Welcome to the growing number of satisfied NECO customers

Since 1959, NECO equipment has been proudly designed, manufactured, and supported for customers here in the USA and around the world. Occupational safety is one of NECO's primary concerns. With proper operation and maintenance, the equipment will provide years of safe and dependable service. NECO is continually testing and improving our products in order to provide you with the safest, most efficient, and most economical grain handling & grain conditioning equipment available. We welcome your questions or comments and look forward to a continued relationship, ultimately saving you valuable time and reducing your workload.

About this manual ---

• This manual is provided to help ensure the safety of the equipment operator, as well as others who come into contact with the equipment.
• Failure to read, understand, and follow the instructions within this manual constitute a misuse of the equipment and can affect personnel safety and the product warranty.
• Keep a copy of this manual in a safe place for future reference. Additional copies can be accessed & printed from the NECO website www.necousa.com or contact your local dealer for assistance.
• See the “HAVE QUESTIONS or NEED HELP” section and fill out the required information for correct identification of the equipment and efficient communication when needed.
• Language translations of this manual are made as accurately as possible. If there is a conflict or difference between the English version and other translations of this manual, the English text will prevail.

ATTENTION -- Become Alert !

• This symbol is used to call your attention to instructions concerning personal safety.
• It is your responsibility as an owner, operator, or supervisor to know what hazards exist and to make this information known to all persons working with the equipment or who are in the area.

Be alert to the possibility of serious injury or death.

Product Changes & Improvements ---

• NECO reserves the right to make changes or improvements to its products without incurring any obligation with respect to previously manufactured products.
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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 from NECO prior to returning any defective goods. Those defective goods must be returned, freight-prepaid, to the NECO factory in Omaha, Nebraska. 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 uninstructed 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.
1. SAFETY

![READ and UNDERSTAND]

**WORK AREA SAFETY**
- Work Area is defined as the area surrounding grain handling equipment.
- Make sure that no children or unauthorized persons enter the work area.
- If anyone not involved in the actual operation DOES enter the work area, the operator on duty should immediately shut down the equipment until all unauthorized persons are safely out of the work area.
- Do not have loose clothing, long hair, etc. that can be grabbed by rotating equipment.
- Prior to start-up and during operation, make sure that the work area is clean and free of any tools and debris. **KEEP AREA CLEAN**

**WEAR PERSONAL PROTECTIVE EQUIPMENT (PPE)**
- Wear protective clothing.
- Wear hand protection - leather, etc.
- Wear safety glasses / ear plugs / etc.
- Use fall protection when climbing.

**ANSI and NFPA STANDARDS**
- Install all equipment in compliance with ANSI and NFPA Standards.

**OPERATOR QUALIFICATIONS**
- Anyone who has not read or does not completely understand all operating and safety instructions contained within this manual **is not qualified to operate the equipment**.
- Only competent and experienced persons should operate farm equipment. Anyone operating or working around power equipment must understand and meet all legal and contractual requirements.
- The owner / operator must know the regulations in your own area. For example, some regulations specify that no one under the age of 16 may operate power machinery including farmstead equipment.
- Current OSHA regulations state in part, “At the time of initial assignment and at least annually thereafter, the employer shall instruct every employee in the safe operation and servicing of all equipment with which the employee is, or will be involved. **
- Know and use proper LOCK OUT / TAG OUT procedures and know the emergency shut-off locations of any and all utilities connected to the equipment.

**OPERATING PROCEDURES**
- Safely follow all operating procedures outlined within this manual.
- Prior to startup, make sure that all safety shields and warning decals are in place.
- NEVER leave equipment running without a qualified operator present.
- Inspect the equipment periodically and be alert for unusual noises or vibrations.

** Federal Occupational Safety & Health Standards for Agriculture Subpart D, Section 1928.57 (a)(6).**


**EQUIPMENT INSPECTION**

- **SHUT OFF, LOCK OUT, & TAG OUT all power sources** to the equipment prior to any inspection, adjustment, service, or maintenance.
- Inspect the equipment after assembly, before each use, and at the end of the season.

**DRIVES AND LOCKOUTS**

- Make sure the power disconnect switch can be locked in the OFF position. This disconnect switch must be locked whenever work is being performed on the equipment.
- Inspect all power drives before adding power. Chains, belts, etc. should have proper tension or be adjusted prior to running.
- Electric motors and controls must be installed by a qualified electrician. They must meet the standards set by the NFPA Std 70 of the National Electrical Code and all local and state codes.
- Disconnect power before resetting motor overloads.

--- NECESSARY AIR FLOW ---

- If Roof Exhauster fans draw MORE air out of the bin than aeration fans are pushing in, the roof and walls of the bin could collapse.
- Grain bin Roof Exhauster fans must operate ONLY when bin aeration fans are operating. Make sure Roof Exhausters are electrically interlocked with aeration fans to prevent the possibility of Roof Exhauster fans operating independently.
- Make sure aeration fans ALWAYS push more air into the bin than Roof Exhauster fans are pulling out. (Any excess air will flow out through the nonpowered vents.

**REFERENCE:** A minimum opening of 1 square foot [0.09 square meter] is required for each 1000 CFM [28 CMM] of air blown into bin.

--- BIN SAFETY ---

- Never enter a bin without being monitored by another person.
- Do not enter the grain bin unless all power to equipment has been SHUT OFF, LOCKED OUT & TAGGED OUT.
- Use a safety harness and life line when inside the bin.
- Avoid walking on grain near the grain outlets. Flowing grain can trap and suffocate.
- Do not enter the bin if the grain has not flowed out of the bin normally. Moisture in the bin can cause grain to form steep, unstable inclines or bridges as shown in the diagrams below:

![Crusted Grain Forming Steep Inclines](image1)

![Crusted Grain Forming a Bridge](image2)

Failure to heed these safety instructions can result in Serious Injury or Death !!!
Specific to Optional Explosion-Proof Systems

⚠️ Explosion Proof Roof Exhauster Information ⚠️

NECO grain bin Roof Exhausters (04RE4201X & 04RE4203X) have been designed to operate in a hazardous agricultural environment as defined by the National Electrical Code, Article 500 Class I Group D and Class II, Group F & G.

Class I Group D locations are those in which flammable gases or vapors (such as propane or natural gas) are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

Class II Group F & G are atmosphere locations containing combustible dusts including flour, grain, wood, plastic, chemicals, & carbonaceous dusts such as coal, carbon black, & charcoal.

⚠️ SAFETY NOTE: ⚠️

The NECO explosion proof Roof Exhausters must be installed and wired according to the latest National Electrical Code (NEC). The conduit, wiring, terminations, switches, fittings, boxes and fuses must be selected and installed per NEC article 500 Class I Group D and Class II Group F & G. Failure to do so may result in an explosion. Conduit and fittings may require explosion-proof sealing (see latest NEC). Only qualified personnel familiar with explosion-proof wiring techniques should install these Roof Exhausters. NEC-compliant grounding techniques must be used to avoid any static electricity sparks.

If maintenance or repair work requires disconnection or removal of the exhauster motor, the replacement motor and reconnections must be exactly as the original type. Wiring, conduit and fittings must be repaired and/or replaced as stipulated by NEC. Failure to do so may cause an explosion.
2. WARNING LABELS

Warning Label Overview

• Occupational safety is one of NECO’s primary concerns. Warning labels that conform to industry standards are provided to identify potential safety hazards that could cause harm and to increase your awareness of the hazard.
• It is the Owners & Operators responsibility to ensure that all instructions identified by warning labels are followed - including any suggested use of personal protective equipment (PPE).
• This following warning label information identifies:
  1. Potential hazards that are identified by a warning label.
  2. Warning label header or identification.
  3. The NECO part number for that warning label.
  4. The location of that warning label.
  5. What that warning label looks like - note that label pictorials are not shown full size.
• If the warning labels are missing or become unreadable in any way, use the following information to determine the required part number and contact NECO Customer Service at 402-453-6912 or toll free at 800-367-6208 for replacements.
• Replacement Warning Labels will be sent to you free of charge.
• Surfaces must be free of oils, dirt and moisture before applying replacement warning labels.

Warning Label Identification

* The CE logo is only placed for those units sold for international (CE) usage.
  DO NOT apply on domestic units.

<table>
<thead>
<tr>
<th>LABEL ID</th>
<th>WARNING LABEL HEADER</th>
<th>NECO PART #</th>
<th>QTY</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>GENERAL CAUTION (CE)</td>
<td>043699</td>
<td>1</td>
<td>TOPSIDE COVER, ALONG FRONT EDGE</td>
</tr>
<tr>
<td>B</td>
<td>CAUTION - ELECTRICAL (CE)</td>
<td>043695</td>
<td>1</td>
<td>TOPSIDE COVER, ALONG FRONT EDGE</td>
</tr>
<tr>
<td>C</td>
<td>ROTATION ARROW - RIGHT</td>
<td>035643</td>
<td>1</td>
<td>INSIDE UNIT, UPON FAN GUARD</td>
</tr>
<tr>
<td>D</td>
<td>GROUND SYMBOL, 1/2&quot;</td>
<td>040471</td>
<td>1</td>
<td>ON THE MOTOR</td>
</tr>
<tr>
<td>* E</td>
<td>CE LOGO</td>
<td>040599</td>
<td>1</td>
<td>POSITIONED ABOVE &amp; BETWEEN &quot;A&quot; &amp; &quot;B&quot;</td>
</tr>
</tbody>
</table>
NOTE: Warning Label Graphics are representations only - NOT shown actual size.

#043699 - GENERAL CAUTION (CE)

#043695 - CAUTION_Electrical (CE)

#040471 - GROUND SYMBOL - 1/2"

#035643 - ROTATION ARROW - RIGHT

#040599 - CE LOGO
(Do not use on domestic units)
3. EQUIPMENT OVERVIEW

General Design Criteria

NOTE:
Be sure to read the Safety section to ensure that installation and operation are done correctly in order to prevent bin collapse.

OPTIONAL EXPLOSION PROOF UNITS:
Explosion proof units are identified with an "X" at the end of the model # and use special motors and impellers.

⚠️ When servicing explosion-proof models, be SURE TO USE PROPER PARTS.

MODEL SPECIFICATIONS:

<table>
<thead>
<tr>
<th>Part Number</th>
<th>FAN TYPE</th>
<th>POWER</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>HP</td>
<td>kW</td>
</tr>
<tr>
<td>04RE4201</td>
<td>24&quot; [60.96cm] 1-Phase</td>
<td>2</td>
<td>1.49</td>
</tr>
<tr>
<td>04RE4203</td>
<td>24&quot; [60.96cm] 3-Phase</td>
<td>2</td>
<td>1.49</td>
</tr>
<tr>
<td>04RE4201X</td>
<td>24&quot; [60.96cm] 1-Phase Explosion-proof</td>
<td>2</td>
<td>1.49</td>
</tr>
<tr>
<td>04RE4203X</td>
<td>24&quot; [60.96cm] 3-Phase Explosion-proof</td>
<td>2</td>
<td>1.49</td>
</tr>
<tr>
<td>04RE4203 - 50</td>
<td>24&quot; [60.96cm] 3-Phase CE rated</td>
<td>2</td>
<td>1.49</td>
</tr>
</tbody>
</table>

SERIAL # TAG:

Example Part #: 04RE4203 - 50

04 = Product Code
RE = Roof Exhauster
4 = 24" Fan Diameter
20 = 2.0 HP
3 = 3 phase (1 = single phase)
X = Explosion-proof
or
50 = CE unit with 50Hz motor
4. INSTALLATION

Grounding

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

Wire equipment motor through a circuit breaker or fused disconnect switch.

Ensure proper electrical ground in accordance with NFPA 70 (National Electric Code) 2011 Edition, Article 250, including Sections 547.9 and 547.10, or in accordance with local codes or standards.

**WARNING**

NECO recommends that grain bin electrical devices be connected to a ground rod that is no further than 8 feet away. The ground rod should be connected to the Roof Exhauster with a minimum 6 AWG solid, bare copper wire. The ground rod must be copper-clad and 5/8” diameter x 8 feet long. Install the rod 2 feet away from the fan and/or bin foundation and in accordance with local requirements.

The ground rod-to-bin connection provides additional safety in the event of a short or lightning strike. It also provides the necessary grounding for operation and helps provide for a long life of control circuits.

NECO does not supply or sell ground rods and wires. Please contact your local electrical parts supplier. NECO recommends that the rod not be driven into dry ground.

Follow the next few steps to ensure proper ground rod installation:

1. Dig a ditch large enough to hold 1 to 2 gallons of water.
2. Fill the ditch with water.
3. Push the rod into the water and jab it into the ground.
4. Jab the rod repeatedly to allow the water to work its way into the hole. This technique will promote a good conductive bond with the surrounding soil. Drive the rod completely into the ground.
5. Connect one end of the ground wire to the rod with an appropriate ground clamp.
6. Connect the other end of the wire to a ground lug connector inside the fan control box. The ground wire should not have any splices or breaks. Insulated wire is not recommended for grounding purposes.
Position & Cut Bin Roof

Refer to Figure 1:
- NECO Roof Exhausters should be equally spaced on the bin roof circumference.
- The roof exhausters should be positioned and installed as far up the roof slope as the tapered ribs on the bin roof sheet will allow.
- The selected locations must provide a rigid mounting area for each roof exhauster.

WARNING:
Use fall protection and any other necessary safety equipment!!

Fig 1 - Position the Roof Exhauster(s)

Refer to Figure 2
- At the required position(s) and using the dimensions provided, cut the air exhaust hatched area and the twelve mounting holes thru the bin roof.
**NOTE:** Dimensions are in inches, with millimeters shown in brackets [mm].

---

**Caulk and Secure in Final Position**

- Place the Roof Exhauster over the cutout area and align the mounting holes.

- Mark around the perimeter of the flange and re-position the exhauster to the side so that caulking can be applied throughout the area between the cutout and the marked perimeter.

- Replace the Roof Exhauster into final position and secure it from underneath with the angles and fasteners that are supplied.

- Remove any excess caulk / ensure corner areas have sufficient caulking to prevent water seepage.
5. OPERATION

Pre-Start Instructions

- With the power supply disconnected and locked out, make certain that the Roof Exhauster is free of debris.
- Rotate the fan impeller to make sure that it revolves easily and does not rub against the housing.
- Make certain the fan guard is securely in place.
- Inspect ALL fasteners to make sure they are tight. If any are loose, check for proper clearance and retighten.
- Be sure that the disconnect switch and Roof Exhauster are properly grounded.

Ensure Proper Motor Rotation

**ATTENTION:** Prior to testing or running the newly installed Roof Exhauster, ensure there is sufficient air that can ENTER the bin - open access doors, drying fans turned ON, etc.

- The first time the fan is started, run it briefly to make sure the fan is rotating in the proper direction and that air is flowing out of the bin.
- If air is flowing in the wrong direction, instruct your electrician to reverse the motor connections and re-check to ensure proper rotation and air flow.

Normal Operation

**NOTE:** The Roof Exhauster SHOULD BE RUN AT LEAST 30 CONTINUOUS MINUTES EVERY 3 WEEKS to eliminate damaging moisture buildup in the motor.

- Ensure the unit always runs in conjunction with aeration fans.
- Single-phase motors may encounter problems during the initial starting surge. The initial starting amperage surge is usually about 5 times the nameplate rating. The total voltage drop should not be below 190 volts on starting surge nor should it be lower than the NEMA-specified 10% of line voltage during continuous motor operation. If the voltage drops below 190 volts during the starting surge, the capacitors may burn out. If line voltage remains low during operation, the motor is likely to overheat in which case a nuisance shutoff or burnout is likely to occur.
6. MAINTENANCE

WARNING

Follow all safety procedures as outlined in the SAFETY section of this manual. Use Lock-Out / TagOut procedures when required and ensure all guards are in place.

Overview
NECO takes pride in choosing quality vendors and products in association with the design and manufacture of our products:
- OEM products have a service life related to operating conditions and usage.
- Contact the OEM product manufacturer for service, replacement, or warranty concerns.

Prior to each season or usage:
- Complete the “OPERATION - Pre Start” instructions and verify completion for each step.

During regular usage - based on overall conditions and amount of usage:
- Run the Roof Exhauster AT LEAST 30 CONTINUOUS MINUTES EVERY 3 WEEKS to eliminate damaging moisture buildup in the motor.
- Keep the outlet guard free of debris - motor will eventually overheat and shut down if debris are allowed to accumulate. Debris are also one of the main causes of abnormal vibrations and excessive moisture buildup.
- Check for impeller damage and replace if needed. Damage usually results in an out-of-balance situation, which causes vibration.
- Inspect and immediately replace any damaged fan guards.
- Check for proper lubrication.

Lubrication Requirements

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

- Motor bearings are double-sealed and require little or no servicing. Any servicing should be performed by an authorized motor service center.

Fan Motor

NOTE: Motors used in Roof Exhauster units are standard NEMA* frame motors. These motors are specially designed for use in crop drying and are protected either by built-in thermal overloads or by an overload heater on the starter unit.

* National Electrical Manufacturers Association (USA)
## Troubleshooting Section

<table>
<thead>
<tr>
<th>Problem</th>
<th>Reason</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fails to start</td>
<td>No power</td>
<td>Replace the fuse (main power supply)</td>
</tr>
<tr>
<td></td>
<td>Bad coil</td>
<td>Replace coil on the contactor</td>
</tr>
<tr>
<td></td>
<td>The reset switch on the overload relay is out</td>
<td>Reset the switch and set for automatic</td>
</tr>
<tr>
<td></td>
<td>No ground</td>
<td>Establish a good ground connection</td>
</tr>
<tr>
<td>Fails to come up to speed within 10 seconds</td>
<td>Low amps and low voltage</td>
<td>Check amperage with amp probe and consult with power supplier</td>
</tr>
<tr>
<td></td>
<td>Bad starter capacitor</td>
<td>Replace starter capacitor</td>
</tr>
<tr>
<td></td>
<td>Bad centrifugal switch (if equipped)</td>
<td>Replace switch or replace motor</td>
</tr>
<tr>
<td>Blows fuses or trips circuit breakers</td>
<td>The fuse and/or the circuit breaker have inadequate capacity</td>
<td>Use FRN Fusetron or larger circuit breaker</td>
</tr>
<tr>
<td></td>
<td>There’s a short in either the fan controls or motor</td>
<td>Check for hot wires</td>
</tr>
<tr>
<td>Excessive vibration</td>
<td>Cover on fan inlet</td>
<td>Remove cover</td>
</tr>
<tr>
<td></td>
<td>Blade is out of balance</td>
<td>Balance or replace blade</td>
</tr>
<tr>
<td></td>
<td>Debris is on the blade</td>
<td>Remove debris from the blade</td>
</tr>
<tr>
<td></td>
<td>Unit is not tightened down</td>
<td>Tighten fasteners</td>
</tr>
<tr>
<td>Quits after operating a few hours</td>
<td>Weak coil (magnetic starter)</td>
<td>Replace the coil</td>
</tr>
<tr>
<td></td>
<td>High amps</td>
<td>Check the heater strip size and amperage draw (check voltage)</td>
</tr>
<tr>
<td></td>
<td>Control box is in the sun on a very hot day</td>
<td>Shade the control box and/or provide vent to help cool it</td>
</tr>
<tr>
<td></td>
<td>Severe vibration is causing contactor to drop out</td>
<td>Eliminate the vibration</td>
</tr>
<tr>
<td>Item</td>
<td>Part Number</td>
<td>Quantity</td>
</tr>
<tr>
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</table>

*CAUTION:* Explosion-proof models must use the appropriate impellers and motors. When servicing explosion-proof models, do NOT install a standard motor or a standard impeller.