Continuous Mixed-Flow Grain Dryer
Grain Dryer

This Technical Reference Guide provides support for the installation and operation of the Continuous Mixed-Flow Grain Dryer (D and K Series).

Applicable Models:
- D1660, D1670, D1680, D1690, D16106, D16120, D16140, D16160
- D24108, D24150, D24180, D24210, D24240, D24260, D24330, D24380
- D32260, D32340, D232440, D32500, K600, K700, K800, K900
CONTENTS

1. General Design Criteria ................................................................. 5
   Tier Information ........................................................................... 5
   Body Section Information ............................................................. 5
   Standard Lengths ......................................................................... 5
   Total Tier Levels per Length ......................................................... 5
   Dryer Model Number ................................................................... 6
   Dryer Rating Label ....................................................................... 6

2. Parts of the Dryer ........................................................................ 7
   Front of Dryer ............................................................................. 7
   Rear of Dryer ............................................................................. 9
   Catwalk Positions ....................................................................... 10

3. Fuel Supply Components ............................................................... 11
   Liquid Propane (LP) ..................................................................... 11
   Natural Gas (NG) ........................................................................ 17

4. Burner Control and Temperature Control ..................................... 18

5. Blower System ............................................................................ 22

6. Grain Cooling System (optional) ................................................... 23

7. Grain Level Switches ................................................................... 25

8. Discharge Equipment .................................................................. 31

9. Control Components ................................................................. 39
   Main Control Box ....................................................................... 39
   PLC Details .............................................................................. 41
   HMI Enclosure .......................................................................... 44
   Moisture/Temperature Sensor Overview .................................... 48

10. Discharge Plugged Sensor .......................................................... 50

11. External Transport(s) ................................................................. 51

12. Optional External Transport Configurations ............................... 52

13. Wiring External Transports ......................................................... 55

14. Wiring NEMA Starters / IEC Starters / Air Systems ..................... 56

15. PLC and HMI Recorded Data Sheet ........................................... 57

16. Updating the PLC and HMI Programs ....................................... 59

17. Main Control Box Terminal Strip (D Series) ............................... 63

18. Main Control Box Terminal Strip (K Series) ............................... 64

19. Honeywell Burner Control Fault Codes ..................................... 65

20. KS45 & TB45 Controller LEDs .................................................. 67

21. HMI Wiring Connections ........................................................... 72

22. Dryer Master Moisture Sensor Circuit Board ............................... 75

CONTINUOUS MIXED-FLOW GRAIN DRYER – GRAIN DRYER
23. Commander Wi-Fi Access Vijeo Air App (D Series Only) .......................................................... 76
24. Dryer Temperature Considerations .......................................................................................... 79
25. Manual Dryer Speed ................................................................................................................ 80
1. General Design Criteria

Note
Continuous Mixed-Flow Grain Dryer design is based on load factors. If you wish to add more sections to your dryer in the future, please let NECO know when you place your order so it will be designed to fit to your expanding needs.

Tier Information

- A tier is a set of parts that make up ONE layer of the dryer (also called body section).
- The top four tiers on all dryers are made up of 18 gauge material.
- The tiers below the 18 gauge tiers will be made of heavier materials, based on the required strength of that dryer configuration.

Body Section Information

- An assembled dryer section may be made up of:
  - 3 to 7 tiers
  - a blower
  - a burner
- The lowest body section is attached to the dryer frame and includes the entrance door.

Standard Lengths

Table 1. Standard Lengths

<table>
<thead>
<tr>
<th>Length in feet</th>
<th>Length in inches</th>
<th>Length in meters</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>192</td>
<td>4.88</td>
</tr>
<tr>
<td>24</td>
<td>288</td>
<td>7.32</td>
</tr>
<tr>
<td>32</td>
<td>384</td>
<td>9.75</td>
</tr>
</tbody>
</table>

Total Tier Levels per Length

Table 2. Total Tier Levels per Length

<table>
<thead>
<tr>
<th>Length in feet</th>
<th>Length in meters</th>
<th>Minimum Tiers</th>
<th>Maximum Tiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>4.88</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>24</td>
<td>7.32</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>32</td>
<td>9.75</td>
<td>12</td>
<td>24</td>
</tr>
</tbody>
</table>
1. GENERAL DESIGN CRITERIA

CONTINUOUS MIXED-FLOW GRAIN DRYER – GRAIN DRYER

Dryer Model Number

D Series Model Numbers

The dryer model number provides information on the dryer length and capacity.

- The two digits after “D” are the dryer length.
- Multiply the remaining digits by 10 to determine the approximate bushel capacity for corn. In this example: 40 x 10 = 400 bushels

Example: D 16 60

- 16 indicates this model is a 16 foot long dryer
- 60 indicates this model has a capacity of 60 x 10 = 600 bushels

Using the same process, a model D32500 would be a 32 foot long dryer with an approximate capacity of 5,000 bushels.

K Series Model Number

The three digits after “K” indicate the nominal storage capacity. For example, a K600 holds approximately 600 bushels of grain.

Dryer Rating Label

Figure 1. Dryer Rating Label — CE

Figure 2. Dryer Rating Label — CSA

Figure 3. Dryer Rating Label — Domestic

FAN/HEATER UNIT FOR USE IN CROP DRYING

WARNING: FOR OUTDOOR INSTALLATION ONLY

REVIEW THE DRYER MANUAL FOR INSTALLATION, OPERATION, AND TROUBLESHOOTING INSTRUCTIONS.

MANUFACTURER: NEBRASKA ENGINEERING CO.

OMAHA, NEBRASKA, USA

T E L: 402-453-6912 OR 800-367-6208

MINIMUM INPUT RATE: 0.6 MM BTU/H

MAXIMUM SUPPLY PRESSURE: 250 PSI

MAXIMUM INPUT RATE: 8400 MJ/H

MINIMUM SUPPLY PRESSURE FOR MAXIMUM INPUT: 44.8 kPa (13 PSI)

MINIMUM SUPPLY PRESSURE FOR MINIMUM OUTPUT: 2 ... 10 PSI

MANIFOLD PRESSURE @ MINIMUM INPUT: 1 PSI

CLEARANCE TO COMBUSTIBLES: 6 FT (2 M)

PERIMETER SERVICE CLEARANCE: 6 FT (2 M)

MINIMUM SUPPLY PRESSURE FOR MAXIMUM INPUT: 30 PSI

MINIMUM SUPPLY PRESSURE FOR MINIMUM OUTPUT: 12.5 PSI

MAXIMUM TEMP. RISE: 110°C

MINIMUM AMBIENT TEMPERATURE: 0°F

FUEL TYPE: LP

MODEL: D24210

PART / SERIAL NO: DRYR-1234

SUPPLY VOLTAGE:

PHASE: 3

FREQUENCY: 60 Hz

FULL LOAD AMPS:

LARGEST MOTOR AMP:

SCCR: 50 kA

CONTROL VOLTAGE: 120 VAC

WENTIÉLAUTEUR/SECHIOR pour le séchage des récoltes

Pour utilisation dans des espaces non occupés uniquement

Pour utilisation dans des espaces non occupés uniquement

Design Standard

EN 302-354/UE Code

Figure 1. Dryer Rating Label — Domestic

FAN/Dryer Unit for Use in Crop Drying

WARNING: FOR OUTDOOR INSTALLATION ONLY

REVIEW THE DRYER MANUAL FOR INSTALLATION, OPERATION, AND TROUBLESHOOTING INSTRUCTIONS.

MANUFACTURER: NEBRASKA ENGINEERING CO.

OMAHA, NEBRASKA, USA

T E L: 402-453-6912 OR 800-367-6208

MINIMUM INPUT RATE: 0.6 MM BTU/H

MAXIMUM SUPPLY PRESSURE: 250 PSI

MAXIMUM INPUT RATE: 8400 MJ/H

MINIMUM SUPPLY PRESSURE FOR MAXIMUM INPUT: 44.8 kPa (13 PSI)

MINIMUM SUPPLY PRESSURE FOR MINIMUM OUTPUT: 2 ... 10 PSI

MANIFOLD PRESSURE @ MINIMUM INPUT: 1 PSI

CLEARANCE TO COMBUSTIBLES: 2 M (6 FT)

PERIMETER SERVICE CLEARANCE: 2 M (6 FT)

MINIMUM SUPPLY PRESSURE FOR MAXIMUM INPUT: 30 PSI

MINIMUM SUPPLY PRESSURE FOR MINIMUM OUTPUT: 12.5 PSI

MAXIMUM TEMP. RISE: 110°C

MINIMUM AMBIENT TEMPERATURE: 0°F

FUEL TYPE: LP

MODEL: D24210

PART / SERIAL NO: DRYR-1234

SUPPLY VOLTAGE:

PHASE: 3

FREQUENCY: 60 Hz

FULL LOAD AMPS:

LARGEST MOTOR AMP:

SCCR: 50 kA

CONTROL VOLTAGE: 120 VAC

WENTIÉLAUTEUR/SECHIOR pour le séchage des récoltes

Pour utilisation dans des espaces non occupés uniquement

Pour utilisation dans des espaces non occupés uniquement

Design Standard

EN 302-354/UE Code

Figure 3. Dryer Rating Label — Domestic

FAN/HEATER UNIT FOR USE IN CROP DRYING

WARNING: FOR OUTDOOR INSTALLATION ONLY

REVIEW THE DRYER MANUAL FOR INSTALLATION, OPERATION, AND TROUBLESHOOTING INSTRUCTIONS.

MANUFACTURER: NEBRASKA ENGINEERING CO.

OMAHA, NEBRASKA, USA

T E L: 402-453-6912 OR 800-367-6208

MINIMUM INPUT RATE: 0.6 MM BTU/H

MAXIMUM SUPPLY PRESSURE: 250 PSI

MAXIMUM INPUT RATE: 8400 MJ/H

MINIMUM SUPPLY PRESSURE FOR MAXIMUM INPUT: 44.8 kPa (13 PSI)

MINIMUM SUPPLY PRESSURE FOR MINIMUM OUTPUT: 2 ... 10 PSI

MANIFOLD PRESSURE @ MINIMUM INPUT: 1 PSI

CLEARANCE TO COMBUSTIBLES: 2 M (6 FT)

PERIMETER SERVICE CLEARANCE: 2 M (6 FT)
2. Parts of the Dryer

Important
Understanding the terms used to identify the various components of a dryer system will make the instructions in this manual clearer and easier to follow.

Front of Dryer

Figure 4. Front of Dryer (from Fuel Train Side)
Figure 5. Front of Dryer (from Blower Belt Shield Side)
Rear of Dryer

Figure 6. Rear of Dryer (from Below)

NOTE: The Plenum Door is at the rear of dryer and allows access into the center plenum area. Each dryer section ABOVE THE PLENUM DOOR is separated by a Divider Floor with one Divider Door for plenum access. Divider Doors should always be closed during operation. Optional Cooling Floor(s) & Doors serve a totally different purpose - See Grain Cooling System.
Catwalk Positions

Figure 7. Topside Filling Options

ROOF WITH GRAVITY FILL

ROOF WITH LEVEL AUGER

Figure 8. Catwalk Positions

Multi-Blower Dryer

Rear of Dryer
Front of Dryer
(blower side)

Single-Blower Dryer
(left, center, right, right extended discharge)

Single-Blower Dryer
(left extended discharge)
3. Fuel Supply Components

**WARNING**

- Know where the main shut-off is.
- Make sure all required personnel are trained.
- Observe all safety rules when working with the fuel system
- Use lockout/tagout.

**Note**

The layout of fuel train components varies for different dryer types. Although your fuel components may not exactly match what is shown in the following diagrams, the general function of each identified component remains the same.

**Liquid Propane (LP)**

**Overview Layout**

Each dryer section with a burner has the following fuel system components:

- Inlet section
- Vaporizer section
- Regulator section
- Control loop section
Figure 9. LP Overview Layout
**LP Fuel - Inlet Section**

*Figure 10. LP Fuel — Inlet Section*

<table>
<thead>
<tr>
<th>Item # in Diagram</th>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fuel supply inlet elbow</td>
<td>The main fuel supply connects here on the <strong>bottom</strong> dryer section. Note that the top dryer section also uses an elbow.</td>
</tr>
<tr>
<td>2</td>
<td>Fuel shut–off valve</td>
<td>The fuel supply for ALL dryer sections can be shut off here.</td>
</tr>
<tr>
<td>3</td>
<td>Fuel supply “T” and transfer line</td>
<td>All middle dryer sections connect here. The upper-most dryer section has an elbow at this location.</td>
</tr>
<tr>
<td>4</td>
<td>Fuel strainer</td>
<td>The fuel strainer traps foreign debris that may be in the liquid fuel line.</td>
</tr>
<tr>
<td>5</td>
<td>Hydrostatic relief valve</td>
<td>The hydrostatic relief valve relieves the hydrostatic pressure that may develop in sections of liquid piping between closed shutoff valves.</td>
</tr>
<tr>
<td>6</td>
<td>Liquid solenoid valve</td>
<td>This is an electrically actuated valve to turn fuel ON or OFF.</td>
</tr>
<tr>
<td>7</td>
<td>Vent pipe assembly (CSA Only)</td>
<td>This piping carries away any liquid discharged from hydrostatic relief valves.</td>
</tr>
</tbody>
</table>
LP Fuel — Vaporizer Section

Figure 11. LP Fuel — Vaporizer Section

<table>
<thead>
<tr>
<th>Item # in Diagram</th>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Vaporizer coils</td>
<td>Finned tubes that vaporize the liquid propane. These are located in the dryer plenum.</td>
</tr>
</tbody>
</table>
LP Fuel — Regulator Section

Figure 12. LP Fuel — Regulator Section

<table>
<thead>
<tr>
<th>Item # in Diagram</th>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Pressure regulator</td>
<td>Reduces fuel pressure to the downstream sections of the fuel system.</td>
</tr>
<tr>
<td>9</td>
<td>Pressure gauge</td>
<td>Indicates fuel pressure at the regulator output.</td>
</tr>
<tr>
<td>10</td>
<td>Overpressure relief valve (CSA Only)</td>
<td>Vents excessive vapor pressure that may build up downstream of the regulator.</td>
</tr>
</tbody>
</table>
LP Fuel - Control Loop Section

Figure 13. LP Fuel — Control Loop Section

<table>
<thead>
<tr>
<th>Item # in Diagram</th>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Main valve 1</td>
<td>Electrically actuated valve to turn the fuel ON or OFF to the pilot and burner</td>
</tr>
<tr>
<td>12</td>
<td>Pilot shut-off valve</td>
<td>Manual valve for shutting off fuel to the pilot</td>
</tr>
<tr>
<td>13</td>
<td>Pilot pressure regulator</td>
<td>Further reduces fuel pressure to the pilot solenoid valve</td>
</tr>
<tr>
<td>14</td>
<td>Pilot solenoid valve</td>
<td>Electrically actuated valve to turn the fuel ON or OFF to the pilot</td>
</tr>
<tr>
<td>15</td>
<td>Pilot line</td>
<td>Supplies fuel to the pilot</td>
</tr>
<tr>
<td>16</td>
<td>Main valve 2</td>
<td>Electrically actuated valve to turn fuel ON or OFF to the burner</td>
</tr>
<tr>
<td>17</td>
<td>Electronic modulating motor</td>
<td>Receives signal from the temperature controller. Moves a linkage attached to the butterfly valve to modulate the fuel flow to the burner.</td>
</tr>
<tr>
<td>18</td>
<td>Butterfly valve</td>
<td>Controls flow of fuel to the burner to maintain the desired temperature.</td>
</tr>
<tr>
<td>19</td>
<td>Burner shut-off valve</td>
<td>Manually operated to shut off fuel to the burner</td>
</tr>
</tbody>
</table>
Natural Gas (NG)

Figure 14. NG Fuel Layout

<table>
<thead>
<tr>
<th>Item # in Diagram</th>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fuel supply inlet</td>
<td>The main fuel supply connects at this location.</td>
</tr>
<tr>
<td>2</td>
<td>Fuel shut–off valve</td>
<td>The fuel supply for ALL dryer sections can be shut off here.</td>
</tr>
<tr>
<td>3</td>
<td>Pressure regulator</td>
<td>Reduces fuel pressure to the downstream sections of the fuel system.</td>
</tr>
<tr>
<td>4</td>
<td>Main valve 1</td>
<td>Electrically actuated valve to turn fuel ON or OFF to the pilot and burner.</td>
</tr>
<tr>
<td>5</td>
<td>Pressure gauge</td>
<td>Indicates fuel pressure at the regulator output.</td>
</tr>
<tr>
<td>6</td>
<td>Pilot shut-off valve</td>
<td>Manual valve for shutting off fuel to the pilot.</td>
</tr>
<tr>
<td>7</td>
<td>Pilot solenoid valve</td>
<td>Electrically actuated valve to turn the fuel ON or OFF to the pilot.</td>
</tr>
<tr>
<td>8</td>
<td>Pilot line</td>
<td>Supplies fuel to the pilot.</td>
</tr>
<tr>
<td>9</td>
<td>Main valve 2</td>
<td>Electrically actuated valve to turn the fuel ON or OFF to the burner.</td>
</tr>
<tr>
<td>10</td>
<td>Electronic modulating motor</td>
<td>Receives signal from the temperature controller. Moves a linkage attached to the butterfly valve to modulate the fuel flow to the burner.</td>
</tr>
<tr>
<td>11</td>
<td>Butterfly valve</td>
<td>Controls flow of fuel to the burner to maintain the desired temperature.</td>
</tr>
<tr>
<td>12</td>
<td>Burner shut-off valve</td>
<td>Manually operated to shut off fuel to the burner.</td>
</tr>
<tr>
<td>13</td>
<td>Pilot Pressure Regulator (CSA Only)</td>
<td>Further reduces fuel pressure to the pilot solenoid valve</td>
</tr>
<tr>
<td>14</td>
<td>Overpressure relief valve</td>
<td>Vents excessive pressure that may build up downstream of the regulator.</td>
</tr>
</tbody>
</table>
4. Burner Control and Temperature Control

Electrocution Hazard

- Know where the main shut-off is.
- Make sure all required personnel are trained.
- Observe all safety rules when working with the electrical system
- Use lockout/tagout.

Burner Control Box Components

The Burner Box contains five primary components, which work together to control the combustion inside the dryer. They are:

- The **Air Switch** checks for airflow across the burner.
- The **Spark Igniter** sends voltage to the spark plug to light the pilot.
- The **KS45 Temperature Controller** sends and receives temperature data.
- The **TB45 High Temperature Limit Switch** allows manual control of the high temperature setting by adjustment of the knob. If the high temperature limit is exceeded, the dryer shuts down immediately with NO cool-down period.
- The **Honeywell Flame Safety Relay** checks functions related to combustion:
  - Absence of pilot flame
  - Adequate air flow
  - Presence of burner flame
  - High Temperature Limit
  - Controls outputs for ignition, inlet valves, pilot valve, main valve, and burner reset.
Figure 15. Burner Box Control
**Burner Box Cable(s)**

- The grey cable entering the left side of the burner box(es) from each modulating motor is pre-wired at NECO. This cable signals the modulating motor to adjust the butterfly valve, controlling the flow of fuel.

- The yellow burner cable(s) and the grey communication cable(s) are used between each burner box and also from the lowest burner box to the main control box.
  - The yellow cable connects to the T-connector on the top burner box, as does the yellow splitter cable for the fill and low switches.
  - The grey cable plugs directly into the top burner box, while the T-connector is used for lower burner boxes when present.

---

**Figure 16. Burner Box Cable Connections**
Components Located at Each Burner

- The spark plug lights the pilot upon signal from the spark igniter.
- The UV sensor checks for two separate conditions relating to the absence or presence of flame.
- The pilot fuel line supplies the fuel for the pilot. This line comes from the main fuel train and has its own manual shut-off, pressure regulator, and solenoid valve.
- The air switch line is connected to the air switch and must sense airflow in order for the burner to light and stay lit.

Temperature Control (each plenum with a burner)

- The sealed dual temperature probe has two thermocouples: one for the temperature control (KS45), and the other for the high temperature limit sensing (TB45).

**Note**
Locate the dual temperature probe in the plenum, 5 ducts away from the burner horizontally and 3 ducts from the floor vertically.

**WARNING**

Fire Hazard
Observe the temperature values regularly to ensure that the system is working properly. At the beginning of each drying season, test the high limit shut-off system.
5. Blower System

**WARNING** Do not run the dryer without the proper guard in place.

### Blower System

- The blower motor, pulley, and blower housing are located at the lowest level of each dryer section. A transition housing connects the blower housing to specific tiers of that section.

- Proper airflow is verified by the static pressure air switch located within the burner box.

- The primary purpose for the blower system is to provide airflow for each dryer section. Most blower/transition housings include a burner system. However, a bottom dryer section can be ordered with a blower, but NO burner. This would be used for cooling only.

- The blower motor size is provided per dryer configuration and customer requirements, and ranges from 15 to 30 HP.

- The blower system in the lowest dryer section with a burner can also include an optional system that will cool grain using cooling floors and cooling doors. See **Section 6. – Grain Cooling system on page 23**

---

**Note**
Shown without safety guard for clarity.
6. Grain Cooling System (optional)

In this Section:

- Overview of Batch Mode Drying/All Heat
- Overview of Continuous Mode Drying / with Cooling

Overview

- An optional grain cooling system with either one or two cooling floors can be supplied with the dryer. Each of the cooling floors has door openings spaced evenly along the length of the dryer. The operator has several grain cooling options from which to choose.
- The cooling floor(s) work in combination with a manually positioned cooling flap that can direct a portion of the blower system airflow. The cooling flap is in-line with the position of the exterior handle so that the operator can tell at a glance where the cooling flap is positioned. The handle position should be secured with the locking system.
- The cooling flap position determines the amount of cooling air that reaches the grain. Moving the handle down lowers the cooling flap and increases the cooling. To decrease the cooling, move the handle up. To shut off the cooling move the handle all the way up.

<table>
<thead>
<tr>
<th>Batch Mode Drying / All Heat</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Cooling doors all open</td>
</tr>
<tr>
<td>• Cooling flap fully raised for all heat</td>
</tr>
</tbody>
</table>

![Figure 20. Batch Mode Drying / All Heat](image-url)
Continuous Mode Drying / with Cooling

- Cooling doors shut in the top cooling floor give two levels of cooling
- Cooling doors in the bottom cooling floor give one level of cooling
- Cooling flap shown closed for maximum cooling

**Note**

It is common to operate with the cooling flap only partially closed to achieve the desired level of cooling.
7. Grain Level Switches

Overview
In continuous mode the system is capable of monitoring five safety/operational switches. The following three switches are included with the system and are field-installed:

- Fill Dryer switch
- Low Dryer switch (D Series dryers only)
- Plugged Discharge switch

Two optional switches (customer supplied and installed) can be wired into the dryer control:

- Wet Bin Empty switch
- Dry Bin Full switch
### Fill Dryer Switch and Low Dryer Switch

**Note**

Location of the Fill Dryer and Low Dryer switches depend on the style of fill and configuration of the intake grain supply. Refer to the figures in this section for details.

- The Fill Dryer switch senses the presence of grain. It signals the PLC to shut off the filling auger.
- The Low Dryer switch is designed to shut off the dryer just before any ducts are empty so that fuel will not be wasted.

**Note**

The Commander Control ignores the loss of signal from this switch for a period of time to prevent nuisance alarm triggers due to grain movement.

---

### Figure 22. Switch — Side View

**ATTENTION:** Correctly set switches MUST be used at the proper locations for both FILL & EMPTY switches are identified with a decal as to the internal dip switch setting of “H” for fill switch or “L” for low switch.

### Figure 23. Switch — Top View

**ATTENTION:** Correctly set switches MUST be used at the proper locations for both FILL & EMPTY switches are identified with a decal as to the internal dip switch setting of “H” for fill switch or “L” for low switch.
**Roof with Gravity Fill System**

Gravity fill system intake grain at the center. The intake auger system must match to this location.

**Figure 24. Gravity Fill Switch and Cover Locations**

![Diagram of Gravity Fill Switch and Cover Locations]

**Figure 25. Hole Cover and Switch Flanges**

![Diagram of Hole Cover and Switch Flanges]

**Figure 26. Fill Dryer Switch Location – Gravity Fill System**

![Diagram of Fill Dryer Switch Location – Gravity Fill System]
Level Auger Fill System Overview

- Grain intake position must be between 1' and 2' from the end of the dryer level auger.
- Factory configuration, per motor cable length and catwalk access, has the level auger motor located at the front end of the dryer closest to the control box.
- The Fill dryer switch and the Low dryer switch must be located at the OPPOSITE end of the intake grain entry for correct operation.
- Standard auger motor rotation brings the intake grain FORWARD from a grain entry position located at the rear end of the dryer. Reversed auger rotation results in the opposite.
Figure 28. Level Auger Fill Switch Location

- Standard Auger Motor Rotation Pulls Grain Toward Motor
- Intake Grain at Rear (2 ft from end)
- Fill Switch at Opposite End of Filling
- Rear of Dryer

Roof with Level Auger System

Figure 29. Fill Dryer switch location – Roof with level auger
- Fill Dryer Switch Assembly: #059167-16-30 (Replacement Switch: 059167RH)

Figure 30. Low Dryer switch location – gravity fill and level auger fill systems
- Low Dryer Switch Assembly: #059167-16-45 (Replacement Switch: 059167RL)
**Wet Bin Empty and Dry Bin Full Switches (optional)**

**Note**
Optional switches are provided and installed by the customer.

- The Dry Bin Full switch should be placed near the top of the dry holding bin.
- The Wet Bin Empty switch should be placed near the bottom of the wet holding bin.
- The wires route to the main control box terminal strip and connects shown below:

![Figure 31. Wet Bin Empty and Dry Bin Full sensor connections](image-url)
8. Discharge Equipment

Overview

The discharge system is offered using either auger or drag.

- The grain is fed into a discharge system by a pair of metering rolls powered by a DC drive motor and controlled to discharge grain at the target moisture content.
- The discharge system runs along both sides of the dryer and moves the grain from front (blower end) to rear (plenum door end).
- Cleanout doors are located below each discharge system for ease of maintenance, etc.
- At the rear of the dryer, the grain is combined and directed to a final discharge area.

<table>
<thead>
<tr>
<th>Metering Rolls</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The metering rolls direct the grain to the discharge system at a controlled rate.</td>
</tr>
</tbody>
</table>

**Figure 32. Metering Rolls on Auger and Drag Style Discharges**

AUGER STYLE DISCHARGE
METERING ROLLS
DRAG STYLE DISCHARGE
Metering Rolls DC Drive Motor

- The DC motor is located under the front frame of the dryer. Chains run from the DC motor to drive sprockets on the ends of the metering rolls.
- When in AUTO mode, the motor receives RPM input from the DC drive unit based on requirements to meet the outlet target moisture content.
- Batch operation and initial automatic mode operation require a manual metering roll speed to be set - this speed would be active until the Dryer Master obtains enough data to begin automated control.
- See Section 25. – Manual Dryer Speeds on page 80 for recommended dryer speed for all dryer models / motor RPMs and desired moisture content.

Attention

If the equipment was ordered heavy for future expansion, there may be a higher RPM motor installed than list on the chart in the Appendix. Check the DC drive motor rating plate to be sure.

Table 3. DC Drive Motor for Metering Rolls

<table>
<thead>
<tr>
<th>1/4 HP Drive Motors</th>
<th>1/2 HP Drive Motors</th>
</tr>
</thead>
<tbody>
<tr>
<td>27 RPM</td>
<td>60 RPM</td>
</tr>
<tr>
<td>42 RPM</td>
<td>92 RPM</td>
</tr>
<tr>
<td>62 RPM</td>
<td></td>
</tr>
<tr>
<td>83 RPM</td>
<td></td>
</tr>
</tbody>
</table>
**Metering Rolls Stall Switch**

- The proximity switch is located to the left of the metering roll drive sprockets. It senses the rotation of the sprocket.
- If the metering rolls jam or stall, the dryer will shut down WITH a cool down period.

*Figure 34. Metering Rolls Stall Proximity Switch*
Auger Style Discharge

**WARNING** Shut down the dryer and lock out power before opening any conveyor access points. Use a stick or tool (not hands) for cleanout.

- The discharge motor turns the discharge augers counterclockwise, as seen from the front of the dryer. Grain moves to the rear.
- Each set of clean-out doors open for access to the discharge augers facilitating ease of clean-out.
- Normally, the discharge drive motor has a motor starter, but can be optionally controlled by a VFD. The VFD allows the auger system to match the speed of the metering rolls, resulting in less grain damage, etc.

**Note**

---

**Figure 35. View into the Open Clean-out Doors at the Auger**

**Figure 36. Drive System for Auger Discharge System (guards are shown open to show detail)**
Rear Cross-Augur System

- The cross auger system combines the dried grain from the two main discharge augers and transfers it to a single discharge output that can be supplied with a left-hand discharge, right-hand discharge, or a center discharge.
- If needed, the orientation of the discharge (RHT, LFT, CTR) can be changed. Contact your NECO dealer.

To close the clean-out doors on the auger system:

1. Close the outer clean-out door first.

   **Figure 37. Outer Door Closed**

2. While holding the outer door in place, close the inner door until it overlaps with a snug fit.

   **Figure 38. Adjust the Latch**

3. Adjust the latch to a reasonable tension.

4. Put the latch’s loop into the inner door’s hook.

5. Secure by pushing the draw latch closed.
Figure 39. Push the Latch

Note
To open the doors, simply reverse the previous steps (excluding the tension adjustment).

Drag Style Discharge

- The discharge motor rotates the two drags positioned along the sides and moves the grain to the rear of the dryer.
- Normally the discharge drive motor has a motor starter, but can be optionally controlled by a variable frequency drive (VFD).

Note
On both sides of the main drags under the dryer are metering roll clean-out doors. To open, pull out the pin on each of the clamps. See Figure 42 and Figure 43.
**Note**

To access the drag conveyor itself, open the hinged doors on the bottom of the conveyors. To minimize stress on the bolts, first remove the three nuts on the hinge side of the door, and then remove the three nuts on the opposite side before swinging the door open. Reverse the order when shutting the door. Refer to the figure below.

**Figure 44. Removing the Hinged Door**
Rear Cross Drag System

- The cross drag combines the dried grain from the two main drags and transfers it to a single discharge output. This can be supplied with a left-hand or right-hand discharge.

- If needed, the orientation of the discharge (RHT, LFT) can be changed. Contact your NECO dealer.
9. Control Components

Main Control Box

Figure 47. Main Control Box

WARNING

Pushing the E-STOP button will turn OFF all outputs from the PLC. It does NOT shut off power into either Control Box. The Power ON lamp will remain lit on the Main Control front panel.
Figure 47  Main Control Box (continued)
PLC Details

Figure 48. PLC Details (D Series) Panel View
Figure 49. PLC Details (D Series)
Figure 50. PLC Details (K Series) Panel View

Figure 51. PLC Details (K Series)

- 24 VDC inputs from starter overloads and run confirmation relays
- Modbus comm from burner box(es)
- Ethernet port
- Main rack
- SD card and battery
HMI Enclosure

Location
NECO recommends that the HMI enclosure be located indoors, with line-of-sight of the dryer. Maximum distance should be within 300 feet (91.4 m) — the maximum length of the Ethernet cabling.

If it is necessary to place the unit outside, subject to temperature and weather extremes, it must be installed inside another enclosure.

Note
Do not locate the HMI screen in direct sunlight.
Figure 52. Example HMI Location
HMI Screen (D and K Series)

Figure 53. HMI Screen (D Series)

NOTE: This ON/OFF switch controls the DryerMaster unit only, not the entire HMI enclosure. POWER IS STILL ON INSIDE THE HMI UNIT.

WARNING Pushing the E-STOP button will turn OFF all outputs from the PLC. It does NOT shut off power into the HMI or main control panel. The Power ON lamp will remain lit on the Main Control front panel.

Figure 54. Rear View of HMI Screen (D Series)
Figure 55. HMI Screen (K Series)

Figure 56. HMI Screen Rear View (K Series)
**Moisture/Temperature Sensor Overview**

- The combination moisture/temperature sensing unit (059250W) has a moisture sensing “fin” and a temperature sensing probe directly below it. The sensor provides 0 to 10 VDC signals for both temperature and moisture, which the embedded DryerMaster converts to grain moisture and temperature readings.
- One sensor is located at the top of the dryer for reading INLET grain moisture and temperature.
- One sensor is located at the dryer grain discharge chute for reading OUTLET grain moisture and temperature.
Outlet Moisture/Temperature Sensor

- The grain is directed past the moisture fin and temperature probe.
- Manual grain samples must be taken for the outlet grain moisture calibration, and also for measuring the grain temperature.

For auger unloads, pull back the spring-loaded locking pin and tilt the sample chute back into the grain flow to collect a sample. For drag unloads, pull out the spring loaded slide gate and grain will flow out of the sample chute.

Outlet Moisture/Temperature Sample Button

Note
Pushing the sample button activates the moisture calibration routine, the same as if activated from the HMI in AUTO mode.
10. Discharge Plugged Sensor

<table>
<thead>
<tr>
<th>Discharge Plugged Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Dryers with auger unloads utilize a proximity switch (059118) to detect a plugged discharge. If the grain encounters a plug and backs up into the discharge chute, the hinged door will lift and when the movement is detected by the proximity switch, the dryer will shut down.</td>
</tr>
<tr>
<td>• Dryers with drag unloads utilize a diaphragm switch (059245) to detect plugs. If grain backs up into the discharge chute, the direct contact with the diaphragm switch will cause the dryer to shut down.</td>
</tr>
</tbody>
</table>

Figure 63. Plug Switch Auger

Figure 64. Plug Switch Drag
11. External Transport(s)

A transport device can be configured to fill the dryer with wet grain and empty the dry grain using the Commander Control system.

**Note**

D Series dryers can be configured to control two filling (wet) transports and two unloading (dry) transports. K Series dryers can control one of each.

All motor starters, starter coils, and overload contacts required are customer-supplied.

Depending on what type of transport style and configuration, the necessary data inputs must be entered in the Fill/Empty setup routine, see Dealer and Customer Entered Data sections in the Operations manual. These data inputs consist of:

<table>
<thead>
<tr>
<th>Question</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is a motor present that needs to be controlled?</td>
<td>PRESENT</td>
</tr>
<tr>
<td>Does that motor need to run continuous?</td>
<td>RUN CONTINUOUS</td>
</tr>
<tr>
<td>Does that motor need to stop after drying stops (2 minute delay)?</td>
<td>STOP DRYING AFTER STOPS</td>
</tr>
<tr>
<td>Start delay (seconds)?</td>
<td>START DELAY</td>
</tr>
<tr>
<td>Stop delay (seconds)?</td>
<td>STOP DELAY</td>
</tr>
</tbody>
</table>

The control integrates the external transport equipment actions depending on the presence of the following switches:

- Wet bin empty switch
- Dry bin full switch

See Section 12. – Optional External Transports on page 52
12. Optional External Transport Configurations

Example 1: Wet 1 Auger and Dry 1 Air System

The following diagram shows an example of a one-wet and one-dry air system to be controlled and operated by the Commander system.

Note
Shown for example only. Individual configuration vary.

Note
The table information below is an example of the Fill/Empty Setup data inputs that would be required for the Wet/Dry type of layout shown above.

Table 4. Fill/Empty Setup Data

<table>
<thead>
<tr>
<th></th>
<th>Motor Present</th>
<th>Run Continuous</th>
<th>Stop After Drying Stops</th>
<th>Start Delay Seconds</th>
<th>Stop Delay Seconds</th>
<th>Relay #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet 2 Transport</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Farthest From Dryer)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wet 1 Transport</td>
<td>Yes</td>
<td>No</td>
<td>1</td>
<td>1</td>
<td>63CR</td>
<td></td>
</tr>
<tr>
<td>(Closest To Dryer)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level Auger</td>
<td>Yes</td>
<td>No</td>
<td>1</td>
<td>1</td>
<td>- -</td>
<td></td>
</tr>
<tr>
<td>Unload Auger</td>
<td>Yes</td>
<td></td>
<td>5</td>
<td>5</td>
<td>- -</td>
<td></td>
</tr>
<tr>
<td>Dry 1 Transport</td>
<td>Yes</td>
<td></td>
<td>1</td>
<td>1</td>
<td>62CR</td>
<td></td>
</tr>
<tr>
<td>(Closest To Dryer)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dry 2 Transport</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Farthest From Dryer)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Example 2: Wet 1 and Wet 2 Augers and Dry 1 Auger

The following diagram shows an example of a two-wet and one-dry air system to be controlled and operated by the Commander system.

**Note**
Shown for example only. Individual configuration vary.

![Diagram of Wet 1 and Wet 2 Augers and Dry 1 Auger](image)

**Table 5. Fill/Empty Setup Data**

<table>
<thead>
<tr>
<th>Motor Present</th>
<th>Run Continuous</th>
<th>Stop After Drying Stops</th>
<th>Start Delay Seconds</th>
<th>Stop Delay Seconds</th>
<th>Relay #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet 2 Transport (Farthest From Dryer)</td>
<td>Yes</td>
<td></td>
<td></td>
<td>1</td>
<td>75CR</td>
</tr>
<tr>
<td>Wet 1 Transport (Closest To Dryer)</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td>63CR</td>
</tr>
<tr>
<td>Level Auger</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td>- -</td>
</tr>
<tr>
<td>Unload Auger</td>
<td>Yes</td>
<td></td>
<td>1</td>
<td>5</td>
<td>- -</td>
</tr>
<tr>
<td>Dry 1 Transport (Closest To Dryer)</td>
<td>Yes</td>
<td>No</td>
<td>1</td>
<td>15</td>
<td>62CR</td>
</tr>
<tr>
<td>Dry 2 Transport (Farthest From Dryer)</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note**
The table information below is an example of the Fill/Empty Setup data inputs that would be required for the Wet/Dry type of layout shown above.
Example 3: Wet 1 and Wet 2 Augers and Dry 1 and Dry 2 Augers

The following diagram shows an example of a two-wet and two-dry air systems to be controlled and operated by the Commander system.

**Note**
- Shown for example only. Individual configuration vary.

---

**Figure 67. Wet 1 and Wet 2 Augers and Dry 1 and Dry 2 Augers**

---

**Note**
- The table information below is an example of the Fill/Empty Setup data inputs that would be required for the Wet/Dry type of layout shown above.

### Table 6. Fill/Empty Setup Data

<table>
<thead>
<tr>
<th>Motor Present</th>
<th>Run Continuous</th>
<th>Stop After Drying Stops</th>
<th>Start Delay Seconds</th>
<th>Stop Delay Seconds</th>
<th>Relay #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet 2 Transport (Farthest From Dryer)</td>
<td>Yes</td>
<td></td>
<td>1</td>
<td></td>
<td>75CR</td>
</tr>
<tr>
<td>Wet 1 Transport (Closest To Dryer)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td>63CR</td>
</tr>
<tr>
<td>Level Auger</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td>- -</td>
</tr>
<tr>
<td>Unload Auger</td>
<td>Yes</td>
<td></td>
<td>1</td>
<td>5</td>
<td>- -</td>
</tr>
<tr>
<td>Dry 1 Transport (Closest To Dryer)</td>
<td>Yes</td>
<td>No</td>
<td>1</td>
<td>15</td>
<td>62CR</td>
</tr>
<tr>
<td>Dry 2 Transport (Farthest From Dryer)</td>
<td>Yes</td>
<td>No</td>
<td>1</td>
<td>5</td>
<td>74CR</td>
</tr>
</tbody>
</table>
13. Wiring External Transports

The customer is responsible for wiring any external transport equipment. The following schematics are for reference.

Figure 68. Wiring Connections for External Transports

<table>
<thead>
<tr>
<th>TRANSPORT CONNECTIONS</th>
<th>WET 2</th>
<th>WET 1</th>
<th>DRY 1</th>
<th>DRY 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>STARTER COIL POWER $\rightarrow$ 11 75CR $\rightarrow$ 14 $\rightarrow$ RUN SIGNAL TO STARTER COIL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>24V OVERLOAD/FAULT $\rightarrow$ 10 $\rightarrow$ 75CR $\rightarrow$ 14 $\rightarrow$ RUN SIGNAL TO STARTER COIL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RUN CONFIRMATION $\rightarrow$ 13 $\rightarrow$ 75CR $\rightarrow$ 14 $\rightarrow$ RUN SIGNAL TO STARTER COIL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\rightarrow$ 10 $\rightarrow$ 75CR $\rightarrow$ 14 $\rightarrow$ RUN SIGNAL TO STARTER COIL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\rightarrow$ 13 $\rightarrow$ 75CR $\rightarrow$ 14 $\rightarrow$ RUN SIGNAL TO STARTER COIL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\rightarrow$ 30 $\rightarrow$ 75CR $\rightarrow$ 14 $\rightarrow$ RUN SIGNAL TO STARTER COIL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\rightarrow$ 31 $\rightarrow$ 75CR $\rightarrow$ 14 $\rightarrow$ RUN SIGNAL TO STARTER COIL</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TRANSPORT CONNECTIONS

3 PAIRS OF WIRES ARE NEEDED FOR EACH REMOTE TRANSPORT DEVICE.
2 WIRES FOR THE RUN SIGNAL (ROUTE POWER THRU THE RELAY TO THE STARTER COIL).
2 WIRES FOR THE 24VDC FAULT (INSTALL JUMPER IF UNAVAILABLE. COIL MUST NOT ENERGIZE IF FAULT).
2 WIRES FOR THE 24VDC RUN CONFIRMATION (PLC MUST SEE A CHANGE OF STATE).
14. Wiring NEMA Starters / IEC Starters / Air Systems

Figure 69. Starter and Air System Wiring Diagrams

**NEMA Type Motor Starter/Overload Wiring**
- Using Dry1 Transport as an Example

**IEC Type Motor Starter & Contactor Wiring**
- Using Dry1 Transport as an Example

**Typical Air System Interface Wiring**
- Using Dry1 Transport as an Example
## 15. PLC and HMI Recorded Data Sheet

**Figure 70. K Series PLC and HMI Recorded Data Sheet**

### Setup Tab

<table>
<thead>
<tr>
<th>Temp &amp; Volume Units:</th>
<th>Imperial</th>
<th>Metric</th>
</tr>
</thead>
</table>

### Setup Tab - Dryer Configuration

- **Length:** 12', 16', 24'
- **Gearmotor RPM:**
  - Yes
  - No
- **Number of blowers:** 1, 2
- **Number of burners:** 1, 2
- **Number of tiers at blower:**
  - Blower #1
  - Blower #2
    - 3, 4, 5
- **Gas Type:** Liquid Propane (LP) or Natural Gas (NG)

### Setup Tab - Fill & Empty Setup

- **Wet Transport:** Yes, No
  - Run Continuous: Yes, No
  - Stop After Drying Stops: Yes, No
  - Start Delay Seconds:
  - Stop Delay Seconds:
- **Level Auger:**
  - Yes
  - No
  - Run Continuous: Yes, No
  - Start Delay Seconds:
  - Stop Delay Seconds:
- **Unload Auger:**
  - Yes, No
  - Run Continuous: Yes, No
  - Stop After Drying Stops: Yes, No
  - Start Delay Seconds:
  - Stop Delay Seconds:
- **Dry Transport:**
  - Yes, No
  - Run Continuous: Yes, No
  - Stop After Drying Stops: Yes, No
  - Start Delay Seconds:
  - Stop Delay Seconds:

### Setup Tab - Timers Setup

- **Auto Filling Delay (10 SEC):**
- **Max Run Time (5 MIN):**
- **Blower Start Delay (5 SEC):**
- **Burner Enable Delay (5 SEC):**
- **Enable Discharge (30 SEC):**
- **Metering Roll Stall (3 MIN):**
- **Metering Roll Pause (60 SEC):**
- **Discharge Plugged Ignore (3 SEC):**
- **Dryer Cooling Time (5 MIN):**

### Main Menu Tab - Trouble Shooting

- **Dealer Info:**

### Main Menu Tab - Trends

- **Discharge Rate Factor:**
- **Throughput:**
- **Total Throughput:**
- **Hours:**

### Main Menu Tab - Fill / Empty Dryer

- **Manual Metering Roll Setpoint:**
- **Serial #:**

### Main Menu Tab - PLC & HMI Version

- **Version #:**
### Figure 71. D Series PLC and HMI Recorded Data Sheet

#### SETUP TAB
**Temp & Volume Units:** Imperial Metric

| SETUP TAB - Dryer Configuration |
|---------------------|-----------------|
| Length: 12’ 16’ 24’ 32’ |
| Gearmotor RPM: Yes No |
| Level Auger: 1 2 3 4 5 6 |
| Number of Blowers: 1 2 3 4 5 6 |
| Number of Burners: 1 2 3 4 5 6 |

<table>
<thead>
<tr>
<th>Number of Tiers at Blower:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blower #1: 3 4 5 3 4 5</td>
</tr>
<tr>
<td>Blower #2: 3 4 5 3 4 5</td>
</tr>
<tr>
<td>Blower #3: 3 4 5 3 4 5</td>
</tr>
<tr>
<td>Blower #4: 3 4 5 3 4 5</td>
</tr>
<tr>
<td>Blower #5: 3 4 5 3 4 5</td>
</tr>
<tr>
<td>Blower #6: 3 4 5 3 4 5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SETUP TAB - Fill &amp; Empty Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet Transport 2: Yes No</td>
</tr>
<tr>
<td>Run Continuous: Yes No</td>
</tr>
<tr>
<td>Stop After Drying Stops: Yes No</td>
</tr>
<tr>
<td>Start Delay Seconds:</td>
</tr>
<tr>
<td>Stop Delay Seconds:</td>
</tr>
<tr>
<td>Wet Transport 1: Yes No</td>
</tr>
<tr>
<td>Run Continuous: Yes No</td>
</tr>
<tr>
<td>Stop After Drying Stops: Yes No</td>
</tr>
<tr>
<td>Start Delay Seconds:</td>
</tr>
<tr>
<td>Stop Delay Seconds:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SETUP TAB - Control Setup (Overrides)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAIN MENU TAB - Trouble Shooting</td>
</tr>
<tr>
<td>Dealer Info:</td>
</tr>
</tbody>
</table>

| TROUBLE SHOOTING - Temperature Control |
| Ramp Deg/Min: |
| 1 |
| 2 |
| 3 |
| 4 |
| 5 |
| 6 |

<table>
<thead>
<tr>
<th>MAIN MENU TAB - Trends</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge Rate Factor:</td>
</tr>
<tr>
<td>Throughput:</td>
</tr>
<tr>
<td>Total Throughput:</td>
</tr>
<tr>
<td>Hours:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MAIN MENU TAB - Fill / Empty Dryer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual Metering Roll Setpoint:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Serial #:</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLC &amp; HMI Version #:</td>
</tr>
</tbody>
</table>
16. Updating the PLC and HMI Programs

In this Section:

- Program Update Instructions
- Installing the M241 PLC Firmware
- Installing the M241 PLC Software
- Installing the HMIGTO Screen Software

Program Update Instructions

Note
Updating the PLC and HMI programs results in the loss of certain setup configuration data. Settings on various screens will need to be manually re-entered. Make a copy of the Section 15 – PLC and HMI Record Sheet on page 57 to record the necessary data.

Note
It is best and easiest to take photos of each screen prior to updating the PLC and HMI programs.

- Update the PLC unit first. Then follow with the HMI update.
- In order to access and re-enter data, log in as: User = N e c o T e c h, Password = Neco11

Installing the M241 PLC Firmware

To install the Firmware:

Note
Firmware only needs to be installed if installing a PLC different to the one delivered with the machine, or if an update is unsuccessful.

1. Turn off the power at 1CB.
2. Insert the SD card.
3. Turn on the power at 1CB; the SD light turns on for approximately two minutes.
   
   Note
   When the ERR light turns on, the loading is finished.
4. Turn off the power at 1CB, and remove the SD card.
5. Turn on the power at 1CB.
6. When the ETH (Ethernet) light turns on, and the ERR light blinks, the PLC is ready for a program.

Installing the M241 PLC Software

To install the M241 PLC Software:

1. Turn off the power at 1CB.
2. Insert the SDHC card.
3. Turn on the power.

Note
When only the SD and PWR lights are green the program is loaded.

4. Turn off the power at 1CB.
5. Remove the SD card.
6. Turn on the power at **1CB**.

7. Check that the **PWR**, **RUN**, and **ETH** lights are on, and that the **SL2** light is flashing; The M241 is ready for operations.

![Lights Indicating M241 Ready for Use](image)

**Figure 77.** Lights Indicating M241 Ready for Use

---

### Installing the HMIGTO Screen Software

**To install the HMIGTO software:**

1. Power off the **HMI**.
2. Remove **USB drive** from **dryer HMI**.
3. Format **USB drive** to **Fat32**.
4. Replace the **USB drive** in the **HMI**.
5. Install the **SD card** with the new files.
6. Power on the **HMI**.

**Note**

Installation should begin automatically (~2 minutes).

7. When the installation is complete, remove the **SD card**, then press **Restart**.
Figure 78. HMIGTO Series

- INSERT SD CARD WITH NOTCH POSITIONED AT UPPER-RIGHT CORNER
- USB MUST BE INSTALLED DURING UPDATE
- SD CARD PORT ON LEFT END OF HMI REAR PANEL
17. Main Control Box Terminal Strip (D Series)

Important
After installation is complete check the motor wires for the correct motor rotation and auger rotation direction.

Figure 79. Main Control Box Terminal Strip (D Series)
18. Main Control Box Terminal Strip (K Series)

Important
After installation is complete check the motor wires for the correct motor rotation and auger rotation direction.

Figure 80. Main Control Box Terminal Strip (K Series)
19. Honeywell Burner Control Fault Codes

The Honeywell Burner Control system displays system faults by illuminating the red Alarm LED, and turning the green Power LED on and off in patterns. The patterns consist of one or more fast, and one or more slow, flashes of the Power LED. These patterns are sometimes referred to as blink codes. The following table provides a description of the blink codes and their meanings.

**Figure 81.  Honeywell Burner Control Location and LEDs**

---

**Table 7. Power LED Fault Codes**

<table>
<thead>
<tr>
<th>CODE (Fast-Slow)</th>
<th>FAULT DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1</td>
<td>Low AC line voltage</td>
</tr>
<tr>
<td>1-2</td>
<td>AC quality problem</td>
</tr>
<tr>
<td>2-1</td>
<td>Unexpected flame signal</td>
</tr>
<tr>
<td>2-2</td>
<td>Flame signal absent</td>
</tr>
<tr>
<td>2-3</td>
<td>Flame signal overrange</td>
</tr>
<tr>
<td>3-1</td>
<td>Running ILK switch problem</td>
</tr>
<tr>
<td>3-2</td>
<td>Running ILK switch in Standby</td>
</tr>
<tr>
<td>3-3</td>
<td>Valve proving fault</td>
</tr>
<tr>
<td>CODE (Fast-Slow)</td>
<td>FAULT DESCRIPTION</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>4-1</td>
<td>Purge card problem</td>
</tr>
<tr>
<td>4-2</td>
<td>Wiring problem/internal fault</td>
</tr>
<tr>
<td>4-3</td>
<td>Flame amplifier problem</td>
</tr>
<tr>
<td>4-4</td>
<td>Configuration jumper problem</td>
</tr>
<tr>
<td>5-1</td>
<td>PII fault (Normal state when turned off)</td>
</tr>
<tr>
<td>5-2</td>
<td>HFS/LFS fault</td>
</tr>
<tr>
<td>5-3</td>
<td>MOS/Start switch</td>
</tr>
<tr>
<td>6-1</td>
<td>Output drive failure</td>
</tr>
<tr>
<td>6-2</td>
<td>Internal fault</td>
</tr>
<tr>
<td>6-3</td>
<td>Device specific fault</td>
</tr>
<tr>
<td>6-4</td>
<td>Accessory fault</td>
</tr>
<tr>
<td>7-7</td>
<td>Unrecognized fault</td>
</tr>
</tbody>
</table>
## 20. KS45 & TB45 Controller LEDs

### Table 8. KS45 and TB45 Controller LED Warnings

<table>
<thead>
<tr>
<th>Color</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Ok</td>
</tr>
<tr>
<td>Green, blinking</td>
<td>No Modbus communications</td>
</tr>
<tr>
<td>Red</td>
<td>Excessive Temperature or bad Thermocouple</td>
</tr>
<tr>
<td>Red, blinking</td>
<td>Internal fault, replace controller</td>
</tr>
</tbody>
</table>

### Honeywell Modbus Mode LEDs

<table>
<thead>
<tr>
<th>LED Behavior</th>
<th>Pulse Period</th>
<th>Interval</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mostly ON with 1 blink</td>
<td>50ms (OFF)</td>
<td>1 sec</td>
<td>Normal Operation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Both ControlBus and ModBus are active</td>
</tr>
<tr>
<td>Always OFF</td>
<td></td>
<td>OFF</td>
<td>No power or device failure</td>
</tr>
<tr>
<td>Always ON</td>
<td></td>
<td>ON</td>
<td>Modbus card failure</td>
</tr>
<tr>
<td>Mostly OFF with 1 flash</td>
<td>50ms (ON)</td>
<td>3.85 sec</td>
<td>ModBus is not active</td>
</tr>
<tr>
<td>LED Behavior</td>
<td>Pulse Period</td>
<td>Interval</td>
<td>Meaning</td>
</tr>
<tr>
<td>------------------------------</td>
<td>------------------------------</td>
<td>----------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Mostly OFF with 2 pulses</td>
<td>2 x (200ms ON, 200ms OFF)</td>
<td>1.75 sec</td>
<td>Program CRC error</td>
</tr>
<tr>
<td>Most OFF with 3 pulses</td>
<td>3 x (200ms ON, 200ms OFF)</td>
<td>2.15 sec</td>
<td>No ControlBus signal from the burner controller</td>
</tr>
</tbody>
</table>

**Honeywell Relay Module Blinking Power LED Indication**

**Note**
A 5-1 blink code (Pre-Ignition Interlock) is a normal stand-by condition on NECO dryers with Commander & Commander Lite controls when not running.

<table>
<thead>
<tr>
<th>Fault Code</th>
<th>System Failure</th>
<th>Recommended Troubleshooting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code 1-1 &quot;Low AC Line Voltage&quot;</td>
<td>Low AC Line detected.</td>
<td>1. Check the relay module and display module connections.</td>
</tr>
<tr>
<td>Code 1-2 &quot;AC Quality Problem&quot;</td>
<td>Excessive noise or device running on slow, fast, or AC line dropout detected.</td>
<td>2. Reset and sequence the Relay Module.</td>
</tr>
<tr>
<td>Code 2-1 &quot;Unexpected Flame Signal&quot;</td>
<td>Flame sensed when no flame is expected during STANDBY or PURGE.</td>
<td>3. Check the 7800 power supply and make sure that frequency and voltage meet specifications.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Check the backup power supply, as appropriate.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Remove the flame amplifier and inspect its connections. Reseat the amplifier.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. If the code reappears, replace the flame amplifier and/or the flame detector.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. If the fault persists, replace the relay module.</td>
</tr>
<tr>
<td>Fault Code</td>
<td>System Failure</td>
<td>Recommended Troubleshooting</td>
</tr>
<tr>
<td>------------</td>
<td>----------------</td>
<td>----------------------------</td>
</tr>
</tbody>
</table>
| Code 2-2  | No-flame time present at the end of the Pilot Flame Establishing Period; lost during the Main Flame Establishing Period or during RUN. | 1. Measure the flame signal. If one exists, verify that it meets specifications.  
2. Make sure that the flame amplifier and flame detector are compatible.  
3. Inspect the main fuel valve(s) and valve connection(s).  
4. Verify that the fuel pressure is sufficient to supply fuel to the combustion chamber. Inspect the connections to the fuel pressure switches. Make sure they are functioning properly.  
5. Inspect the Airflow Switch and make sure that it is functioning properly.  
6. Check the flame detector sighting position; reset and recycle. Measure the flame signal strength. Verify that it meets specifications. If not, refer to the flame detector and/or flame amplifier checkout procedures in the installation instructions.  
7. Replace the flame amplifier and/or the flame detector, if necessary.  
8. If the fault persists, replace the relay module. |
| Code 2-3  | Flame signal value is too high to be valid. | 1. Make sure the flame detector and flame amplifier are compatible.  
2. Remove the flame amplifier and inspect its connections. Reset the flame amplifier.  
3. Reset and sequence the relay module.  
4. Check the flame detector sighting position; reset and recycle. Measure flame strength. Verify that it meets specifications. If not, refer to the flame detector and/or flame amplifier checkout procedures in the installation instructions.  
5. If the code reappears, replace the flame amplifier and/or the flame detector.  
6. If the fault persists, replace the relay module. |
| Code 3-1  | Running or Lockout Interlock fault during Prepurge. | 1. Check wiring; correct any errors.  
2. Inspect the fan; make sure there is no air intake blockage and that it is supplying air.  
3. Make sure the Lockout Interlock switches are functioning properly and the contacts are free from contaminants.  
4. Reset and sequence the relay module to Prepurge (place the TEST/RUN Switch in the TEST position, if available). Measure the voltage between terminal 7 and G (ground); 120 Vac should be present. Switch TEST/RUN back to RUN.  
5. If steps 1 through 4 are correct and the fault persists, replace the relay module. |
| Code 3-2  | Lockout Interlock powered at improper point in sequence or On in Standby | 1. Check wiring to make sure that the Lockout Interlocks are connected properly between terminals 6 and 7. Correct any errors.  
2. Reset and sequence the relay module.  
3. If the fault persists, measure the voltage between terminal 6 and G (ground), then between terminal 7 and G. If there is 120 Vac at terminal 6 when the controller is off, the controller switch may be bad or is jumpered.  
4. If steps 1 through 3 are correct and there is 120 Vac at terminal 7 when the controller is closed and the fault persists, check for a welded or jumpered Running Interlock or Airflow Switch. Correct any errors.  
5. If steps 1 through 4 are correct and the fault persists, replace the relay module. |
| Code 3-3  | VPS (Valve Proving Switch) in wrong state during VPS Test. | 1. Check wiring, making sure upstream valve is connected to terminal 9 and downstream valve is connected to terminal 17.  
2. Conduct Valve Seat leakage test using a manometer.  
3. Reset and sequence the relay module; if fault repeats, test VPS (connected to terminal 16) is functioning properly; replace if necessary.  
4. Reset and sequence the relay module.  
5. If fault persists, replace the relay module. |
| Code 4-1  | No purge card or the purge card timing has changed from the original configuration. | 1. Make sure the purge card is seated properly.  
2. Inspect the purge card and the connector on the relay module for any damage or contaminants.  
3. Reset and sequence the relay module.  
4. If the fault code reappears, replace the purge card.  
5. Reset and sequence the relay module.  
6. If the fault code persists, replace the relay module. |
| Code 4-2  | Pilot (ignition) valve terminal, main valve, ignition or Main Valve 2 was on when it should be off. | **WARNING**  
Electrical Shock Hazard; Fire or Explosion Hazard. Can cause severe injury, death or property damage. Remove system power and then off power supply.  
1. Remove system power and turn off fuel supply.  
2. Check wiring; correct any errors.  
3. Inspect Pilot Fuel Valve(s), both places, and connections.  
4. Reset and sequence the relay module.  
5. If the fault persists, replace the relay module. |
<table>
<thead>
<tr>
<th>Fault Code</th>
<th>System Failure</th>
<th>Recommended Troubleshooting</th>
</tr>
</thead>
</table>
| Code 4-3  | Flame not sensed, or sensed when it should be on or off | 1. Check wiring; correct any errors.  
2. Make sure the flame amplifier and flame detector are compatible.  
3. Remove the flame amplifier and inspect the connections. Reseat the amplifier.  
4. Reset and sequence the relay module.  
5. If the code reappears, replace the flame amplifier and/or the flame detector.  
6. If the fault persists, replace the relay module. |
| Code 4-4  | The configuration jumpers differ from the sample taken at startup. | 1. Inspect the jumper connections. Make sure the clipped jumpers were completely removed.  
2. Reset and sequence the relay module.  
3. If the fault persists, replace the relay module. |
| Code 5-1  | Preignition Interlock | 1. Check wiring and correct any errors.  
2. Check Preignition Interlock switches to assure proper functioning.  
3. Check fuel valve operation.  
4. Reset and sequence the relay module; monitor the Preignition Interlock status.  
5. If the fault persists, replace the relay module. |
| Code 5-2  | Either High Fire Switch or Low Fire Switch failure. | 1. Check wiring and correct any errors.  
2. Reset and sequence the relay module.  
3. Use manual motor potentiometer to drive the motor open and closed. Verify at motor switch that the end switches are operating properly. Use RUN/TEST switch if manual potentiometer is not available.  
4. Reset and sequence the relay module.  
5. If the fault persists, replace the relay module. |
| Code 5-3  | Man-Open Sw., Start Sw. or Control On in the wrong operational state. | 1. Check wiring and correct any errors.  
2. Make sure that the Manual Open Valve Switch, Start Switch and Control are operating properly.  
3. Start Switch held “On” too long.  
4. Reset and sequence the relay module.  
5. Reset and sequence the relay module. If the fault persists, replace the relay module (RM7838A1014; RM7838B1013 or RM7838C1004 only). |
| Code 6-1  | Relay Module self-test failure. | 1. Reset and sequence the relay module.  
2. If fault reappears, remove power from the device, reapply power, then reset and sequence the relay module.  
3. If the fault persists, replace the relay module. |
| Code 6-2  | Relay Module Self-Test failure. | 1. Reset and sequence the relay module.  
2. If fault reappears, remove power from the device, reapply power, then reset and sequence the relay module.  
3. If fault does not repeat on the next cycle, check for electrical noise being copied into the relay module through the external loads or possibly an electrical grounding issue.  
4. If the fault persists, replace the relay module. |
| Code 6-3  | Fault with special OEM input circuits. | 1. Check wiring and operation of special OEM inputs.  
2. Reset and sequence the relay module.  
3. If fault reappears, remove power from the device, reapply power, then reset and sequence the relay module.  
4. If the fault does not repeat on the next cycle, check for electrical noise being copied into the relay module through the external loads or possibly an electrical grounding issue.  
5. If the fault persists, replace the relay module. |
| Code 6-4  | Unused at this time. | — |
| Code 7-7  | Unused at this time. | — |
### Fireye Lockout Codes Interpretation

During an alarm condition, the Alarm LED [bell icon] is made to flash at approximately a twice per second rate. The remaining LED’s are illuminated as a coded sequence identifying the reason for the lockout. This remains true if power is removed and then restored in a locked out condition.

<table>
<thead>
<tr>
<th>LED DISPLAY READOUT</th>
<th>FAN</th>
<th>OPEN DAMPER</th>
<th>CLOSE DAMPER</th>
<th>AUTO</th>
<th>IGN</th>
<th>FLAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>T13 FUEL VALVE END SWITCH OPEN</td>
<td>⚫</td>
<td>⚫</td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-D LOW FIRE START OPEN</td>
<td>⚫</td>
<td></td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-D LOW FIRE START OPEN - PTFI</td>
<td>⚫</td>
<td></td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-D LOW FIRE START OPEN - MTFI</td>
<td>⚫</td>
<td>⚫</td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-D CLOSED</td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-8 CLOSED</td>
<td></td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-8 HIGH PURGE CIRCUIT OPEN</td>
<td></td>
<td></td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FALSE FLAME-STANDBY</td>
<td></td>
<td></td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLAME FAIL PTFI</td>
<td>⚫</td>
<td></td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLAME FAIL - MTFI</td>
<td>⚫</td>
<td>⚫</td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLAME FAIL AUTO</td>
<td></td>
<td></td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-P RUN INTLK OPEN - PREPURGE</td>
<td>⚫</td>
<td></td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-P RUN INTLK OPEN - PURGE</td>
<td>⚫</td>
<td></td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-P RUN INTLK OPEN-PTFI</td>
<td>⚫</td>
<td></td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-P RUN INTLK OPEN-MTFI</td>
<td>⚫</td>
<td>⚫</td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-P RUN INTLK CLOSED-STANDBY</td>
<td></td>
<td></td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-P RUN INTLK OPEN-AUTO</td>
<td></td>
<td></td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FUEL VALVE STATE CHANGE</td>
<td></td>
<td></td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHECK FUSE</td>
<td></td>
<td></td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHECK WIRING</td>
<td></td>
<td></td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHECK SCANNER</td>
<td></td>
<td></td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHECK PROGRAMMER</td>
<td></td>
<td></td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHECK CHASSIS</td>
<td></td>
<td></td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHECK EXPANSION MODULE</td>
<td></td>
<td></td>
<td></td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
21. HMI Wiring Connections

**Important**
The HMI must be connected to a customer-supplied 120 VAC, 400 to 600 VA uninterruptible power supply (UPS).

**Electrical Wiring from Main Control to HMI**

1. Using the labels provided, pull and connect the following wires from the main control terminals to the HMI terminals.

   **Note**
   For K Series dryers, refer to the schematic in the main control panel for HMI connections.

**Figure 82. Terminals Inside HMI Enclosure**

<table>
<thead>
<tr>
<th>Wire Label</th>
<th>Wire Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1A</td>
<td>Blue</td>
</tr>
<tr>
<td>E2</td>
<td>Blue</td>
</tr>
<tr>
<td>E2A</td>
<td>Blue</td>
</tr>
<tr>
<td>24V</td>
<td>Blue</td>
</tr>
<tr>
<td>0V</td>
<td>White</td>
</tr>
</tbody>
</table>

**Ethernet Cable from Main Control to HMI**

1. Pull Cat 6 shielded Ethernet cable from the main control to the HMI. The maximum distance should be less than 300 feet.
2. Terminate each end of the Ethernet cable (if not already terminated).
3. Plug one end into the ethernet switch in the main control panel.
4. Plug the other end into the Ethernet switch inside the HMI enclosure.
Figure 83. Ethernet Cable Connection in Main Control Panel

Figure 84. Ethernet Cable Connection in HMI Cabinet
HMI Enclosure Wiring

The following diagram shows electrical and Ethernet wiring entering the HMI enclosure (dashed lines).

Figure 85. HMI Wiring Diagram (D Series)
22. Dryer Master Moisture Sensor Circuit Board

Figure 86. Dryer Master Enclosure

The DryerMaster moisture sensor circuit board is factory set and should not need adjustment.

Figure 87. Dryer Master Circuit Board and Connections

The “J3” jumper should be always set to “STORE” position.
You must consider the potential of accidental touches from remote mobile devices. Know and understand the hazards regarding equipment movement started by a remote operation. You, as the operator, are responsible for all gates and interlock for protecting people and equipment. Failure to follow these instructions can result in death, serious injury, or equipment damage.

| Required Hardware (source locally) | • Wi-Fi router  
| • Ethernet cable  
| • Tablet or cell phone with Wi-Fi capability |

| Hardware installation | • Locate Wi-Fi router in a suitable location near the HMI enclosure.  
| • The Wi-Fi router should be powered by its own power supply.  
| • Connect an ethernet cable from Wi-Fi router to the ethernet switch inside the HMI enclosure. |

| Router configuration | • static IP address 10.10.11.5  
| • subnet mask 255.255.255.0  
| • gateway 10.10.11.211  
| 1. Configure router  
| 2. Set router name (NECO dryer)  
| 3. Set router security password to prevent unauthorized access  
| 4. Record security password here |

| Required Software (download app) | Schneider Vijeo Design’Air (available on google apps) |

| Tablet / Phone Wi-Fi settings | • Connect to router (NECO dryer)  
<p>| • Enter router security password |</p>
<table>
<thead>
<tr>
<th>Initial Vijeo Design’Air app settings</th>
<th><strong>To configure app settings:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Press + <strong>Add device</strong>.</td>
</tr>
<tr>
<td></td>
<td>2. Name: NECO dryer</td>
</tr>
<tr>
<td></td>
<td>3. Host: 10.10.11.101</td>
</tr>
<tr>
<td></td>
<td>4. Port: 37891</td>
</tr>
<tr>
<td></td>
<td>5. Press “OK”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Using the Vijeo Air app</th>
<th><strong>Note</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The use of this app allows remote access to monitor, make minor operational setting changes and to stop the dryer only. Starting of equipment must be performed at the dryer HMI panel.</td>
</tr>
<tr>
<td></td>
<td>The local operator (User, Owner or NecoTech) via the HMI must start and get the dryer and associated equipment in the desired state of operation.</td>
</tr>
<tr>
<td></td>
<td>Once all equipment is running as desired, the local operator enables remote access.</td>
</tr>
<tr>
<td></td>
<td>MAIN MENU &gt; SETUP &gt; SECURITY SETUP &gt; I ACCEPT &gt; ENABLE REMOTE ACCESS.</td>
</tr>
<tr>
<td></td>
<td>When the “ENABLE REMOTE ACCESS” icon is pressed the current operator is logged out and the “Remote” user is logged in on the HMI.</td>
</tr>
<tr>
<td></td>
<td>The user is now able to access the dryer control via the Vijeo Design’Air app.</td>
</tr>
<tr>
<td></td>
<td>Press the app icon on the tablet / phone, then press “NECO dryer”.</td>
</tr>
<tr>
<td></td>
<td>Read accept the liability statement. Press “OK” or “View-only” icon.</td>
</tr>
<tr>
<td></td>
<td><strong>Login.</strong></td>
</tr>
<tr>
<td></td>
<td>• Username: RemoteWiFi</td>
</tr>
<tr>
<td></td>
<td>• Password: 1379</td>
</tr>
<tr>
<td></td>
<td>• Press “OK”</td>
</tr>
<tr>
<td></td>
<td>At this point the tablet / phone displays the same image the HMI screen.</td>
</tr>
<tr>
<td></td>
<td>The operator may remotely:</td>
</tr>
<tr>
<td></td>
<td>• change Burner Temperature(s)</td>
</tr>
<tr>
<td>• change Target Moisture</td>
<td></td>
</tr>
<tr>
<td>• change Manual Metering Speed Setpoint</td>
<td></td>
</tr>
<tr>
<td>• and view all screens</td>
<td></td>
</tr>
</tbody>
</table>

**Note**

If the LOGOUT icon is pressed the dryer control will not be able accessible until operator locally re-enables the remote access.
24. Dryer Temperature Considerations

High-Limit Temperature Consideration

Fire Hazard

- In cases where the grain has a lot of trash, or when drying high moisture grain (that is immature or frozen grain), drying at these temperatures may not be possible, as the risk of fire is increased.
- In cases where there is blockage in the machine due to trash, it is possible for this material to become subject to spontaneous combustion.
- Shut the blower(s) OFF immediately in ANY case where a person may see smoke coming from the machine.
- When the High Temperature Limit alarm is activated, the equipment will immediately shut down with NO cool-down period (blowers OFF).
- To avoid tripping the High Temperature Limit, ensure the High Limit Switch is set to 30°F (17°C) above the operating temperature at each burner.

Cool-Down

When stopping the machine the grain should be cooled down:

- **Manual Cool-Down:** Turn off burners, but leave blowers on for a period of 5 to 15 minutes.
- **Automatic Cool-Down:** The system has five possible grain level monitors. Certain conditions can result in the equipment automatically shutting down. Most of these conditions include a cool-down period. A few conditions, such as High Limit Temperature, that are reached provide a shut-down with NO cool-down period.
25. Manual Dryer Speed

Note
These speeds are recommended as a starting point only for input as manual metering roll speed until the Dryer Master system reaches full automatic. As grain drying factors change, speeds will need to change in order to maintain a correct and steady output grain moisture value.

Some factors to consider when drying grain are:
- The type of grain. Some varieties are moisture-resistant compared to others.
- The end usage of the grain - will it be used for seed, feed, commercial, or some other usage.
- The outside weather conditions - including temperature, humidity, and even wind.
- The moisture content of the incoming grain.
- The cleanliness of the incoming grain.
- The crop region.

Table 9. D Series Model Speed Setting (DC motor %)

<table>
<thead>
<tr>
<th>MODEL - RPM</th>
<th>MOISTURE CONTENT (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td>D1240 - 27 RPM</td>
<td>42%</td>
</tr>
<tr>
<td>D1250 - 27 RPM</td>
<td>52%</td>
</tr>
<tr>
<td>D1260 - 27 RPM</td>
<td>63%</td>
</tr>
<tr>
<td>D1660 - 27 RPM</td>
<td>42%</td>
</tr>
<tr>
<td>D1670 - 27 RPM</td>
<td>52%</td>
</tr>
<tr>
<td>D1680 - 27 RPM</td>
<td>62%</td>
</tr>
<tr>
<td>D1690 - 27 RPM</td>
<td>73%</td>
</tr>
<tr>
<td>D16106 - 42 RPM</td>
<td>53%</td>
</tr>
<tr>
<td>D16120 - 42 RPM</td>
<td>67%</td>
</tr>
<tr>
<td>D16140 - 42 RPM</td>
<td>80%</td>
</tr>
<tr>
<td>D16160 - 62 RPM</td>
<td>63%</td>
</tr>
<tr>
<td>D24108 - 27 RPM</td>
<td>62%</td>
</tr>
<tr>
<td>D24150 - 27 RPM</td>
<td>53%</td>
</tr>
<tr>
<td>D24180 - 42 RPM</td>
<td>67%</td>
</tr>
<tr>
<td>D24210 - 42 RPM</td>
<td>80%</td>
</tr>
<tr>
<td>D24240 - 62 RPM</td>
<td>63%</td>
</tr>
<tr>
<td>D24260 - 62 RPM</td>
<td>72%</td>
</tr>
<tr>
<td>D24330 - 83 RPM</td>
<td>66%</td>
</tr>
<tr>
<td>D24380 - 83 RPM</td>
<td>81%</td>
</tr>
<tr>
<td>D32260 - 62 RPM</td>
<td>54%</td>
</tr>
</tbody>
</table>
### Table 9  D Series Model Speed Setting (DC motor %) (continued)

<table>
<thead>
<tr>
<th>MODEL - RPM</th>
<th>3</th>
<th>5</th>
<th>7</th>
<th>9</th>
<th>11</th>
<th>13</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>D32340 - 62 RPM</td>
<td>72%</td>
<td>43%</td>
<td>31%</td>
<td>24%</td>
<td>20%</td>
<td>17%</td>
<td>15%</td>
</tr>
<tr>
<td>D32440 - 92 RPM</td>
<td>61%</td>
<td>36%</td>
<td>26%</td>
<td>20%</td>
<td>17%</td>
<td>14%</td>
<td>12%</td>
</tr>
<tr>
<td>D32500 - 92 RPM</td>
<td>73%</td>
<td>44%</td>
<td>31%</td>
<td>24%</td>
<td>20%</td>
<td>17%</td>
<td>15%</td>
</tr>
</tbody>
</table>

### Table 10.  K Series Model Speed Setting (DC motor %)

<table>
<thead>
<tr>
<th>MODEL - RPM</th>
<th>3</th>
<th>5</th>
<th>7</th>
<th>9</th>
<th>11</th>
<th>13</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>K600- 27 RPM</td>
<td>42%</td>
<td>26%</td>
<td>19%</td>
<td>15%</td>
<td>13%</td>
<td>10%</td>
<td>9%</td>
</tr>
<tr>
<td>K700- 27 RPM</td>
<td>52%</td>
<td>32%</td>
<td>23%</td>
<td>18%</td>
<td>15%</td>
<td>12%</td>
<td>11%</td>
</tr>
<tr>
<td>K800- 27 RPM</td>
<td>62%</td>
<td>38%</td>
<td>27%</td>
<td>21%</td>
<td>17%</td>
<td>15%</td>
<td>13%</td>
</tr>
<tr>
<td>K900- 27 RPM</td>
<td>73%</td>
<td>44%</td>
<td>32%</td>
<td>25%</td>
<td>20%</td>
<td>17%</td>
<td>15%</td>
</tr>
</tbody>
</table>