Read this manual before using product. Failure to follow instructions and safety precautions can result in serious injury, death, or property damage. Keep manual for future reference.
This product has been designed and manufactured to meet general engineering standards. Other local regulations may apply and must be followed by the operator. All personnel must be trained in the correct operational and safety procedures for this product. Use the sign-off sheet below to record initial and periodic reviews of this manual with all personnel.

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<th>Date</th>
<th>Employee Name and Signature</th>
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</tbody>
</table>
1. Introduction

Thank you for your purchase. Follow the instructions in this manual for safe use of this grain dryer. Following proper operation and maintenance will help to keep the grain dryer running in optimal condition.

Keep this manual handy for frequent reference and to review with new personnel. A sign-off form is provided on the inside front cover for your convenience. If any information in this manual is not understood or if you need additional information, please contact AGI or your representative for assistance.

This manual should be regarded as part of the equipment.

1.1. Product Information

Always give your dealer the following product information when ordering parts or requesting service. Please record the product information in the table below for easy reference.

<table>
<thead>
<tr>
<th>Local Dealer’s Name and Address</th>
<th>Phone</th>
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<table>
<thead>
<tr>
<th>Local Contractor’s Name:</th>
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</thead>
<tbody>
<tr>
<td>Service Contractor’s Name:</td>
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<tr>
<th>Purchase Date:</th>
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<tbody>
<tr>
<td>Model Number:</td>
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<tr>
<td>Fuel Type:</td>
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</tbody>
</table>

| Wiring Diagram Drawing Number: |

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 DRYER MANUAL FOR INSTALLATION, OPERATION, AND TROUBLESHOOTING INSTRUCTIONS.**

**MANUFACTURER:** NECO

**OMAHA, NEBRASKA, USA**

**FAN/HEATER UNIT FOR USE IN CROP DRYING**

**WARNING: FOR OUTDOOR INSTALLATION ONLY.**

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

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**OMAHA, NEBRASKA, USA**

**FAN/HEATER UNIT FOR USE IN CROP DRYING**

**WARNING: FOR OUTDOOR INSTALLATION ONLY.**

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

**MANUFACTURER:** NECO

**OMAHA, NEBRASKA, USA**

**Fuel Type:** Natural Gas

**Part / Serial No:** DRYR-####

**Supply Voltage:** 208 / 230 VAC

**Phase:** 3

**Frequency:** 60 Hz

**Full Load Amps:** 150

**Burner Manifold Pressure at Min. Input:** 0.00 PSI

**Burner Manifold Pressure at Max. Input:** 1.40 PSI

**MINIMUM INPUT RATE:** 0.5 MM BTU/H

**MAXIMUM INPUT RATE:** 8.0 MM BTU/H

**MINIMUM SUPPLY PRESSURE FOR MAX. OUTPUT:** 14 kPa (2 PSI)

**LARGEST MOTOR AMP:** 25

**MANIFOLD PRESSURE @ MIN. INPUT:** 1 PSI

**CLEARANCE TO COMBUSTIBLES:** 2M (6FT)

**PERIMETER SERVICE CLEARANCE:** 2M (6FT)

**WARNING:** FOR OUTDOOR INSTALLATION ONLY

**FUEL TYPE:** LP

**MAXIMUM SUPPLY PRESSURE:** 250 PSI

**MAXIMUM INPUT RATE:** 8.4 MM BTU/H

**MINIMUM SUPPLY PRESSURE FOR MAX. OUTPUT:** 26.5 PSI

**LARGEST MOTOR AMP:** 25

**MANIFOLD PRESSURE @ MIN. INPUT:** 1 PSI

**CLEARANCE TO COMBUSTIBLES:** 2M (6FT)

**PERIMETER SERVICE CLEARANCE:** 2M (6FT)

**WARNING:** FOR OUTDOOR INSTALLATION ONLY

**FUEL TYPE:** LP

**MAXIMUM SUPPLY PRESSURE:** 250 PSI

**MAXIMUM INPUT RATE:** 8.4 MM BTU/H

**MINIMUM SUPPLY PRESSURE FOR MAX. OUTPUT:** 26.5 PSI

**LARGEST MOTOR AMP:** 25

**MANIFOLD PRESSURE @ MIN. INPUT:** 1 PSI

**CLEARANCE TO COMBUSTIBLES:** 2M (6FT)

**PERIMETER SERVICE CLEARANCE:** 2M (6FT)
Figure 4. Electrical Schematic Drawing

NOTE: The dryer electrical schematic drawing is located on the inside of the control panel door.

To register your grain dryer, scan the following QR code, or call AGI NECO at 402-453-6912. For SureTrack Dryer Manager registration, see the instructions included with the SureTrack gateway or call 855-835-5231.

1.2. Intended Use

The grain dryer is intended for use as listed below and described throughout this manual. Use in any other way is considered contrary to the intended use and is not covered by the warranty.

Intended use for the grain dryer
- Designed to dry free-flowing grains, field crops and oil seeds.

1.2.1 Misuse

Do not install/use the grain dryer for/with:
- drying grains at temperatures higher than recommended.
- applications other than drying farm crops.
- excessive chaff, seed pods, half cobs, leafy materials, and other foreign material.
- finely milled grain dust.
- bypassed safety sensors.
2. Safety

2.1. Safety Alert Symbol and Signal Words

This safety alert symbol indicates important safety messages in this manual. When you see this symbol, be alert to the possibility of injury or death, carefully read the message that follows, and inform others.

Signal Words: Note the use of the signal words DANGER, WARNING, CAUTION, and NOTICE with the safety messages. The appropriate signal word for each message has been selected using the definitions below as a guideline.

- **DANGER**: Indicates an imminently hazardous situation that, if not avoided, will result in serious injury or death.
- **WARNING**: Indicates a hazardous situation that, if not avoided, could result in serious injury or death.
- **CAUTION**: Indicates a hazardous situation that, if not avoided, may result in minor or moderate injury.
- **NOTICE**: Indicates a potentially hazardous situation that, if not avoided, may result in property damage.

2.2. General Safety Information

Read and understand all safety instructions, safety decals, and manuals and follow them.

- Owners must give instructions and review the information initially and annually with all personnel. Untrained users/operators expose themselves and bystanders to possible serious injury or death.

- Use for intended purposes only.

- Do not modify the grain dryer in any way without written permission from the manufacturer. Unauthorized modification may impair the function and/or safety. Any unauthorized modification will void the warranty.

- Follow a health and safety program for your worksite. Contact your local occupational health and safety organization for information.

- Always follow applicable local codes and regulations.

2.3. Overhead Power Lines

- Keep grain dryers a horizontal distance of at least 100 ft (30.5 m) from power lines.

- Do not use the grain dryer if there is a chance of any loading or unloading equipment contacting power lines.

- Do not locate grain dryers on both sides of a power line.

- Electrocution can occur without direct contact.
2.4. Grain Dryer Safety

- Do not overheat grain or operate the dryer temperature too high. Keep the maximum plenum temperature not more than the maximum set point temperature.
- Be cautious of spontaneous combustion when working with oil seeds.
- Grain dust is a fire hazard. Keep all areas (including areas under the perforated floors) free from dust and fines.
- Clean out the dryer after using to remove grain dust, husks, and other materials.
- Screen grain before it goes into a bin to help prevent dust and trash buildup. Using a grain spreader will help distribute dust/fines.
- Ventilate, purge all contaminants, and allow burner, and drying areas to cool inside the heater, in the heater area and the dryer area before any persons enter these areas.
- Do not remove covers, touch, or service internal components during operation.
- Do not install or combine with products from other manufacturers. The design and safety features may not be compatible.
- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of dryer.
- Do not use the dryer where a high concentration of grain dust or flammable liquids or vapors exist, such as milled grain dust.
- Use the dryer only with the gas types intended, connecting alternate fuel sources to the dryer can result in fires.
- Shut off and lock out or disconnect power and close valve at gas source before inspecting or servicing the heater, or when not in use.
- Keep away from fan impeller/blade; high suction can pull a person toward the inlet. Contact with an unguarded impeller/blade will cause severe injury.
- Keep the fan inlet screen in place at all times.
- Remove foreign material from the fan inlet before operating.
- Do not operate the fan if there is excessive vibration or noise.
- When the power is locked out, fans can still be dangerous because of potential “windmilling.” Always block the impeller/blade before working on any moving parts.

**In case of a dryer fire:**
- Turn off gas at the heater and supply tank.
- Shut off and lock electrical power.
- Seal the aeration fan inlet and any other opening to smother the fire.
- Evacuate all personnel from the area.
- Call the fire department.
2.5. Gas Leak Hazards

**WARNING** If You Smell Gas:

- Turn off gas at the source if possible.
- Do not try to light or relight any appliance.
- Extinguish any flames and remove any sources of ignition from the vicinity of the bin.
- Do not touch any electrical switch.
- Evacuate all personnel from the vicinity of the source of the smell.
- Immediately call your gas supplier. Follow the gas supplier’s instructions.
- If you cannot reach your gas supplier, call the fire department.

2.6. Guards Safety

**WARNING**

- Keep guards in place. Do not operate with guard removed.
- Do not walk on, step on, or damage guards.
- Lock out power before removing a guard.
- Ensure all guards are replaced after performing maintenance.

2.7. Drives and Lockout/Tagout Safety

Inspect the power source(s) before using and know how to shut down in an emergency. Whenever you service or adjust your equipment, make sure you shut down your power source and gas supply and follow lockout and tagout procedures to prevent inadvertent start-up and hazardous energy release. Know the procedure(s) that applies to your equipment from the following power sources.

For example:

- De-energize, block, and dissipate all sources of hazardous energy.
- Lock out and tag out all forms of hazardous energy.
- Ensure that only 1 key exists for each assigned lock, and that you are the only one that holds that key.
- After verifying all energy sources are de-energized, service or maintenance may be performed.
- Ensure that all personnel are clear before turning on power to equipment.

For more information on occupational safety practices, contact your local health and safety organization.
2.7.1 Electric Motor Safety

**WARNING**

**Power Source**
- Electric motors and controls shall be installed and serviced by a qualified electrician and must meet all local codes and standards.
- Do not modify the magnetic starter. This component provides overload and under-voltage protection.
- Motor starting controls must be located so that the operator has full view of the entire operation.
- Locate main power disconnect switch within reach from ground level to permit ready access in case of an emergency.
- Motor must be grounded.
- Guards must be in place and secure at all times.
- Ensure electrical wiring and cords remain in good condition; replace if necessary.

**Lockout**
- The main power disconnect switch should be in the locked position during shutdown or whenever maintenance is performed.
- In the event of unexpected fan shutdown, the fan can be reset using the main power switch located on the fan or using a reset button when equipped.

2.8. Personal Protective Equipment

The following Personal Protective Equipment (PPE) should be worn when operating or maintaining the equipment.

- **Safety Glasses**
  - Wear safety glasses at all times to protect eyes from debris.

- **Steel-Toe Boots**
  - Wear steel-toe boots to protect feet from falling debris.

- **Coveralls**
  - Wear coveralls to protect skin.

- **Work Gloves**
  - Wear work gloves to protect your hands from sharp and rough edges.

- **Hard Hat**
  - Wear a hard hat to help protect your head.

- **Fall Protection**
  - Use a fall arrester or fall restraint when climbing or working at heights.
2.9. Safety Equipment

The following safety equipment should be kept on site.

- **Fire Extinguisher**
  Provide a fire extinguisher for use in case of an accident. Store in a highly visible and accessible place.

- **First-Aid Kit**
  Have a properly-stocked first-aid kit available for use should the need arise, and know how to use it.

2.10. Safety Decals

- Keep safety decals clean and legible at all times.
- Replace safety decals that are missing or have become illegible. See decal location figures that follow.
- Replaced parts must display the same decal(s) as the original part.
- Replacement safety decals are available *free of charge* from your distributor, dealer, or factory as applicable.

2.11. Decal Installation/Replacement

1. Decal area must be clean and dry, with a temperature above 50°F (10°C).
2. Decide on the exact position before you remove the backing paper.
3. Align the decal over the specified area and carefully press the small portion with the exposed sticky backing in place.
4. Slowly peel back the remaining paper and carefully smooth the remaining portion of the decal in place.
5. Small air pockets can be pierced with a pin and smoothed out using the decal backing paper.

2.12. Safety Decal Locations and Details

Replicas of the safety decals that are attached to the grain dryer and their messages are shown in the figure(s) that follow. Safe operation and use of the grain dryer requires that you familiarize yourself with the various safety decals and the areas or particular functions that the decals apply to, as well as the safety precautions that must be taken to avoid serious injury, death, or damage.
Figure 5. Front Left Dryer Safety Decal Locations

Figure 6. Front Right Dryer Safety Decal Locations
Figure 7. Drag Unload Safety Decal Locations

Figure 8. Auger Unload Safety Decal Locations

Figure 9. Door Safety Decal Locations
### Table 1. Safety Decal Details — CSA

<table>
<thead>
<tr>
<th>Code</th>
<th>Image</th>
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<tbody>
<tr>
<td>036726</td>
<td>![WARNING] CUTTING HAZARD To prevent serious injury, keep away from blade when fan is operating. Shut off and lock out or disconnect power before inspecting or servicing. Keep guards in place while operating.</td>
</tr>
<tr>
<td>035691</td>
<td>![WARNING] HIGH VOLTAGE To prevent serious injury or death, turn off and lock out power before servicing.</td>
</tr>
<tr>
<td>036725</td>
<td>![DANGER] DANGER HIGH VOLTAGE To prevent serious injury or death, turn off and lock out power before servicing.</td>
</tr>
<tr>
<td>7713361</td>
<td>![SAFETY INSTRUCTIONS] For proper operation: • Read your operator’s manual carefully. It contains valuable information on how to run this machine safely and economically. • Clean out dryer after initial filling to prevent fires. • When operating with oil seeds, be cautious of spontaneous combustion. • Check fuel line components for leaks after transport and periodically thereafter.</td>
</tr>
<tr>
<td>036222</td>
<td>![WARNING] BURN HAZARD To prevent burns from high temperature flame: • Keep door closed when operating. • Lock out power before opening inspection door.</td>
</tr>
<tr>
<td>035690</td>
<td>![WARNING] ENTANGLEMENT HAZARD To prevent serious injury or death: • Keep body, hair, and clothing away from rotating pulleys, belts, chains, and sprockets. • Do not operate with any guard removed or modified. Keep guards in good working order. • Shut off and lock out power source before inspecting or servicing machine.</td>
</tr>
<tr>
<td>036737</td>
<td>![CAUTION] DO NOT TOUCH! Door may be hot and under pressure. Be sure blower has completely stopped and allow unit to cool down before opening door. Failure to heed may result in minor to moderate injury.</td>
</tr>
<tr>
<td>1001985</td>
<td>![DANGER] ROTATING FLIGHTING HAZARD To prevent death or serious injury: • KEEP AWAY from rotating auger flighting. • Shut off and lock out power before removing cover or servicing.</td>
</tr>
<tr>
<td>1002301</td>
<td>![WARNING] To prevent serious injury or death: • Read and understand the manual before assembling, operating, or maintaining the equipment. • Only trained personnel may assemble, operate, or maintain the equipment. • Children and untrained personnel must be kept outside of the work area. • Do not modify the equipment. Keep in good working order. • Lock out power before performing maintenance. • If the manual, guards, or decals are missing or damaged, contact factory or representative for free replacements.</td>
</tr>
</tbody>
</table>
### Table 1 Safety Decal Details — CSA (continued)

<table>
<thead>
<tr>
<th>079338</th>
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</thead>
<tbody>
<tr>
<td><strong>WARNING</strong></td>
<td><strong>AVERTISSEMENT</strong></td>
</tr>
<tr>
<td>To avoid injury from moving parts, disconnect power to the equipment before (removing, opening) this (cover, door).</td>
<td>Si les informations données dans le mode d’emploi ne sont pas respectées à la lettre, un incendie ou une explosion peut survenir et entraîner des dommages matériels, des blessures ou la mort.</td>
</tr>
<tr>
<td><strong>AVERTISSEMENT</strong></td>
<td><strong>AVERTISSEMENT</strong></td>
</tr>
<tr>
<td>Pour éviter les blessures attribuables aux pièces mobiles débrancher l’appareil avant (de retirer, d’ouvrir) (ce couvercle, cette porte).</td>
<td>Ne pas entreposer ni utiliser d’essence ou autres vapeurs ou liquides inflammables à proximité de cet appareil ou de tout autre appareil.</td>
</tr>
<tr>
<td><strong>WARNING</strong></td>
<td><strong>AVERTISSEMENT</strong></td>
</tr>
<tr>
<td>If the information in the manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.</td>
<td>Si les informations données dans le mode d’emploi ne sont pas respectées à la lettre, un incendie ou une explosion peut survenir et entraîner des dommages matériels, des blessures ou la mort.</td>
</tr>
<tr>
<td><strong>MISSING GUARD HAZARD</strong></td>
<td><strong>MISSING GUARD HAZARD</strong></td>
</tr>
<tr>
<td>To prevent serious injury or death, shut off power and reattach guard before operating machine.</td>
<td>To prevent serious injury or death, shut off power and reattach guard before operating machine.</td>
</tr>
<tr>
<td><strong>WARNING</strong></td>
<td><strong>AVERTISSEMENT</strong></td>
</tr>
<tr>
<td>This compartment must be closed except when servicing.</td>
<td>Ce compartiment doit être fermé sauf pendant une réparation.</td>
</tr>
</tbody>
</table>

**Note**

The towing label is only used on certain models that can be safely towed.
Table 2. Safety Decal Details — CE

<table>
<thead>
<tr>
<th>Decal Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>036726A</td>
<td><img src="image" alt="Missing Guard Hazard" /></td>
</tr>
<tr>
<td>043695</td>
<td><img src="image" alt="Safety Instructions" /></td>
</tr>
<tr>
<td>035690A</td>
<td><img src="image" alt="Missing Guard Hazard" /></td>
</tr>
<tr>
<td>7713361</td>
<td><img src="image" alt="Safety Instructions" /></td>
</tr>
<tr>
<td>043696</td>
<td><img src="image" alt="Safety Instructions" /></td>
</tr>
<tr>
<td>035690A</td>
<td><img src="image" alt="Missing Guard Hazard" /></td>
</tr>
</tbody>
</table>

**SAFETY INSTRUCTIONS**

For proper operation:
- Read your operator's manual carefully. It contains valuable information on how to run the machine safely and economically.
- Clean out dryer after initial filling to prevent fires.
- When operating with oil seeds, be cautious of spontaneous combustion.
- Check fuel line components for leaks after transport and periodically thereafter.

**MISSING GUARD HAZARD**

To prevent serious injury or death, shut off power and reattach guard before operating machine.
**Note**

The towing label is only used on certain models that can be safely towed.
3. Features

Read this section to familiarize yourself with the basic component names and functions of the grain dryer.

3.1. 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.

Batch Mode Drying / All Heat
- Cooling doors all open
- Cooling flap fully raised for all heat

Figure 10. Batch Mode Drying / All Heat
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.

Figure 11. Continuous Mode Drying / with Cooling
4. Operation

Before continuing, ensure you have completely read and understood this manual’s Safety section, in addition to the safety information in the section(s) below.

4.1. Operation Safety

- Keep away from rotating and moving parts, including the flighting, drive components, shafts, and bearings.
- Lock the grain dryer access points (where equipped) and close all other access doors when not in use.
- Always operate with guards, covers, and shields in place.
- Ensure maintenance has been performed and is up to date.
- Ensure that electrical cords are in good condition; replace if necessary.
- The area around the heater should be kept clear and free from combustible materials and other flammable liquids.
- When heater is not in use, shut off gas valve on heater and at gas source.
- Have another trained person nearby who can shut down any powered loading, unloading, or internal equipment in case of accident.
- Keep the work area clean and free of debris.
4.2. Equipment Pre-Check

**Important**
After completion of assembly and before each use, inspection of the dryer is mandatory. The dryer should be frequently checked and serviced for a trouble-free operation.

Figure 12. New dryer start-up checklist

<table>
<thead>
<tr>
<th>SERIAL#</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MODEL#</td>
<td>CUSTOMER</td>
</tr>
<tr>
<td>CONTROL TYPE: PLC/SWITCHES</td>
<td>ADDRESS</td>
</tr>
<tr>
<td>PROGRAM VERSION: PLC: HMI:</td>
<td>PHONE #</td>
</tr>
<tr>
<td>BELTS-TENSION AND ALIGNMENT</td>
<td>COMMENTS</td>
</tr>
<tr>
<td>CHAINS-TENSION AND ALIGNMENT</td>
<td>INITIALS</td>
</tr>
<tr>
<td>OIL LEVEL IN GEARBOX</td>
<td></td>
</tr>
<tr>
<td>METERING ROLLS CLEANED OUT</td>
<td></td>
</tr>
<tr>
<td>UNLOAD DOORS CLOSED PROPERLY</td>
<td></td>
</tr>
<tr>
<td>BLOWER MOTOR ROTATION</td>
<td></td>
</tr>
<tr>
<td>BLOWER MOTOR AMPS</td>
<td></td>
</tr>
<tr>
<td>AUGER/DRAG ROTATION</td>
<td></td>
</tr>
<tr>
<td>METERING ROLLS ROTATION</td>
<td></td>
</tr>
<tr>
<td>CROSS AUGER/DRAG ROTATION</td>
<td></td>
</tr>
<tr>
<td>GUARDS &amp; SHIELDS IN PLACE</td>
<td></td>
</tr>
<tr>
<td>ALL GAS UNIONS</td>
<td></td>
</tr>
<tr>
<td>ADDITIONAL GAS LINE LEAKS</td>
<td></td>
</tr>
<tr>
<td>FILL DRYER SWITCH</td>
<td></td>
</tr>
<tr>
<td>LOW DRYER SWITCH</td>
<td></td>
</tr>
<tr>
<td>THERMOCOUPLE/HIGH LIMIT POSITION</td>
<td></td>
</tr>
<tr>
<td>THERMOCOUPLE/HIGH LIMIT CONDITION</td>
<td></td>
</tr>
<tr>
<td>DISCHAGE PLUG SWITCH</td>
<td></td>
</tr>
<tr>
<td>SET GAS PRESSURE</td>
<td></td>
</tr>
<tr>
<td>AIR SWITCH FUNCTIONALITY</td>
<td></td>
</tr>
<tr>
<td>BURNER SETTINGS</td>
<td></td>
</tr>
<tr>
<td>CHECK &amp; CALIBRATE MOISTURE SENSOR</td>
<td></td>
</tr>
<tr>
<td>SET MIN &amp; MAX METERING ROLL SPEEDS</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BELT INFORMATION—# OF BELTS &amp; SIZES</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLOWER BELT</td>
</tr>
<tr>
<td>UNLOAD BELT</td>
</tr>
<tr>
<td>LEVEL AUGER</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

ADDITIONAL COMMENTS
**Pre–season checklist**

<table>
<thead>
<tr>
<th>SERIAL#</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MODE#</td>
<td>CUSTOMER</td>
</tr>
<tr>
<td>CONTROL TYPE: PLC/SWITCHES</td>
<td>ADDRESS</td>
</tr>
<tr>
<td>PROGRAM VERSION: PLC:</td>
<td>PHONE #</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COMMENTS</th>
<th>INITIALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>INSPECT FOR GAS LEAKS</td>
<td></td>
</tr>
<tr>
<td>BELTS-CONDITION &amp; TENSION</td>
<td></td>
</tr>
<tr>
<td>DRIVE CHAINS-CONDITION &amp; TENSION</td>
<td></td>
</tr>
<tr>
<td>GEAR BOX OIL LEVEL &amp; CONDITION</td>
<td></td>
</tr>
<tr>
<td>CLEAN METERING ROLLS</td>
<td></td>
</tr>
<tr>
<td>BEARINGS ON METERING ROLLS</td>
<td></td>
</tr>
<tr>
<td>BEARINGS ON BLOWER</td>
<td></td>
</tr>
<tr>
<td>BEARINGS ON AUGERS (UNLOAD AND Fill)</td>
<td></td>
</tr>
<tr>
<td>GREASE ALL BEARINGS</td>
<td></td>
</tr>
<tr>
<td>CLEAN BURNER</td>
<td></td>
</tr>
<tr>
<td>CLEAN AIR SWITCH TUBE</td>
<td></td>
</tr>
<tr>
<td>AIR SWITCH ADJUSTMENT (IF NEEDED)</td>
<td></td>
</tr>
<tr>
<td>BACK DOOR SEAL</td>
<td></td>
</tr>
<tr>
<td>THERMOCOUPLE WIRE</td>
<td></td>
</tr>
<tr>
<td>CLEAN VAPORIZER TUBE FINS (LP)</td>
<td></td>
</tr>
<tr>
<td>HIGH LIMIT/ THERMOSTAT FUNCTION</td>
<td></td>
</tr>
<tr>
<td>FULL DRYER SWITCH</td>
<td></td>
</tr>
<tr>
<td>LOW DRYER SWITCH</td>
<td></td>
</tr>
<tr>
<td>DISCHARGE PLUGGED SWITCH</td>
<td></td>
</tr>
<tr>
<td>START DRYER AND TEST BURNER</td>
<td></td>
</tr>
<tr>
<td>TEMPERATURE CONTROL</td>
<td></td>
</tr>
<tr>
<td>TEST ALL LIGHTS ON CONTROL PANEL</td>
<td></td>
</tr>
</tbody>
</table>

| BELT INFORMATION--# OF BELTS & SIZES |
|---------|---------------|----------|----------|
| BLOWER BELT | SIZE: | QUANTITY: | WET 1 | SIZE: | QUANTITY: |
| UNLOAD BELT | SIZE: | QUANTITY: | WET 2 | SIZE: | QUANTITY: |
| LEVEL AUGER | SIZE: | QUANTITY: | DRY 1 | SIZE: | QUANTITY: |
| LEVEL AUGER | SIZE: | QUANTITY: | DRY 2 | SIZE: | QUANTITY: |

<table>
<thead>
<tr>
<th>ADDITIONAL COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>
4.3. Commander Control Setup

4.3.1 Before Logging In

In this Section:
- Temporarily unavailable screens
- Before logging in: Buttons
- Before logging in: USB device
- Before Logging In: Main Screen
- Before Logging In: Version Compatibility

Note
Before logging in, the following controls are unavailable:
- Alarms
- Data
- Fill/Empty Dryer
- Go to Start Dryer

Before Logging In: Buttons

- Active buttons are shaded solid.
- Inactive buttons have hatched background pattern.
- Some on-screen items are informational only.
- Some on-screen items call up screens, sub-screens, or menus.

Before Logging In: USB Device

If a The USB device is connected. message appears, click X to clear the message; the Main Menu and Log In buttons display.
### Before Logging In: Main Screen

Before logging in, the following controls are available:

**Setup**
Opens the Setup screen. None of the controls on the Setup screen are available until logging in is complete. Click the Main Menu button on the Setup screen to return to the Main Menu screen.

**Troubleshooting**
Tap the Troubleshooting button. NECO and dealer contact information displays on the Troubleshooting screen. The controls on the Troubleshooting screen are unavailable until logging in is complete. Tap the Main Menu button to return to the Main Menu screen.

### Before Logging In: Version Compatibility

The HMI and PLC software version numbers display in the upper-right corner of the Setup screen. These numbers must be compatible.
### 4.3.2 Logging In and Out

**In this Section:**

- Accessing the Log in to Operate screen
- Entering Name and Password
- Completing the Log in procedure
- Main menu after Log in
- Verifying Setup information
- Logging out

Tap the Log in to Operate button; the Log In screen appears with the Name and Password fields.

**Figure 20. Log In to Operate**

**Figure 21. Log In Screen**
## Enter Name and Password

**Note**
Name and Password are case-sensitive.

### Enter Name

1. Tap the **Name** field box; the alpha-numeric keypad appears.
2. Enter one of the following into the Name field:
   - For basic operations, enter: **USER** (case-sensitive).
   - To access **Setup** configuration, enter: **Owner** (case-sensitive)

### Enter Password

1. Tap the **Password** field box; the alpha-numeric keypad appears.
2. Type one of the following into the Password field:
   - For User (basic operation), enter: **123** (case-sensitive)
   - For Owner (setup), enter: **MyDryer** (case-sensitive)
3. Tap Enter.

**Note**
If an incorrect name or password is entered, a warning message displays. Tap **X** to re-start the Log In process.

---

## Complete the Log In Procedure

1. Tap **Unlock**; the **Current User** field displays the Name of the logged in user.
2. Tap **Home**; the **Main Menu** screen appears with the following changes:
   - The **Log Out** button is available.
   - The **User Name** appears directly above the **Log Out** button.
   - Depending on the login security level, additional buttons are now available, including the **Operation Permitted** indicator.

---

### Figure 22. The Alpha-numeric Keypad

![Alpha-numeric Keypad](image22)

### Figure 23. Invalid Entry

![Invalid Entry](image23)

### Figure 24. Log Out Button

![Log Out Button](image24)

### Figure 25. Operation Permitted Button

![Operation Permitted Button](image25)
### Main Menu — After Log In

#### Note
A flashing **Set Up** button indicates the system configuration data must be restored. This may happen after installing new software, or replacing the PLC battery.

Depending on which screen is currently active, buttons and indicators may appear, or change status:

- The **Operation Permitted** indicator may change to a flashing **E-STOP Active** indicator.
- Tapping the **Main Menu** button displays the **Main Menu** screen. Tapping the **Back** button displays the previous screen.

**After Log In,** the following buttons and screens are available:

- **Setup** Verifies or enters various setup parameters related to the dryer and auxiliary equipment.
- **Alarms** Views any current Alarm status.
- **Troubleshooting** Contact information for NECO or the local dealer is available for viewing.
- **Graphs** Generated for grain moisture, grain temperature, or grain discharge rate. Data values such as volume throughput are shown.
- **Fill/Empty Dryer** Used for production filling or emptying of the dryer.
- **Go to Start Dryer Screen** Used for setting up **Start Dryer** parameters such as which blowers and burners are enabled.

---

#### Figure 26. Main Menu Displaying E-STOP Active

![Diagram showing the Main Menu with E-STOP Active indicator highlighted.](image-url)
Verification

Important
Before startup or operation, all Setup information must either be verified or entered.

The NECO factory enters some data in order to do system testing prior to shipment of the equipment. Additional information, such as auxiliary equipment, can only be entered after all equipment has been installed.

1. Logged in as Owner, go to Setup and complete the Fill & Empty Setup and Timers Setup requirements.

   Note
   After entering and verifying this Setup data, these screens only need to be accessed if there are changes made to the physical dryer configuration, motors replaced, or the status of any auxiliary equipment has changed.

2. If all Setup information has been entered and verified, see the Section 4.2 – New Dryer Checklist on page 21 and Section 4.2 – Pre-Season Checklist on page 21 as required. Go to Section 4.4 – Operation on page 37 to determine how best to fill, start, and run the dryer.

Logging Out

The Log Out button can be activated at any time during the drying process. On logging out, the existing process will continue. NECO recommends not leaving the dryer system completely unattended for an extended period of time, even with the Dryer Master in Auto mode. The moisture content should be regularly checked and calibrated.
4.3.3 Setting Up the Main Screen

In this Section:

- Compatible Versions
- Security Setup button
- Initialize or Save button

### Compatible Versions and Security Setup Button

**Important**

The current version of PLC and HMI software displays at the top-right corner of this main Setup screen. The two version numbers must match. If they match the Versions Compatible indicator appears. If they do not match, contact a dealer.

Some information has been entered and verified at the NECO factory and cannot be edited or changed unless the user is logged in as an Owner.

**Note**

The Security Setup button (H) is not available if logged in as User. To activate the button and setup the quick login procedure, log in as Owner or NecoTech.

### Initialize or Save Configuration Button

Starting with the Version 50 installation, the various configuration data is periodically saved to the HMI’s USB data port.

**In the event of a battery failure, the configuration and settings can be restored:**

1. Tap the Initialize button.
2. Make the setup changes.
3. Click Save Configuration to save data after making setup changes and at the end of the season before turning power off.
### 4.3.4 NECO Entered Setup Data

In this Section:
- A. Units of measurement
- B. Dryer configuration screen
- C. User language
- D. Screen configuration

#### A. Units of Measurement

<table>
<thead>
<tr>
<th>Units of Measurement</th>
<th>Temperature</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imperial</td>
<td>°F</td>
<td>bushels per hour (BPH)</td>
</tr>
<tr>
<td>Metric</td>
<td>°C</td>
<td>cubic meters per hour (CMH)</td>
</tr>
</tbody>
</table>

**Note**

If no unit of measurement is selected, the default is Imperial.

**Note**

If during initialization or setup, the units designation does not match the temperature controller configuration, a warning message displays, and the correct units must be chosen. It may be necessary to change temperature units to °C then back to °F to clear this message.

The system can switch between unit modes. Tap the required mode button. It takes approximately 45 seconds for the control to change over.

![Figure 32. Units of Measurement](image1)

![Figure 33. Units of Measurement](image2)
B. Dryer Configuration

Dryer configuration information is entered at the NECO factory and provides the software with the as-built dryer configuration.

The screen can be viewed by any login status, but only NecoTech login status can make changes.

**Note**

The screen example here shows a mock 24 ft dryer that has three blowers and burners, with each pair feeding four tiers. Units = Imperial (F); fuel system is liquid propane (LP). Since the example is a three blower system, and the dryer has no #4 blower present, the remaining buttons for line #4, as well as #5 and #6 are row inputs, are not visible.

---

C. User Language

User language information is entered at the NECO factory.

The screen can be viewed by any login status, but only Owner login status can make changes.

User language choices reflect NECO written programming screens only.
D. Screen Configuration

The following items can be changed with Owner login status:

- Brightness
- Date/Time
- Language (changes within the Schneider software screens only)

### Table 3. Schneider Language Choices

<table>
<thead>
<tr>
<th>Enter #</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>English</td>
</tr>
<tr>
<td>2</td>
<td>French</td>
</tr>
<tr>
<td>3</td>
<td>German</td>
</tr>
<tr>
<td>4</td>
<td>Italian</td>
</tr>
<tr>
<td>5</td>
<td>Spanish</td>
</tr>
<tr>
<td>6</td>
<td>Chinese</td>
</tr>
<tr>
<td>7</td>
<td>Portuguese</td>
</tr>
</tbody>
</table>

**NOTE:** Do not change any other settings.
4.3.5 Dealer or Customer Entered Setup Data

In this Section:
- Fill/Empty Setup
- Equipment Choices
- Metering Rolls Minimum and Maximum Speed
- Control Setup (overrides)
- Outlet Moisture Maximum and Minimum Alarm Setpoints
- Timers Setup
- Security Setup

E. Fill/Empty Setup

- This information is entered by the dealer. It provides the software with as-built dryer and auxiliary equipment information required for filling and emptying the dryer.
- The screen can be viewed by any login status, but only Owner login status can enter data or make changes.

Figure 37. Fill/Empty Dryer Setup Screen
## Equipment Choices

The following are possible options for the equipment choices.

**Note**

If **Motor Present** is set to **No**, no further options are displayed for that piece of equipment.

Based on the data entered, further options for that piece of equipment are available:

- For each piece of equipment, is a **Motor Present?** Yes or No.
- If a motor is present, does it **Run Continuous?** Yes or No.
- If the motor runs continuous, should it **Stop After Drying Stops?** Yes or No.
- **Start or Stop Delay** values can be entered as required.

### Equipment to be Controlled

- WET 2 TRANSPORT (farthest from dryer)
- WET 1 TRANSPORT (closest to dryer)
- LEVEL AUGER (optional part of dryer)
- UNLOAD TRANSPORT (part of the dryer)
- DRY 1 TRANSPORT (closest to dryer)
- DRY 2 TRANSPORT (farthest from dryer)

### Switches to be Monitored

- WET BIN EMPTY SWITCH INSTALLED? Yes or No
- DRY BIN FULL SWITCH INSTALLED? Yes or No
- LOW LEVEL SWITCH INSTALLED? Yes or No
- UNLOAD TRANSPORT STALL SWITCH INSTALLED? Yes or No

### Metering Rolls Minimum and Maximum Speed

- The minimum speed default value is 10. This may need to be increased to ensure the moisture sensor remains covered with grain.
- The maximum speed value should reflect the unload system capabilities:
  - If the value is set too high, excessive plugged discharge alarms will occur.
  - If the value is set too low, production will not be maximized.
Control Setup (overrides)

- Allows the operator or technician to override switches.
- For fully automatic dryer and moisture control operation, all switches should be On. This causes the control to automatically proceed to the next stage, without pausing to wait for a screen control to be activated.
- If the Dryer Master system has an alarm, the default control status to proceed is to Stop Drying. If the screen control is toggled, the dryer will continue running at Manual Metering Roll Speed.

Outlet Moisture Maximum and Minimum Alarm Setpoints

- Outlet moisture readings outside of these limits trigger an alarm and shut down the dryer.
- These setpoints are also visible and editable when changing the target moisture. They can be set as close as 0.5% above and below target moisture.

**Note**
The narrower this window, the more likely the dryer is to shut down.
Timers Setup

- Default timer values are set by NECO as a starting point. The default data may require fine tuning for the specific equipment configuration. Your dealer will assist with this during startup.
- Depending on the equipment configuration, some timer functions may not be used. These are unavailable and cannot be selected.
- Use the Section 8.2 – PLC and HMI Recorded Data Sheets on page 90 to record this information.

Enter or Edit Timer Data:

1. Tap the field (box) for the data to be changed. The on-screen numeric keypad appears.
2. Enter the required data.
3. Tap the Enter on the keypad; the Timer field displays the new data.
4. Edit additional timers or navigate to the Main Menu, or Back to the Setup screen using the buttons at the bottom of the screen.

Security Setup

By default, a user name and a password are required to log in and gain access to the dryer operations. The log in security can be disabled for the User or Owner level access, if needed. Only one of the two is permitted to be active. Once activated and no one is logged in, a quick login button is visible in the middle of the main screen.
4.4. Operation Overview

The NECO continuous dryer system is configured for different grain drying requirements by selecting the mode of operation, and customizing settings.

There are three main operating modes: **Batch Drying Mode**, **Auto Drying Mode**, and a **Combined Mode**.

**Batch Drying Mode**
- Generally used to start or end a drying cycle.
- Uses some, or all blowers and burners.
- Drying time manually set.

**Auto Drying Mode**
- Uses **Dryer Master** control to generate a drying model that meets the target moisture setpoint.
- Operation is fully automatic based on drying model.

**Combined (Auto Mode followed by Batch Mode)**
- Operation set to **Auto Mode** followed by **Batch Mode**.

The system also allows for different equipment configurations for controlling the movement of grain in and out of the system. After a drying cycle, grain can be directed to a dry bin storage, or directed to a wet bin to be recycled through the dryer.

Examples A, B, and C are the most common equipment configurations:

- **Example A**: **Batch Drying Mode** with output grain directed to dry bin grain storage after drying.
- **Example B**: **Auto Drying Mode** with output grain directed back to the wet bin to be recycled through the dryer.
- **Example C**: **Combined** with output grain directed to dry bin storage after drying.

**Overview of Operation Steps**

**Note**
Both examples start by filling the dryer with wet grain using the Fill/Empty routine.

1. Configure the system:
   - Verify or edit the crop type. See **Section – Crop and Cooling Setup** on page 47.
   - Designate cooling tiers. See **Section – Enable or Disable Blowers and Burners** on page 49.
   - Set burner temperature. See **Section – Set Burner Temperature** on page 51.

2. Fill the dryer with wet grain using the **Fill/Empty** routine. See **Section 4.5 – Fill/Empty Dryer** on page 43 for more details.
3. Once the dryer is filled above the low level switch and any continuous equipment is running, the Start Auto Dryer button displays.

Figure 46. Start Drying Screen

4. Begin drying using either of the following optional modes:
   - Batch (all heat) Mode (see Section 4.7 – Batch Drying Mode on page 54)
• **Automatic Mode** (see Section 4.8 – Auto Drying Mode on page 58)

### 4.4.1 Example A: Batch Drying

In this example output grain is directed to dry bin grain storage after drying.

<table>
<thead>
<tr>
<th>Batch Drying Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Fill the dryer with wet grain.</td>
</tr>
<tr>
<td>2. Select <strong>Batch Mode</strong>.</td>
</tr>
<tr>
<td>3. Dry the grain until the required moisture content is reached.</td>
</tr>
</tbody>
</table>

**Note**

During the drying process, use the **Fill/Empty Bypass** to move the cooler, higher moisture grain to the heat ducts, increasing the uniformity of grain drying. This also prevents over-temperature exposure to the drier corn kernel.

4. Monitor moisture levels on the **Dryer Master Status** screen during the drying process.

**Note**

**Dryer Master Moisture Controller** collects data to set the drying model.
4.4.2 Example B: Auto Drying

In this example output grain is initially directed to wet bin grain storage after drying.

Auto Drying Example

1. Fill the dryer with wet grain.
2. Set the discharge equipment so that the grain output is directed back into the wet bin.
3. If cooling floors are present on the dryer, run in the all heat configuration until the moisture has reached an acceptable level for storage limitations in the dry bin.
   
   **Note**
   For dryers with multiple burners, start the drying process with higher temperatures in the lower sections and lower temperatures in the higher sections.

4. Go to the Start Dryer screen and begin drying using a manual metering roll speed.
   
   **Note**
   The grain moving through the dryer at this point should be discharged back to the wet bin.

5. After the moisture has been brought down to an acceptable level, divert the grain to the dry bin and make sure that some cooling is applied to the grain. Ideally, the grain should be as close to ambient temperature as possible upon exit of the dryer assuming limited aeration capabilities of the dry bin. If applicable, the cooling floors can be adjusted to allow for cooling of grain before it exits the dryer. Burner temperatures may also need to be updated at this point.
   
   **Note**
   Once a drying model is developed, **Dryer Master** takes control of the metering rolls. If **Automatic Dryer Master Control Enabling** is set to Off, then the press **Enable Dryer Master** button at this point.
4.4.3 Example C: Combined

In this example output grain is directed to dry bin grain storage after drying.

1. Repeat the Batch Drying process from Example A. For a dryer with multiple burners, it is advisable to start the drying process with higher temperatures in the lower sections and lower temperatures in the upper sections.

2. Once the grain reaches the target moisture, begin auto drying. Note that if present, discharge (dry) transports need to be started before auto drying can commence. At this point, temperatures can be reversed for multi-burner dryers (higher temperatures in the upper sections, lower temperatures in the lower sections).
4.4.4 Plenum Door Safety Switch

**WARNING** Be sure to follow proper lockout/tagout procedures prior to entering the dryer.

The plenum door safety switch is mounted on the top right-hand corner of the plenum entry door.

**Note**
When the door is open, the emergency stop alarm will appear on the HMI screen. This will turn off all outputs from the PLC. It does not shut off power into either Control Panel. The Power On lamp will remain lit on the main Control Panel. Close plenum door for dryer operation.

![Diagram of plenum door safety switch and emergency stop alarm.](image-url)
4.5. Fill/Empty Dryer

In this Section:
- Setting Manual Metering Roll Speed
- Filling the Dryer
- Emptying the Dryer
- Manual Mode

Figure 48. Fill/Empty Dryer Screen

Note
If an error occurs, a flashing alarm indicator/button appears in place of the Back button. Tap this button to open the Alarms screen to view and reset the alarm after the condition has been resolved.
Set Manual Metering Roll Speed

See Section 8.1 – Manual Dryer Speed on page 88 for recommended metering roll speed starting point. This speed is used as the manual setpoint for Batch Mode drying and for initial Automatic Drying Mode until the Dryer Master gathers enough moisture data to take full automatic control.

**Note**

Only the equipment identified in Setup — Fill/Empty shows in this list. Status indicator is On or Off. If the equipment fails to run or a motor overload trips, a fault indicator appears. Once the problem is solved, the alarm indicator goes out. If Off, push Start or if On, push Off to start the delay timer for that piece of equipment.

- Wet Transport 2 (furthest from dryer)
- Wet Transport 1 (nearest to dryer)
- Level Auger
- Unload Auger
- Dry Transport 1 (nearest to dryer)
- Dry Transport 2 (furthest from dryer)

**Fill Dryer**

Used to initially fill the dryer with grain.

1. Tap Start to start filling.
2. Tap Stop to stop filling

**Note**

Filling will stop automatically when the Fill Switch is activated.
Fill and Empty (Bypass)

Used if the grain must pass through the dryer, but not actually be dried.

1. Tap **Start** to start.
2. Tap **Stop** to stop.

Figure 51. Fill and Empty (Bypass)

Empty Dryer

Used when no further filling of wet grain is required and the remaining grain must be discharged.

1. Tap **Start** to start.
2. Tap **Stop** to stop.

Figure 52. Empty Dryer Screen
### Manual Mode

Press the **Manual Mode** button to allow manual operation of the Wet 1, Wet 2 and Dry 1, Dry 2 transports when not drying.

- The external transports can be run manually without the need for additional external local/auto switches.
- Both the Wet 1 & Wet 2 transports as well as Dry 1 & Dry 2 transports can be interlocked so that if one faults out the other will stop.

![Figure 53. Manual Mode](image-url)
4.6. Start Dryer

4.6.1 Start Dryer Overview

The Start Dryer main screen is used for setting necessary drying parameters and then activating either **Batch Mode**, **Auto Mode**, or a combined mode:

See the following sections A, B, and C to set parameters for the required drying mode:

- **A. Section – Crop and Cooling Setup on page 47** to change, add, or edit crops, and setup cooling tiers. The current crop and cooling tier layout are shown in the upper-left area of the screen, below the NECO logo.

- **B. Section – Enable or Disable Blowers and Burners on page 49** to enable or disable blower(s) and burner(s) for either **Batch Mode** or **Auto Mode**.

- **C. Section – Set Burner Temperature on page 51** to set burner temperature setpoints for either **Batch Mode** or **Auto Mode**.

Figure 54.  Start Dryer – Main

---

**A. Crop and Cooling Setup**

In this Section:

- Adding or editing crop names
- Selecting a different crop
- Setting cooling tiers (floors)
Select **Crop and Cooling Setup** to show the **Crop/Tier** screen. This screen displays **Yes** beside the current crop selection. The operator can:

- Select a different crop
- Set cooling tiers
- Edit or enter a crop name or description

**Figure 55. Crop Selection Screen**
A. Crop and Cooling Setup

To select a different crop:
1. Tap the No button next to the indicator for the new crop; Yes appears, and the screen automatically switches to the Start Dryer - Main screen.
2. Verify the current crop indication at the upper-left corner of the screen has changed to display the newly selected crop.
3. Make the required changes, using a maximum of 26 characters.

To set cooling tiers (floors):
Tap the button representing the correct number of cooling tiers.

To add or edit crop names:
1. Tap the Edit Crop Names button; the Edit Crop Names button changes to Lock Crop Names. The existing crop name buttons become available, allowing them to be selected.
2. Tap any crop name button to be changed. The alpha-numeric keypad appears. The current crop selection is shown at the top of the keypad.
3. Tap Enter.
4. Tap the Lock Crop Names button to lock in the changes. The button changes to display Edit Crop Names as before.
5. Tap the Back icon to return to the Start Dryer - Main screen.
6. Verify that the current crop icon at upper-left corner has changed to the newly selected crop.

Figure 56. Alpha-numeric Keypad

Figure 57. Edit Crop Names

B. Enable or Disable Blowers and Burners

In this Section:
- Overview of configuration
- Startup operation sequence
- Possible burner settings

Overview
- Dryer configuration is set at the factory. The screen only displays the actual blower/burner rows (number 1 to number 6) that are in this particular dryer configuration.
- The Setup - Main and Batch Drying screens utilize this layout and can show from 1 to 6 blower rows.
- On multiple blower dryers, the blower start time is staggered, starting with the upper-most section (number 1). The **Blower Start Delay Timer** is factory set for a five second delay.

  **Note**
  Increase the default delay time on dryers that have blower soft-starters or VFDs to allow each blower motor to ramp up to full speed before starting the next motor.

- The **On** or **Off** status indicators show the current status as either Off or On. When the indicator is On, it appears to be illuminated.

<table>
<thead>
<tr>
<th>Startup Operation Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, B, C, D, and E in the following sequence refer to the reference letters in the associated figure:</td>
</tr>
<tr>
<td>1. The blower turns <strong>On</strong> and the <strong>Blower indicator</strong> changes from <strong>Off</strong> to <strong>On (A)</strong>.</td>
</tr>
<tr>
<td>2. The <strong>Burner Start Delay Timer</strong> is factory set for a five second delay. Upon blower <strong>On</strong>, the delay timer starts. When the timer is complete the LP liquid valve opens and the <strong>Liquid Valve indicator</strong> changes from <strong>Off</strong> to <strong>On (B)</strong>.</td>
</tr>
<tr>
<td>3. When <strong>Liquid Valve</strong> goes <strong>On</strong>, the valve remains open and purges for a set time of 30 seconds. During this time the <strong>Blower</strong> is <strong>On</strong>, but the pilot valve and main valve (M1) remain closed.</td>
</tr>
<tr>
<td>4. At the end of the purge period, the pilot valve and M1 valve opens. The spark generator energizes to light the pilot. The <strong>Pilot Ignition indicator</strong> changes from <strong>Off</strong> to <strong>On (C)</strong>.</td>
</tr>
<tr>
<td>5. When the spark generator creates a pilot flame, the flame sensor voltage appears in the <strong>Flame VDC indicator</strong> field (D). If the voltage is 1.25 volts or less the pilot flame is not recognized and an error occurs.</td>
</tr>
<tr>
<td>6. After a factory set 10-second period to verify pilot flame, the M2 valve opens.</td>
</tr>
<tr>
<td>7. When M2 valve opens, a factory set 10–second delay begins.</td>
</tr>
<tr>
<td>8. If the air switch does not detect blower operation, or the UV sensor does not verify the presence of burner flame, an error occurs. When the UV sensor does detect the burner flame, the main ignition indicator changes from <strong>Off</strong> to <strong>On (E)</strong>.</td>
</tr>
<tr>
<td>9. On correct blower and burner detection the pilot valve closes and the main run indicator changes from <strong>Off</strong> to <strong>On (F)</strong>.</td>
</tr>
</tbody>
</table>
### Possible Burner Settings

Depending on whether **Batch** or **Auto** mode is selected, the blower/burner settings shown in (Blower Number) rows 1, 2, 3, and 4 below are possible:

- **Row 1**: Both blower and burner are enabled for use, so all of the remaining status indicators are visible.
- **Row 2**: The blower is enabled, but the burner is disabled, so the status indicators are not visible.
- **Row 3**: The blower is disabled, so none of the following status indicators (including the burner status) are visible.
- **Row 4**: The blower is enabled, and this section is operating without a burner, so the blower status is visible but the burner and related status indicators (including temperature indications) are not visible.

---

### C. Set Burner Temperature

**In this Section:**

- Burner setpoints
- Setting burner temperature

**Note**

For each burner setpoint value, once a temperature has been entered, that value stays current until changed. Even if a dryer section burner is disabled, the setpoint value remains effective.

---

**Set Burner Temperature**

**Note**

The temperature setpoints can be modified at any time during the drying process.

1. Tap the setpoint field for the temperature to be entered or changed to open the numeric keypad.
2. Enter a temperature setpoint value between a minimum value of 32°F and a maximum of 250°F (0°C–121°C).
3. Tap **Enter** to lock in the value.
## 4.6.2 Completion of Dryer Setup

### Completion of Dryer Setup

On completion of the preceding steps (A, B and C), and prior to starting either **Batch** or **Auto** drying modes:

- Current dryer status is displayed in the upper-right corner of the screen.
- The **Start Batch Drying** or **Start Auto Drying** buttons appear when all required conditions are met.

### Figure 60. Current Dryer Status

<table>
<thead>
<tr>
<th>START DRYER</th>
<th>DRYER FULL</th>
</tr>
</thead>
<tbody>
<tr>
<td>START BATCH DRYING</td>
<td>START TRANSPORTS</td>
</tr>
</tbody>
</table>

**Dryer Grain Status** is shown here:
- Dryer full
- Grain level OK
- Grain level low
- Wet bin empty
- Dry bin full
- Max fill time exceeded
4.6.3 Starting Batch Drying

**To Start Batch Drying**

Batch drying can be activated with any of the grain level status indicators. Batch drying can begin when grain is at any level within the dryer. If grain is below the top-most set of tier ducts, be aware that the drying heat from that section is wasted.

1. Tap the **Start Batch Drying** button to proceed. Immediately, the blower and burner starting sequence begins.

2. The **Start Batch Timer** indicator only appears after all enabled burners are **On** as shown in the Main Run Status column.

3. As soon as the **Start Batch Timer** indicator appears, the control allows 30 seconds of the operator to tap/activate it. If this does not occur in the time allotted the system will change to **Cooling Mode**.

**Figure 61. Starting Batch Drying**

**Figure 62. Start Batch Timer**

*NOTE:* The **START BATCH TIMER** indicator does not appear until all of the enabled burners are in **MAIN RUN mode** (ON).

---

Contemporary Mixed-Flow Grain Dryer – Grain Dryer 4. Operation
4.7. Batch Drying Mode

4.7.1 Batch Drying Overview

Batch operations are generally used to start or end a drying cycle and can utilize all or some of the system blowers and burners. Refer to the following sections A, B and C to set up and operate in Batch Drying Mode:

- **Section – A. Set Drying Time on page 54**
  
  **Note**
  
  Skip steps B and C if **Batch Drying Mode** is directly switched to **Auto Drying Mode**. However, before **Auto Drying Mode** can start, two conditions must be met. For details, see **Section 4.8 – Auto Drying Mode on page 58**

- **Section – B. Cooling on page 56**
- **Section – C. Restart on page 57**

**Overview**

- The operation run time is manually set and can be up to 120 minutes.
- Temperature setpoints can be changed at any time during the process. The actual temperature data per dryer section is shown in the final column.
- The status indicators **On** or **Off** indicate the progression of startup or shutdown for the various equipment items such as blower, burner, liquid valves, pilot, main ignition, and main run. See **Section – Enable or Disable Blowers and Burners on page 49** for a complete description of this sequence.

**A. Set Drying Time**

In this Section:

- Default batch drying time
- Setting total batch drying time
- Minutes remaining
- Switching to **Auto Drying Mode**
- Stopping drying
Total Batch Time

- Default total time = 30 minutes
- Tapping the Up button (▲) increases the total time by 5 minutes (to a maximum run time of 120 minutes).
- Tapping the Down button (▼) decreases the total time by 5 minutes (to a minimum run time of 5 minutes).
- The total run time can be changed at any time prior to the time remaining value reaching zero. When the total run time is modified, the time remaining changes accordingly.

Minutes Remaining

- Shows the number of minutes remaining to operate in Batch Drying — Heated Mode.
- At a value of 0 the dryer proceeds to Batch Drying Cooling Mode.

Note

The Batch Timer can be disabled when all the burners are off. In this mode, the blowers are allowed to run continuously without heat being applied to the grain.
Switch Directly to Auto Drying Mode

To switch directly to Auto Drying Mode:

1. Skip the **Batch Drying**, **Cooling Mode**, or **Restart Mode**.
   
   **Note**
   One of the following displays:
   
   - Fill dryer
   - Start
   - Start auto drying

2. Tap the button to select the pre-level of auto drying displayed by the button.

Stop Drying

To stop drying:

- Tap **Stop Drying** to stop the process and start **Cooling Mode**.

B. Cooling

In this Section:

- Remaining cooling mode time
- Stopping cooling
- Starting batch drying
Cooling

- **Minutes**: This field displays the cooling mode time remaining.
- **Stop Cooling**: Tapping **Stop Cooling** shuts down all blowers. The **Restart Dryer** button appears.
- **Start Batch Drying**: Tapping **Start Batch Drying** restarts the process without stopping the blowers. The **Start Dryer** screen appears and displays the blower starting process.

C. Restart

**Restart**

Tap **Restart Dryer** to go to the **Start Dryer– Main** screen. This enables the operator to continue drying using either **Batch** or **Auto Mode**.
4.8. Auto Drying Mode

4.8.1 Auto Drying Pre-Conditions

Required Pre-conditions

For the Start Auto Drying button to be available, the following two conditions must be met:

1. The dryer status must display Dryer Full or Dryer Level OK. If neither of these display:
   a. Tap the Fill Dryer button; the Fill/Empty Dryer screen appears.
   b. Tap the Start button to fill the dryer. The dryer must fill past the level of the Low level sensor. When it does, the dryer status indicator displays Dryer Level OK or Dryer Full.

2. All required transports must be started prior to initiating Auto Drying Mode. If transports are enabled, but not running, the Start Transports indicator appears.

3. The Fill/Empty Dryer screen appears.

When the Fill/Empty Dryer screen displays:

1. Tap the Start button to fill the dryer.
2. Allow the dryer to fill past the top level indicator.
3. When ready, the dryer status indicator displays Dryer Level OK or Dryer Full.
### 4.8.2 Auto Drying Overview

In this Section:

- Metering Roll Pause/Resume
- Burner Setup
- Change in Progress indicator

Refer to the following sections A, B, C, D, E to set up and operate in **Auto Drying Mode**:

- **Section – A. Manual Speed on page 61**: (Dryer Master collecting data) Burner setup is available
- **Section – B. Auto First Load on page 62**: Burner setup is available
- **Section – C. Dryer Master Control on page 63**: Burner setup is available
- **Section – D. Cooling on page 63**
- **Section – E. Restart on page 64**

**Note**

When drying in **Auto Mode**, use small increments of change when making adjustments to either the burner temperatures or target moisture percentage. For example, to change a burner temperature from 180 to 220, adjust to 200 for five to ten minutes, then increase to 220. Use a similar approach to making moisture percentage changes.

---

#### Metering Roll Pause/Resume

Pause the metering rolls to temporarily stop the discharge of grain from the dryer. This is typically used when switching between drying bins. When paused, the grain stops discharging from the dryer. The unload and dry transports keep running and empty out. Once empty, the grain is re-directed to a new dry bin location. If the Resume button is not pushed before the timer reaches zero, the dryer will shut down.

**Note**

As the various operation stages occur, the display screen center panel area provides the operator with important status information. See the following example:

---

**Figure 72. Metering Roll Resume Button**

**Figure 73. Metering Roll Pause Button**
Burner Setup

**Note**
As the various operation stages occur, the display screen center panel area provides the operator with important status information. See the following example:

The **Burner Setup** screen appears. Initially it shows the current status.

---

### Figure 74. The Burner Setup Button on the Auto Drying Screen

![Burner Setup Button](image1)

### Figure 75. The Burner Setup screen

![Burner Setup Screen](image2)
Change in Progress

Note
The Change in Progress indicator appears until changes are completed.

• As burner number 4 is going through the process of turning On, the screen does not allow additional changes, or return to the previous stage, until that change is completed. Note that the Main Menu button is unavailable, but the Stop Drying button is available.

• After changes are completed, the screen shows the current status.

• Options to proceed include return to Main Menu, Back, or Stop Drying.

Figure 76. Example of Change in Progress

A. Manual Speed

In this Section:

• Manual Speed

• Automatic Dryer Master Control Enabling

• Enabling Automatic Moisture Control

Figure 77. Manual Speed Control
Manual Speed

The dryer runs at the manual metering roll speed entered until the Dryer Master gathers sufficient data. The manual speed can be dialed in and changed to come closer to target moisture.

If Automatic Dryer Master Control Enabling is set to Off, as soon as the Dryer Master has gathered enough data, the Enable Automatic Moisture Control button (located with the main center panel) appears.

Tap Enable Automatic Moisture Control to proceed to Auto First Load.

Note
By default, Automatic Dryer Master Control Enabling is set to On, the control will proceed into Auto First Load automatically.

B. Auto First Load

Auto First Load

The Dryer Master control uses previous history to assist in building a current model, if possible. During Auto First Load, grain cycles through the dryer for enough time to gather completed current data. This time period varies, but can be up to one complete grain cycle. Once a current computer model of correct operation that will meet the target moisture setpoint is obtained, the control proceeds to full Dryer Master automatic operation.
C. Dryer Master Control

Dryer Master Control

- In **Dryer Master Controlling Mode** the Dryer Master controls the process and runs until **Stop Drying** is activated, or a low level sensor is activated.
- The operator should regularly check the grain moisture graph for abnormalities.
- Moisture calibration for the lower moisture sensor should be done at least every 2-3 hours.
- When changing the target moisture, a pop-up window appears that also shows the Minimum and Maximum alarm setpoints for the outlet grain.

![Control Setup Screen](image)

**Figure 80. Control Setup Screen**

**Figure 81. Dryer Master Controlling**

D. Cooling

**Cooling**

- The **Cooling Mode** default timer setting is five minutes. See **Setup - Timers** to modify.
- Blowers continue to run and the burners turn **Off**.
- When the timer runs out, or if the **Stop Cooling** button is activated, all blowers shut down immediately and the **Restart Dryer** button appears.

![Cooling](image)

**Figure 82. Cooling**
E. Restart

Tap **Restart Dryer** to go to the **Start Dryer– Main screen**. This enables continuation of drying using either **Batch** or **Auto** modes.

![Auto Drying Screen with Restart Button](image)

**Figure 83. Auto Drying Screen with Restart Button**

4.8.3 Slide Gate Adjustment

**Slide Gate Adjustment**

For either auger or drag unload systems, grain passes through a discharge chute, and a portion of the grain is directed over the outlet moisture sensor. The flow of the grain over the moisture sensor is controlled by a metering roll which rotates at a constant speed whenever the unload system is operating.
Although it is not the primary means of controlling the flow, a slide gate can be used to make small adjustments. Typically, the slide gate will not need to be adjusted during normal operation.

**To adjust the slide gate position:**

1. Lift up on the sliding lock plate.
2. Push or pull the slide gate to the desired location.
3. Lower the sliding lock plate, ensuring that it engages with one of the notch sets on the slide gate.

During normal operation, grain should cover the fin of the outlet moisture sensor at all times, and a steady flow of grain should be observed through the viewing window on the side of the discharge chute. If the drying rate is low enough that grain does not consistently keep the chute full enough to cover the moisture sensor, try pulling the slide gate out of the chute one notch at a time until the flow is backing up sufficiently. If grain is backing up too much in the chute, try pushing the slide gate further into the chute one notch at a time.

**Note**

The notch furthest out from the chute and closest to the slide gate handle is used to position the slide gate for cleanout, and is not intended for normal operation.
Viewing doors are available for both auger and drag unloads. For auger systems, the viewing door is located on the discharge chute itself. Note that there are two identical doors on the discharge chute. The viewing door is on the opposite side of the chute as the plug switch. If the other door is opened, the switch will indicate a plugged discharge, and the dryer will shut down. For drag unloads, the viewing door is located on top of the cross drag and is not tied into the plugged discharge switch.
4.8.4 Moisture Calibration

**Note**
For grains requiring lower range moisture sensing (e.g. 8% for rape seed) contact your dealer for instructions on how to re-calibrate the moisture sensor, or order the low range moisture sensor #059250WLR.

### Moisture Calibration

**To calibrate moisture levels:**

1. Start the **Inlet Sensor** calibration routine by tapping its associated **Initiate** button.

2. Start the **Outlet Sensor** calibration routine by tapping its associated **Initiate** button, or by pressing the **Sample** button located at the rear of the dryer, near the grain exit chute.

   **Note**
   On starting the calibration routine for either sensor, the **Sampling** indicator displays.

3. The Dryer Master obtains an average of moisture readings for the next 30 seconds. During this same time period, collect several grain samples near the sensor being calibrated. When the automated sampling period ends, the **Done** indicator appears.

4. Have the samples tested for actual grain moisture content.

5. Average the values for the actual grain moisture content.

6. Enter the calculated average for the actual grain moisture content using the **Sample Test Moisture** button.

7. Tap **Done**.

   **Note**
   In the example here, the **Current Reading Value** was originally 21.6. The **Sample Test Moisture** average of the measured values was 24.5. Since 24.5—21.6 is more than 1.0, the new **Current Reading** moved closer to the **Sample Test Moisture Value** by 0.5 (from 21.6 to 22.1).
4.9. Data and Graphs Screens

4.9.1 Data Screen

Figure 87. Data Screen

The Data screen displays the following information:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dryer Volume Between Sensors</td>
<td>Bushels or cubic meters.</td>
</tr>
<tr>
<td>Minutes in Dryer at Current Rate</td>
<td>Minutes required for grain to move from the inlet sensor to the outlet sensor at the current discharging rate.</td>
</tr>
<tr>
<td>Discharge Rate Factor</td>
<td>• The value used to calculate the throughput bushels or cubic meters value.</td>
</tr>
<tr>
<td></td>
<td>• Initial adjustment may be necessary to obtain correct throughput value. Also, the discharge rate factor will likely need to be adjusted for different grains.</td>
</tr>
<tr>
<td>Discharging Rate (bu/h or m³/h)</td>
<td>Current discharging rate of the dryer.</td>
</tr>
<tr>
<td>Metering Roll Percent</td>
<td>Meter speed percent, maximum.</td>
</tr>
<tr>
<td>Total Throughput (bu or m³)</td>
<td>Volume of grain run through the dryer. Note this value increases with or without grain when the metering rolls are running.</td>
</tr>
<tr>
<td>Dryer Run Time</td>
<td>Running hours of the dryer.</td>
</tr>
<tr>
<td>Dry Grain Storage</td>
<td>• Grain Bin volume counters.</td>
</tr>
<tr>
<td></td>
<td>• Select the desired grain bin counter.</td>
</tr>
</tbody>
</table>
4.9.2 Performance Data Graphs

In this Section:

- Grain Moisture graph
- Temperature graph
- Discharge Rate graph

- The graph is represented using the current mode of units, showing BPH (bushels per hour) or m$^3$/hr (cubic meters per hour).

- The graph time period can be switched at any time and can be represented for 3, 6, 12, or 24 hour periods.

- Graphs also give current readings for applicable sensors. For instance, the moisture graph shows target moisture, current actual inlet moisture, and current outlet moisture rates. The temperature graph shows current inlet and outlet temperature. The discharge graph toggles, showing either current metering roll speed (%) or volumetric throughput.

- Press the up or down arrow on the Grain Moisture Graph to increase or decrease the moisture range displayed.
Figure 89. Grain Moisture

Figure 90. Temperature

Figure 91. Discharge Rate

Note
All graphs capture a data point every three minutes.
4.10. Emergency Shutdown Procedure

1. Push the E-STOP button.

   **WARNING** Pushing the E-STOP button will turn OFF all outputs from the PLC. It does NOT shut off power into either Control Panel. The Power ON lamp will remain lit on the main Control Panel.

2. Turn OFF the electrical power at the main electrical disconnect.

3. Turn OFF the fuel supply at the main ball valve in the bottom dryer section and then at the main fuel source.

4. If the emergency requires grain to be removed from the dryer more quickly than the unload system can operate, there are several alternative routes to clear the grain. With power shut off and locked out, the following methods can be used:
   
   - Open up one or more of the emergency unload doors around the perimeter of the frame. To open, pull the pin on the clamp assembly. Use caution as the doors can swing open with great force.

---

**Figure 92. Emergency Door Closed**

![Diagram of emergency door closed]
Figure 93. Emergency Door Open

- For auger unloads, the cleanout doors can be opened to allow grain to flow by the metering rolls and augers.
- For drag unloads, both the metering roll doors on the sides of the drag conveyors and the cleanout doors on the drag conveyors themselves can be opened to let grain flow out.
5. Maintenance

Before continuing, ensure you have completely read and understood this manual’s Safety section, in addition to the safety information in the section(s) below.

5.1. Maintenance Safety

⚠️ WARNING

- Keep components in good condition. Follow the maintenance procedures.
- Ensure the service area is clean, dry, and has sufficient lighting.
- Do not modify any components without written authorization from the manufacturer. Modification can be dangerous and result in serious injuries.
- Lock out power source and shut off gas valves.
- All gas components, connections, and appliances are to be serviced or maintained by a qualified gas technician.
- After maintenance is complete, replace all guards, service doors, and/or covers.
- Use only genuine NECO replacement parts or equivalent. Use of unauthorized parts will void warranty. If in doubt, contact NECO or your local dealer.

5.2. Maintenance Overview

NECO takes pride in choosing quality vendors and products in association with the design and manufacture of our products:

- OEM products have a service life related to operating conditions and usage.
- Vendor supplied products consist of motors, gear reducers, bearings, valves, switches, etc.
- This information is to assist in keeping the equipment in operating condition and to help obtain correct OEM data for proper maintenance.

Prior to each season or usage:

- Complete the Section 4.2 – Equipment Pre-Check on page 21 section and verify completion for each step.

During regular usage, based on overall conditions and amount of usage:

- Check for debris buildup within the plenum and throughout the system.
- Check all pipe fittings and fuel train components with a qualified detection method.
- Check the burner ports for blockage. See Section 5.3 – Burner Gas Ports on page 74.
- Check all fan and discharge auger belts tension and alignment monthly. Be careful not to over tension.
- Check metering roll chain tension monthly.
- Clean air switch line monthly.
- Perform lubrication checks when needed.

**End-of-season equipment shutdown:**
- Open the clean-out doors on both sides and let any grain fall through. If needed, the discharge augers can be run briefly to ensure no grain is left on the topside of a stationary auger system.
- Clean out the rear cross auger.
- For storage, the cleanout doors should be left open so that rain may fall through.
- The belts should be loosened and removed, then stored in a dark place.
- The chains should be removed and lubricated, then stored in an air tight container.

### 5.3. Burner Gas Ports

Conduct initial inspection within the first month after commissioning. Visually check the gas ports of the new burner assemblies for any piping scale or debris. Use a pin vise with drill sizes as shown below:

**Figure 94. Burner Gas Port Checking/Cleaning**

Annual inspections are normally adequate once the initial piping debris is removed. Heavy usage of the burner may require checking and cleaning monthly or more.

### 5.4. Solenoid Valves

All solenoid valves should be cleaned annually. The time between cleanings will vary depending on the service conditions. In general, if the voltage to the coil is correct, sluggish valve operation, excessive noise, or leakage will indicate that cleaning is required. In the extreme case, faulty valve operation will occur and the valve may fail to open or close.

Cleaning instructions and rebuild kits for valves can be obtained online from vendors such as ASCO, etc.
5.5. Lubrication

Important
On greaseable sealed bearings, apply grease only until a thin bead of new grease is visible along the seal edge. Applying excessive grease may force out the seals, causing contamination and rapid bearing wear.

Table 4. Lubrication Data

<table>
<thead>
<tr>
<th>PART DESCRIPTION</th>
<th>LUBRICATION PRODUCT</th>
<th>PER TIME PERIOD OF USAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blower Drive Motor</td>
<td>Mfg Recommendation</td>
<td>Mfg Recommendation</td>
</tr>
<tr>
<td>Cross Auger Gearbox</td>
<td>80/90 Gear Oil 1/2 Full</td>
<td>Check Weekly</td>
</tr>
<tr>
<td>Fan Shaft Bearings</td>
<td>Mfg Recommendation</td>
<td>80 Hours</td>
</tr>
<tr>
<td>Cross Auger Bearings</td>
<td>Mfg Recommendation</td>
<td>100 Hours</td>
</tr>
<tr>
<td>Roller Chains</td>
<td>Le 451/452 Almasol</td>
<td>Annually</td>
</tr>
</tbody>
</table>

5.6. Motors

The OEM drive motors can vary in size and manufacturer, depending on the dryer size and usage requirements. In order to properly maintain the various drive motors within your system, record the manufacturer, model number, etc. from the motors ID tag. Follow manufacturers instructions for proper maintenance, including possible lubrication of shaft bearings.
6. Troubleshooting

6.1. Solutions Table

The following section covers some causes and solutions to some of the problems that may be encountered. If there is a problem that is difficult to solve, even after having read through this section, please contact your representative or AGI. Have this manual and the serial number available.

**Temperature Controller**

<table>
<thead>
<tr>
<th>Problem</th>
<th>Check</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature control communication error</td>
<td>If other temperature controls are visible</td>
<td>Incorrect address of the temperature controller</td>
<td>Re-address temperature controller</td>
</tr>
<tr>
<td></td>
<td>If other temperature controllers are not visible</td>
<td>Damaged Modbus communication wires</td>
<td>Starting at the front of the PLC, trace Modbus communication cables to the lowest burner box</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Loose connection at gray communication tee connector</td>
<td>Tighten connection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If problem persists contact dealer</td>
</tr>
<tr>
<td>Temperature displays ***</td>
<td>Front of KS45 inside burner box displays FAIL on top display</td>
<td>Damaged thermocouple</td>
<td>Repair twisted end of thermocouple or replace whole wire</td>
</tr>
<tr>
<td>Unable to reach set point temperature</td>
<td>MAIN MENU-&gt; TROUBLESHOOTING-&gt; TEMPERATURE CONTROLS</td>
<td>If mod motor position is at 100% there is a fuel delivery problem</td>
<td>Turn fuel regulated pressure at individual burner up. CAUTION: DO NOT EXCEED 6 PSI for NG .10 PSI for LP</td>
</tr>
<tr>
<td>Actual temperature exceeds set point</td>
<td>MAIN MENU-&gt; TROUBLESHOOTING-&gt; TEMPERATURE CONTROLS</td>
<td>If mod motor position is at 0% there is a fuel delivery problem</td>
<td>Turn fuel regulated pressure down, trouble lighting may occur if operating pressures are turned below 1 PSI</td>
</tr>
<tr>
<td>Unsteady temperature control (high and low)</td>
<td>MAIN MENU-&gt; TROUBLESHOOTING-&gt; TEMPERATURE CONTROLS</td>
<td>Unsteady mod motor position</td>
<td>Turn fuel regulated pressure down, trouble lighting may occur if operating pressures are turned below 1 PSI</td>
</tr>
<tr>
<td></td>
<td>Thermocouple location and condition</td>
<td>Location inside the dryer too close or too far away from burner</td>
<td>Thermocouple should be located three tiers from the floor and five air ducts back from the burner unless otherwise instructed by NECO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Thermocouple corrosion</td>
<td>Cut and strip and tightly re-twist 3/4&quot; of thermocouple wire</td>
</tr>
<tr>
<td></td>
<td>Natural gas applications</td>
<td>Too high of a ramp rate</td>
<td>Troubleshooting–&gt; temperature controls set ramp rate to 125</td>
</tr>
</tbody>
</table>
### Limits exceeded before plenum temperature is reached

<table>
<thead>
<tr>
<th>Problem</th>
<th>Check</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limits exceeded before plenum temperature is reached</td>
<td>Check set point of high limit switch</td>
<td>High limit switch set too low</td>
<td>High limit switch to be set 20-30 degrees F above operating temp of individual section. NOTE: V42 is changed to be Max temp on switch</td>
</tr>
<tr>
<td></td>
<td>Check location of thermocouple in relation to the high limit bulb</td>
<td>Thermocouple and high limit switch bulb are too far apart</td>
<td>Thermocouple twisted pair should be within inches of high limit bulb without touching anything conductive</td>
</tr>
</tbody>
</table>

### Honeywell Burner Control

#### Problem: Will not remote reset

<table>
<thead>
<tr>
<th>Check</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check to see if a manual reset button on Honeywell works</td>
<td>If manual reset works, failure of 24VDC reset relay</td>
<td>Repair or replace 24VDC reset relay or resolve wiring problem</td>
</tr>
<tr>
<td>Check to make sure connector is firmly plugged into top of controller</td>
<td>If manual reset does NOT work, read blink code and repair</td>
<td>Correct Honeywell fault</td>
</tr>
</tbody>
</table>

#### Problem: Honeywell communication error

<table>
<thead>
<tr>
<th>Check</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorrect address of the Honeywell</td>
<td></td>
<td>Re-address Honeywell</td>
</tr>
<tr>
<td>Baud rate jumper installed in the bottom of the Modbus module</td>
<td></td>
<td>Remove the baud rate jumper (NOTE: all new Modbus modules come with jumper installed)</td>
</tr>
<tr>
<td>Incorrect wiring on plug attached to Honeywell</td>
<td></td>
<td>Correct wiring error</td>
</tr>
<tr>
<td>Damaged Modbus communication wires</td>
<td></td>
<td>Starting at the front of the PLC, trace Modbus communication cables to the lowest burner box</td>
</tr>
<tr>
<td>Loose connection at gray communication tee connector</td>
<td></td>
<td>Tighten connection</td>
</tr>
</tbody>
</table>

### Moisture Controls

<table>
<thead>
<tr>
<th>Problem</th>
<th>Check</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture drift on outlet sensor</td>
<td>Blockage in discharge chute</td>
<td>Debris bridging over outlet sensor blocking grain flow</td>
<td>Clean out discharge chute around sensor</td>
</tr>
<tr>
<td></td>
<td>Can sensor be seen through flow of grain</td>
<td>Insufficient grain flow over sensor</td>
<td>Adjust gate in discharge chute to restrict flow of grain</td>
</tr>
<tr>
<td>INLET MOISTURE SENSOR ERROR</td>
<td>Make sure that the Inlet Sensor is completely covered in grain</td>
<td>Incorrect timer settings on filling equipment allowing sensor to become uncovered</td>
<td>Adjust timer settings on the filling equipment to ensure sensor coverage.</td>
</tr>
</tbody>
</table>
## Starting the Dryer in AUTO

<table>
<thead>
<tr>
<th>Problem</th>
<th>Check</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dryer will not light and goes directly into COOLING</td>
<td>If the ALARM screen has any errors in red…</td>
<td>Wet or Dry transport failure</td>
<td>Correct problem and reset the alarm</td>
</tr>
<tr>
<td>Dryer will not light</td>
<td>Fan is running but no flame present</td>
<td>Honeywell fault</td>
<td>MAIN MENU-&gt; TROUBLESHOOTING-&gt; BURNER CONTROLS, Identify and resolve issue</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Spark plug failure</td>
<td>Clean/replace plug</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fuel delivery</td>
<td>Identify if to much fuel or not enough and resolve issue</td>
</tr>
<tr>
<td></td>
<td>Fan is running and there is pilot light igniting, but not main ignition</td>
<td>Low or no VDC on UV sensor</td>
<td>Clean/replace sensor - Ensure that wires are tight behind the Honeywell</td>
</tr>
</tbody>
</table>

## General Operation

<table>
<thead>
<tr>
<th>Problem</th>
<th>Check</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHANGE BATTERY</td>
<td>Battery in PLC is low, if not replaced DRYER CONFIGURATION can be lost</td>
<td>Battery in PLC should be replaced approx. every 3 years</td>
<td>Replace 1/2 AA battery in the bottom of the PLC in the main control panel</td>
</tr>
<tr>
<td>DRYER CONFIGURATION is lost.</td>
<td>CHANGE BATTERY displayed in lower right corner of HMI screen when powered up</td>
<td>Battery died in PLC during time of non use</td>
<td>Contact dealer to replace battery and re-configure dryer</td>
</tr>
<tr>
<td>E-STOP ACTIVE</td>
<td>Both E-STOP switches must be released</td>
<td>One switch is active</td>
<td>Activate and release each switch</td>
</tr>
<tr>
<td></td>
<td>E-STOP Relay inside main control panel normally</td>
<td>If E-STOP button activated the relay displays</td>
<td>Repair or replace the E-STOP button or repair circuit</td>
</tr>
<tr>
<td></td>
<td>Supply–green</td>
<td>Supply–green</td>
<td>If only one K1 or K2 on check wiring of switch</td>
</tr>
<tr>
<td></td>
<td>K1 –green</td>
<td>K1 –off</td>
<td></td>
</tr>
<tr>
<td></td>
<td>K2 –green</td>
<td>K2 –off</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reset –off</td>
<td>Reset –off</td>
<td></td>
</tr>
<tr>
<td>Unable to get Wet or Dry motors to start</td>
<td>MAIN MENU-&gt; SET UP-&gt; FILL &amp; EMPTY SETUP</td>
<td>Review FILL &amp; EMPTY SETUP page</td>
<td>Turn on necessary options</td>
</tr>
<tr>
<td></td>
<td>MAIN MENU-&gt; TROUBLESHOOTING-&gt; PLC INPUTS</td>
<td>Review PLC INPUT STATUS, blinking icons indicate configuration/wiring errors</td>
<td>Ensure that overloads are on for installed starters. If off, ensure that starters are not overloaded. If not overloaded and still off wiring error present</td>
</tr>
<tr>
<td></td>
<td>MAIN MENU-&gt; ALARMS</td>
<td>Alarm Present</td>
<td>Address any alarm problem in RED</td>
</tr>
<tr>
<td>Unable to get Wet Transport motors to start</td>
<td>Grain level in dryer</td>
<td>Wet Transports will not start with dryer full</td>
<td>Lower grain level below fill switch</td>
</tr>
<tr>
<td></td>
<td>MAIN MENU-&gt; SET-UP-&gt; FILL &amp; EMPTY SETUP</td>
<td>WET BIN EMPTY SWITCH enabled</td>
<td>Wet bin is empty</td>
</tr>
<tr>
<td>Problem</td>
<td>Check</td>
<td>Cause</td>
<td>Solution</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>---------------------------------------------</td>
<td>------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Check Fill rotary switch operation</td>
<td>PLC thinks that dryer is full</td>
<td>Repair/replace faulty rotary switch</td>
<td></td>
</tr>
<tr>
<td>MAIN MENU-&gt; ALARMS</td>
<td>Alarm Present</td>
<td>Address any alarm problem in RED</td>
<td></td>
</tr>
<tr>
<td>Unable to get Dry Transport motors to start</td>
<td>MAIN MENU-&gt; SET-UP-&gt; FILL &amp; EMPTY SETUP</td>
<td>DRY BIN FULL SWITCH enabled</td>
<td>Dry bin is full</td>
</tr>
<tr>
<td>Presence of active alarm</td>
<td>DISCHARGE PLUGGED</td>
<td>Clear plugged discharge and reset alarm</td>
<td></td>
</tr>
</tbody>
</table>
6.2. HMI Troubleshooting Screens

The following screens are used primarily for troubleshooting:

- Alarms and Alarm Log
- Troubleshooting
- PLC Inputs Status
- PLC Outputs Status
- Dryer Master Status and Dryer Master Values
- Temp Control Status
- Burner Control Status

Figure 95. Alarms and Alarm Log Screens

The Alarm Log shows alarm history. Both screens show time alarm went active and time alarm was reset (RTN).
CONTINUOUS MIXED-FLOW GRAIN DRYER – GRAIN DRYER

6. TROUBLESHOOTING

Figure 96.  Troubleshooting Screen

Figure 97.  PLC Inputs Screen
6. TROUBLESHOOTING

CONTINUOUS MIXED-FLOW GRAIN DRYER – GRAIN DRYER

Figure 98. PLC Outputs Status Screen

![PLC Outputs Status Screen]

Figure 99. Dryer Master Status Screen

![Dryer Master Status Screen]
Figure 100. Dryer Master Values Screen

Figure 101. Temp Control Status Screen
6. TROUBLESHOOTING

Figure 102. Burner Control Screen

<table>
<thead>
<tr>
<th></th>
<th>HONEYWELL CONTROLLER STATUS</th>
<th>HONEYWELL CONTROLLER FAULT</th>
<th>HOURS</th>
<th>FLAME VFD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Run</td>
<td>(no fault)</td>
<td>333</td>
<td>4.06</td>
</tr>
<tr>
<td>2</td>
<td>Run</td>
<td>(no fault)</td>
<td>22</td>
<td>3.97</td>
</tr>
<tr>
<td>3</td>
<td>Post Purge</td>
<td>Preignition Interlock</td>
<td>142</td>
<td>0.00</td>
</tr>
</tbody>
</table>

CLEAN UV SENSOR WHEN BELOW 2.50 VDC
BURNER WILL NOT WORK WHEN BELOW 1.25 VDC

Figure 103. Blower VFD (Eaton) Screen

<table>
<thead>
<tr>
<th></th>
<th>L</th>
<th>OFF</th>
<th>JOG</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>INCOMING POWER</th>
<th>MOTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAC 230</td>
<td>AMPS 1.7</td>
</tr>
<tr>
<td>PHASE 1</td>
<td>RPM 1760</td>
</tr>
<tr>
<td>FREQUENCY 60 Hz</td>
<td>FT 0.70</td>
</tr>
</tbody>
</table>

RAMP 10.0s 150s 0.00Hz FREQUENCY
0.0 AMPS
0.0% TORQUE
0.0% POWER
VFD TEMP °C
35.5°C

LAST 66 0 FAULT CODE
CONTINUOUS MIXED-FLOW GRAIN DRYER – GRAIN DRYER

6. TROUBLESHOOTING

Figure 104. Fault Code (Eaton) Screen

Figure 105. Communications Screen
7. Specifications

7.1. Standard Model Specifications

Refer to the following table for specifications on standard NECO dryers. They are listed by model number as shown on the rating plate located on the front of the main control.

Note

1. Drying capacities represent NECO’s best estimate of attainable wet bushel capacities based on a combination of actual field results and computer analysis.

2. Capacities will vary depending on outside temperature, humidity, initial grain temperature, crop maturity and variety, cleanliness of the grain, test weight, operating temperature, drying vs. cooling zones, etc.

3. Hot grain discharged from the dryer will dry an additional 1.5% – 2% when properly cooled.

4. Average burner output MMBTU/hr is based on 155° F temperature rise. Ambient of 55° F and dryer operating temperature of 210° F.

5. Holding capacity values represent corn at 15.5% moisture content (56 lb/bushel).

If the model number of your particular dryer is not shown below, contact your dealer.

Table 5. Standard Model Specifications

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Number of Tiers</th>
<th>Holding Capacity</th>
<th>Number of Burners and Blowers</th>
<th>TOTAL Blower Output (Max)</th>
<th>TOTAL Burner Output (Max)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Bushels (See Notes)</td>
<td>Metric Tonnes</td>
<td>cubic ft/min</td>
<td>cubic m/min</td>
</tr>
<tr>
<td>D1660</td>
<td>4</td>
<td>579</td>
<td>15</td>
<td>1</td>
<td>21,500</td>
</tr>
<tr>
<td>D1670</td>
<td>5</td>
<td>674</td>
<td>17</td>
<td>1</td>
<td>23,500</td>
</tr>
<tr>
<td>D1680</td>
<td>6</td>
<td>770</td>
<td>19</td>
<td>1</td>
<td>27,500</td>
</tr>
<tr>
<td>D1690</td>
<td>7</td>
<td>866</td>
<td>22</td>
<td>1</td>
<td>32,000</td>
</tr>
<tr>
<td>D16106</td>
<td>8</td>
<td>962</td>
<td>24</td>
<td>2</td>
<td>36,600</td>
</tr>
<tr>
<td>D16120</td>
<td>10</td>
<td>1,155</td>
<td>29</td>
<td>2</td>
<td>47,000</td>
</tr>
<tr>
<td>D16140</td>
<td>12</td>
<td>1,347</td>
<td>34</td>
<td>2</td>
<td>55,000</td>
</tr>
<tr>
<td>D16160</td>
<td>14</td>
<td>1,539</td>
<td>39</td>
<td>3</td>
<td>65,300</td>
</tr>
<tr>
<td>D16180</td>
<td>16</td>
<td>1,731</td>
<td>44</td>
<td>3</td>
<td>78,500</td>
</tr>
<tr>
<td>D24108</td>
<td>6</td>
<td>1,155</td>
<td>29</td>
<td>2</td>
<td>41,200</td>
</tr>
<tr>
<td>D24150</td>
<td>8</td>
<td>1,443</td>
<td>36</td>
<td>2</td>
<td>55,000</td>
</tr>
<tr>
<td>D24180</td>
<td>10</td>
<td>1,732</td>
<td>44</td>
<td>2</td>
<td>62,000</td>
</tr>
<tr>
<td>D24210</td>
<td>12</td>
<td>2,020</td>
<td>51</td>
<td>3</td>
<td>82,500</td>
</tr>
<tr>
<td>D24240</td>
<td>14</td>
<td>2,309</td>
<td>58</td>
<td>3</td>
<td>89,500</td>
</tr>
<tr>
<td>D24260</td>
<td>16</td>
<td>2,597</td>
<td>66</td>
<td>4</td>
<td>110,000</td>
</tr>
<tr>
<td>D24330</td>
<td>20</td>
<td>3,174</td>
<td>80</td>
<td>5</td>
<td>137,500</td>
</tr>
<tr>
<td>D24380</td>
<td>24</td>
<td>3,750</td>
<td>95</td>
<td>6</td>
<td>165,000</td>
</tr>
<tr>
<td>D32260</td>
<td>12</td>
<td>2,693</td>
<td>68</td>
<td>3</td>
<td>108,000</td>
</tr>
</tbody>
</table>
Table 5  Standard Model Specifications (continued)

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Number of Tiers</th>
<th>Holding Capacity</th>
<th>Number of Burners and Blowers</th>
<th>TOTAL Blower Output (Max)</th>
<th>TOTAL Burner Output (Max)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Bushels (See Notes)</td>
<td>Metric Tonnes</td>
<td>cubic ft/min</td>
<td>cubic m/min</td>
</tr>
<tr>
<td>D32340</td>
<td>16</td>
<td>3,463</td>
<td>88</td>
<td>4</td>
<td>144,000</td>
</tr>
<tr>
<td>D32440</td>
<td>20</td>
<td>4,232</td>
<td>107</td>
<td>5</td>
<td>182,000</td>
</tr>
<tr>
<td>D32500</td>
<td>24</td>
<td>5,001</td>
<td>127</td>
<td>6</td>
<td>216,000</td>
</tr>
</tbody>
</table>
8. Appendix

8.1. 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 6. Speed Settings (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>68%</td>
</tr>
<tr>
<td>D24380 - 83 RPM</td>
<td>81%</td>
</tr>
</tbody>
</table>
Table 6  Speed Settings (DC Motor %) (continued)

<table>
<thead>
<tr>
<th>MODEL - RPM</th>
<th>MOISTURE CONTENT (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td>D32260 - 62 RPM</td>
<td>54%</td>
</tr>
<tr>
<td>D32340 - 62 RPM</td>
<td>72%</td>
</tr>
<tr>
<td>D32440 - 92 RPM</td>
<td>61%</td>
</tr>
<tr>
<td>D32500 - 92 RPM</td>
<td>73%</td>
</tr>
</tbody>
</table>
### 8.2. PLC and HMI Recorded Data Sheet

#### SETUP TAB - Dryer Configuration

<table>
<thead>
<tr>
<th>Temp &amp; Volume Units</th>
<th>Imperial</th>
<th>Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>12'</td>
<td>16'</td>
</tr>
<tr>
<td>Gearmotor RPM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level Auger</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Number of Blowers</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>Number of Burners</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>Number of Tiers at Blower:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blower #1</td>
<td>3 4 5</td>
<td>3 4 5</td>
</tr>
<tr>
<td>Blower #2</td>
<td>3 4 5</td>
<td>3 4 5</td>
</tr>
<tr>
<td>Blower #3</td>
<td>3 4 5</td>
<td>3 4 5</td>
</tr>
<tr>
<td>Blower #4</td>
<td>3 4 5</td>
<td>3 4 5</td>
</tr>
<tr>
<td>Blower #5</td>
<td>3 4 5</td>
<td>3 4 5</td>
</tr>
<tr>
<td>Blower #6</td>
<td>3 4 5</td>
<td>3 4 5</td>
</tr>
<tr>
<td>Gas Type</td>
<td>Liquid Propane (LP) or Natural Gas (NG)</td>
<td></td>
</tr>
</tbody>
</table>

#### SETUP TAB - Timers Setup

- Auto Filling Delay (10 SEC):
- Low Level Ignore (30 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 (1 SEC):
- Dryer Cooling Time (5 MIN):

#### SETUP TAB - Fill & Empty Setup

<table>
<thead>
<tr>
<th>Wet Transport 2:</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Run Continuous</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stop After Drying Stops</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Start Delay Seconds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stop Delay Seconds</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wet Transport 1:</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Run Continuous</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stop After Drying Stops</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Start Delay Seconds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stop Delay Seconds</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level Auger:</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Run Continuous</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stop After Drying Stops</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Start Delay Seconds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stop Delay Seconds</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unload Auger:</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Run Continuous</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stop After Drying Stops</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Start Delay Seconds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stop Delay Seconds</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dry Transport 1:</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Run Continuous</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stop After Drying Stops</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Start Delay Seconds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stop Delay Seconds</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dry Transport 2:</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Run Continuous</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stop After Drying Stops</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Start Delay Seconds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stop Delay Seconds</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Wet Bin Empty Switch: | Yes | No |
| Dry Bin Full Switch:  | Yes | No |
| Low Level Switch:     | Yes | No |
| Metering Roll Max Speed: |     |    |

### SETUP TAB - Control Setup (Overrides)

#### MAIN MENU TAB - Trouble Shooting
- Dealer Info: 
- Trouble Shooting:

#### MAIN MENU TAB - Temperature Control
- Ramp Deg/Min:
  1
  2
  3
  4
  5
  6

#### MAIN MENU TAB - Trends
- Discharge Rate Factor:
- Throughput:
- Total Throughput:
- Hours:

#### MAIN MENU TAB - Fill / Empty Dryer
- Manual Metering Roll Setpoint:
- Serial #: 
- Manual Metering Roll Setpoint:

### PLC & HMI Version #: 

8.3. 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 8.2 – PLC and HMI Record Sheet on page 90 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 = NecoTech, 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.

   Figure 106. Lights When Power Turned Back On  Figure 107. PWR and ERR Lights On

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.
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 112. HMIGTO Series**

8.4. 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.
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>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>
</tbody>
</table>
Table 7 Power LED Fault Codes (continued)

<table>
<thead>
<tr>
<th>CODE (Fast-Slow)</th>
<th>FAULT DESCRIPTION</th>
</tr>
</thead>
<tbody>
<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>

8.5. 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>

RELAY LEDS INDICATE COIL POWER PRESENT
KS45 AND TB47 LEDS
HONEYWELL MODBUS MODULE MODE LED
HONEYWELL RELAY MODULE POWER LED
### 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 (good)</td>
<td>50ms (OFF)</td>
<td>1 sec</td>
<td>Normal Operation, Both ControlBus and ModBus are active</td>
</tr>
<tr>
<td>Always OFF</td>
<td>OFF</td>
<td></td>
<td>No power or device failure</td>
</tr>
<tr>
<td>Always ON</td>
<td>ON</td>
<td></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, Check ModBus wiring</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. 2. Reset and sequence the Relay Module. 3. Check the 7800 power supply and make sure that frequency and voltage meet specifications. 4. Check the backup power supply, as appropriate.</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></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>1. Check that flame is not present in the combustion chamber; correct any errors. 2. Make sure that the flame amplifier and flame detector are compatible. 3. Check the wiring and correct any errors. 4. Remove the flame amplifier and inspect its connections. Reseat the amplifier. 5. Reset and sequence the relay module. 6. If the code reappears, replace the flame amplifier and/or the flame detector. 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>
<tr>
<td>Code 2-2</td>
<td>No-flame time present at the end of the Pilot Flame Establishing Period; lost during the Main Flame Establishing Period or during RUN.</td>
<td>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.</td>
</tr>
<tr>
<td>Code 2-3</td>
<td>Flame signal value is too high to be valid.</td>
<td>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 signal. 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.</td>
</tr>
<tr>
<td>Code 3-1</td>
<td>Running or Lockout Interlock fault during Prepurge.</td>
<td>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.</td>
</tr>
<tr>
<td>Code 3-2</td>
<td>Lockout Interlock powered at improper point in sequence or On in Standby.</td>
<td>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 wedged 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.</td>
</tr>
<tr>
<td>Code 3-3</td>
<td>VPS (Valve Proving Switch) in wrong state during VPS Test.</td>
<td>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.</td>
</tr>
<tr>
<td>Code 4-1</td>
<td>No purge card or the purge card timing has changed from the original configuration.</td>
<td>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.</td>
</tr>
</tbody>
</table>
| 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 turn 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>
<tbody>
<tr>
<td>Code 4-3</td>
<td>Flame not sensed, or sensed when it should be on or off.</td>
<td>1. Check wiring; correct any errors.</td>
</tr>
<tr>
<td>Code 4-4</td>
<td>The configuration jumpers differ from the sample taken at startup.</td>
<td>1. Inspect the jumper connections. Make sure the clipped jumpers were completely removed.</td>
</tr>
<tr>
<td>Code 5-1</td>
<td>Preignition Interlock.</td>
<td>1. Check wiring and correct any errors.</td>
</tr>
<tr>
<td>Code 5-2</td>
<td>Either High Fire Switch or Low Fire Switch failure.</td>
<td>1. Check wiring and correct any errors.</td>
</tr>
<tr>
<td>Code 5-3</td>
<td>Man-Open Switch, Start Switch or Control On in the wrong operational state.</td>
<td>1. Check wiring and correct any errors.</td>
</tr>
<tr>
<td>Code 6-1</td>
<td>Relay Module self-test failure.</td>
<td>1. Reset and sequence the relay module.</td>
</tr>
<tr>
<td>Code 6-2</td>
<td>Relay Module Self-Test failure.</td>
<td>1. Reset and sequence the relay module.</td>
</tr>
<tr>
<td>Code 6-3</td>
<td>Fault with special OEM input circuits.</td>
<td>1. Check wiring and operation of special OEM inputs.</td>
</tr>
<tr>
<td>Code 6-4</td>
<td>Unused at this time.</td>
<td>—</td>
</tr>
<tr>
<td>Code 7-7</td>
<td>Unused at this time.</td>
<td>—</td>
</tr>
</tbody>
</table>
Fireye Lockout Codes Interpretation

During an alarm condition, the Alarm LED 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>LOCKOUT MESSAGE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T13 FUEL VALVE END</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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8.6. 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.
8.7. Grain Drying Tips

8.7.1 Specific Crops

**Drying Suggestions**

FOR SPECIFIC GRAINS / SITUATIONS IN YOUR AGI® NECTO DRYER

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**Notes to the Reader:**
The information presented here should be considered suggestions only and do not constitute any guarantee of drying performance in your dryer.

The NECO Continuous Flow Grain Dryer is one of the most flexible and robust dryers on the market, but keep in mind that every crop, hybrid, and drying condition is different and vary from season to season. Every drying situation is unique and careful evaluation and planning should be given to each situation.

**Warning:**
High temperature grain dryers utilize many moving parts and fuel trains supplying combustible fuel to the burners. It is critical to work safely around the dryer and keep an eye on changing conditions. Dryers and the area around them should be kept clean. Dryers and their supporting equipment should be properly maintained at all times.

All power to the dryer must be locked-out and tagged-out before any work is performed. Even without power, extreme caution should be exercised when working inside of the dryer.

For any questions, please call the NECO factory at 402-453-6912 or send an email to service@necoldryers.com.

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**Corn**

**Difficulty:** 

**Drying Temp:** 210°F (100°C)

**Notes:**
Corn is probably the easiest of the grains to dry in the NECO dryer. Corn will handle quite high temperatures and is generally dried at 210°F.

Known issues with corn can be a crop that has experienced a difficult growing season and is immature or stressed. These kernels will be more difficult to dry and capacities through the dryer will be reduced. Certain hybrids that are designed to be drought or moisture resistant will have thicker seed coats and smaller attachment points that make the drying process more difficult. Capacities will be markedly reduced.

**Concerns:**
- Some crops may need higher moisture content and are more difficult to dry.
- Corn will not tolerate high temperatures in the dryer.
- Very high moisture corn will generate large amounts of steam exiting the dryer.
- Buildup of ice on the fan blades can occur on very cold days causing overamping of the blower motors and dryer shutdowns.

**White Corn / Food Grade**

**Difficulty:** 

**Drying Temp:** 130-160°F (54-60°C)

**Notes:**
Grains that are highly susceptible to stress cracking are well suited to the NECO dryer. Similar to corn, white corn dries well. Slow cooling is the most critical factor for these grains to avoid stress cracking.

Reduce burner temperatures to 130-140°F (54-60°C) and slow the rate of cooling. With multiple burner dryers, the upper temperatures may be able to run slightly hotter. Stagger the temperatures to slightly reduce kernel temps as the grain progresses through the dryer.

**Concerns:**
Bees’ wings or “white” dogs will be present during drying and worse with higher moisture corn. Cleanup in and around the dryer as often as necessary.

On very warm days use as many cooling floors as possible or run the dryer with reduced temperatures in an All-Heat mode and slow cool in the bin with properly sized aeration fans.

**Caution:** on extremely cold days, the outside cooling air will likely be too cool. The kernels will shrink too quickly and stress cracks will form. Consider slow cooling in the bin. If using the entire bottom section for cooling, run this burner at a low temperature like 80-90°F (27-32°C).
8. APPENDIX

CONTINUOUS MIXED-FLOW GRAIN DRYER – GRAIN DRYER

WHEAT

DIFFICULTY: ●●●●● DRYING TEMP: 180°F (82°C) or lower

NOTES:
Wheat should be dried at slightly lower temperatures than corn – perhaps 180°F (82°C) to achieve highest quality.

Wheat will dry quite easily and sometimes will move through the dryer so quickly that the unload will have problems keeping up.

CONCERNS:
If wheat gets above 28% moisture – watch the quality closely. It may need to run in two passes. Too high of temperatures used on very high moisture wheat can damage the quality.

High moisture wheat that is full of debris can be "sluggish" as it moves through the dryer. Perform periodic inspections to make sure grain columns are moving.

BARLEY / OATS

DIFFICULTY: ●●●●● DRYING TEMP: 160-170°F (71-77°C)

NOTES:
Barley and oats run well in a NEO dryer but bearded barley especially can hang up in the dryer. Reduce burner temperatures to 160-170°F (71-77°C).

Check regularly to make sure the grain is moving through the dryer. Look in each of the lower ducts for grain movement. There might be bridging that is keeping the column from moving freely.

CONCERNS:
If working on the outside of the dryer – blockages in the upper ducts can be removed while the dryer is running. If the blockage seems to be in the bottom duct, stop the unload and lockout the machine before trying to work with the metering rolls. If you need to access the ducts inside the dryer, stop the dryer and lockout the machine.

As incoming barley or oats gets dryer, it can get quite light and fail to engage the fill switch to shut down the filling equipment. Lower the adjustable height rotary switch into the grain or consider adding paddle extensions to better engage the grain mass.

If the incoming grain contains large amounts of chaff, consider pre-cleaning or view the section on Special Harvest Situations – EXCESS CHAFF.

SOYBEANS

DIFFICULTY: ●●●●● DRYING TEMP: 140-145°F (60-63°C)

NOTES:
Reduce drying temperatures to 140-145°F (60-63°C). If having problems with seed coat cracking, use slow cooling techniques (see WHITE CORN). Oilseed crops should not be left unattended while drying.

CONCERNS:
The plenum area can get a buildup of “fuzz” that needs to be cleaned each day. Soybeans can be quite “trashy”. Bean pods can build up in corners of the dryer causing blockages and “hot spots”.

This lighter material (seed pods) can build up in the dryer to the outside ends of the dryer at the very top (viewed from inside the plenum top section). Every couple of days – turn off the fill equipment until the grain level falls below the low dryer switch. Refill the dryer and continue drying. This will help “flush” some of this material through the dryer. If in doubt, it is a best practice to simply empty the dryer to remove the excess material, refill the dryer, and resume drying.

Leafy material can be pulled into the blowers and ignited at the burner. On very windy days, watch for this issue. Consider drying on a different day.

SORGHUM / MILLET

DIFFICULTY: ●●●●● DRYING TEMP: 130-140°F (54-60°C)

NOTES:
Sorghum or milo dries relatively well if caution is used. Reduce drying temperatures to 130-140°F (54-60°C).

CONCERNS:
Sorghum can be quite “trashy” with chaff and debris. Buildup in the corners of the dryer can cause blockages and “hot spots”.

This lighter material can build up in the dryer to the outside ends of the dryer at the very top (viewed from inside the plenum top section). Every couple of days – turn off the fill equipment until the grain level falls below the low dryer switch. Refill the dryer and continue drying. This will help “flush” some of this material through the dryer. If in doubt, it is a best practice to simply empty the dryer to remove the excess material, refill the dryer, and resume drying.

Leafy material can be pulled into the blowers and ignited at the burner. On very windy days, watch for this issue. Consider drying on a different day.

If coming off the field very wet, too much heat in the upper sections can cause auto-ignition problems. ‘Very wet sorghum as been known to auto-ignite in the grain cahr. Reduce heat to the upper section and make sure the grain is getting plenty of air – especially in the wet bin.
CONTINUOUS MIXED-FLOW GRAIN DRYER – GRAIN DRYER

EDIBLE BEANS

DIFFICULTY: 

DRYING TEMP: 120-130°F (49-55°C)

NOTES: The NECO mixed flow dryer is well suited for the gentle drying required with edible beans. Reduce temperatures to 120-130°F (49-55°C) to keep seed coat from cracking or discoloring. At this point the handling of the product needs to be considered.

CONCERNS: Augers should be slowed down with a pulley change or VFD to keep them running as full as possible. Smaller VFDs can be installed in the main cabinet. Larger VFDs should be installed in a secondary cabinet to reduce electrical noise to components in the main cabinet.

If having problems with seed coat cracking, use slow cooling techniques (see WHITE CORN).

Consider purchasing poly flattening for even better results – or consider the option of a drag unload with VFD. Some customers have installed after market belt conveyors.

RAPE / CANOLA

DIFFICULTY: 

DRYING TEMP: 130-140°F (54-60°C)

NOTES: Rape seed or canola will dry relatively trouble free – but special conditions apply. Reduce burner temperatures to 130-140°F (54-60°C). Rape seed should not be dried unattended due to its oil content. Rape has numerous varieties. Those with very high oil content should NOT be dried unattended.

CONCERNS: Material can fly out of the ducts at the top corners for the dryer. These ducts may need to be partially blocked with duct cover (7755995). Contact the NECO factory to determine if a Small Grains Kit might be applicable to your situation. Or the air can be slowed slightly with a pulley change or even a VFD on the blower motor – but anytime the airflow is reduced, the operator should check to make sure they are still achieving good flame quality. If using a VFD, install the equipment in a secondary cabinet to reduce electrical noise to components in the main cabinet.

If the rape seed gets above 24% - watch quality closely. It may need to run in two passes. If the rape seed or canola has excess chaff – see the section on Special Harvest Situations – EXCESS CHAFF.

RICE

DIFFICULTY: 

DRYING TEMP: 115-125°F (46-52°C) NIGHT
105-115°F (41-46°C) DAY

NOTES: Rice can be quite difficult to dry. Most operators will bring rice to the dryer around 19-22% moisture. The dryer should be set to run in all heat (without cooling). Drying temperatures should be set at 115-125°F (46-52°C) in the nighttime and 105-115°F (41-46°C) in the daytime hours.

CONCERNS: Rice can only be brought down approximately 3-4 points in moisture at a time. More than this and the kernel may shrink too quickly causing internal stress cracking. Some customers have reported success removing 7 points in one pass but complete drying data was not available.

Partially dried rice should be stored in bins with fan aeration and left at least 24 hours to temper. At that point, a decision can be made to leave it in aeration or bring it back through the dryer for a second pass. Rice can also see some moisture rebound in the bin. Final moisture should be brought to 12.5-13.0%. If rice is already less than 18%, consider an air-only pass.

Rice hybrids can be caustic and produce significant wear. Watch very closely the leveling augers if equipped and discharge auger wood bearings. Wood bearings may need to be rotated after only a short while.

SUNFLOWER

DIFFICULTY: 

DRYING TEMP: 120-130°F (49-55°C)

NOTES: Sunflowers present the greatest challenge in a high temperature dryer. Because it is an oil seed with a large surface area, it could ignite if subjected to high temperatures for long periods of time. Reduce drying temperature to 120-130°F (49-55°C). Sunflower seeds should NEVER be dried unattended.

CONCERNS: Sunflowers can be one of the dirtiest crops. The plenum area can get a buildup of “fuzz” that needs to be cleaned each day. Lighter material can build up in the dryer to the outside ends of the dryer at the very top (viewed from inside the plenum top section). Every couple of days – turn off the filling equipment until the grain level falls below the low dryer switch. Refill the dryer and continue drying. This will help “flush” some of this material through the dryer.

If in doubt, it is a best practice to simply empty the dryer to remove the excess material, refill the dryer, and resume drying.

(See CONCERNS continued on next page)
8. APPENDIX

CONTINUOUS MIXED-FLOW GRAIN DRYER – GRAIN DRYER

SUNFLOWER

DIFFICULTY: ★★★★★
DRYING TEMP: 120-130°F (49-55°C)

CONCERNS: The seeds may start lifting out of the air ducts as they get dryer at the bottom. It may be necessary to restrict the airflow by blocking ducts with duct cover (77135099). Contact the NECO factory to determine if a Small Grains Kit might be applicable to your situation. Or the air can be slowed slightly with a pulley change or even a VFD on the blower motor— but anytime the airflow is reduced, the operator should check to make sure they are still achieving good flame quality. If using a VFD, install the equipment in a secondary cabinet to reduce electrical noise to components in the main cabinet.

On very windy days, make sure floating material is not being pulled back into the blower inlets. If possible, stop drying until calmer conditions are met.

As a last note – sunflowers have one of the highest moisture-rebound rates. It might be necessary to dry to a couple points under the desired setpoint before putting into the bins.

SPECIALTY CROPS

OTHER SPECIALTY CROPS:
The NECO dryer has been used to dry many other specialty crops including radish seed, mustard seed, sesame seed, grass seed, grape seed, chickpeas and even some nuts—like hazelnuts. Drying data was not available in all instances.

Use caution and start slowly until you have learned the best techniques to use in your instance.

Begin at a lower temperature and work your way up to a point where you are comfortable.

Always remember the crop needs to be free flowing, relatively clean of debris and foreign material.

Always maintain a clean dryer and a clean working area around the dryer.

For any questions, please call the NECO factory at 402-453-6932 or send an email to service@necedryers.com.

HARVEST SITUATIONS

SPECIAL HARVEST SITUATIONS:

EXCESS BULK MATERIAL
During difficult harvest seasons, it is very common to speed up the combines to shorten the harvest. This often results in excess corn cobs, stalks, leafy material and the like. This situation can be common with certain types of harvest machines—no matter the speed.

Keep in mind any dryer is designed to dry free flowing grains and not bulky material (cobs, stalks, leaves) that may bridge. Material that is not free flowing may plug up a dryer and restrict the free movement of the grain.

Material that is hung up in the dryer will eventually over dry to the point it becomes a hazard. If the grain is full of this material – regularly inspect random sections of the dryer to ensure the grain is free flowing. If in doubt – it is a best practice to empty the dryer and inspect for the presence of this material. Clean the dryer, refill the dryer and resume drying.

Consider putting grain with excess bulky material through a scalper or pre-cleaner before bringing it to the dryer. The grain will flow better, the potential for bridging will be reduced, and you will not be paying to dry the bulk material.

EXCESS CHAFF

Crops that come to the dryer with an excess amount of chaff will cause similar hazards.

Chaff is lighter than grain and will “float” on top of the flowing grain—remaining somewhat stationary and accumulating over time. This can happen anywhere in the dryer.

A tell-tale sign of excess chaff would be the buildup in the heat ducts where the constant flow of air will push it to the sidewall of the dryer. Over time this material will over dry and become a hazard. If the grain is full of this material—regularly inspect random sections of the dryer to ensure there is no buildup of chaff in the heat ducts. If in doubt – it is a best practice to empty the dryer to remove this material. Clean the dryer, refill the dryer and resume drying.

It might be possible to stop drying and simply run the unloads for 15-20 minutes to see if this material will be drawn into the mass of flowing grain. Recheck for the excess chaff condition and if in doubt - empty the dryer completely, refill the dryer and resume drying.

Consider putting material with excess chaff through a pre-cleaner prior to bringing it to the dryer. The grain will flow better, the potential for hot spots will be reduced, and you will not be paying to dry chaff.
8.7.2 Measuring Actual Seed Temperatures

Note
Putting a thermometer directly in the dryer only gives the temperature of the air between the kernels and not the correct temperature of the actual kernels.

When operating in batch mode:

- To determine correct kernel temperature, take a sample from a duct at the lower part of the heating section.
- Put into an insulated (covered) container, with a thermometer directly in the grain.
- After 10 minutes record the temperature reading.
9. Compliance

Declaration of Conformity
Konformitätserklärung

Nebraska Engineering Company (NECO)
a Division of Ag Growth International (AGI)
9364 North 45th Street
Omaha, NE 68152 USA
Phone: 402-453-6912

Continuous Flow Grain Dryer, 380V 3PH 50Hz


Conforms to applicable requirements of directive 2006/42/EC
In Übereinstimmung mit der Richtlinie des Rates 2006/42/EC

Omaha, NE USA
10. Limited Warranty

For a period of one (1) year after shipment of goods by the Buyer to the Buyer’s customer, NECO will supply, free of charge, FOB per NECO’s factory located in Omaha, Nebraska, replacement parts for any parts that NECO identifies to be defective due to workmanship or material.

- This limited warranty does not extend to parts that wear due to normal operation and need to be replaced periodically.
- Goods not manufactured by NECO carry only their manufacturer’s warranty.
- This undertaking is in lieu of all other warranties, expressed or implied, including merchantability and fitness for a particular purpose.
- You must obtain a “Return Authority” form NECO prior to returning any defective goods. Those defective goods must be returned, freight-prepaid, to the NECO factory in Omaha, NE. See the back cover of this manual for complete address information.
- NECO reserves the right to make changes or improvements to products and goods without incurring any obligation with respect to previously manufactured products.
- Failure to follow the instructions contained in this manual, as well as the existence of any of the conditions listed below, will cause this Limited Warranty to be null and void:
  1. Improper assembly.
  2. Improper installation, including power and wiring.
  3. Unauthorized alteration of the product or components therein.
  4. Operation of the unit when repairs are needed.
  5. Use of unauthorized parts.
  6. Operation by children or un instructed personnel.
  7. Processing of materials that are abrasive, that do not flow freely, or that are otherwise unsuited for processing in farm equipment.
  8. Misuse of the equipment or any of its components.
  9. Damage due to negligence, abuse, or accidents.

LIMITATION OF LIABILITY

- Buyer agrees that in no event shall NECO have liability for direct damages in excess of the contract price of the goods for which the claim is made.
- Buyer further agrees that in no event shall NECO have liability for loss of use, loss of profits, or for any indirect, incidental, or consequential damages on any claim of any kind.
Neco is an AGI Brand.

AGI is a leading provider of equipment solutions for agriculture bulk commodities including seed, fertilizer, grain, and feed systems with a growing platform in providing equipment and solutions for food processing facilities. AGI has manufacturing facilities in Canada, the United States, the United Kingdom, Brazil, South Africa, India and Italy and distributes its products globally.