Continuous-Flow Grain Dryer

COMMANDER Control
Assembly Manual

This manual applies to following models:
D1660, D1670, D1680, D1690, D16106, D16120, D16140, D16160
D24108, D24150, D24180, D24210, D24240, D24260, D24330, D24380
D32260, D32340, D232440, D32500

INSTALLATION AND WIRING MUST BE IN ACCORDANCE WITH CEC, NEC, AND LOCAL ELECTRICAL CODES

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.
**WARNING:** If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

— Do not store or use gasoline or other flammable vapours and liquids in the vicinity of this or any other appliance.

— **WHAT TO DO IF YOU SMELL GAS**
  - Do not try to light any appliance.
  - Extinguish any open flames.
  - Do not touch any electrical switch.
  - Immediately call your gas supplier. Follow the gas supplier's instructions.
  - If you cannot reach your gas supplier, call the fire department.

— Installation and service must be performed by a qualified installer, service agency or the gas supplier.

⚠ **WARNING:** Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

**FOR YOUR SAFETY**

The use and storage of gasoline and other flammable vapors and liquids in open containers in the vicinity of this appliance is hazardous.
New in this Manual
The following changes have been made in this revision of the manual:

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<th>Section</th>
</tr>
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</tr>
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1. Safety

1.1. 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.

1.2. General Safety

Read and understand all safety instructions, safety decals, and manuals and follow them when assembling the equipment.

- Only experienced personnel who are familiar with this type of assembly and installation should perform this work. Untrained assemblers/installers expose themselves and bystanders to possible serious injury or death.

- Do not modify the grain dryer in any way or deviate from the instructions in this manual without written permission from the manufacturer. Unauthorized modification or methods 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.

- Contact your local representative or NECO if you need assistance or additional information.

- Always follow applicable local codes and regulations.
1.3. Grain Dryer Safety

**WARNING**
- 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 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.
1.4. 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.

1.5. 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.

1.6. Ladder Safety

**WARNING**
- Do not climb ladder if damaged, wet, icy, greasy, or slippery.
- Remove slippery materials on platforms, rungs and gripping surfaces.
- Maintain good balance by having at least three points of contact at all times.
- Use a fall restraint and arrest system when required. Consult your local health and safety organization.

1.7. Overhead Power Lines

**WARNING**
- 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.
1.8. Towing the Grain Dryer

The grain dryer is not intended for transport on public roads. If it requires transport on a public roadway, the following steps should be taken:

- Check with local authorities regarding transport on public roads. Obey all applicable laws and regulations.
- Always travel at a safe speed, never exceeding 20 mph (32 km/h).
- Reduce speed on rough surfaces.
- Do not transport on slopes greater than 20°.
- Use caution when turning corners or meeting traffic.
- Make sure the SMV (slow moving vehicle) emblem and all the lights and reflectors that are required by local authorities are in place, are clean, and can be seen by all over-taking and oncoming traffic.
- Always use hazard-warning flashers on tractor/towing vehicle when transporting unless prohibited by law.
- Do not allow riders on the grain dryer or towing vehicle during transport.
- Attach to towing vehicle with an appropriate pin and retainer. Always attach safety chains.
- Place the grain dryer in the transport position before moving on roads.

1.9. 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.
1.9.1 Electric Motor Safety

**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.

1.10. Personal Protective Equipment

The following Personal Protective Equipment (PPE) should be worn when installing the equipment.

**Safety Glasses**

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

**Coveralls**

- Wear coveralls to protect skin.

**Hard Hat**

- Wear a hard hat to help protect your head.

**Steel-Toe Boots**

- Wear steel-toe boots to protect feet from falling debris.
Work Gloves
• Wear work gloves to protect your hands from sharp and rough edges.

Fall Protection
• Use a fall arrester or fall restraint when climbing or working at heights.

1.11. 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.

1.12. 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.

1.13. 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.
1.14. 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 1. Front Left Dryer Safety Decal Locations**

**Figure 2. Front Right Dryer Safety Decal Locations**
Figure 3. Drag Unload Safety Decal Locations

Figure 4. Auger Unload Safety Decal Locations

Figure 5. Door Safety Decal Locations

One decal per door, including cleanout doors
<table>
<thead>
<tr>
<th>DECAL NUMBER</th>
<th>SAFETY MESSAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>036726</td>
<td><strong>WARNING</strong></td>
</tr>
<tr>
<td></td>
<td>CUTTING HAZARD</td>
</tr>
<tr>
<td></td>
<td>To prevent serious injury, keep away from blade when fan is operating.</td>
</tr>
<tr>
<td></td>
<td>Shut off and lockout or disconnect power before inspecting or servicing.</td>
</tr>
<tr>
<td></td>
<td>Keep guards in place while operating.</td>
</tr>
<tr>
<td>035691</td>
<td><strong>WARNING</strong></td>
</tr>
<tr>
<td></td>
<td>HIGH VOLTAGE</td>
</tr>
<tr>
<td></td>
<td>To prevent serious injury or death, turn off and lock out power before servicing.</td>
</tr>
<tr>
<td>036725</td>
<td><strong>DANGER</strong></td>
</tr>
<tr>
<td></td>
<td>HIGH VOLTAGE</td>
</tr>
<tr>
<td></td>
<td>To prevent serious injury or death, turn off and lock out power before servicing.</td>
</tr>
<tr>
<td>7713361</td>
<td><strong>SAFETY INSTRUCTIONS</strong></td>
</tr>
<tr>
<td></td>
<td>For proper operation:</td>
</tr>
<tr>
<td></td>
<td>• Read your operator’s manual carefully. It contains valuable information on how to run this machine safely and economically.</td>
</tr>
<tr>
<td></td>
<td>• Clean out dryer after initial filling to prevent fires.</td>
</tr>
<tr>
<td></td>
<td>• When operating with oil seeds, be cautious of spontaneous combustion.</td>
</tr>
<tr>
<td></td>
<td>• Check fuel line components for leaks after transport and periodically thereafter.</td>
</tr>
<tr>
<td>036222</td>
<td><strong>WARNING</strong></td>
</tr>
<tr>
<td></td>
<td>BURN HAZARD</td>
</tr>
<tr>
<td></td>
<td>To prevent burns from high temperature flame:</td>
</tr>
<tr>
<td></td>
<td>• Keep door closed when operating.</td>
</tr>
<tr>
<td></td>
<td>• Lock out power before opening inspection door.</td>
</tr>
<tr>
<td>1001985</td>
<td><strong>WARNING</strong></td>
</tr>
<tr>
<td></td>
<td>ENTANGLEMENT HAZARD</td>
</tr>
<tr>
<td></td>
<td>To prevent serious injury or death:</td>
</tr>
<tr>
<td></td>
<td>• Keep body, hair, and clothing away from rotating pulleys, belts, chains, and sprockets.</td>
</tr>
<tr>
<td></td>
<td>• Do not operate with any guard removed or modified. Keep guards in good working order.</td>
</tr>
<tr>
<td></td>
<td>• Shut off and lock out power source before inspecting or servicing machine.</td>
</tr>
<tr>
<td>036737</td>
<td><strong>CAUTION</strong></td>
</tr>
<tr>
<td></td>
<td>DO NOT TOUCH!</td>
</tr>
<tr>
<td></td>
<td>Door may be hot and under pressure.</td>
</tr>
<tr>
<td></td>
<td>Be sure blower has completely stopped and allow unit to cool down before opening door.</td>
</tr>
<tr>
<td></td>
<td>Failure to heed may result in minor to moderate injury.</td>
</tr>
<tr>
<td>1002301</td>
<td><strong>WARNING</strong></td>
</tr>
<tr>
<td></td>
<td>DANGER</td>
</tr>
<tr>
<td></td>
<td>ROTATING FLIGHTING HAZARD</td>
</tr>
<tr>
<td></td>
<td>To prevent death or serious injury:</td>
</tr>
<tr>
<td></td>
<td>• KEEP AWAY from rotating auger flighting.</td>
</tr>
<tr>
<td></td>
<td>• Shut off and lock out power before removing cover or servicing.</td>
</tr>
<tr>
<td>035690</td>
<td><strong>WARNING</strong></td>
</tr>
<tr>
<td></td>
<td>DANGER</td>
</tr>
<tr>
<td></td>
<td>ROTATING FLIGHTING HAZARD</td>
</tr>
<tr>
<td></td>
<td>To prevent death or serious injury:</td>
</tr>
<tr>
<td></td>
<td>• KEEP AWAY from rotating auger flighting.</td>
</tr>
<tr>
<td></td>
<td>• Shut off and lock out power before removing cover or servicing.</td>
</tr>
<tr>
<td>1001985</td>
<td><strong>WARNING</strong></td>
</tr>
<tr>
<td></td>
<td>DANGER</td>
</tr>
<tr>
<td></td>
<td>ROTATING FLIGHTING HAZARD</td>
</tr>
<tr>
<td></td>
<td>To prevent death or serious injury:</td>
</tr>
<tr>
<td></td>
<td>• KEEP AWAY from rotating auger flighting.</td>
</tr>
<tr>
<td></td>
<td>• Shut off and lock out power before removing cover or servicing.</td>
</tr>
<tr>
<td>1002301</td>
<td><strong>WARNING</strong></td>
</tr>
<tr>
<td></td>
<td>ROTATING FLIGHTING HAZARD</td>
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<tr>
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<td>To prevent death or serious injury:</td>
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<tr>
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</tr>
<tr>
<td></td>
<td>• Shut off and lock out power before removing cover or servicing.</td>
</tr>
<tr>
<td>035690</td>
<td><strong>WARNING</strong></td>
</tr>
<tr>
<td></td>
<td>DANGER</td>
</tr>
<tr>
<td></td>
<td>ROTATING FLIGHTING HAZARD</td>
</tr>
<tr>
<td></td>
<td>To prevent death or serious injury:</td>
</tr>
<tr>
<td></td>
<td>• KEEP AWAY from rotating auger flighting.</td>
</tr>
<tr>
<td></td>
<td>• Shut off and lock out power before removing cover or servicing.</td>
</tr>
</tbody>
</table>

**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.

**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.

**WARNING**

To prevent serious injury or death, turn off and lock out power before servicing.

**DANGER**

To prevent death or serious injury or death, turn off and lock out power before servicing.

**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.

**WARNING**

To prevent burns from high temperature flame:
- Keep door closed when operating.
- Lock out power before opening inspection door.

**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.
### Table 1  Safety Decal Details (continued)

<table>
<thead>
<tr>
<th>Decal</th>
<th>Description</th>
</tr>
</thead>
</table>
| 079338 | **WARNING**
To avoid injury from moving parts, disconnect power to the equipment before (removing, opening) this (cover, door).

**AVERTISSEMENT**
Pour éviter les blessures attribuables aux pièces mobiles débrancher l’appareil avant (de retirer, d’ouvrir) (ce couvercle, cette porte).

| 035690B | **WARNING**
MISSING GUARD HAZARD
To prevent serious injury or death, shut off power and reattach guard before operating machine.

| 079339 | **WARNING**
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.

- **DO NOT** store or use gasoline or other flammable vapours and liquids in the vicinity of this or any other appliance.
- If you suspect you smell gas, follow these steps:
  - DO NOT try to light any appliance.
  - Extinguish any open flames.
  - DO NOT touch any electrical switch.
  - Immediately call your gas supplier, call the fire department.
  - Installation and service must be performed by a qualified installer, service agency or the gas supplier.

**FOR YOUR SAFETY** - The use and storage of gasoline and other flammable vapors and liquids in open containers in the vicinity of this appliance is hazardous.

| 079337 | **WARNING**
This compartment must be closed except when servicing.

| 040220 | **DANGER**
ELECTROCUTION HAZARD
To prevent death or serious injury when operating or moving, keep equipment away from overhead power lines and devices. This equipment is not insulated. Electrocution can occur without direct contact.

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

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

2.1. General Design Criteria

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

2.1.1 Tier Information

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

2.1.2 Body Section Information

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

2.1.3 Standard Lengths

Table 2. Standard Lengths

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

2.1.4 Total Tier Levels per Length

Table 3. Total Tier Levels per Length

<table>
<thead>
<tr>
<th>Length in feet</th>
<th>Length in meters</th>
<th>Minimum Tiers</th>
<th>Maximum Tiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>4.88</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>24</td>
<td>7.32</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>32</td>
<td>9.75</td>
<td>12</td>
<td>24</td>
</tr>
</tbody>
</table>
2.1.5 Dryer Model Number

The dryer model number provides information on the dryer length and capacity.
- The two digits after "D" are the dryer length.
- Multiply the remaining digits by 10 to determine the approximate bushel capacity for corn. In this example: 40 x 10 = 400 bushels

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

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

2.1.6 Dryer Rating Label
2.2. Front of Dryer

Figure 8. Front of Dryer (from Fuel Train Side)
Figure 9. Front of Dryer (from Blower Belt Shield Side)
2.3. Rear of Dryer

Figure 10. Rear of Dryer (from Below)

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

Figure 11. Topside Filling Options

ROOF WITH GRAVITY FILL

ROOF WITH LEVEL AUGER

Figure 12. Catwalk Positions

Multi-Blower Dryer

Rear of Dryer
Front of Dryer
(blower side)

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

Single-Blower Dryer
(left extended discharge)
2.5. Main Control Panel

Figure 13. Main Control Panel

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

**NOTE**
When replacing the original wire type supplied with the dryer, it shall be replaced with the original size and temperature rating and/or equivalent type.

- FRONT PANEL
- ELECTRICAL SCHEMATICS
- EMERGENCY STOP BUTTON (E-STOP)
- POWER ON LAMP
- 2" HOLE FOR MAIN POWER ENTRY
- BLOWER MOTOR STARTERS
- INSIDE VIEW
2.6. PLC Details

Figure 14. PLC Details

- 24V ISOLATION RELAYS
- PLC ASSEMBLY M221
- SEE DETAILS BELOW
- E-STOP RELAY
- 24V POWER SUPPLY
- TRANSFORMER 1.5 KVA
- DC DRIVE
- 24 VDC INPUTS FROM STARTER OVERLOADS AND RUN CONFIRMATION RELAYS
- M221 ANALOG I/O 0-10 VDC FOR MOISTURE SENSORS & DC DRIVE
- M221 BATTERY (Behind Wires)
- M221 DIGITAL I/O EXPANSION
- 120V OUTPUTS TO MOTOR STARTER COILS
- MODBUS COMM FROM BURNER BOX(S)
- SD CARD ENTRY
- ETHERNET PORT
- 24V DC OUT DC IN
- M221 MAIN BASE

2. FEATURES

CONTINUOUS-FLOW GRAIN DRYER – COMMANDER CONTROL
2.7. HMI Enclosure

2.7.1 Location

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

If it is necessary to place the unit outside, subject to temperature and weather extremes, it must be installed inside another enclosure. Contact your dealer or electrician for assistance.

Note
Do not locate the HMI screen in direct sunlight.

Figure 15.  Example HMI Location
2.7.2 HMI Screen

Figure 16. HMI Screen

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

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

Figure 17. Rear View of HMI Screen
2.7.3 Interior

Figure 18. Inside View
3. Transport

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.

3.1. Transport Safety

- Check with local authorities regarding transport on public roads. Obey all applicable laws and regulations.
- Always travel at a safe speed, never exceeding 20 mph (32 km/h). Reduce speed on rough surfaces. Use caution when turning corners or meeting traffic.
- Yield to other drivers and allow faster traffic to pass.
- Make sure the SMV (slow moving vehicle) emblem and all the lights and reflectors that are required by local authorities are in place, are clean, and can be seen by all over-taking and oncoming traffic. Always use hazard-warning flashers on tractor/towing vehicle when transporting unless prohibited by law.
- Do not transport during times of limited visibility such as fog, snow, or heavy rain. Take extra precautions at night and at dusk.
- Keep others away from the transport vehicle and grain dryer.
- Do not allow riders on the grain dryer or towing vehicle during transport.
- Stay away from overhead obstructions and power lines when operating and transporting. Electrocuption can occur without direct contact.
- Attach to a proper towing vehicle with a pin and retainer. Always attach safety chain(s).
- Empty grain dryer of all grain or seed before transporting. Transporting a full grain dryer will place excessive loads on the tube, frame, axle, hitch, and tow vehicle.
- Do not transport on slopes greater than 20°.
- Do not transport with an under-inflated tire(s).
3.2. Transport Preparation

1. The following dryer models can be towed:

   Table 4. Towable Dryer Specifications

<table>
<thead>
<tr>
<th>DRYER MODEL</th>
<th>Towed With Roof</th>
<th>TOW HEIGHT</th>
<th>TONGUE WEIGHT (lbs)</th>
<th>TOWED WEIGHT (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1670</td>
<td>NO</td>
<td>10' 4&quot;</td>
<td>1,000</td>
<td>10,580</td>
</tr>
<tr>
<td>D1680</td>
<td>NO</td>
<td>12' 4&quot;</td>
<td>1,000</td>
<td>13,130</td>
</tr>
<tr>
<td>D24108</td>
<td>NO</td>
<td>14' 4&quot;</td>
<td>2,500</td>
<td>20,800</td>
</tr>
</tbody>
</table>

   Note
   • NECO places Warning Label #040220 on both sides of the dryer concerning the Danger of Power Lines.
   • Overall width to outside of tires is 10' 2".
   • The roof base section is 37" tall.
   • Level auger system or gravity fill system are assembled on site.

   Figure 19. Towable Dryer

2. Requirements for towing vary from state to state. Contact the DOT for each state the trip includes for specific requirements. NECO does not provide, but suggests using the following:
   a. Use an OVER SIZE LOAD banner at rear.
   b. Use four red flags: two at the front and two at the rear.
   c. Use tail lights at the rear of dryer.
   d. Axles do NOT have brakes. Ensure the tow vehicle size and brakes are adequate.
e. Use a safety chain setup.

f. Tires are standard 15" x 8". Wheel have six hole rims with 31 x 10.5 R15 LT tires. NECO does not supply a spare tire.

Figure 20. Preparation for Towing
4. Assembly

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. Assembly Safety

- All installation and servicing operations are to be carried out by qualified technicians.
- Do not take chances with safety. The components can be large, heavy, and hard to handle. Always use the proper tools, rated lifting equipment, and lifting points for the job.
- Carry out assembly in a large open area with a level surface.
- Always have two or more people assembling the grain dryer.
- Make sure you have sufficient lighting for the work area.
- Tighten all fasteners according to their specifications. Do not replace or substitute bolts, nuts, or other hardware that is of lesser quality than the hardware supplied by the manufacturer.
- Stay away from overhead power lines and other obstructions during assembly. Contact with power lines can cause electrocution.
- Do not work in high winds.

4.2. Check Shipment

Unload the grain dryer parts at the assembly site and compare the packing slip to the shipment. Ensure that all items have arrived and that none are damaged. Take pictures of shipments prior to or just after unloading if there are any damaged parts.

Report missing or damaged parts immediately to ensure that proper credit is received from NECO or your representative, and to ensure that any missing parts can be shipped quickly to avoid holding up the assembly process.

Important
Do not assemble or install damaged components.

4.3. Product Storage

NECO Grain Dryer parts should be stored in a clean, dry location to prevent rust and corrosion of steel components.

For outdoor storage, protection should be provided.

Rust on Galvanized Parts

1. White rust forms when moisture is allowed to collect on galvanized surfaces that have yet to develop the durable zinc oxide layer. This zinc oxide layer naturally occurs as the surface interacts with carbon dioxide, and is characterized over time by the dull grey appearance that weathered galvanized surfaces get.

2. Parts that are not well ventilated or well drained can collect water between surfaces and develop white rust.
3. White rust is not a structural concern if its development is stopped in the early stages. A light film or powdery residue can occur after a period of heavy rainfall or a short time of improper storage. If white rust has started to develop, separate parts and wipe off any moisture. Next, using a clean cloth, apply a thin layer of petroleum jelly or food-grade oil to the entire part. Due to safety concerns with installation and use, NECO does not recommend the use of oil on other parts such as roof sheets, rungs, treads, and platforms.

4. If moisture is left on parts, this white rust can become more aggressive and turn into red rust. Red rust can cause degradation in the material and become a structural concern. Any parts that have red rust should be replaced immediately.

**Storage Guidelines**

- Keep all bundles dry before assembly of the grain dryer.
- Start assembly as soon as possible.
- Do not lay bundles on the bare ground. Raise all bundles 6" to 8" off the ground on wood blocks or timbers.
- All other bundles material should be placed so that they are well sloped to promote good drainage.
- Temporary storage can be provided by erecting a simple framework supporting a waterproof tarp.
- All hardware boxes should be stored inside. These are not waterproof, and will deteriorate in normal weather conditions, allowing moisture to contact the parts inside.

**If Parts Become Wet**

1. If parts become submerged or wet, the bundles should be opened as soon as possible, sheets or material separated and dried. Keep separated until assembly.
   
   Brace parts properly so as to avoid damage or injury from material falling when in storage.

2. Any boxed parts that become wet should be dried and stored in a new box that is free of moisture.

3. In addition to wiping down the grain dryer parts, a food-grade oil can also be applied with a clean, lint-free cloth. This will assist in preventing any further moisture from contacting the galvanizing on the steel. Due to safety concerns with installation and use, NECO does not recommend the use of oil on other parts such as roof sheets, rungs, treads, and platforms.

**4.4. Site Preparation**

**Important**

- NECO recommends always hiring an expert for proper advice, accurate paperwork and safe procedures to complete this task in conformance with local codes.

- The actual foundation specifications and concrete pad specifications must be determine from local data. Anchors that are sufficient for local wind loading must be installed. Consult a civil engineer.

- For data and specifications related to wind loads, dryer weight, and foundations/weight load points, refer to **Section 6. – Appendix on page 111**.
4.4.1 Concrete Work - Overview

**Important**
The weight of grain in a full NECO dryer will range from 16 tons to more than 200 tons.

- Support the frame of the dryer with properly designed and sized footings.
- NECO recommends having a concrete pad under the dryer to allow for easy clean-up.
- The dryer must be anchored and secured against wind loading. Consult a civil engineer who has experience with soil AND wind conditions in your area.
- Work with your millwright or installer, and consult NECO if additional information is needed.

4.4.2 Set Up Fuel Supply

⚠️ **WARNING** Hire a professional to plan, setup, and connect the chosen fuel supply: liquid propane or natural gas. Either type MUST include an emergency shut-off valve.

For Dryer Installations in Canada
The equipment shall be installed in accordance with the Natural Gas and Propane Installation Code, CSA B149.1 and the Propane Storage and Handling Code, CSA B149.2, or applicable provincial regulations, which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.

**Propane (LP) Fuel Source**
Contact your gas supplier regarding the location of fuel tanks and the safe storage, transport and handling of fuel. The LP storage tank must be located at least 25 ft (8 meters) from any structures. Local codes may require more distance.

When propane is the fuel source the tank, use a **vapor tap** and a **liquid tap**. Equip the liquid tap with a rapid flow shutoff valve. This valve will stop the flow of propane if a fuel line breaks.

Prevent oil sediment from entering the fuel system by propping one end of the propane tank higher than the other end, as shown in Figure 21.

**Figure 21. Propane Tank Installation**

![Propane Tank Installation Diagram](image)
Important

- Do not use a converted anhydrous ammonia tank. Fuel train components can be damaged by anhydrous ammonia. Fuel train components damaged by anhydrous ammonia are not covered under warranty.

- Oil entering the dryer fuel system will VOID the warranty on fuel train components. Install the fuel tank as shown in Figure 21.

4.4.2.1 Sizing the LP Supply Line

Note

Size the line for maximum capacity of your dryer system, while taking into consideration any future plans to upgrade.

- The supply regulator set should be located near the dryer to reduce the supply line length.

- Refer to the Standard Model Specifications table in Section 5. – Specifications on page 100 to obtain the MAX burner output value. Then, choose a proper (slightly greater) flow rate for current or future flow requirements. Based upon the flow requirements, which includes the 1 psi pressure drop, use the following table to choose the line material and length that best suits the system requirements.

Table 5. Flow Rate: MM BTU/Hr (kWH) - Schedule 80 Pipe with 1 psi Pressure Drop

<table>
<thead>
<tr>
<th>Piping Length ft (m)</th>
<th>1/2&quot; NPT</th>
<th>3/4&quot; NPT</th>
<th>1&quot; NPT</th>
<th>1-1/4&quot; NPT</th>
<th>1-1/2&quot; NPT</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 (3.05)</td>
<td>27.45 (8045)</td>
<td>62.04 (18182)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 (4.57)</td>
<td>22.51 (6597)</td>
<td>50.51 (14803)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 (6.10)</td>
<td>19.22 (5631)</td>
<td>43.92 (12872)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 (9.14)</td>
<td>15.92 (4666)</td>
<td>35.69 (10458)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40 (12.19)</td>
<td>13.73 (4022)</td>
<td>30.74 (9010)</td>
<td>60.39 (17699)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 (15.24)</td>
<td>12.08 (3540)</td>
<td>27.45 (8045)</td>
<td>53.80 (15768)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60 (18.29)</td>
<td>10.98 (3218)</td>
<td>24.71 (7240)</td>
<td>48.86 (14320)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70 (21.34)</td>
<td>9.88 (2896)</td>
<td>23.06 (6758)</td>
<td>45.02 (13194)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>80 (24.38)</td>
<td>9.33 (2735)</td>
<td>21.46 (6275)</td>
<td>42.27 (12389)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90 (27.43)</td>
<td>8.78 (2574)</td>
<td>20.31 (5953)</td>
<td>39.35 (11585)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 (30.48)</td>
<td>8.24 (2413)</td>
<td>19.22 (5631)</td>
<td>37.33 (10941)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>150 (45.72)</td>
<td>6.59 (1931)</td>
<td>15.37 (4505)</td>
<td>30.20 (8849)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 (60.96)</td>
<td>6.04 (1770)</td>
<td>13.18 (3862)</td>
<td>26.35 (7723)</td>
<td>56.55 (16573)</td>
<td></td>
</tr>
<tr>
<td>300 (91.44)</td>
<td>10.43 (3057)</td>
<td>20.86 (6114)</td>
<td>45.57 (13355)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>400 (121.92)</td>
<td>9.33 (2735)</td>
<td>18.12 (6114)</td>
<td>38.98 (11424)</td>
<td>59.84 (17538)</td>
<td></td>
</tr>
</tbody>
</table>
Natural Gas (NG) Fuel Source

- Refer to the Standard Model Specifications table in Section 5. – Specifications on page 100 for maximum heat capacity output. Ensure that the pressure supplied to the fuel train inlet is 15 to 20 psi.
- The natural gas inlet line fitting for all NECO Dryers is 2”.
- The supply regulator set should be located near the dryer to reduce the supply line length.
- Contact your local natural gas supplier for line sizing.

Fuel Train Inspection

Important
The following inspections should be done at initial installation, as well as annually, to ensure safety:

- The dryer fuel train shall be inspected for leaks to verify the gas tightness of the dryer components and piping under normal operating conditions. After installation and annually, use a solution of soap and water to check fittings and pipe for leaks.
- The gas tightness of the solenoids can be checked by adding test gauges to the test ports of the main solenoid valves. While the dryer is running, turn off the manual shutoff valve before each burner, and turn off the fuel supply manual shutoff at the inlet fuel supply to the dryer. Monitor the pressure of upstream and downstream pressure gauges. If the pressure of any of the gauges drops to zero, there could be a leak in the system. Use a solution of soap and water to find the source of the leak.

4.4.3 Set Up Electrical Supply

**WARNING**
- NECO recommends hiring an expert for proper advice, accurate paperwork, and safe procedures to complete electrical work in conformance with local codes.
- For dryer installations in Canada — Electrical disconnect shall be installed and all wiring must be done in accordance with the Canadian Electrical Code, Part 1, CSA C22.1.

- The Dryer Rating Label on the control panel lists the full-load amps required for the dryer and the input voltage.
- The customer is responsible for providing materials and labor to connect the control to the power source, including a properly sized and placed fused disconnect box.
- The electrical power supply will have to meet service amp requirements.
- Copper wire of the appropriate size, based on the required amps and distance, must be run between the main disconnect switch and the distribution block located in the dryer control panel.
4.5. Pre-Assembly of Dryer Sections

4.5.1 Identify Groups of Parts

Note
All dryers require some assembly. The following information is included to help organize that overall task:

- The level of assembly required depends on many factors concerning the dryer model and optional equipment.
- Gather, identify, and separate all parts and hardware. (See Section 4.5.2 – Assembly Hardware Key on page 36.)
- Study this manual and look closely at the equipment overview section to become familiar with the various parts.
- For smooth assembly, the parts should organized into groups.

Note
Unless otherwise specified, standard assembly hardware should be zinc-plated and Grade 5. Tighten all connections firmly.

4.5.2 Assembly Hardware Key

Table 6. Assembly Hardware Key

<table>
<thead>
<tr>
<th>Key</th>
<th>Item Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HB</td>
<td>HEX BOLT</td>
</tr>
<tr>
<td>CB</td>
<td>CARRIAGE BOLT</td>
</tr>
<tr>
<td>FW</td>
<td>FLAT WASHER</td>
</tr>
<tr>
<td>LW</td>
<td>LOCK WASHER</td>
</tr>
<tr>
<td>HN</td>
<td>HEX NUT</td>
</tr>
<tr>
<td>WL</td>
<td>FLANGED WHIZ-LOCK NUT</td>
</tr>
<tr>
<td>WN</td>
<td>WING NUT</td>
</tr>
</tbody>
</table>
4.5.3 Roof Systems

Figure 22. Roof Systems

**ATTENTION**

Level auger system grain intake should be between 1' and 2' from the end of auger.

The level auger motor rotation will need to be properly configured by the installation electrician for proper filling - dependant upon the grain intake position.
Roof with Level Auger

Note
To plan proper position of the motor end, grain intake position, sensor end, auger direction, etc. refer to Section 4.7.2 – Final Electrical Hookup on page 79.

Figure 23. Level Auger Assembly Details

Table 7. Level Auger for Various Dryer Sizes

<table>
<thead>
<tr>
<th></th>
<th>Dryer Size</th>
<th>Auger Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>8&quot;</td>
</tr>
<tr>
<td>Idler Shaft</td>
<td>16'</td>
<td>040420</td>
</tr>
<tr>
<td></td>
<td>24'</td>
<td>040420</td>
</tr>
<tr>
<td>Drive Shaft</td>
<td>16'</td>
<td>040419</td>
</tr>
<tr>
<td></td>
<td>24'</td>
<td>040419</td>
</tr>
<tr>
<td>Level Auger</td>
<td>16'</td>
<td>7715174</td>
</tr>
<tr>
<td></td>
<td>24'</td>
<td>7714719</td>
</tr>
<tr>
<td>End Plates</td>
<td>16'</td>
<td>7714720</td>
</tr>
<tr>
<td></td>
<td>24'</td>
<td>7714720</td>
</tr>
<tr>
<td>Side Skirt</td>
<td>16'</td>
<td>7714201</td>
</tr>
<tr>
<td></td>
<td>24'</td>
<td>7714716</td>
</tr>
<tr>
<td>Hanger Bearing Support/</td>
<td>16'</td>
<td>040417</td>
</tr>
<tr>
<td>Splice</td>
<td>24'</td>
<td>040417</td>
</tr>
<tr>
<td>Idler Shaft Shield</td>
<td>16'</td>
<td>044344</td>
</tr>
<tr>
<td></td>
<td>24'</td>
<td>044344</td>
</tr>
<tr>
<td>Hanger Bearing Holder Half</td>
<td>16'</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Table 7  Level Auger for Various Dryer Sizes (continued)

<table>
<thead>
<tr>
<th></th>
<th>24'</th>
<th>16'</th>
<th>24'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level Auger Cover</td>
<td>023200</td>
<td>7714718</td>
<td>N/A</td>
</tr>
<tr>
<td>Level Auger Cover Plate</td>
<td>7714717 7714718</td>
<td>7715093 7715094 7715096</td>
<td></td>
</tr>
</tbody>
</table>

1. Using 1/2" hardware, bolt the connecting shaft(s), drive shaft, and idler shaft to the level augers and extension auger(s) as needed.

2. Position the end plates at both ends of the auger assembly, and then place the 044756 insert bearings and 035116 flangettes on both ends.

3. Using 3/8" hardware, pre-assemble the bearings and flangettes to the end plates at both ends, but DO NOT tighten locking collars on the bearings until later in the process.

Figure 24. Auger Shaft Connections

Note

Ensure the drive end of the shaft (with the keyway) is on the same end as the motor.
Figure 25. Pre-assemble Insert Bearing and End Plates to Auger

4. Using 1/4\" x 3/4 HB (HB), flat washers (FW), and flanged whiz-lock nuts (WL), bolt the end plates with auger assembly to the roof.

5. Using 1/4 x 3/4 HB, FW, and WL, bolt the required side skits to the roof.

6. Using 3/8 x 1 HB, FW, LW, and HN, bolt the hanger bearing supports to the side skirts.

   **Note**

   12" side skirts have an extra splice placed under the bearing support to seal the gap from grain flow, etc. Splice plate attaches to the OUTSIDE of skirts using 1/2\" x 1\" bolts with Whiz-lock nuts.

7. Using 1/2\" hardware, bolt the hanger bearing holder halves to the hanger bearing bracket.

8. Determine correct wood bearing size and place it in the hanger bearing holder halves.
Figure 26. Assemble Side Skirts, Idler Shaft Shield and Hanger Bearing Support Splice

Differences in Side Skirts

Figure 27. Hanger Plate / Wood Bearing Details

Figure 28. Details of Extra Splice Plate (for 12" auger size only)

9. Center the augers onto the wood bearings.
10. Tighten down the locking collars on the insert bearing at both ends.
11. Using 1/2" x 1" HB, FW, and WL, bolt the required idler shaft shield to the auger support channel opposite the motor end. (See the preceding tables.)
12. Using four 3/4" x 5" threaded rod and hardware, assemble the level auger cover plate and motor mount base to the side skirts.

13. Using 1/4" hardware, assemble the pitched level auger covers to the side skirts.

14. Using 5/16" x 1" HB, FW, LW and HN, bolt the motor onto the motor mount pivot plate.

15. Using 5/16" x 2-1/2" carriage bolts (CB) and wing nuts (WN), attach the motor mount pivot plate to the motor mount base.

16. Using a 1/4" x 1/4" x 2" key, attach the driver pulley to the motor shaft.

17. Using 3/8" hardware, bolt the belt shield mounting plate to the level auger belt shield bracket.

18. Using 1/2" hardware, attach the level auger belt shield bracket to the end plate.
19. Using 5/16" hardware, bolt the belt shield back plate to the belt shield mounting plate.
20. Assemble the pulleys and keys onto the shafts and tighten the set screws on the pulleys.
21. Pivot the motor mount to install the belt.
22. Adjust the 3/4" rods as needed for a proper belt fit.
23. Attach the belt shield with 5/16" WN.

**Figure 31. Belt Shield Assembly**

24. Check the completed assembly and make sure all bolts are tight and that the belt shield and auger shields are secure.

**Roof with Gravity Fill**

**Note**
- In all instances, use 1/4" x 3/4" HB, FW, and WL.
- Middle panel assemblies already have the inner splice plates assembled.

**For 16' dryers:**
1. The top section is already pre-assembled.
2. For 16' dryers, this section is all that is used; add the assembly to the upper-most tier / roof base section.

**For 24' dryers:**
1. Bolt one middle panel assembly and two corner assemblies together and add the top-most pre-assembled 16' section. Add the assembly to the upper-most tier / roof base section.
2. Add the top-most pre-assembled 16' section.
3. Add the assembly to the upper-most tier / roof base section.
For 32' dryers:
1. Bolt two middle panel assemblies and two corner assemblies together.
2. Atop that, add an assembled 24' dryer assembly.
3. Finish with the top-most pre-assembled 16' section.
4. Add the assembly to the upper-most tier / roof base section.

Figure 32. Roof with Gravity Fill — 16', 24' or 32'

4.5.4 Catwalk and Safety Cage Assembly

Note
Catwalk systems are only used on models with closed roofs. If the system is NOT either a Roof with Gravity Fill system, or a Roof with Level Auger system, skip this section.

WARNING Do all catwalk and safety cage assembly at ground level.

- The main catwalk parts required per dryer length are outlined in the following table.
- For ease of assembly, note how the various dryer lengths have sections of catwalk making up the required length along the topside of the dryer.
Table 8. Catwalk Parts (Quantity per Dryer Length)

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>PART DESCRIPTION</th>
<th>16’ DRYER</th>
<th>24’ DRYER</th>
<th>32’ DRYER</th>
</tr>
</thead>
<tbody>
<tr>
<td>7612502</td>
<td>INNER (SHORT) UPRIGHT</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>7612507</td>
<td>OUTER (TALL) UPRIGHT</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>7712538</td>
<td>TOEBOARD - FRONT RIGHT 106”</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>7712536</td>
<td>TOEBOARD - FRONT LEFT 106”</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>7712355</td>
<td>TOEBOARD - MIDDLE 96”</td>
<td>N/A</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>7612973</td>
<td>TOEBOARD - END WITH HINGES</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>7712566</td>
<td>FLOOR PANEL - 103”</td>
<td>N/A</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>7712378</td>
<td>FLOOR PANEL - 96”</td>
<td>N/A</td>
<td>N/A</td>
<td>1</td>
</tr>
<tr>
<td>7612986</td>
<td>FLOOR PANEL - 87.96”</td>
<td>1</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>7612974</td>
<td>FLOOR PANEL - 80.72”</td>
<td>N/A</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>7712569</td>
<td>FLOOR SPlice / SUPPORTS</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7712573</td>
<td>FLOOR SUPPORTS</td>
<td>3</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>7612976</td>
<td>ACCESS CROSS BRACE</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>0018010</td>
<td>HINGE - 3” X 3”</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>7612975</td>
<td>PLATFORM ACCESS DOOR</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>F118072</td>
<td>HANDLE</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>7712895</td>
<td>LADDER SUPPORT BEAM</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>7712893</td>
<td>LADDER SUPPORT UPRIGHTS</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>7712894</td>
<td>LADDER SUPPORT BRACE</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>7712568</td>
<td>HANDRAIL LOWER FRONT 106”</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>7712567</td>
<td>HANDRAIL UPPER FRONT 106”</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>7712533</td>
<td>HANDRAIL LOWER MIDDLE 96”</td>
<td>N/A</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>7712394</td>
<td>HANDRAIL UPPER MIDDLE 96”</td>
<td>N/A</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>7712576</td>
<td>HANDRAIL CROSS BRACE</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>080085</td>
<td>LADDER EXTENSION RAIL WALKTHRU</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>7712583</td>
<td>HANDRAIL DIAG BRACE - END</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>7612510</td>
<td>HANDRAIL SPLICE</td>
<td>N/A</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>7712584</td>
<td>HANDRAIL DIAG BRACE - SIDE MID</td>
<td>N/A</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>080083</td>
<td>LADDER CONNECTION PLATES</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>7712587</td>
<td>HANDRAIL DIAG BRACE - SIDE FRONT</td>
<td>N/A</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Note
Upright supports are factory mounted to the roof side panel.

1. Using 1/4” hardware, assemble 7612502 inner catwalk uprights to the upper supports.
2. Using 1/4” hardware, assemble 7612507 outer catwalk uprights to the lower supports.
Figure 33. **Assemble Uprights to Upright Supports**

[Diagram showing uprights and supports with annotations for 1/4" x 3/4" bolt, 1/4" flat washer, and 1/4" Whizlock nut.]

**Note**

Position notched ends of these toeboards TOWARD the end of dryer where ladder is.

3. Using 3/8" hardware, assemble 7712536 front left 106" toeboard and 7712538 front right 106" toeboards to the uprights.

Figure 34. **Assemble front Toeboards to Uprights**

[Diagram showing toeboards and uprights with annotations for 3/8" x 1" bolt, 3/8" nut, and 3/8" lock washer.]

4. Use 3/8" hardware to complete toeboard installation.
5. For 16' dryers without a catwalk extension, install the 7612973 end toeboard.
6. For all other dryers, complete assembly of the remaining side toeboards as shown, then install the 7612973 end toeboard.

**Figure 35. Toeboard and Floorboard Layout**

**NOTE**
For flooring and floor supports, use 1/4 x 3/4 HB & WL.

- **16' DRYERS**
  - Uses handrails 7712567 & 7712568
  - Notched ends

- **24' DRYERS**
  - Uses handrails 7712567 & 7712568
  - Notched ends

- **32' DRYERS**
  - Uses handrails 7712567 & 7712568
  - Notched ends

**Figure 36. Extension Toeboards and Floorboards**

- Using 1/4" hardware, assemble any remaining floor panels required.
- Assemble 7712569 splice supports at edge where hinged door shuts & each floor panel joint.
- Assemble 7712573 supports - one at the ladder end of front floor panel & two at mid span.
Figure 37. Assemble Floor Supports and Splice Supports

10. Bolt the 7612976 catwalk access cross brace between the center of the 7712569 floor splice support and either the 7612973 end toeboard for non-extended catwalks or the 7712593 floor support for extended catwalks.

11. Bolt the F118072 handle and 035369 hinges to the 7612975 platform access door.

12. Bolt the 7612976 catwalk access cross brace between the center of the 7712569 floor splice support and either the 7612973 end toeboard for non-extended catwalks or the 7712593 floor support for extended catwalks.

Figure 38. Assemble Floor Panel Access Door System

13. Use 1/4" x 3/4 HB, FW, and WL hardware.

14. Bolt the 7712895 ladder support beam to the toeboards and the front floor section.
15. Bolt the 7712893 ladder support uprights to the support beam. Be sure to use the TOP holes.
16. Bolt the 7712894 support braces to the support uprights. Use the holes below the support beam.
17. Located directly beneath the ladder support legs, remove the two bolts from the lip of the top tier / roof edge.
18. Position the support legs so that the base hole lines up with where the two bolts were removed and re-install the two bolts to secure the bases of the support uprights.

**Figure 39. Assemble the Ladder Support System**

19. Use 3/8” x 1” HB, FW, & WL hardware.
20. For extended catwalks, repeat Step 14 – Step 19 on the opposite end of the catwalk.
21. Bolt the upper handrails to the inner & outer upright supports.
22. Bolt the lower handrails to the inner & outer upright supports.
23. Bolt the 080085 ladder extension uprights to the toeboards and handrails. For extended catwalks, repeat on the opposite end.
Figure 40. Assemble Handrails and Ladder Extensions

24. Using 3/8" hardware, bolt the 7712576 handrail cross braces and the 7712583 diagonal end braces to the end inner & outer uprights.

25. Using 1/4" hardware, bolt the 7612510 handrail splice on the underside of top railings - where any two top handrails butt up.

26. FOR GRAVITY FILL ROOF STYLES ONLY - Using 1/4" x 3/4 HB & WL, install 7712896 lateral braces between the inner top handrail and re-use existing bolts in the gravity fill overlapped lips.

Figure 41. Assemble End Rails
Note
The diagonal side braces go ONLY on the 96" long sections. On 24' dryers, they are at the end 96" section opposite the ladder end. On 32' dryers they are at the middle 96" section. Diagonal side braces (7712587) go on the 103" long beginning sections on all dryers and on catwalk extension sections.

27. Using 3/8" hardware, bolt the 7712584 diagonal side braces to the inner & outer uprights.

Figure 42. Assemble Diagonal Side Braces (24' dryer shown)

28. Using 3/8" hardware, bolt the 080085 ladder extensions to the bottom of the 080083 ladder connection plates. For extended catwalks, repeat at the opposite end if a second ladder is to be installed on the dryer, opposite the standard ladder.

29. These connection plates will attach to the top of the ladder system which is installed using 088028 ladder clips with 3/8" hardware after the topside is installed.

Figure 43. Assemble Ladder Extension Connection Plates

30. Once the catwalk is complete, install the upper ladder. Note that the vertical position may need to be adjusted somewhat when the roof assembly is stacked.
31. The top end of the ladder connects to the 080083 ladder connection plates at the end of the catwalk. Note that the ladder connection plates mount outside the ladder rails.

**Figure 44. Finish Ladder Connection**

32. Secure the ladder to the tiers of the roof section using one (4' ladders) or two (6' and 8' ladders) 080022 ladder brackets. When a ladder bracket is installed at the bottom of the roof assembly, a 080024 spacer must be used under the 080022 bracket. This spacer is not needed when installing the brackets in other locations. Once all required brackets are in place, secure the ladder to the brackets with the 088028 ladder clips.

**Figure 45. Bolt on Ladder**
4.5.5 Safety Cage Assembly

Dryers with Roofs and Catwalk System

Assemble safety cage as shown in Figure 46. Use 7714611 box of hardware.

Figure 46. 7714610 Cage for Roofs with Catwalk
4.6. Install Dryer

**WARNING** Check and verify all anchor attachment systems are tight and correctly installed according to the anchor manufacturer's specifications before adding any upper dryer sections or installing leg kit (when supplied).

4.6.1 Position Lower Dryer Section at Location

1. Position the lower dryer section at the final location.
2. Be sure to support the lower section using a crane or setting it on temporary blocks, etc.

**Figure 47. Positioning the Lower Dryer Section**

4.6.2 Install NECO Leg Kit

**WARNING** Be sure to support the dryer's lower section assembly by hanging from a crane or sitting on blocks prior to installing ANY support legs.

**Leg Styles and Location**
- “A” Side legs are located around the outside & inside perimeter of the dryer.
- “B” Center leg is located under the dryer at the front (blower) end.
- “C” Column legs (if needed) are located to provide column support for the platforms.
Figure 48. Support Legs

- "A" LEGS OUTER & INNER
- "B" LEG(S) CENTER
- "C" LEGS COLUMN

**Important**
Be sure to torque all legs properly as they are being installed. Then, double-check torque values upon completion.

Figure 49. Using Shims

**Outer Legs and Inner Legs**
1. Use 5/8" x 1-½" hardware.
2. While the dryer lower section is hanging from a crane or setting on blocks, bolt the “A” outer side legs only around the outside perimeter of the dryer frame.
3. Once the “A” side legs are mounted around the outside, mount the inner “A” side legs to the inside frame positions.
Table 9. Side Legs (outer and inner)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Elevation</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>inches</td>
<td>mm</td>
</tr>
<tr>
<td>045354</td>
<td>48</td>
<td>1220</td>
</tr>
<tr>
<td>7714575</td>
<td>60</td>
<td>1524</td>
</tr>
</tbody>
</table>

Note
Use 5/8" x 1-1/2" bolts, flat washer and flange nut.
Center Leg(s)

Note
Use 1/2" x 1-1/2" bolts, flat and lock washers and flange nut.

Dryers use the “B” double leg style for the front inner legs and the “A” style legs for the remainder of the inner legs. Use ½" x 1-1/2" hardware.

Figure 52. Center Support — Double

Table 10. Center Support — Double Leg

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Elevation</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>inches</td>
<td>inches</td>
</tr>
<tr>
<td></td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td>045555</td>
<td>48</td>
<td>1220</td>
</tr>
<tr>
<td></td>
<td>65–3/8</td>
<td>1661</td>
</tr>
<tr>
<td>7714576</td>
<td>60</td>
<td>1524</td>
</tr>
<tr>
<td></td>
<td>77–3/8</td>
<td>1965</td>
</tr>
</tbody>
</table>
Column (Platform) Support Legs

Note
Dryers with only one section (one blower) do not use column support legs. Dryers with more than one sections use “C” column support legs. For dryers without a bottom front platform, bolt the required column support leg to the I-beam on top of the dryer tongue. Use ½" x 1-1/2" hardware. For dryers with the bottom front platform, bolt the required column support legs with 1/2" x 5-1/2" hardware to the 044304 support tabs fastened to the cross support tube underneath the platform.

Figure 53. Column (Platform) Support Legs
Table 11. Column Support Legs

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Where Used</th>
<th>Elevation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>inches</td>
</tr>
<tr>
<td>7712905</td>
<td>For dryers without bottom front platform</td>
<td>48</td>
</tr>
<tr>
<td>7712918</td>
<td></td>
<td>60</td>
</tr>
<tr>
<td>7715832</td>
<td>For dryers with bottom front platform</td>
<td>48</td>
</tr>
<tr>
<td>7715833</td>
<td></td>
<td>60</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>inches</td>
</tr>
<tr>
<td>65-3/8</td>
</tr>
<tr>
<td>77-3/8</td>
</tr>
<tr>
<td>68-1/4</td>
</tr>
<tr>
<td>80-1/4</td>
</tr>
</tbody>
</table>

Note
Use 1/2" x 1-1/2" bolts, flat and lock washers and flange nut.

4.6.3 Anchor Lower Section to Pad/Foundation

1. Install anchors in the dryer leg as specified in the anchor manufacturer’s recommendations.
2. Regardless of the method used, double-check and verify proper assembly. Make sure anchors are installed properly and are secure.
Important
Check verify that all anchors are tight and correctly installed according to the anchor manufacturer’s specifications.

4.6.4 Anchor Bottom Platform

If the dryer includes the optional bottom front platform, the installation of the ladder and control panel support legs must be done in the field.

1. An 8’ ladder assembly is shipped with the bottom platform, with 080083 ladder connection plates and 040069 anchor brackets on the bottom. Loosen the 040069 anchor brackets and slide them out of the way. Cut the ladder to the required length, and then secure the 040069 brackets back in place at the bottom of the ladder.

2. Connect the 080083 plates to the platform rails using the provided hardware.

Figure 55. Bottom Platform Ladder

![Bottom Platform Ladder](image)

3. Anchor the 040069 brackets to the concrete pad to secure the bottom of the ladder. Follow the anchor manufacturer’s recommendations for installation.

Figure 56. Bottom Platform Ladder Anchor

![Bottom Platform Ladder Anchor](image)

Important
At the same time, the control panel should be lowered to a comfortable working height and the panel support legs should be lowered to the ground. Support the control panel with a forklift and then loosen the hardware supporting the vertical rails on the back of the panel as well as the 7715846 support legs. Once the panel is at the appropriate height and the legs are firmly resting on the ground, reattached all components with the removed hardware. Anchor the support legs to the ground, following the anchor manufacturer's recommendations for installation.
4.6.5 Stack and Secure Sections

**WARNING** Do NOT stack any additional sections on top of the bottom section unless it is secured to the foundation.

**Important**
The following stacking information is applicable for:

- Upper dryer sections made up of three to six tier levels.
- Top-most filling dryer section made up of one or two tier levels and the topside filling system.

**Note**
All styles of fill systems, including catwalks and/or safety cages, should be completely assembled on the ground and then lifted into position and secured.

**Overview**
1. Refer to the information contained in [Section 2. – Features on page 17](#) and [Section 6.1 – Dryer Tier / Ladder / Shipping Layouts on page 111](#) for specifics on layout and stacking order.
2. Depending on the dryer model configuration, some parts are installed at the factory whereas other parts require installation as the sections are stacked.
3. STACKING ORDER: If your dryer has multiple sections, be sure to stack the sections in the proper order. Each section has a decal indicating the section number, located just under the flanges below the burner box. Section #1 is the top section. If the decals cannot be located, the motor lead length is also an indicator of order, with the longest motor lead corresponding to the top section.
4. LP FUELED DRYERS: Be careful of the LP vaporizer coils when stacking sections; they stick up slightly and can be damaged.

5. PLATFORM SUPPORT COLUMNS: These are shipped secured to the platforms and should be mounted at the bottom to the platform support angles prior to adding the next dryer section.

Remove Lifting Lug Top Plates

1. Prior to stacking any dryer sections, remove all 7714349 lifting lug top plates from corners of the lower section already in place. If these are left in place, the next sections flange lips will NOT position correctly.

2. ALL of the factory mounted corner support gussets must stay attached.

   Note
   Lifting lugs can be left in place or removed. If removed, replace the hardware.
Install Air Plenum End Panel Spacers

1. Position 044380 plenum end panel spacer for installation where ANY two air plenum end panels meet together.

2. Position as shown in Figure 61.

3. Secure when outside flange lips are bolted together.

Figure 61. Install Spacers Between Any Two Air Plenum End Panels
Install Transition/Plenum Fill Strips

1. When the transition lip is level with the dryer sections top tier AND the next section to stack has a plenum end panel, use a 7712699 transition/plenum fill strip to secure the top of the transition to the underside lip of that next stacks plenum end panel.

2. Use 1/4" x 3/4" HB, FW, and WL to secure the strip at both edges.

Figure 62. Install Transition/Plenum Fill Strip

Install Platform Support Columns

1. SKIP to next step if the dryer does NOT have multiple platforms.

2. If the dryer does not have a bottom front platform, mount the LOWER support column directly to the beam. ALL upper sections, or bottom sections with a bottom front platform, use UPPER support columns and mount using #044510 support angles.

3. The support column angles are factory mounted and the support columns for that section are wired to the platform for shipment.

   Note
   The support columns must be in position PRIOR to the installation of the next dryer section.

Table 12. Support Column Size Requirements

<table>
<thead>
<tr>
<th>LOCATION &amp; TIER SPAN</th>
<th>COLUMN PART NUMBER</th>
<th>COLUMN LENGTH (* REFERENCE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOWER - 3 TIER</td>
<td>7712919</td>
<td>69 - 7/8&quot;</td>
</tr>
<tr>
<td>UPPER - 3 TIER</td>
<td>7715019</td>
<td>68 - 3/16&quot;</td>
</tr>
<tr>
<td>LOWER - 4 TIER</td>
<td>7712920</td>
<td>93 - 7/8&quot;</td>
</tr>
<tr>
<td>UPPER - 4 TIER</td>
<td>044516</td>
<td>92 - 3/16&quot;</td>
</tr>
<tr>
<td>LOWER - 5 TIER</td>
<td>7712921</td>
<td>117 - 7/8&quot;</td>
</tr>
<tr>
<td>UPPER - 5 TIER</td>
<td>040117</td>
<td>116 - 3/16&quot;</td>
</tr>
<tr>
<td>LOWER - 6 TIER</td>
<td>7712922</td>
<td>141 - 7/8&quot;</td>
</tr>
<tr>
<td>UPPER - 6 TIER</td>
<td>7714832</td>
<td>140 - 3/16&quot;</td>
</tr>
</tbody>
</table>
**Figure 63. Lower Column with Flange Weldment**

Lower Support Column

Use 1/2 x 1-1/2” Bolts & Hardware

Used on Lowest Section Only

**Figure 64. Upper Column with Support Angles**

Upper Column with Support Angles

Support Angle #044510

Use 1/2 x 5-1/2” Bolts & Hardware

**Raise the Next Section and Lower into Position**

1. Either MINIMIZE strap angles or use a spreader system to raise the sections.
2. Use the support columns as guides and lower the section into initial position.
3. Ensure that the lowering flange lips overlap properly all around.

**Figure 65. Raising/Lowering Sections**

A WARNING: Do not remove crane from supporting the load until all assembly/installation for that section is complete.

4. Line up flange lips and secure the four corners first to ensure position is held.
5. Make sure all bolts are present and tight.
Figure 66. Outer and Inner Overlapping Lip Connection

Secure Platform Support Columns

1. Using 1/2" x 5-1/2" bolts and hardware, secure the support columns to the 044304 support tabs fastened to the cross support tube.

Figure 67. Secure Top of Platform Support Columns

Important
Note orientation of splice plates.

Install Body Section Braces

1. Position and bolt a 7711498 body section brace under the overlapped outside and inside flange lips, centered directly under ALL tier splices.

2. Repeat, completing ALL exterior braces first.

Note
On model D24108, shipped in sections (NOT assembled and towed) a divider floor will be installed in the plenum. The divider floor provides the needed support, so the INTERIOR body section braces are not needed for that level ONLY.
Figure 68. Body Section Brace Connection

Attach Cross Braces

Note
DO NOT install cross brace on tier levels that have a divider floor or cooling floor. Skip to the next step. Both of these floor structures provide the necessary cross stability without the use of cross braces.

1. Using 1/4" hardware, attach 044074 cross braces at or near every inside splice plate location.

Figure 69. Attach Body Section Cross Braces

Optional Removal of Platform Braces / Lifting Lugs

Note
The following items can be removed AFTER the dryer section has been stacked and secured:

- The platform shipping braces can either be left in place or removed.
- The lifting lugs can either be left in place or removed.
- Be sure to replace all hardware removed if either of these are taken off.
Figure 70. Lifting Lugs and Platform Braces Removal

- Lifting Lugs**
- Platform Braces**
  **Removal is optional

- Lifting Lug Top Plates*
  *Must be removed before stacking next dryer section

Platform Braces & Lifting Lugs can be removed or left in place

Attach Ladder Sections

Refer to Section 6.1 – Dryer Tier / Ladder / Shipping Layouts on page 111 for information on necessary ladder section lengths and placement.

1. Exterior ladder location depends on model type. Single blower units have the ladder system mounted at the rear of dryer, to the RIGHT of the plenum door (unless the dryer has a left-hand extended discharge, in which case the ladder is to the LEFT of the plenum door). Dryers with multiple platforms have the ladder system mounted at the front of dryer, going up through the platform floors, on the opposite side of the transition from the fuel train.

2. Except for the upper-most ladder section that reaches to the catwalk, ladders are pre-installed on the dryer sections. As sections are stacked, adjacent ladders are connected to each other with 088029 ladder splices as shown. Ladders may need to be adjusted up or down during this process for proper alignment.

Figure 71. Bolt Ladder Sections Together with Ladder Splice

3/8" x 1" BOLT
3/8" FLAT WASHER (2X)
3/8" LOCK WASHER
3/8" NUT

3. Interior plenum ladders are installed in the rear of the dryer, on the right side of the plenum as you enter. For dryers with cooling floors, 18" ladders are installed at the factory between the bottom floor and first
cooling floor, and between the two cooling floors. For all other ladders, the necessary ladder brackets are factory-installed in the plenum, but the ladders themselves are shipped separately. Following the layout found in Section 6.1 – Dryer Tier / Ladder / Shipping Layouts on page 111, install the remaining ladders by connecting the ladders to the 080022 brackets using the 088028 ladder clips.

**Figure 72. Plenum Ladder**

![Plenum Ladder Diagram]

**Install Topside Filling Section**

**WARNING** Be sure to utilize spreader bars or similar means to properly lift the unit. The main lift component should be vertical. Do not use sharp angles on strapping.

**Important**

Assembly of the topside filling section, attached to the top-most tier section, should already have been done at ground level.

1. Ensure the topside system is completed to this level before proceeding further.
2. Make sure the 7714349 lifting lug top plates were removed for the section being stacked upon.
3. Lift the completed topside filling section as one completed unit. Use guide lines to assist in positioning.
4. Be sure the safety cage 080083 ladder attachment brackets or final ladder section line up correctly with any existing ladder sections.
5. Install the topside filling section into the final position and secure it.
4.6.6 Install NECO Logo Bracket

1. Install the NECO logo bracket assembly (1-169876) so that it can be viewed from a main road if at all possible.

2. Note that the bracket has four mounting tabs with holes that will line up with dryer tier section mounting bolts.

3. Remove the necessary four sets of tier lip hardware.

4. Position the bracket.

5. Replace the four sets of hardware to secure the logo bracket.

Figure 75. Example of a Mounted Logo Bracket Assembly
4.6.7 Install the Cross Auger or Cross Drag

Auger Unload

Dryers with a non-extended left, right, or center discharge come with the cross auger pre-assembled on the dryer. In these cases, skip to step 4. For extended discharges, the cross auger must be installed in the field.

1. Cross augers extended 2' are shipped as a single unit. Cross augers extended further than 2' are shipped as two units – an intake assembly and an extension assembly. Mount either the 2' extended cross auger or intake assembly to the spouts on the rear of the dryer using ½" x 1" bolts as shown. The center top cover may need to be removed for access.

Figure 76. Cross Auger Extension

2. For two-piece cross augers, connect the extension assembly to the intake assembly. The long top cover may need to be removed for access. Attach the extension trough to the trough splice using ¼" x ½" carriage bolts and whiznuts. Connect the extension auger to the connecting shaft on the intake assembly using ½" x 2-1/2" bolts and locknuts. The auger should be timed such that the ends of the flighting are rotated approximately 180 degrees apart.

Figure 77. Extension Trough
3. Install the chain drive connecting the rear gearbox to the cross auger. The rear chain guard is mounted on the four standoffs shown below. Mount the provided sprockets to the exposed gearbox shaft and the cross auger drive shaft. Loosely mount the idler sprocket to the rear chain guard as shown. Verify all sprockets are aligned and adjust if needed. Route the roller chain as shown, slide the idler sprocket to tension the chain, and then tighten the sprocket mounting hardware to secure in place. Install the outer cover over the chain drive using the provided 5/16” x ¾” carriage bolts and wingnuts.

4. Install the discharge chute using ¼” x ¾” carriage bolts and whiznuts.
Drag Unload

1. To remove the factory-installed cover from the chain drive, remove the four bolts from the top of the cover. Note that the bolts run through spacers between the gearbox and the cover. Take care not to lose the bolts or spacers, and retain for future use.
2. Mount the cross drag to the spouts on the rear of the dryer using 3/8" x 1" bolts and whiznuts.

Figure 82. Cross Drag

3. Remove the shield that covers the sprockets on the cross drag. Route the provided chain between the sprocket on the rear side of the gearbox and the drive sprocket on the cross drag as shown. Verify all sprockets are aligned and adjust if needed. Use the idler sprocket to tension the chain and tighten in place.

Figure 83. Chain

4. Remove the sampler assembly and seal plates to get to the 7714450 trough plate. This plate has two knockouts to accommodate different orientations of the sampler assembly. Remove the knockout in line with the sampler tube. Reinstall the removed parts.
5. Mount the discharge chute to the cross drag using 3/8" x 1" bolts and whiznuts. Mount the diaphragm switch to the side of the discharge chute using ¼" x ¾" bolts and whiznuts.
4.6.8 Install the Blower Motor VFDs (Optional)

1. Assemble the VFD stand(s) as shown. Note that there are four different sizes available. Refer to the VFD enclosure model number to determine the correct dimensions to use. Connect the horizontal struts to the “L” and “T” brackets with ½” x 1-1/2” bolts, lockwashers, and channel nuts. Connect the vertical struts to the “L” and “T” brackets with ½” x 2-1/2” bolts, flatwashers, lockwashers, and nuts. Depending on the lifting equipment available and the size of the enclosure, the VFD enclosures can be mounted to the stands on the ground or after the stands have been raised and anchored. The enclosure is mounted to the stand using 5/16” x 1” bolts, lockwashers, flatwashers, and channel nuts.

Figure 86. VFD Stand Components

<table>
<thead>
<tr>
<th>ENCLOSURE</th>
<th>X</th>
<th>H</th>
<th>W</th>
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<td>34-3/8</td>
<td>103-7/8</td>
<td>44</td>
</tr>
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</table>

2. Raise the stand into position.
   a. For dryers with a bottom front platform, it’s recommended to place the stands along the sides of the platform, as shown. Use the 7716113 and 7716114 brackets to connect the vertical struts to the platform toeboard.
b. For dryers without the bottom front platform (typically only single-section dryers when ordered with a blower VFD), it is recommended to place the VFD enclosure next to the main control panel. Use the 7716112 bracket to connect the vertical strut of the VFD stand to the vertical control panel mounting bracket.
3. Anchor the stand legs to the ground, following the anchor manufacturer's recommendations for installation. If the VFD enclosures were not previously mounted to the stands, do so at this time.
4.7. Final System Hookup

4.7.1 Adjust Control Box Height

**WARNING** Support the weight of the main control box with a forklift or other secure means when adjusting the height.

**Note**
For dryers with the optional bottom front platform, the control box height adjustment is addressed in Section 4.6.4 – Anchor Bottom Platform on page 60.

1. Loosen the fasteners that hold the control panel in place.
2. Adjust the vertical guide rails upward or downward as necessary.
3. Position the control panel at a comfortable operator height.
4. Secure it in position.

**Figure 91. Adjusting the Control Box Height**

4.7.2 Final Electrical Hookup

**Note**
NECO recommends hiring an expert for proper advice, accurate paperwork, and safe procedures to complete electrical work in conformance with local codes.

**Note**
For dryer installations in Canada: Electrical disconnect shall be installed and all wiring must be done in accordance with the Canadian Electrical Code, Part 1, CSA C22.1.

- The customer is responsible for providing wiring materials and labor to the dryer system.
- A properly sized fused disconnect box must be in place PRIOR to completing final connections to the dryer control box. All personnel should know the location and how to operate it.
Due to the various possible configurations, power to the main control panel must be installed by the electrical contractor in accordance with the amperage requirements stamped on the control box front door tag, located in the lower-left corner. (See also, Section 4.4.3 – Set Up Electrical Supply on page 35.)

For main power entry location, see Figure 91.

**Figure 92. Three-phase Connections**

![Example showing 3-phase entry wiring to terminal blocks & ground]

### 4.7.3 Blower Motor Wire(s)

**Note**

Blower #1 is always the top-most blower.

For dryers *without* blower VFDs route the blower motor harnesses from all upper sections down to the main control panel (bottom section blower motors are already connected to the panel at the factory). Holes are available on the left side of the main control panel, near the bottom.

For dryers *with* blower VFDs, route all blower motor harnesses to the corresponding VFD enclosure(s) and route the power and control harnesses from the VFD enclosure(s) to the main control panel. Holes for the harnesses must be field-drilled on the bottom or low on the side of the VFD enclosure(s).

In either case, one or more 080032 conduit hangers are included to help route and manage the upper blower motor harnesses. Clamp the hanger assembly to a convenient location on the drive-side support column, and mount the brackets on the motor harness to the hanger assembly using the provided ¼" hardware.

**Figure 93. Conduit Hanger**

![Conduit Hanger 080032]
Single Phase (1P) Wiring (Without VFD)
1. Connect wires T1 and T2 into the bottom of the respective starter(s). Note that T3 loops from the lower-middle position back up to the upper-right position to provide internal feedback within the control system.
2. Connect the green ground wire to the ground terminal in the control box.

Three Phase (3P) Wiring (Without VFD)
1. Connect wires T1, T2, and T3 into the bottom of the respective starter(s).
2. Connect the green ground wire to the ground terminal in the control box.

Figure 94. Blower Motor Wiring

Single or Three Phase Wiring (With VFD)
Connect wires in VFD enclosure(s) and main control panel as indicated in their respective schematics sent with the dryer.
4.7.4 Install the Dual Thermocouple Probe

The dual thermocouple probe is factory mounted for each dryer section. The probe measures temperature for high-limit temperature control in each dryer section.

Figure 95. Dual Thermocouple Probe

4.7.5 Install Burner Box Cables*

*Shipped in the dryer crate.

- The yellow and gray cables and tees are used to connect the burner boxes to each other and to the main electrical panel.
- Directly connect the gray cable to the top burner box. (Do not install the gray tee in the top burner box.)

Figure 96. Burner Box Connections
4.7.6 Install the Fill Switch and Low Switch

- The installation location of the fill and low switches depends upon the style of fill and configuration of the intake grain supply.

- The various installation positions come from the factory, covered with a 059166 cover plate.

- Determine the correct switch position for the equipment configuration.

- Install the switches in the locations shown in Figure 99 – Figure 101. Leave any unused locations covered.

- Connect the wiring as described in Connect Fill Switch and Low Switch on page 85.

Roof with Gravity Fill System

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

Figure 97. Gravity Fill Switch and Cover Locations

Figure 98. Hole Cover and Switch Flanges
Figure 99. Fill Dryer Switch Location – Gravity Fill System

Figure 100. Low Dryer Switch Location – Gravity Fill and Level Auger Fill Systems

Level Auger Fill System Overview

- Grain intake position must be between 1’ and 2’ from the end of the dryer level auger.
- Factory configuration, per motor cable length and catwalk access, has the level auger motor located at the front end of the dryer closest to the control box.
- The Fill dryer switch and the Low dryer switch must be located at the OPPOSITE end of the intake grain entry for correct operation.
- Standard auger motor rotation brings the intake grain FORWARD from a grain entry position located at the rear end of the dryer. Reversed auger rotation results in the opposite.
Figure 101. Level Auger Fill Switch Location

Connect Fill Switch and Low Switch

1. The upper-most dryer section burner box uses the Y-split cables, one cable end marked “Fill” and the other cable marked “Low”. This cable will be in the dryer crate.

2. Cable length supplied is sufficient to reach switch locations on all dryer sizes.

3. Route the cable above the transition and along the toe board of the catwalk using sticky tabs to the middle of the dryer.

4. Connect the cable marked “Low” to the low dryer switch.

5. Connect the cable marked “Fill” to the fill dryer switch.
**Figure 102. Gravity Fill Cable Route***

*The illustrations show cable routes for several possible switch locations.*

**Figure 103. Level Auger Cable Route***

**4.7.7 Install Moisture/Temperature Sensors**

**Moisture/Temperature Sensor Overview**

- The combination moisture/temperature sensing unit (059250W) has a moisture sensing “fin” and a temperature sensing probe directly below it. The sensor provides 0 to 10 VDC signals for both temperature and moisture, which the embedded DryerMaster converts to grain moisture and temperature readings.

- One sensor is located at the top of the dryer for reading INLET grain moisture and temperature.

- One sensor is located at the dryer grain discharge chute for reading OUTLET grain moisture and temperature.
Mount Inlet Moisture/Temperature Sensors

1. Mount the inlet moisture sensor in the housing.
2. Connect the cable marked “Inlet Moisture”.

   **Note**
   
   Roof with Gravity Fill AND Level Auger Fill systems locate the inlet sensor on the catwalk side of the roof. (See the hatch-style door at the end of the catwalk for access.)

Mount Outlet Moisture/Temperature Sensors

1. Mount the sensor in the housing.
2. Connect the cable marked “Outlet Moisture”.
3. Mount the sample button.
4. Connect with the cable marked “Sample Button”.
**Note**
The outlet sensor/sample housing may be left-hand, center, or right-hand mounted onto the rear cross auger system.

**Figure 107. Outlet Sensor and Sample Button Locations**

4.7.8 **Install the Discharge Chute Cables**

1. The gearmotor on the discharge chute comes pre-wired to a small capacitor box. Mount the box in a convenient location, ideally under the dryer or under the cross auger/drag.

2. Connect the yellow “Sensor Motor” cable from the control panel to the capacitor box.

3. Dryers with auger unloads use a proximity switch (059118) to detect a plugged discharge, and dryers with drag unloads use a diaphragm switch (059245) for this purpose. Install the appropriate switch as shown, and connect the yellow “Plug Switch” cable from the control panel.

**Figure 108. Plug Switch Auger**
4.7.9 Install Wet Bin Empty and Dry Bin Full Switches (Optional)

Note
These OPTIONAL switches are provided and installed by the customer.

1. Install the wet bin empty switch near the bottom of the wet holding bin.

Note
The switch, when activated, only shuts off the filling equipment associated with the switch. The dryer will continue to dry grain until the dryer goes into a Low Dryer alarm status.

2. Place the dry bin full switch near the top of the dry holding bin.

3. Once the switches are in position, route the wires to the main control box terminal strip.

4. Connect the switches as shown in the following diagram:

Figure 110. Wet Bin Empty and Dry Bin Full Sensor Connections
4.7.10 HMI Wiring Connections

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

**Electrical Wiring from Main Control to HMI**
1. Using the labels provided, pull and connect the following wires from the main control terminals to the HMI terminals:

**Figure 111. Terminals Inside HMI Enclosure**

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

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

**Figure 112. Ethernet Cable Connection in Main Control Panel**

**Figure 113. Ethernet Cable Connection in HMI Cabinet**
HMI Enclosure Wiring

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

**Figure 114. HMI Wiring Diagram**
4.7.11 Final Fuel Supply Hookup

**WARNING** Hire a professional to plan, set up and connect your chosen fuel supply. This includes either liquid propane or natural gas.

**WARNING** After the plumbing is connected, check all connections and pipes for leaks. Because pipe connections can loosen due to vibration during shipping, it may be necessary to reseal the pipes.

**Important**
Either type of gas supply MUST include a manual emergency shut-off valve located in an appropriate location that allows access to this valve to shut off the fuel to the dryer in case of a fire or explosion at the dryer.

**Note**
Before making any threaded connections in the field, first ensure that the threads are free of debris. To provide a good seal and to prevent thread galling, utilize both pipe tape and a liquid sealant at the joints. Ensure that both the tape and liquid sealant are compatible with stainless steel and the dryer fuel type.

**Plumbing Bleeds and Vents**
Bleeds and vents that require venting shall be vented away from all ignition sources. Follow instruction included in the vent pipe box of parts.

**Liquid Propane (LP)**
Liquid propane fuel trains are largely assembled and installed at the factory, however, there are a few exceptions described below.

**Connect Riser Pipes and Fuel Source (All Dryers)**
1. For multi-burner dryers, connect the fuel trains of each section with the provided riser pipes, as shown. ½" pipes are used for 16' and 24' dryers, and ¾" pipes are used for 32' dryers.
2. Connect the LP fuel source to the elbow on the bottom section inlet. A ½" elbow is used for 16' and 24' dryers, and a ¾" elbow is used for 32' dryers.
Figure 115. Connect LP Fuel Source

**NOTE:** MIDDLE DRYER SECTIONS WOULD HAVE A "T" UPPER CONNECTION. THE TOP-MOST DRYER SECTION WOULD HAVE AN ELBOW.
Install Vaporizer (Select Models Only)

Due to space constraints, certain dryer sections are shipped with the vaporizer uninstalled. In these cases, the vaporizer must be installed in the field after the sections have been stacked.

1. Use the provided unions to connect the vaporizer weldment to the vertical pipes protruding through the floor. Note that one union is ¾" and the other is ½", so the vaporizer must be oriented accordingly.

Figure 116.  Vaporizer

2. If the 040127 vaporizer support bracket is not already in place, it will need to be mounted to the dryer body side behind the vaporizer. Position the bracket where the mounting flanges are free from obstructions, and where you will have access to install hardware through duct openings. Also ensure that there is clearance for the 5/16" bolts that will be used to connect the 040127 bracket and the 040120 strap. Once properly positioned, drill through the mounting holes of the 040127 bracket into the body side. Secure in place with ½" x ¾" bolts and whiznuts. Sandwich the vaporizer between the 040120 strap and the 040127 bracket, and secure with 5/16" x 1-1/2" bolts and whiznuts.
Install Vent Pipe Assemblies (CSA Models Only)

1. Vent pipe assemblies are shipped partially broken down for shipping purposes. Reassemble as shown.

2. Connect the vent pipe assemblies to the fuel inlet assemblies on the dryer as shown and secure to the 041015 brackets with the provided ¼" U-bolts and whiznuts. Adjust the level of the brackets as needed to ensure that the vent pipes are level or sloped slightly in a direction that will allow water to drain.
**Natural Gas**

1. Connect between dryer sections using the riser pipe provided with the dryer section.
2. Connect the NG fuel source to the inlet elbow of the lowest dryer section.

**Figure 120. NG Connection Between Dryer Sections and Fuel Source Connection**

**NOTE:** Middle dryer sections would have a "T" upper connection. The top-most dryer section would have an elbow.
Dryer Fuel System Gas Leak Check

Important
The dryer fuel train shall be inspected for leaks to verify the gas tightness of the dryer components and piping under normal operating conditions. After installation and annually thereafter use a solution of soap and water to check fittings and pipe for leaks.
The dryer and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of ½ psi (3.5 kPa). The dryer must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures to or less than ½ psi (3.5 kPa).
The gas tightness of the solenoids can be checked by adding test gauges to the test ports of the main solenoid valves. While the dryer is running turn off the manual shutoff valve before each burner and turn off the fuel supply manual shutoff at the inlet fuel supply to the dryer. Monitor the pressure of upstream and downstream pressure gauge. If the pressure of any of the gauges drops to zero there could be a leak in the system. Use a solution of soap and water to find the source of the leak.

4.7.12 External Transport(s)

Overview
The following diagrams show typical transport setups, which are detailed with sample input data in the Commander Control Owner's and Operator's Manual.
For specific wiring information related to external transports and NEMA starters, see the Section 6. – Appendix on page 111.
NECO provides the ability to control two transport devices to FILL the dryer and two transport devices to EMPTY the dryer within the Commander control system. All motor starters, starter coils, and overload contacts required are customer-supplied.
These external transport systems can control incoming (wet) grain and outgoing (dry) grain so that the overall system works in conjunction with the dryer. (See Commander Control Owner's and Operator's Manual for specifics to enter Fill/Empty setup data.)
External Transport Examples

Example 1: Wet 1 Auger and Dry 1 Air System
The following diagram show one wet system and one dry system to be controlled and operated by the Commander system.

Note
Shown for example only. Individual configuration vary.

Figure 121. Wet 1 Auger and Dry 1 Air System

Example 2: Wet 1 and Wet 2 Augers and Dry 1 Auger
The following diagram show two wet systems and one dry system to be controlled and operated by the Commander system.

Note
Shown for example only. Individual configuration vary.

Figure 122. Wet 1 and Wet 2 Augers and Dry 1 Auger
Example 3: Wet 1 and Wet 2 Augers and Dry 1 and Dry 2 Augers

The following diagram show two wet systems and two dry systems to be controlled and operated by the Commander system.

Note
Shown for example only. Individual configuration vary.

Figure 123. Wet 1 and Wet 2 Augers and Dry 1 and Dry 2 Augers

4.7.13 Commander Control Setup

Note
The setup of the Commander control system is detail in the Commander Control Owner's and Operator's Manual.

The dryer configuration information is input at the factory prior to system testing. This type of information includes:

- Language
- The dryer system's measurement units are either set to Imperial or metric. Imperial units output temperature in Fahrenheit and volume in bushels. Metric units output temperature in Celsius and volume in cubic meters.
- The type of fuel supplied to the system.
- The dryer system's number of blowers and burners.
- Output gear motor RPM.
- The number of tiers in each blower/burner section.

After installation, the Fill/Empty setup and Timers setup are completed by the customer. This type of information includes:

- If optional sensors are present (e.g. wet bin empty or dry bin full)
- Presence of additional auxiliary equipment (e.g. unload auger system, etc.)
- Maximum metering roll speed
- Various timers (e.g. cooling time, metering roll start time, etc.)
5. Specifications

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

Table 13. Standard Model Specifications

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<thead>
<tr>
<th>Model Number</th>
<th>Number of Tiers</th>
<th>Holding Capacity</th>
<th>Number of Burners and Blowers</th>
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<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>
<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>

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).
5.2. Wind Load

Refer to Section 5.2.1 – Wind Load Data on page 102 for dimensions for wind load calculations.

Figure 124. Wind Load Data Dimensions
### 5.2.1 Wind Load Data

**Table 14. Wind Load Data**

<table>
<thead>
<tr>
<th>DRYER MODEL</th>
<th>“A” ft (m)</th>
<th>“B” ft (m)</th>
<th>“C” ft (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1660</td>
<td>16 (4.9)</td>
<td>24 (7.3)</td>
<td>15.0 (4.6)</td>
</tr>
<tr>
<td>D1670</td>
<td>16 (4.9)</td>
<td>24 (7.3)</td>
<td>17.0 (5.2)</td>
</tr>
<tr>
<td>D1680</td>
<td>16 (4.9)</td>
<td>24 (7.3)</td>
<td>19.0 (5.8)</td>
</tr>
<tr>
<td>D1690</td>
<td>16 (4.9)</td>
<td>24 (7.3)</td>
<td>21.0 (6.4)</td>
</tr>
<tr>
<td>D16106</td>
<td>16 (4.9)</td>
<td>24 (7.3)</td>
<td>23.0 (7.0)</td>
</tr>
<tr>
<td>D16120</td>
<td>16 (4.9)</td>
<td>24 (7.3)</td>
<td>27.0 (8.2)</td>
</tr>
<tr>
<td>D16140</td>
<td>16 (4.9)</td>
<td>24 (7.3)</td>
<td>31.0 (9.4)</td>
</tr>
<tr>
<td>D16160</td>
<td>16 (4.9)</td>
<td>24 (7.3)</td>
<td>35.0 (10.7)</td>
</tr>
<tr>
<td>D24108</td>
<td>24 (7.3)</td>
<td>32 (9.8)</td>
<td>21.7 (6.6)</td>
</tr>
<tr>
<td>D24150</td>
<td>24 (7.3)</td>
<td>32 (9.8)</td>
<td>25.7 (7.8)</td>
</tr>
<tr>
<td>D24180</td>
<td>24 (7.3)</td>
<td>32 (9.8)</td>
<td>29.7 (9.1)</td>
</tr>
<tr>
<td>D24210</td>
<td>24 (7.3)</td>
<td>32 (9.8)</td>
<td>33.7 (10.3)</td>
</tr>
<tr>
<td>D24240</td>
<td>24 (7.3)</td>
<td>32 (9.8)</td>
<td>37.7 (11.5)</td>
</tr>
<tr>
<td>D24260</td>
<td>24 (7.3)</td>
<td>32 (9.8)</td>
<td>41.7 (12.7)</td>
</tr>
<tr>
<td>D24330</td>
<td>24 (7.3)</td>
<td>32 (9.8)</td>
<td>49.7 (15.1)</td>
</tr>
<tr>
<td>D24380</td>
<td>24 (7.3)</td>
<td>32 (9.8)</td>
<td>57.7 (17.6)</td>
</tr>
<tr>
<td>D32260</td>
<td>32 (9.6)</td>
<td>40 (12.2)</td>
<td>36.4 (11.1)</td>
</tr>
<tr>
<td>D32340</td>
<td>32 (9.6)</td>
<td>40 (12.2)</td>
<td>44.4 (13.5)</td>
</tr>
<tr>
<td>D32440</td>
<td>32 (9.6)</td>
<td>40 (12.2)</td>
<td>52.4 (16.0)</td>
</tr>
<tr>
<td>D32500</td>
<td>32 (9.6)</td>
<td>40 (12.2)</td>
<td>60.4 (18.4)</td>
</tr>
</tbody>
</table>
5.3. Dryer Weight Data

The following information can be used to calculate the total dryer weight for purposes of transferring those numbers to the load points (anchor legs, etc.) shown in the following sections to determine proper concrete support footings for the dryer system.

Table 15. Dryer Weight Data

<table>
<thead>
<tr>
<th>DRYER MODEL</th>
<th>NUMBER OF TIERS</th>
<th>DRYER EMPTY WEIGHT (lbs)</th>
<th>DRYER EMPTY WEIGHT (kg)</th>
<th>EMPTY VOLUME * (bushel)</th>
<th>FULL WEIGHT CORN @ 68 lbs/bushel</th>
<th>EMPTY VOLUME ** (cubic meters)</th>
<th>FULL WEIGHT CORN (metric tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1670</td>
<td>5</td>
<td>11941</td>
<td>5416</td>
<td>674</td>
<td>45,832</td>
<td>23.8</td>
<td>21</td>
</tr>
<tr>
<td>D1680</td>
<td>6</td>
<td>12831</td>
<td>5820</td>
<td>770</td>
<td>52,360</td>
<td>27.1</td>
<td>24</td>
</tr>
<tr>
<td>D1690</td>
<td>7</td>
<td>13970</td>
<td>6336</td>
<td>866</td>
<td>58,888</td>
<td>30.5</td>
<td>27</td>
</tr>
<tr>
<td>D16106</td>
<td>8</td>
<td>17054</td>
<td>7735</td>
<td>962</td>
<td>65,416</td>
<td>33.9</td>
<td>30</td>
</tr>
<tr>
<td>D16120</td>
<td>10</td>
<td>19329</td>
<td>8767</td>
<td>1155</td>
<td>78,540</td>
<td>40.7</td>
<td>36</td>
</tr>
<tr>
<td>D16140</td>
<td>12</td>
<td>21604</td>
<td>9799</td>
<td>1347</td>
<td>91,596</td>
<td>47.5</td>
<td>42</td>
</tr>
<tr>
<td>D16160</td>
<td>14</td>
<td>26405</td>
<td>11977</td>
<td>1539</td>
<td>104,652</td>
<td>54.2</td>
<td>47</td>
</tr>
<tr>
<td>D24108</td>
<td>6</td>
<td>20495</td>
<td>9296</td>
<td>1155</td>
<td>78,540</td>
<td>40.7</td>
<td>36</td>
</tr>
<tr>
<td>D24150</td>
<td>8</td>
<td>23402</td>
<td>10614</td>
<td>1443</td>
<td>98,124</td>
<td>50.8</td>
<td>45</td>
</tr>
<tr>
<td>D24180</td>
<td>10</td>
<td>26821</td>
<td>12165</td>
<td>1732</td>
<td>117,776</td>
<td>61.0</td>
<td>53</td>
</tr>
<tr>
<td>D24210</td>
<td>12</td>
<td>32187</td>
<td>14599</td>
<td>2020</td>
<td>137,360</td>
<td>71.2</td>
<td>62</td>
</tr>
<tr>
<td>D24240</td>
<td>14</td>
<td>36473</td>
<td>16543</td>
<td>2309</td>
<td>157,012</td>
<td>81.4</td>
<td>71</td>
</tr>
<tr>
<td>D24260</td>
<td>16</td>
<td>42709</td>
<td>19372</td>
<td>2597</td>
<td>176,596</td>
<td>91.5</td>
<td>80</td>
</tr>
<tr>
<td>D24330</td>
<td>20</td>
<td>53231</td>
<td>24145</td>
<td>3174</td>
<td>215,832</td>
<td>111.8</td>
<td>98</td>
</tr>
<tr>
<td>D24380</td>
<td>24</td>
<td>63753</td>
<td>28836</td>
<td>3750</td>
<td>255,000</td>
<td>132.1</td>
<td>116</td>
</tr>
<tr>
<td>D32260</td>
<td>12</td>
<td>41222</td>
<td>18697</td>
<td>2693</td>
<td>183,124</td>
<td>94.9</td>
<td>83</td>
</tr>
<tr>
<td>D32340</td>
<td>16</td>
<td>54810</td>
<td>24861</td>
<td>3463</td>
<td>235,484</td>
<td>122.0</td>
<td>107</td>
</tr>
<tr>
<td>D32440</td>
<td>20</td>
<td>68398</td>
<td>31024</td>
<td>4232</td>
<td>287,776</td>
<td>149.1</td>
<td>131</td>
</tr>
<tr>
<td>D32500</td>
<td>24</td>
<td>81986</td>
<td>37188</td>
<td>5001</td>
<td>340,068</td>
<td>176.2</td>
<td>154</td>
</tr>
</tbody>
</table>

* US measurement of dry bushels

** The volume of cubic meters = (3 of dry bushels) x 0.0352

Note

- The following layouts show the dryer load points at the centers of standard NECO anchor legs and column support legs.
- A concrete pad (non-load supporting) under the dryer makes cleanup considerably easier. The recommended minimum size is shown as a reference for each layout size.
5.4. Utility Layout and Weight Load Points

Figure 126. Load Point (Anchor Legs) Layout for Dryer Models D1660
Figure 127. Load Point (Anchor Legs) Layout for Dryer Models D1670, D1680, and D1690
Figure 128. Load Point (Anchor Legs) Layout for Dryer Models D16106, D16120, and D16140
Figure 129. Load Point (Anchor Legs) Layout for Dryer Models D16160
Figure 130. Load Point (Anchor Legs) Layout for Dryer Models D24108, D24150, and D24180
Figure 131. Load Point (anchor legs) Layout for Dryer Models D24210, D24240, D24260, D24330, and D24380
Figure 132. Load Point (Anchor Legs) Layout for Dryer Models D32260, D32340, D32440, and D32500
6. Appendix

6.1. Dryer Tier / Ladder / Shipping Layouts

<table>
<thead>
<tr>
<th>LEGEND</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>18, 14, OR 12</td>
<td>Indicates tier panel and material gauge thickness</td>
</tr>
<tr>
<td>14S or 12S</td>
<td>Indicates the gauge WITH side stiffeners</td>
</tr>
<tr>
<td>---</td>
<td>Indicates where the dryer &quot;spits&quot; for shipping</td>
</tr>
<tr>
<td></td>
<td>Indicates transition and blower tier is located</td>
</tr>
<tr>
<td>10*</td>
<td>Indicates a length of ladder in feet and mounted location when shipped per section</td>
</tr>
<tr>
<td>*</td>
<td>Indicates ladder is 1 foot shorter for dryer with lower platform</td>
</tr>
<tr>
<td>10**</td>
<td>Indicates a nominal length of ladder inside plenum. Actual length of ladder will be 6&quot; shorter to fit in between floors.</td>
</tr>
<tr>
<td>**</td>
<td>Indicates ladder length for ALL HEAT Dryer</td>
</tr>
</tbody>
</table>

6.1.1 16' Dryer Sections – 4-8 Tiers
6.1.2 16' Dryer Sections – 10-16 Tiers

6.1.3 24' Dryer Sections – 6-12 Tiers
6.1.4 24' Dryer Sections – 14-24 Tiers
6.1.5 32' Dryer Sections
6.2. Main Control Box Terminal Strip

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

**Figure 133. Main Control Box Terminal Strip**
6.3. Wiring External Transports

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

Figure 134. Wiring Connections for External Transports

<table>
<thead>
<tr>
<th>TRANSPORT CONNECTIONS</th>
<th>ISOLOATED (RUN SIGNAL) RELAY CONTACTS (62CR, 63CR, 74CR, 75CR) RATED: 6A/230VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Pairs of wires are needed for each remote transport device.</td>
<td></td>
</tr>
<tr>
<td>2 Wires for the run signal (route power thru the relay to the starter coil).</td>
<td></td>
</tr>
<tr>
<td>2 Wires for the 24VDC fault (install jumper if unavailable. Coil must not energize if fault).</td>
<td></td>
</tr>
<tr>
<td>2 Wires for the 24VDC run confirmation (PLC must see a change of state).</td>
<td></td>
</tr>
</tbody>
</table>
6.4. Wiring NEMA Starters / IEC Starters / Air Systems

Figure 135. Starter and Air System Wiring Diagrams

NEMA TYPE MOTOR STARTER/OVERLOAD WIRING
(USING DRY1 TRANSPORT AS AN EXAMPLE)

IEC TYPE MOTOR STARTER & CONTACTOR WIRING
(USING DRY1 TRANSPORT AS AN EXAMPLE)

TYPICAL AIR SYSTEM INTERFACE WIRING
(USING DRY1 TRANSPORT AS AN EXAMPLE)
6.5. Optional Unload Motor VFD

NECO offers an optional variable frequency drive (VFD) for the unload auger system. **

** NOTE - Other VFDs can be used, but the installer is responsible for proper connections and parameter settings for any non-NECO supplied units.

NECO can only support VFDs supplied & factory installed.

The following information and schematics outline the wiring for the VFD auger unload system:

Figure 137. Fuse Schematic
## 7. Bolt Torque

Table 16 gives the correct torque values for various hardware. Tighten all bolts to the torque specified, unless otherwise noted. Check tightness periodically, using Table 16 as a guide. Replace the hardware with the same strength bolt, contact NECO if you are unsure.

### Table 16. Recommended Bolt Torque

<table>
<thead>
<tr>
<th>Size</th>
<th>Dry or Lubricated</th>
<th>Threads per inch (Course/Fine)</th>
<th>Area of Bolt (sq in.)</th>
<th>Recommended Torque (ft-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Coarse</td>
<td>Fine</td>
</tr>
<tr>
<td>1/4&quot;</td>
<td>Dry</td>
<td>20/28</td>
<td>0.0318</td>
<td>0.0364</td>
</tr>
<tr>
<td></td>
<td>Lubricated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5/16&quot;</td>
<td>Dry</td>
<td>18/24</td>
<td>0.0524</td>
<td>0.058</td>
</tr>
<tr>
<td></td>
<td>Lubricated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>Dry</td>
<td>16/24</td>
<td>0.0775</td>
<td>0.0878</td>
</tr>
<tr>
<td></td>
<td>Lubricated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7/16&quot;</td>
<td>Dry</td>
<td>14/20</td>
<td>0.1063</td>
<td>0.1187</td>
</tr>
<tr>
<td></td>
<td>Lubricated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>Dry</td>
<td>13/20</td>
<td>0.1419</td>
<td>0.1599</td>
</tr>
<tr>
<td></td>
<td>Lubricated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9/16&quot;</td>
<td>Dry</td>
<td>12/18</td>
<td>0.182</td>
<td>0.203</td>
</tr>
<tr>
<td></td>
<td>Lubricated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>Dry</td>
<td>11/18</td>
<td>0.226</td>
<td>0.256</td>
</tr>
<tr>
<td></td>
<td>Lubricated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>Dry</td>
<td>10/16</td>
<td>0.334</td>
<td>0.373</td>
</tr>
<tr>
<td></td>
<td>Lubricated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7/8&quot;</td>
<td>Dry</td>
<td>9/14</td>
<td>0.462</td>
<td>0.508</td>
</tr>
<tr>
<td></td>
<td>Lubricated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1&quot;</td>
<td>Dry</td>
<td>8/14</td>
<td>0.606</td>
<td>0.679</td>
</tr>
<tr>
<td></td>
<td>Lubricated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-1/8&quot;</td>
<td>Dry</td>
<td>7/12</td>
<td>0.763</td>
<td>0.856</td>
</tr>
<tr>
<td></td>
<td>Lubricated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-1/4&quot;</td>
<td>Dry</td>
<td>7/12</td>
<td>0.989</td>
<td>1.073</td>
</tr>
<tr>
<td></td>
<td>Lubricated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-1/2&quot;</td>
<td>Dry</td>
<td>6/12</td>
<td>1.405</td>
<td>1.581</td>
</tr>
<tr>
<td></td>
<td>Lubricated</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Torque value for bolts and cap screws are identified by their head markings. Established at 75% of yield strength of bolt given the cross-sectional area.

**Note**

Torque figures in table are valid for non-greased or non-oiled threads and head unless otherwise specified. Therefore, do not grease or oil bolts or cap screws unless otherwise specified in this manual. When using locking elements, increase torque values by 5%. 

8. 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.
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