The location and orientation of the cooling tower can affect the safety of those responsible for installing, servicing or repairing the cooling tower. Since SPX does not dictate or determine where the tower is located or how it is oriented, SPX is not responsible for addressing the safety issues that are affected by the tower’s location or orientation. The following safety issues should be considered by those responsible for designing the tower installation. Failure to consider and address these issues may result in substantial personal injury or death to those involved in installing, servicing or repairing the cooling tower.

- Access to and from the fan deck.
- Access to and from maintenance access doors.
- Access for cleaning and other service.
- Potential access problems due to obstructions surrounding the tower.
- The possible need for handrails around the fan deck.
- The possible need for ladders (either portable or permanent) to gain access to the fan deck or maintenance access doors.
- The possible need for safety cages around ladders.

These are only some of the safety issues that may arise in the design process. SPX strongly recommends that you consult a safety engineer to be sure that all safety considerations have been addressed.

SPX offers optional equipment that may assist you in addressing some of these safety issues. Contact your Marley representative for information on these optional items.

CONFIDENTIAL- The contents of this document are confidential and constitute the exclusive property of the SPX Cooling Technologies, Inc and is intended for use in the construction (contractor) and maintenance (owner) of this cooling tower. This document and its contents may not be made public in any manner, distributed or loaned to others, or reproduced or copied either in whole or part without prior written consent of SPX Cooling Technologies, Inc.
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GETTING STARTED

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Note: Optional equipment not listed above is installed using separate installation drawings and bills of material. These documents are located within the literature package and should be reviewed prior to starting assembly. Optional equipment may affect assembly sequence.
**ABOUT THIS MANUAL**

To obtain maximum efficiency, it is strongly recommended that this entire manual be read before starting assembly. This assembly manual illustrates the field installation of standard and optional items that your tower may have. Due to shipping limitations these items cannot be installed in the factory. Review all manuals, drawings and bills of material prior to assembly. Contact your Marley sales representative if questions arise.

All steel parts are tagged for identification, as shown below.

**Find Number:** This is a three digit alpha/numeric number that ties everything together. Used throughout this manual, in the text it's the number in bold type **M35**, in the Figures, it's the number within the circle. It is also the first column in the BILL OF MATERIAL. In the bill of material, all tower components are listed in numerical order by this number.

**Item Number:** This number is used by Marley to manufacture and inventory the components of your cooling tower. Give this number to your Marley sales representative if an item is missing or a replacement item is required.

**Drawing Number:** (Reference only) This is the number of the drawing used to fabricate this item.

**Description:** (Reference only) All steel parts begin with SHEET or ASSEMBLY followed by the size of the sheet used to fabricate the item or a description of the assembly. Your tower may have a few fiberglass items which begin GRP.

**Stainless Steel:** This indicates when an item has been made from stainless steel. If the item is made from the standard galvanized material this will not be printed on the tag.

Bills of material (BOM) are separate from drawings and this manual. At the top of each bill there is a Drawing Number and the drawing description which indicates if the items on that bill will be installed per this assembly manual or per a special installation drawing. The find number, item number, description and quantity of items are all cross referenced on the bill of material. If a number is missing or hard to read, check the illustrations in this assembly manual first and then the bill of material to see if you can find it. As the tower is prepared for assembly, the quantities of each item should be checked against the bill of material.

**NEED HELP!**

If anything is missing or damaged, or you need help of any kind, contact your Marley sales representative as soon as possible. If you need help determining the representative in your area please call us at 1-800-4MARLEY or check the internet at www.spxcooling.com.
MEASUREMENT SYSTEM

This manual uses both, the English System and the Système International d'Unitès (S.I.) systems of measurement. Fasteners are denoted and supplied in conformance with the English System.

TOOLS AND SUPPLIES

- **HOIST.** 2500 pound (1140kg) capacity. For hoisting of motor on towers with field installed motors or MOA.
- **1/2" electric drill and bit set.**
- **Socket wrench set.** You will be using 9/16" sockets a lot so it’s a good idea to have more than one.
- **Combination wrenches.** Mainly 9/16" up to 1 1/8". Adjustable wrenches are OK but not recommended.
- **Screwdrivers.**
- **Torque wrench.** 150 ft-lb (203 N-m) capacity
- **Caulking guns.** Required for application of sealant.
- **Pipe wrenches.**
- **Drift pins (alignment tools).** These are extremely important to help line up all the holes. You should have more than one.
- **Allen wrenches.**
- **Protractor level.** For setting fan blade pitch.
- **Dial Indicator kit.** Marley Item No. 115311M. For drive shaft alignment. Needed for motor outside airstream option only.
- **Scaffolding, portable stairs** or other means of temporary access and support.
- **Electric impact wrench (or air).** Optional, really makes the job go fast. You can get by without one but if you can get one you should.
- **Wear protective clothing, gloves, nonslip footwear, hard hat and safety glasses.** Cooling towers are constructed of steel and could have burrs that can cause cuts. The surface of steel material may be slick. Protection from thrown or falling objects should be used at all times around a construction site.
- **ACETONE solvent.** About a gallon (4 liters) and plenty of clean cotton rags.
JOINT SEALING INSTRUCTIONS

Surface preparation instructions:
The following information covering surface preparation applies to all sealed joints whether sealer Z11 or strip sealer Z12 or Z13 is being used. Years of experience has shown the instructions on surface preparation and sealing details do result in watertight joints. Inadequate attention to these details will result in joints that leak.

Do not apply either sealer if temperature is below 40°F Fahrenheit (5°C Celsius).

All flanges are to be straight. Rework kinks or bends that exist. Clean surfaces being sealed with acetone. If cloth is used, it must always be clean and dry. Exercise caution in using solvents, always read labels and instructions. Care should be taken not to wipe dirt or oil onto the cleaned surface from adjacent uncleaned area. Mating surfaces to be sealed must be kept clean and dry prior to assembly. No water, grease or dirt should contaminate cleaned area. Note that stainless steel requires a larger area to be cleaned because oil will recontaminate surfaces quickly. Oil will migrate through punched holes and around sheared edges.

Application instructions for Sealer Z11 (Type A, B & C seals):
Sealer Z11 comes in a 1/12th gallon (315ml) cartridge and is applied using a standard caulking gun. Apply sealer to the unassembled parts. The typical joint sealing details shown on this page and the following page are referenced throughout this manual. Care should be taken to fill voids and gaps at joints. After parts have been assembled, trowel excess sealant over joint, taking care to force sealant, back into joint, and not out of joint. Do not use solvent to aid in applying sealer as solvent adversely affects bonding of sealant to metal. Care should be taken to avoid leaving holes or air bubbles in sealant.

Do not subject sealed joints to waterloading for 48 hours at temperatures of 70°F Fahrenheit (21°C Celsius) and above. Lower temperature will require a longer cure time.

This symbol is used throughout the manual to indicate the locations where sealer Z11 is required. The A refers to a “Type ‘A’ seal” which is a 3/8” (10mm) diameter bead of sealer Z11 laid along the centerline of a row of holes curving over each hole it passes. Reference detail at the right.

This symbol is used throughout the manual to indicate the locations where sealer Z11 is required. The B refers to a “Type ‘B’ seal” which is a 3/8” (10mm) diameter bead of sealer Z11 laid along the centerline of a row of holes curving completely around each hole it passes. Reference detail at the right.
This symbol is used throughout the manual to indicate the locations where sealer Z11 is required. The \( \text{C} \) refers to a “Type ‘C’ seal” which is a 3/8” (10mm) diameter bead of sealer Z11 laid completely around each hole in a row of holes. Reference detail at the right.

Application instructions for Strip Sealer Z12 & Z13 (Type D, E & F seals):

Strip sealer is supplied in 1/2” (12mm) Z13 and 1” (25mm) Z12 widths. It is intended that the 1” (25mm) wide sealer be used unless noted otherwise.

Apply continuous pieces of strip sealer to the unassembled parts. Do not splice pieces except where turning a corner. Cut with a sharp instrument, do not stretch or tear.

Gaps at joints and corners can be filled by stretching a piece of strip sealer to obtain the proper thickness. Then work it into the joint to fill gap and create an even surface.

After parts are set together, use a drift pin or other pointed object to puncture sealer at each fastener hole, where required.

This symbol is used throughout the manual to indicate the locations where a single layer of strip sealer Z12 or Z13 is required. Reference detail at the right.

This symbol is used on collection basin joints to indicate the locations where two layers of strip sealer are required. Align bottom edge of strip sealer Z13 with top edge of bolt holes. Align top edge of strip sealer Z12 with bottom edge of bolt holes. Reference detail at the right.

This symbol is used on distribution basin joint to indicate the locations where two layers of strip sealer are required. Align bottom edge of first strip sealer Z13 with top edge of bolt holes. Align top edge of second strip sealer Z13 with bottom edge of bolt holes. Reference detail at the right.
A FEW WORDS ABOUT FASTENERS

Stainless steel fasteners:
Stainless steel fasteners are sensitive to galling. This is when you notice a sudden increase in the force needed to turn a nut before parts are clamped. Apply anti-seize compound included with the tower to the threads of the bolt before installing the nut. If a nut does not easily spin on a bolt do not try to force it. Chances are it will seize. Some extra hardware is included to replace problem hardware.

Due to availability, 3/8" standard nuts and Loctite may have been substituted for 3/8" self-locking nuts. If this substitution has been made, do not apply the anti-seize compound to the stainless steel bolts. Insert bolt thru hole before applying Loctite. Loctite will act as a thread lubricant.

Torque Requirements:
The idealized standard fastener torque values for galvanized and stainless steel fasteners are shown in the table below. These values may vary in actual practice. Note that the values shown for stainless steel fasteners are based on the fasteners being lubricated with anti-seize compound.

<table>
<thead>
<tr>
<th>Bolt Diameter</th>
<th>Fastener Torque foot-lbs. (newton-meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Galvanized</td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>20 (27.1)</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>45 (61)</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>150 (203)</td>
</tr>
</tbody>
</table>

* Values based on fasteners lubricated with anti-seize compound. (Stainless steel only)

Loctite:
Critical structural and mechanical attachments require extra protection against the nuts vibrating loose during tower operation. This is accomplished on galvanized fasteners by applying Loctite Z05 thread locking compound to the exposed threads of a bolt after the nut has been installed and tightened. Bolts should be installed with the threaded end up or horizontally. On stainless steel fasteners the use of anti-seize compound makes the use of Loctite ineffective. Therefore in these critical areas with stainless steel fasteners self-locking nuts have been substituted for the standard nuts and the Loctite will not be used.

This symbol is used throughout the manual to indicate the locations where Loctite Z05 is required. Reference details at the right.
GENERAL DECAL INSTRUCTIONS

Note: Decals are an important part of the tower assembly. Decals and nameplates provide instructions, identifications, cautions and warnings deemed necessary for proper maintenance.

Surface Preparation
Surface must be clean and dry. Oil and dirt may be removed with solvent (such as acetone) or commercial detergent. Finally wash the area with warm water and dry with a lint-free cloth. Ultimate adhesion will occur 24-48 hours after application. Application should not be undertaken if temperature is below 35° F (2° C) or humidity is greater than 95%.

General application instructions
Peel off backing paper, taking care to avoid dirt contamination of the exposed adhesive. On larger decals with slit back removal of half of the backing paper before and the other half during installation is beneficial for ease of alignment and installation.
Carefully apply the decal to the desired location with light pressure to avoid any distortion of vinyl. This is the time to remove the other half of backing paper on larger decals. Once positioned, smooth out with the aid of a squeegee or toweling.
If air bubbles occur, puncture with a pin or needle and smooth down with the squeegee. The finished decal should be completely flat.
(This page intentionally left blank)
A security strap is installed thru holes in the latch of the access door at the factory. Cut and remove the security strap shown in Figure 1-1. Note that most of the field installed items are shipped inside the tower.
NC STANDARD FIELD DETAILS

**Module Connection Details**

**NC8310 thru NC8312 only**

Before top module is hoisted into place on bottom module, clean any dirt and debris from the underside of the top module skid sides and beams. Remove shipping guards from bottom of top module. After top module is in place the modules may be connected near louver columns as shown in Figure 1-2A, or inside tower on eliminator face per Figure 1-2B.

---

**Find No.** | **Description**
---|---
V19 | 1/2"x1 1/2" Bolt
W03 | 1/2" Lock Washer
W23 | 1/2" Flat Washer
X03 | 1/2" Nut

---

**Before hoisting!** Make sure seal strips are in place along cased face girts and on eliminator support beams of bottom module. A 2" (51mm) gap will exist in seal strip adjacent to fill. If problems exist, contact Marley Rep.

---

**Before hoisting!** Remove shipping guards from bottom of top module.

---

**Before hoisting!** Clean any dirt and debris from the underside of the top module skid & beams before hoisting into place.

---

**Clean any dirt and debris from the underside of the top module skid & beams before hoisting into place.**
UPPER FAN CYLINDER & FAN GUARD

For all models without a velocity recovery stack, fan cylinder segments D31 are installed on top of the lower cylinder that extends down from fan deck. Segments are to straddle tower centerline and be orientated as shown in Figure 1-3. Installation hardware for the cylinder segments has been pre-installed at the factory and must be removed prior to cylinder installation.

A single piece fan guard is provided on models NC8301 thru NC8303. Models NC8304 thru NC8312 use a two piece fan guard and require guard splice hardware. On models with a single piece fan guard, position guard D34 over cylinder and raise center to align with holes in fan cylinder. On models with a two piece fan guard, guard D32 is installed first and a splice clip N97 is used to retain guard D34.

See the next page for velocity recovery stack installation details.

---

**Figure 1-3**  
All towers without a velocity recovery stack

<table>
<thead>
<tr>
<th>Find No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>T07</td>
<td>3/8&quot;x1&quot; Tap Screw</td>
</tr>
<tr>
<td>V04</td>
<td>1/4&quot;x1 1/2&quot; Bolt (all thrd.)</td>
</tr>
<tr>
<td>V09</td>
<td>3/8&quot;x1 1/2&quot; Bolt</td>
</tr>
<tr>
<td>W01</td>
<td>1/4&quot; Lock Washer</td>
</tr>
<tr>
<td>W02</td>
<td>3/8&quot; Lock Washer</td>
</tr>
<tr>
<td>W11</td>
<td>1/4&quot; Oversize Washer</td>
</tr>
<tr>
<td>W12</td>
<td>3/8&quot; Oversize Washer</td>
</tr>
<tr>
<td>W21</td>
<td>1/4&quot; Flat Washer</td>
</tr>
<tr>
<td>W23</td>
<td>1/2&quot; Flat Washer</td>
</tr>
<tr>
<td>X01</td>
<td>1/4&quot; Nut</td>
</tr>
<tr>
<td>X02</td>
<td>3/8&quot; Nut</td>
</tr>
<tr>
<td>X11</td>
<td>1/4&quot; Self-locking Nut</td>
</tr>
</tbody>
</table>
VELOCITY RECOVERY STACK

On models with a velocity recovery stack, install fiberglass fan cylinder segments D31 per Figure 1-4 on top of lower cylinder that extends down from fan deck. Segments are to straddle tower centerline. Installation hardware for the cylinder segments has been pre-installed at the factory and must be removed prior to cylinder installation. Fan guard is not required on these models.
Inlet piping and fasteners
Supplied by others. Fasteners to be the same material as the distribution basin.

Center section of inlet flume may be removed if access for attaching inlet piping is required. Reinstall flume after inlet piping is secure.

Figure 1-5

BASIC INLET PIPING
If tower is not using the optional HC valves, inlet piping is attached directly to the distribution basin, see Figure 1-5A. Note that inlet piping and fasteners are supplied by others. If HC valves are to be installed, see next page.
INLET PIPING WITH OPTIONAL HC VALVES

If HC valves N40 are to be installed, attach as shown in Figure 1-6. A full face gasket N45 is used between valve and distribution basin and a ring gasket N39 is used between valve and inlet piping. Valve may be rotated 90° or 180° if desired.

Stainless fasteners are provided with stainless basins

Center section of inlet flume may be removed if access for attaching valve is required. Reinstall flume after valve is secure.

Find No. | Description
---|---
V32 | 3/4"x2" Bolt
V35 | 3/4"x3" Bolt (all thrd.)
V42 | 7/8"x5" Bolt (all thrd.)
V46 | 7/8"x2" Bolt
W20 | 7/8" Flat Washer
W30 | 3/4" Flat Washer
W35 | 3/4" Sealing Washer
W36 | 7/8" Sealing Washer
X04 | 3/4" Nut
X06 | 7/8" Nut

Piping, supports, design of piping and supports, and restraint of lateral piping loads is the responsibility of others.
SINGLE INLET PIPING OPTION

If the tower has been supplied with a single inlet option, see installation details on pages 1-7 thru 1-9.

**Figure 1-7A**
SINGLE BOTTOM INLET

**Figure 1-7B**
SINGLE SIDE INLET

<table>
<thead>
<tr>
<th>Find No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>V41</td>
<td>3/4&quot;x5&quot; Bolt (all thrd.)</td>
</tr>
<tr>
<td>V42</td>
<td>7/8&quot;x5&quot; Bolt (all thrd.)</td>
</tr>
<tr>
<td>W05</td>
<td>3/4&quot; Lock Washer</td>
</tr>
<tr>
<td>W06</td>
<td>7/8&quot; Lock Washer</td>
</tr>
<tr>
<td>W20</td>
<td>7/8&quot; Flat Washer</td>
</tr>
<tr>
<td>W30</td>
<td>3/4&quot; Flat Washer</td>
</tr>
<tr>
<td>X04</td>
<td>3/4&quot; Nut</td>
</tr>
<tr>
<td>X06</td>
<td>7/8&quot; Nut</td>
</tr>
</tbody>
</table>

**EXTERNAL INLET PIPING BY OTHERS. FASTENERS ARE SIZED ASSUMING THE FLANGE THICKNESS IS PER ANSI B16.1**

**Piping, supports, design of piping and supports, and restraint of lateral piping loads is the responsibility of others.**
Install pipe support Q74 on to the stud bolts protruding from the fan deck as shown in Figure 1-8A. Prior to installation of Single Inlet fan deck piping Q63 or Q64, clean outside of pipe and inside rubber boot protruding from the fan deck. Then apply a thin layer of sealer Z11 to inside of rubber boot. Install the fan deck pipe into boot so that it butts with the interior pipe and align the flanged end with the hot water basin inlet along with gasket Q66. When installed, the fan deck piping should be level in relation to the fan deck. Finally, attach pipe support strap Q69 to pipe support as shown.
Models NC8310 thru NC8312 with the Single Bottom Inlet Option require the installation of a Depend-O-Lok pipe coupling Q83 between the piping of the top and bottom tower modules. The Depend-O-Lok includes fasteners, gaskets, manual closure tool, and detailed instructions for installation. "C" clamp, ratchet, and adjustable wrench are optional tools for installation and are **not** included.
OVERFLOW & DRAIN

All towers must have an overflow and drain, either as the standard standpipe in the collection basin floor or at the optional coverplate location. The standpipe overflow and drain is installed per Figure 1-10A. Bolt coupling assembly Q47 to bottom of the collection basin floor at the 6" (152mm) diameter hole and bolt pattern. Install standpipe Q48. The standpipe is PVC unless an optional heater element is close by, then a steel standpipe will be installed with teflon tape (supplied by others) to protect the threads.

If the optional coverplate drain and overflow is being used, the cutout in the depressed section for the standpipe has been covered with a drain plate that must have plug Q18 installed per Figure 1-10B. If coverplate drain is not being plumbed, install pipe plug Q18 per Figure 1-10C.
**Figure 2-1 Sump**

Installs two layers thick with corners overlapped. Do not leave gaps where strips butt. Sump may be used as a template to drill 7/16" (11mm) diameter holes in gasket strips.

**(under oversize washer)**

After sump is installed, apply a bead of sealer around perimeter of sump, force into seam and spread out evenly.

**Apply a bead where strips butt.**

**SUMP**

Sump installation is per Figure 2-1. Sump may be rotated 90° or 180° provided outlet piping will clear supporting steel. Lay strips of gasket Y10 around sump opening in depressed section floor. Set sump Q04 in place and use as a template to drill 7/16" (11mm) dia. holes thru gasket. Attach sump to floor and seal around perimeter. On fiberglass sumps, install plastic tank adapter Q06 and pipe cap Q07 in the bottom of the sump as a drain (on steel sumps, pipe plug Q07 is installed in the coupling in the front of the sump).

---

**Find No.** | **Description**
---|---
V09 | 3/8"x1 1/2" Bolt
W12 | 3/8" Oversize Washer
W22 | 3/8" Flat Washer
W32 | 3/8" Sealing Washer
X02 | 3/8" Nut

Stainless steel fasteners must be used on stainless steel basins to avoid loss of connection.
A sump plate is shipped wired inside fiberglass sumps only. Remove wire and install using outlet piping fasteners (supplied by others).

Clean surfaces and apply a 3/8" (10mm) dia. bead of sealer around and between all holes on sump plate and outside of sump.

See Figure 2-2 for the typical attachment of customer piping using gasket Q14. A sump plate is used on the inside of fiberglass sumps only. After piping has been installed set sump screen (if required) in place over the sump opening. On sumps with a higher flows, a screen assembly with anti-vortex plate is used instead of the sump screen shown. See "Screen with anti-vortex plate" installation detail. The tower is not designed to support additional piping loads. DO NOT SUPPORT PIPING FROM THE TOWER.
OUTLET PIPING AND FASTENERS
Supplied by others
Fasteners must be stainless
in stainless basins

Collection basin
depressed area floor

Clean surfaces and
apply a 3/8” (10mm)
dia. bead of sealer
around and between all
holes under basin
where gasket attaches.

For additional leak protection
apply sealer under bolt head
and washer.

Figure 2-3

BOTTOM OUTLET

The typical attachment of customer piping
for bottom outlet or equalizer connection using
gasket Q14 is shown in Figure 2-3. The tower
is not designed to support additional piping
loads. DO NOT SUPPORT PIPING FROM THE
TOWER.

Piping, supports, design of piping and
supports, and restraint of lateral piping
loads is the responsibility of others.
Bottom Outlet Screen
For bottom outlets with high flows a screen assembly with anti-vortex plate is used. (See "Screen with anti-vortex plate" installation detail.)

BOTTOM OUTLET SCREEN
When a screen is needed with the bottom outlet, it is installed as shown in Figure 2-4. On bottom outlets with higher flows a screen assembly with anti-vortex plate is used. See "Screen with anti-vortex plate" installation detail.
On towers with higher outlet flows, a screen assembly with an anti-vortex plate is used as shown in Figure 2-5. Anti-vortex plate is pre-assembled with screens and retainers. Position anti-vortex assembly in depressed area of collection basin centered over outlet.

**Figure 2-5**

**SCREEN WITH ANTI-VORTEX PLATE**

On towers with higher outlet flows, a screen assembly with an anti-vortex plate is used as shown in Figure 2-5. Anti-vortex plate is pre-assembled with screens and retainers. Position anti-vortex assembly in depressed area of collection basin centered over outlet.
If collection basins of multiple towers are to be connected together, a flume is installed per Figure 2-6.

Flume collars are shop installed in each tower along with temporary coverplates for shipment. Remove coverplates before continuing. Note that if a weir gate option (a removable plate used to isolate adjacent towers) has been purchased, the weir gate is shop installed, in one tower, for shipment. The weir gate will be reinstalled, in either tower, after installation of flume per Figure 2-7.

**FLUME**

Note that towers must be aligned before attempting to install flume in place. **Sealing of the flume connections is critical to prevent leaks.** Apply a 1/2" (13mm) bead of sealer Z11 as indicated, around and between all holes on both flume collars. Install non-joggled flume corners Q11 first. Apply another bead of sealer around and between holes where joggle will overlap on flume. Complete flume installation by installing joggled flume corners Q15. If weir gate option is purchased, ends of flume corners must be flush to ensure a proper seal.

**Find No.**

<table>
<thead>
<tr>
<th>Find No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>V07</td>
<td>3/8”x1” Bolt</td>
</tr>
<tr>
<td>W22</td>
<td>3/8” Flat Washer</td>
</tr>
<tr>
<td>W32</td>
<td>3/8” Sealing Washer</td>
</tr>
</tbody>
</table>

**IMPORTANT!** Flumes are not a walking surface. Flumes that are 18” (457mm) long and longer have a caution decal which should be orientated on top.

**Figure 2-6**

Apply a 1/2” (13mm) diameter bead of sealer around and between holes on flume collars.

Collection basin side

Important note: Flumes are not a walking surface. Flumes that are 18” (457mm) long and longer have a caution decal which should be orientated on top.
WEIR GATE

If the weir gate option is being used refer to Figure 2-7 for installation details. Slide weir gate Q16 and gasket Q19 (removed from tower before flume installation) over eight longer bolts. Tighten all bolts, beginning at the top, compressing gasket against end of flume insert.

<table>
<thead>
<tr>
<th>Find No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>W02</td>
<td>3/8&quot; Lock Washer</td>
</tr>
<tr>
<td>X02</td>
<td>3/8&quot; Nut</td>
</tr>
<tr>
<td>X12</td>
<td>3/8&quot; Self-locking Nut</td>
</tr>
</tbody>
</table>

Figure 2-7
FLOAT VALVE FLOAT

Attach stem Q29 to float Q31. Install float and stem assembly into end of float valve lever arm as shown in Figure 2-8. See your NC Owners Manual for adjustment of float valve.
Figure 2-9

STANDPIPE FLOAT VALVE

Figure 2-9 shows the standpipe float valve installation. Start by attaching standpipe assembly Q25 and gasket Q53 to the collection basin floor. Using pipe joint compound Z04 on all pipe connections, connect 90° elbow Q26, pipe Q32, and float valve Q28 (make sure valve opening is pointing down). Install float Q31 and valve stem Q29. Coat exposed pipe threads with rust inhibiting paint. See your NC Owners Manual for adjustment of float valve.

<table>
<thead>
<tr>
<th>Find No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>V07</td>
<td>3/8&quot;x1&quot; Bolt</td>
</tr>
<tr>
<td>W22</td>
<td>3/8&quot; Flat Washer</td>
</tr>
<tr>
<td>W32</td>
<td>3/8&quot; Sealing Washer</td>
</tr>
<tr>
<td>X02</td>
<td>3/8&quot; Nut</td>
</tr>
</tbody>
</table>
ELECTRIC BASIN HEATERS

The collection basin modifications for the heater components for single cell towers are typically located on a cased face for a single heater element and thru the depressed section floor for multiple heater elements. The collection basin modifications for the heater components for multi-cell towers are typically located thru the collection basin depressed floor. See Figure 2-10A. Depending on heater package selected, multiple holes for heater elements may be in basin.

The installation must meet requirements of latest National Electric Code and local codes. Heater package components consist of an enclosure, magnetic contactor, circuit board, transformer, heater elements, and control probe. One heater package can control the heaters for a maximum of a two cell multi-cell tower. Multi-cell towers with more than two cells must have a heater package for every two cells, or for every cell. See Pages 2-11 thru 2-12 for installation details.

If the heater is unavailable and it is necessary to run the tower, temporary cover plates P51 are provided for installation per Figure 2-10B.
Figure 2-11A
(Heater thru collection basin side)

Figure 2-11B
(Heater thru collection basin depressed section)

Figure 2-11C
(Required on towers with stainless steel collection basin)

**Find No.** | **Description**
---|---
V07 | 3/8"x1" Bolt
W22 | 3/8" Flat Washer
W32 | 3/8" Sealing Washer
X02 | 3/8" Nut
The heater element(s) are installed in the 2 7/16" (6.19 cm) diameter hole(s) in the collection basin. On galvanized basins install scruf-tite fitting as shown in Figures 2-11A and 2-11B. On stainless steel basins install gasket, plates and coupling as indicated in Figure 2-11C. Use pipe joint compound on threads for a watertight connection and screw heater element into fitting or coupling. Plugs are provided in conduit openings of heater element. Install single conduit to opening with temporary plastic plug. Do not remove pipe plug unless conduit is installed.

If heater is located over an equalizer, install the equalizer before installing the heater. Bolt heads of the equalizer fasteners must be on the inside of the basin.

If heater is within ten inches of a grp sump, a heat shield has been provided. Clean area and apply a 3/8" diameter bead of sealer Z11 around holes. Attach shield P04 to floor as shown in Figures 2-11A and 2-11B.

If heater is over 10 killowatts a heater support is required as shown in Figure 2-12C. Insert formed wire P03 thru heater support P02 and slide over the end of the heater element. Position support to keep the unsupported length of the heater element under 30 inches (76.2 cm). Clean area under support and "glue" to floor using sealer Z11.

Install the control probe in the bulkhead fitting as shown in Figure 2-12A. Use pipe joint compound on threads for a watertight connection. The bulkhead fitting is then installed in the 1 1/8" (2.86 cm) diameter hole in the collection basin.

The basin heater control box (Figure 2-12B) is to be located and installed by the customer, outside the cooling tower. Control probe cord length of 12'-0" (3.66 m) limits control box location.
EXTERNAL VIBRATION SWITCH

If your tower is equipped with an external Metrix, Robertshaw, Murphy, or other vibration switch, install bracket M98 to the fan deck on the motor side of the tower as shown. The bracket may be rotated 180° from the position shown on towers without the ladder and handrail option. Install switch M99 as shown. If a rainshield is required, it is provided for installation between the beam and the switch using the switch mounting hardware.

<table>
<thead>
<tr>
<th>Find No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>V04</td>
<td>1/4&quot;x1 1/2&quot; Bolt (all thrd.)</td>
</tr>
<tr>
<td>V19</td>
<td>1/2&quot;x1 1/2&quot; Bolt</td>
</tr>
<tr>
<td>W01</td>
<td>1/4&quot; Lock Washer</td>
</tr>
<tr>
<td>W03</td>
<td>1/2&quot; Lock Washer</td>
</tr>
<tr>
<td>W23</td>
<td>1/2&quot; Flat Washer</td>
</tr>
<tr>
<td>X01</td>
<td>1/4&quot; Nut</td>
</tr>
<tr>
<td>X03</td>
<td>1/2&quot; Nut</td>
</tr>
</tbody>
</table>
(This page intentionally left blank.)
**MOTOR OUTSIDE AIRSTREAM (MOA)**

On towers with MOA option, the motor must be installed in the field on a special support outside the tower and a driveshaft is used as the drive line between motor and Geareducer.

For models NC8301 thru NC8303 refer to Figure 3-1. Attach support clips M35 to support rails M29 and M36. Insert end gusset M34 into each support rail and attach with hardware as shown. Install bottom plate M45 to the bottom of the support rails. Attach support assembly to the outside of tower as shown.

### Find No. | Description
--- | ---
V19 | 1/2"x1 1/2" Bolt
V32 | 3/4"x2" Bolt
W03 | 1/2" Lock Washer
X03 | 1/2" Nut
X04 | 3/4" Nut
X13 | 1/2" Self-locking Nut
X15 | 3/4" Self-locking Nut
For models NC8304 thru NC8312 refer to Figure 3-2. Attach support clips M35 to support rails M29 and M36. Insert one rail gusset M34 into the center of each support rail, but do not fasten with hardware at this time. Insert end gusset M34 into each support rail and attach with hardware as shown. Install bottom plate M45 to the bottom of the support rails. Attach support assembly to the outside of tower as shown.
Install motor supports M25 and/or M26 as shown in Figure 3-3. For NC8304 thru NC8312 models attach center gussets fitted loose previously. In order to determine the motor support and gusset positions, you must determine your tower model and motor frame size. Then refer to the appropriate figures in this section.

**Figure 3-3**

<table>
<thead>
<tr>
<th>Find No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>V19</td>
<td>1/2&quot;x1 1/2&quot; Bolt</td>
</tr>
<tr>
<td>W03</td>
<td>1/2&quot; Lock Washer</td>
</tr>
<tr>
<td>W23</td>
<td>1/2&quot; Flat Washer</td>
</tr>
<tr>
<td>X03</td>
<td>1/2&quot; Nut</td>
</tr>
<tr>
<td>X13</td>
<td>1/2&quot; Self-locking Nut</td>
</tr>
</tbody>
</table>
If your tower model and motor frame size are listed in the table below, orient motor support M25 as shown in Figure 3-4A. Install motor support at the dimensions shown in Figure 3-4B.

<table>
<thead>
<tr>
<th>Tower Model</th>
<th>Motor Frame</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC8301</td>
<td>184T</td>
<td>15 1/4&quot; (387mm)</td>
<td>4 3/8&quot; (111mm)</td>
</tr>
<tr>
<td>NC8301</td>
<td>213T &amp; 215T</td>
<td>11 13/16&quot; (300mm)</td>
<td>4 3/8&quot; (111mm)</td>
</tr>
</tbody>
</table>
If your tower model and motor frame size are listed in the table below, orient motor support M25 as shown in Figure 3-5A. Install motor support at the dimensions shown in Figure 3-5B.

<table>
<thead>
<tr>
<th>Tower Model</th>
<th>Motor Frame</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC8301</td>
<td>254T &amp; 256T</td>
<td>10 15/16&quot; (278mm)</td>
<td>4 3/8&quot; (111mm)</td>
</tr>
<tr>
<td></td>
<td>284TS &amp; 286TS</td>
<td>7 9/16&quot; (192mm)</td>
<td>4 3/8&quot; (111mm)</td>
</tr>
</tbody>
</table>
If your tower model and motor frame size are listed in the table below, orient motor support M25 as shown in Figure 3-6A. Install motor support at the dimensions shown in Figure 3-6B.

<table>
<thead>
<tr>
<th>Tower Model</th>
<th>Motor Frame</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC8302 &amp; NC8303</td>
<td>184T</td>
<td>12 1/2&quot; (317mm)</td>
<td>7 1/8&quot; (181mm)</td>
</tr>
</tbody>
</table>
If your tower model and motor frame size are listed in the table below, orient motor support M25 as shown in Figure 3-7A. Install motor support at the dimensions shown in Figure 3-7B.

<table>
<thead>
<tr>
<th>Tower Model</th>
<th>Motor Frame</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC8302 &amp; NC8303</td>
<td>213T &amp; 215T</td>
<td>10&quot; (254mm)</td>
<td>7 1/8&quot; (181mm)</td>
</tr>
</tbody>
</table>
If your tower model and motor frame size are listed in the table below, orient motor supports M25 as shown in Figure 3-8A. Notice that the back hat is turned 180 degrees from the front hat. Install motor support at the dimensions shown in Figure 3-8B.

### Table: Tower Model and Motor Frame Sizes

<table>
<thead>
<tr>
<th>Tower Model</th>
<th>Motor Frame</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC8302 &amp; NC8303</td>
<td>254T &amp; 256T</td>
<td>4 1/4&quot;</td>
<td>7 1/8&quot;</td>
<td>15 1/2&quot;</td>
</tr>
</tbody>
</table>

(All dimensions in mm)
If your tower model and motor frame size are listed in the table below, orient motor support M25 as shown in Figure 3-9A. Install motor support at the dimensions shown in Figure 3-9B.

<table>
<thead>
<tr>
<th>Tower Model</th>
<th>Motor Frame</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC8302 &amp; NC8303</td>
<td>284TS &amp; 286TS</td>
<td>6 7/8&quot; (175mm)</td>
<td>4 3/8&quot; (111mm)</td>
</tr>
</tbody>
</table>
If your tower model and motor frame size are listed in the table below, orient motor supports M25 and M26 as shown in Figure 3-10A. Install motor support at the dimensions shown in Figure 3-10B.

<table>
<thead>
<tr>
<th>Tower Model</th>
<th>Motor Frame</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC8302 &amp; NC8303</td>
<td>324TS &amp; 326TS</td>
<td>4 1/4&quot; (108mm)</td>
<td>4 3/8&quot; (111mm)</td>
<td>13 5/8&quot; (346mm)</td>
</tr>
</tbody>
</table>
If your tower model and motor frame size are listed in the table below, orient motor supports M25 as shown in Figure 3-11A. Install motor support at the dimensions shown in Figure 3-11B.

<table>
<thead>
<tr>
<th>Tower Model</th>
<th>Motor Frame</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC8304 &amp; NC8305</td>
<td>213T &amp; 215T</td>
<td>16 5/8&quot; (422mm)</td>
<td>5 7/16&quot; (138mm)</td>
</tr>
<tr>
<td>NC8306 &amp; NC8307</td>
<td></td>
<td></td>
<td>7 1/8&quot; (181mm)</td>
</tr>
</tbody>
</table>
If your tower model and motor frame size are listed in the table below, orient motor supports M25 as shown in Figure 3-12A. **Notice that the back hat is turned 180 degrees from the front hat.** Install motor support at the dimensions shown in Figure 3-12B.

<table>
<thead>
<tr>
<th>Tower Model</th>
<th>Motor Frame</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC8304 &amp; NC8305</td>
<td>254T &amp; 256T</td>
<td>10 7/8&quot; (276mm)</td>
<td>5 7/16&quot; (138mm)</td>
<td>22 1/8&quot; (562mm)</td>
</tr>
<tr>
<td>NC8306 thru NC8312</td>
<td></td>
<td></td>
<td>7 1/8&quot; (181mm)</td>
<td></td>
</tr>
</tbody>
</table>
If your tower model and motor frame size are listed in the table below, orient motor supports M25 as shown in Figure 3-13A. **Notice that the back hat is turned 180 degrees from the front hat.** Install motor support at the dimensions shown in Figure 3-13B.

<table>
<thead>
<tr>
<th>Tower Model</th>
<th>Motor Frame</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC8304 &amp; NC8305</td>
<td>284T &amp; 286T</td>
<td>9 1/4&quot; (235mm)</td>
<td>5 7/16&quot; (138mm)</td>
<td>20 1/4&quot; (514mm)</td>
</tr>
<tr>
<td>NC8306 thru NC8312</td>
<td></td>
<td></td>
<td>7 1/8&quot; (181mm)</td>
<td></td>
</tr>
</tbody>
</table>
If your tower model and motor frame size are listed in the table below, orient motor supports M25 as shown in Figure 3-14A. Install motor support at the dimensions shown in Figure 3-14B.

<table>
<thead>
<tr>
<th>Tower Model</th>
<th>Motor Frame</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC8304</td>
<td>324T &amp; 326T</td>
<td>7 1/8&quot; (181mm)</td>
<td>5 7/16&quot; (138mm)</td>
<td>19 1/8&quot; (486mm)</td>
</tr>
<tr>
<td>NC8305</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NC8306 thru NC8312</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
If your tower model and motor frame size are listed in the table below, orient motor supports M25 as shown in Figure 3-15A. Install motor support at the dimensions shown in Figure 3-15B.

<table>
<thead>
<tr>
<th>Tower Model</th>
<th>Motor Frame</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC8304</td>
<td>364T &amp; 365T</td>
<td>5 7/16” (138mm)</td>
<td>5 7/16” (138mm)</td>
<td>16 5/8” (422mm)</td>
</tr>
<tr>
<td>NC8305</td>
<td></td>
<td>5 3/8” (137mm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NC8306 thru NC8312</td>
<td></td>
<td>7 1/8” (181mm)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
If your tower model and motor frame size are listed in the table below, orient motor supports M25 as shown in Figure 3-16A. **Notice that the back hat is turned 180 degrees from the front hat.** Install motor support at the dimensions shown in Figure 3-16B.

<table>
<thead>
<tr>
<th>Tower Model</th>
<th>Motor Frame</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC8306 thru NC8312</td>
<td>404T</td>
<td>4 1/8&quot; (105mm)</td>
<td>7 1/8&quot; (181mm)</td>
<td>15 3/8&quot; (391mm)</td>
</tr>
<tr>
<td>2200 &amp; 2400 Geareducer only</td>
<td>405T</td>
<td>2 5/8 (67mm)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
If your tower model and motor frame size are listed in the table below, orient motor supports M25 and M26 as shown in Figure 3-17A. Install motor support at the dimensions shown in Figure 3-17B.

<table>
<thead>
<tr>
<th>Tower Model</th>
<th>Motor Frame</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC8306 thru NC8312</td>
<td>444T</td>
<td>4 1/8&quot; (105mm)</td>
<td>7 1/8&quot; (181mm)</td>
<td>15 3/8&quot; (391mm)</td>
</tr>
<tr>
<td>2200 &amp; 2400 Geareducers only</td>
<td>445T</td>
<td>2 5/8 (67mm)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Attach the loose center gusset at the position shown.

Motor front mounting holes

Figure 3-17A

Figure 3-17B
If your tower model and motor frame size are listed in the table below, orient motor supports M25 as shown in Figure 3-18A. **Notice that the back hat is turned 180 degrees from the front hat.** Install motor support at the dimensions shown in Figure 3-18B.

<table>
<thead>
<tr>
<th>Tower Model</th>
<th>Motor Frame</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC8312 with Series 3000 Geareducer</td>
<td>405T</td>
<td>16 1/8” (410mm)</td>
<td>29 1/8” (740mm)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>445T</td>
<td>11 3/8” (289mm)</td>
<td>24 3/8” (619mm)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>447T</td>
<td>7 7/8” (200mm)</td>
<td>27 7/8” (708mm)</td>
<td></td>
</tr>
</tbody>
</table>
If your tower model and motor frame size are listed in the table below, orient motor supports M25 as shown in Figure 3-19A. Install motor support at the dimensions shown in Figure 3-19B.

<table>
<thead>
<tr>
<th>Tower Model</th>
<th>Motor Frame</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC8312 with Series 3000 Geareducer</td>
<td>444T</td>
<td>13 3/8&quot; (340mm)</td>
<td>7 1/8&quot; (181mm)</td>
<td>27 7/8&quot; (759mm)</td>
</tr>
</tbody>
</table>
If your tower model and motor frame size are listed in the table below, orient motor supports M25 and M26 as shown in Figure 3-20A. Install motor support at the dimensions shown in Figure 3-20B.

<table>
<thead>
<tr>
<th>Tower Model</th>
<th>Motor Frame</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC8312 with Series 3000 Geareducer</td>
<td>449T</td>
<td>2 7/8&quot; (73mm)</td>
<td>7 1/8&quot; (181mm)</td>
<td>27 7/8&quot; (708mm)</td>
</tr>
</tbody>
</table>
For towers with 100 hp and larger motors. Add the support brackets M70 and clips M71. The clips attach to the bottom skid of the upper module.
CAUTION: Excessive force when installing the driveshaft could damage Geareducer seal. See Service Manual for installation instructions.

CAUTION: Before installing motor, on towers with 3000 gear reducers, install support brackets per page 3-21.

Figure 3-22
M.O.A. only

For optional M.O.A. (Motor Outside Airstream) installation refer to Figure 3-22. Attach motor to motor supports. Coat motor shaft, Geareducer shaft and bores of driveshaft yokes with lubricant Z21. Slide driveshaft guard M30 around driveshaft M28 and install per Driveshaft Service Manual.

Use shims Y56, as required, to align driveshaft. After installing driveshaft, coat motor and Geareducer shafts with paint. Slide guard thru hole in casing against motor and use guard clips as templates to drill (2) 3/16" (5mm) dia. holes in guard and attach to clips.

Find No. | Description
--- | ---
T06 | 1/4"x3/4" Tap Screw

See table on the next page for motor attachment hardware.

Do not apply anti-seize compound to stainless steel motor hold down bolts. Loctite will be applied to these attachments later.
CAUTION: Excessive force when installing the drive coupling could damage Geareducer seal. See Service Manual for installation instructions.

FIELD INSTALLED MOTOR

For field installation of motor inside the tower refer to Figure 3-23. Attach motor to motor supports and install drive coupling M28. Refer to Close Coupling Service Manual for installation instructions. Use shims Y56, as required, to align drive coupling. After installing drive coupling, coat motor and geareducer shafts with paint.

**Motor Attachment Hardware**

<table>
<thead>
<tr>
<th>Motor Frame</th>
<th>Find Numbers</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>184T</td>
<td>V07</td>
<td>W22</td>
</tr>
<tr>
<td>213T &amp; 215T</td>
<td>V09</td>
<td>W22</td>
</tr>
<tr>
<td>254T thru 286T, 284TS &amp; 286TS</td>
<td>V22</td>
<td>W23</td>
</tr>
<tr>
<td>324T thru 365T &amp; 324TS</td>
<td>V30</td>
<td>W29</td>
</tr>
<tr>
<td>404T thru 449T</td>
<td>V33</td>
<td>W30</td>
</tr>
</tbody>
</table>

See Figure 3-21 for alignment pin installation.

Do not apply anti-seize compound to stainless steel motor hold down bolts. Loctite will be applied to these attachments later.
Any single blade must be same distance from fan deck to fan blade around perimeter of cylinder within a range of one inch (25mm).

All blades when rotated past the same location on cylinder must be same distance from fan deck within ±A".

Fan blade

Fan cylinder

Fan Blade Pitch Detail

Fan rotation

Bevel Protractor

A ±1/8" (±3mm)

Inside of cylinder

Fan blade

Fan Tilt Check

Adjust by shimming gear reducer while maintaining alignment with motor.

Tip Track Check

If not within tolerance recheck blade, blade attachment and fan pitch.

Blade Tip Clearance Check

Adjust by repositioning Gear reducer within cylinder or by adjusting fan cylinder.

On towers with MOA option or field installed motor, final fan adjustments must be made after motor is in place. Fan blades are pitched to contract requirements in the plant. Fan blade tip clearance, tip track, and fan tilt must be adjusted, in the field, as indicated in Figure 3-24. Tower must be plumb and cylinder centered around fan to provide proper tip clearance. Use longest blade and check all around cylinder for tip clearance. Be certain each blade is in its furthest out position.

<table>
<thead>
<tr>
<th>Tower Model</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC8301</td>
<td>3/8&quot; (10mm)</td>
</tr>
<tr>
<td>NC8302 &amp; NC8303</td>
<td>7/16&quot; (11mm)</td>
</tr>
<tr>
<td>NC8304 &amp; NC8305</td>
<td>1/2&quot; (13mm)</td>
</tr>
<tr>
<td>NC8306 &amp; NC8307</td>
<td>5/8&quot; (16mm)</td>
</tr>
<tr>
<td>NC8308 &amp; NC8309</td>
<td>11/16&quot; (17mm)</td>
</tr>
<tr>
<td>NC8310 &amp; NC8311</td>
<td>5/8&quot; (16mm)</td>
</tr>
<tr>
<td>NC8312</td>
<td>11/16&quot; (17mm)</td>
</tr>
</tbody>
</table>
After all drive coupling and fan adjustments have been made refer to Figure 3-25. Tighten each motor and Geareducer nut 5 to 10 ft-lbs (7 to 13 N-m) less than specified torque while holding bolt head. Retighten nuts to specified torque. Bolt heads may be tightened while holding nut if nut is not accessible with torque wrench. Now apply thread locking compound Z05 to all bolt threads. On towers with a Series 20 or 22 Geareducer two drive pins Y55 are used to retain alignment. Using pilot holes in Geareducer feet, drill a 23/64" (9mm) diameter hole thru support and drive pin thru to project an equal distance above Geareducer foot and below support.
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