

Nordson EcoDry® Series Induction Dryers Hybrid Controller Upgrade



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

Description

Use this instruction sheet to upgrade the Nordson EcoDry® Series operator panel to the hybrid touchscreen controller with ambient temperature compensation (ATC) for more consistent temperature control. This instruction also describes the screens specific to the hybrid touchscreen controller.

Removing Old Controller

1. Remove power to the system, and perform approved lockout/tagout procedures.
2. See Figure 1. Open coil tray lid (1) and base enclosure doors (2).

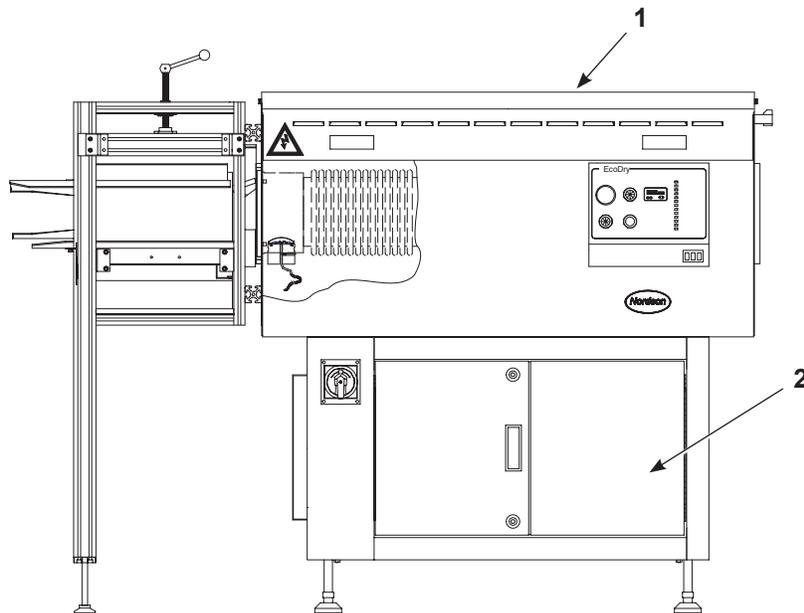


Figure 1 EcoDry Series Induction Dryer

3. See Figure 2. Disconnect P1 inline connector (6) from the operator panel (3) to the system.
4. Disconnect thermocouple wire (1) from the back of the operator panel (3).
5. Disconnect and remove the wiring for the ramp power potentiometer (7), and the timer relay (8) and associated wiring.
6. Carefully remove the LED board display cable connector (4) from the back of the LED display board. Leave the other end connected to the interface board (5).
7. Disconnect the two wires connected to the lid interlock switch (2).
8. Remove the eight operator panel screws and remove the operator panel (3).

NOTE: Retain the eight screws for installing the new touchscreen controller.

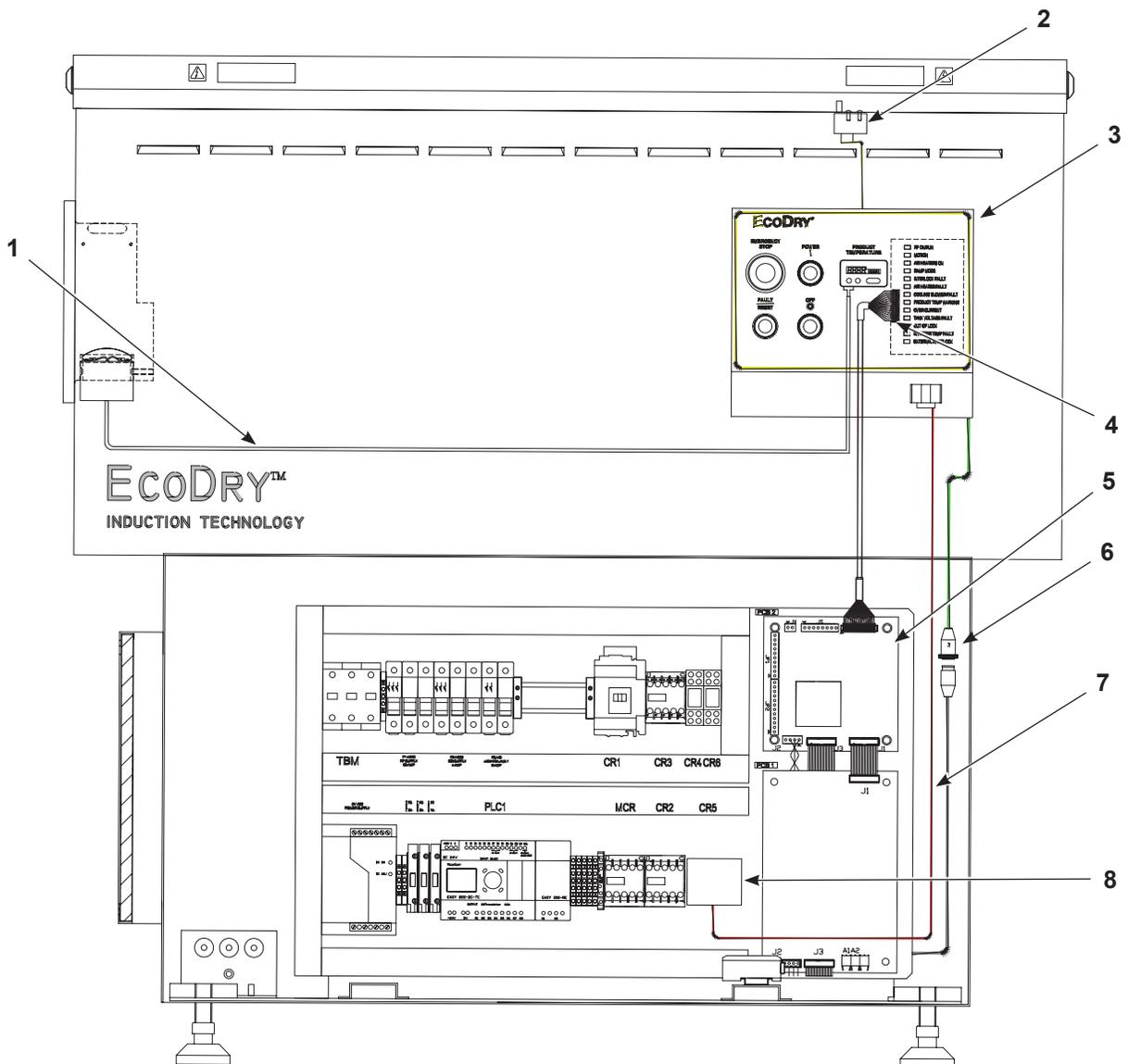


Figure 2 Removing Old Operator Panel

Installing New Hybrid Touchscreen Controller

1. See Figure 3. Mount and install the new touchscreen controller (3) using the retained eight screws.
2. Connect the P1 inline connector (7) from the new touchscreen controller to the system connector.
3. Connect the LED board display cable (6) to the connector board located on the back side of touchscreen controller.
4. Connect the two new wires to the lid interlock switch (2).
5. Connect the thermocouple (1) to the back of the new touchscreen controller.

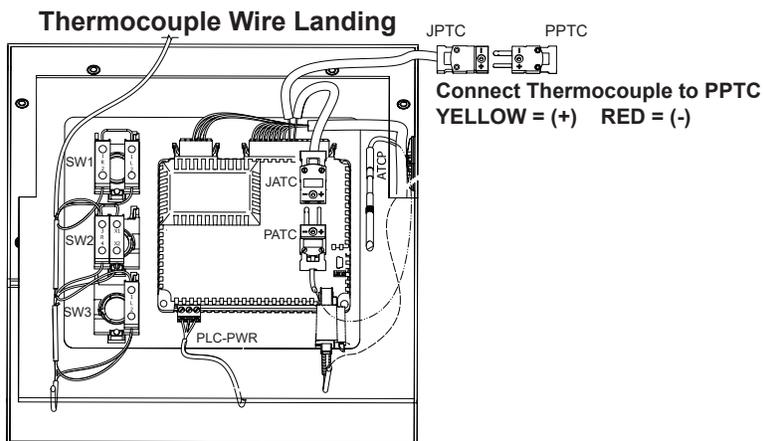
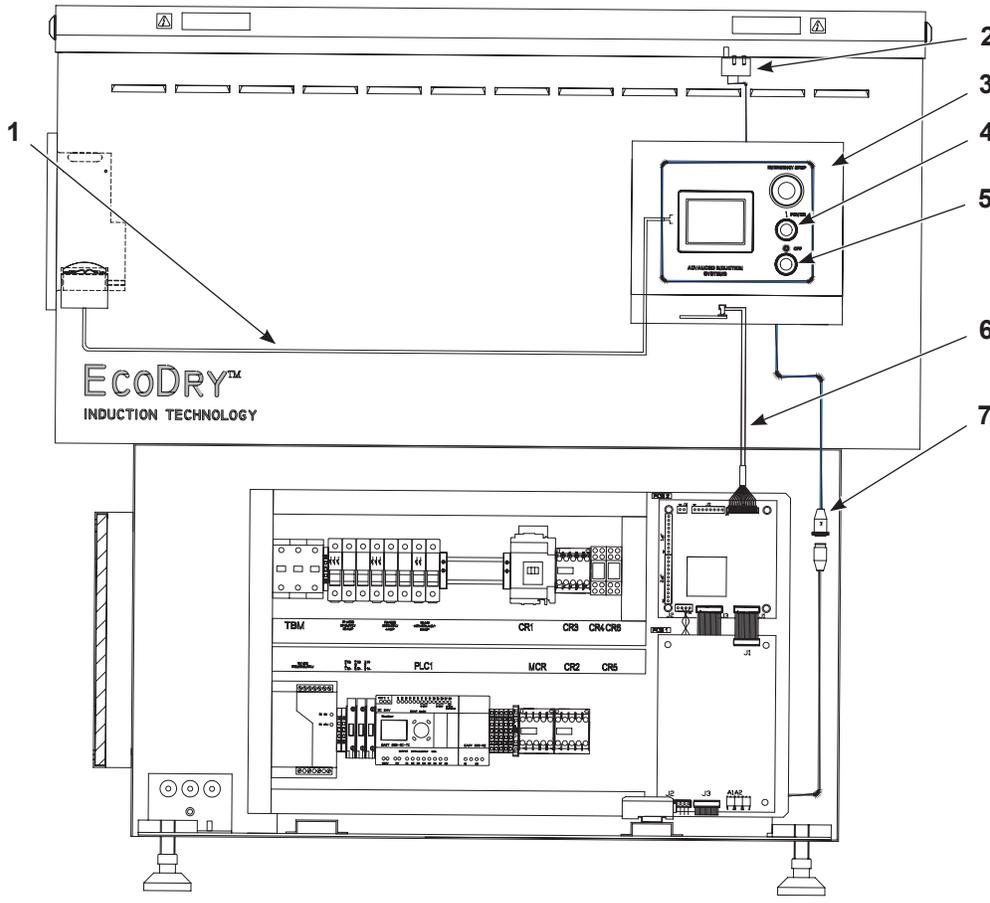


Figure 3 Installing Touchscreen Controller

Touchscreen Controller Setup

1. Close the coil tray lid, but leave the base enclosure doors open.
2. See Figure 4. Override the enclosure door interlock switch by pulling the switch actuator all the way out and restore power to the dryer.

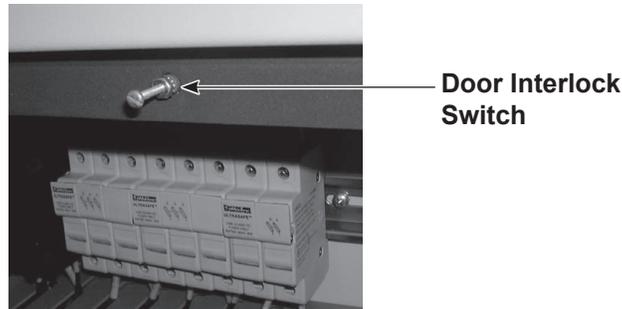


Figure 4 Base Enclosure Interlock Switch Override

3. See Figure 3. Press the **POWER** button (4) on the panel of touchscreen controller. The control power is now ON. Ignore any faults displayed on the touchscreen at this time.
4. See Figure 5. In the base enclosure, locate the small PLC display. Using P1 through P4 buttons, set the **Ramp Time** to **1s**.

NOTE: The large decal on the inside of the left door describes the switch position (P1, P2, P3, and P4) functions. Refer to the *Nordson EcoDry Series Induction Dryers* manual for more information on the PLC control panel and monitor.

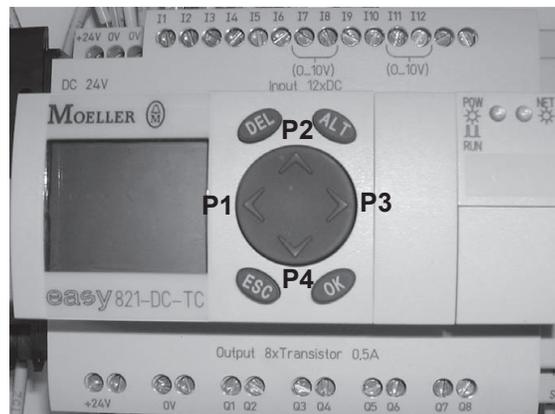


Figure 5 PLC Control Panel and Monitor

5. See Figure 3. Use the **OFF** button (5) to turn the controller power off, and close the base enclosure doors.
6. Use the **POWER** button to start the controller. The controller uses unique screens specific to the hybrid controller.

Operator Interface

The dryer is controlled by the use of **Power On/OFF/E-Stop** pushbuttons, and a touchscreen operator interface system for dryer operations.

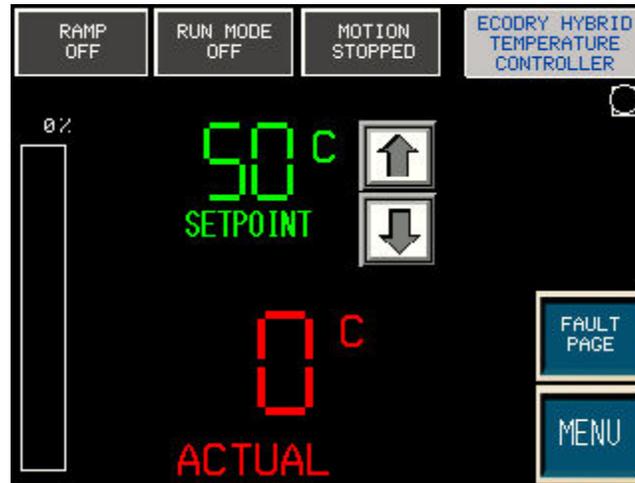


Figure 6 Automatic Screen

1. Press the **POWER** button on the Operator Control panel.
2. After the Nordson Splash screen appears, the **Automatic** screen appears by default.
3. The control system will stay in automatic control while navigating through the menus. The system will run in the **Manual Mode** only when the **Manual** screen is displayed.
4. All temperature control settings are made from the touchscreen controller. The system screens are:
 - NAVIGATION menu
 - AUTOMATIC
 - MANUAL
 - TEMP SETUP – display and change temperature related settings
 - PID – display and change PID settings
 - RAMP/MOTION
 - OFFSET/LIMITS
 - FAULT PAGE
 - CONFIGURATION
 - PLC I/O – displays the status of temperature controller inputs and outputs

Navigation Screen

The **Navigation** screen is a simple interface to temperature control functions. Dryer setup screens, configuration options, fault page, diagnostic screen, and runtime screens are accessible from the **Navigation** screen.

To access the **Navigation** screen, use the menu button located at the lower right hand corner of the various operating or setup screens.

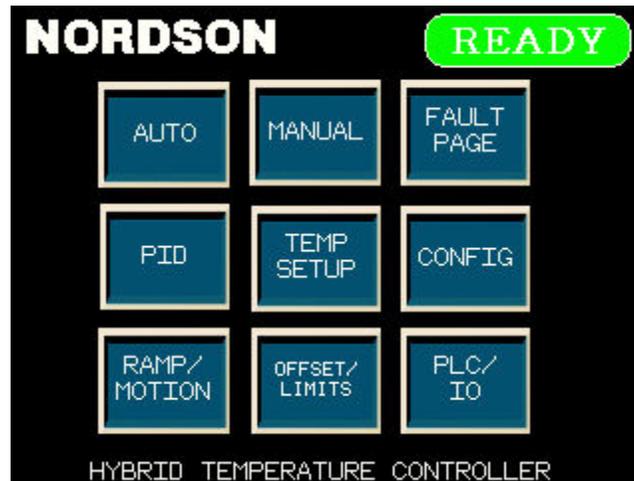


Figure 7 Navigation Screen

Ramp Mode Power Level Adjustment

The **RAMP MODE** settings of the dryer are very important for accurate temperature control. The two settings used within the ramp mode are **Ramp Power** and **Ramp Timer**.

The **Ramp Power** level is the percentage of total power needed to reach the setpoint temperature during the **Ramp Time(r)**. Check the **Ramp Power** setting periodically to ensure that correct power level is set. An effective method of checking the Ramp Power setting is by using the **Manual Mode** screen and adjusting the power level until the appropriate product temperature is reached. Then program that power level into the **Ramp Power** setting. Refer to the *Manual Mode Screen* section if necessary.

The ramp mode is activated every time coil power is turned on. Press the **Ramp Power** setting display area and a pop-up keypad will appear. Enter the new **Ramp Power** level and press the **Enter** key on the keypad.

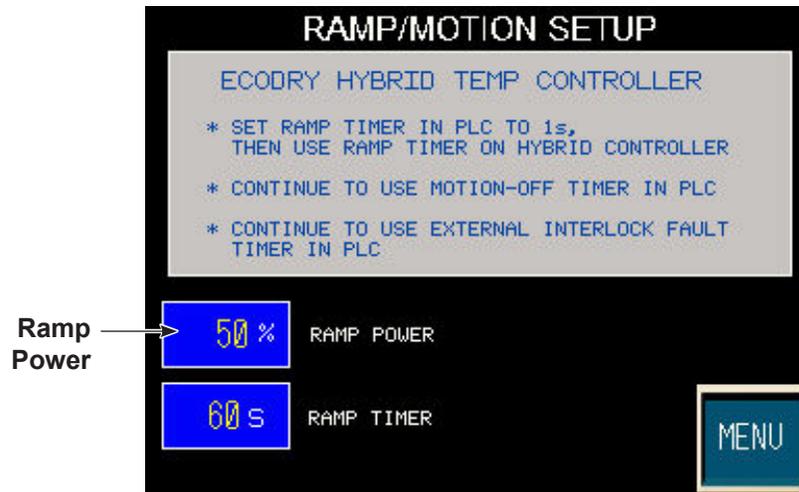


Figure 8 Ramp/Motion Setup Screen

Ramp Timer Setting

The **Ramp Time** is the time it takes a can end to travel the length of the dryer, from the entrance to the exit. This time is dependent on your line speed. When the ramp timer ends, the temperature control transfers to the PID (Auto Run) algorithm. If the set point temperature is reached anytime during the ramp cycle, the temperature control will immediately transfer to the PID (Auto Run) algorithm. The factory default is 60 seconds.

NOTE: This setting should be accurate to ensure proper operation of the dryer.

Press the **RAMP TIMER** setting display area. When the pop-up keypad appears, enter the new **Ramp Timer** value and press **Enter** on the keypad.

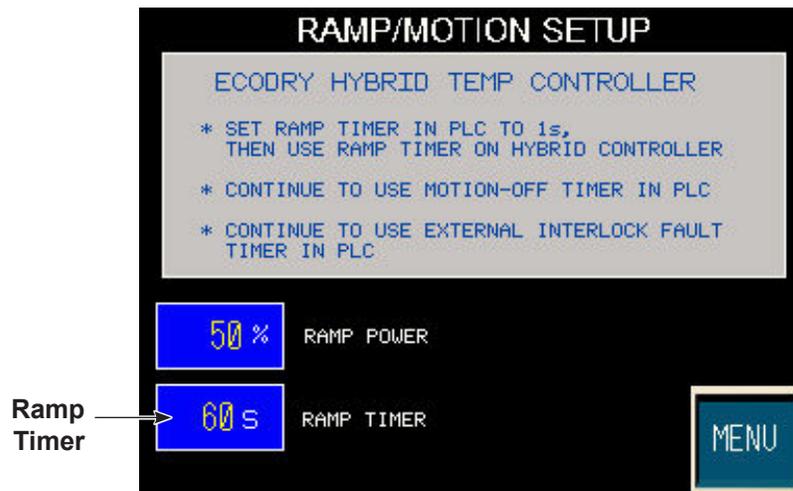


Figure 9 Ramp/Motion Setup Screen

Temperature Setup

Use the **Temperature Setup** screen to program the following settings:

- **PRODUCT TEMPERATURE SETPOINT** - Desired temperature of the ends.
- **ALARM HIGH SETPOINT** - The amount of temperature deviation (C or F) above the Product Setpoint that will result in a fault.
- **ALARM LOW SETPOINT** - The amount of temperature deviation (C or F) below the Product Temp Setpoint that will result in a fault.
- **TEMPERATURE ALARM DELAY** - Delay timer used to avoid false tripping. An additional 10s PLC delay will be added to this value.
- **C/F** - Press to alternate between the two temperature scales. When pressed, the dryer will pause momentarily and then restart in Ramp Mode.

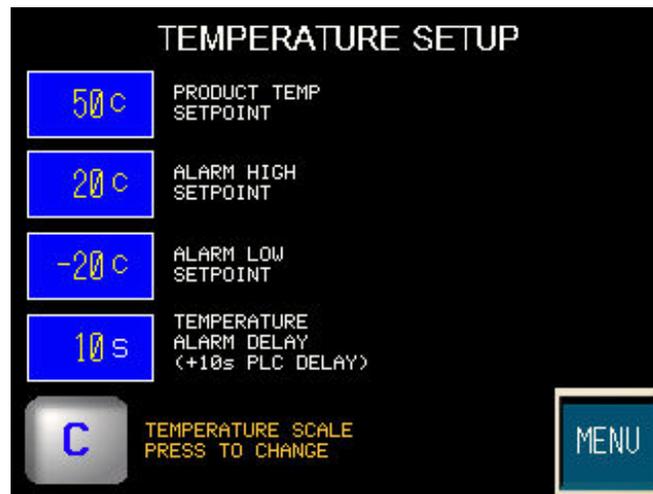


Figure 10 Temperature Setup Screen

Offset / Limits Setup

Use the **Offset/Limits** screen to program the following settings:

- **TEMPERATURE OFFSET** - Add or subtract degrees from the live reading. Typically a method of compensating for inaccurate sensor readings.
- **MAX POWER OUTPUT LIMIT** - Limits the maximum percentage of power delivered to the coil/ends.
- **MIN POWER OUTPUT LIMIT** - Limits the minimum percentage of power delivered to the coil/ends.
- **POWER LIMIT ON/OFF** - Enable or Disable the power limits. When ON, the power limits programmed above are active. When OFF, the output will range between 0 to 100%.

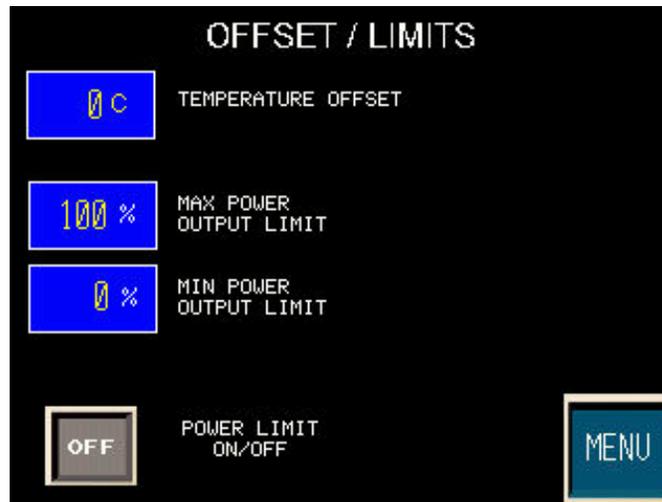


Figure 11 Offset/Limits Screen

PID Settings

The PID parameters make up the temperature control loop that controls the duty cycle used to regulate the amount of power applied to the induction coils and ends. PID settings for your dryer are optimized to provide the best possible response; fastest rise time with minimum overshoot.

NOTE: If changes to the gains are necessary, please contact the factory for assistance or advice on the proper method for tuning the system.

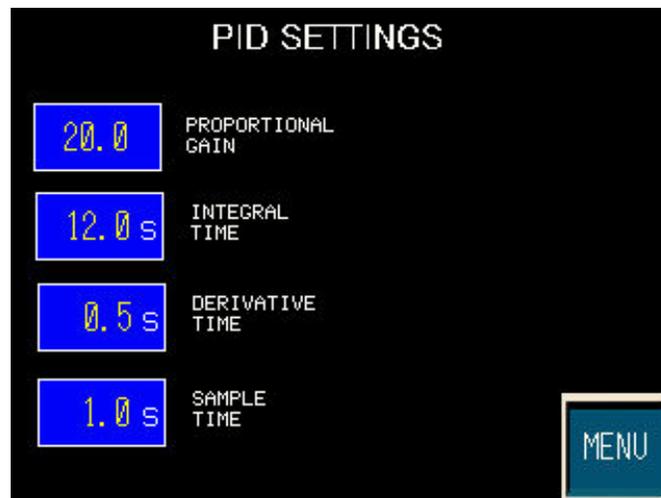


Figure 12 PID Settings Screen

Configuration Screen

The configuration screen is password protected. If necessary, contact your Nordson representative to obtain the password.

NOTE: To minimize unauthorized program changes, operator access can be blocked by selecting OFF for the individual program settings.

- TEMP SETPOINT ADJUST (ON/OFF) – Change the setpoint temperature.
- TIMER ADJUST (ON/OFF) – Adjust system timers.
- AMBIENT TEMP COMPENSATION (ON/OFF) - Starts the ATC setup process.
- KEEP CURRENT VALUES (RESTORE DEFAULTS) – when enabled, and the dryer will load all of the original setup values during the next On/Off power cycle.
- TEMP ALARM ADJUST (ON/OFF) – Change the temperature related alarm functions.
- OFFSET & POWER LIMIT ADJUST (ON/OFF) – Adjust the temperature offset settings, and the Power limit levels, and enable.
- USE ATC MANUAL (ON/OFF) - Dryer uses manual mode with power setting determined by ATC calculation.
- ALLOW FAULT LOG CLEAR (ON/OFF) - When ON, the fault log may be cleared.
- PID ADJUST (ON/OFF) – Adjust the PID settings.
- ALLOW MANUAL MODE (ON/OFF) – Allows access to the **Manual Mode** screen. While viewing this screen, **Manual Mode** will output a set power level continuously during operation. **PID** and **Low Alarms** are not in use.

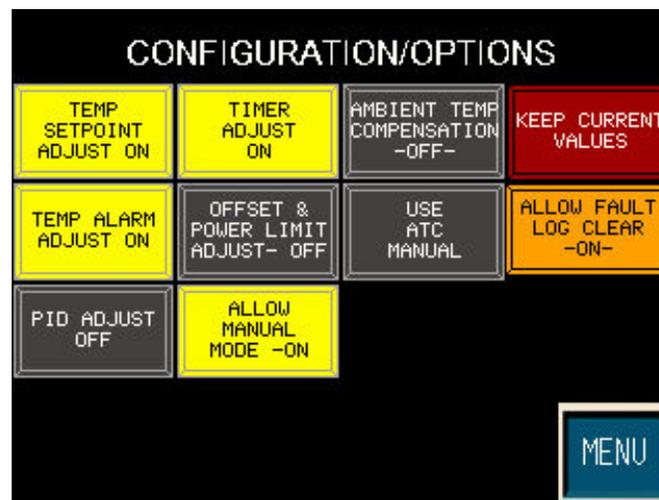


Figure 13 Configuration Screen

Fault Page Screen

System faults appear on this screen. When the **RESET** button is pressed, the system attempts to clear the fault and restart. If the fault cannot be cleared, it will continue to be displayed.

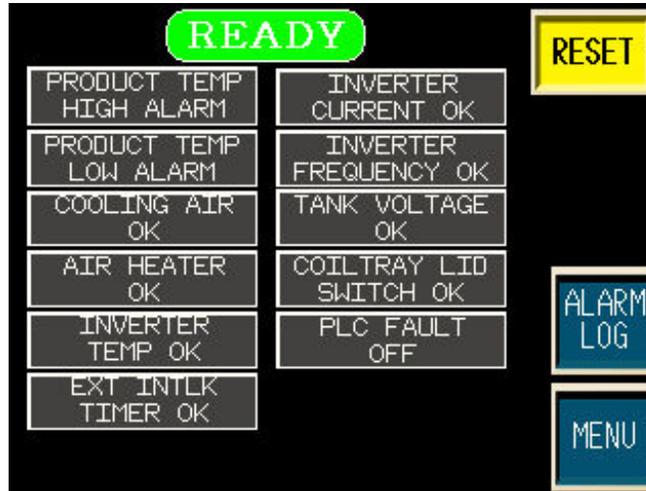


Figure 14 Fault Page Screen

Fault	Description
PRODUCT TEMP HIGH ALARM	Product temperature is greater than the programmed limits.
PRODUCT TEMP LOW ALARM	Product temperature is lower than the programmed limits not active during Ramp Mode and Manual Mode.
COOLING AIR (OK/FAULT)	Dryer air pressure switch is not being detected.
AIR HEATER (OK/FAULT)	Dryer has detected a defective air heater assembly.
INVERTER TEMP (OK/FAULT)	The inverter heatsink thermostat has opened, indicating that the heatsink is getting too hot.
EXT INTLK TIMER (OK/FAULT)	External interlock timer has expired.
INVERTER CURRENT (OK/OVER CURRENT)	RF Board has detected an over-current condition.
INVERTER FREQUENCY (OK/OUT OF LOCK)	RF system cannot lock onto a valid frequency.
TANK VOLTAGE	RF system has detected that the tank voltage is above or below the maximum limit allowed; limit not adjustable.
COILTRAY LID SWITCH (OK/ OPEN)	The system has detected that the coil tray lid is open.
PLC FAULT	The EcoDry PLC is issuing a general fault output.

PLC I/O Screen

This screen displays information for the various system inputs and outputs, and their associated functions:

- INPUT indicators – System inputs, their functions, and their current status.
- OUTPUT indicators – System outputs, and their functions, and their current status.
- Program code – Three part code that indicates system model, program number and revision level. Example:
E10-1002-111710 = Ecodry, program # 1002, revision date 11-17-2010.
- INV HOURS – Amount of time that the system inverter has been conducting current to the coil.
- RUN HOURS – Amount of time that the system has been in the **RUN** mode, processing ends.
- AMB/C DATA - Ambient compensation related data values.

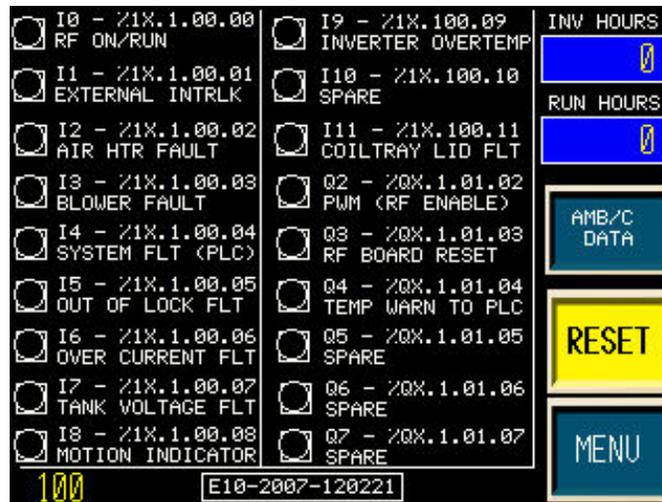


Figure 15 PLC I/O Screen

Manual Mode Screen

Use this screen for the following:

- Run the system as a straight percentage of power without temperature control.
- As a setup tool to find the correct power setting to obtain the desired end temperature. Program the power settings into the **RAMP POWER** setting on the **RAMP/MOTION** screen.
- In the event of a **THERMOCOUPLE FAULT**, the unit can be placed into the **Manual Mode** screen to continue production until the thermocouple is serviced.
- Program the **POWER** level and enter in the current **Ramp Power** level. Touching the power display area of the screen to displays the pop-up keypad to enter the **Ramp Power** level.

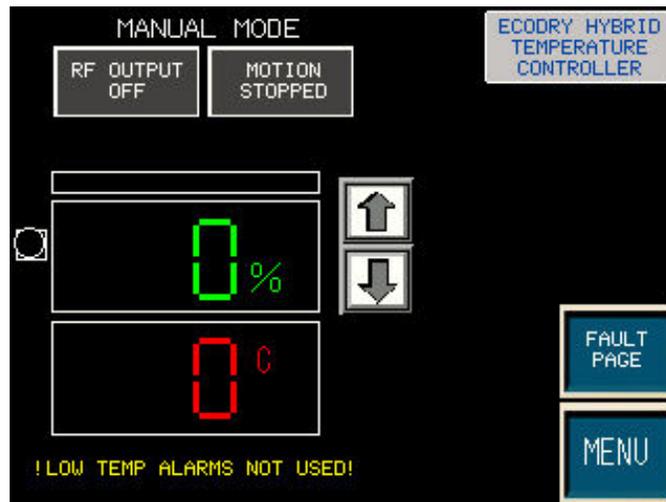


Figure 16 Manual Mode Screen

Operation

Dryer Controls

See Figure 17. The following controls are available to the operator:

- Main Disconnect (on left side of control enclosure)
- Emergency Stop switch
- Power pushbutton/indicator (Start)
- Off pushbutton (Stop)
- Touchscreen / Operator Interface

Temperature Control

Normally in the **AUTOMATIC** screen, the system displays the actual end temperature and the setpoint end temperature. The setpoint temperature can be changed during normal operations with the up and down buttons or with the pop-up keypad by touching the data display area. It is the only parameter that can be changed without entering the Temperature Control/PID setup menus respectively.

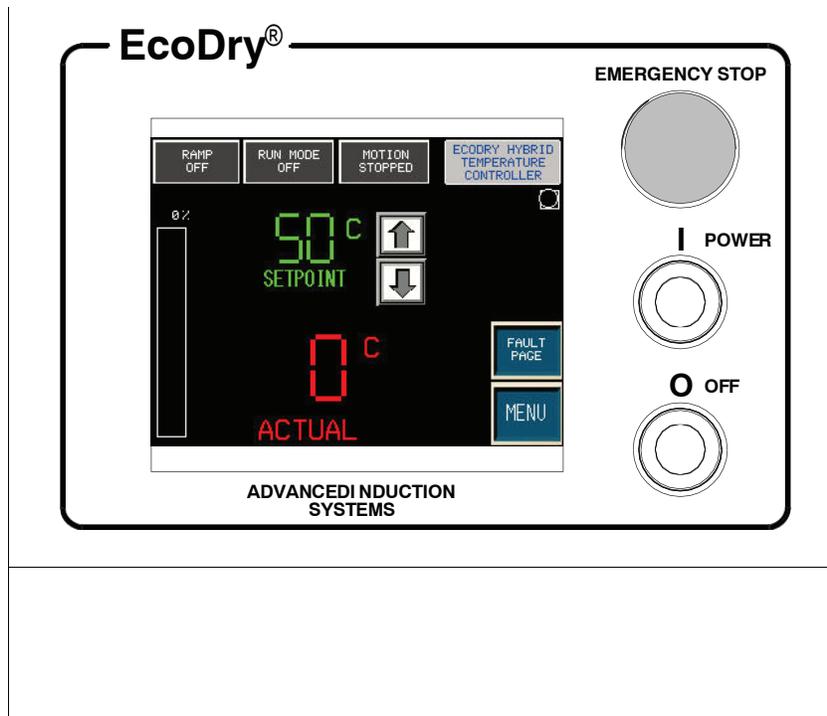


Figure 17 Dryer Controls (shown with AUTOMATIC Screen)

Startup

1. Turn the main disconnect switch to the ON position.
2. Make sure that the:
 - coil tray lid is closed and locked
 - enclosure doors are closed and locked
 - rear access panel is fastened into place
 - **Emergency Stop** switch is in the released position
3. Press the green **POWER** pushbutton.

The power indicator lights and the system runs a self test.

The temperature controller displays the temperature of the product in contact with the thermocouple at the exit hub, or the air temperature if no product is present in the exit hub.

NOTE: Refer to *Temperature Conversions* in the *Nordson EcoDry Series Induction Dryers* manual for Celsius to Fahrenheit conversions.

When the self test is complete:

- If no faults are detected then the system is ready to operate.
 - If a fault occurs during the test, the FAULT indicator will be ON. Refer to the *Troubleshooting* section in *Nordson EcoDry Series Induction Dryers* manual.
4. Start the production line and run can ends through the dryer.

The system powers the induction coil and heats the can ends whenever the motion sensor detects moving can ends. When the line stops, the dryer automatically stops heating the ends. It automatically resumes heating when the line restarts.

Shutdown

To shut down the dryer, press the **OFF** pushbutton on the operator panel.

NOTE: Although the dryer can be stopped by pressing the **EMERGENCY STOP** button or by switching the main disconnect switch to the **OFF** position, always use the **OFF** pushbutton for a controlled power down.

Ambient Temperature Compensation

The ambient temperature compensation (ATC) option allows the dryer to track ambient temperature changes in the plant and automatically adjust the **Ramp Power Setting**. This is beneficial for plants seeing substantial temperature swings.

It is critical to complete the following procedures from the *Nordson EcoDry Series Induction Dryers* manual before you proceed. The initial ramp power setting obtained will be entered into the setup page for ambient compensation.

- *Ramp Mode Power Level Adjustment*
- *Ramp Timer Setting*
- *Motion Timer Setting*

NOTE: Some dryers may offer **ATC Manual** mode, which can be enabled/disabled as needed without re-entering the ATC setup values. **ATC Manual** is offered in situations where overall PID control has been unsuccessful. The system will remain in manual control (fixed power output level), but the power level is based on a system Delta T over ambient and adjusted in accordance with the ambient temperature.

Ambient Temperature Compensation Setup

1. Proceed to the **Menu/Navigation** screen and select **Config** button (password required).
2. See Figure 18. Select the **Ambient Temp Compensation** button.

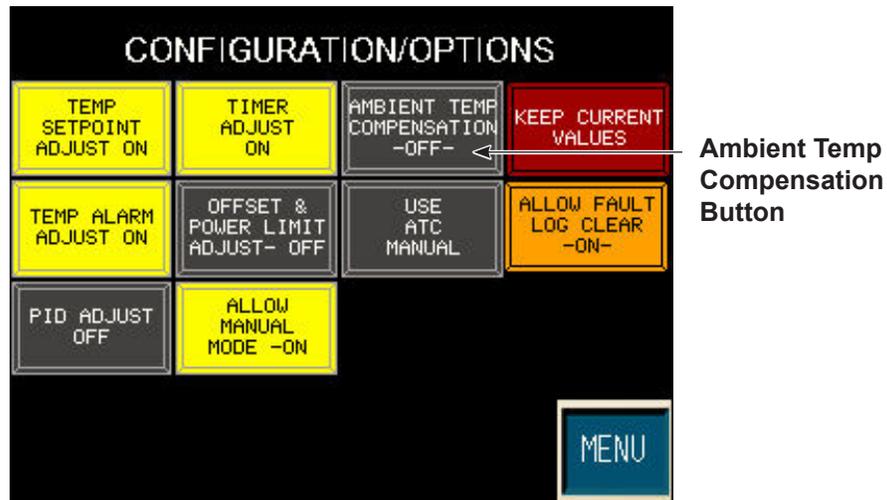


Figure 18 Ambient Temp Compensation Button

3. See Figure 19. On the **ATC Setup** screen, touch the **Ramp Power** field and use the screen keypad to adjust ramp power.

NOTE: The ramp power setting was obtained by completing the bulleted procedures listed on Page 16.

4. Next, touch the **Product Temp Setpoint** field and use the screen keypad to adjust the product temperature setting.
5. To finalize setpoints, touch the **Accept Settings** button. The screen will automatically update to the **Menu/Navigation** screen.

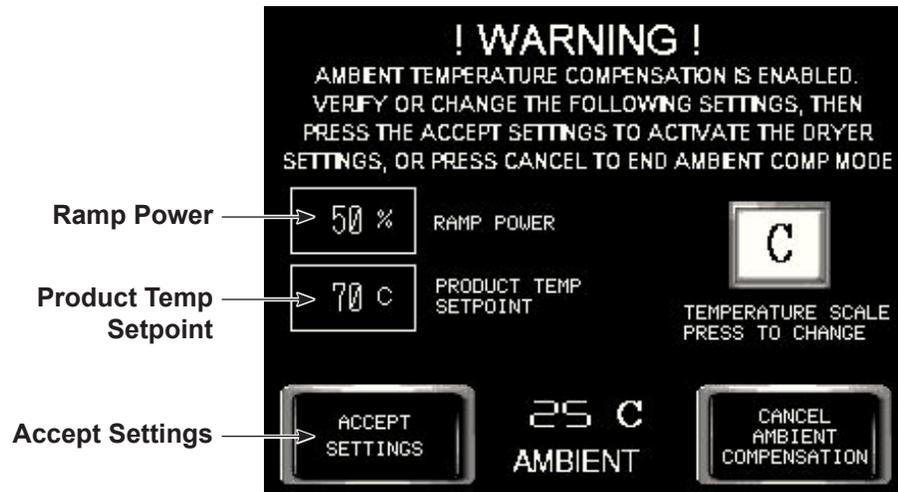


Figure 19 Ambient Temperature Setup Screen

NOTE: See Figure 20. If ambient temperature compensation is initialized several screens will automatically update.

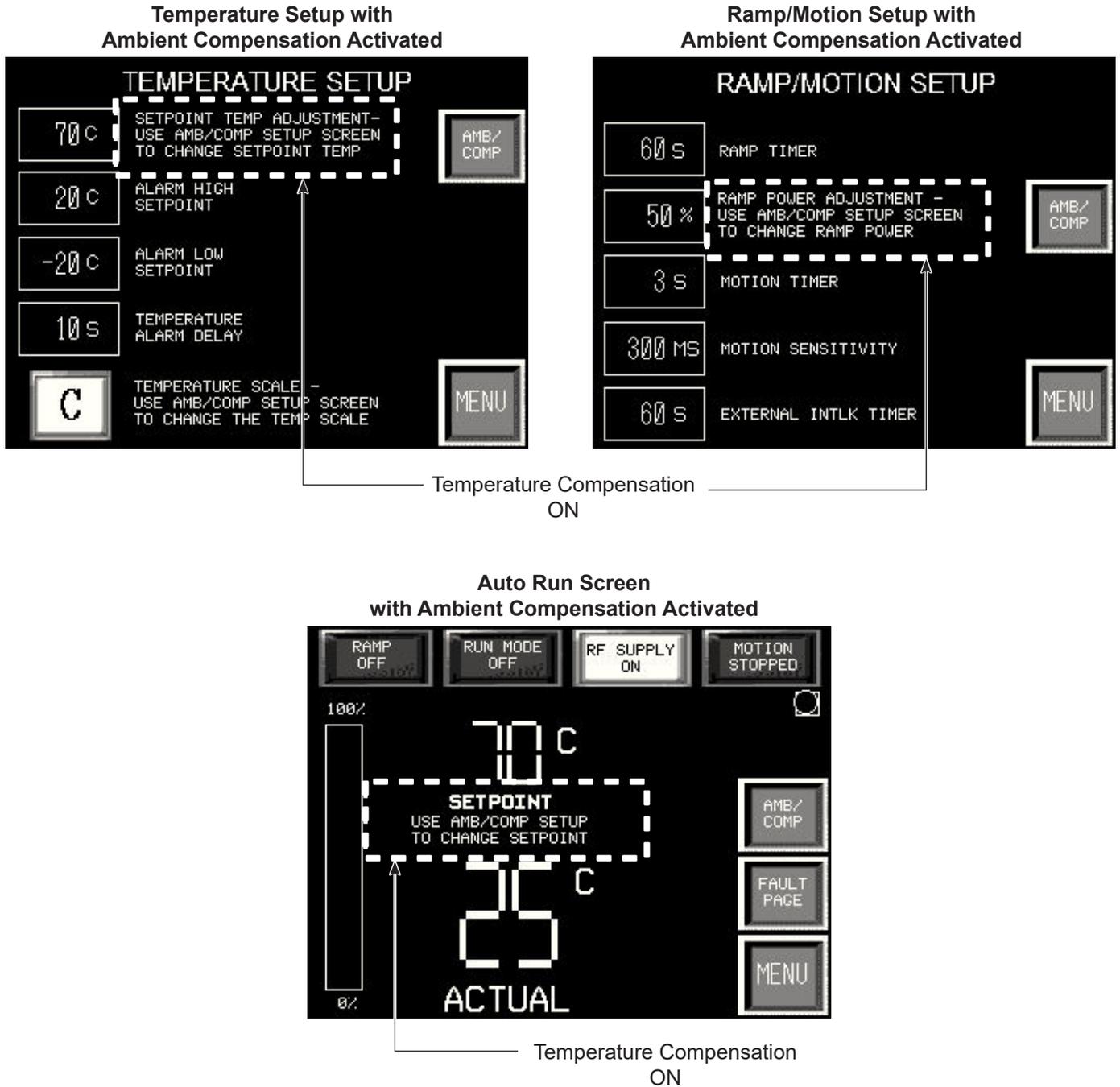


Figure 20 Automatic Screen Updates

Changing Setpoint Temperature from the Auto Run Screen

See Figure 21.

1. Select the **AMB/COMP** button from the **Auto Run** screen.
2. From the **Warning** screen, select **Enter New Data** and enter password in the popup screen.
3. From the **ATC Setup** screen, enter the new setpoint in the **Product Temp Setpoint** field.
4. Select **Accept Settings** button to finalize the change.

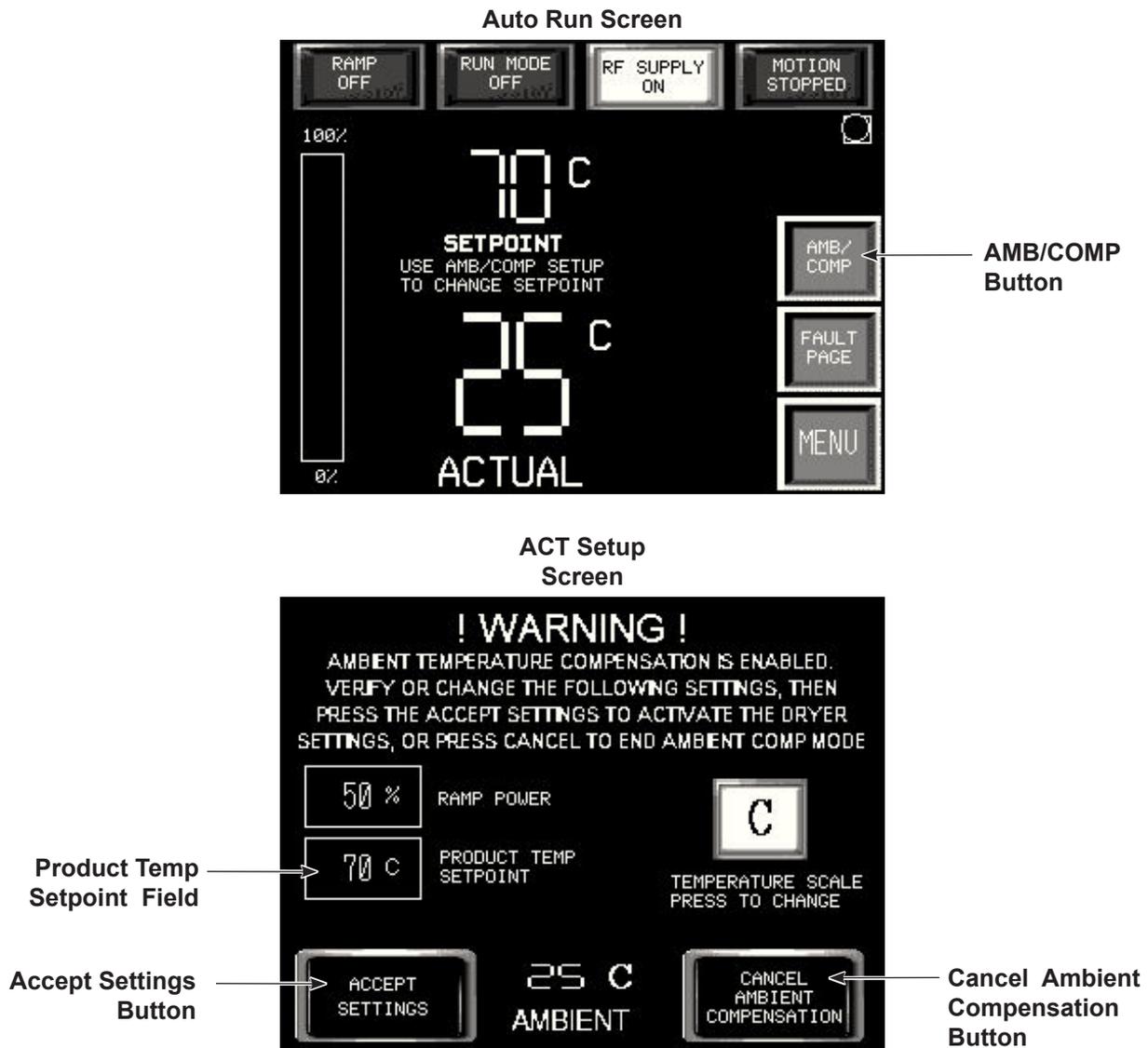


Figure 21 Changing Setpoint Temperature

Ambient Temperature Compensation Cancellation

NOTE: Ambient Temperature Compensation can be turned off at any time through the **Auto Run** screen or through the **Configuration/Options** screen. A password is required to cancel.

Through Auto Run Screen:

1. See Figure 21. Select the **AMB/COMP** button from the **Auto Run** screen.
2. From the **Warning** screen, select **Enter New Data** and enter password in the popup screen.
3. Select **Cancel Ambient Compensation** button.

Through Configuration/Options Screen:

1. From the **Menu/Navigation** screen, select the **Config** Button, and then select the **Ambient Temp Compensation ON** button.
2. See Figure 21. From the **ATC Setup** screen, select **Cancel Ambient Compensation** button.

Ambient Compensation Data Monitor

Compensation data can be monitored to compare original presets to current settings.

1. Select the **Menu** button from any screen, and then from the **Menu/Navigation** screen, select the **PLC/IO** button.
2. From the **PLC/IO** screen, select **AMB/C DATA** button to view the data table on the **Ambient Compensation Data** screen (see Figure 22).

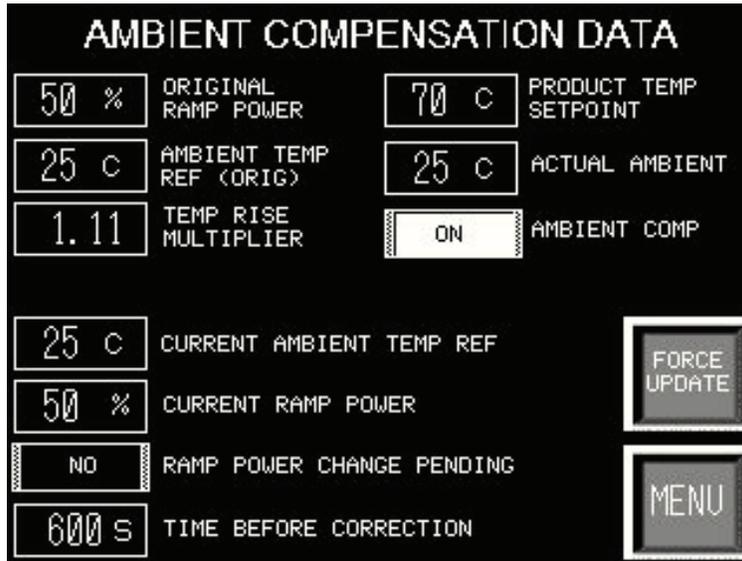


Figure 22 Ambient Compensation Data Screen

Parts

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

Part	Description	Quantity	Note
1621990	HYBRID OPERATOR PANEL UPGRADE, EcoDry V1	1	

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