N-o	N-o
ALFA	ALFA DO NOT TOUCH	0.65	0.65
TidU	Interigal/Derivative Time Unit	1.00	1.00
At-G	At Calculated Gain Width	0.8	0.8
At-H	Auto Tune Hysteresis	1.4	1.4
CNF	Input Digital Filter	0.0	1.0

Continued...

Advanced Level Settings	All parameters may or may not be there. Be concerned with highlighted ones only.	Default Settings	Nordson Factory Settings
MAV	Moving Average Count	Off	Off
odP	MV Display	Off	On
REt	Automatic Return of Display	Off	99
bRGt	Display Brightness	3	3
A1Lt	Alarm 1 Latch	Off	Off
A2Lt	Alarm 2 Latch	Off	Off
PRLt	Move to Protect Level Time	3.0	3.0
A1oN	Alarm 1 ON Delay	0.0	0.0
A2oN	Alarm 2 ON Delay	0.0	0.0
A1oF	Alarm 1 OFF Delay	0.0	0.0
A2oF	Alarm 2 OFF Delay	0.0	0.0
MVSE	MV at Stop and Error Addition	Off	Off
AMAd	Auto/Manual Select Addition	On	On
MANt	Manual MV Initial Value	iNit	HoLd
Rt	Robust Tuning	Off	On
Out1	Control Output Assignment 1	o	o
SUB 1	Auxiliary Control 1 Assign	ALM1	NO ASSIGN
SUB 2	Auxiliary Control 2 Assign	ALM2	ALM2
SUB 3	Auxiliary Control 3 Assign	C-o	ALM1
SUB 4	Auxiliary Control 4 Assign	C-o	CO
MANL	Manual MV Limit Enable	Off	On
HCtM	Heating Cooling Tuning Method	0.0	3.0
oMPW	Minimum Output ON/OFF Band	1.0	1.0
PF	PF Setting	SHFT	A-M
SPD1	PV/SP No1 Display Selection	4.0	4.0
SPD2	PV/SP No2 Display Selection	0.0	0.0
odSL	MV Display Selection	o	o
PVdP	PV Decimal Point Display	On	On
PVST	Process Value Status Display Function	Off	ALM1
SVST	Setpoint Value Status Display Function	Off	MANU
d REF	Display Refresh Period	0.25	0.25
CMoV	Move to Calibration Level	0.0	0.0

E5EN-H Temperature Controller Settings

Go to AMoV and set adjustment level and advanced level first.

NOTE: All parameters may or may not be available. Standard parameters for adjustment are highlighted throughout the table.

Operation Level				
Display	**Definition**	**Default Settings**	**Nordson Factory Settings**	**Note**
PV	Process Value (Red)			
SV	Set Value (Green)	Celcius (C)	F or C	
MV	Manipulated Variable (Yellow) Heat %			
Display Key	**Set initial settings - first press menu button 3-4 seconds and go to adjustment level**	**Default Settings**	**Nordson Factory Settings**	
AM	Auto Manual	Off	Off	
RSP	Remote Setpoint			
SP-M	Local Setpoint			
R-S	Run/Stop	Run	Run	
AL1H	Alarm 1 High	0.0	5 F/2.8 C	
AL1L	Alarm 1 Low	0.0	5 F/2.8 C	
AL2H	Alarm 2 High	0.0	5 F/2.8 C	
AL2L	Alarm 2 Low	0.0	5 F/2.8 C	
Initial Setting Level	**Press display key and level key for 1 second**	**Default Settings**	**Nordson Factory Settings**	
Ladj	Level Adjust			
AT	Auto Tune Execute/Cancel	Off	Off	
CRdA	Infared Communication Use	Off	Off	
SPMd	To Select Local (LSP) or Remote (RSP) Setpoint	LSP	LSP	
Ct-1	Heater Current 1 Value Monitor	0.0	0.0	
Oc1	Heater Overcurrent Detection 1	50.0	50.0	
Ct2	Heater Current 2 Value Monitor	0.0	0.0	
Oc2	Heater Overcurrent Detection 2	50.0	50.0	
CnS	Temperature Input Shift	0.0	0.0	
P	Proporational Band	8.0	5.0	
C	Integral Time	233.0	180.0	
d	Derivative Time	40.0	0.0	
C-SC	Cooling Coeffients	1.0	1.0	
C-db	Cooling Dead Band	0.0	0.0	
SPRt	Setpoint Ramp Time Unit	Off	Off	
oL-H	MV Upper Limit	5.0	105.0	
oL-L	MV Lower Limit	0.0	-105.0	
Orl	MV Change Rate Limit	0.0	0.0	
			Continued...	

Adjustment Level	**Press level key initial setting level (hold bottom button down for 3-4 seconds)**			
Set adjustment level and advanced level first				
To unlock AMOV setting hold close loop and open loop at the same time change CCPT from 1 to 0				
To get to advanced level, press and hold level key until In-T (CN-T) comes up. Then press mode key 20 times until iNiT (CNCT) is showing. Enter "-169" again press level key. To exit, press level key.				
Display	**Definition**	**Default Settings**	**Nordson Factory Settings**	**Note**
Cn-T	Input Type	5	1	A
d-U	C/F Selection	C	C or F depending	A
SL-H	Setpoint Upper Limit	500.0/900.0	130°F/54°C	A
SL-L	Setpoint Lower Limit	-199.9/ -199.9	60°F/15.5°C	A
CntL	Control On/Off or PID	Pid	Pid	A
S-HC	Standard or Heat/Cool	Stnd	H-C	A
PTRN	Program Pattern	Off	Off	A
CP	Control Period (Heat)	20.0	20.0	A
C-CP	Control Period (Cool)	20.0	20.0	A
orEu	Direct or Reverse Act	or-r	or-r	A
ALt1	Alarm 1 Type	2 Deviation upper limit	1 Deviation upper/ lower limit	A, B
ALH1	Alarm 1 Hysteris	0.2	0.2	A
Alt2	Alarm 2 Type	2 Deviation upper limit	4 Deviation upper/ lower limit	A, B
ALH2	Alarm 2 Hysteris	0.2	0.2	A
tRt	Transfer Output Type	Off	Pv	A
Tr-H	Transfer Output High	900.0	200°F/100°C	A
Tr-L	Transfer Output Low	-199.0	0.0	A
EV-b	Bank Numbers Used	None	None	A
EV-2	Event Input Assignment 1	None	None	A
EV-3	Event Input Assignment 2	None	None	A
EV-4	Event Input Assignment 3	None	None	A
AMoV	Advanced Function Setting Level	0.0	password-169	
NOTE: A. Press mode key 20 times to get to AmoV. B. Normally open contact use 1; for normally closed use 4.				

Advanced Level Settings	All parameters may or may not be listed. Be concerned with the highlighted ones only.	Default Settings	Nordson Factory Settings
iNiT	Parameter Initialization	Off	Off
SPRU	SP Ramp Time Unit	M	M
SbIN	Auxiliary Output 1 Open in Alarm	N-O	N-O
Sb2N	Auxiliary Output 2 Open in Alarm	N-O	N-O
HbU	Heater Burnout Latch	On	Off
ALFA		0.65	0.65
At-G	At Calculated Gain Width	1.0	1.0
At-H	Auto Tune Hysteresis	1.4	1.4
CNF	Input Digital Filter	0.0	1.0
PVAD	Additional PV Display	Off	Off
odP	MV Display	Off	Off
rEST	Standby Sequence Reset	0	0
rEt	Automatic Return of Display	0	99
A1Lt	Alarm 1 Latch	Off	Off
A2Lt	Alarm 2 Latch	Off	Off
PRLt	Move to Protect Level Time	3.0	3.0
SERo	Input Error Output	Off	Off
CoLo	PV Change Color	Red	G-R
PV-B	PV Stable Band	5.0	5.0
A1oN	Alarm 1 ON Delay	0.0	0.0
A2oN	Alarm 2 ON Delay	0.0	0.0
A1oF	Alarm 1 OFF Delay	0.0	0.0
A2oF	Alarm 2 OFF Delay	0.0	0.0
iStP	Input Shift Type	iNSi	iNSi
MVSE	MV at Stop and Error Addition	Off	Off
AMAd	Auto/Manual Select Addition	On	On
Rt	Robust Tuning	Off	Off
HSU	HB On/Off	On	Off
Out1	Control Output Assignment 1	o	o
Out2	Control Output Assignment 2	Co	Co
SUB 1	Auxiliary Control 1 Assign	AL-1	AL-1
SUB 2	Auxiliary Control 2 Assign	AL-2	AL-2
CSEL	Character Select	On	On
rSPU	Remote Setpoint Enable	Off	On
rSPH	Remote Setpoint High Range	130	130°F/54°C
rSPL	Remote Setpoint Low Range	60	60°F/15.5°C
SPtr	Setpoint Tracking	Off	Off
RSEo	Remote Set Point Input Error Output	Off	Off
PIDI	PID Set Automatic Selection Data	PV	PV
PIDH	PID Set Automatic Selection Hysteresis	0.5	0.5
MANL	Manual MV Limit Enable	Off	On
CSCA	Automatic Cooling Coefficient Adjustment	Off	Off
OCU	Heater Overcurrent Use	On	Off
OCL	Heater Overcurrent Latch	On	On

Advanced Level Settings	All parameters may or may not be listed. Be concerned with the highlighted ones only.	Default Settings	Nordson Factory Settings
OCH	Heater Overcurrent Hysteresis	0.1	0.1
PF	PF Setting	A-M	A-M
SPdP	PV/SP Display Screen Selection	4.0	4.0
odSL	MV Display Selection	0.0	0.0
PVdP	PV Decimal Point Display	On	On
SPSt	Process Value Status Display Function	Off	Off
SPVt	Setpoint Value Status Display Function	Off	Off
d REF	Display Refresh Period	0.25	0.25
RA1	Control Output 1 ON/OFF Count Alarm Set Value	0.0	0.0
RA2	Control Output 2 ON/OFF Count Alarm Set Value	0.0	0.0
RAC	Control Output 1 ON/OFF Reset	0.0	0.0
CMoV	Move to Calibration Level	0.0	0.0

Love Chiller Controller Settings

CAUTION: To prevent damage to the chiller unit, do not deviate from the following settings.

Display	Definition	Default Settings	Nordson Factory Settings Farenheit (F)	Nordson Factory Settings Celsius (C)
Operation Level				
	Process Value	0	55	12
Primary Menu − Press Set-Set. Press up or down arrow to adjust. Press set and down arrow to return display.				
SP	Setpoint Adjust		55	12
Secondary Menu − Press Set for 8 seconds. Press Set to access menu parameters				
00	Access Code	0	0	0
r0	Differential Hystersis		5	3
r1	Lower Value Setpoint	-50	53	11
r2	Higher Value Setpoint	150	90	32
d0	Heating or Cooling	Co (Cool)	Co (Cool)	Co (Cool)
d2	Time for Defrosting	30	00	00
d8	Interval Time Between Defrosts	6	0	0
c0	Minimum Stop Time for Load	00	06	06
c1	Continuous Cycle Time	00	24	24
c2	On Time of Fault Cycle	5	10	10
c3	Off Time of Fault Cycle	5	6	6
P1	Ambient Probe Adjustment	00	00	00
H5	Parameter Access Dode	00	00	00
H6	Probe Type	Ptc	Ptc	Ptc
t0	Maximum Temperature on Display	150	150	83

Honeywell UDC3200 Controller Configuration Settings

To completely configure controller, follow the instructions starting from the top.

NOTE: All parameters may or may not be available. Standard parameters for adjustment are highlighted throughout the table.

Display	Definition	Default Settings	Nordson Factory Settings Celsius (C)
1st Press MAN/AUTO button on controller until A appears on the controller			
2nd Set input type			
INPUT 1			
IN1 TYPE	Input 1 Type	0-10mV	100 LO
IN1 HI	Not Adjustable	300	300
IN1 LO	Not adjustable	-300	-300
RATIO 1	Input Action Ratio	1	1
BIAS IN1	Input Bias	0	0
FILTER 1	Input Filter	1	1
BURNOUT1	Input Burnout Setting	None	None
3rd Change gain to prop band			
CONTROL			
PBorGAIN	Proportional or Gain	GAIN	PB PCT
4th Set Algorthm			
ALGORTHM			
CONT ALG	Control Algorthm	PID A	PID A
TIMER	Timer	DISABLE	DISABLE
IN ALG 1	Timer	NONE	NONE
5th Follow sheet below to complete controller configuration			
TUNING			
PROP BD	Proportional Band	1	5
RATE MIN	Derivative Time	0	0
RSET MIN	Integral Time	1	3
PROP BD 2	Proportional Band	1	5
RATE MIN 2	Derivative Time	0	0
RSET MIN 2	Integral Time	1	3
SECURITY	Security Setting	0	0
LOCKOUT	Lock Strategy	CALIB	NONE (cal before shipping)
AUTOMA	Automatic/Manual	ENABLE	DISABLE
RUN HOLD	Run Hold Select	ENABLE	DISABLE
SP SELECT	Setpoint Select	ENABLE	ENABLE
SP RAMP			
SP RAMP	Setpoint Ramp	DISABLE	DISABLE
SP RATE	Setpoint Ramp Rate	DISABLE	DISABLE

Continued...

5th Follow sheet below to complete controller configuration			
ACCUTUNE			
FUZZY	Fuzzy Logic	DISABLE	ENABLE
ACCUTUNE	Auto Tuning	DISABLE	DISABLE
ALGORTHM			
CONT ALG	Control Algorthm	PID A	PID A
TIMER	Timer	DISABLE	DISABLE
IN ALG 1	Timer	NONE	NONE
OUT ALG			
OUT ALG	Output Algorthm	CURRENT	TIME D
CO RANGE	Co Range	4-20 Ma	MECH
RLYSTATE	Output @ 0%	1OF 2OF	1OF 2ON
PLYTYPE	Relay Type	MECHAN	MECHAN
INPUT 1			
IN1 TYPE	Input 1 Type	0-10mV	100 LO
IN1 HI	Not Adjustable	300	300
IN1 LO	Not Adjustable	-300	-300
RATIO 1	Input Action Ratio	1	1
BIAS IN1	Input Bias	0	0
FILTER 1	Input Filter	1	1
BURNOUT1	Input Burnout Setting	NONE	NONE
INPUT 2			
IN2 TYP	Input 2 Type	1-5V	DISABLE
XMITR2	Transmitter Characterization	LIN	[For 4-20] LIN
IN2 HI	Input 2 Hi Limit	2400	200
IN2 LO	Input 2 Low Limit	0	0
RATIO2	Input Action Ratio	1	1
BIAS2	Input Bias	0	0
FILTR2	Input 2 Filter	1	1
CONTROL			
INP 1	Input 1	PV SOURCE	PV SOURCE
PID SETS	# of Control PID Values	1 ONLY	1 ONLY
LSP'S	Local Setpoint Source	1 ONLY	1 ONLY
RSP SRC	Remote Setpoint Source	NONE	NONE
AUTOBIAS	Auto Bias Adjustment	DISABLE	DISABLE
SP TRACK	Setpoint Tracking	NONE	NONE
PWD MODE	Power on Mode	MANUAL	AL SP
SP HiLIM	Setpoint High Limit	300	120F/46
SP LoLIM	Setpoint Low Limit	0	60F/15C
ACTION	Control Action	REVERSE	REVERSE
OUT RATE	Output Rate	DISABLE	DISABLE

Continued...

5th Follow sheet below to complete controller configuration			
OUTLoLIM	Output Low Limit	0	0
OUTHiLIM	Output High Limit	100	100
1 Lo LIM	1 Low Limit	0	0
1 Hi LIM	1 High Limit	100	100
DEADBAND	Deadband	2	0
DROPOFF	Dropoff	0	0
FAILSAFE	Failsafe Output	0	50
FAILMODE	Failure Mode	NO LAT	NO LAT
MAN OUT	Manual Output Start	0	50
AUTO OUT	Auto Output Start	0	50
PBorGAIN	Proportional or Gain	GAIN	PB PCT
MINorRPM	Minutes or RPM	MIN	MIN
OPTIONS			
AUXOUT	Auxiliary Output	DISC	DISC
0 PCT	Auxiliary Output Low	0	0
100 PCT	Auxiliary Output High	100	200
CRANGE	Auxiliary Output Range	4-20	4-20
DIGINT	Digital Input	NONE	NONE
COM			
COM ADDR	Communication Address	3	3
ComSTATE	Communications State	DISABLE	DISABLE
IRENABLE	Infered Enabled	ENABLED	ENABLED
BAUD	Baud Rate	19200	19200
TX DELAY	Text Delay	1	
ALARMS			
A1S1TYPE	Alarm 1 Type	NONE	DEV
A1S1 VAL	Alarm 1 Value	90	5 F/2.8 C
A1S1 HL	Alarm 1 High or Low	HIGH	LOW
A1S2TYPE	Alarm 1 Type	NONE	DEV
A1S2 VAL	Alarm 1 Value	10	5 F/2.8 C
A1S2HL	Alarm 1−2 High or Low	LOW	HIGH
A2S1TYPE	Alarm 2 Type	NONE	NONE
A2S1TYPE	Alarm 2 Type	NONE	NONE
AL HYST	Alarm Hysterisis	0.1	0.2
ALM OUT1	Alarm Output Type	NO LAT	NO LAT
BLOCK	Alarm Blocking	DISABLE	DISABLE
DIAGNOST	Diagnostics	DISABLE	DISABLE
DISPLAY			
DECIMAL	Display Decimal	NONE	NONE
TEMPUNIT	Temperature Units	NONE	DEG F or DEG C
PWR FREQ	Supply Power Hertz	60Hz	60Hz or 50Hz

Continued...

5th Follow sheet below to complete controller configuration			
RATIO 2	Ratio 2	DISABLE	DISABLE
LANGUAGE	Display Language	ENGLISH	ENGLISH
CALIBRATE			
CAL IN1	Input 1 Calibration	DISABLE	DISABLE
INPUT 1	Input 1	FACTORY CALIBRATED	FACTORY CALIBRATED
INPUT 2	Input 2	FACTORY CALIBRATED	FACTORY CALIBRATED
CAL IN2	Input Calibration	DISABLE	DISABLE
When configuration is complete, configure lockout as follows			
TUNING			
LOCKOUT	Lockout Strategy	CALIB	MAX

Optional Water Cooled Condensor

General Specifications

Specification	Single	Dual	Triple	Quad
GPM Requirements for Supply to TCU:	10 gpm	17 gpm	24 gpm	(see note A)
Weight:	1200 lb (544 kg)	1400 lb (635 kg)	1600 lb (726 kg)	Contact Nordson
Operating Sound Level (Full Load Operation):	78.5 dBA	78.5 dBA	Contact Nordson	Contact Nordson
Maximum Incoming Water Pressure to TCU:	200 psi (13.8 bar)			
Supply and Return Bulkhead Fittings:	1 in. FNPT			
Water Supply Temperature Requirement:	85°F (29.4°C) or lower			
NOTE: A. Consult Nordson representative for additional information.				

Remote Mounting Stand Paint Color Options

Part	Description	Paint Color
1090988	STAND, floor, mounting, 5”x72” height heated exchanger	Nordson blue
1622493	STAND,floor, mounting, 5”x72” height heated exchanger	Light gray