

Aqua Marine Supply E-Drive Features

- General Description

The AMS E-Drive is a double reduction worm gear reducer contained in a single housing. It was designed specifically for a boatlift application. The input is a NEMA 56C to allow mounting of a standard electric motor directly onto the reducer. The output is a hollow shaft design that is sized to accommodate a standard 2" pipe. The connection to the pipe utilizes the cross bolt identical to the current Flat Plate design. This design provides maintenance free service without grease lubrication intervals or belt drive adjustments.

- Housing

The housing is made of lightweight cast aluminum for corrosion resistance in salt water and humid environments. The housing is designed to provide separate lubrication reservoirs for the high and low speed gear sets to ensure proper lubrication without having to overfill. The housing is non-vented to prevent build up of condensation inside the reducer in humid environments.

- Gearing

There are two models of high-speed gear sets. The 4:1 and 5:1 provide for high efficiency. They utilize production gear sets from an industrial product line designed to AGMA specifications. The worm is made from heat-treated steel alloy and meshed with a bronze worm gear. There are two models of low-speed gear sets of 96:1 and 120:1. They are designed to have extremely low helix angle to prevent any possibility of back drifting. The worm and bull gear also mesh a bronze and heat-treated steel configuration. The large center distance of the low speed gear set results in lower tooth loads for a given output torque.

- Bearings

All shaft and gears are supported by deep groove ball bearings to provide precision positioning and high efficiency. The low speed worm bearings are pre-lubricated and shielded to ensure proper lubrication and contain the lubrication in the high-speed cavity.

- Lubrication

The AMS E-Drive is factory filled with high quality semi-fluid grease. This high viscosity grease is capable of handling the high shear stress inherent in worm gear products. The semi-fluid grease greatly reduces the potential for leakage.

- Sealing

The E-Drive utilizes spring loaded triple lip oil seals. The triple lip design helps protect the sealing lip from outside contaminants and shaft corrosion. The spring loaded sealing lips are more than capable of handling the small internal pressures that may result from the temperature changes that occur throughout the year.

- Mounting

The E-Drive is shaft mounted with a flange to accommodate a torque arm connection to resist rotation of the housing. This allows for a flexible mounting system so the housing can move with the shaft, without binding. This eliminates the need for a precise machined mounting surface to secure the housing to the frame. **DO NOT USE A STAINLESS STEEL BOLT** to mount the E-Drive (due to the properties of stainless steel).

SPECIAL NOTE

- Drive Bolt

This bolt is ½ x 4 grade 5, casehardened. The nut is self-locking. **It is very important the nut NOT BE TIGHTENED against the hub of the drive gear casting.** Since the nut is self-locking, it can be tightened with 1/8" – ¼" from the hub. Castings are extremely strong; however, unlike steel tubing, they do not take compression, and will crack. **DO NOT REPLACE THIS BOLT WITH A STAINLESS STEEL BOLT!**

- Evaluating Gear Performance When Installed

Open Gear Flat Plate systems can easily be inspected if the lift structure is misaligned or too great of weight is being lifted. These open systems will make noise, leave metal shavings or boil grease off when placed in overload conditions.

The enclosed E-Drive conceals all these characteristics. Therefore we are recommending that on each installation the voltage drop be checked under load. Determine the voltage at the service panel. Then check the voltage across L-1 & L-2 on each motor under load. The drop **MUST NOT** exceed 4% (if 117v @ panel, 4%=5v, Voltage @ the motor should not be lower than 112v, under load). If the drop is more than 4%, the problem must be addressed before leaving the job site.

Every E-Drive is provided with a tube of anti-seize, to be applied to the motor shaft prior to installation.

IMPORTANT The E-Drive comes with special Corrosion X Heavy-Duty Anti-Rust lubrication on the front & back of the steel output shaft. Periodically check the area where the oil seal touches the shaft and make sure a lubricant (such as grease) is in this area to prevent excessive rust.

For additional assistance please call Aqua Marine Supply at 1-888-350-Lift (5438)

Torque Calculations

$$\text{Torque} = \text{Force} \times \text{Distance}$$

In the case of a boatlift, the distance is the radius from the center of rotation to the centerline of the cable. The force is the total weight being lifted.

Example: What is the torque required to lift 3000 pounds with a ¼” cable wrapped around a 2” pipe? The nominal outside diameter of a 2” pipe is 2.375”. The distance in this case would be half the pipe diameter plus half the cable diameter, which equals 1.3125”. The force is the cable pull – 3000 pounds. The torque would be 1.3125” x 3000 lbs. = 3937.5 inch pounds.

We recommend not to ever exceed 85% of the maximum capacity (6000 x 85% = 5100 inch pounds).

We realize that the application of Gears varies greatly depending on many factors. We would recommend that all applications be calculated based on the example below. The example is using hypothetical numbers which would change according to individual design. Plug the appropriate values into the formula below to determine the torque on each motor. Which we recommend should not exceed 5100 inch pounds.

- 10,000 lb. lift divided by 2 motors equals 5000 lbs per motor
- 5000 lb. motor divided by 2 part line equals 2500 lbs per motor
- 2500 lbs per motor divide by .85 (friction factor) equals 2941 lbs per motor
- 2941 lbs per motor x radius (2.5” cable drum / 2 = 1.25) equals 3676
$$\frac{\text{FORCE}}{\text{FORCE}} \times \frac{\text{DISTANCE}}{\text{DISTANCE}} = \frac{\text{inch lbs of torque/motor}}{\text{inch lbs of torque/motor}}$$

*Note: Torque is Force times Distance

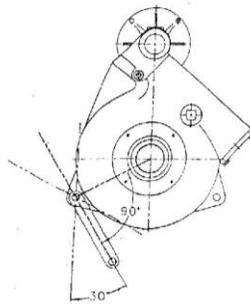
Radius is Diameter of cable winder plus cable divided by 2

Suggested Mounting for AMS Reducer

The AMS E-Drive is designed to be shaft mounted. It is intended to have a Flexible Mounting System to allow the housing to move with the shaft without bonding. This eliminates the need for a precise machined mounting surface to secure the housing to the frame. It is very important that the mounting eye not be put in a bind by rigidly attaching it to a mounting bracket. Rigid attachment will not allow the gear to flex with the lifting shaft and will eventually cause premature wear on seals, bearings and gears, while creates a greater risk of cracking the aluminum casting.

Position of Torque Link

It is very common for shaft-mounted gearboxes to incorporate some type of torque arm/link to prevent the gearbox from rotating with the shaft. This torque link allows the gear to “wobble” as the shaft rotates. The ideal position of this link would be a 90-degree angle with a line drawn from the center of the shaft to the connecting point. See figure below. As illustrated in this figure, it is acceptable for this angle to vary +/- 30 degrees. If the link varies more either way, the load in that link increases by 16%.



E-Drive Warranty

Aqua Marine Supply E-Drive are guaranteed for Two Years to be free from any and all manufacturing defects in material and workmanship. The unit will be replaced within the first 12 months and prorated months 13-24. We will cover damage to your E-Drive caused by defects in workmanship or quality of the material. This warranty does not cover labor, cost to return product for warranty evaluation or damages resulting from any defects. This warranty ONLY applicable to the original purchaser and is NON-TRANSFERABLE.

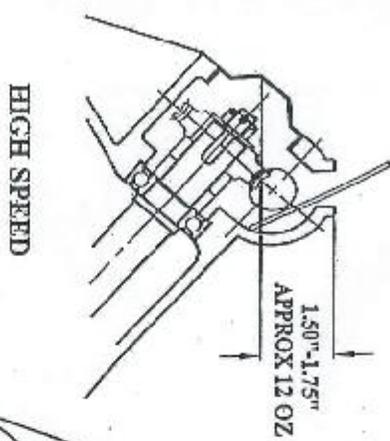
We reserve the right, at our option, to repair the E-Drive components or replace the entire E-Drive. This guarantee does not cover damage resulting from abuse, neglect, improper handling or incorrect installations. Warranty is predicated on the E-Drive being inspected and serviced on an annual basis by a qualified technician. A record of inspection is required with any warranty request.

The guarantee does not cover ordinary wear and tear. As with any gear, component parts, particularly moving parts will show wear over time and eventually may need to be refurbished or replaced. If such wear and tear occurs, Aqua Marine Supply can provide you with the option of either repairing or refurbishing your E-Drive. Please contact your original dealer or contractor for warranty or contact Aqua Marine Supply.

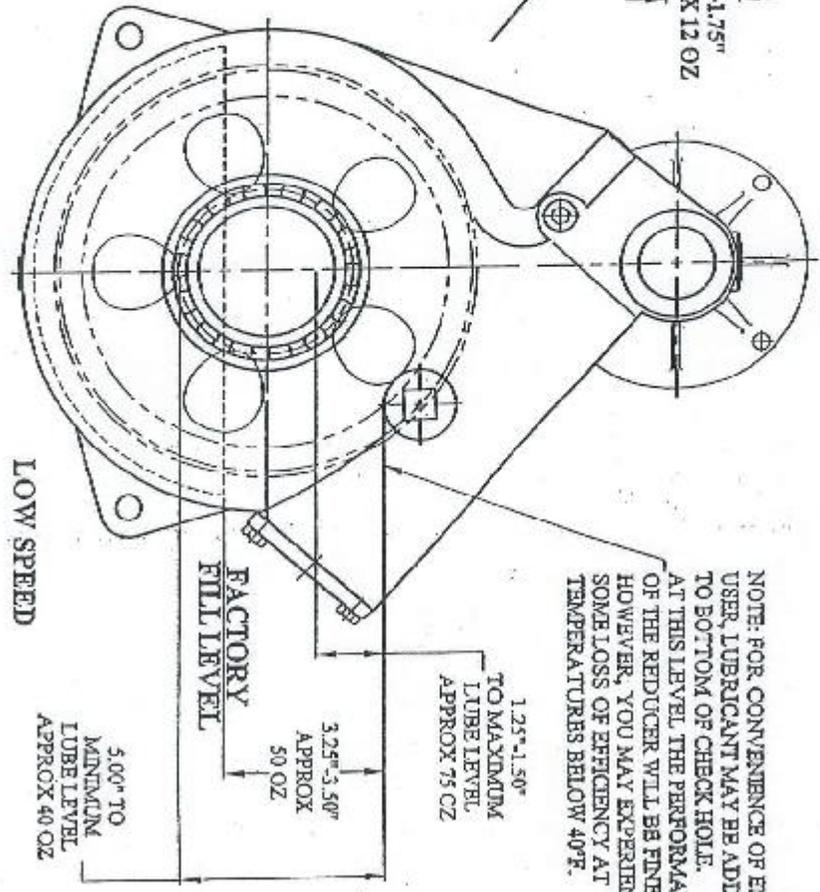
All defective parts must be returned to Aqua Marine Supply with the following information to be considered for warranty repair and/or replacement and must be returned within 30 days of failure. Items must be shipped **Pre Paid Freight** and **MUST** have a RMA number on outside of box(s), Call for RMA number before shipping. The warranty is valid only if an annual inspection record is kept by a professional lift installer.

- Date installed
- Type of lift
- Weight being lifted
- Detailed description of the problem
- Any service history

THIS REDUCER HAS SEPARATE RESERVOIRS FOR THE HIGH-SPEED AND LOW-SPEED GEARSETS. THE LUBRICANT LEVELS FOR BOTH COMPARTMENTS MUST BE MAINTAINED.



HIGH SPEED



LOW SPEED

NOTE: FOR CONVENIENCE OF END USER, LUBRICANT MAY BE ADDED TO BOTTOM OF CHECK HOLE. AT THIS LEVEL THE PERFORMANCE OF THE REDUCER WILL BE FINE. HOWEVER, YOU MAY EXPERIENCE SOME LOSS OF EFFICIENCY AT TEMPERATURES BELOW 40°F.

Lubricant
Mobilux EP 023

