Vanguard
Equipment,
Inc.

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Operation and Maintenance Manual

Slewing Canopy - An Attachment

S/N 037201400021 – UP (T8 Slewing Canopy)
S/N 037200370021 – UP (D6N LGP Slewing Canopy)

To be used with the carrier vehicle's Operation and Maintenance Manual

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Foreword

Literature Information

This manual should be stored in the Slewing Canopy Attachment's tool box, in the Welding Package's genset compartment's literature holder in the left door (closest to the radiator end), or in the operator's compartment in the literature holder or seat back literature storage area of the carrier vehicle.

This manual contains safety information, operation instructions, transportation information, lubrication information and maintenance information.

Some photographs or illustrations in this publication show details or attachments that can be different from your machine. Guards and covers might have been removed for illustrative purposes.

Continuing improvement and advancement of product design might have caused changes to your machine which are not included in this publication. The latest version of this publication is available for downloaded from the internet at http://vanguardequip.com/. Read, study and keep this manual with the machine.

Machine Description

Vanguard’s Slewing Canopy attachment is an attachment that can be mounted onto a variety of self-propelled carrier vehicles: crawler tractors, Panther T8 tracked vehicle, etc. It is typically used in conjunction with a welding package such as Vanguard Equipment’s CPW-125-4 or CPW-125-4-S2. The slewing canopy is powered and controlled by the existing carrier vehicle's hydraulic implement system.

The primary use of this attachment is to support and carry the welding cables and lightweight accessories, such as hand-grinders, etc, used during Shielded Metal Arc Welding (SMAW) or Manual Metal Arc Welding (MMA or MMAW)—commonly referred to as stick welding—of petroleum-product pipeline construction. The Slewing Canopy also provides limited protection from the sun and wind.

The Slewing Canopy is not intended to be used as a lifting device or as a crane.

The operator should read, understand, and follow both the carrier’s and the Slewing Canopy’s operating and maintenance instructions. The operator must comply with all pipeline-construction procedures, regulations, and safety precautions.

This equipment is to be operated by qualified personnel only.

This equipment is to be serviced and maintained by qualified personnel only.

The daily service/inspection procedure should be performed before start-up.

The Slewing Canopy uses the carrier vehicle’s controls for operation. Operate the appropriate controls before commencing actual work until familiar with the Slewing Canopy operation.

Safety

The safety sections list basic safety precautions. In addition, these sections identify the text and locations of warning signs and labels used on the machine.

Read and understand the basic precautions listed in the safety sections before operating or performing lubrication, maintenance and repair on this machine.

This equipment is to be operated and serviced by qualified personnel only. To become familiar with the basic safety precautions and warning sign locations and wording, at a minimum they must read and understand the safety section before operating or performing lubrication, maintenance and repair on this equipment.

Do not attempt to bypass any of the safety equipment or instrumentation on this equipment.

Do not attempt to operate this equipment with any of the safety equipment or instrumentation bypassed.

Machines that are operating safely in various applications depend on machine maintenance, operating speed of the machine, conditions of the terrain, fluid levels. **The most important criteria are the skill and judgment of the operator.**

Certain conditions and precautions are peculiar to pipeline construction operations. The following represents the minimum considerations for safe operation of this equipment.

Operation

The operation section is a reference for the new operator and a refresher for the experienced operator. This section includes a discussion of machine controls, and transportation information.

Photographs and illustrations guide the operator through correct procedures of checking, starting, operating, and stopping the equipment.

Maintenance

The maintenance section is provided for quick, general reference only.

The maintenance sections are guides to equipment care. The Maintenance Interval Schedules (MIS) list the items to be maintained at a specific service interval. Items without specific intervals are listed under the "When Required" service interval.

Maintenance Intervals

Use the carrier vehicle’s service hour meter to determine servicing intervals. Calendar intervals shown (daily, weekly, monthly, etc.) can be used instead of service hour meter intervals if they provide more convenient servicing schedules and approximate the indicated service hour meter reading. Recommended service should always be performed at the interval that occurs first.

Under extremely severe, dusty or wet operating conditions, more frequent lubrication than is specified in the maintenance intervals charts might be necessary.

Perform service on items at multiples of the original requirement. For example, at every 500 service hours or 3 months, also service those items listed under every 250 service hours or monthly and every 10 service hours or daily.

Safety Section

Safety Signs and Labels

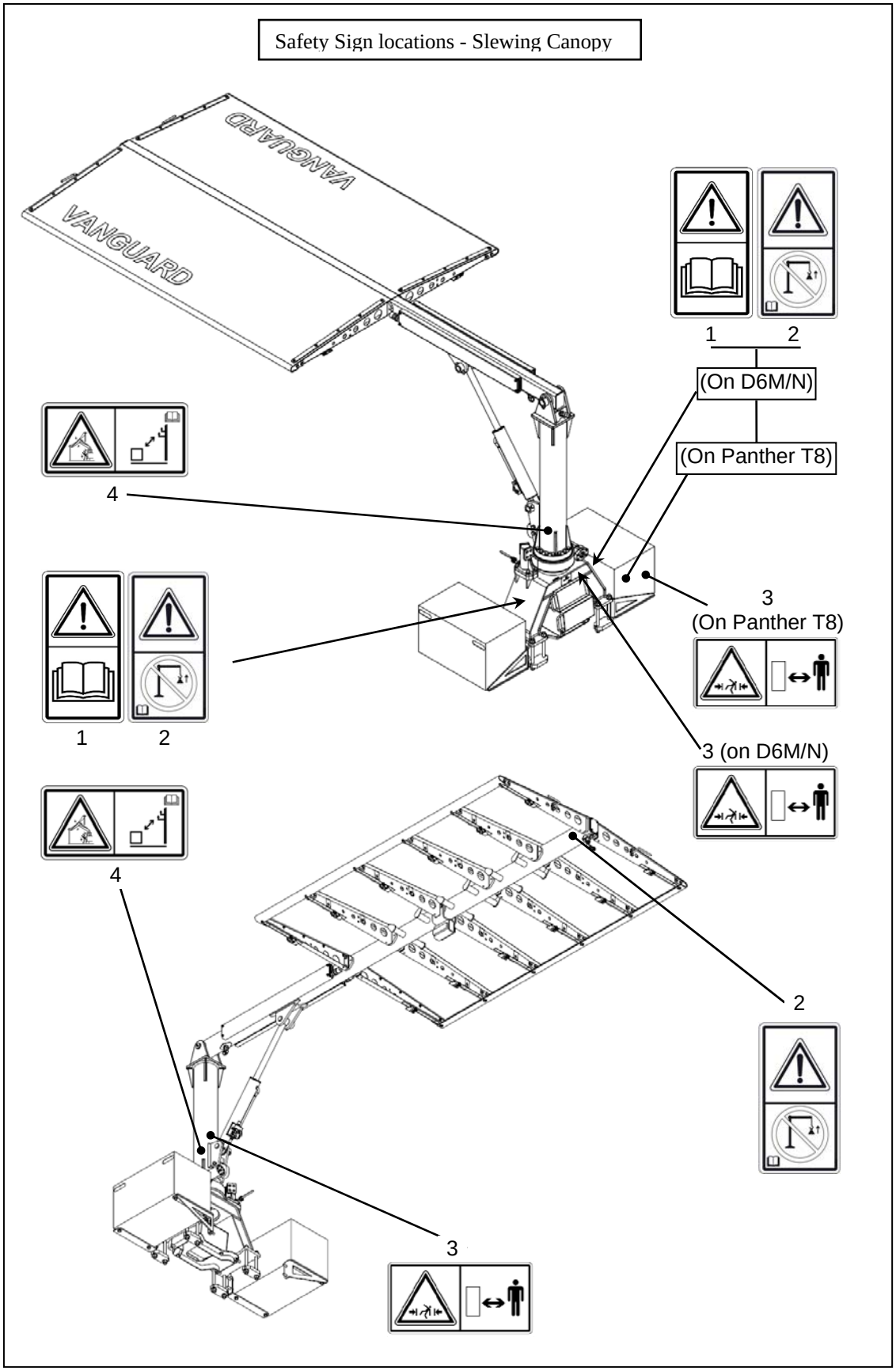
There are several specific safety signs on this equipment. The exact location of the hazard and the description are reviewed in this section. Become familiarized with all safety signs.

Make sure that all of the safety signs are legible. Clean or replace the safety signs if you cannot read the words. Replace the illustrations if the illustrations are not visible. Use a cloth, water, and mild soap to clean the safety signs. Do not use solvent, gasoline, or other harsh chemicals to clean the safety signs. Solvents, gasoline, or harsh chemicals could loosen the adhesive that secures the safety message. Loose adhesive will allow the safety message to fall.

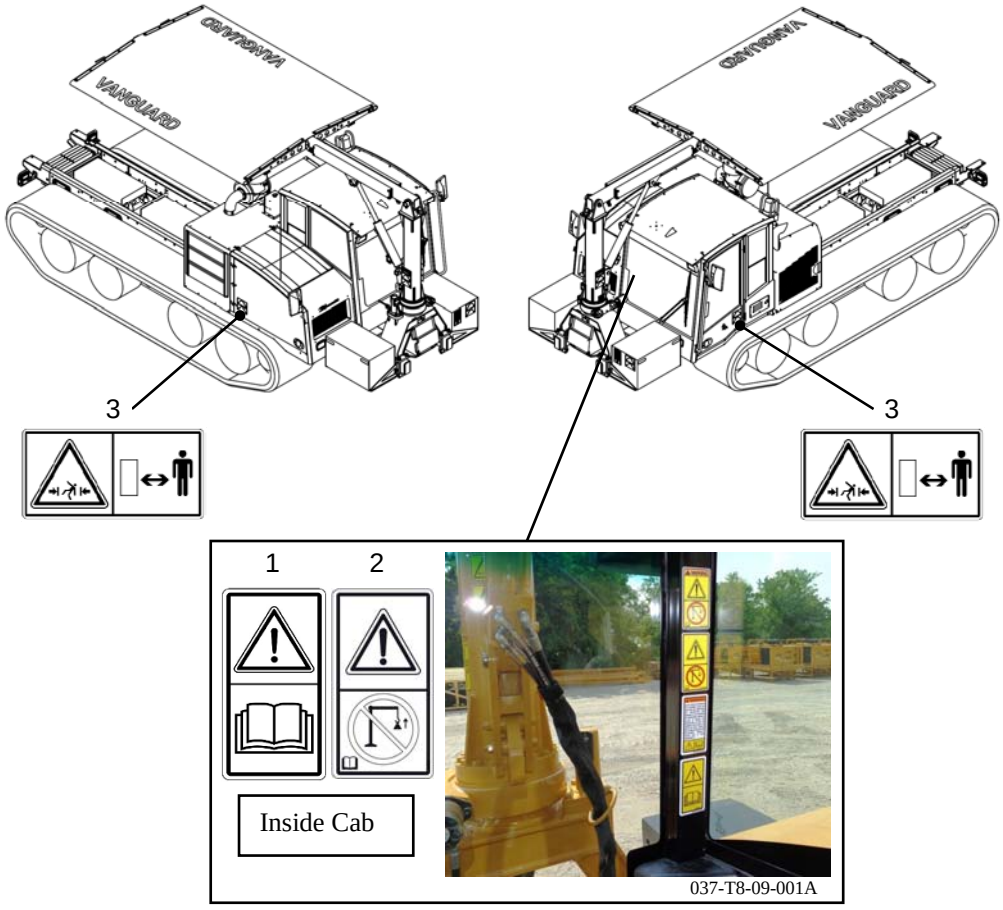
Do not use pressure washers to clean the safety signs.

Replace any safety sign that is damaged, or missing. If a safety sign is attached to a part that is replaced, install a safety sign on the replacement part. Vanguard Equipment can provide new safety signs.

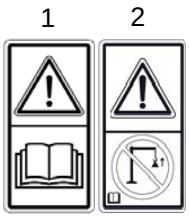
Safety Sign locations - Slewing Canopy



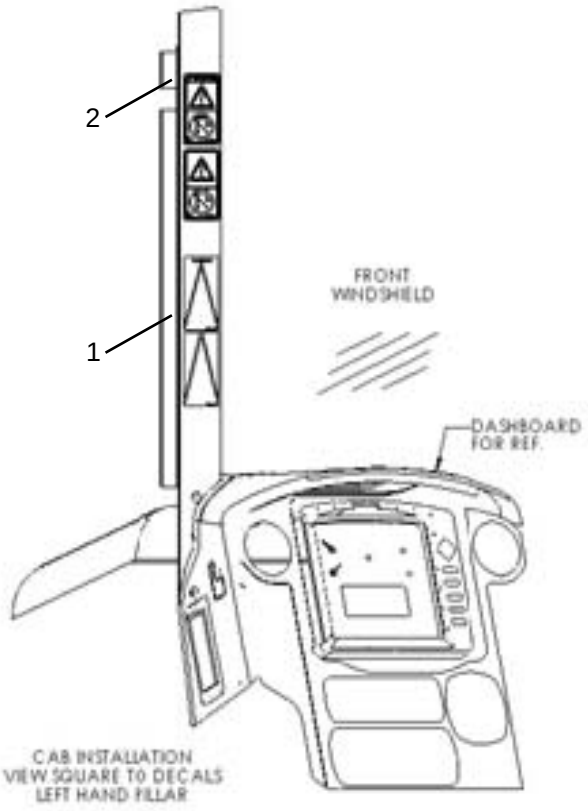
Safety Sign locations - Panther T8 tracked vehicle



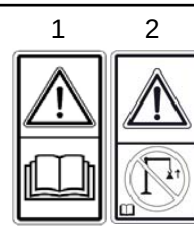
Safety Sign locations - D6M/N tractor vehicle Cab (EROPS)



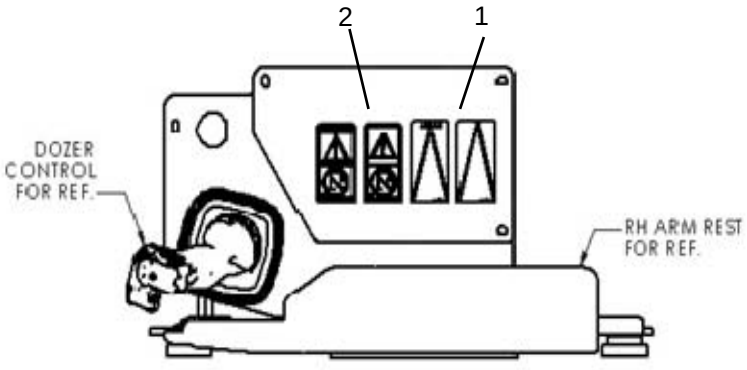
Inside Cab (EROPS)



Safety Sign locations - D6M/N tractor vehicle Canopy (OROPS)



Inside Canopy (OROPS)



CANOPY INSTALLATION VIEW FROM OPERATOR'S SEAT RH CONTROLS

Do Not Operate (1)

WARNING

WARNING! Do not operate or work on this machine unless you have read and understand the instructions and warnings in the Operation and Maintenance Manuals. Failure to follow the instructions or heed the warnings could result in injury or death. Contact your dealer for replacement manuals. Proper care is your responsibility.

Safety message (1) is located on the front of the left Slewing Canopy storage box (if equipped with a storage box), or on the left and right sides of the Slewing Canopy Base if not equipped with storage boxes. Safety message (1) is located inside the Operator Station of the carrier vehicle: on the right front cab-pillar in Panther T8 tracked vehicle, on the left font pillar in the cab (EROPS) of a D6M/N, or besides the right armrest in the Canopy (ORPS) D6M/N.

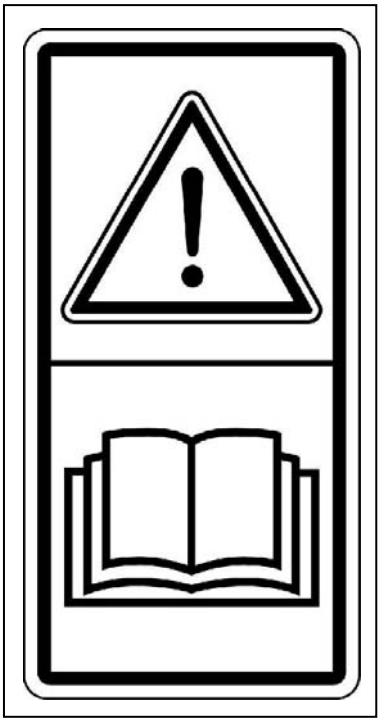


Figure 1: Do not operate (1)

Not a Lifting Device (2)

⚠ WARNING

Dropping load hazard! Do not attempt to use the Slewing Canopy as a lifting device, crane, or as a lifting jib or boom to raise or support any type of load other than the intended use. Only use the Slewing Canopy to support and carry the welding cables and lightweight accessories used for Manual Metal Arc Welding operations, such as hand grinders or other similar tools. Do not overload the Slewing Canopy, serious equipment damage, personnel injury, or even death could result. Refer to the Load Capacity section of this manual.

Safety message (2) is located on the front of the left Slewing Canopy storage box (if equipped with a storage box), or on the left and right sides of the Slewing Canopy Base if not equipped with storage boxes, and on the outer end of the Slewing Canopy on both sides of the tube. Safety message (2) is located inside the Operator Station of the carrier vehicle: on the right front cab-pillar in Panther T8 tracked vehicle, on the left font pillar in the cab (EROPS) of a D6M/N, or besides the right armrest in the Canopy (ORPS) D6M/N.

Figure 2: Not a lifting device (2)

No Clearance (3)

⚠ WARNING

Crushing Hazard! Stay back a safe distance. No clearance for a person in this area when the Slewing Canopy turns. Severe injury or death from crushing could occur.

Safety message (3) is located on the base of the Slewing Canopy Mast, above the lift cylinder attachment point. On the Panther T8 tracked vehicle, Safety message (3) is located on the exterior left and right hand sides of the carrier vehicle near the Slewing Canopy vehicle attachment supports. For D6M/N tractors, Safety message (3) is located on the front of the Slewing Canopy Base.

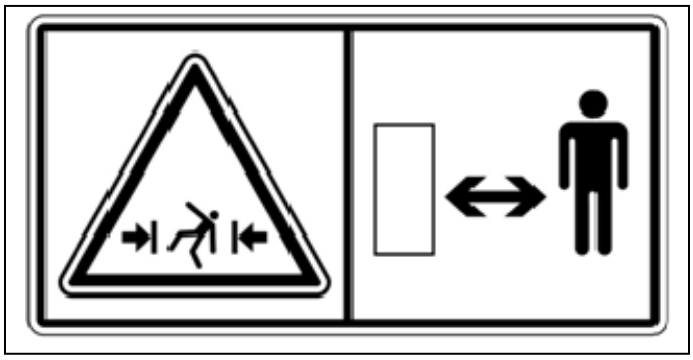


Figure 3: No clearance (3)

Electrical Power Lines (4)

⚠ DANGER

Electrocution Hazard! Keep the machine and attachments a safe distance from electrical power. Stay clear 3 M (10 ft) plus twice the line insulator length. Read and understand the instructions and warnings in the Operation and Maintenance Manual. Failure to follow the instructions and warnings will cause serious injury or death.

Safety message (4) is located on both sides of the base of the Slewing Canopy Mast

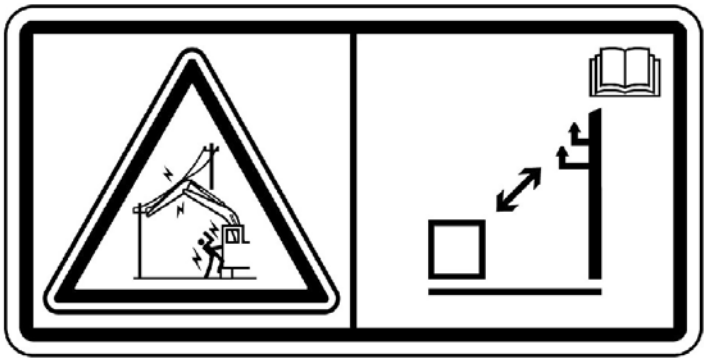


Figure 4: Electrical power lines (4)

General Hazard Information

Before you service the equipment or before you repair the equipment, attach a “Do Not Operate” tag or similar tag to the start switch or controls.

Know the width of your equipment in order to maintain proper clearance near fences, boundary obstacles, etc.

This attachment extends significantly beyond the carrier increasing the overall length and/or width, be especially aware of the additional length and/or width when turning and maneuvering the carrier vehicle.

Follow all safety regulations, procedures and precautions that govern the work site, including: wearing a hard hat, protective glasses and other protective equipment in order to accommodate job conditions.

Do not wear loose clothing or jewelry that can catch on controls or other parts of the equipment.

Keep all equipment free from foreign material. Remove debris, oil, tools and other items.

Secure all loose items that are not part of the machine; tools, lunchboxes, water bottles, etc.

Know the appropriate work site hand signals. Also, know the personnel that are authorized to give the hand signals. Accept signals from one person only.

Never put maintenance fluids into glass containers. Drain all liquids into a suitable container.

When you discard liquids, obey all local regulations.

Use all cleaning solutions with care.

Report all necessary repairs.

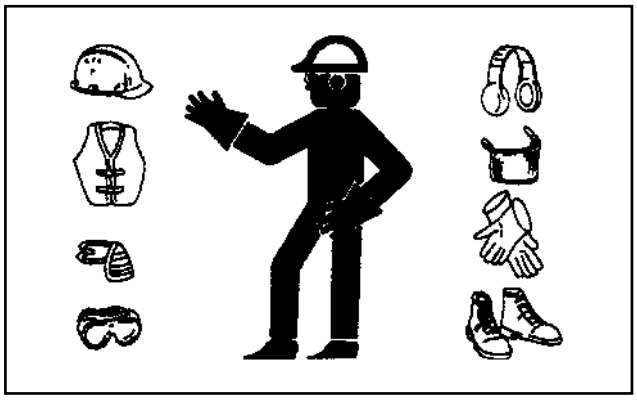
Do not allow unauthorized personnel on the machine.

Perform the maintenance with the carrier parked on level ground as per the manufacturer's instructions

Pressure Air and water

Pressurized air and/or water can cause debris and/or hot water to be blown out. The debris and/or hot water could result in personal injury.

When pressurized air and/or pressurized water are used for cleaning, wear protective clothing, protective shoes, and eye protection. Eye protection includes goggles or a protective face shield.



The maximum air pressure for cleaning purposes must be reduced to 205 kPa (30 psi) when the nozzle is deadheaded and the nozzle is used with an effective chip deflector and personal protective equipment. The maximum water pressure for cleaning purposes must be below 275 kPa (40 psi).

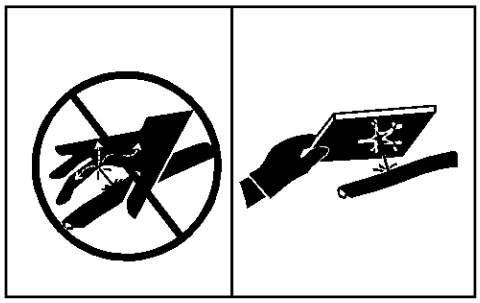
Trapped Pressure

Pressure can be trapped in a hydraulic system. Trapped pressure can cause sudden equipment movement. Use caution if you disconnect hydraulic lines or fittings. High-pressure oil that is released can cause a hose to whip. High-pressure oil that is released can cause oil to spray. Fluid penetration can cause serious injury and possible death.

Fluid Penetration

Pressure can be trapped in the hydraulic circuit long after the engine has been stopped. The pressure can cause hydraulic fluid or items such as pipe plugs to escape rapidly if the pressure is not relieved correctly.

Do not remove any hydraulic components or parts until pressure has been relieved or personal injury may occur. Do not disassemble any hydraulic components or parts until pressure has been relieved or personal injury may occur. Refer to the Service Manual for any procedures that are required to relieve the hydraulic pressure.



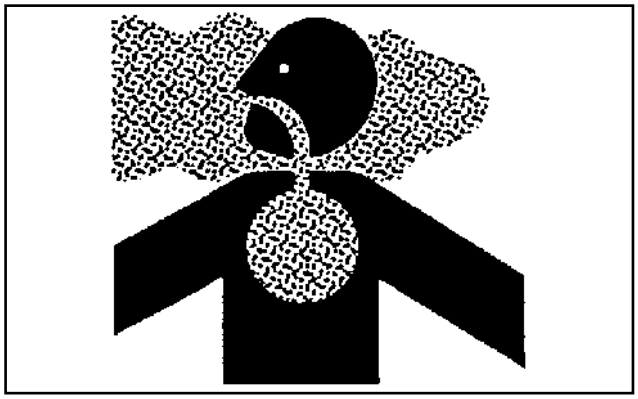
When you check for a leak, use a board or cardboard. Leaking fluid that is under pressure can penetrate body tissue. Fluid penetration can cause serious injury and possible death. A pin hole leak can cause severe injury. If fluid is injected into your skin, you must obtain treatment immediately. Seek treatment from a doctor that is familiar with this type of injury.

Containing Fluid Spillage

Care must be taken in order to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the equipment. Prepare to collect the fluid with suitable containers before opening any compartment or disassembling any component that contains fluids.

Obey all local regulations for the disposal of liquids.

Inhalation



Asbestos Information

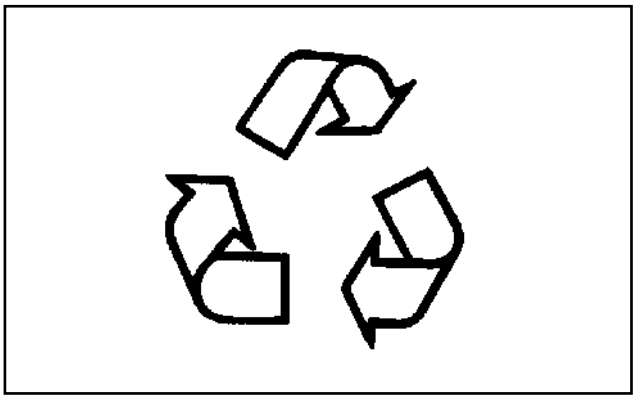
Equipment and replacement parts that are shipped from Vanguard are asbestos free. Use only genuine OEM replacement parts. If any replacement parts that contain asbestos are used, follow the manufacturer's handling guidelines and procedures as outlined in their instruction documentation.

Obey environmental regulations for the disposal of asbestos.

Stay away from areas that might have asbestos particles in the air.

Dispose of Waste Properly

Improperly disposing of waste can threaten the environment. Potentially harmful fluids should be disposed of according to local regulations.



Always use leak proof containers when you drain fluids. Do not pour waste onto the ground, down a drain, or into any source of water.

Crushing Prevention and Cutting Prevention

Support the equipment properly before you perform any work or maintenance beneath that equipment. Do not depend on hydraulic cylinders to hold up the equipment. Equipment can fall if a control is moved, or if a hydraulic line breaks.

Unless you are instructed otherwise, never attempt adjustments while the machine is moving or while the engine is running.

Whenever there are equipment control linkages the clearance in the linkage area will change with the movement of the equipment or the machine. Stay clear of areas that may have a sudden change in clearance with machine movement or equipment movement.

Stay clear of all rotating and moving parts.

If it is necessary to remove guards in order to perform maintenance, always install the guards after the maintenance is performed.

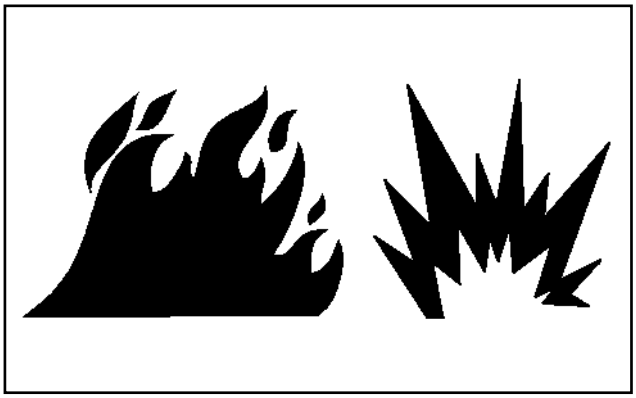
When you strike a retainer pin with force, the retainer pin can fly out. The loose retainer pin can injure personnel. Make sure that the area is clear of people when you strike a retainer pin. To avoid injury to your eyes, wear protective glasses when you strike a retainer pin.

Chips or other debris can fly off an object when you strike the object. Make sure that no one can be injured by flying debris before striking any object.

Oils

Hot oil and hot components can cause personal injury. Do not allow hot oil to contact the skin. Also do not allow hot components to contact the skin.

Fire Prevention and Explosion Prevention



General

All fuels, most lubricants, and some coolant mixtures are flammable.

To minimize the risk of fire or explosion, the following actions are recommended.

Always perform a Walk-Around Inspection, which may help you identify a fire hazard. Do not operate a machine when a fire hazard exists. Contact your dealer for service.

Do not operate a machine with a fluid leak. Repair leaks and clean up fluids before resuming machine operation. Fluids that are leaking or spilled onto hot surfaces or onto electrical components can cause a fire. A fire may cause personal injury or death.

Remove flammable material such as leaves, twigs, papers, trash, and so on. These items may accumulate around hot areas and hot parts on the machine.

Clean all flammable materials such as fuel, oil, debris, etc. from the machine.

Do not operate the machine close to the any flames.

Do not weld or flame cut on tanks or lines that contain flammable fluids or flammable material. Empty and purge the lines and tanks. Then clean the lines and tanks with a nonflammable solvent prior to welding or flame cutting. Ensure that the components are properly grounded in order to avoid unwanted arcs.

Dust that is generated from repairing nonmetallic components may be flammable and/or explosive. Repair such components in a ventilated area away from open flames or sparks. Use suitable Personal Protection Equipment (PPE).

Inspect all lines and hoses for wear or deterioration. Replace damaged lines and hoses. The lines and the hoses should have adequate support and secure clamps. Tighten all connections to the recommended torque. Damage to the protective cover or insulation may provide fuel for fires.

Store fuels and lubricants in properly marked containers away from unauthorized personnel. Store oily rags and flammable materials in protective containers. Do not smoke in areas that are used for storing flammable materials.

Properly clean areas of spillage.

Never store flammable fluids in the operator compartment of the carrier vehicle.

Wiring

Check electrical wires daily. If any of the following conditions exist, replace parts before you operate the machine.

- Fraying
- Signs of abrasion or wear
- Cracking
- Discoloration
- Cuts on insulation
- Other damage

Make sure that all clamps, guards, clips, and straps are reinstalled correctly. This action will help to prevent vibration, rubbing against other parts, and excessive heat during machine operation.

Attaching electrical wiring to hoses and tubes that contain flammable fluids or combustible fluids should be avoided.

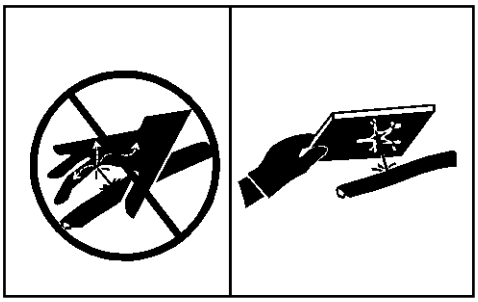
Consult your dealer for repair or for replacement parts.

Keep wiring and electrical connections free of debris.

Lines, Tubes and Hoses

Do not bend high-pressure lines. Do not strike high-pressure lines. Do not install bent lines, bent tubes, or bent hoses. Do not install damaged lines, damaged tubes, or damaged hoses.

Repair loose lines, loose tubes, and loose hoses. Repair damaged lines, damaged tubes, and damaged hoses. Use the appropriate backup wrenches in order to tighten all connections to the recommended torque. Leaks can cause fires. Contact Vanguard Equipment for replacement parts.



Check lines, tubes and hoses carefully. Wear Personal Protection Equipment (PPE) in order to check for leaks. Do not use your bare hands to check for leaks. Always use a board or cardboard to check for leaks. Leaking fluid that is under pressure can penetrate body tissue. Fluid penetration can cause serious injury and possible death. A pin hole leak can cause severe injury. If fluid is injected into your skin, you must get treatment immediately. Seek treatment from a doctor that is familiar with this type of injury.

Replace the affected parts if any of the following conditions are present:

- End fittings are damaged or leaking.
- Outer coverings are chafed or cut.
- Wires are exposed.
- Outer coverings are swelling or ballooning.
- Flexible parts of the hoses are kinked or crushed.
- Outer covers have exposed embedded armoring.
- End fittings are displaced.

Make sure that all clamps, guards, and heat shields are installed correctly. During machine operation, this action will help to prevent vibration, rubbing against other parts, excessive heat, and failure of lines, tubes, and hoses.

Do not operate a machine when a fire hazard exists. Repair any lines that are corroded, loose, or damaged. Leaks may provide fuel for fires. Consult your dealer for repair or for replacement parts. Use genuine OEM parts or the equivalent, for capabilities of both the pressure limit and temperature limit.

Fire Extinguisher

A fire extinguisher is typically carried on the vehicle carrier.

Be familiar with the operation of the fire extinguisher. Inspect the fire extinguisher and service the fire extinguisher regularly. Obey the recommendations on the fire extinguisher's instruction-plate.

Fire Safety

Note: Locate fire extinguishers and how to use a fire extinguisher before you operate the machine.

Follow the instructions covering Fire Safety outlined in the carrier vehicle's Operation and Maintenance Manual, and/or the welding-package's Operation and Maintenance Manual.

If you find that you are involved in a machine fire, your safety and that of others on site is the top priority. The following actions should only be performed if the actions do not present a danger or risk to you and any nearby people. At all times you should assess the risk of personal injury and move away to a safe distance as soon as you feel unsafe.

Move the machine away from nearby combustible material such as fuel/oil stations, structures, trash, mulch and timber.

Lower any implements and turn off the engine as soon as possible. If you leave the engine running, the engine will continue to feed a fire. The fire will be fed from any damaged hoses that are attached to the engine or pumps.

If possible, turn the battery disconnect switch to the OFF position. Disconnecting the battery will remove the ignition source in the event of an electrical short. Disconnecting the battery will eliminate a second ignition source if electrical wiring is damaged by the fire, resulting in a short circuit.

Notify emergency personnel of the fire and your location.

Use the on-board fire extinguisher, per the instructions on the fire extinguisher's instruction-plate, use the following procedure:

1. Pull the pin.
2. Aim the extinguisher or nozzle at the base of the fire.
3. Squeeze the handle and release the extinguishing agent.
4. Sweep the extinguisher from side to side across the base of the fire until the fire is out.

Remember, if you are unable to do anything else, shut off the machine before exiting. By shutting off the machine, fuels will not continue to be pumped into the fire. Use the emergency Stop button on the welder package to shut off the machine.

If the fire grows out of control, be aware of the following risks:

- Tires on wheeled machines pose a risk of explosion as tires burn. Hot shrapnel and debris can be thrown great distances in an explosion.
- Tanks, accumulators, hoses, and fittings can rupture in a fire, spraying fuels and shrapnel over a large area.
- Remember that nearly all of the fluids on the machine are flammable, including coolant and oils. Additionally, plastics, rubbers, fabrics, and resins in fiberglass panels are also flammable.

Fire Extinguisher Location

Make sure that a fire extinguisher is available. Be familiar with the operation of the fire extinguisher. Inspect the fire extinguisher and service the fire extinguisher. Obey the recommendations on the instruction plate.

Mount the fire extinguisher in the accepted location per local regulations.

Electrical cables and wire-harnesses

Do not bend electrical cables or wire-harnesses to a tighter radius than already installed. Do not strike electrical cables or wire-harnesses. Do not kink electrical cables or wire-harnesses. Do not install kinked electrical cables or wire-harnesses. Do not install damaged electrical cables or wire-harnesses.

Note: Only qualified personnel should work on electrical equipment, including electrical cables or wire-harnesses. Follow established safety procedures when working on electrical equipment, including locking out operator controls as described in the "General Hazard Information" section above.

Replace electrical cables or wire-harnesses with the same electrical rating, properties, and specifications as the original. Contact your dealer or Vanguard for replacement parts.

Replace electrical cables or wire-harnesses if any of the following conditions are present:

- The outer covering is chafed or cut.
- The insulation is chafed, cut, or damaged in any way.
- Signs of burning or arcing through the outer covering/insulation are present.
- The electrical cable or wire-harness has been crushed by a heavy object.

Make sure that all clamps and guards are installed correctly. During operation, this will help prevent vibration and rubbing against other parts.

Before Operating Equipment

Clear all personnel from the equipment and from the area.

Check for obvious signs of damage, lose bolts, lose equipment, and foreign objects or debris on and around the equipment.

Visibility Information

Before you start the machine, perform a walk-around inspection in order to ensure that there are no hazards around the machine.

While the machine is in operation, constantly survey the area around the machine in order to identify potential hazards as hazards become visible around the machine.

Your machine may be equipped with visual aids. Some examples of visual aids are Closed Circuit Television (CCTV) and mirrors. Before operating the machine, ensure that the visual aids are in proper working condition and that the visual aids are clean. Adjust the visual aids using the procedures that are located in the carrier-vehicle's Operation and Maintenance Manual.

This attachment extends significantly beyond the carrier increasing the overall length and/or width, be especially aware of the additional length and/or width when turning and maneuvering the carrier vehicle. The installation of the Slewing Canopy may restrict vision, and it may not be possible to provide direct visibility to all areas around the machine. Appropriate job site organization is required in order to minimize hazards that are caused by restricted visibility. Job site organization is a collection of rules and procedures that coordinates machines and people that work together in the same area. Examples of job site organization include the following:

- Safety instructions
- Controlled patterns of machine movement and vehicle movement
- Workers that direct traffic to move when it is safe
- Restricted areas
- Operator training
- Warning symbols or warning signs on machines or on vehicles
- A system of communication
- Communication between workers and operators prior to approaching the machine

Operation

Machine Operating Temperature Range

When using the correct hydraulic oil weight, as specified by the carrier vehicle OEM, the Slewing Canopy configuration is intended for use within an ambient temperature range -40°C (-40°F) to 50°C (122°F). Consult the carrier vehicle’s Operation and Maintenance Manual for additional information on special configurations.

Machine Operation

Follow the Operation instructions of the carrier-vehicle.

Report any needed repairs that were noted during operation.

Load Capacities

Maintain control of the machine. Do not overload the machine beyond the machine capacity. Ensure that the correct load capacity indication film is referenced. The supported load must be within the capabilities of the machine to ensure that the carrier vehicle does not become unstable. Additional counterweight added to the vehicle may be required to ensure the carrier vehicle is stable.

Electrical Power Lines

⚠ WARNING

Serious injury or death by electrocution can result if the machine or attachments are not kept the proper distance from electrical power lines.

Use the following chart as a reference to determine the safe distance from high voltage wires during these conditions:

- machine operation
- machine transportation

When Operating Near High Voltage Power Lines	
Normal Voltage (Phase to Phase)	**Minimum Clearance Required**
0 Volts to 50 kVolts	3.05 Meters (10 Feet)
Over 50 kVolts to 200 kVolts	4.60 Meters (15 Feet)
Over 200 kVolts to 350 kVolts	6.10 Meters (20 Feet)
Over 350 kVolts to 500 kVolts	7.62 Meters (25 Feet)
Over 500 kVolts to 750 kVolts	10.67 Meters (35 Feet)
Over 750 kVolts to 1000 kVolts	13.72 Meters (45 Feet)
While in Transit Near High Voltage Power Lines	
Normal Voltage (Phase to Phase)	**Minimum Clearance Required**
0 Volts to 0.75 kVolts	1.22 Meters (4 Feet)
Over 0.75 kVolts to 50 kVolts	1.83 Meters (6 Feet)
Over 50 kVolts to 345 kVolts	3.05 Meters (10 Feet)
Over 345 kVolts to 750 kVolts	6.10 Meters (20 Feet)
Over 750 kVolts to 1000 kVolts	7.62 Meters (25 Feet)

Table 1: Power lines, minimum clearance

Machine Parking

Refer to the carrier's Operation and Maintenance Manual for specific machine parking instructions.

Sound Level Information

The Slewing Canopy itself does not produce elevated sound pressure levels.

Refer to the carrier's Operation and Maintenance Manual for sound level information.

Sound Level Information for Machines in European Union Countries and in Countries that Adopt the "EU Directives"

The Slewing Canopy itself does not produce elevated sound pressure levels.

Refer to the carrier's Operation and Maintenance Manual for sound level information for Machines in European Union Countries and in Countries that Adopt the "EU Directives".

Refer to the carrier's Operation and Maintenance Manual to determine if hearing protection is prescribed for the operator of the carrier vehicle.

Vibration

When the machine is operated according to the intended use, the vibration data for the carrier-vehicle is unaffected by attachment of the Slewing Canopy.

Guards (Operator Protection)

There are different types of guards that are used to protect the operator. The machine and the machine application determines the type of guard that should be used.

A daily inspection of the guards is required in order to check for structures that are bent, cracked or loose. Never operate a machine with a damaged structure.

The operator becomes exposed to a hazardous situation if the machine is used improperly or if poor operating techniques are used. This situation can occur even though a machine is equipped with an appropriate protective guard. Follow the established operating procedures that are recommended for your machine.

Product Information Section (SLEWING CANOPY)

General Information

Equipment Information Section (SLEWING CANOPY)

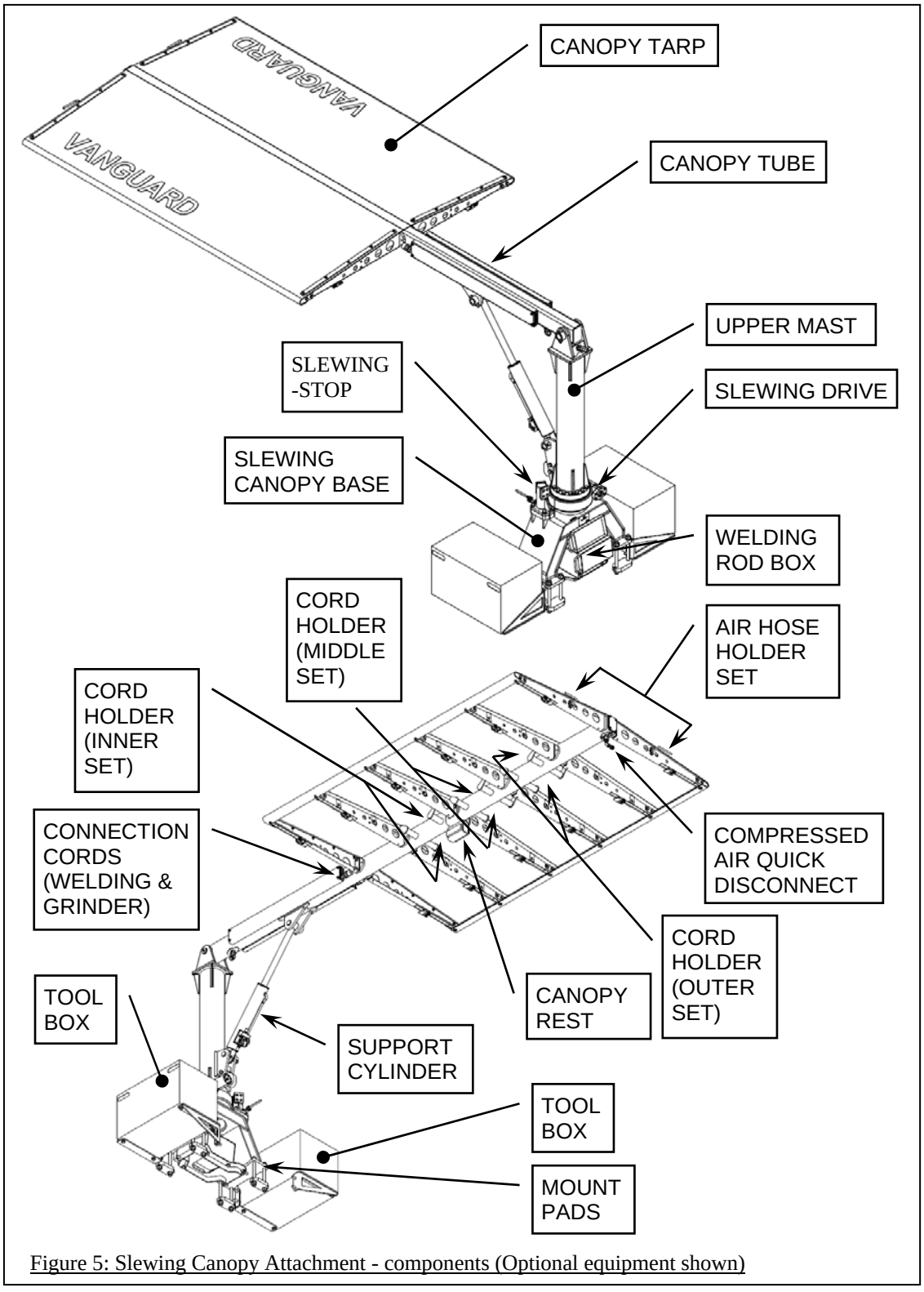
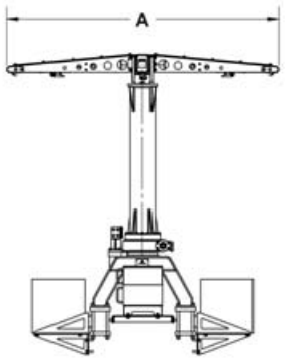
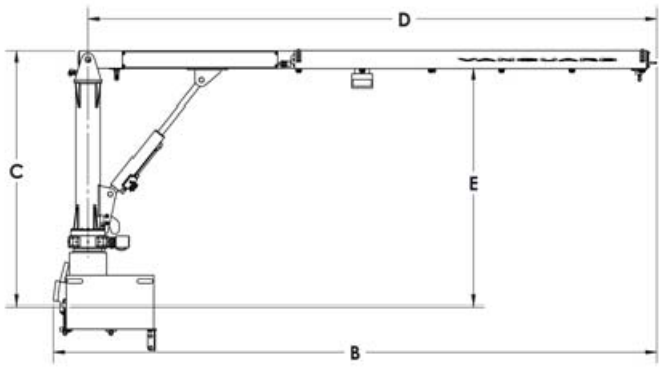


Figure 5: Slewing Canopy Attachment - components (Optional equipment shown)

Slewing Canopy Attachment Specification (Carrier-vehicle weights not included)





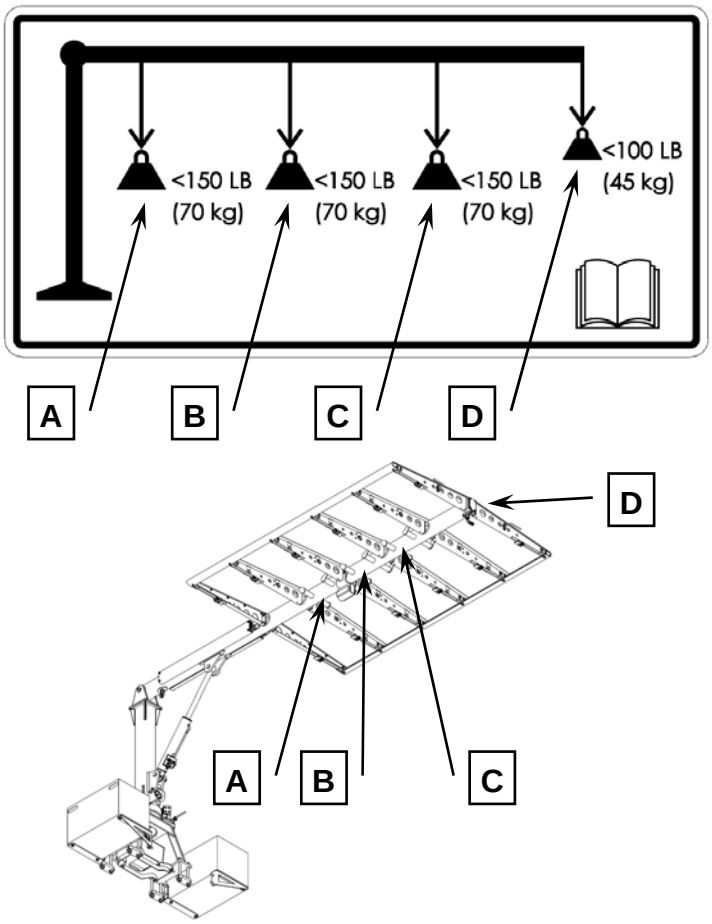
(A) Canopy Width		2368 mm	93.25 in
(B) Overall Length with Canopy Horizontal (Shipping)		5260 mm	207.1 in
(C) Maximum Height Above Attachment Mounting Pads	Canopy Horizontal (Shipping)	2206 mm	86.87 in
	Canopy Fully Raised	2413 mm	95 in
	Canopy Fully Lowered (To Top of Upper mast)	2231 mm	87.83 in
(D) Canopy Slewing Radius	Canopy Horizontal (Shipping)	4953 mm	195 in
	Canopy Fully Raised	4950 mm	194.89 in
	Canopy Fully Lowered	4505 mm	177.36 in
(E) Working Space Height (Tip of Canopy Tube Above Attachment Mounting Pads)	INSTALLED ON PANTHER T8		
	Canopy Horizontal (Shipping)	2054 mm	80.87 in
	Canopy Fully Raised	2248 mm	88.5 in
	Canopy Fully Lowered	61 mm	2.4 in
	INSTALLED ON D6M/N TRACTOR		
	Canopy Horizontal (Shipping)	2457 mm	96.75 in
	Canopy Fully Raised	2652 mm	104.4 in
	Canopy Fully Lowered	465 mm	18.3 in
Weight Slewing Canopy Attachment	INSTALLED ON PANTHER T8 (Includes Stow Arm & empty Tool Boxes)	1045 kg	2330 lb
	INSTALLED ON D6M/N TRACTOR (No additional accessories)	950 kg	2100 lb

Intended Use

The primary use of this attachment is to support and carry the welding cables and lightweight accessories, such as hand-grinders, etc, used during Shielded Metal Arc Welding (SMAW) or Manual Metal Arc Welding (MMA or MMAW) — commonly referred to as stick welding—of petroleum-product pipeline construction. The Slewing Canopy also provides a limited degree of protection from the sun and wind.

The Slewing Canopy is not intended to be used as a lifting device or as a crane.

Load Capacity



The loading at each individual holder set (A), (B), (C), (D) must not be exceeded. The combined loading (A)+(B)+(C)+(D) must not be exceeded:

(A) Total Combined load supported at INNER CORD HOLDER SET

+

(B) Total Combined load supported at MIDDLE CORD HOLDER SET

+

(C) Total Combined load supported at OUTER CORD HOLDER SET

+

(D) Total Combined load supported at AIR HOSE HOLDER SET

Figure 6: Slewing Canopy Load Capacity

Identification Information

Plate Locations and Film Locations - CE Mark

The attachment/component information plate is attached to the component to identify the model name/number and the serial number. It is not a Product Information Number (PIN). The attachment/component information plate is located on the front of the Slewing Canopy Base, below the Slewing Drive, per the illustration below. For quick reference, record this information in the spaces that are provided below. The Slewing Canopy Attachment is compliant to "2006/42/EC", the serial number (S/N), Model name/number (M/N), and Manufacture year information is stamped onto the "CE" plate. For quick reference, record this information in the spaces provided below:

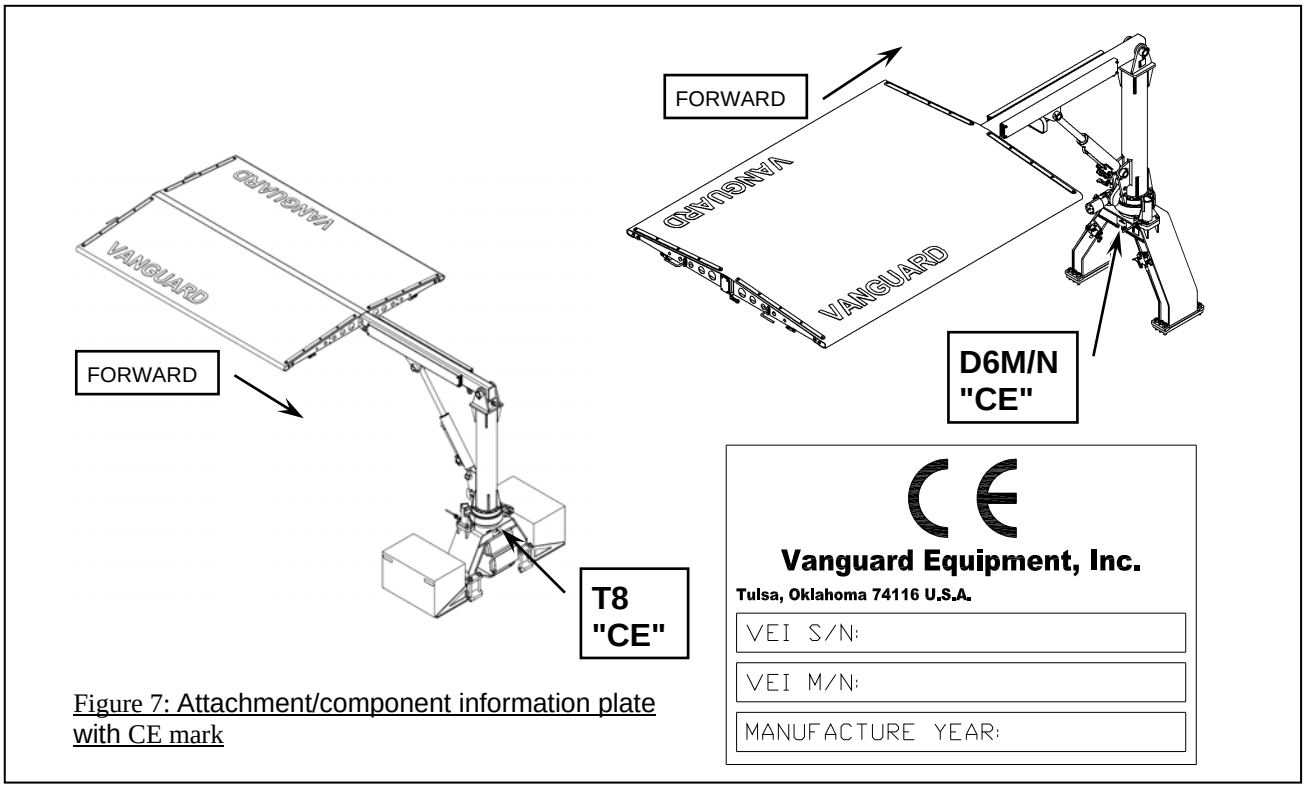


Figure 7: Attachment/component information plate with CE mark

Declaration of Conformity

Machines supplied with the "CE" plate are compliant to "2006/42/EC".

VANGUARD EQUIPMENT, INC.

EC DECLARATION OF CONFORMITY

CE 13

We: **Vanguard Equipment, Inc.**
15627 East Pine Street
Tulsa, OK 74116
+1 918.437.1796
+1 918.437.1794 (Facsimile)

declare under our sole responsibility that the product,

Slewing Canopy

to which this documentation relates, is in conformity with the following documents:

Directive: **Machinery Directive 2006/42/EC**

Statement regarding **Pressure Equipment Directive 97/23/EC:** The Slewing Canopy is excluded from the scope of the Pressure Equipment Directive, by the language of Article 1, Section 3.6. This equipment is classified less than Category I under Article 9. The pressure-related safety of this equipment has been evaluated according to Sound Engineering Practice (SEP).

The technical file is maintained at:
Relevant information will be transmitted via e-mail in response to a reasoned request by national authorities.

Pipeline Machinery International
Parkstraat 83
The Hague, Netherlands
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David Hart, P. Eng.
Chief Engineer

Date of Issue: September 6, 2013
Place of Issue: Tulsa, OK 74116

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15627 E. Pine St.
Tulsa, Oklahoma
74116, USA
☎: 918.437.1796 🖷: 918.437.1794

Operation Section

Before Operation

Mounting and Dismounting

Refer to the carrier vehicle's Operation and Maintenance Manual for specific instructions and machine access way information.

Refer to Vanguard Equipment's CPW-125-4 or CPW-125-4-S2 Weld-deck Operation and Maintenance Manuals for specific instructions and machine access way information for Vanguard Equipment's weld-decks.

Daily Inspection

For maximum service life of the machine, perform a daily walk-around inspection.

Note: Watch closely for leaks. If leaking is observed, find the source of the leak and correct the leak. If leaking is suspected or leaking is observed, check the fluid levels more frequently.

Inspect the machine for the following items:

- Inspect the hydraulic system for leaks. Repair any hydraulic system leaks. Inspect the hoses, the seals, and the flanges.
- Inspect covers and the guards for damage, for loose bolts, and for missing bolts.
- Inspect mirrors and make sure they are in good condition and replace if broken.

Note: Refer to the carrier vehicle's operation manual for detailed information on the specific daily inspection of the carrier unit.

Notice

Accumulated grease and oil on a machine is a fire hazard.

Remove debris with steam cleaning or high-pressure water, at the specified interval in the Maintenance Interval Schedule or each time any significant quantity of oil is spilled on the machine.

Daily Checks

After you inspect the machine, perform the daily maintenance that is listed in the maintenance interval schedule. Perform the daily maintenance before you mount the machine in order to operate the machine.

Refer to Operation and Maintenance Manual, "Maintenance Interval Schedule" for the correct procedures for the following checks:

- "Slewing Drive Bearing Left side - Lubricate"
- "Slewing Drive Bearing Right side - Lubricate"
- "Slewing Canopy Support Cylinder Pivot Pins- Lubricate"
- "Slewing Canopy Pivot Pin - Lubricate"

Note: Refer to the carrier vehicle's operation manual for detailed information on the specific daily checks of the carrier unit.

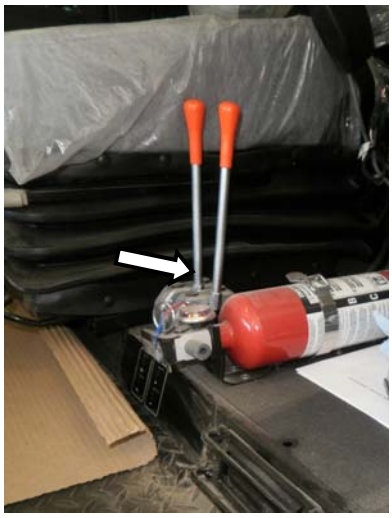
Operator Controls

The hydraulic functions of the Slewing Canopy Attachment are controlled by the carrier vehicle's implement controls. Refer to the specific carrier vehicle's Operation and Maintenance manual for information regarding the type and location of the implement controls.

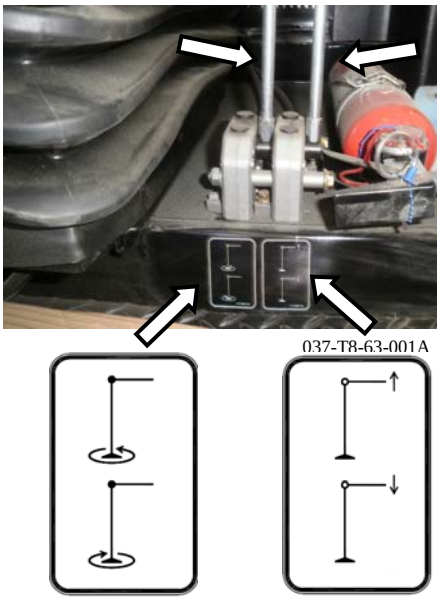
The implement controls may consist of either two separate levers, or there may be a single multifunction control. For two lever controls, there will be one lever to control the raise and lower functions and another for multifunction controls, such as the blade control on a dozer, one control axis will operate the raise and lower functions, and another axis will control the slewing functions.

The relevant carrier vehicle's implement controls should be relabeled with the correct hydraulic function symbols for the Slewing Canopy Attachment as shown in this section. Contact your dealer to obtain replacement symbols and installation instructions if any or all of the symbols are not present.

037-T8-05-006A



037-T8-63-003A

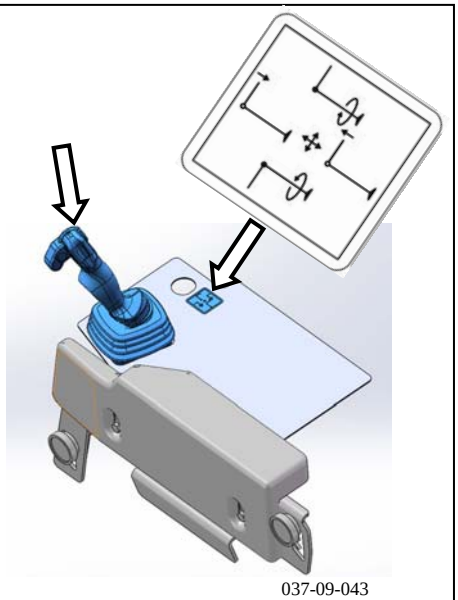


037-T8-63-001A

Figure 8: Typical implement control location - Panther T8 tracked vehicle

037-D6N-05-001B

037-T8-63-003A



037-09-043

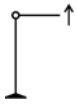
Figure 9: Typical implement control location - D6N LGP tractor

The speed of the Slewing Canopy will be dependent on the engine RPM speed driving the hydraulic implement pump. The faster the engine RPM, the faster the Slewing Canopy operational speed.

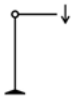
Slewing Canopy Controls

HOLD: Move the control lever(s) to the centre position to stop the motion of the Slewing Canopy. The Slewing Canopy will remain at the position it is in. The HOLD function will be identified by one of two methods, depending on the type of implement controls in the carrier vehicle. **1)** The HOLD position will be indicated by a mechanical detent (a point of resistance at the centre of control lever movement), and the implement controls will have to be manually returned to HOLD position. **2)** Spring force will self centre the lever to the HOLD position whenever it is released.

Note: Refer to the specific carrier vehicle's Operation and Maintenance manual for information regarding operation of the implement controls when they are released.

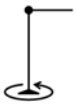


RAISE: Move the lever to this position to RAISE the Slewing Canopy. The further the lever is pushed away from HOLD position, the faster the Slewing Canopy will RAISE. The closer the lever is toward HOLD, the slower the Slewing Canopy will RAISE.



LOWER: Move the lever to this position to lower the Slewing Canopy. The further the lever is pushed away from HOLD position, the faster the Slewing Canopy will lower. The closer the lever is toward HOLD, the slower the Slewing Canopy will lower.

Rotate/Slew Clockwise: Move the lever to this position to rotate the Slewing Canopy clockwise. The further the lever is pushed away from HOLD position, the faster the Slewing Canopy will rotate. The closer the lever is toward HOLD, the slower the Slewing Canopy will rotate. The Slewing Canopy will rotate until it contacts the mechanical slewing-stop. Do not continue to rotate the canopy once it comes into contact with the mechanical slewing-stop



Rotate/Slew Counterclockwise (Anticlockwise): Move the lever to this position to rotate the Slewing Canopy counterclockwise (anticlockwise). The further the lever is pushed away from HOLD position, the faster the Slewing Canopy will rotate. The closer the lever is toward HOLD, the slower the Slewing Canopy will rotate. The Slewing Canopy will rotate until it contacts the mechanical slewing-stop. Do not continue to rotate the canopy once it comes into contact with the mechanical slewing-stop

Notice

The control motion of the Slewing Canopy must be observed by the operator at all times. Significant risk of injury or even death may result if the Slewing Canopy contacts personnel under force of the hydraulic controls. Significant risk of damage to equipment on or near the carrier vehicle may result if the Slewing Canopy contacts equipment under force of the hydraulic controls.

Always ensure that you are watching the Slewing Canopy and are aware of personnel near or around the work area whenever the hydraulic controls are being operated.

Machine Parking

Refer to the carrier's Operation and Maintenance Manual for specific machine parking instructions.

Transportation Information

⚠ WARNING

Do not transport the machine with the Slewing Canopy unsecured. Do not transport the machine with the Slewing Canopy facing forwards.

Note: The total combined weights and Dimensions of the Slewing Canopy, the Carrier Vehicle, and any additional attachments must be considered when transporting the machine.

Note: The slewing canopy should also be configured for transport whenever the carrier vehicle is being driven from one location to another whenever the carrier vehicle travels at a speed greater than normal "working" speed. For example, when being driven from one work area to another, without any welding work being carried out between nearby pipe joints, or when traveling from one welding set-up site to another.

Transport the machine with the Slewing Canopy facing rearwards, never transport with the Slewing Canopy facing forwards.

Obey all jurisdictional transportation laws that apply. Refer to the *Equipment Information Section (Slewing Canopy)* of this manual for weight and dimension considerations of the Slewing Canopy.

T8 Slewing canopy configure for transport

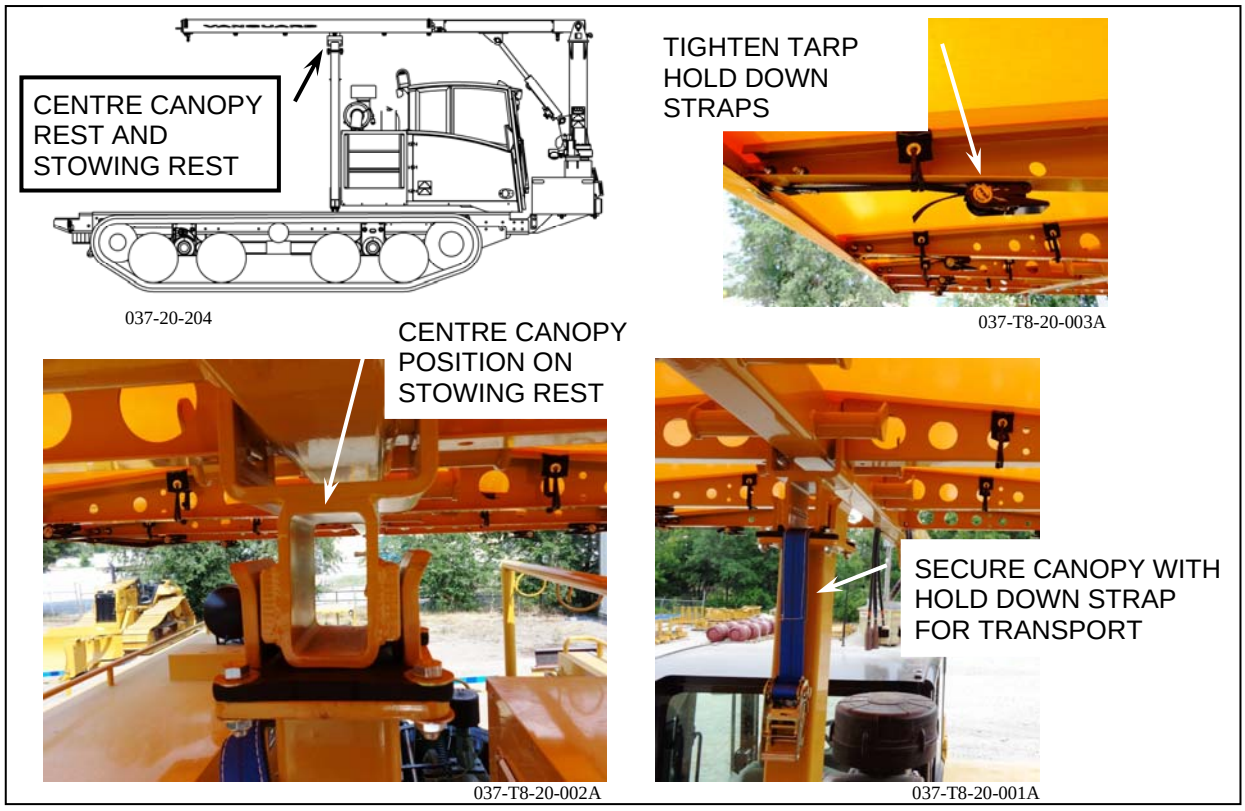


Figure 10: T8 Slewing canopy configured for transport.

1. Ensure that the canopy tarp is tightly secured to the canopy frame; tighten the canopy tarp hold down straps along each side of the canopy tarp as required.

2. Ensure that there are no rips or worn sections that could result in damage during transport. Ensure that all of the hold down grommets are securely in place.

3. Rotate the Slewing Canopy rearward over the carrier vehicle, so that the canopy rest is centred on the stowing rest.

4. Slowly lower the Slewing Canopy until it contacts the stowing rest.

5. Loop the hold down strap through the canopy rest, and through the stowing ratchet. Use the ratchet to remove the slack and firmly secure the Slewing Canopy for transport. Ensure the ratchet holds the strap securely.

D6N Slewing canopy configure for transport

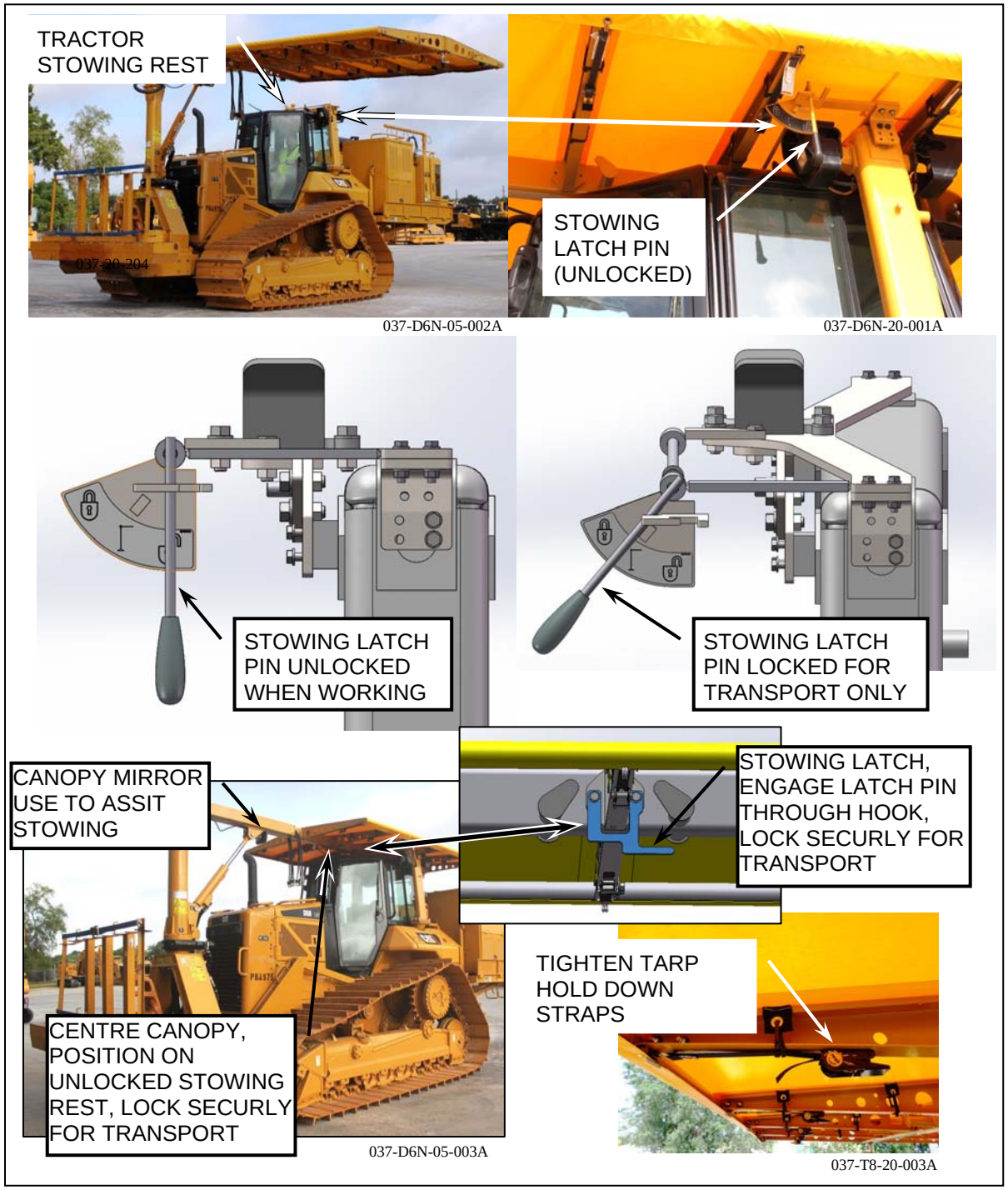
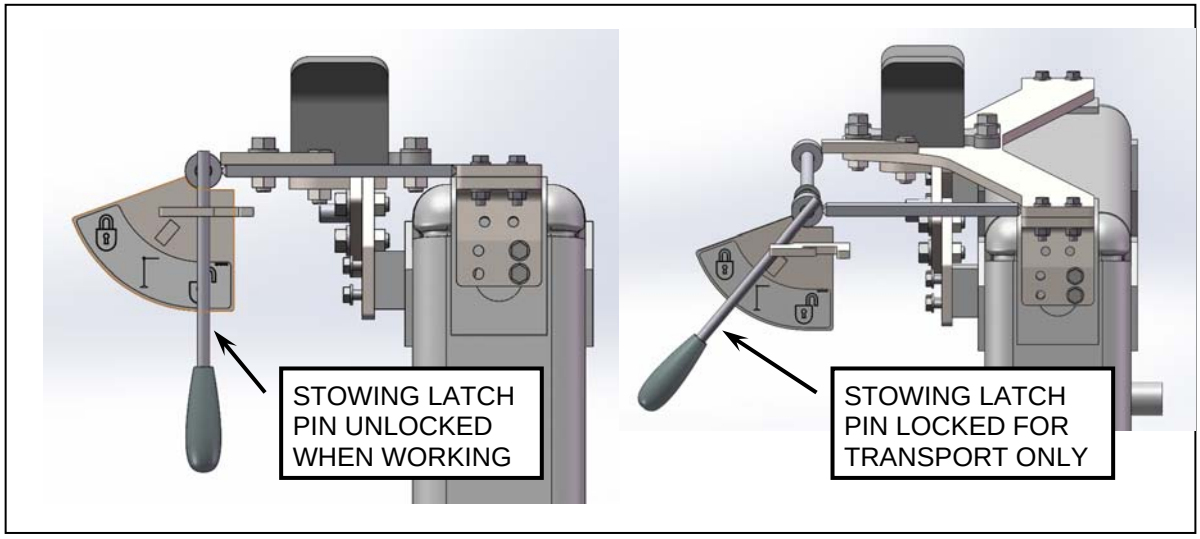


Figure 11: D6M/N Slewing canopy configured for transport.

1. Ensure that the canopy tarp is tightly secured to the canopy frame; tighten the canopy tarp hold down straps along each side of the canopy tarp as required.

2. Ensure that there are no rips or worn sections that could result in damage during transport. Ensure that all of the hold down grommets are securely in place.

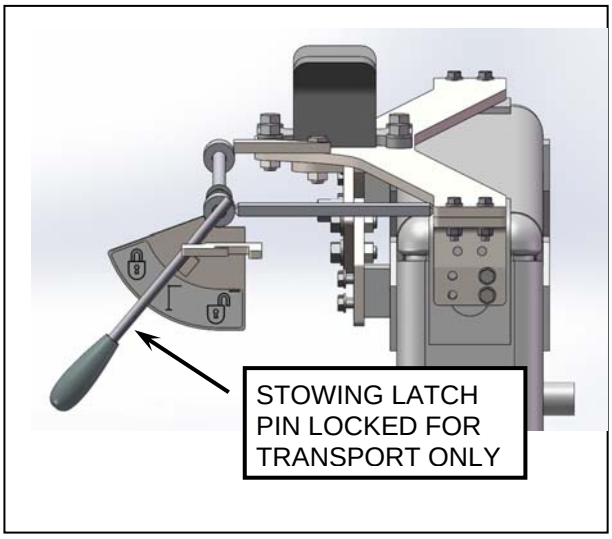
3. Ensure that the Stowing Latch Pin is in the UNLOCKED working position.



4. Rotate the Slewing Canopy rearward over the carrier vehicle, so that the canopy tube is centred on the D6M/N tractor-mounted stowing rest. Use the Canopy Mirror to assist positioning.

Slowly lower the Slewing Canopy until it contacts the tractor-mounted stowing rest.

5. Engage the Stowing Latch Pin through the Stowing Latch. Move the Stowing Latch Pin handle to the LOCKED position for transport.



6. Ensure the Stowing Canopy is properly secured.

Towing the Carrier

Note: DO NOT connect to any part of the Slewing Canopy or its mounting base for towing purposes of any kind.

Refer to the carrier vehicle's *Operation and Maintenance Manual* for correct towing procedures.

Maintenance and Lubrication Section

Lubricant Viscosities

General

- Follow Carrier Vehicle manufacture's maintenance and lubrication instructions for vehicle service as required.
- To prevent corrosion damage to the slewing drive interior, if not used regularly, rotate the slewing canopy between its limits of travel several times at least once a month.

Selecting the Viscosity

The proper lubricant viscosity grade is determined by the minimum outside temperature. This is the temperature when the machine is started and when the machine is operated. In order to determine the proper lubricant viscosity grade, refer to the "Min" column in the table. This information reflects the coldest ambient temperature condition for starting a cold machine and for operating a cold machine. Refer to the "Max" column in the table in order to select the oil viscosity grade for operating the machine at the highest temperature that is anticipated.

Lubricant Viscosities for Ambient Temperatures

Lubricant Viscosities for Ambient Temperatures						
Compartment or System	**Oil Type and Classification**	**Oil Viscosities**	**°C**		**°F**	
			Min	**Max**	**Min**	**Max**
Grease Spec	**Mobil Mobilux EP 2**		-40	50	-40	122
	Caterpillar Ultra 5Molly NGLI #0		-40	35	-40	95
	Caterpillar Ultra 5Molly NGLI #1		-35	40	-31	104
	Caterpillar Ultra 5Molly NGLI #2		-30	50	-22	122
	Caterpillar Arctic Platinum NGLI #0		-40	20	-40	68
Hydraulic System	**Follow Carrier Vehicle's Requirements**					

Table 2: Lubricant viscosities for ambient temperature

Capacities (Refill)

Compartment or System		cc	oz
Slewing drive	Roller bearing	40	1.4
Slewing drive	Worm Gear	80	2.7
Slewing drive	Ball bearings	100	3.4
Cylinder Pin Bushings		As required	As required
Canopy Pivot pin		As required	As required

Table 3: Lubricant refill capacities

Maintenance Interval Schedule (MIS)

Ensure that all safety information, warnings, and instructions are read and understood before any operation or any maintenance procedures are performed. The user is responsible for the performance of maintenance, including all adjustments, the use of proper lubricants, fluids, filters, and the replacement of components due to normal wear and aging. Failure to adhere to proper maintenance intervals and procedures may result in diminished performance of the product and/or accelerated wear of components. Use mileage, fuel consumption, service hours, or calendar time, WHICH EVER OCCURS FIRST, in order to determine the maintenance intervals. Products that operate in severe operating conditions may require more frequent maintenance.

Service Intervals

Note: Before each consecutive interval is performed, all maintenance from the previous interval must be performed. Perform the following servicing at EVERY interval they occur; for example, the 10-hour and 50-hour service are also performed at the 200-hour interval, etc.

Break-in Period

Slewing Drive Mounting Bolts

To compensate for possible settling, it is necessary to retighten the slewing drive mounting bolts to the prescribed torque. This shall be done after no more than 100 hours of operation and without external load applied to the bolt connection. In case of loose bolts, replace all bolts and washers with new ones. Refer to the section Slewing drive mounting bolts retighten to the prescribed torque - Check in this manual.

When Required

- Slewing Canopy Hold down strap for transport - Check, replace if damaged
- Slewing Canopy Tarp Hold down straps - Check, replace if damaged

Every 10 Service Hours or Daily

- Controls for proper operation of Slewing Canopy – Check
- Slewing Drive Bearing Left and Right side - Lubricate
- Slewing Drive Roller Bearings and Worm Gear - Lubricate
- Slewing Canopy Support Cylinder Pivot Pins- Lubricate
- Slewing Canopy Pivot Pin - Lubricate
- Carrier Vehicle Hydraulic System Oil Level – Check
- Hydraulic Hoses and fittings for leaks – Check
- Pneumatic Hoses and fittings for leaks – Check
- Canopy Tarp and tarp hold down straps - Check
- Electrical cables for signs of damage to insulation - Check, replace if damaged

Every 2000 Service Hours or 1 Year

- Slewing drive mounting bolts retighten to the prescribed torque - Check

Slewing Drive Maintenance

Refer to the Slewing Drive Manual in the appendix of this manual.

Slewing Drive Bearing – Lubricate

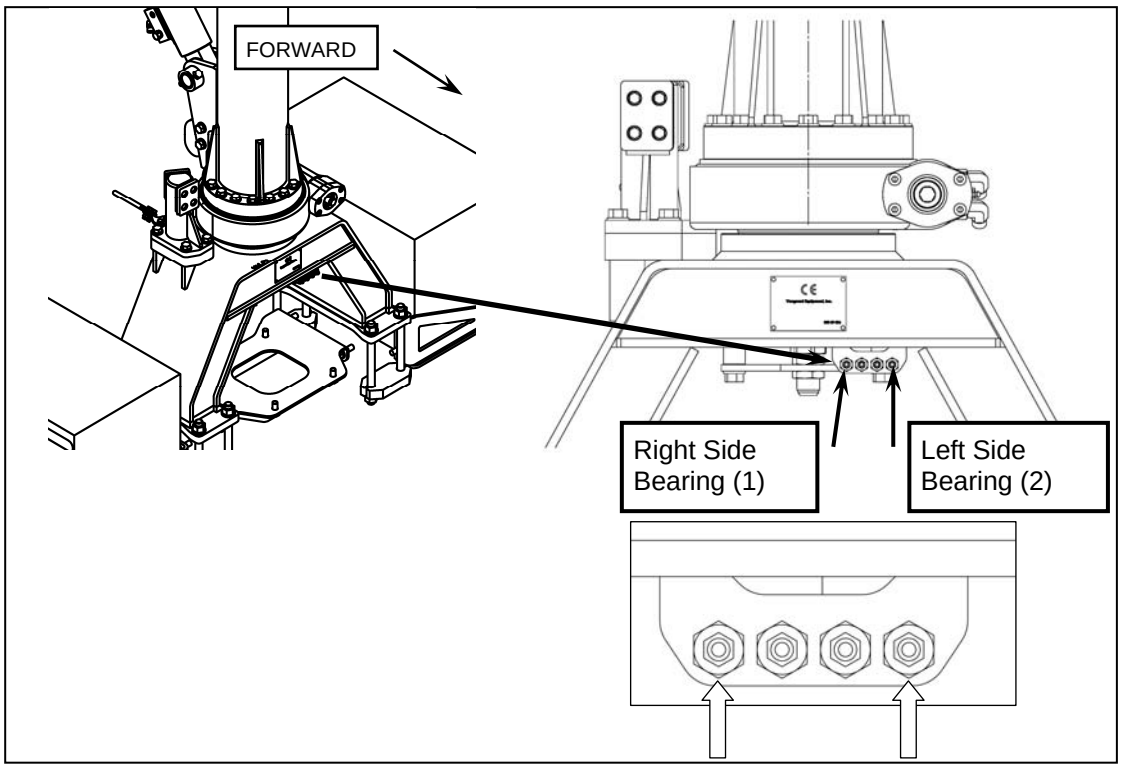


Figure 12: Slewing Drive Bearing lubrication Left and Right side location

While rotating the slewing drive, inject grease into all the cleaned grease nipples (1) and (2) consecutively until a continuous collar of fresh grease forms at least on one sealing lip.

Slewing Drive Roller Bearings and Worm Gear - Lubricate

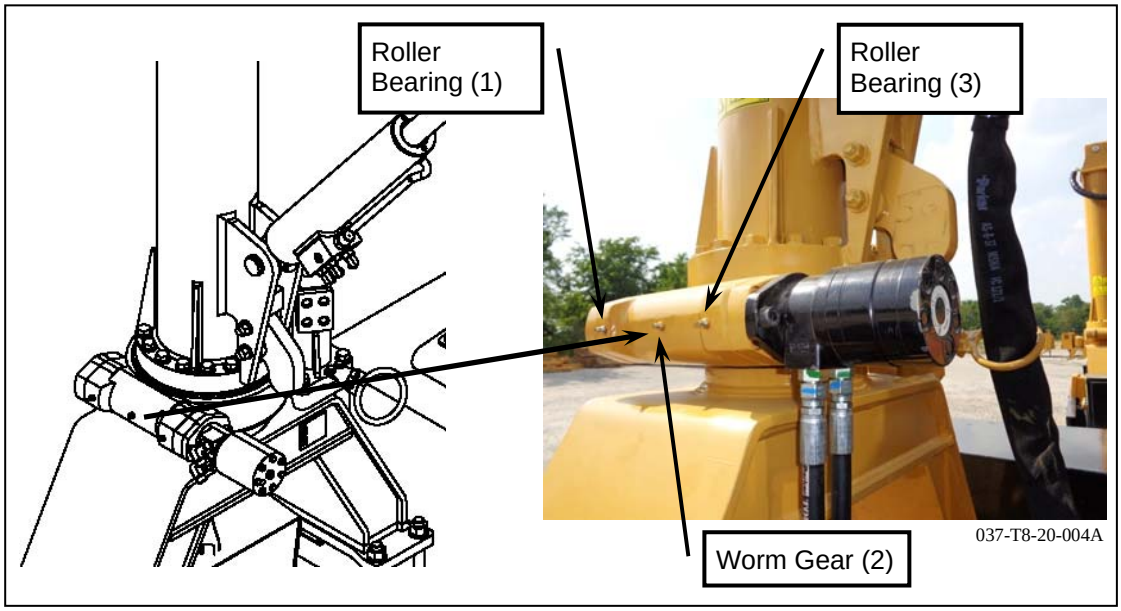


Figure 13: Slewing Drive Roller Bearing and Worm Gear lubrication location

While rotating the slewing drive, inject grease into all the cleaned grease nipples (1), (2), and (3) consecutively.

Canopy Support Cylinder Pivot Pins – Lubricate

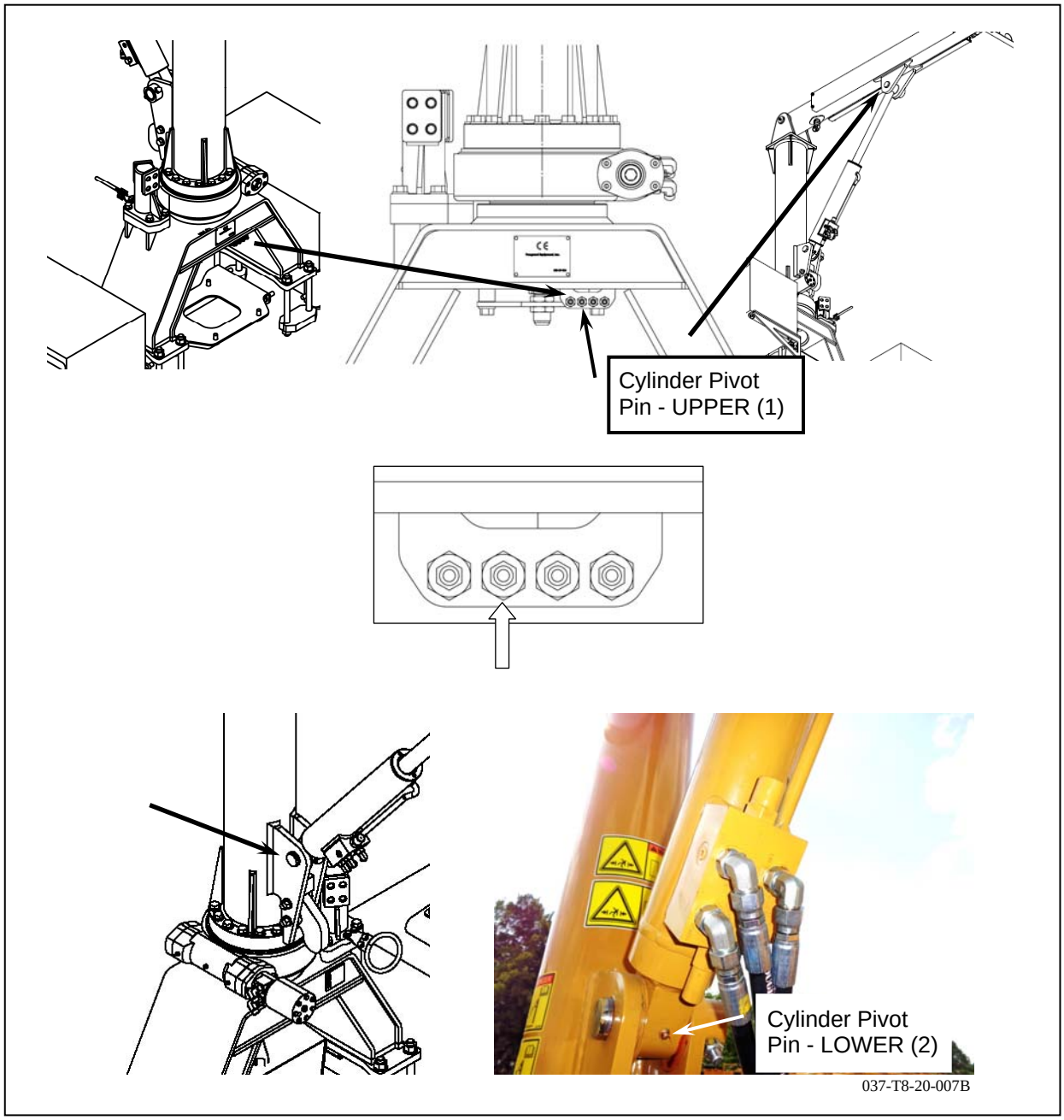


Figure 14: Canopy Cylinder Pivot Pins lubrication location

Lubricate one fitting for the upper cylinder pin (1), and lubricate one fitting for the lower cylinder pin (2).

Slewing Canopy Pivot Pin - Lubricate

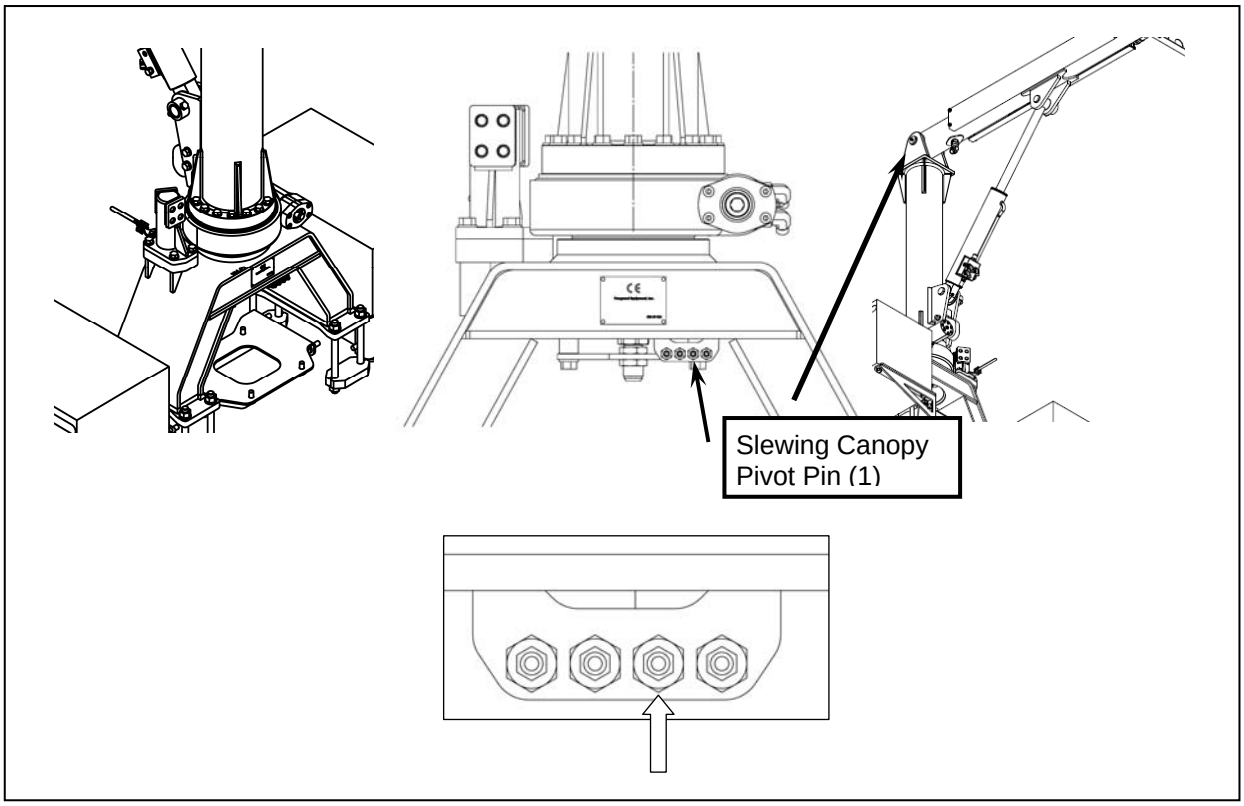


Figure 15: Slewing Canopy Pivot Pin lubrication location

Lubricate one fitting for Slewing Canopy Pivot Pin (1).

Slewing drive mounting bolts retighten to the prescribed torque - Check

To compensate for possible settling, it is necessary to retighten the bolts to the prescribed torque .This shall be done without an external load applied to the bolt connection. This inspection shall be repeated annually, or 100 hours after installation.
Inspection: The following procedure is to be used only as an indication that minimum assembly requirements have been achieved or maintained:

1. Start with either inner or outer ring. Start at one bolt and work around the bolt circle to check all bolts. Repeat for the other ring.
2. Apply the static inspection torque in the tightening direction
3. The fastener shall not move when the static inspection torque is applied.
4. In case of loose bolts, replace all bolts and washers with new ones.

Installation: The following procedure is to be used only for reinstallation of the slewing drive mounting bolts.

1. When replacing or reassembling bolts, apply removable strength Thread Lock, Loctite Blue 242, or equivalent to the bolt threads.
2. Preload the bolts crosswise. See the general pattern in the sketch in Figure 16 below to reinstall bolts (1) and (2), tighten in a crosswise pattern sequence.
3. Start with either the inner or the outer ring. Do the crosswise tightening of all bolts to 30% of installation torque. Then repeat crosswise torque to 80% of installation torque. Finally crosswise torque to 100% of the installation torque as noted. Repeat for the other ring.
4. Once the bolt is tightened, permanently mark the position of the bolt head to that of the stationary structure. This will be used later during inspection to be sure the bolt head has not unwound.

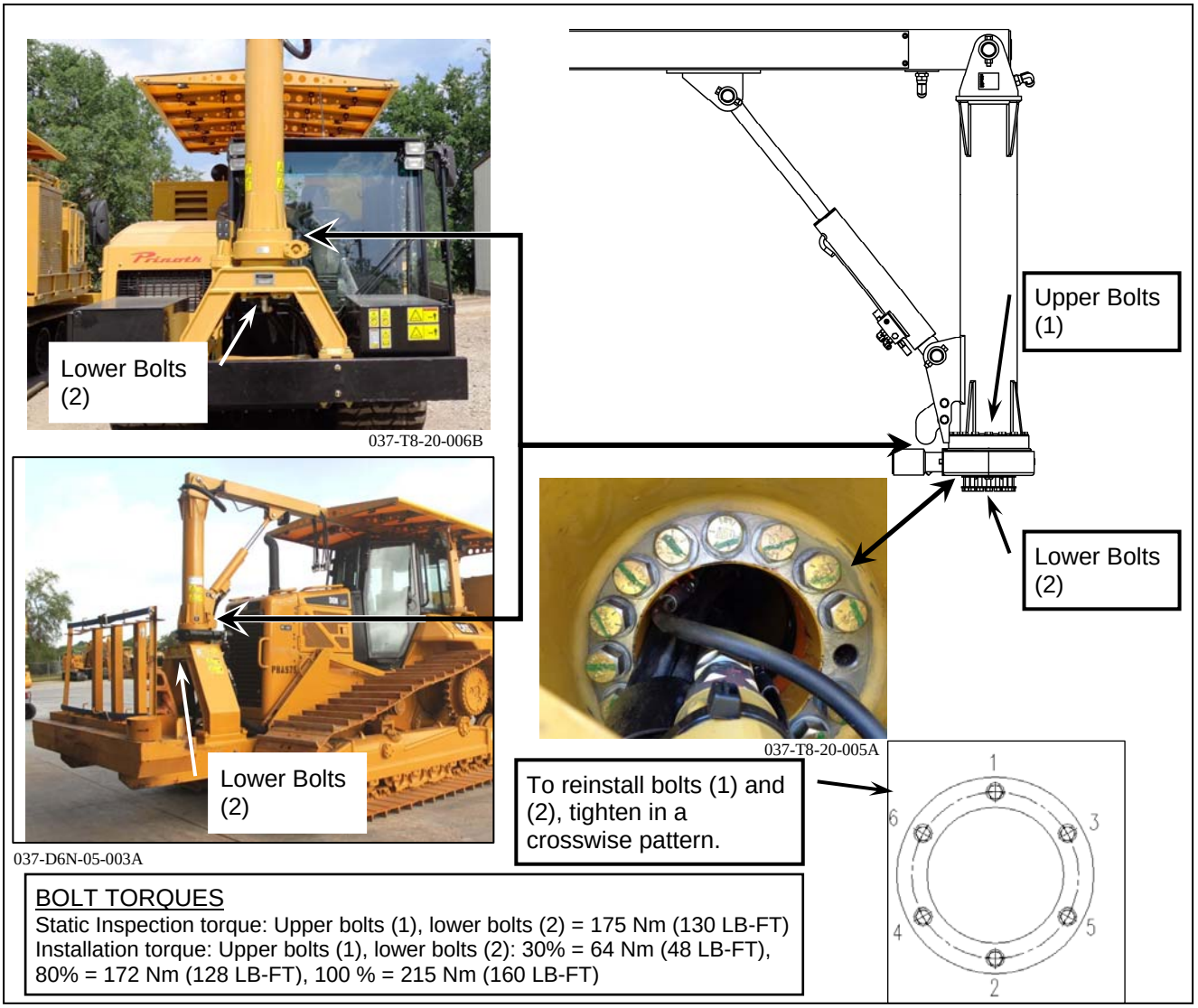


Figure 16: Slewing drive mounting bolts torque

Appendices: Equipment Modules' Operation and Maintenance Manuals

1) Slewing Drive Manual

Appendix 1) — Slewing Drive Manual

The following pages are taken from information published by the original equipment manufacturer (OEM), and are subject to change without notice.

Contents

Preface

The following instructions give you the information you need to be able to correctly install and maintain a KMI slew drive.

These instructions replace earlier versions. All instructions are provided with a revision number. Installation and maintenance instructions with previous revision numbers are invalid. The latest version is published on our homepage and can be downloaded from there (www.kinematicsmfg.com). Please always check that you are working with the latest revision.

All work steps listed here are to be executed by suitably qualified personnel.

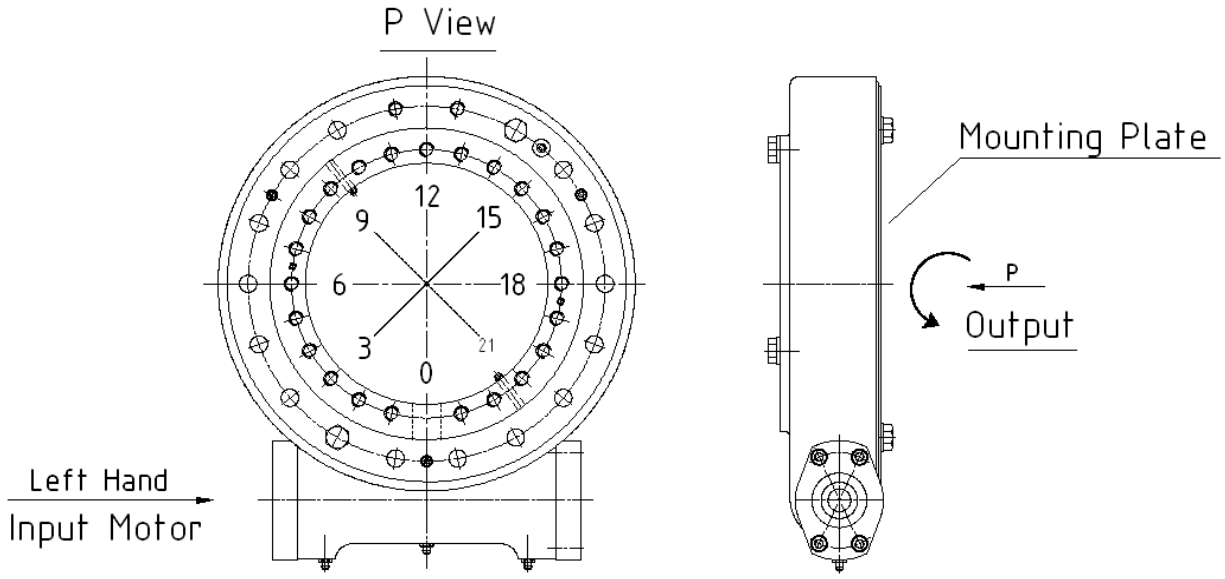
Please do not hesitate to contact our Technical Department for any further assistance.

8-C: C-Capped end (no hex extrusion). E-Supply Encoder. None- Worm hex extrusion.

9- 2: None-Worm number/ Blank-Single, 2-Dual

10-XXXX: Blank-RAL9017, Traffic black . XXXX-RAL code(customer choice).

Example:
SE-17-C-26112M-25M-24VDC-R-XXXX-REV.A
S - Slewing drive,
E - Enclosed housing
17 - 17" ball path diameter
C - Engineering Level
26112 - reduction ratio, M-Metric threads
25M - 25 mm keyed input shaft diameter
24 – 24VDC Electric Motor
R – Right hand mount
XXXX – OEM Special Specifications Apply
Rev – Current Revision Release



Transport, Handling & Storage

Transport only in horizontal position, impacts should be avoided.

Wear work gloves and be careful when handling the slewing drives.

Use the holes of the rings in the slewing drives to fix bolts for safe hoisting, handling and placement.

Store only in a horizontal position and in closed rooms, keep it away from getting wet, the surface corrosion protection of exposed mating surfaces lasts approximately 5 months in closed packaging. Longer period storage requires special protective measures.

Installation

Preparation

Check the slewing drive for physical damage.

Clean the slewing drive and the mounting structure, see ***Cleaning***.

Remove extraneous materials from supporting surfaces.

Cleaning

Permissible Flatness Deviation

Table 1: permissible flatness including perpendicularity deviations for Slewing drives

Size of Slew Drive	Permissible perpendicularity deviation in length [in]	[mm]	Permissible perpendicularity deviation in angle dimension degree
3”	0.009	0.237	0.32
5”	0.031	0.335	0.32
7”	0.016	0.405	0.32
9”	0.022	0.569	0.32
12”	0.032	0.807	0.32
14”	0.036	0.907	0.32
17”	0.045	1.133	0.32
21”	0.057	1.489	0.32
25”	0.069	1.753	0.32

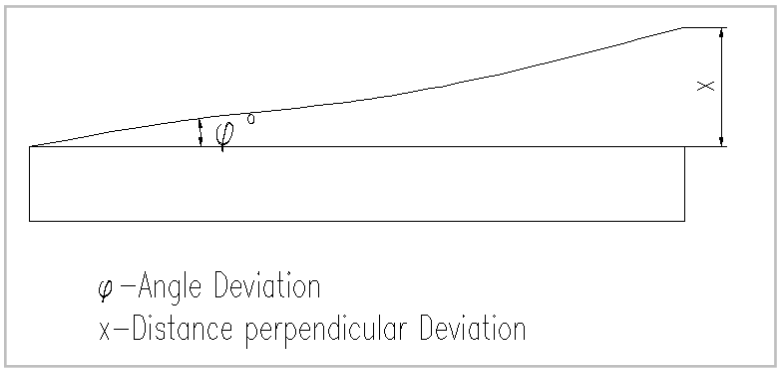


Figure 2.1

The form must resemble a sine curve that gradually rises and falls.

Mounting Bolts

As the gearbox manufacturer, we do not supply, warrant or recommend the mounting fasteners used. Please take great care in specifying this item which will attach our product to yours.

Prescribed sizes, number and quality grades shall be used.

Grip ratio (grip length to diameter of bolt) shall be observed, from minimum ≥2 to maximum ≤10.

Bolts with a fully threaded shaft should be not permissible.

Slewing drive function, lifespan, and durability of the bolt connection are affected in case of non-compliance.

Use flat washers of appropriate size and strength choice of tightening torques so that the permissible interfacial pressure is not exceeded.

Mounting bolts are in normal cases adequately secured by correct preloading.

Notice: Use of split rings, split washers, etc. not permissible.

Tightening Torque	Mounting Bolt Dimension					
Class	**M6** (1/4-20UNC)	**M8** (5/16-18UNC)	**M10** (3/8-16UNC)	**M12** (7/16-14UNC)	**M16** (5/8-11UNC)	**M20** (3/4-10UNC)
Class 8.8	11.5 N.M	28 N.M	55 N.M	97 N.M	240 N.M	470 N.M
Class 10.9	14 N.M	33 N.M	72 N.M	120 N.M	305 N.M	600 N.M
Class 12.9	17 N.M	42 N.M	83 N.M	145 N.M	360 N.M	705 N.M

Table 2: Tightening Torque and initial preloads for mounting bolts.
KMI does not warrant information of this table. Information is for guidance only.

Install the Slewing Drive

Clean the mounting structure, e.g. from welding, galvanizing, residues, dirt, etc.

Lift the slewing drive with eye bolts.

The slewing drive shall be mounted in unloaded condition.

Remove the shipping bolts after setting on the final mounting structure.

The following procedure shall be followed in order to avoid deviations between bolt tightening forces.

Apply thread lock liquid to threads.

Brand: 

Type: TS242Threadlocking adhesive

Note: General purpose, chemotropic, viscosity. For locking and sealing M6-M20 threads

Parts can be separated using hand tools, controlled lubricity, can attain accurate clamp loads.

Color: Blue

Usage:

Shake thoroughly before use

Clean and dry parts with TS755 cleanser

Lay thread lock liquid on thread gap requesting fitting parts fully.

Preload the bolts crosswise. See the general pattern in sketch below of how bolts get torque in crosswise sequence. Start with either inner or outer ring. Do the crosswise torqueing of all bolts to 30% of tightening torque. Then repeat crosswise torque to 80% of tightening torque. Finally crosswise torque to 100% of the tightening torque.

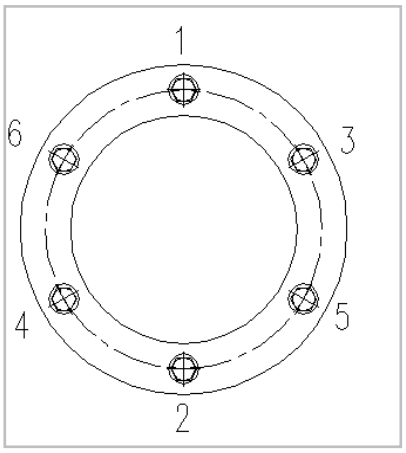


Figure 2.2

First completely torque inner or outer ring, then do the other ring.

Once the screw is tightened, please permanently mark the position of the screw head to that of the stationary structure. This will be used later during inspection to be sure the screw head has not unwound.

Determine Tilting Clearance

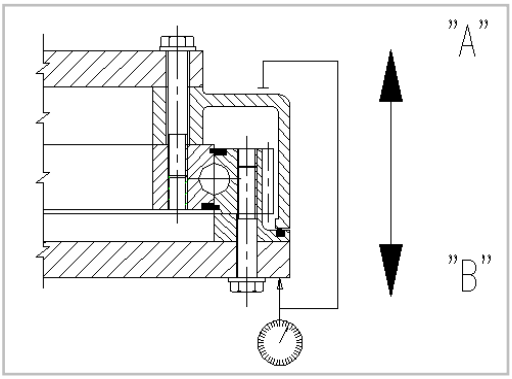
The tilting clearance increases with raceway wear. To determine the increase in tilting clearance, it is necessary to take basic periodic measurements.

Permanently designate the measuring point in the main load direction.

Record all measured values into Table 3.

Procedure

Determine and mark the measuring spot at the point of load, both on the housing as well as on the worm wheel or on the slewing ring.



Fix the dial gauge. The use of magnetic dial would be ideal in this case.

Apply a 20kg load in “A” direction.

Set the dial gauge on zero.

Apply a 20kg load in “B” direction.

The measured difference between “A” and “B” corresponds to the tilting clearance and serves as the basis for comparison for later inspections.

Figure 2.3

Item	Load	Direction “A”	Direction “B”	Remark
1				
2				
3				
4				
5				
6				

Table 3: User Written Tilting Measurements

General

All subsequent measurements are performed at the same measuring point, with the same loads, at the same position of the housing relative to the worm wheel or gear ring and in the same sequence.

All the measured values are recorded.

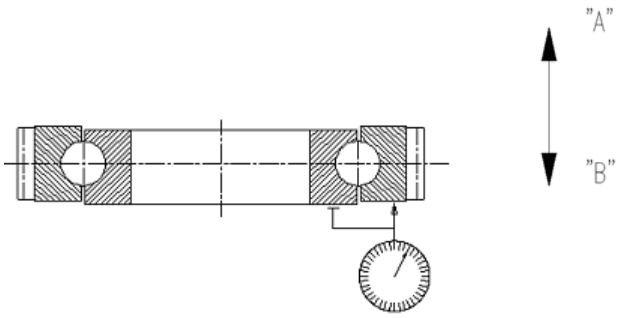
Maintenance & Safety Checks

Mounting Bolts

To compensate for possible settling, it is necessary to retighten the bolts to the prescribed torque .This shall be done after no more than 100 hours of operation and without external load applied to the bolt connection. This inspection shall be repeated annually.

The inspection frequency may be reduced under special operating conditions. In case of loose bolts, replace all bolts and washers with new ones.

KMI does not supply or warranty any fasteners for attaching the slew drive to the customer's equipment. The few large diameter cap screws shipped in the new slewing drives are for shipping purposes only. These are very low grade fasteners and should never be reused in the final installation of the slew drive.



Tilting Clearance

Measuring tilting clearance on new product without rated load

Figure 4.1

- Fix the dial gauge. The use of magnetic dial would be ideal in this case.
- Apply a 20kg load in “A” direction.
- Set the dial gauge on zero.
- Apply a 20kg load in “B” direction.
- The measured difference between “A” and “B” corresponds to the tilting clearance and serves as the basis for comparison for later inspections.

“A-B”≤Table 1 Value

Table 1: Tilting clearance on new slew drives

Size of Slew Drive	Permissible perpendicularity deviation in length		Permissible perpendicularity deviation in angle dimension
	[in]	[mm]	degree
3”	0.002	0.06	0.09
5”	0.0035	0.09	0.09
7”	0.004	0.11	0.09
9”	0.006	0.16	0.09
12”	0.009	0.23	0.09
14”	0.010	0.26	0.09

17”	0.013	0.32	0.09
21”	0.017	0.42	0.09
25”	0.019	0.49	0.09

Measuring tilting clearance on new product under rated load

- Install slew drive into customer specific equipment using customer’s standard load, as long as the load falls within maximum guideline ratings of the KMI slewing drive.
- Take a measurement using the same instruction of 4.2.1 Record this value as the equipment’s starting raceway tilting clearance value.
- Raceway wear leads to increased tilting clearance.
- Check the increase in tilting clearance δk directly on a slewing drive.
- The value (m1) determined after installation of the slewing drive is considered as the basic value and is deducted from the latest inspection value (mx). The difference between mx and m1 may not exceed 0.8 mm (0.0315in) during the life of the drive. If this value is exceeded then the drive is worn out.

$\delta_k = mx\text{-}m1 \leq \delta_T\,perm$

$\delta_T\,perm = 0.8mm\ (0.0315in)$

- Checking the increase in tilting clearance δT not directly on slewing drive.
- Increase in tilting clearance is to be converted proportionally for each measurement (after the installation measurement) and compared with δk permissible.
- Reduce the inspection interval to 200 operating hours if the measured increase in tilting clearance amounts to approx. 75% of the maximum permissible increase in tilting clearance.
- Reduce the inspection interval once again after further increase in tilting clearance (to 50-100 operating hours).
- Replace the slewing drive if the maximum permissible increase in tilting clearance is reached.

Torsional Clearance

Gear wear leads to increased rotational backlash.

Procedure:

- Clip a dial gage between the stationary and rotating structure.
- Determine the rotational play by gently turning the upper structure against the stationary structure, reading the total difference in measurement from a clockwise to a counterclockwise turn.

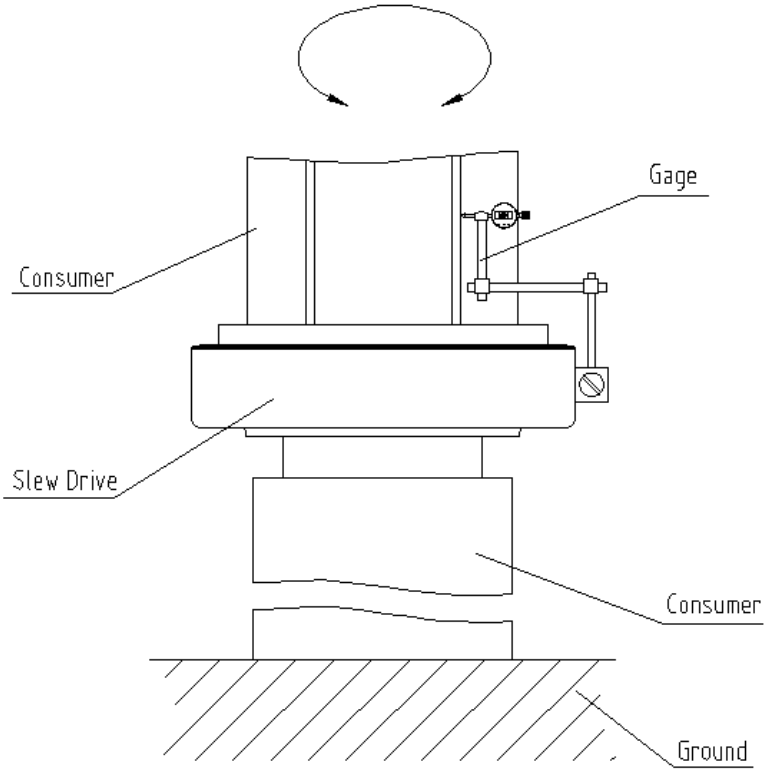


Figure 4.2

- Do not force the turning or the measurement will be inaccurate. The purpose of the measurement is to find the gap clearance.
- All measured values are to be recorded.
- At a rotational clearance of greater than the (Slew Size*25.4/400) mm the slewing drive should be considered for replacement.

Lubrication Instruction

Provisions about handling the respective lubricants must be observed.

While rotating the slewing drive, inject grease into all the cleaned grease nipples consecutively until a continuous collar of fresh grease forms at least on one sealing lip.

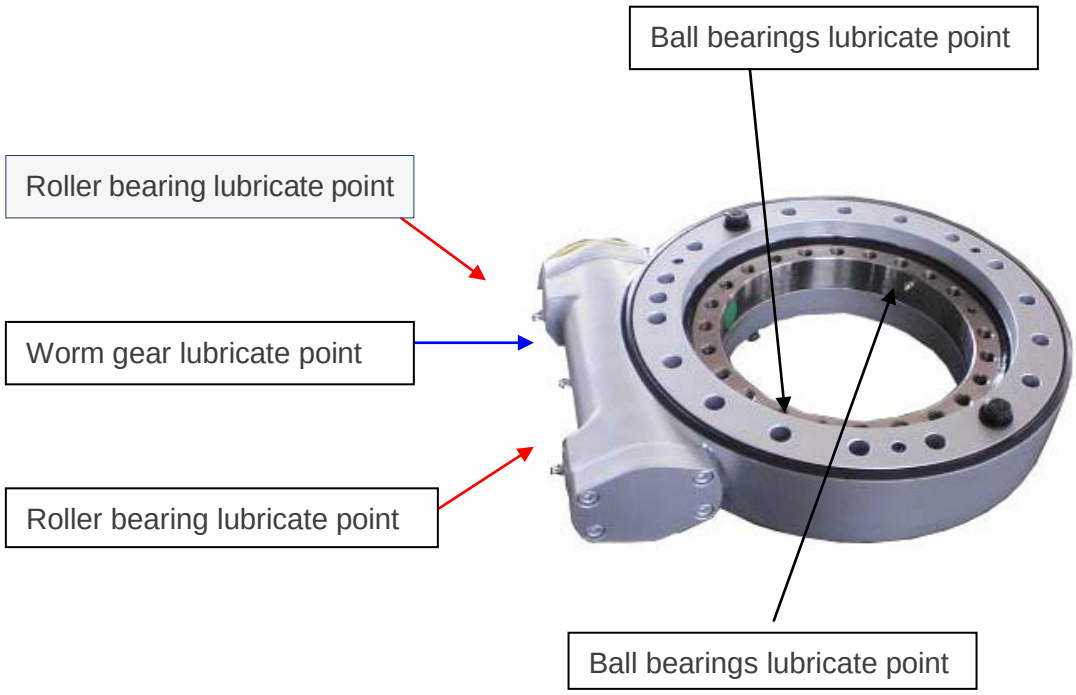


Figure 4.3 lubricate point

- The roller bearings and worm gear are open to the same cavity, but it's suggested to fill them using the separate grease points to be sure each is hit directly. The ball bearing is enclosed separately.
- While rotating the slewing drive, inject grease into all the cleaned grease nipples consecutively as follows:
- Roller Bearings - 40 cc of grease
- Worm Gear - 80 cc of grease
- Ball Bearings -100 cc of grease

Weather Protection

Paint spec

Epoxy Epicon Zinc HB-2

KMI drives are coated with a special two part epoxy coating in KMI's automated painting line to give the drive excellent heat and weather protection.

Epoxy

Brand: CMP

EPICON ZINC HB-2

EPICON ZINC HB-2 is a high-build type epoxy zinc rich paint based on a combination of epoxy resin and polyamide resin pigmented with metallic zinc power.

It has the following advantages:

- Long term rust-preventing property;
- Excellent physical properties such as toughness, impact and abrasion resistance;
- Extreme resistance to seawater, rain, heat, oil, oxidation and sunlight

Recommended Use:

- As a primer for protection of blast-cleaned steel plates (ISO 8501-1 1988 Sa 2.5)
- Volume Solid: 52±2%
- Dry Film Thickness: 2.0-3.0 mils; 80-100 μm;
- Method of Application: Airless spray
- Thinner: EPOXY THINNER A
- Temperature Rating: 110C

Coating

Brand: PRIME 福莱姆 PRIME

Type: 2K Straight Colors

Color: Any from RAL color chart. KMI automated paint process can match any of 264+ RAL colors.

Fastener and/or Coating

Stainless Steel is used for every fastener to ensure no rust and long life.

If the customer requires a non-stainless fastener, then it is coated with Zinc-Co-Nl to reduce the bolts rust.

Features:
1. Excellent resistance to corrosion resistance, salt spray test 8-10 times for the traditional function of zinc, zinc and iron or zinc-nickel alloy plating for 2 to 4 times, 5um can be achieved when more than 1000 hours (red rust), 8μm when 2,000 hours or more (red rust), 24um, when up to 6000 hours or more (red rust).

2. Coating with low internal stress, high plating thickness, is not brittle. 20um thickness of the above, do not have a zinc bending tests peeling off problem.

3. Low current excellent gloss and covering power, such as for hanging plating, especially for computers, electrical box of the plating

l8μm, the mist test (DIN50018) up to 6 cycles or more for the traditional galvanized two-fold.
4. Zinc deposit brightness is very good, high and low current of uniform thickness (1.5:1), traditional galvanized 4:1.

5. With a special anti-rust coating, such as nano-coatings, Magni Coating System rust-proof up to 6000 ~ 10000 hours (ASTM B117), acid-resistant up to 15 ~ 50cycles above (Kesternich test DIN50018)

6. The capacity of superior weather resistance

7. No hydrogen brittle of the problem

Grease Spec

There are four places which are lubricated, they are (1)slewing ring ball bearings, (2)worm gear, (3)taper roller bearings and (4)planetary gears. Slewing drives are supplied fully lubricated.

Table 5: Eco Friendly Grease Specifications

Parts needed to be lubricated	Taper Bearing Ring raceway Worm Gear Thread
Condition of Lubricate	Pre-lubricated by manufacturer
Recommended Grease Product name	Mobilux EP 2
Applicable temp. range in ºC	-40 to +130C
Color	Brown
Four-ball test	250 kg ASTM D 2596
Viscosity (-40 °C, 10 s-1) Pas	160
Dropping Point °C	190
Penetration, Worked 0.1 mm	280

Mobilux EP 2 is a lithium hydroxystearate baesd grease. It's formulated to provide extra protection against wear, rust and water. It is applied in heavy-duty application where high unit pressures are present. It provides excellent protection against rust and corrosion.

Mobilux is suitable for the lubrication of enclosed gears and bearings, and for applications where conventional oil cannot be retained, or should not be used for environmental reasons.

The grease helps to provide reduced wear under heavy load and vibration, protection against rust in the presence of water, extended bearing life in wet environments.

It meets or exceeds the DIN 51825 (2004-06)

Rubber Spec

Composite rubber of NBR and PVC specification

NBR has good oil resistance and wearing resistance, but lacks of age resistance and ozone proof of climate. To overcome this shortage, by research and test, adding PVC greatly improves NBR's age resistance, ozone protection, oil resistance, wearing resistance and heat resistance.

Measured Standards
Temperature Rating -20C to 120C

Item	Test Conditions	Requirement	Unit	Standard
Usual status test				
Hardness	Room temp.	70±5	Shore A	GB/T 531
Tensile strength		10min	MPa	GB/T 528
Elongation at break		250min	%	GB/T 528
Air oven aging test				GB 3512
Hardness change	100℃	±15	/	
Tensile strength change	70h	±30	%	
Elongation at break change		-50max	%	
Oil resistance test				GB/T 1690
Hardness change	ASTM NO.1 Oil	±10	/	
Tensile strength change	100℃	-30max	%	
Elongation at break change	70h	-30max	%	
Volume change		-10 to +15	%	
Oil resistance test				GB/T 1690
Tensile strength change	ASTM NO.3 Oil	-60max	%	
Elongation at break change	100℃	-50max	%	
Volume change	70h	+100max	%	
Akron abrasion wear	Room temp.	0.4max	cm3/1.61km	GB 1689

Comparison Test Report				
Client: Jiangyin KMI		**Date:** 2009-7-31		
Item Name: Rubber Seal		**Material:** NBR/PVC		
Inspection Items	Inspection Condition	NBR sample data	NBR+PVC sample data	Unit
Normal test:	**Room temp**			
Hardness		72	69	Shore A
The tensile-strength		13.2	13.7	MPa
The elongation at break		344	472	%
Heat resistance				
Hardness change		5	5	/
Tensile strength change	100℃	14	4	%
Elongation change	70H	-29	-28	%
Oil-Resistance Test :	**7014-1 Oil**			
The change rate of volume	100℃,70h	-10.51	-4.29	%
Oil-Resistance Test :	**ASTM NO.3 Oil**			
The rate of volume change	100℃,70h	-8.33	-0.3	%
Compression permanent set	100℃,22h	57.7	52.7	%
Abrasion	cm3/1.61Km	0.29	0.26	%
Cheek	Audit	Authorize		

Liquid Sealant

Product Description
LOCTITE® 510™ provides the following product characteristics:

Technology	Acrylic
Chemical Type	Dimethacrylate ester
Appearance (uncured)	Opaque pink paste LMS
Components	One component - requires no mixing
Viscosity	High
Cure	Anaerobic
Application	Gaskets and Sealing
Strength	Medium

LOCTITE® 510™ cures when confined in the absence of air between close fitting metal surfaces. This product is a general gasket product suitable for hand dispensing or screen printing.

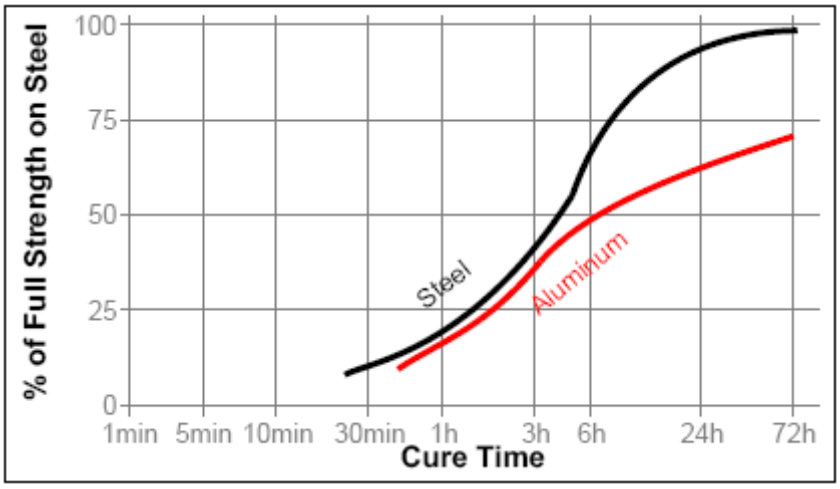
TYPICAL PROPERTIES OF UNCURED MATERIAL

- Specific Gravity @ 25 °C 1.1
- Flash Point - See MSDS
- Viscosity, Brookfield - HBT, 25 °C, mPa·s (cP):
- Spindle TC, speed 2.5 rpm, Helipath 200,000 to 750,000LMS
- Spindle TC, speed 20 rpm, Helipath 40,000 to 140,000LMS
- Instant Sealing Capability
- Anaerobic sealants have the ability to resist low on-line test pressures while uncured. This test was performed with uncured product immediately after assembly of an annular polycarbonate sealing surface with an internal diameter of 50mm and an external diameter of 70 mm.
- Pressure Resistance, MPa: Induced Gap 0 mm 0.02 Induced Gap 0.125 mm 0.01 Induced Gap 0.25 mm 0.01

TYPICAL CURING PERFORMANCE

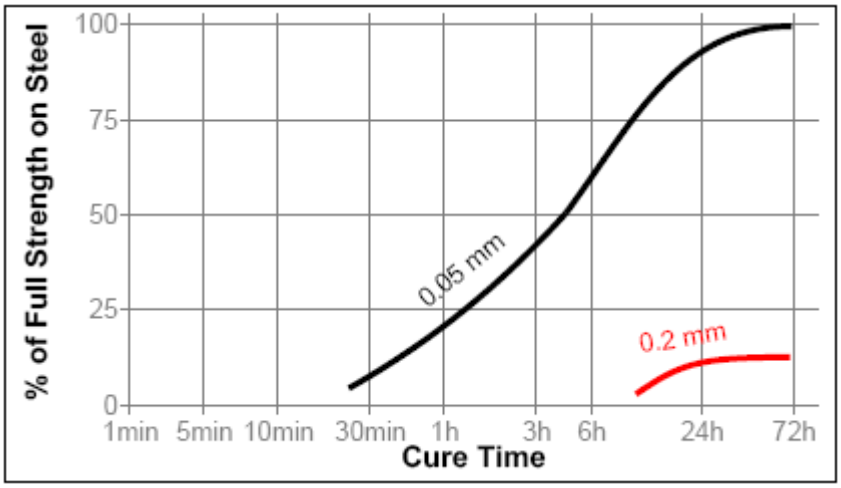
Cure Speed vs. Substrate

The rate of cure will depend on the substrate used. The graph below shows the shear strength developed with time on grit blasted steel lap shears compared to different materials and tested according to ISO4587.



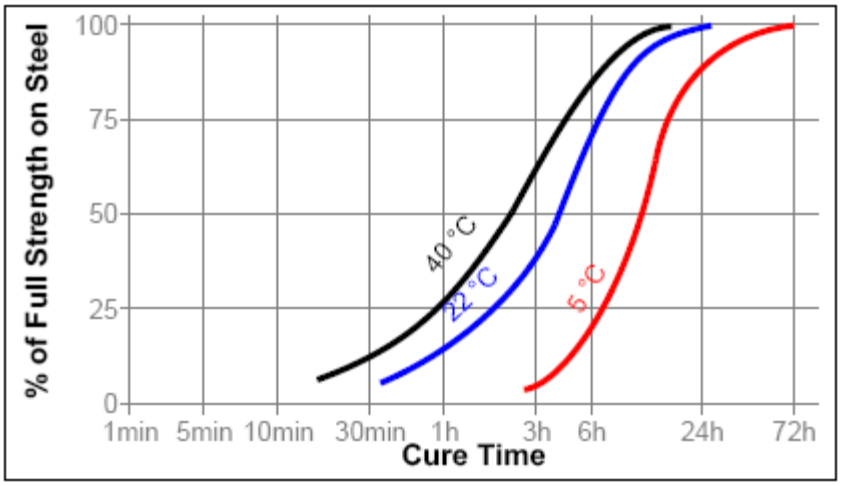
Cure Speed vs. Bond Gap

The rate of cure will depend on the bond line gap. The graph below shows the shear strength developed with time on grit blasted steel lap shears compared to different controlled gaps and tested according to ISO 4587.



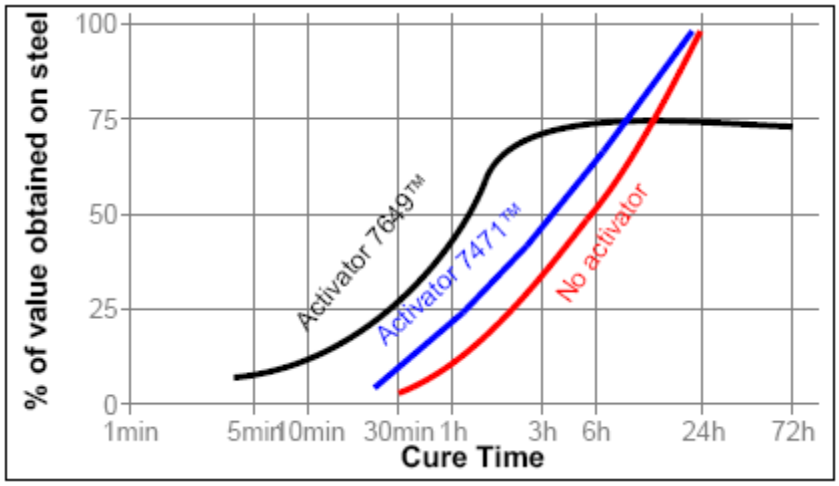
Cure Speed vs. Temperature

The rate of cure will depend on the temperature. The graph below shows the shear strength developed with time at different temperatures on grit blasted steel lap shears and tested according to ISO 4587.



Cure Speed vs. Activator

Where cure speed is unacceptably long, or large gaps are present, applying activator to the surface will improve cure speed. The graph below shows the shear strength developed with time on grit blasted steel lap shears using Activator 7471™ and 7649™ and tested according to ISO4587.



TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties:

- Coefficient of Thermal Expansion, ISO 11359-2, K-1 80×10-6
- Coefficient of Thermal Conductivity, ISO 8302, 0.1
- W/(m·K)
- Specific Heat, kJ/(kg·K) 0.3

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties:
Cured for 1 hour @ 22 °C

Compressive Shear Strength, ISO 10123:
Steel pins and collars (grit blasted) N/mm² LMS(psi) (≥145)
Cured for 24 hours @ 22 °C

Compressive Shear Strength, ISO 10123:
Steel pins and collars (grit blasted) N/mm² LMS(psi) (≥1,085)

Lap Shear Strength, ISO 4587:
Steel (grit blasted) N/mm² 5 (psi) (725)

Tensile Strength, ISO 6922:
Steel (grit blasted) N/mm² 7.5(psi) (1,085)

Sealing Capability:
An annular shaped gasket with an inner diameter of 50 mm and an external diameter of 70 mm was tested up to 1.3 MPa for leakage.

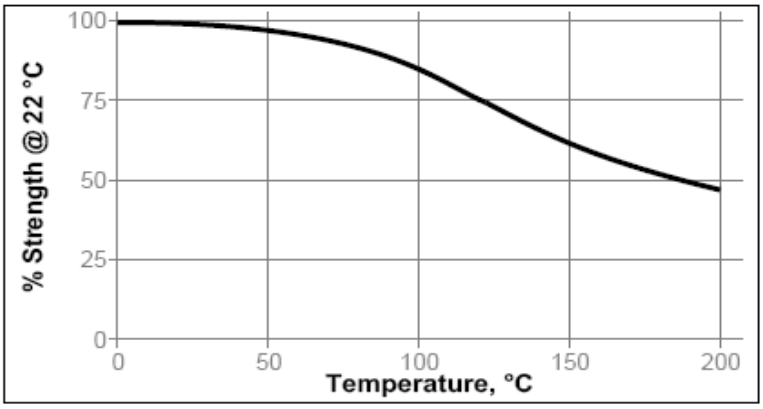
Sealed to Maximum Induced Gap, mm:
Mild steel ≤0.125
Aluminum 2011T3 ≤0.125

TYPICAL ENVIRONMENTAL RESISTANCE

The following tests refer to the effect of environment on strength. This is not a measure of sealing performance. Cured for 1 week @ 22 °C Lap Shear Strength, ISO 4587:Steel (grit blasted)

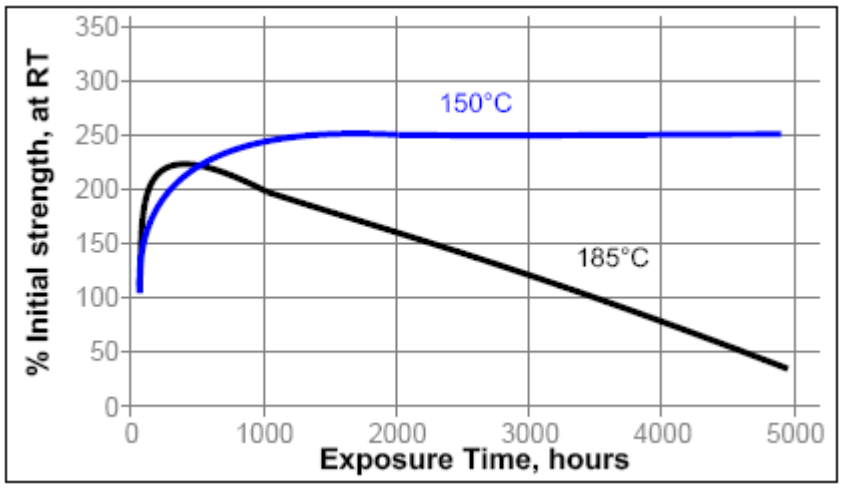
Hot Strength

Tested at temperature



Heat Aging

Aged at temperature indicated and tested @ 22 °C



Chemical/Solvent Resistance
Aged under conditions indicated and tested @ 22°C.

		% of initial strength		
Environment	**°C**	**100 h**	**500 h**	**1000 h**
Motor oil (MIL-L-46152)	125	100	100	100
Unleaded Petrol	22	95	60	60
Water/glycol 50/50	87	160	110	110

General Information
This product is not recommended for use in pure oxygen and/or oxygen rich systems and should not be selected as a sealant for chlorine or other strong oxidizing materials. For safe handling information on this product, consult the Material Safety Data Sheet (MSDS).

Where aqueous washing systems are used to clean the surfaces before bonding, it is important to check for compatibility of the washing solution with the adhesive. In some cases these aqueous washes can affect the cure and performance of the adhesive. This product is not normally recommended for use on plastics (particularly thermoplastic materials where stress cracking of the plastic could result). Users are recommended to confirm compatibility of the product with such substrates.

Directions for use

1. For best performance bond surfaces should be clean and free from grease.

2. The product is designed for close fitting flanged parts with gaps up to 0.25 mm.

3. Apply manually as a continuous bead or by screen printing to one surface of the flanges.

4. Low pressures (<0.05 MPa) may be used when testing to confirm a complete seal immediately after assembly and before curing.

5. Flanges should be tightened as soon as possible after assembly to avoid shimming.

Loctite Material Specification LMS

Storage
Store product in the unopened container in a dry location. Storage information may be indicated on the product container labeling. Optimal Storage: 8 °C to 21 °C. Storage below 8 °C or greater than 28 °C can adversely affect product properties.

The data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons

against any hazards that may be involved in the handling and use thereof. We recommend that each prospective user test his proposed application before repetitive use, using this data as a guide.

Conversions
(°C x 1.8) + 32 = °F
kV/mm x 25.4 = V/mil
mm / 25.4 = inches
µm / 25.4 = mil
N x 0.225 = lb
N/mm x 5.71 = lb/in
N/mm^2 x 145 = psi
MPa x 145 = psi
N·m x 8.851 = lb·in
N·m x 0.738 = lb·ft
N·mm x 0.142 = oz·in
mPa·s = cP

Thread Lock Liquid

Tighten thread locking adhesives
Tighten thread locking adhesives are widely used for sealing, locking and corrosion resistance of threaded fasteners in various environments, can replace spring washers, pins and other traditional mechanical locking methods.

TS242 Thread locking adhesive
Medium strength

- General purpose, chemotropic viscosity, For locking and sealing M6-M20 threads.
- Parts can be separated with hand tools, controlled lubricity, can attain accurate clamp loads.
- **Technical Specification**
  Color – Blue
  Viscosity – 1200/6000 mPa.s
  Prevail Torque – 4.8 Nm
  Break Torque – 12 Nm
  Gap Fill – 0.13 mm

Temperature Rating of Overall Drive

Overall Slew Drive Temperature Rating : -20C to +110C

Limited Warranty

1. PURPOSE. This limited warranty to Buyer, is to provide for repair or replacement of equipment that Seller does not correctly manufacture. The equipment must be operated within the design specifications.

2. LIMITED WARRANTY. Seller guarantees that the equipment, when in good repair, properly adjusted and in the hands of a competent operator, is capable of performing as specified. Seller further guarantees the equipment to be free from defective material and workmanship defects and agrees to furnish free of charge any part or parts necessary to make good any defect directly traceable to a fault in material or workmanship of Seller, provided that the claim for any such defect is made within 1 year after Seller's original invoice of the equipment and provided defective part or parts are promptly returned to Seller's factory, freight prepaid by Buyer. Personnel will be provided to do the repairs at an additional charge. This Warranty will start on the date the equipment is shipped from Seller.
3. The seller provides precision mechanical equipment that deteriorates every time it is used and this warranty does not cover the wear and tear on products, or electric motors/components supplied. Any deterioration in performance resulting from the wear and tear on the equipment is not covered by this Warranty. Likewise, any misuse or use of the equipment outside the design scope of the equipment resulting in damage or failed performance is not a Warranty issue.

4. DAMAGES LIMITATION. Seller's liability on any claim for loss or damage arising out of this Warranty or from the performance or breach connected with the supplying of any equipment, or the sale, resale, operation or use of such equipment, whether based on contract, warranty, tort (including negligence) or other grounds, shall not exceed the original purchase price of the equipment. Seller shall not in any event be liable for any claim, whether breach of contract, warranty, tort (including negligence) or other grounds for incidental, special or consequential damages including, but not limited to loss of profits or revenue, loss of use of the equipment or any associated product, cost of capital, cost of substitute products, facilities or services downtime, cost or claims of customers of Buyer for such damage.

5. SYSTEMS AND OTHER EQUIPMENT. If Seller is furnishing equipment to Buyer that is part of a larger or interconnected system no guarantee is made as to the interaction of the components. Should Seller offer Buyer advice or other assistance which concerns the interconnection of any equipment, or any system or equipment in which Sellers equipment may be installed, and other equipment outside the scope of the equipment supplied by Seller, such advice or assistance will not subject Seller to any liability of any kind.

6. DISCLAIMER. Equipment and accessories not of Seller's manufacture are warranted only to the extent that they are warranted by the manufacturer. There are no other warranties, express or implied, either for merchantability or of fitness for a particular purpose. Buyer agrees that there have been no representations upon which Buyer relied, other than those set forth in this Warranty. Unless specifically agreed to in writing by an authorized representative of Seller, equipment sold is not intended for use where failure of a single component could cause substantial harm to persons or property. If so used, Seller disclaims all liability. To the extent allowed by law, Seller specifically excludes and disclaims any and all implied warranties, including, without limitation, any implied warranties of merchantability and any implied warranties of fitness for a particular purpose. This Warranty does not cover damage caused during shipment, from accident, misuse, abuse, neglect, unauthorized equipment modification, failure to follow the operation instructions outlined in the owner's manual, failure to perform routine maintenance, and operation in excess of tolerances.

7. CHANGES TO EQUIPMENT. It is further understood that any change to the equipment is done at the Buyers risk and Seller only provides a guarantee on equipment as it has been delivered and used in the proper manner. Any change to the construction, machining or any other aspect of the equipment will void any guarantee by the Seller and any not approved use or misuse of the equipment will void the Warranty.

8. SELLER'S OPTION. Buyer agrees that the sole liability of Seller by virtue of any Warranty made by Seller is to make the equipment fulfill the warranty. No warranty made by Seller shall be binding upon Seller after 1 year(s) from the date of the original invoice of the equipment and no liability for any special, indirect or consequential damages of any nature is assumed by or shall be imposed by Seller based upon its undertakings herein.

9. INSTALLATION. The equipment is a precision device and proper installation is a must. Should the equipment not be properly installed, this Warranty is void. If the equipment is not installed by Buyer, it should be done by properly trained installers. The equipment must be maintained as required in the installation instructions. The equipment must be maintained as stated in the manuals. Damage caused by disasters such as fire, flood, lightening, or improper electric current or power surges are not covered by this Warranty.

10. EXTRAORDINARY EVENTS. Seller shall not be liable in any way for delay, non delivery or default in shipment due to labor disputes, transportation shortage, delays in receipt of material, priorities, fires, accidents and all other causes beyond the control of Seller, affecting Seller and/or its suppliers.

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