
Gleason Reel—Vector Duty Motor Reel

Installation, Operation, and Maintenance

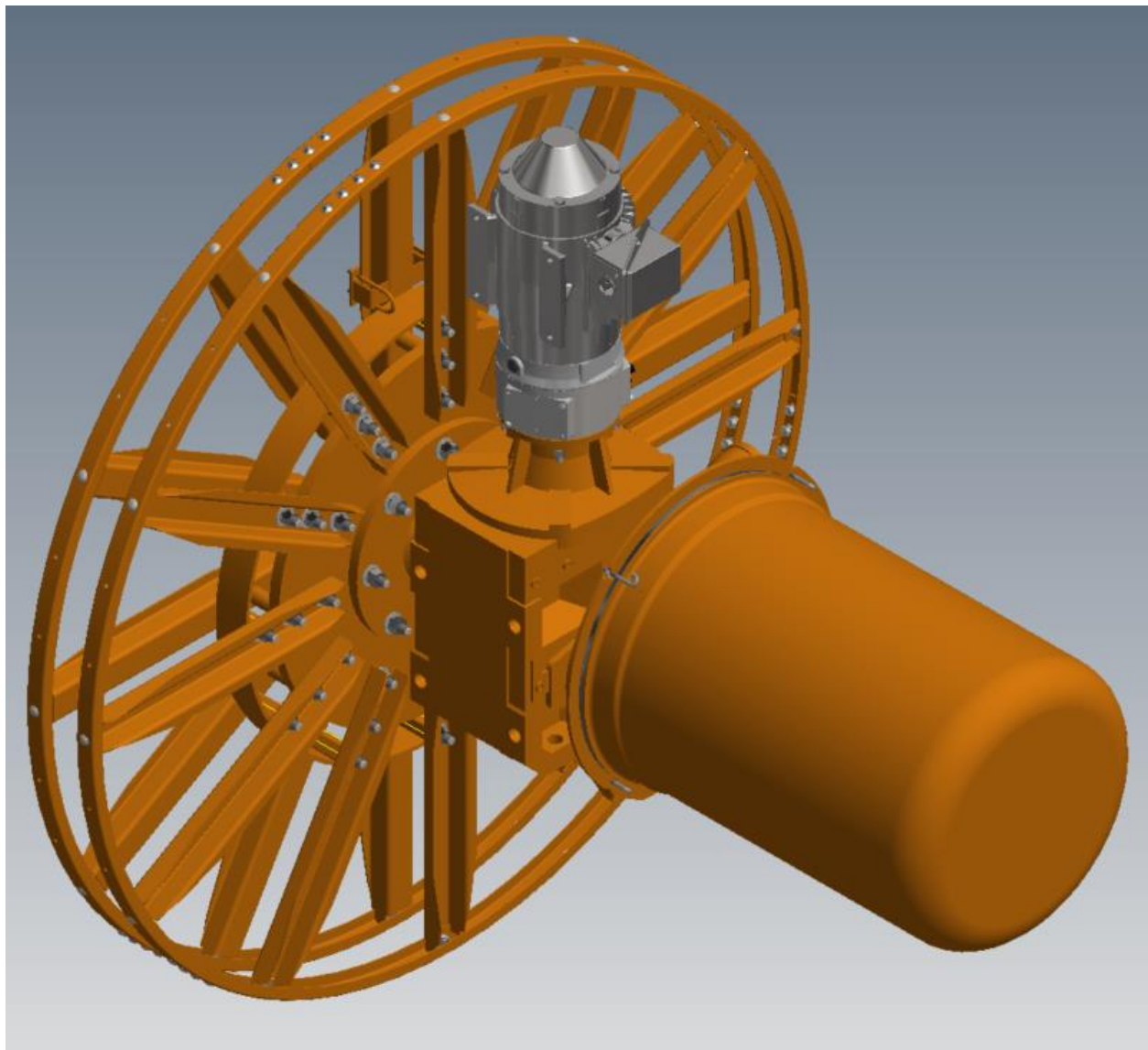


Figure 1: Vector Duty Motor Reel

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Introduction

Introduction

Purpose

This document provides installation, operation, and maintenance information for Gleason Reel's vector duty Motor Reel. The customer and all individuals using and/or maintaining the vector duty motor reel product/system must:

- Read and adhere to the information in this manual to install and use the reel safely and professionally.
- Pay particular attention to the safety instructions/warnings and general guidelines for installation and maintenance.
- Keep a copy of this manual available, on site, for reference.

NOTE: Each vector duty motor reel is tailored to given application requirements. The contents within this manual are to be utilized as reference material for standard use cases. It is likely a given motor reel may differ, requiring less/more specific, contextual information. Use this manual as a general guideline for installation, operation, and maintenance. If there are any application specific deviations requiring further information, reach out to your Gleason Reel representative.

 CAUTION
<ul style="list-style-type: none">• Failure to adhere to the information in this manual may result in injury and/or property damage and may void the warranty.• Gleason Reel advises the installer and customer to fully review this manual prior to product installation and utilization.• The vector duty motor reel in question may differ from the contents within this manual. The content below is to be referenced as a general guideline only.
Failure to adhere to this information may result in death, serious injury, and/or property damage.

Introduction

Product/System Overview

The vector duty motor reel is an intelligent, VFD (variable frequency drive) controlled motor reel designed primarily to be mounted directly onto moving machinery, where automatic (unattended) movement is required. Electric current flows from a designated power source to the machine, or current consumer, through the specified electrical cable mounted on the spool. A self-contained slip ring assembly transfers the current safely from the power source, through the rotating spool body dispensing/retracting the cable, and to the designated machinery. The rugged reel design minimizes the overall footprint of the reel while managing a wide variety of cable diameters and lengths efficiently and carefully for the application needs.

The vector duty motor reel properly manages electrical cable connected to moving machinery. When the machine moves away from the reel, the cable is pulled off of the spool as the machine travels along the designated operating path. This motor is pulled backward, acting as a drag brake, to maintain cable tension. When the machine reverses direction and moves towards the reel the motor runs and wraps the cable back onto the spool while keeping the cable taught at all times.

Introduction

Functional System Overview

The vector duty motor reel's primary function is to maintain the proper amount of torque to extend/retract electrical cable as needed for the customer's dynamic machinery, keeping any cable not required neatly spooled on the reel. Cable between the spool and the machinery will remain taut and straight, keeping the cable out of the way of standard operation. The vector duty motor reels are comprised of four major components: spool assemblies, slip rings, drives, and resistors. Additionally, as each application has specific needs, there are a number of accessories that can be paired with the reel to properly meet the application's requirements. The most typical of these accessories include cable guides, cable anchors, limit switches, encoders, and heaters.

Spool Assembly

Spool assemblies typically consist of two spool discs and a drum. The assembly secures the cable to the reel and must be designed to allow repeated winding and unwinding of the cable onto and off of the drum. Spool discs restrict the cable from falling off of the reel and the drum wraps the cable onto the reel while maintaining the minimum bend radius of the specific cable. In general, spool assemblies consist of one of three wrapping methods: random wrapping, level wind wrapping, or monospiral wrapping. It is always ideal to utilize wrapping methods which allow the spool assembly to have full control over the cable wrapped layers. The single layer level wind and monospiral spools control the cable and only allow for wrapping in the designated position for the given layer. Random wrap spools allow the cable to wrap freely on the spool but are often required for applications with restricted spacing. Figure 2 shows visual representation of the defined wrapping methods.

Spring reels are typically random wrap for reasons of space and economy.

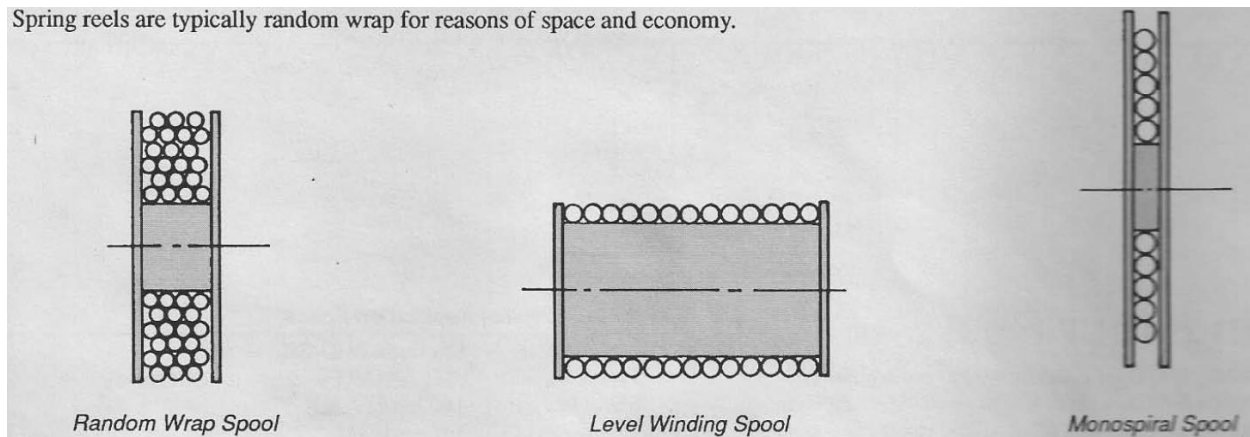


Figure 2: Spool Assembly Wrapping Methods

Slip Ring

Slip rings are comprised of current conducting rings (one per conductor) and mated brush assemblies. Either the rings or the brushes are held steady, while the mating component is rotated. This allows current to pass through the sliding contact from the stationary to the rotary component. Slip rings are rated higher than the cable used to provide ample safety margins and to comply with the National Electric Code. The number of rings will depend on the application requirements.

Introduction

Drive

The drive for the vector duty motor reel is a VFD that regulates the motor to maintain the necessary torque required for the application. The system utilizes custom programming to assure constant torque is provided throughout the various stages of the duty cycle. When cable is pulled off of the reel, the torque is reduced, eliminating the high cable tensions caused by the inertia when accelerating the reel backwards.

Resistors

When the machinery pulls the electrical cable off of the reel, the motor is backwound. This causes a regenerative effect, and the power flow reverts, sending power from the motor to the VFD. Due to the large electrical capacity of the reels, an external resistor is used to dissipate the regenerative energy safely. The resistor is sized accordingly off of the application requirements.

Accessory – Cable Guide

Cable guides are optional and intended to channel the cable on/off the spool in a given orientation and direction. This control can lessen strain seen on the electrical cable and minimize motor reel maintenance by providing proper spooling and extraction/retraction of the cable.

Accessory – Cable Anchor

Cable anchors establish an extra form of protection against strain to the connection point between the cable and power supply. Typically, a cable anchor consists of a spool positioned directly after the cable termination box. The cable running from the termination box to the reel is first wound around the cable anchor spool a minimum of two times. Should any strain be subjected to the cable, the cable wrapped around the cable anchor spool will tighten first, transferring the strain away from the termination box and onto the cable anchor spool. Figure 3 show an illustration of a cable anchor in an under-ground level application:

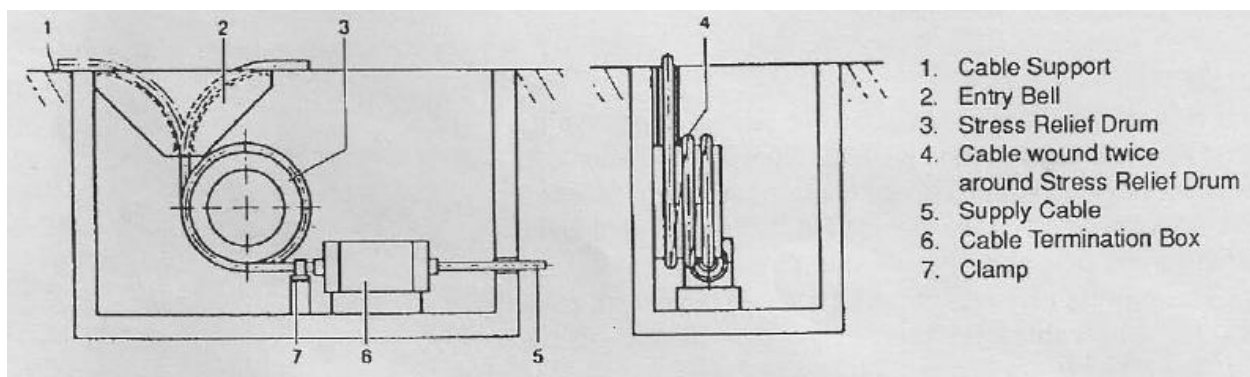


Figure 3: Cable Anchoring Illustration

Introduction

Accessory – Limit Switch

Limit switches can be provided to tie into the machinery the vector duty motor reel is connected to. During install, the switch is set to restrict the machines motion past a certain distance. This assures the reel is not over-extended, leading to damage to the electric cable, reel, and/or machine.

Accessory – Encoder

Motor encoders convert the rotational motion of the motor and convert it to an electrical feedback signal for the VFD. Use of an encoder allows the reel to meet the torque requirements of the application more precisely through direct feedback.

Accessory - Heater

Heaters may be required for applications in environments with high amounts of condensation or colder temperatures. If placed in surroundings that may be subjected to freezing temperatures, a heater in the control panel will be necessary to maintain the ambient operating temperature above the minimum requirements of the controls. Depending on environmental conditions, condensation within the slip ring enclosure or control panel may be of concern. Anti-condensation heaters can be installed to prevent any build-up of moisture within these components.

Physical System Overview

The drawing below in Figure 4 shows the general layout of a typical vector duty motor reel.

NOTE: Each vector duty motor reel is made-to-order for a given application. The image below is for the general application commonly used with vector duty motor reels, but any given reel may differ from the below to meet customer requirements. For the specific reel drawing of an order, refer to the drawing package supplied with this manual or reach out to your Gleason Reel representative.

Introduction

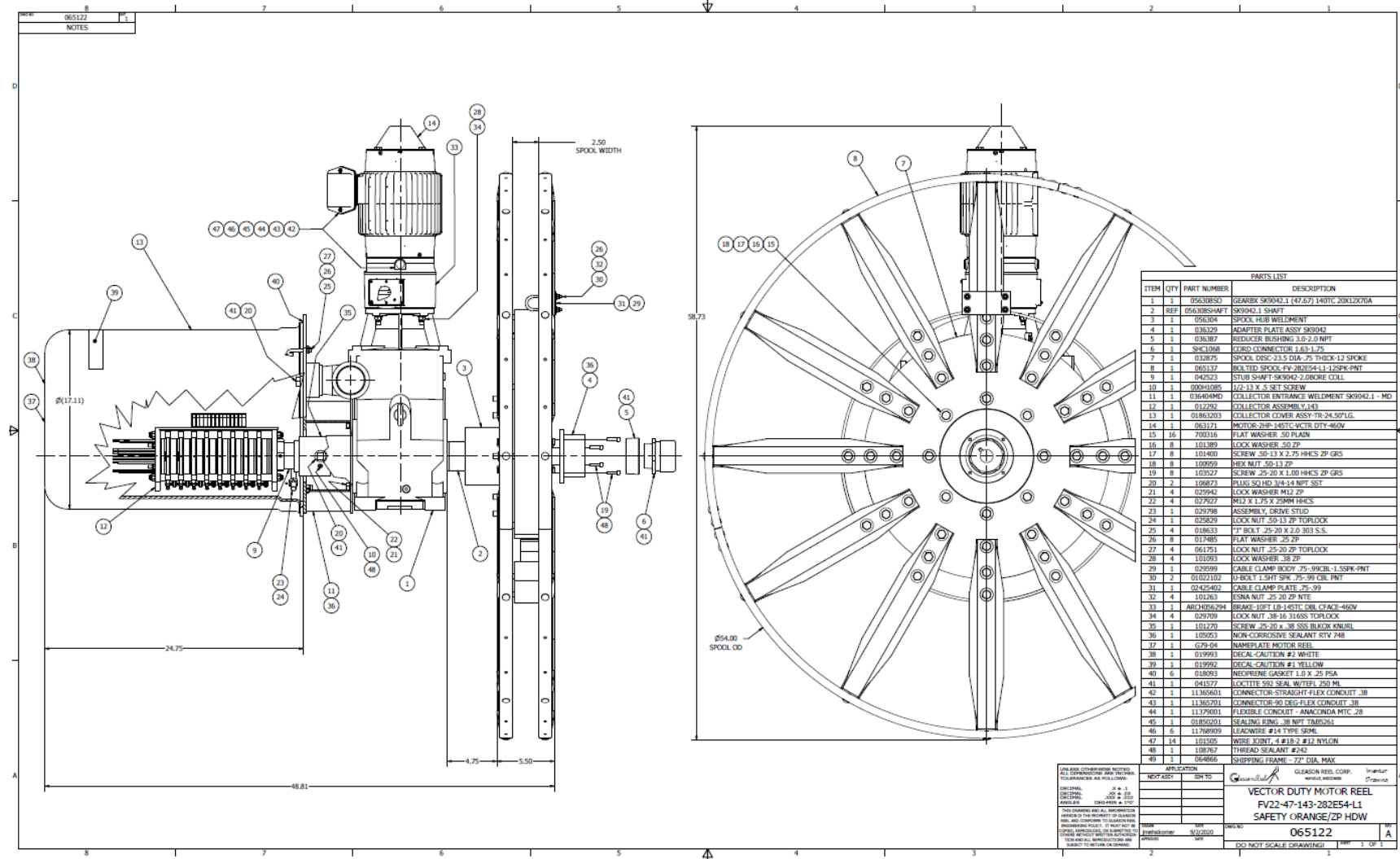


Figure 4: Vector Duty Motor Reel

Nameplate/Product Specifications

Nameplate/Product Specifications

Table 1: Vector Duty Motor Reel Application Specifications

Description		Specification
Vector Duty Motor Reel Part Number		
Vector Duty Motor Reel Model Number		
Vector Duty Motor Reel Serial Number		
Customer		
Gearbox	Part Number	
	Model Number	
	Serial Number	
	Gear Ratio	
Drive Motor	Part Number	
	Model Number	
	Serial Number	
	Horsepower	
	# Phase	3 PH
	Frequency	60 Hz
	Voltage	460 V ac
	Full Load Amps	
	RPM	
Frame Size		
Brake	Part Number	
	Model Number	
	Serial Number	
Controller	Model Number	
	Serial Number	
Resistor	Model Number	
	Serial Number	
Installation Date (Customer Filled)		

NOTE: Enter the vector duty motor reel's installation date in the table above to maintain a record of this information.

Safety

Safety

Safety Documentation/Protocol

By purchasing and installing this product, the customer assumes all responsibility and risk that the product's usage is as the manufacturer intends. This includes compliance to the safety resources in this document, as well as all third-party safety regulations put forth by the customer and/or geographical location of installation. To guarantee the safety of the product user, it is utterly important to understand and follow the guidelines below. Under no circumstance does the manufacturer assume any liability for deviations from the procedures within this document.

As mentioned throughout this document, vector duty motor reel applications are tailored to the customer application. It is the responsibility of the customer to ensure proper precautions and understanding are obtained specific to their application prior to installing, using, or maintaining this product. If there are any concerns or inquiries regarding the specific application in questions, reach out to your Gleason Reel representative.

CAUTION

- It is the responsibility of the customer to understand the safety requirements associated with their given application.
- The vector duty motor reel in question may differ from the contents within this manual. The content below is to be referenced as a general guideline only.
- Gleason Reel advises the customer to reach out for any inquiries associated with the given application.

Failure to adhere to this information may result in death, serious injury, and/or property damage.

Environmental Safety

For disposal of this product, observe all current local, federal, and state regulations pertaining to discarding/recycling various materials. This product primarily consists of steel. Dispose of these components via local recycling practices. Refer to [Appendix A: Additional Resources](#) and Equipment Manual, for subcomponent manuals (variable frequency drive, gearbox, etc.) and their proper disposal requirements.

For inquiries about product disposal, reach out to your Gleason Reel representative.

Safety

User Safety


This product requires qualified personnel for installation, operation, and maintenance procedures. Allowing unqualified personnel to install, operate, or maintain this equipment may lead to unsafe operation of the product and potential damage to the unit and/or injury to employees/bystanders.

A qualified person(s) is an individual or individuals who have the proper training in accordance with relevant laws and regulations. All qualified personnel must be familiar with this installation, operation, and maintenance manual prior to performing any work.

Gleason Reel recommends following all applicable OSHA, NFPA, NEC, and local guidelines when working on this product.

NOTE: This equipment has an arc flash potential; follow NFPA 70E.

- The installation’s available fault current determines the level of arc protection clothing necessary. The end user must label this equipment accordingly.
- In general terms, the NEC lists low voltage as less than 600 volts.

	! DANGER
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH	
<ul style="list-style-type: none"> • Apply appropriate PPE (personal protective equipment) and follow safe electrical work practices. See NFPA 70E • Only qualified electrical personnel shall install and service this equipment. • Turn off all power supplying this equipment before working on or inside equipment • Always use a properly rated voltage sensing device to confirm power is off. • Replace all devices, doors and covers before turning on power to this equipment. 	
<p>Failure to follow these instructions will result in death or serious injury.</p>	

Safety

Standard Safety Procedures

Gleason Reel recommends following standard safety procedures when installing, operating, or maintaining this product. Always check for additional requirements from the employer and/or geographical location. Refer to the following list of recommended safety procedures:

- LOTO (Lock Out Tag Out),
- suitable physical barrier around workplace,
- safety guards in place,
- clear path within and around working area,
- qualified personnel only,
- ensure equipment is clean, and
- utilize proper PPE (personal protective equipment).

Equipment Specific Warnings


VFD (Variable Frequency Drive)—Leakage Current

Pairing VFDs with AC motors generates leakage current that may flow out of the drive. The cause of this is the capacitances existing between the various components within the system. The leakage current may prematurely trip circuit breakers and relays.

Variable Frequency Drive (VFD)—Discharge Time

After power is removed from the drive, wait a minimum of 10 minutes to allow the capacitors sufficient time to discharge prior to any interaction. Using a quality voltage tester, verify the voltage between the drive input power terminals and grounding busbar is zero. Additionally, verify the voltage between the drive output terminals and the grounding busbar is zero.

Repeat the measurements with the DC voltage setting of the testing, measuring between each phase and the ground. Due to leakage capacitances within the motor circuit, DC voltage charging may be present. This voltage can remain charged for a long duration after power has been removed from the drive. Conducting the voltage measurement discharges the voltage.

 WARNING
WHEN REMOVING POWER FROM A VFD, THE CAPACITORS RETAIN ELECTRICAL CHARGE FOR SOME TIME.
<p>Do NOT interact with the VFD until after the capacitors have sufficient time to discharge.</p> <p style="padding-left: 40px;">The standard wait time for this process is at least 10 minutes after removing power.</p> <p>Verify the voltage between the above locations is zero prior to any interaction.</p>
<p>Failure to follow these instructions may result in death or serious Injury.</p>

For more information, see the VFD manual that highlights precautions to take when working with a VFD.

Rotational Bodies—Shaft

 CAUTION
<p>This product utilizes components that rotate. Rotating parts may catch loose clothing, hair, or accessories/jewelry. This can lead to severe injury. Secure loose clothing, jewelry, and any other loose or protruding items before installing or maintaining this product.</p>
<p>Failure to follow these instructions may result in death or serious Injury.</p>

Transportation and Storage

Transportation and Storage

Package Inspection

Upon receiving the product package, review the shipment for any damage or missing items. The vector duty motor reel will generally be delivered installed on a shipping frame. Depending on the reel size, the spool assembly components may be shipped separately and require on-site assembly. This cross-over is standard at spool diameters greater than 6 ft. Take note of any damage and any other observations on receipt of shipment. If required, reach out to your Gleason Reel Representative for any claims for damaged product.


Product Inspection

Inspect the product for any damage from the shipping process. Take note of any observations on receipt of shipment. If required, reach out to your Gleason Reel Representative for any claims for damaged product.

Lifting Guidelines

Gleason Reel recommends keeping the reel installed on the shipping frame until the time of installation. The reel's weight will vary depending on the application requirements. Use lifting straps of sufficient rating for the purchased reel. It is the installer's responsibility to use safe and efficient lifting practices when moving the reel.


When lifting the reel off of the shipping frame to install, do not lift the reel from the collector, wrapper, or the spool rims.

 WARNING
HANDLING, LIFTING, AND TOPPLING HAZARD
<ul style="list-style-type: none">• Keep the area below the equipment clear of all personnel and property while lifting.• Balance and steady the load to prevent tipping.• Use straps of sufficient rating when lifting.
Failure to follow these instructions may result in death, severe injury, and/or equipment damage.

Transportation and Storage

Product Storage

Refer to the following information and procedures if storing the product upon reception:

 CAUTION
IMPROPER WORK PRACTICE
If storing equipment prior to installation, protect it from the weather and keep it free of condensation and dust.
Failure to follow this instruction may result in injury or equipment damage.

Short-Term Storage

If installing the product within 6-months of reception, follow these short-term storage practices:

- Store the product on the shipping pallet and away from the weather (wind, rain, snow, etc.).
- Gleason Reel strongly recommends storing the product indoors and providing a cover over the unit to eliminate airborne dust and dirt.

Long-Term Storage

Follow long-term storage practices when storing the product longer than 6-months. This includes additional storage requirements beyond the processes in the short-term storage section above.


- Place the product in a location that avoids ambient vibration. Should storage location exhibit high vibration, use vibration isolation pads.
- Maintain the storage location's temperature to avoid large temperature swings, resulting in condensation. Minimize relative humidity. A dry location is preferable to minimize/eliminate moisture buildup.
- Coat all external machined surfaces with a rust preventative material.
- Cover all shafts/bores with a rust preventative.

Upon installation/startup, follow the instructions in the gearbox manual found in [Appendix A: Additional Resources](#) and Equipment Manual to assure proper oil fill levels. This information can be found in the "Oil Fill Quantities" section of the gearbox manual and varies depending on gearbox model and installation orientation.

Installation

Installation

Precautions

 WARNING
ACCIDENTAL EQUIPMENT OPERATION
<ul style="list-style-type: none">• Provide adequate clearance for working space around operator control stations.• Guard or locate control station so it is not subject to accidental actuation or damage.
Failure to follow these instructions may result in death, injury, or equipment damage.

Only qualified personnel shall install this product. It is the responsibility of the customer to ensure proper structural integrity to support the reel. All Installations require sufficient structural support to guarantee safe and efficient installation. This includes any analysis pertaining to outdoor installations and their subsequent weather factors. If there is any concern, Gleason Reel recommends obtaining approval from a structural engineer. Gleason Reel is not liable and takes no accountability for installation errors and their subsequent effects.

Only certified electricians shall make electrical connections in compliance with all international, national, state, and local regulations. Failure to adhere to this requirement may lead to product damage and/or personnel injury, as well as potentially voiding the product warranty.

Installation requirements vary from site to site due to location specific prerequisites. For questions regarding the best practices during installation, contact your Gleason Reel representative.

Environment

The vector duty motor reel is suitable for mounting in various indoor and/or outdoor environments. Conduct a review, prior to installation, to ensure the best installation location.

For outdoor locations, consider the weather of the installation environment. It is highly recommended to keep the control panel and resistor installed indoors, in climate controlled conditions free of any combustible materials. In colder environments, where temperatures drop below freezing, the reel requires protection from settling snowfall and ice. If outdoors, ensure the reel has sufficient cover to prevent buildup of the elements on the reel. Furthermore, high wind environments may require extra structural support. If there are any concerns regarding the installation location, Gleason Reel recommends having a structural engineer provide input and approval.

Installation

NOTE: Environmental considerations should be addressed during the quoting stage of the project.

However, it is the customers responsibility to confirm the installation requirements are addressed and met for the project.

Provided Materials

The vector duty motor reel product includes the primary components, consisting of:

- the reel
- the control panel
- the resistor

Depending on the project, cable may be sent with the reel. Hardware is not included due to installation requisites changing per application. For all vector duty motor reel's a minimum of grade 8 hardware should be utilized.

Accessories (Not Included)

As application requirements vary, different locations may demand additional functionality. Below is a list of the standard accessories available for the vector duty motor reel:

- Cable Guide
- Cable Anchor
- Limit Switch
- Encoder
- Heater

Physical Product Installation

Depending on the size of the ordered reel, the product will either come pre-assembled or in separate components required to be put together on site. Additionally, some applications may have cable pre-installed upon receiving the reel. The overall dimensions of the reel, along with the mounting hole pattern, will be supplied within the package drawings received with this I.O.M. Refer to these drawings prior to installing the physical product. The following sub sections provide installation guidelines for each of the installation types.

NOTE: Installation requirements vary from site to site. Each reel is specific to the application and may require additional/less installation steps. Additionally, some installations may require the cable to be installed prior to mounting the reel. If so, see the [Cable Installation](#) section below. Refer to the below sub sections for guidelines associated with the standard vector duty motor reel. Review all installation site requirements and reel drawings prior to commissioning.

Installation

Reel—Preassembled

Upon receipt, the vector duty motor reel will likely be installed on a shipping pallet. Prior to removing the shipping pallet and installing the reel, ensure all necessary equipment is readily available and the area is clear of all obstructions.

1. Position the vector duty motor reel on the shipping pallet as close to the installation location as possible prior to removing the reel from the pallet.

2. Uninstall the reel from the shipping pallet and lift the reel to the installation position.

Confirm the direction the cable will be pulled off of the reel is in the correct orientation for the machinery path of travel.

3. Use a minimum of grade 8 hardware to secure the reel to the installation platform via the gearbox mounting base.

Hardware requirements will vary depending on the installation. It is the customers responsibility to ensure proper hardware is used to secure the reel to the installation platform.

4. Install the cable to the application machinery.

If the cable was not preinstalled on the reel, see the [Cable Installation](#) section below.

Installation

Reel—Assembly Required on Site

Upon receipt, the vector duty motor reel will likely be installed on a shipping pallet. Prior to removing the shipping pallet and installing the reel, ensure all necessary equipment is readily available and the area is clear of all obstructions.

1. Position the vector duty motor reel on the shipping pallet as close to the installation location as possible prior to removing the reel from the pallet.
2. Uninstall the reel from the shipping pallet.
3. Install the spool assembly to the gearbox.

Refer to the assembly drawings within the drawing package supplied with this manual for assembly guidelines. The spool assembly should be built from the spool rim closest to the gearbox out to the spool rim furthest to the gearbox.

4. Lift the reel to the installation position.

Confirm the direction the cable will be pulled off of the reel is in the correct orientation for the machinery path of travel.

5. Use a minimum of grade 8 hardware to secure the reel to the installation platform via the gearbox mounting base.

Hardware requirements will vary depending on the installation. It is the customer's responsibility to ensure proper hardware is used to secure the reel to the installation platform.

6. Install the cable to the application machinery.

If the cable was not preinstalled on the reel, see the [Cable Installation](#) section below.

Installation

Reel—*Improper Installation*

Do not allow the cable to come out/off the reel at a sharp angle. Always extend and retract the cable as close to the direction of the machine movement as possible. Any deviation from this may stress the cable through usage cycles of the product, shortening the cable's life.

If paired with a cable anchor, the spool must be aligned with the cable anchor point. Any deviation from this may stress the cable through usage cycles of the product, shortening the cable's life.

Control Panel

Install the control panel vertically in a secure, climate controlled location.

- The mounting location must provide sufficient clearance for electrical connections to enter/exit the control panel.
- The chosen positions for the electrical connection entries should provide the electrician with the easiest access to each component's terminal blocks.
- All electrical running to/from the control panel and connecting equipment must be within hard conduit.
- Modifications to the enclosure are the responsibility of the customer and must effectively seal the enclosure to maintain the NEMA 12 rating.

Cable Installation

When wrapping the cable onto the working reel, it is essential to begin the first wrap on the side opposite to the natural conductor lay of the cable. The conductor lay has the natural effect of making the cable roll in the specified direction. It is therefore important the first turn of cable be installed on the drum against the cables natural conductor lay. Confirm with the cable manufacturer if there are any questions about the cables' natural lay. See Figure 5 for an example of the cable wrap layers for a left hand conductor lay cable.

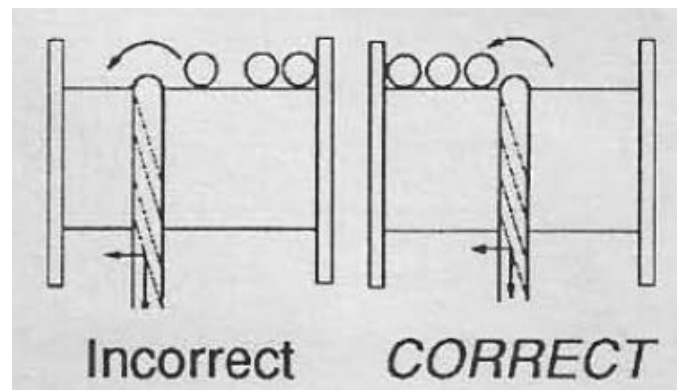


Figure 5: Cable Wrap Example for Left Hand Conductor Lay

Installation

There are two typical methods of cable installation: full layout and direct transfer. The best methods of cable installation attempt to minimize cable twisting, avoid changes in direction and eliminate cable abrasion. For further information on removing cable twists, see the [Removing Cable Twists](#) section below.

NOTE: Figure 6 through Figure 9 are for general reference only. Applications may require cable installation processes which vary from the methods outlined in the below schematics. For inquiries specific to a given project, reach out to your Gleason Reel representative.

Cable Installation – Full Layout

The full layout method keeps cable twisting to a minimum. See Figure 6 for reference of this procedure. The working reel rotation will require reversing from the direction shown in Figure 6 if the cable is being fed to the top of the working reel.

Jack up the transfer reel and unwind all of the cable onto the cable run, paying off of the top of the transfer reel. See Figure 7 for an illustration of this. The cable should lay out in a straight line, leaving both ends free.

Connect the working end of the cable to the vector duty motor reel and move the working reel toward the free end while winding all cable onto the reel. This will allow cable twists to roll toward the free end and be relieved during this procedure.

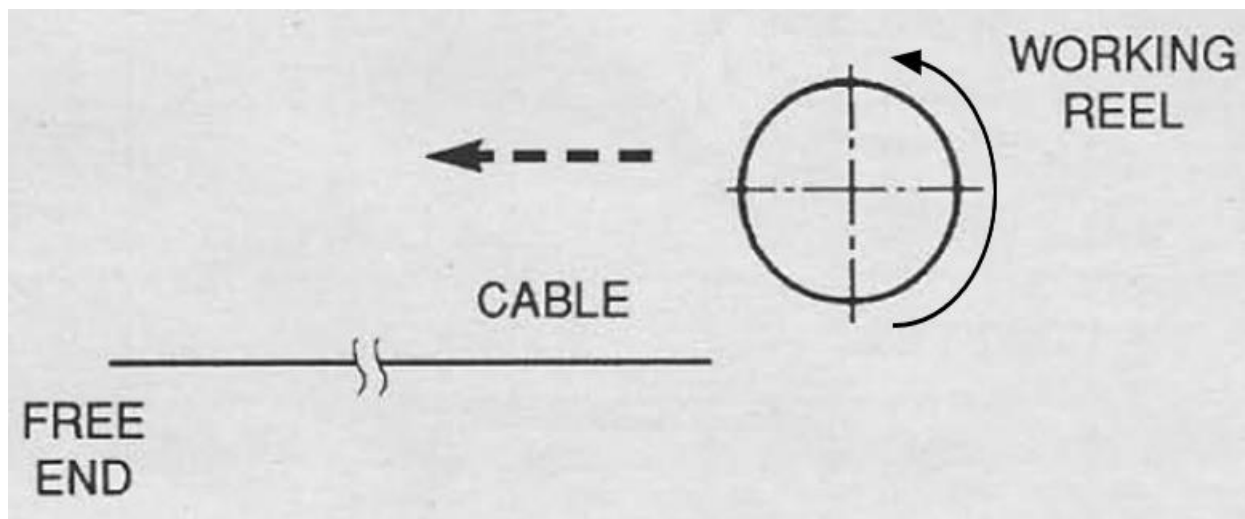


Figure 6: Full Layout Method Illustration

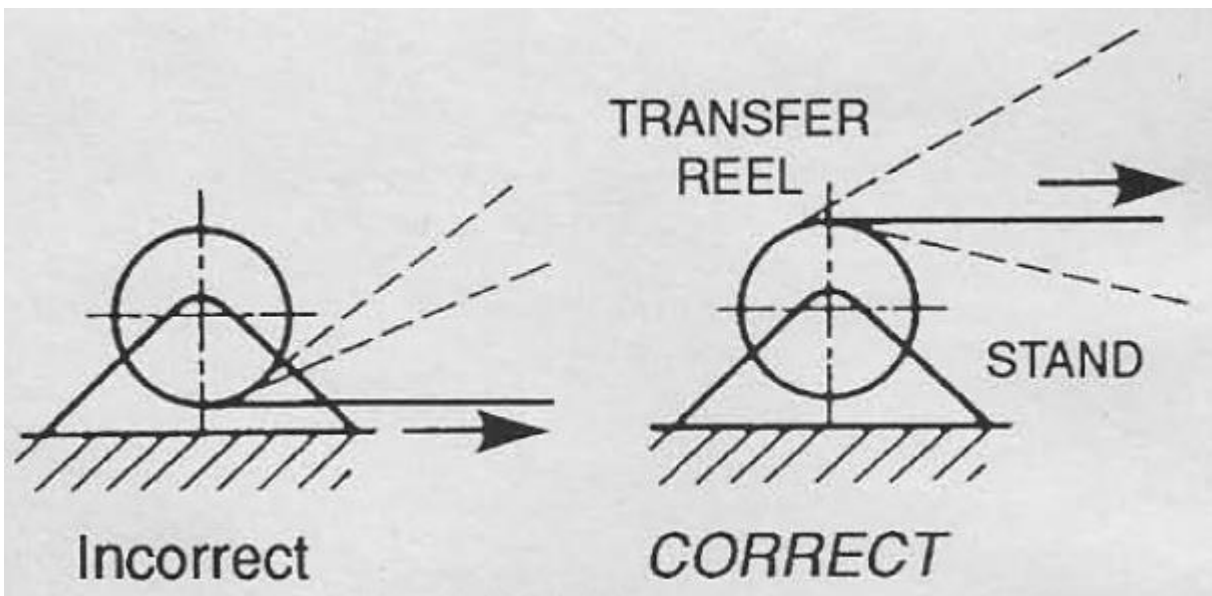


Figure 7: Full Layout Method Illustration

Cable Installation – Direct Transfer

If Full Layout cannot be used, direct transfer is a good alternative. This method is recommended when the working reel and/or cable runway are not accessible or when installing long runs of large diameter cable.

Move the cable from the transfer reel to the working reel in a straight line and avoid any changes in direction. Passing cable around guides, including roller guides, is not recommended. Refer to Figure 8 and Figure 9 for schematics of this process.

Perform the transfer-reel-to-working-reel transfer slowly and with a minimum cable tension to avoid torsional influences on the cable during installation. The machine should be taken to the end of its travel and the anchor point released if detectable torsion (twist) is evident during installation. If torsion is experienced, any twist should be removed and the cable re-anchored.

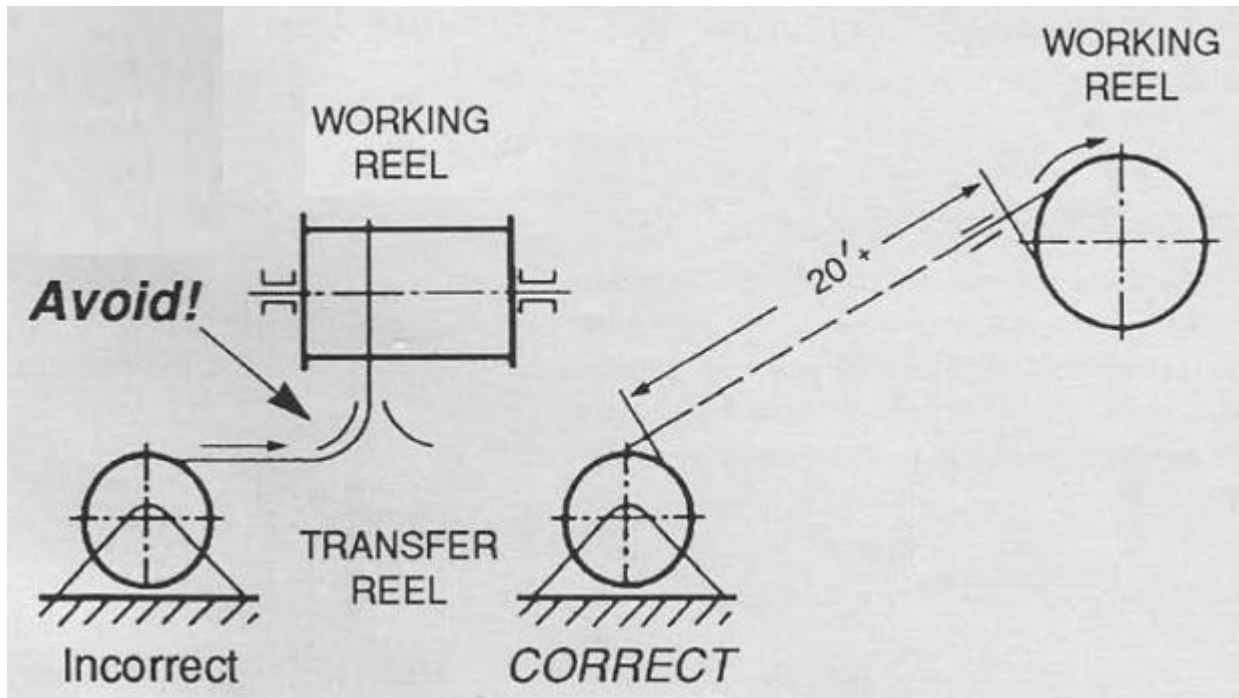


Figure 8: Direct Transfer Method Illustration

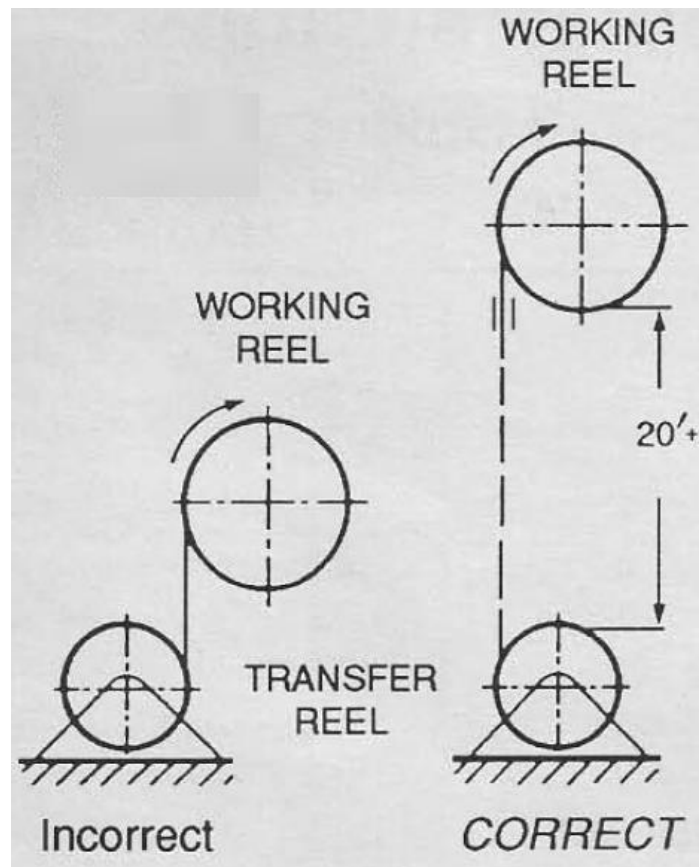


Figure 9: Direct Transfer Method Illustration

Installation

Removing Cable Twists

Twisted cable can occur at the time of installation or throughout the lifecycle of the product. If left uncorrected, twisted cable can lead to premature cable failure. To ensure maximum performance, remove any twisting seen within the cable.

A typical detection of twisting cable is the labeling on the cable jacket. Generally, cable labeling machines print in a straight line. If the text on the cable jacket appears to be twisting around the jacket, there may be a twist in the cable. However, the cable may have been twisted as it passed through the labeling machine, so this is not a guaranteed method. If twists are experienced, unwind the cable from the reel until the twist(s) are exposed, lying on the cable run. Disconnect the cable from the anchor point and remove the twists via one of the two methods below before reconnecting the anchor point.

Removing Cable Twists – Wave Motion Method

Insert a cylinder roller between 6-8 inches in diameter under the cable behind the observed twist. Two people should pick up the roller, one on each end, and walk forward. The roller should push the “wave” through the twist and toward the free end of the cable. Repeat this process until the twist is removed. Refer to Figure 10 for an illustration of this process:

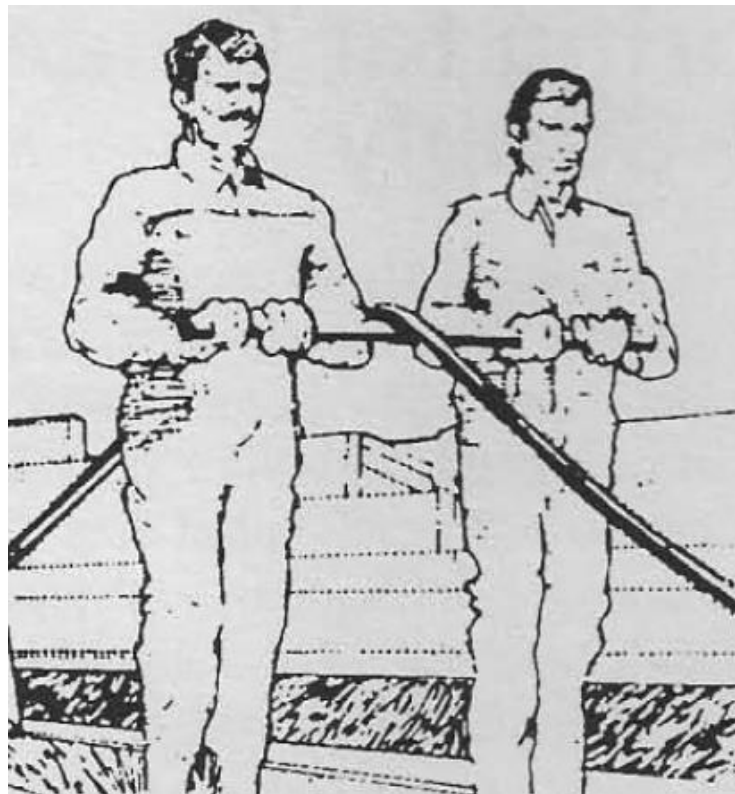


Figure 10: Removing Cable Twists - The Wave Motion Method

Installation

Removing Cable Twists – Spiral Method

Provide enough cable at the fixed end to make a spiral on either the left or right hand side of the cable, depending on the direction of the twist. Roll the spiral to the free end of the cable, removing any twists observed in the cable. Repeat the process until all twists are removed. See Figure 11 for an illustration of this process:

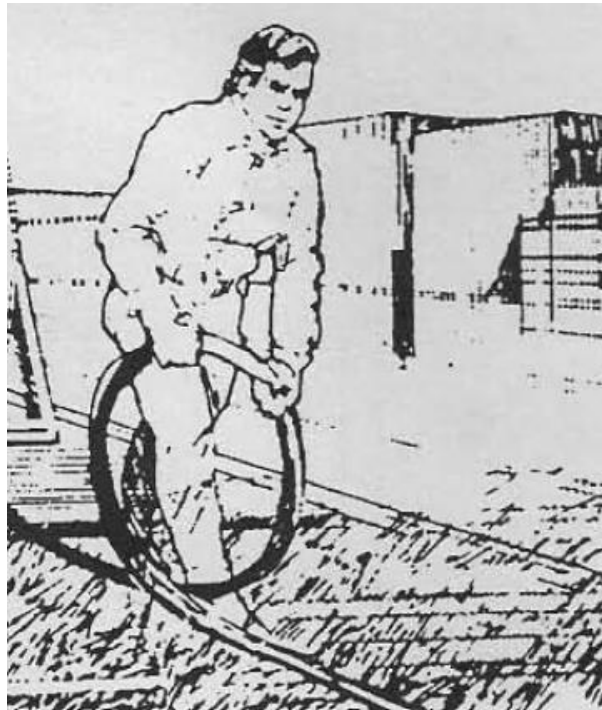


Figure 11: Removing Cable Twists - The Spiral Method

Resistor

Resistors cool via natural convection, causing hot air to rise vertically from the enclosure. The panel should be wall mounted with at least 24" of free space above the enclosure top and 6" of free space surrounding the enclosure sides. If necessary, the unit can be mounted on spacers or channels to limit heat conducting from the enclosure to the mounting surface. It is critical the panel is mounted with the coils remaining in a horizontal orientation and the thermal switch positioned near the top of the enclosure.

Remove the ventilation cover from the resistor to access the mounting holes on the inside of the resistor enclosure. Secure the resistor enclosure to the mounting location. Once complete, securely tighten the cover back on the resistor enclosure to a max of 20 pound-inch of torque. This panel may need to be removed again later during the electrical installation. If completing the electrical installation right away, see the [Electrical Connections](#) section below.

Smaller resistors have convenient conduit knockouts for easy connection. Remove the proper knockout after confirming the most suitable entry point. For larger units, this will require field punching for the

Installation

conduit entry.

Electrical Connections

The electrical wiring diagram is supplied within the control panel and provides information for certified electricians to wire the termination points on the equipment. Follow all information contained within the wiring diagram, as each application may be different. The wiring diagram will reference any information pertinent to the installation. If there are any questions, reach out to your Gleason Reel representative.

When wiring the resistor, route all wiring along the bottom of the enclosure. Avoid running wiring near the top of the enclosure or near the resistor elements.

 CAUTION
Refer to the wiring diagram for the minimum wire gauge requirements. Using an incorrect wire gauge may result in product malfunctions due to voltage loss and/or thermal buildup in the cable.
Failure to follow these instructions may result in injury or equipment damage.

 WARNING
Ensure that the control panel has a quality ground that is sufficient and maintained. The equipment within the control panel has leakage current that exceeds 3.5 mA. Improper grounding practices may lead to severe injury or death. Always follow proper grounding regulations and electrical practices.
Failure to follow these instructions may result in death or severe injury.

Installation

Configuration

NOTE: The sections below refer to configuration instructions for generalized applications occasionally seen used with the vector duty motor reel. Different applications may vary, and the below should be used as reference only. The reel will need power to configure to the application requirements.

Inner Limit Switch Setpoint – Two Position Switch

The vector duty motor reel paired with a limit switch will require adjustment to the limit switch setpoints after installation. These setpoints are not set to any specific customer's application length prior to shipment, as this parameter varies for every location. Either limit within the switch can be used for the inner limit switch setpoint. To begin setting the inner limit switch endpoint:

1. Remove the limit switch cover.
2. Slightly loosen the two bronze screws securing the gears until they are free to rotate.
Do not fully remove the screws.

3. Remove the red adjustment tool from the enclosure.
4. Use the adjustment tool to rotate the two gears to center the raised edge on the gear, in the view slot, on the back plate.

This is the slotted portion roughly 45° off the securing bolt that was previously loosened. Figure 12 below shows the view slots and the bronze securing screw locations.

5. Rotate the spool to wind the cable onto the drum until the cable is in the starting position. Observe the direction the gear associated with the inward limit is rotating while cable is being pulled towards the reel.

NOTE: Be cautious not to retract the cable too far, causing the available cable to run out and potentially damage the reel or cable.

6. Rotate the gear associated with the inward limit in the direction the gear was rotating, noted in step 5, using the gear adjustment tool until the inward switch emits a click sound.

This is the setpoint of the switch.

7. Hold the gear in place after hearing the click and re-tighten the gear's bronze securing screw.

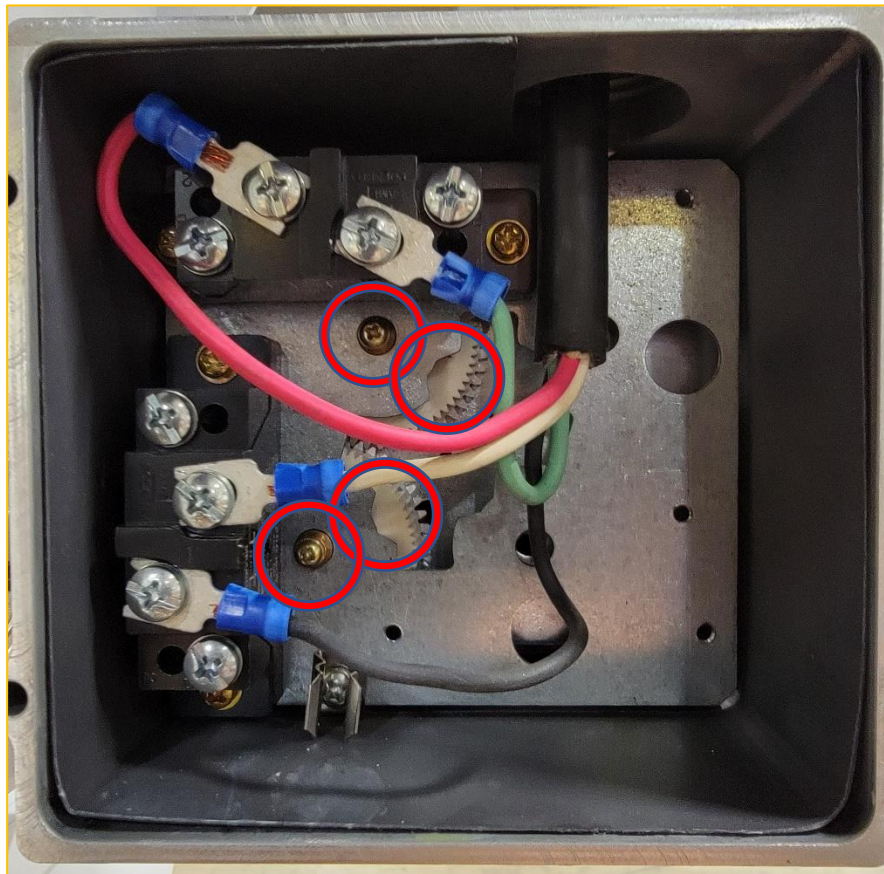


Figure 12: Limit Switch Interior

Outer Limit Switch Setpoint – Two Position Switch

The outer setpoint of the limit switch may vary drastically, depending on the customer's installation requirements.

1. Run the reel to extend the cable out to the maximum travel assigned for the application. Observe the direction the gear associated with the outward limit is rotating while cable is being pulled away from the reel.

NOTE: Do not extend the reel past the point where the 1-2 safety wraps on the spool will be used. The safety wraps are required to mitigate any chances of overextending the reel travel and potentially damaging the cable, reel, or machinery.

2. Rotate the gear associated with the outward limit in the direction observed in step one until the switch emits a click sound.

This is the setpoint of the switch.

3. Hold the gear in place, after hearing the click, and tighten the lower bronze securing screw.
4. Put the red adjustment tool back into the enclosure and reinstall the cover.

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Product Programming

Gleason Reel pre-programs the VFD for the customer. The programming includes product specific safety features and controls which Gleason Reel has tested and approved.

Gleason Reel strongly advises customers to contact their Gleason Reel representative for guidance if they need a change in the vector duty motor reel's programming outside of the parameters highlighted in the below sub sections. All customer requested changes can be reviewed and if accepted instructions can be provided to implement the programming change.

CAUTION

- Modifying the VFD's program without proper documentation and necessary test equipment may make the VFD non-functional.
- The only way to restore the VFD's programming is to import the default program file back onto the drive. This requires specific product knowledge and equipment that is not standard for field maintenance crews.
- Closely monitor the reel during operation immediately after making any parameter changes within the VFD program.
Verify the reel's standard functionality has no unexpected or undesirable changes.
- Without Gleason Reel's consent, modifications to the VFD program may void the warranty. Gleason Reel takes no liability for damage/injury caused by modifying the standard product without approval.

Failure to follow these instructions may result in injury or equipment damage.

VFD Interface – Maintenance/Local Mode

Gleason Reel recommends making any parameter changes to the VFD in Local Mode.

The normal mode of operation of the VFD is "remote", which allows the VFD to be controlled by external run commands in a predefined torque mode. The local operation mode will allow the reel to be operated from the VFD interface. Figure 13 highlights the various points of interest on the VFD interface. All changes to the VFD programming should be tested in local mode prior to changing the operation back to remote.

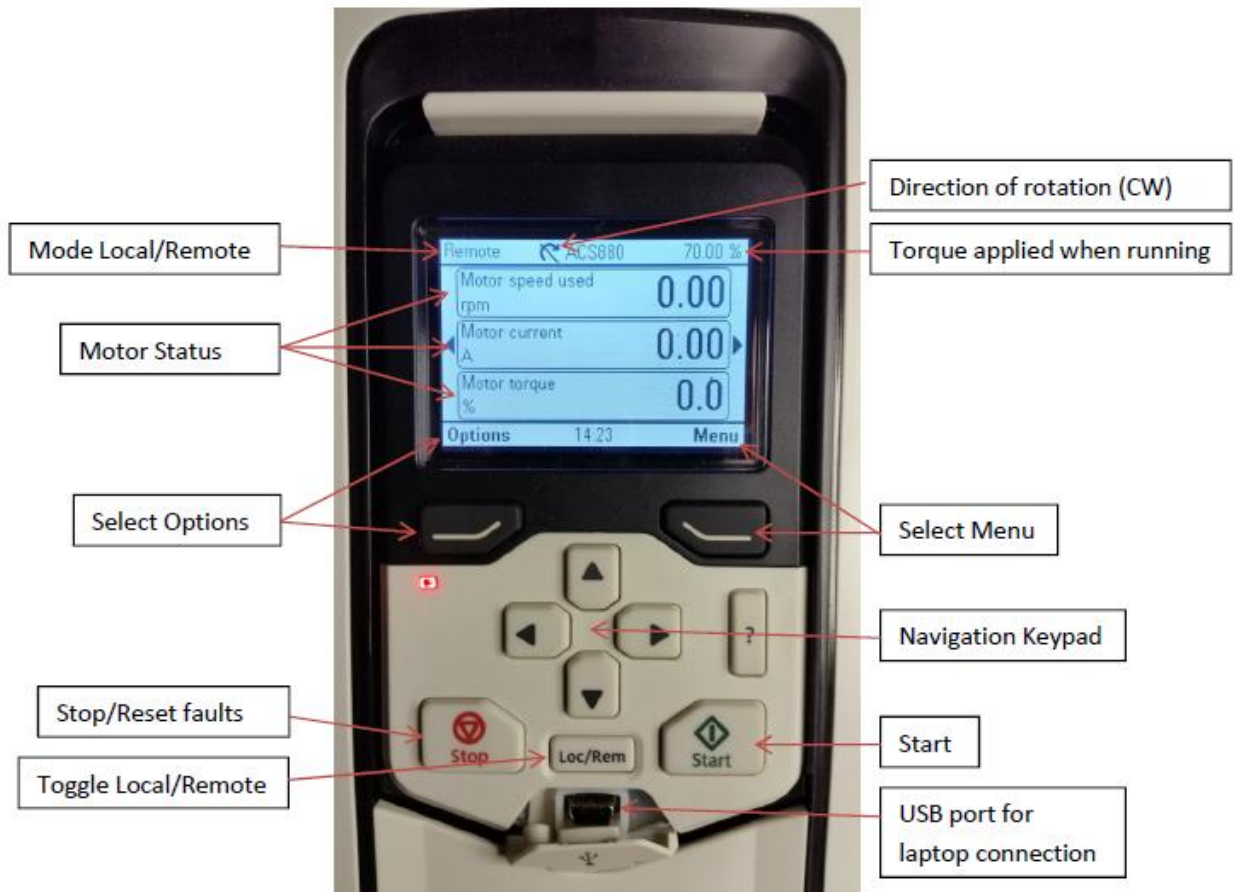


Figure 13: Variable Frequency Drive Interface

The top left corner of the interface illustrates the drive’s current mode of operation.

1. Press the “Loc/Rem” key to switch the mode of operation for maintenance. Local Mode is recommended for VFD modifications. After pressing, the screen will momentarily display the following:



Figure 14: VFD Interface Depicting Switching from Remote to Local Mode



Figure 15: VFD Interface in Local Mode

VFD Interface – Setting Torque Value

The current VFD torque percentage is displayed on the top right of the VFD interface. This value is dependent on the mode of operation. If an increase in torque is required, follow the below instructions:

1. Press the “Loc/Rem” button to change the VFD operation mode to Local.
2. Use the down arrow key to decrease the torque percentage seen on the top right of the VFD display to 0%.

NOTE: Before starting the motor in local mode, ensure the torque percentage is at 0% or a previously tested value. Start the percentage low and increase as needed. Starting the system with too much torque can lead to equipment damage or personal injury.

3. Run the motor in Local Mode. See the [VFD Interface – Operation in Local Mode](#) sub section below for instructions on running the motor in Local Mode.

Installation

4. Use the up arrow key to increase the torque percentage slowly to the required value for the application.
5. Record the value noted on the top right of the VFD interface.
6. From the VFD's home screen, press the upper right button to access the VFD's Menu.
7. Use the arrow keys to navigate to and select "Parameters".
8. Use the arrow keys to navigate to and select "Complete list".
9. Use the arrow keys to navigate to and select "47 Data storage".
10. Use the arrow keys to navigate to and select "47.03 DataStorage 3".
11. Use the arrow keys to input the torque percentage found previously.
12. Press the upper right button to save the changed torque percentage.
13. Select the upper left button until back to the VFD home screen.
14. Select "Loc/Rem" to change the VFD back to "Remote" mode for standard operation.

VFD Interface – Operation in Local Mode

When the VFD is in Local Mode the start/stop signal comes from the VFD interface. Use the start and stop keys on the VFD interface to operate the drive.

NOTE: Prior to running the motor, assure the rotation is in the required direction. The motor's rotation direction can be seen in the middle top of the VFD interface. See [VFD Interface – Reversing the Motor Rotation](#) if the motor rotation requires reversing.

VFD Interface – Reversing the Motor Rotation

When changing the motor rotation in Local Mode for maintenance:

1. Select the upper left button from the VFD's home screen, seen in Figure 13, to access the VFD's Options.
2. Use the arrow keys to navigate to and select "Direction change".
3. Use the arrow keys to reverse the motor rotation.

NOTE: The VFD interface will return to the home screen after a change is made. Notice the middle top of the VFD interface displays the current direction of rotation.

When changing the motor rotation for standard operation in Remote Mode:

1. Select the upper right button from the VFD's home screen, seen in Figure 13, to access the VFD's Menu.
2. Use the arrow keys to navigate to and select "Parameters".
3. Use the arrow keys to navigate to and select "Complete list".

Installation

4. Use the arrow keys to navigate to and select "99 Motor data".
5. Use the arrow keys to navigate to and select "99.16 Motor Phase".
6. Use the arrow keys to change the phase of the motor, reversing the rotational direction.
7. Select the upper left button until back to the VFD home screen.

NOTE: The motor data on the VFD interface may display reading negative values as a result of this change.

VFD Interface – Creating a Program Backup

If changing any VFD program parameters, it is recommended to create a program backup in the VFD. Should something happen to the VFD, the backup stored within the interface can often be referenced to restore the VFD parameters on the replaced unit.

1. From the VFD home screen, press the upper right button to access the VFD's Menu.
2. Use the arrow keys to navigate to and select "Backup".
3. Use the arrow keys to navigate to and select "Create backup".
4. Allow time for the VFD to backup all of the parameters to the VFD interface module.
5. Once complete, the VFD screen will revert back to the previous screen. The newly created backup will be seen below "Create backup".

System Startup

Safely start operating the system after completing the physical and electrical installation processes:

- Monitor the initial system startup for any faults in the equipment and/or installation process.
- Run the reel through the full travel length of cable.
- Monitor the travel path of the cable to observe any unnatural positioning which could cause wear.
- At max travel length, assure there are at least 1-2 safety wraps remaining on the spool and confirm there is no twisting in the cable run.
- Observe all additional accessories added to the reel to ensure proper functionality.

After satisfactory configuration of the reel and ensuring it is operating properly and safely; the product is ready for use in standard operation.

Installation Checklist

Table 2: Installation Checklist

Installation Step	Brief Description	✓
Vector Duty Motor Reel	<ul style="list-style-type: none"> • The reel is rigidly secured to the installation platform. • The installation platform is sufficiently rated for the reel's weight and operation. • The reel's orientation is in the correct direction. • If outdoors, the reel has appropriate coverage from the elements and/or has a canopy. 	
Control Panel	<ul style="list-style-type: none"> • Secure the control panel to a fixture with sufficient structural support. • Control Panel is installed in a climate controlled indoor location, free of combustible materials. • Leave adequate spacing on the sides of the control panel for hard conduit to enter. • Verify the enclosure still meets NEMA 12 requirements after finishing electrical installation. 	
Resistor	<ul style="list-style-type: none"> • Secure the resistor to a fixture with sufficient structural support. • The resistor is installed in a climate controlled indoor location, free of combustible materials. • Leave adequate spacing on the sides and top of the resistor for natural convection and wiring. • Electrical connections use hard conduit. 	
Electrical Wiring	<ul style="list-style-type: none"> • Use the proper gage wire for each section. • Use hard conduits for all electrical wiring runs, outside of electrical enclosures. • All connections are independently grounded. 	

Conventional Errors – Diagnostics and Troubleshooting

Conventional Errors – Diagnostics and Troubleshooting

Table 3 references potential errors that may occur in the field, along with respective tests and solutions. The table is not all encompassing. Use it as an initial reference if the product exhibits any issues. Contact your Gleason Reel representative for product support for any issues this section does not cover.

Table 3: Diagnostic and Troubleshooting Table

Error/Symptom	Potential Cause	Test	Solution
Reel will not operate	No power to control panel.	Verify incoming power lines are supplying sufficient power.	Turn on/correct power quantity to control panel.
	If limit switch is used, the limit switch is set incorrectly.	Review limit switch setpoints to verify correct positioning.	Reset the limit switch setpoints per the application requirements.
	Control panel disconnect is triggered.	Review the control panel disconnect.	Disable the disconnect after confirming reissuance of power will not jeopardize anyone's safety.
	Machine connected to cable reel is not sending start signal.	Review the connected machine wiring to the control panel. Confirm if signals are being sent as required.	Confirm start/stop signals are being sent correctly to the reel from the connected machine.
Damage/Wear observed on cable	Cable twists have been introduced to the cable.	Assess cable for any twisting points throughout the full length of cable travel.	Follow the methods called out in the Removing Cable Twists section above.
	The cable travel path causes the cable to wear against auxiliary object(s).	Review the full travel path of the machine and the cable to check for obstructions contacting the cable.	Correct the cable path to minimize contact or wear on cable.
Slack in the cable	The drive torque is not high enough to eliminate cable slack	Confirm if the drive torque has been modified or needs to be increased.	Follow the steps in VFD Interface – Setting Torque Value to increase the torque to eliminate cable slack.

Reference Appendix A: Additional Resources and Equipment Manual for further information on diagnostics and troubleshooting related to the vector duty motor reel's equipment. A list of all VFD warnings and faults can be found in the drives firmware manual.

Maintenance

Maintenance

Table 4 below provides maintenance procedures along with their recommended service intervals. Reference the table below to maintain the vector duty motor reel. Failure to follow proper product maintenance may lead to equipment damage not covered under warranty.

NOTE: The table below contains Gleason Reel’s recommended maintenance procedures and frequencies. Depending on the equipment utilized for the given vector duty motor reel, these procedures and intervals are likely to change. Additionally, the installation site may dictate additional longer/shorter maintenance intervals and/or additional maintenance procedures. Use the below table as reference.

NOTE: Only certified individuals shall perform all maintenance work.

Table 4: Maintenance Table

Equipment	Area	Maintenance Description	Interval
Gearbox	Lubrication	Check if the gearbox needs reapplication of lubricant. If so, lubricate the gearbox using the recommended oil type specified in the gearbox manual.	Annually
	Sealing	Verify the integrity of the gearbox seal. Proper sealing prevents lubricant leakage and contaminant entry.	Annually
	Torque Check	Assure the bolts connecting the gearbox to the reel are tight and secure.	Annually
Motor	Connections	Inspect contacts to assure tightness and proper contact.	Bi-Annually
	Bearing Inspection	Check bearings for any abnormal vibration, noise, or overheating.	Annually
	Supply Power	Confirm supply voltage magnitude to motor.	Annually
	Mounting	Assure the mounting of the motor to gearbox/reel is tight and secure.	Annually
Reel	Cable Wraps/Layers	Assure the cable is laid correctly, per the application requirements, on the drum diameter.	Bi-Annually
	Mounting	Assure the mounting of the reel to the installation base is tight and secure.	Annually
Cable	Cable Sleeve	Assure there are no twists in the cable throughout the reeling cycle.	Monthly
	Slack	Assure there is not excessive slack within the cable throughout the travel path.	Monthly
	Travel Path	Assure the cable travel path is free of obstacles and does not apply unnecessary wear to the cable.	Monthly

Maintenance

Equipment	Area	Maintenance Description	Interval
Control Panel	Enclosure	Ensure the enclosure has a proper seal that meets NEMA 12 requirements.	Annually
	Wiring Termination Points	Check wiring termination points within the panel for any loose connections. Re-secure all loose wiring.	Annually
Resistor	Wiring Termination Points	Check wiring termination points within the resistor for any loose connections. Re-secure all loose wiring.	Annually
	Ventilation	Check the resistor vents for any blockage. Remove any buildup or blockage in front of the resistor vents.	Annually
All Electrical	Grounding	Ensure proper grounding throughout the product.	Annually

Spare Parts List

Spare Parts List

Table 5, below, references a list of parts considered to be replaceable in the event of product damage. The list does not include part numbers, as the components vary depending on the application. For component specific part numbers, reference the Engineering drawing package provided with this manual. Contact your Gleason Reel representative for a formal quote for all replacement part requirements.


 CAUTION
<ul style="list-style-type: none"> Replacing any components of the vector duty motor reel with products not supplied by Gleason Reel may lead to product failure and result in injury and/or property damage. Replacing any components of the vector duty motor reel with products not supplied by Gleason Reel may void the product warranty. Gleason Reel takes no liability for damage/injury caused by modifying the standard product without approval.
<p>Failure to follow these instructions may result in death, serious injury, and/or property damage.</p>

Table 5: Spare Parts List

Part
Cable
Motor
Resistor
Gearbox
Control Panel
Limit Switch

Product Warranty

Product Warranty

Gleason Reel warrants, for a period of twelve (12) months after date of shipment, that all goods it manufactures to be free from defects in material and workmanship. If, within such warranty period, any such goods are shown, to Gleason's satisfaction, to be defective, such goods shall be repaired or, at Gleason's options, replaced f.o.b. Gleason's factory, without charge. Gleason's obligation hereunder shall be confined to such repair or replacement and shall be further conditioned upon Gleason's receiving written notice of any alleged defect within 10 days after its discovery and, at Gleason's option, the return of the allegedly defective goods to Gleason, f.o.b. its factory.

The foregoing warranty shall not apply to goods not manufactured by Gleason, or to goods which shall have been repaired or altered by others than Gleason so as, in Gleason's judgement, adversely affect the same, or which shall have been subject to other than normal care, or storage. With respect to goods furnished but not manufactured by Gleason, the warranty obligations of Gleason shall in all respects conform and be limited to the warranty extended to Gleason by the supplier.

The foregoing warranty is in lieu of all other express or implied warranties (except of title) and of all other obligations of Gleason.

Warranty Guarantee

The Purchaser has a reasonable time to ascertain whether the apparatus is as represented. Tests made by the Purchaser shall be made within 60 days from date of shipment. The conditions of such tests shall be mutually agreed upon and the Company shall be notified of and reserves the right to be represented at any test. Attempts to disassemble or repair equipment by the customer will invalidate all intended warranty. There are no warranties after acceptance, but the Company will repair or replace F.O.B. factory, any part which under normal and proper use proves defective in workmanship or material within one year from date of shipment. The correction of such defects by repair or replacement shall constitute fulfillment of all the Company's obligations with respect to the apparatus sold hereunder. With respect to goods furnished but not manufactured by Gleason, the warranty obligations of Gleason shall in all respects conform and be limited to the warranty extended to Gleason by the supplier.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF QUALITY WHETHER WRITTEN, ORAL, OR IMPLIED, INCLUDING, BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Warranty Inquiries/Claims

For any inquiries regarding this products warranty or to submit a warranty claim, please contact your Gleason Reel representative.

Appendix A: Additional Resources and Equipment Manuals

Appendix A: Additional Resources and Equipment Manuals

For additional information, please refer to Gleason Reel's website at:

<https://www.hubbell.com/gleasonreel/en>

Address requests for specific information, not found in this document or on our website, to your Gleason Reel Representative. If this contact information is not available, contact our primary office for inquiries at the following phone number: **(920) 387-4120**.

Due to application requirements, some of the below equipment may change per project. As such, the below manuals are for reference. For specific equipment manuals, or if any of the below links are no longer available, please reach out to your Gleason Reel representative for the equipment manuals.

Variable Frequency Drive – Hardware Manual:

https://library.e.abb.com/public/cbb548b3fee348dfb027baa69aeeb0cf/EN_ACS880-01_HW_S.pdf

Variable Frequency Drive – Firmware Manual:

https://library.e.abb.com/public/6b0e2b9eba86e68bc1257b0c0053dab2/EN_ACS880_FW_Man_C.pdf

Nord Gearbox:

For the gearbox manual, go to the manufacturer portal and insert the 9 digit serial number of the gearbox.

<https://portal.nord.com/en-US/documents>

The manual for the typical gearbox utilized for most applications can be found in the below link:

<https://media.nord.com/res/Document/22852.pdf>