ZEON® XD
Winch Service Manual

GENERAL SAFETY PRECAUTIONS

Your safety, and the safety of others, is very important. To help you make informed decisions about safety, we have provided installation and operating instructions and other information on labels and in this guide. This information alerts you to potential hazards that could hurt you or others. It is not possible to warn you about all potential hazards associated with this product, you must use your own good judgment.

CARELESS INSTALLATION AND OPERATION CAN RESULT IN SERIOUS INJURY OR EQUIPMENT DAMAGE. READ AND UNDERSTAND ALL SAFETY PRECAUTIONS AND OPERATING INSTRUCTIONS BEFORE INSTALLING AND OPERATING THIS PRODUCT.

This guide identifies potential hazards and has important safety messages that help you and others avoid personal injury or death. WARNING and CAUTION are signal words that identify the level of hazard. These signal words mean:

⚠WARNING signals a hazard that could cause serious injury or death, if you do not follow recommendations. ⚠CAUTION signals a hazard that may cause minor to moderate injury, if you do not follow recommendations.

This guide uses *NOTICE* to call attention to important mechanical information and NOTE to emphasize general information worthy of special attention.

⚠ WARNING

IMPACT AND MOVING PARTS ENTANGLEMENT HAZARD

Failure to observe these instructions could lead to severe injury or death

- **Always** take time to fully read the Instructions and/or Operations Guide, and/or Basic Guide to Winching Techniques, in order to understand your winch and its operations.
- **Always** use extreme caution when drilling on any vehicle. Make sure that all fuel lines, brake lines, electrical wires, and other objects are not punctured or damaged when/if drilling on the vehicle. Thoroughly inspect the area to be drilled (on both sides of material) prior to drilling, and relocate any objects that may be damaged. Failure to inspect the area to be drilled may result in vehicle damage, electrical shock, fire or personal injury.
- **Always** wear safety glasses when installing this kit. A drilling operation will cause flying metal chips. Flying chips can cause eye injury.
- **Always** remove jewelry and wear eye protection.
- **Never** lean over battery while making connections.
- **Never** route electrical cables:
  - o Across any sharp edges.
  - o Through or near moving parts.
  - o Near parts that become hot.
- **Always** insulate and protect all exposed wiring and electrical terminals.
- **Always** install terminal boots as directed in installation instructions.
- **Always** use appropriate and adequate care in lifting components into place.
- **Always** insure components will remain secure during installation and operation.
- **Always** tighten all nuts and bolts securely, per the installation instructions.
- **Always** replace all worn or damaged parts before operating.
- **Never** operate this WARN product with damaged or missing parts.

Read installation and operating instructions thoroughly.

⚠ CAUTION

MOVING PARTS ENTANGLEMENT HAZARD

Failure to observe these instructions could lead to minor or moderate injury

- **Always** use proper tools when making repairs.
- **Always** utilize a qualified WARN service technician when specialized tools are required.
- **Always** disconnect all wires from the positive battery terminal or disconnect hydraulic hoses from the winch motor before beginning any work on the winch.

Read installation and operating instructions thoroughly.

TABLE OF CONTENTS

BEFORE YOU BEGIN

This manual is intended for use by a WARN authorized service technician. It is important to make repairs with the proper tools and equipment.

⚠ WARNING Read all instructions and safety information provided. Failure to do so, may cause the winch to fail, leading to personal injury. For full winch operation and techniques, as well as other product specific literature, visit www.warn.com.

This manual covers models:

- ZEON® XD 8, 8s, 10, 10s and 12

SECTION 1 - GETTING STARTED

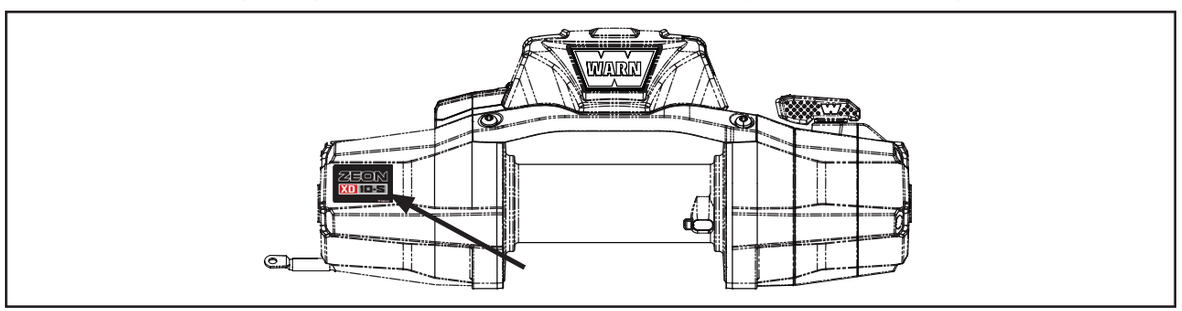
1.1 Identification

To ensure proper winch repair, it is necessary to correctly identify the model and part number of your winch. This makes ordering replacement parts easier and helps you obtain the necessary information from WARN customer service at 1-800-543-9276.

NOTE: For a part description, item number and quantity, refer to the Specification Sheet for your specific winch model at www.warn.com.

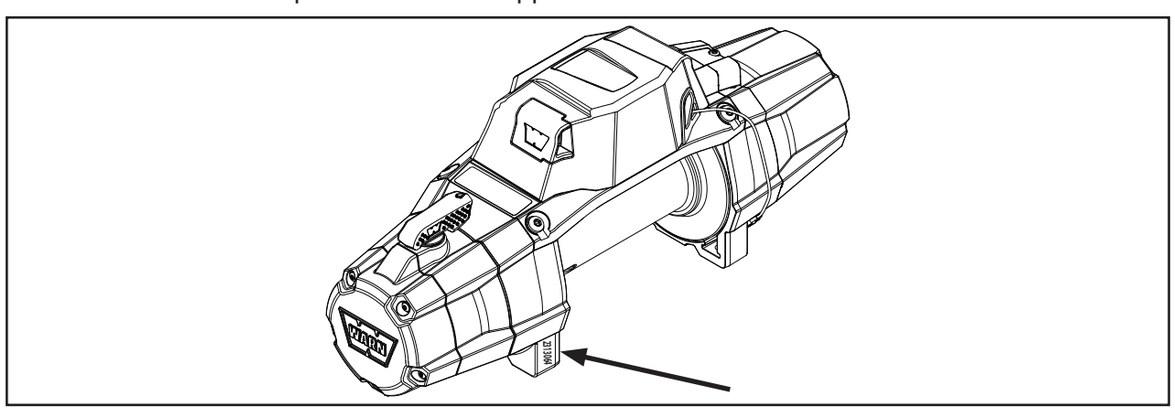
Winch identification:

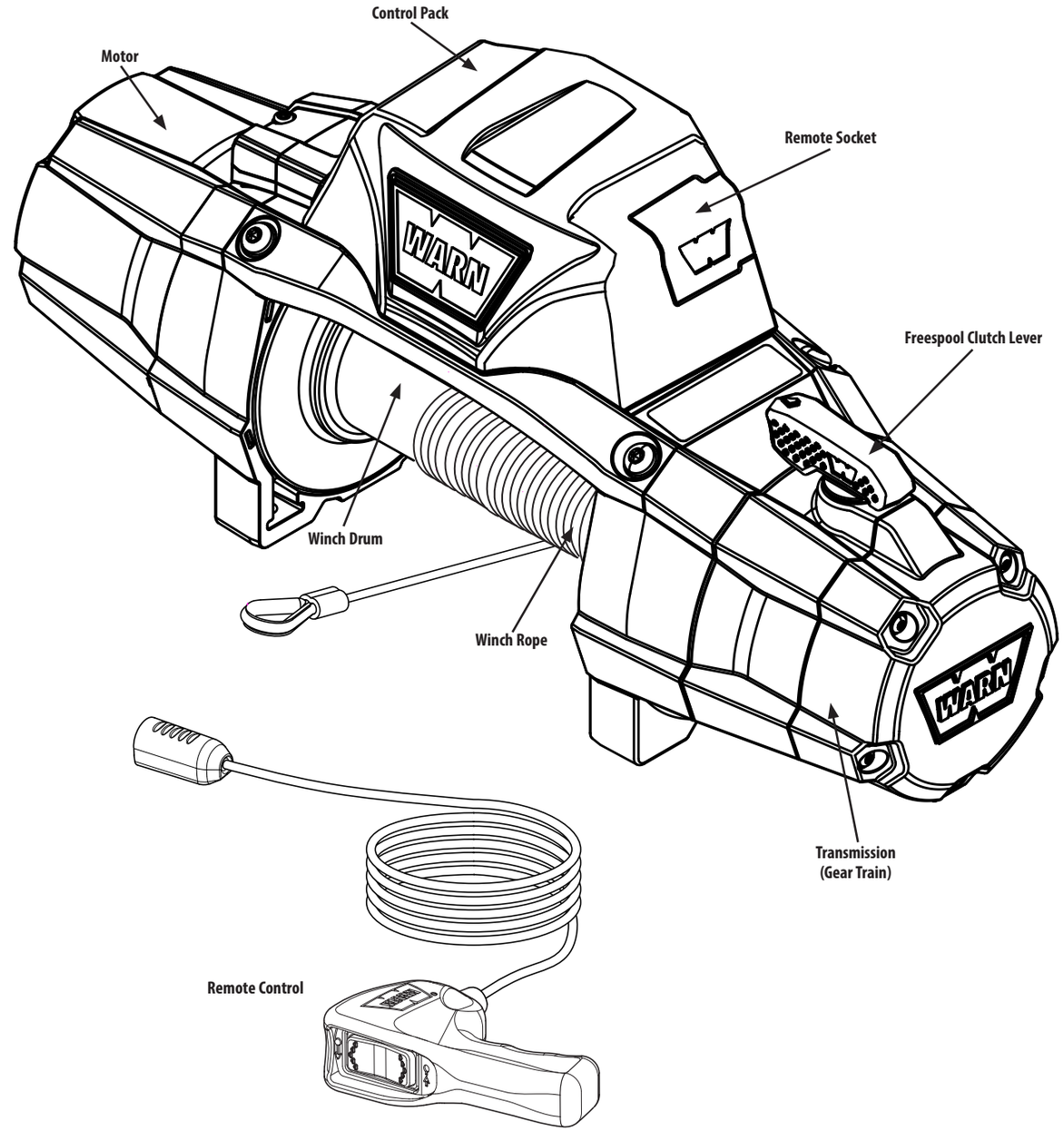
The product label is typically located on front of winch. This label gives winch capacity and model.



Winch serial number:

The serial number is stamped on the drum support.





1.2 Definitions

1.2.1 Definitions

Operation and service of a Warn planetary winch can be explained easier by defining a few major structural components. Refer to Figure 1.2 for the following definitions:

MOTOR: The electric winch is driven by a high speed, low torque electric motor. A 12-volt DC vehicle battery generally powers the electric motor.

REMOTE SOCKET: The remote socket is where the operator plugs in the wired remote control in order to control the winch.

WINCH ROPE: The winch rope's diameter and length are determined by the winch's load capacity and design. Wrapped around the winch drum and fed through the fairlead, the winch rope is looped at the end to accept the hook's clevis pin.

Synthetic winch rope is constructed of a unique ultra high molecular weight polyethylene material and offers tremendous tensile strength. It is coated with a high temperature urethane and equipped with a temperature resistant sleeve on the first layer for added protection. The synthetic rope's high flexibility and low weight make it much easier to handle out in the field.

WINCH DRUM: The winch drum is the cylinder onto which the winch rope feeds. The drum is driven by the motor and drive train. Its direction can be changed using the remote control.

DRUM SUPPORTS: Drum supports are the structural components of the winch that mount the winch to the vehicle. The drum rotates while being held by the drum supports and both the motor and gear train are attached to a drum support.

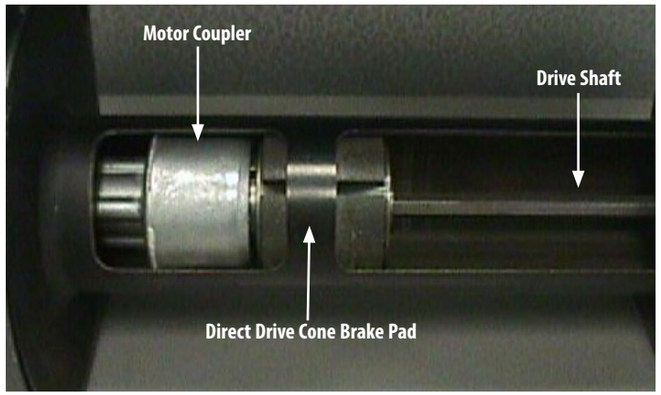
GEAR TRAIN: Warn electric planetary winches consist of a gear train made up of three planetary gear stages. The purpose of the gear train is to multiply motor torque and to reduce motor speed transmitted to the drum. Warn gear trains are enclosed in a housing and are lubricated with grease.

CLUTCH LEVER: The clutch lever allows the operator to manually disengage and engage the winch drum from the geartrain. Disengaging the clutch enables the drum to rotate freely (known as "freespooling"). Engaging the clutch "locks" the winch drum back onto the gear train.

CONTROL PACK: Using electrical power from the vehicle's battery, the control pack's contactor switches power to the motor, enabling the operator to change the direction of the winch drum rotation.

BRAKE: All ZEON® XD winches are equipped with a directional sensitive automatic brake. The brake requires that the winch rope be wound onto the drum in the correct direction to operate properly.

A Drum rotation label is located on the motor end drum support to help identify proper rotation. When the winch rope is reeled in, the brake is not activated. When reeling out under load, however, the brake slows the winch drum to an acceptable speed and holds the load when the winch is shut off. The brake is located inside the winch drum and dissipates heat through the drum and winch rope.



1.3 Winch Operation

A Warn winch is a compact device used to pull heavy loads over short distances. The vehicle battery and charging system generates the power for pulling the load.

Power feeds from the battery power source into the winch control pack. At the push of a remote control switch the power flows to the winch motor.

The winch motor turns the electrical energy into mechanical energy. The motor shaft turns the motor coupler, which, in turn, drives the brake.

On power-in operation, the brake simply rotates and drives the planetary gears, starting with the gear carrier stage farthest from the winch drum (the first stage carrier.) The first stage carrier, in turn, drives the second stage carrier, which then drives the third stage carrier. The third stage directly drives the drum. Since the winch rope is connected to the drum, the rope winds around the drum, causing the load to be drawn in.

On power-out operation, the motor is reversed and the winch drum is rotated in the opposite direction. All winch components operate in the same manner as during power in except the brake. During power-out, the load tries to "over speed" the motor (make the motor turn faster than it would under its own power.) When the brake detects this over speed it engages just enough to make the load and motor run at the same speed and slow the load. When the remote control switch is released, the brake engages and completely stops the load.

SECTION 2 - DISASSEMBLY AND ASSEMBLY

NOTE: This service manual covers service steps for ZEON® XD Winches. Pay particular attention to the steps as some may or may not apply to your specific winch.

2.1 Suggested Tools

The following tools are suggested for these procedures:

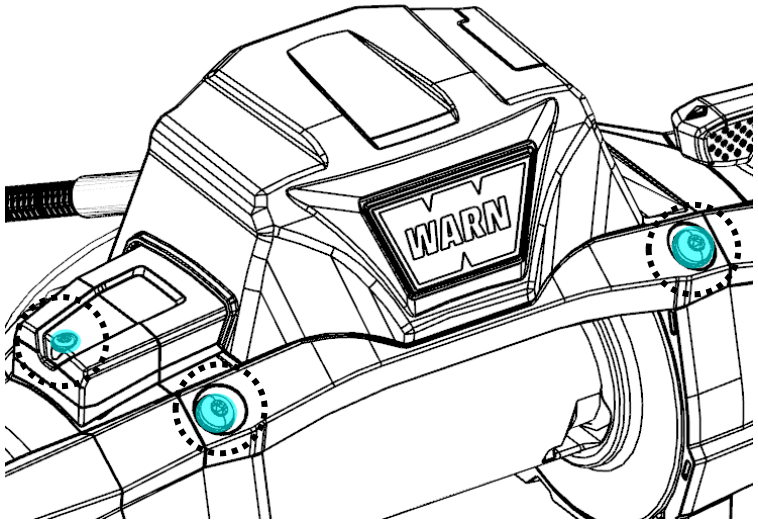
- 1 - 5/32" Hex Key Wrench
- 1 - ¼" Hex Key Wrench
- 1 - 13mm, 1 – ½ ', 3/8 ' Box or Open End Wrenches
- 1 - Flat Head Screwdriver
- 1 - Pliers, including Long Nose Needle
- 1 - Torque Wrench
- Assortment of Torx Bits

2.1 Winch Disassembly

1 Remove tie plate and bus bar cover bolts

Head: T47
Plastite – 6mmx25mm
Torque: 3-5Nm
(27-44inlb)

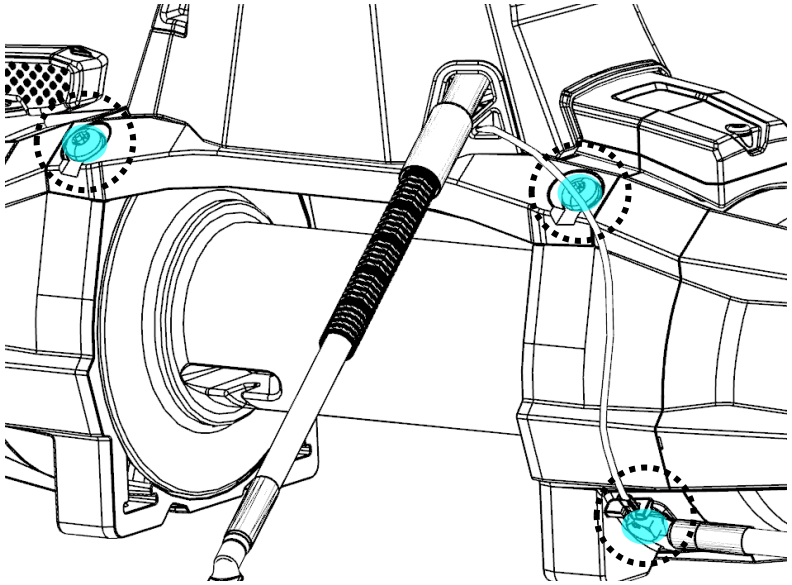
Head: T47
M8x1.25x25mm
Torque: 15-17Nm
(133-150inlb)



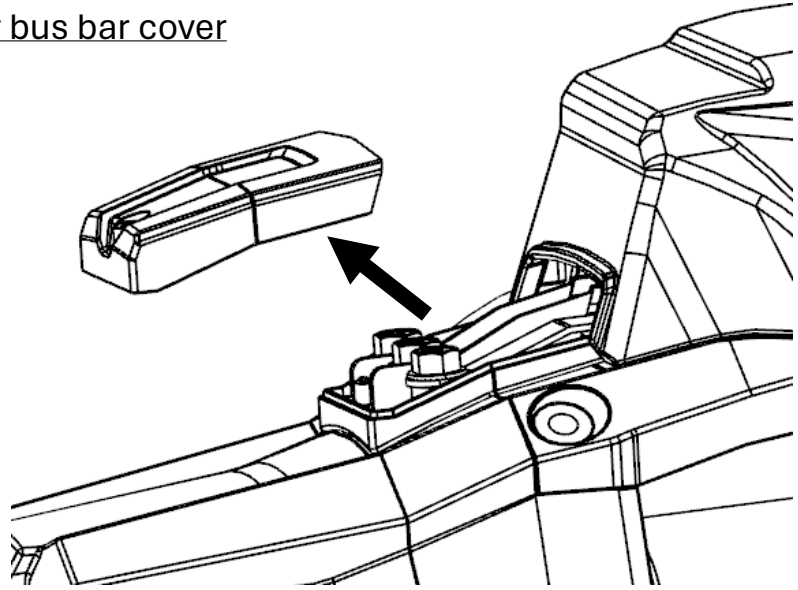
2 Remove tie plate and ground cable bolts

Head: T47
M8x1.25x25mm
Torque: 15-17Nm
(133-150inlb)

Head: 13mm Hex
M8x1.25x14mm
Torque: 10.6-13Nm
(94-115inlb)

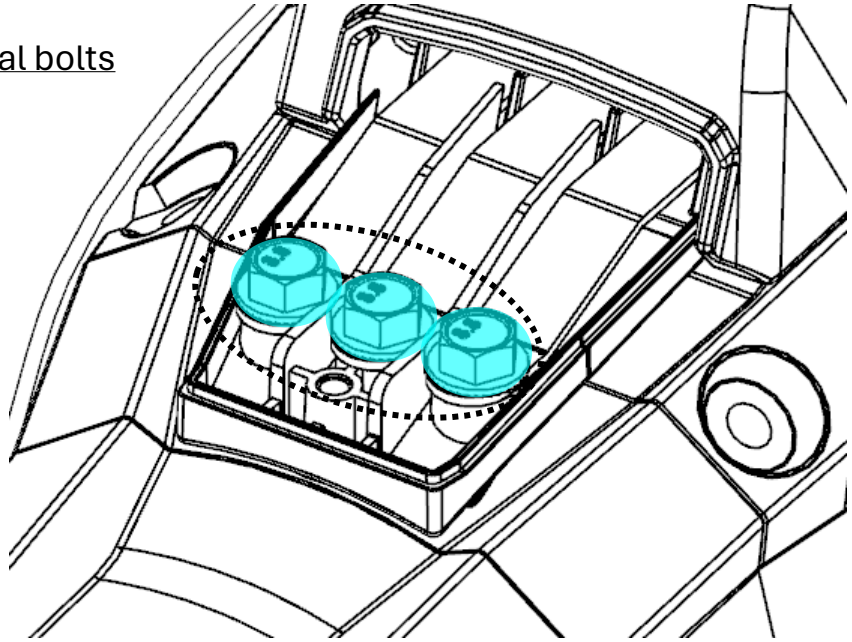


3 Remove upper bus bar cover

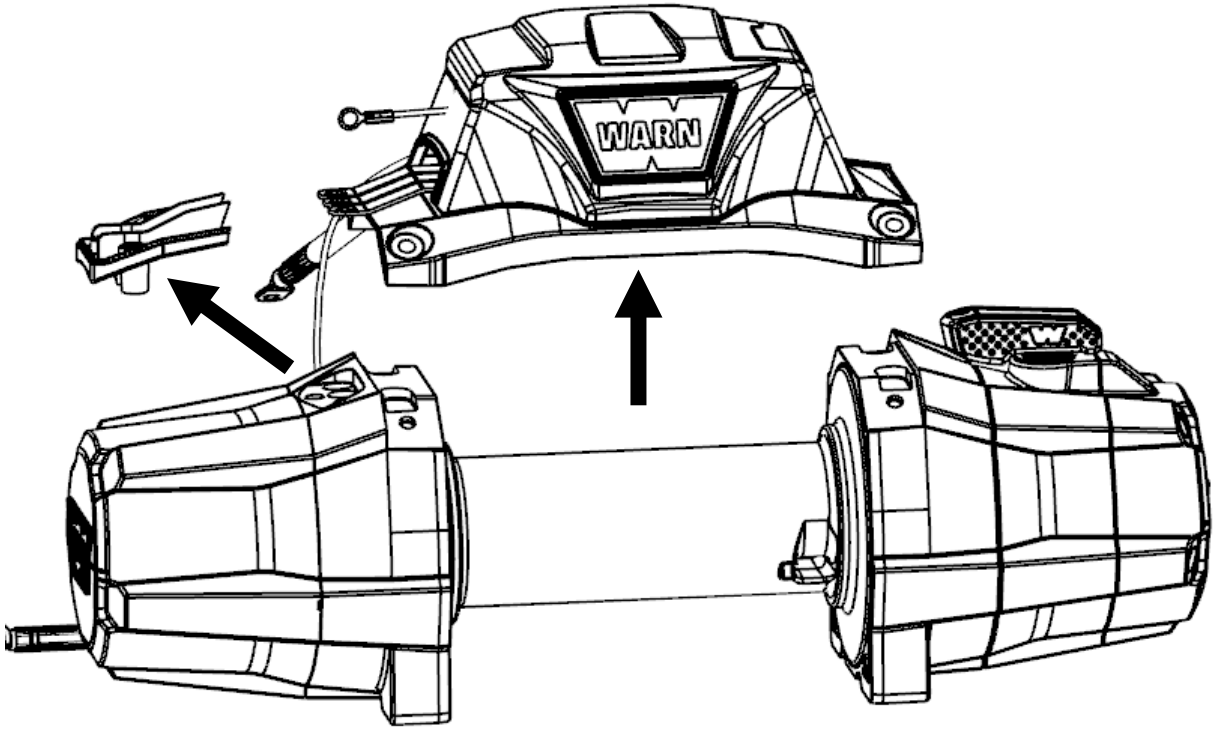


4 Remove terminal bolts

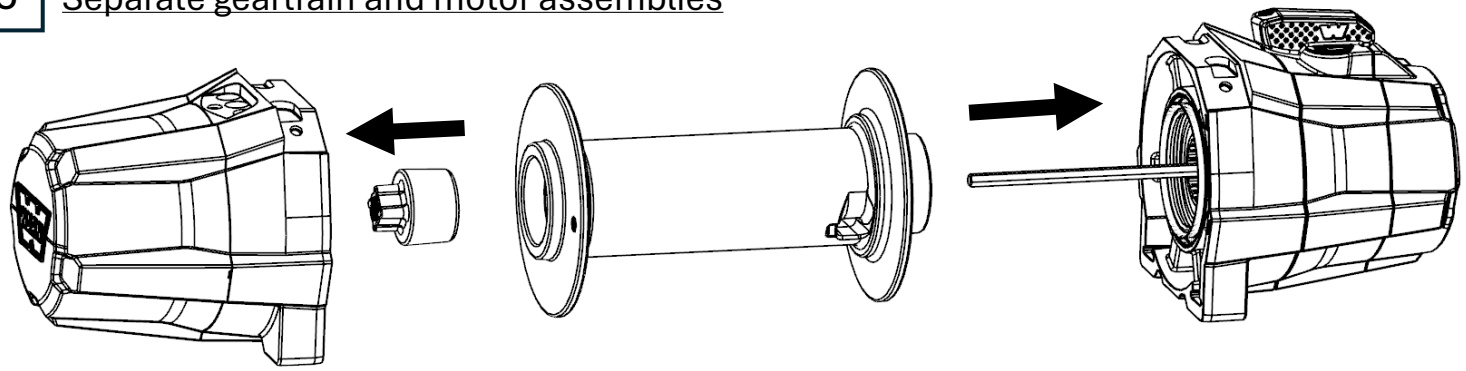
Head: 13mm Hex
M8x1.25x35mm
Torque: 10.6-13Nm
(94-115inlb)



5 Remove control pack and lower bus bar cover

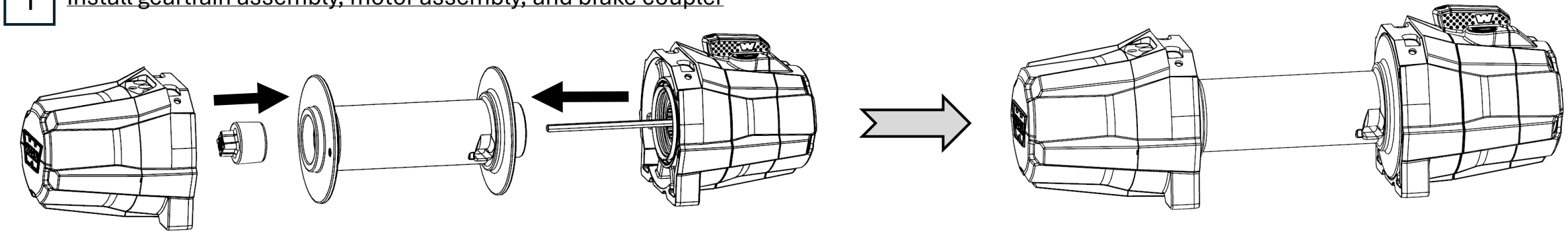


6 Separate geartrain and motor assemblies

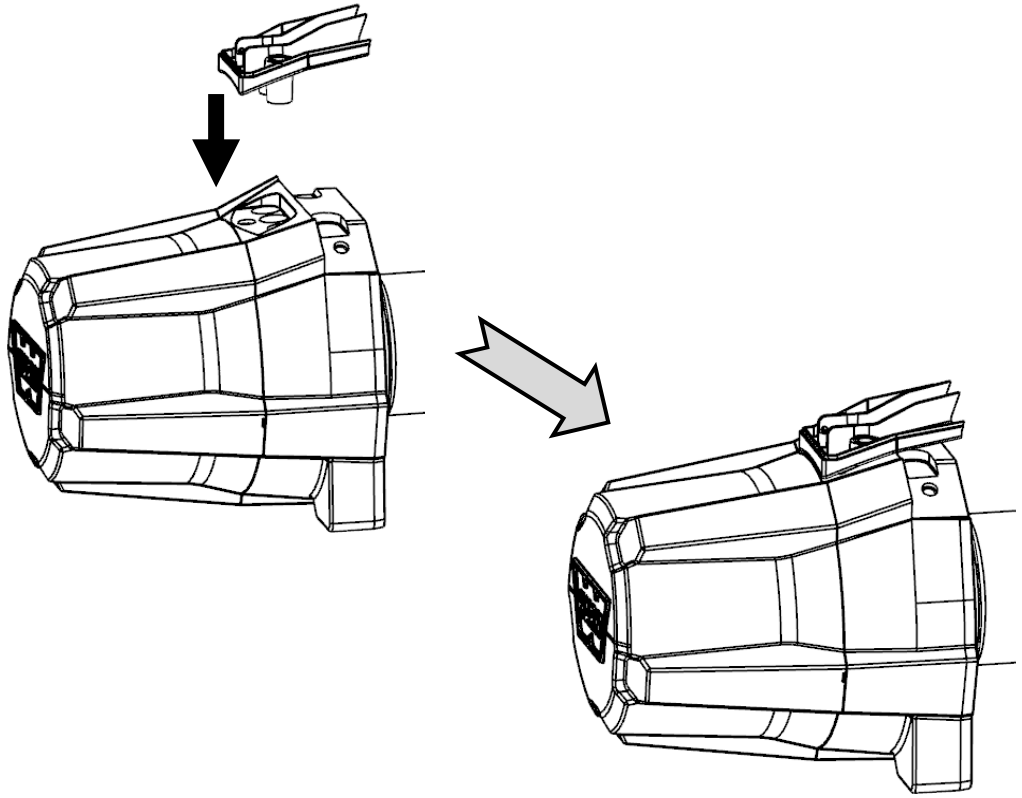


2.2 Winch Reassembly

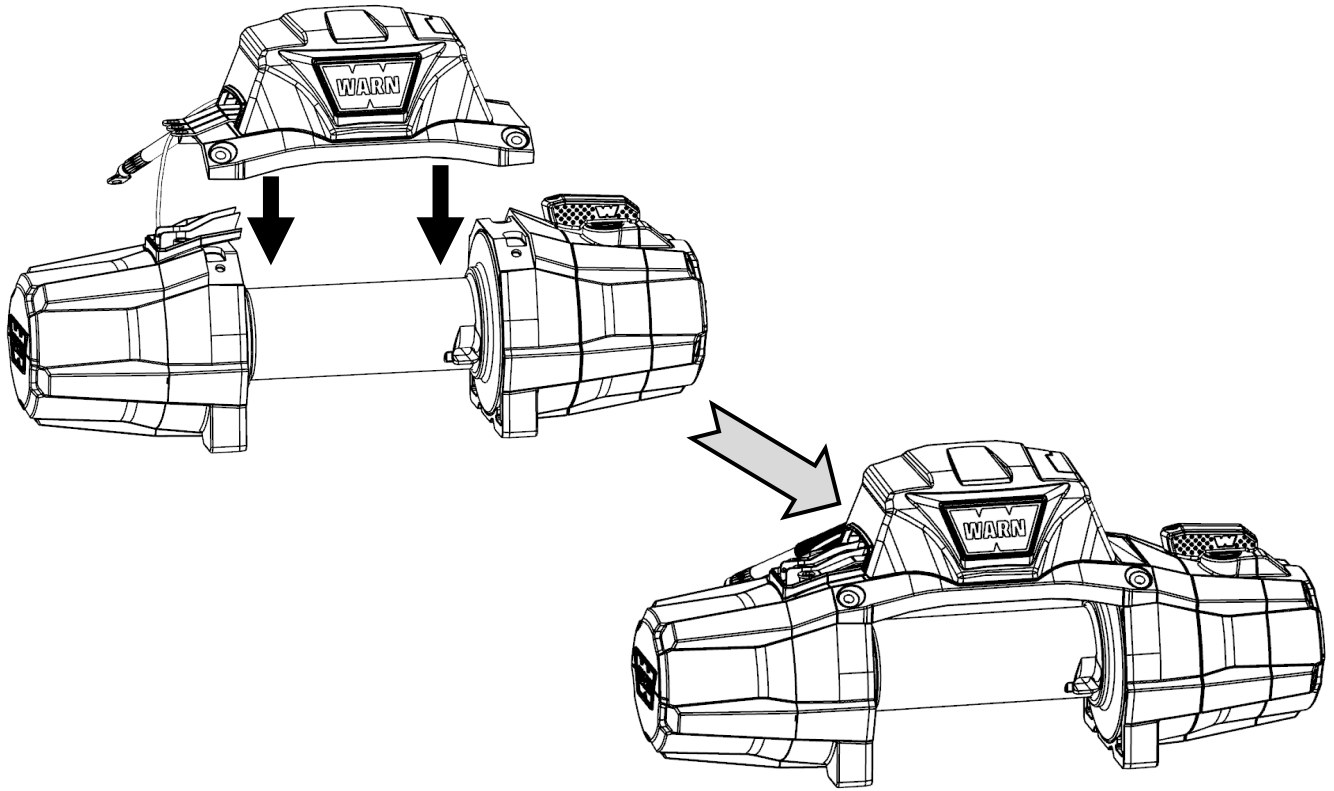
1 Install geartrain assembly, motor assembly, and brake coupler



2 Install lower bus bar cover

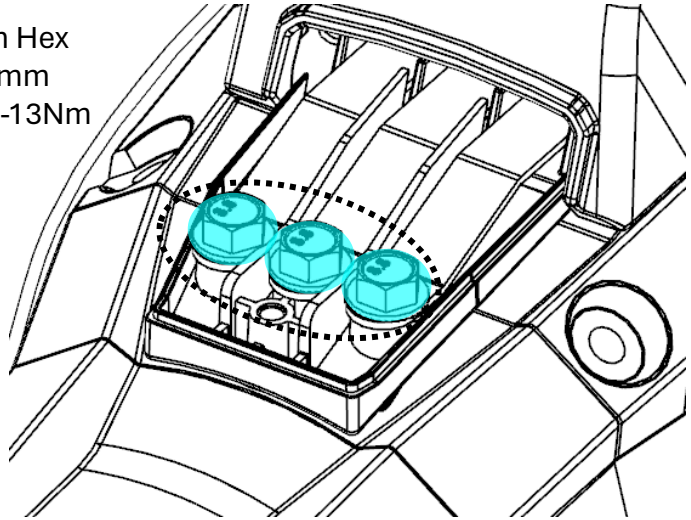


3 Install control pack cover assembly



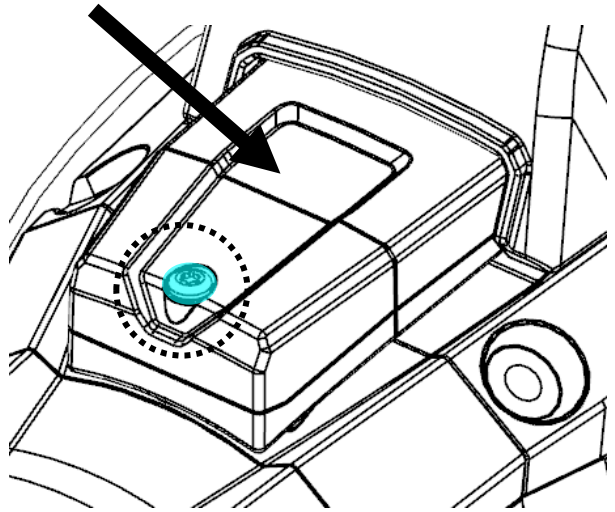
4 Install terminal bolts

Head: 13mm Hex
M8x1.25x35mm
Torque: 10.6-13Nm
(94-115inlb)



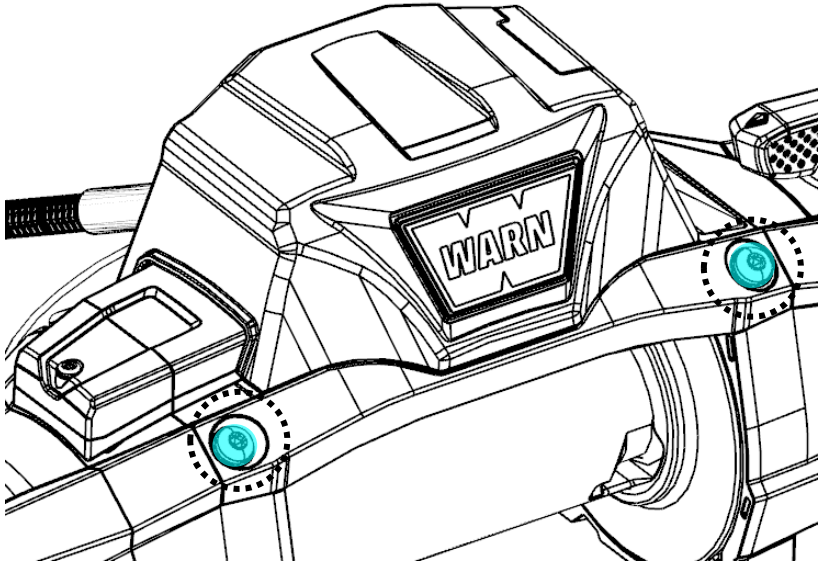
5 Install bus bar cover bolt

Head: T25
Plastite – 6mmx25mm
Torque: 3-5Nm
(27-44inlb)



6 Install tie plate bolts

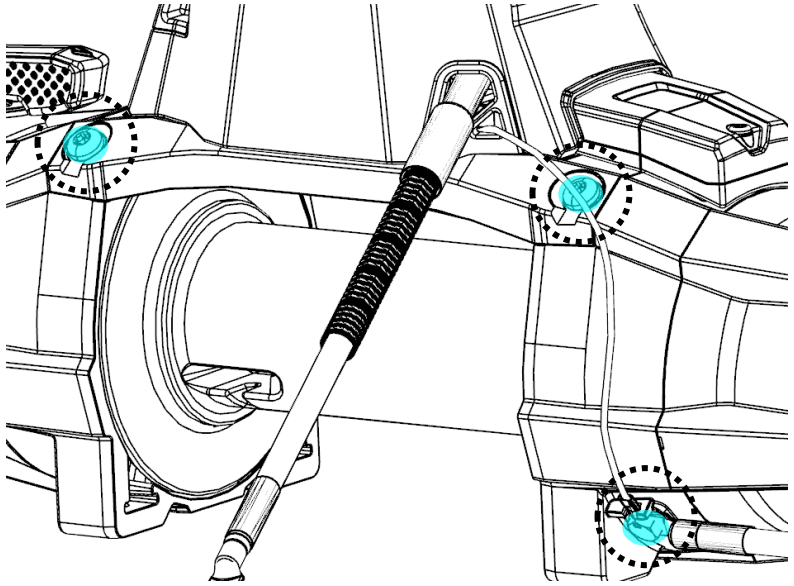
Head: T47
M8x1.25x25mm
Torque: 15-17Nm
(133-150inlb)



7 Install tie plate bolts and ground cable bolt

Head: T47
M8x1.25x25mm
Torque: 15-17Nm
(133-150inlb)

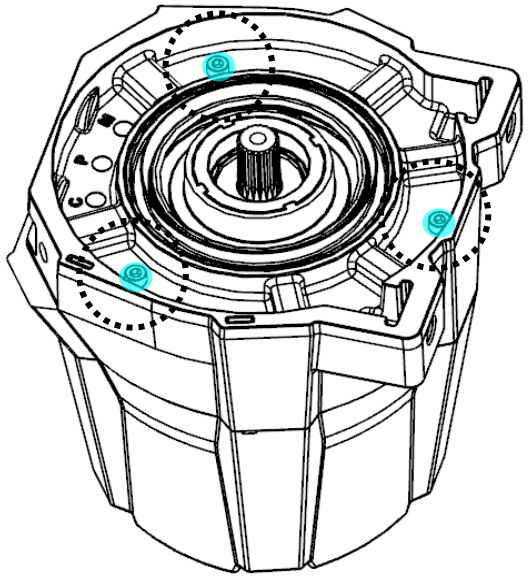
Head: 13mm Hex
M8x1.25x14mm
Torque: 10.6-13Nm
(94-115inlb)



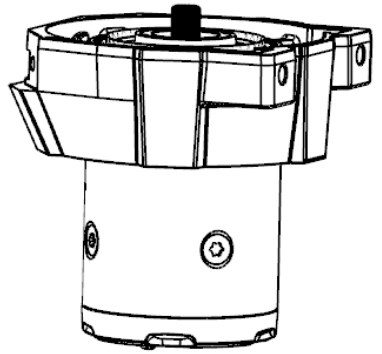
2.4 Motor Disassembly

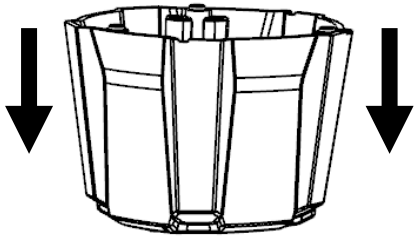
1 Remove motor (Section 2.1, steps 1-6)

Head: 4mm Hex
M5x0.8x60mm
Torque: 10.6-13Nm
(94-115inlb)



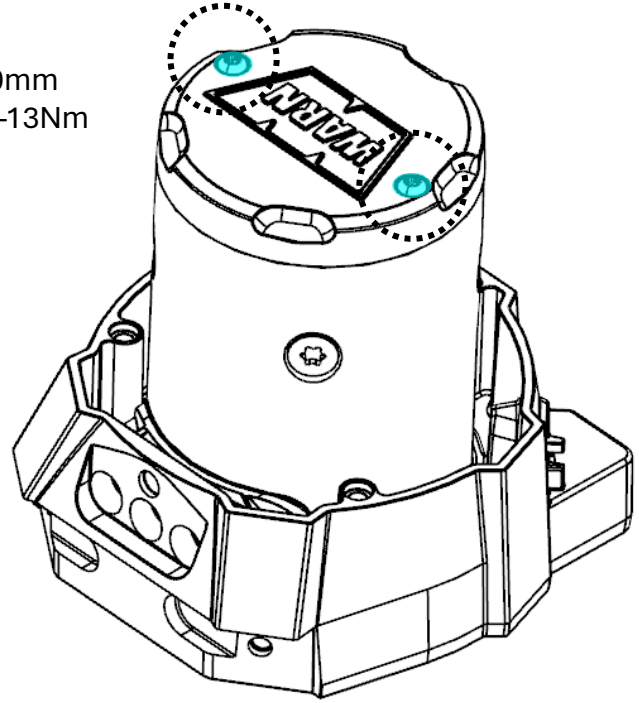
2 Remove motor cover



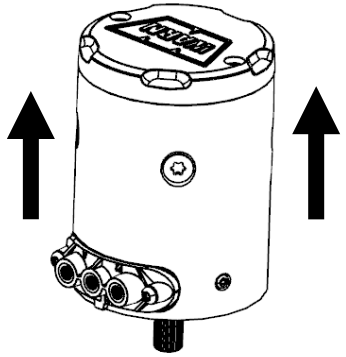


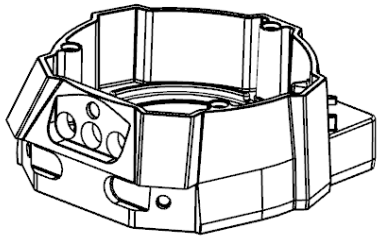
3 Remove motor bolts

Head: T30
M6x1mmx60mm
Torque: 10.6-13Nm
(94-115inlb)



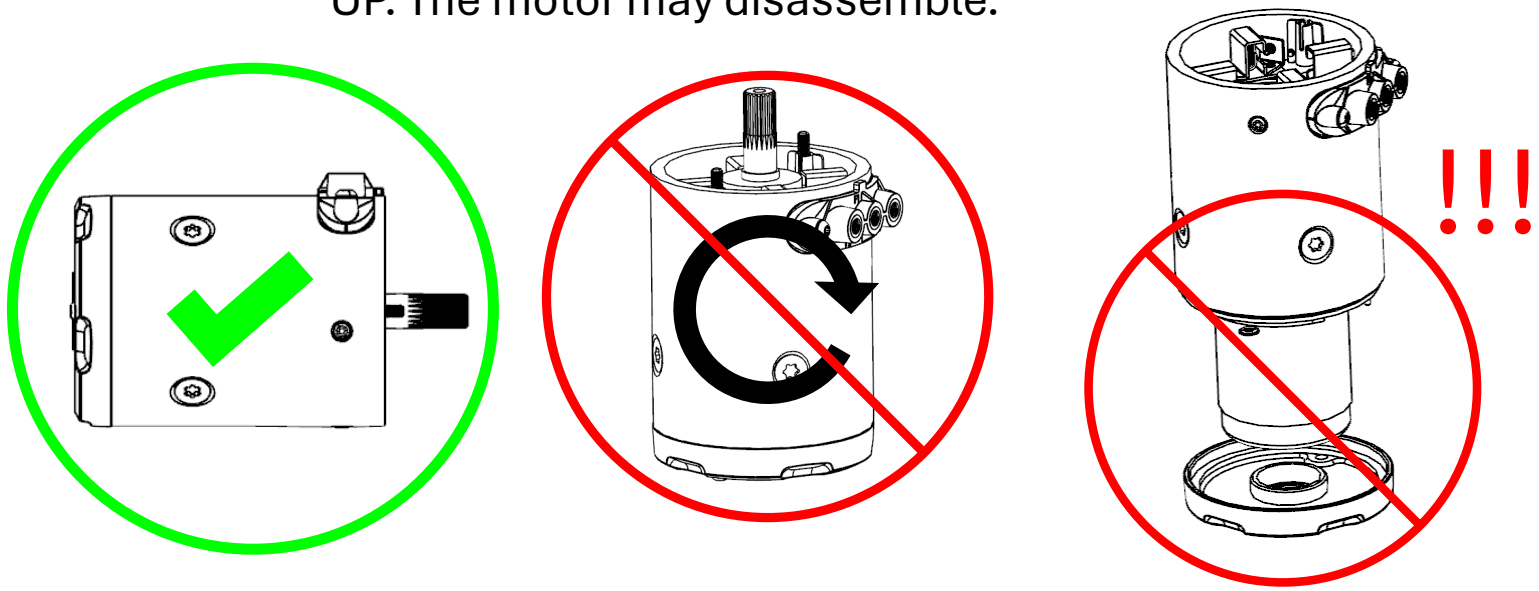
4 Remove motor



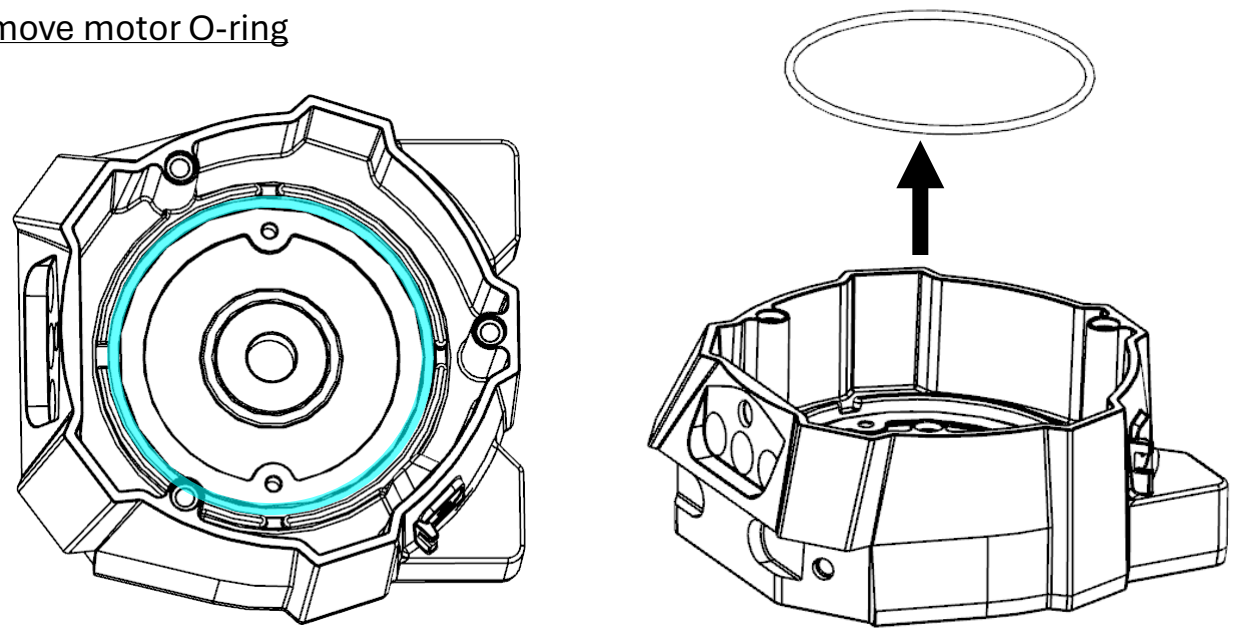


5

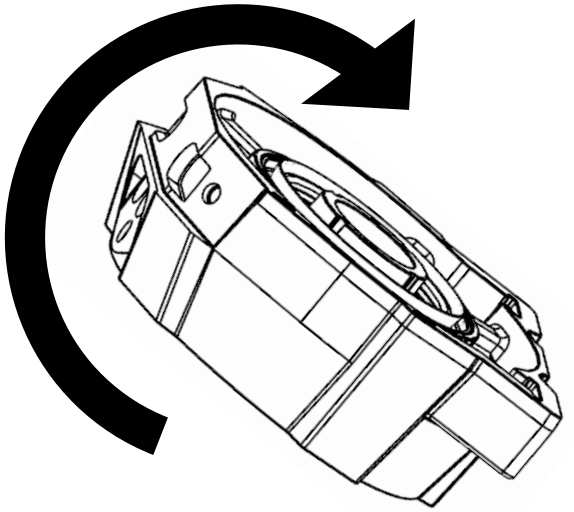
Do NOT hold or place motor with shaft UP. The motor may disassemble.



6 Remove motor O-ring

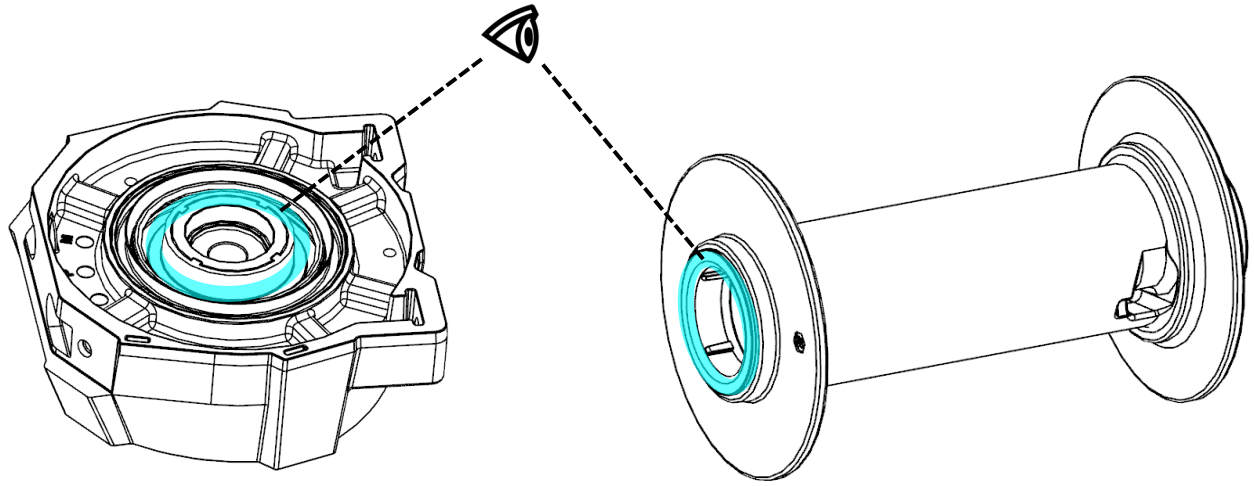


7 Flip motor drum support

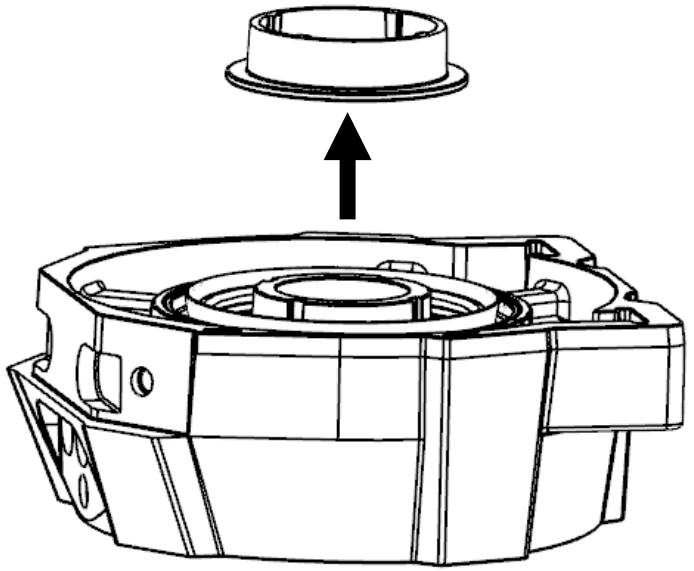


8

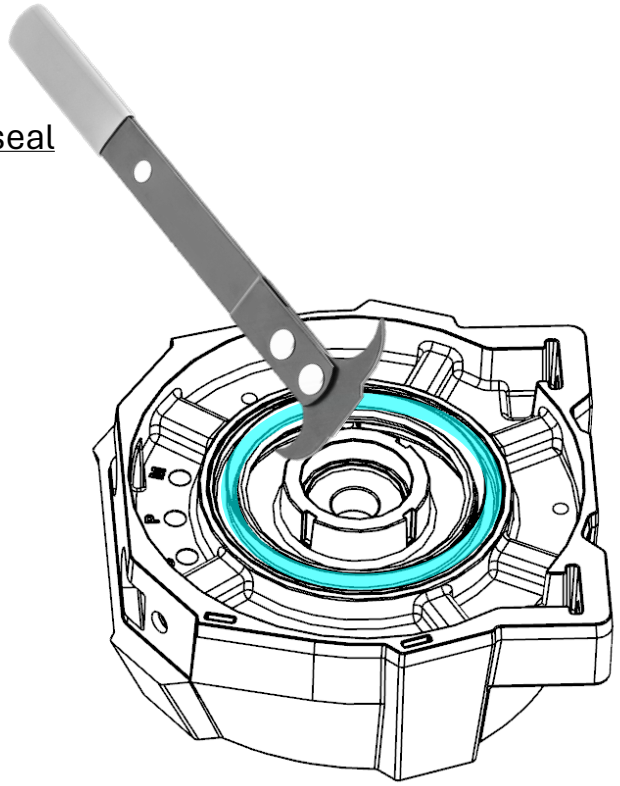
Bushing may be
stuck to either part

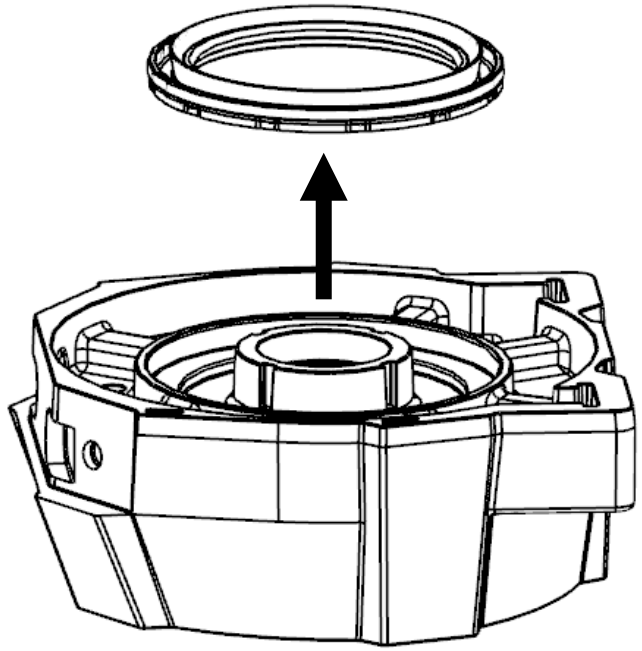


9 Remove motor bushing



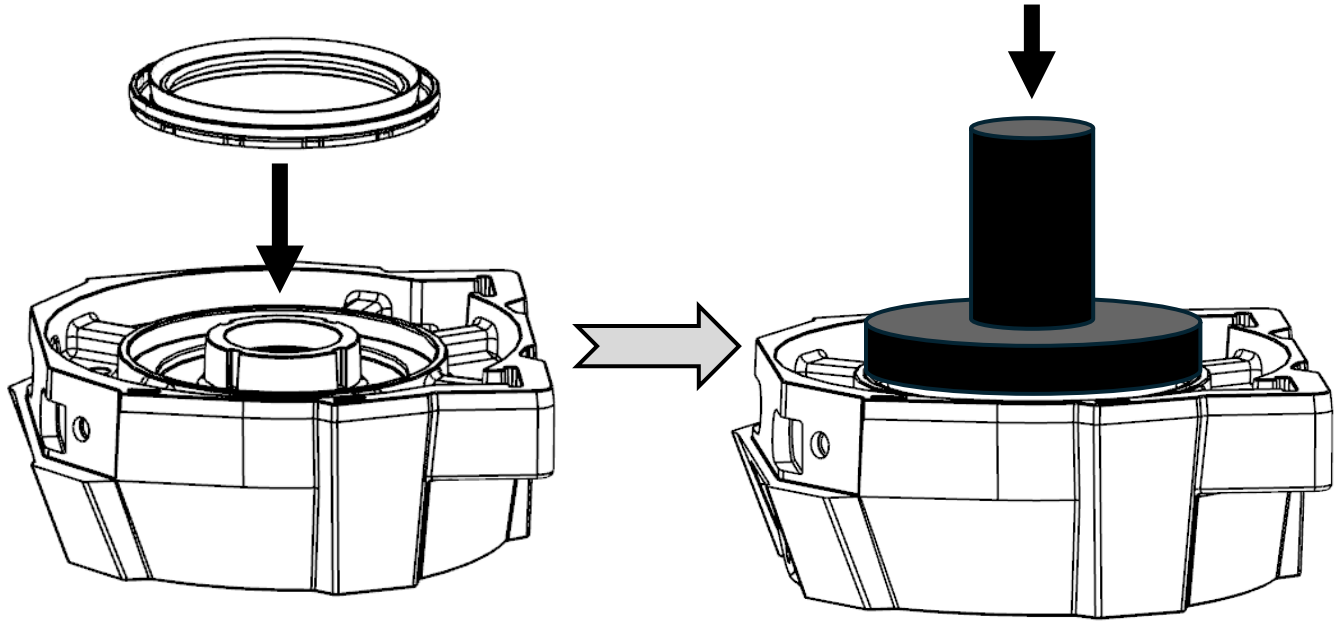
10 Remove motor drum seal



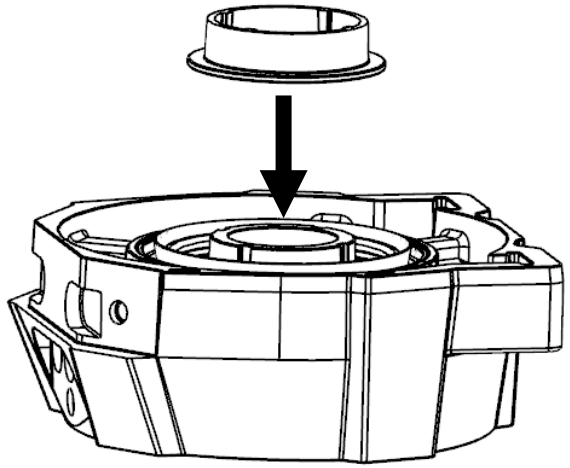


2.5 Motor Reassembly

1 Press in motor drum seal



2 Install motor bushing



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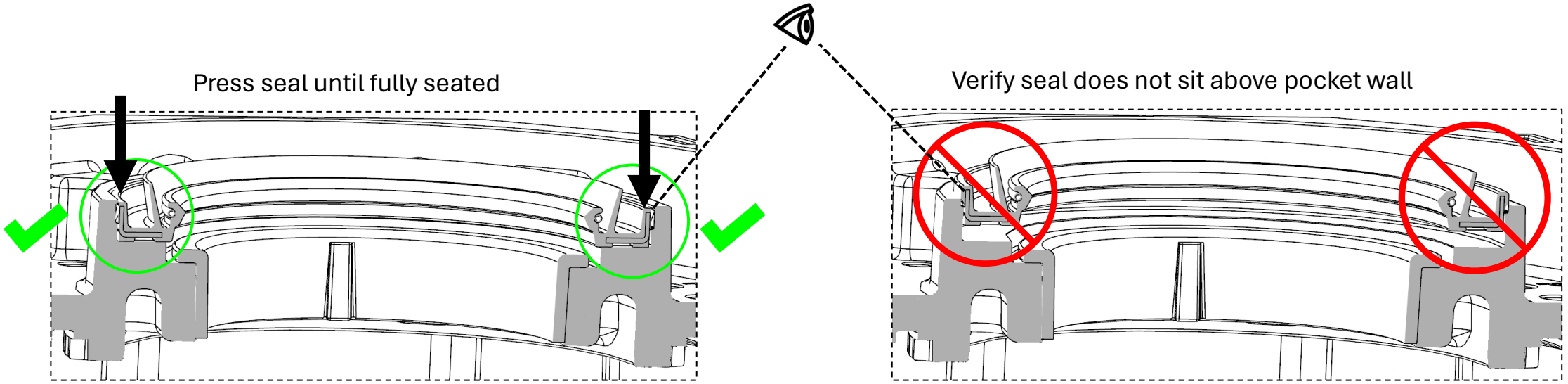
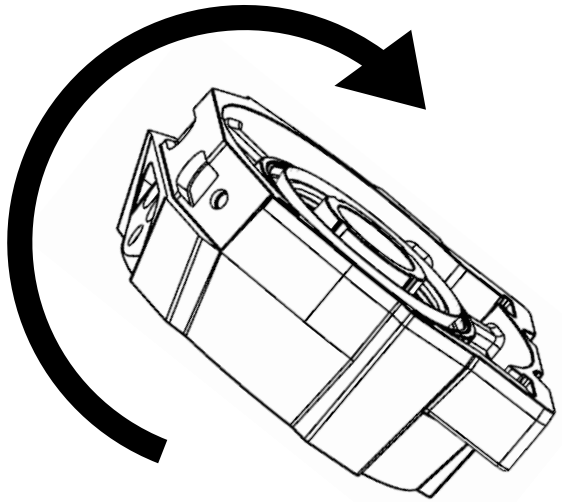
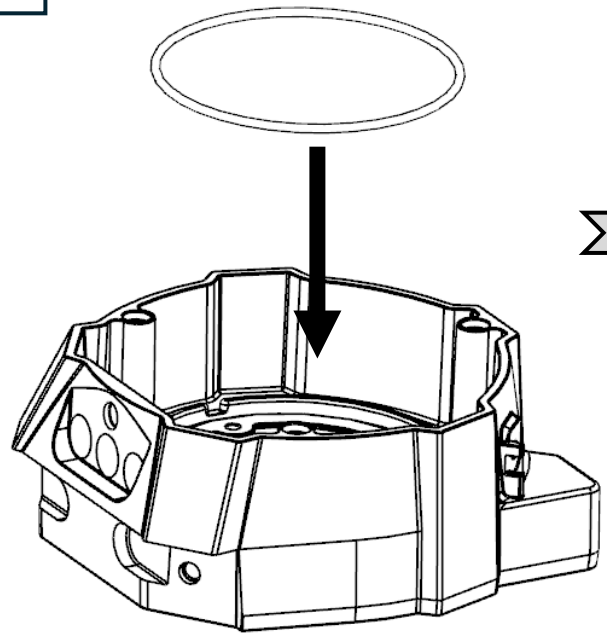
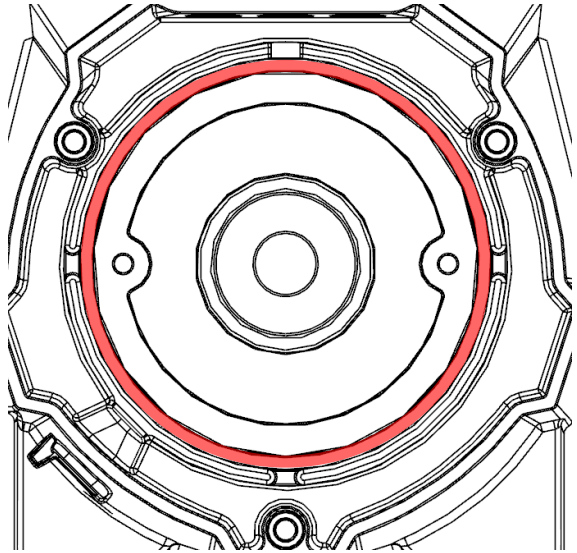


4 Flip motor drum support



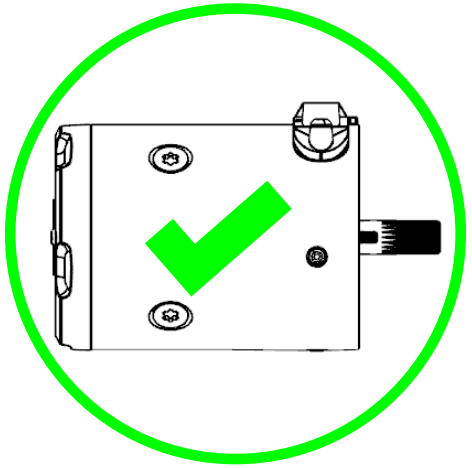
5 Install motor O-ring



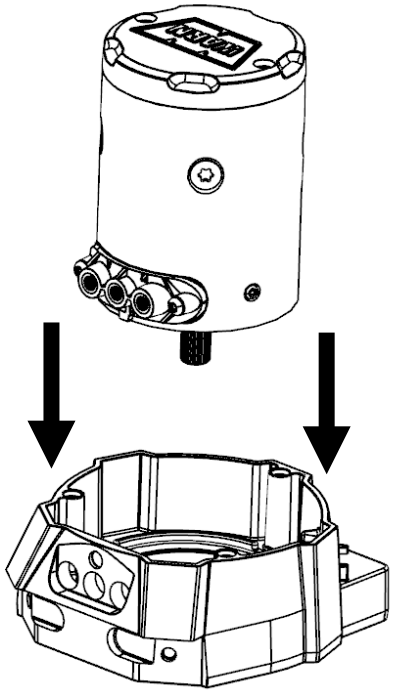


6

Do NOT hold or place motor with shaft UP. The motor may disassemble.

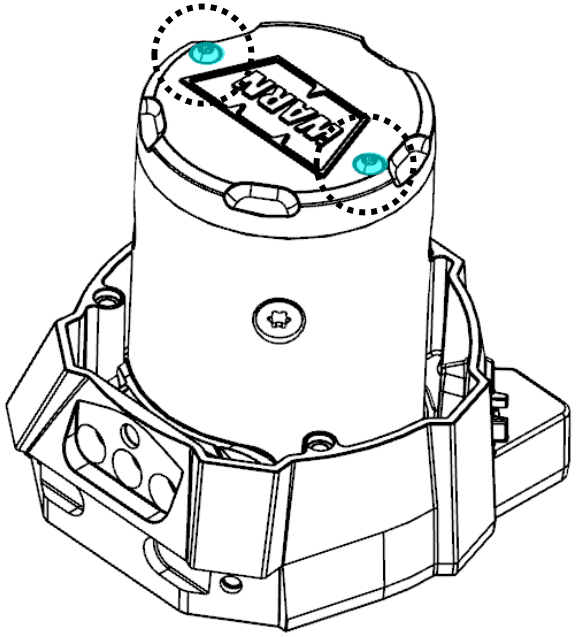


7 Install motor

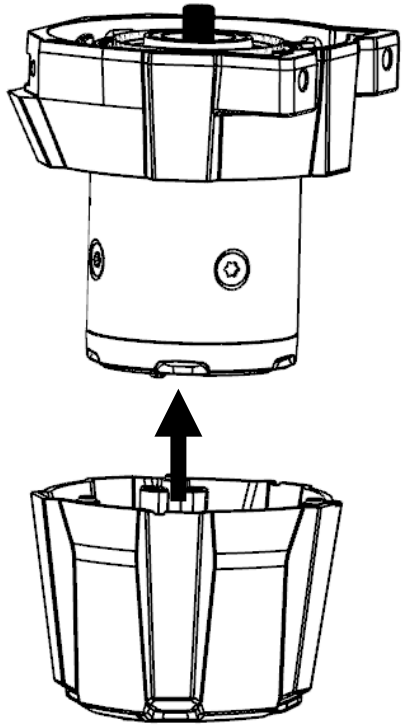


8 Install motor bolts

Head: T30
M6x1mmx60mm
Torque: 10.6-13Nm
(94-115inlb)

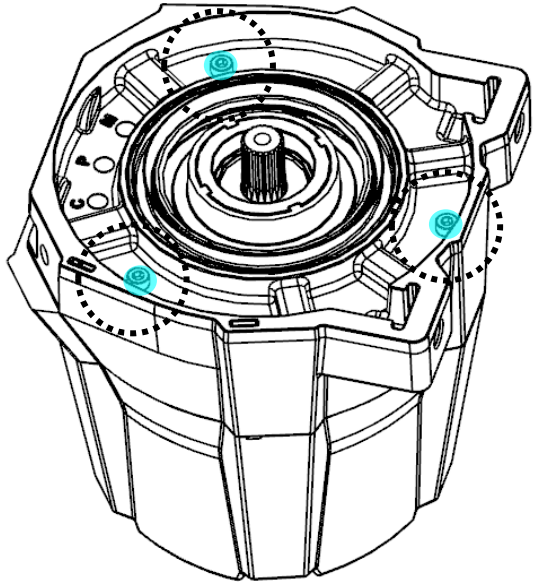


9 Install motor cover



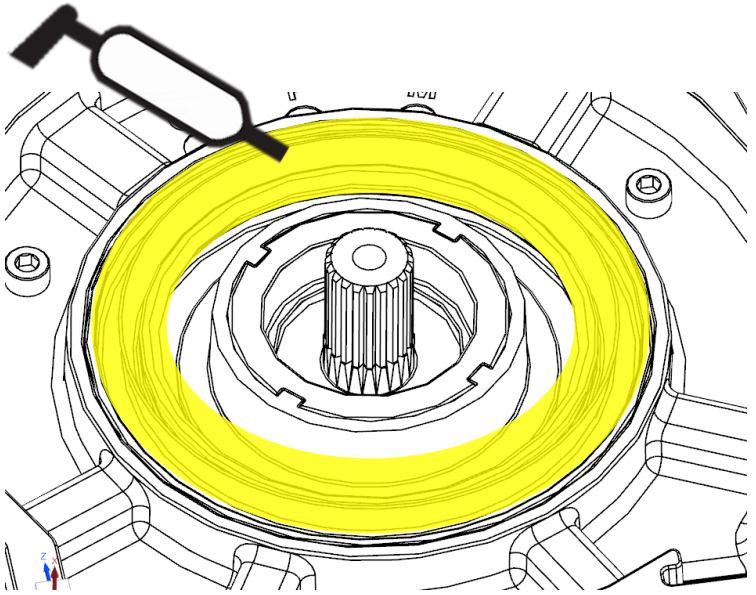
10 Install motor cover bolts

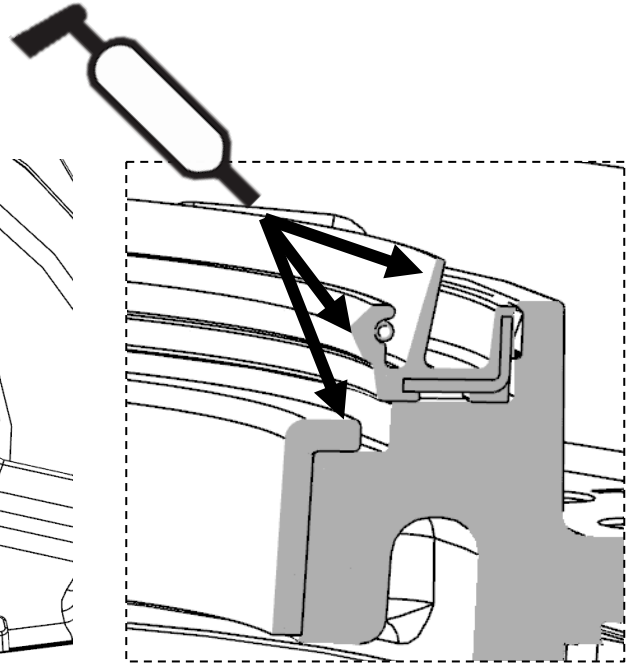
Head: 4mm Hex
M5x0.8x60mm
Torque: 10.6-13Nm
(94-115inlb)



11 Grease motor drum seal

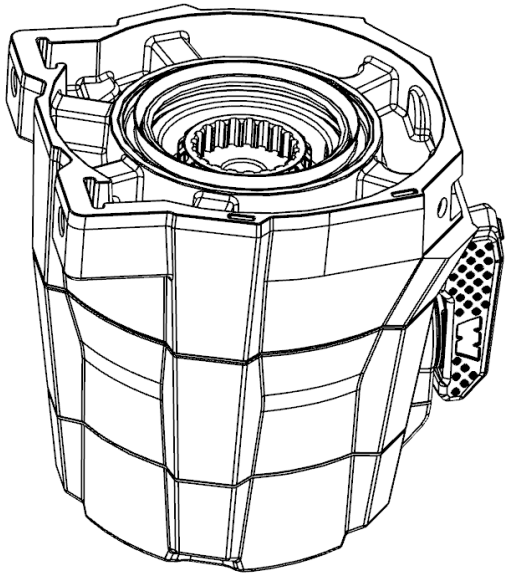
Shell Gadus S5 V220 2 (7-11g)



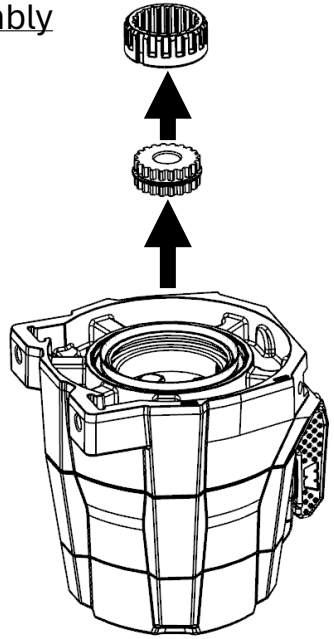


2.6 Geartrain Disassembly

1 Remove Geartrain (Section 2.1, steps 1-6)

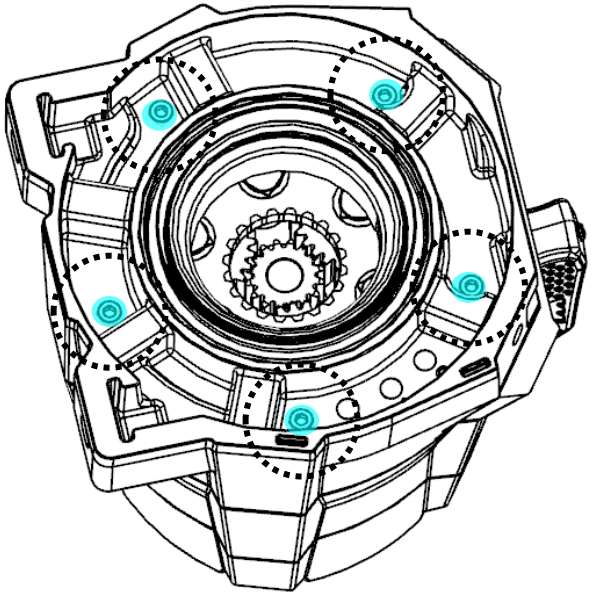


2 Remove drum driver assembly

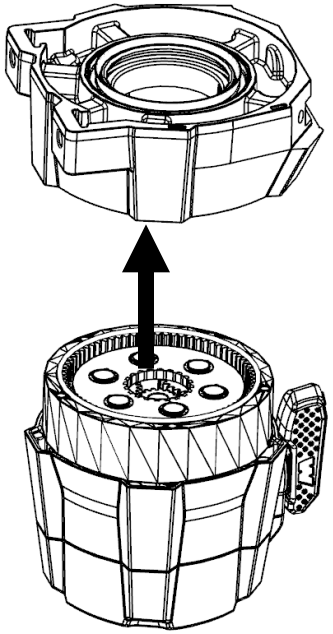


3 Remove geartrain bolts

Head: 4mm Hex
M5x0.8x60mm
Torque: 10.6-13Nm
(94-115inlb)

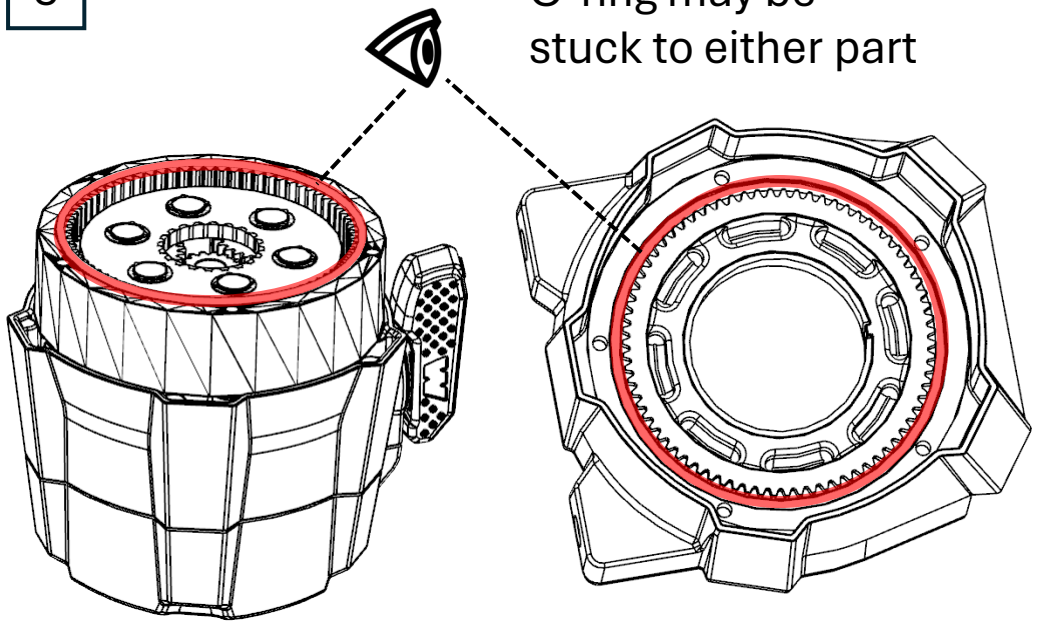


4 Remove geartrain drum support

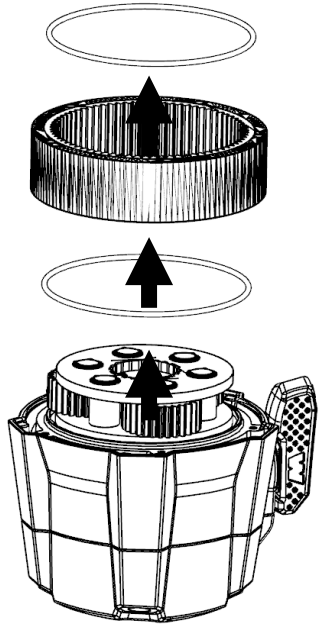


5

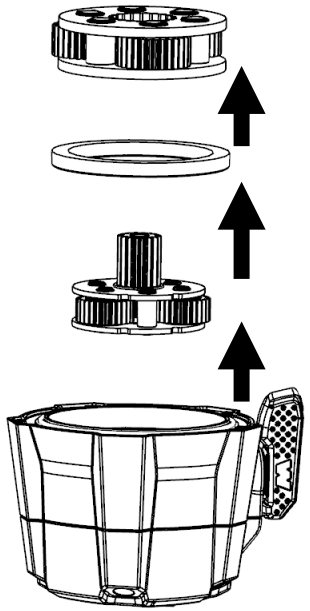
O-ring may be
stuck to either part



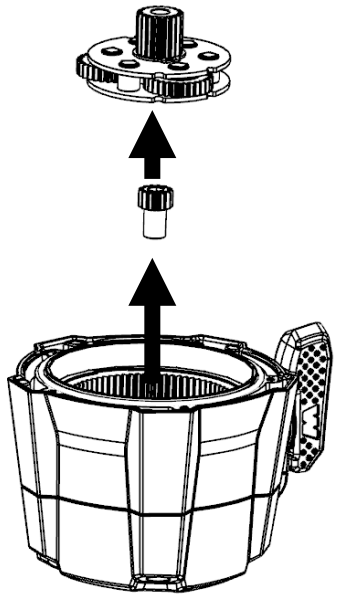
6 Remove 3rd stage ring gear and o-rings



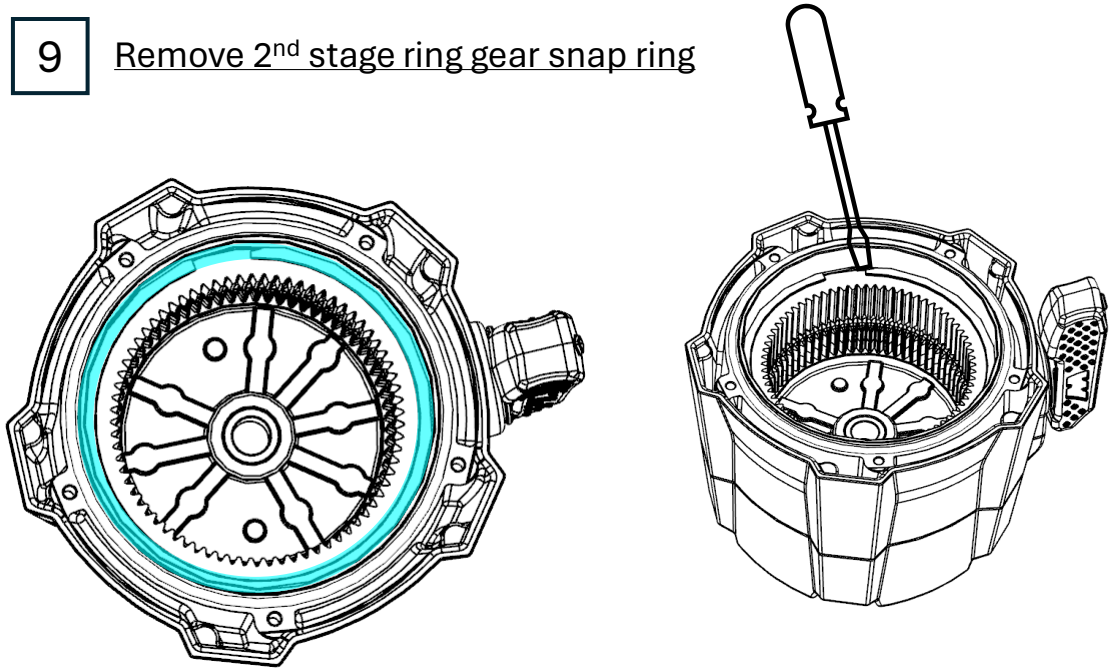
7 Remove 3rd stage carrier, thrust washer, and 2nd stage carrier assemblies



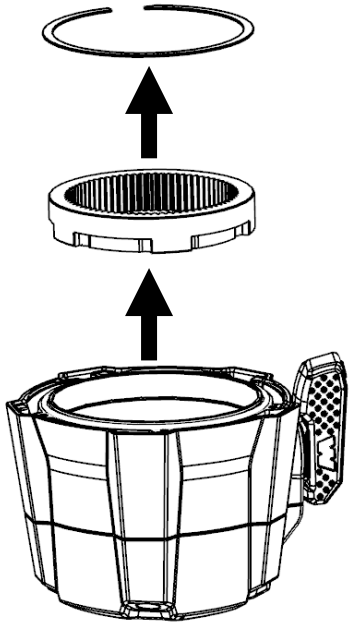
8 Remove 1st stage carrier and input gear



9 Remove 2nd stage ring gear snap ring

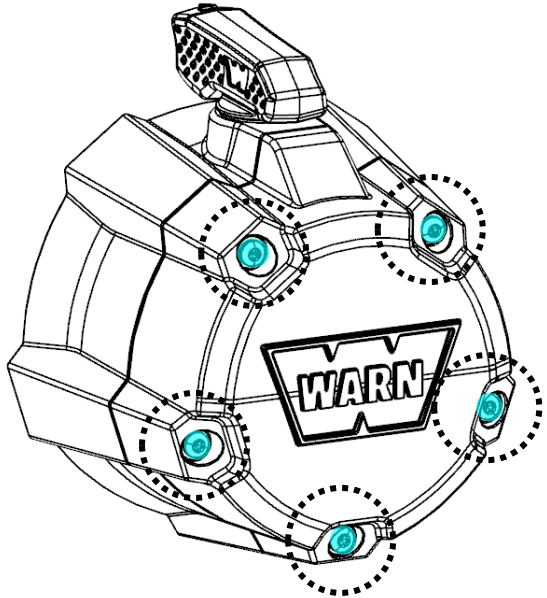


10 Remove 2nd stage ring gear

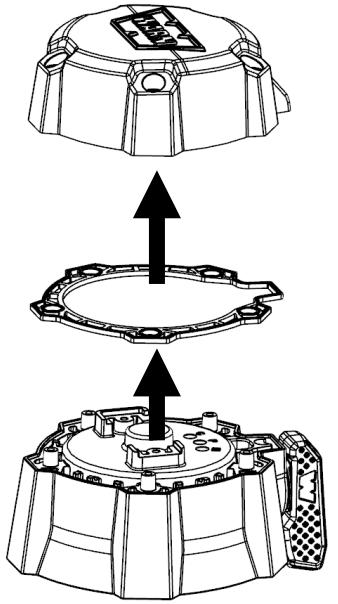


11 Remove end cap bolts

Head: T25 Torx
M5x0.8x35mm
Torque: 5-7Nm
(44-62inlb)

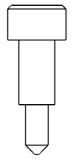


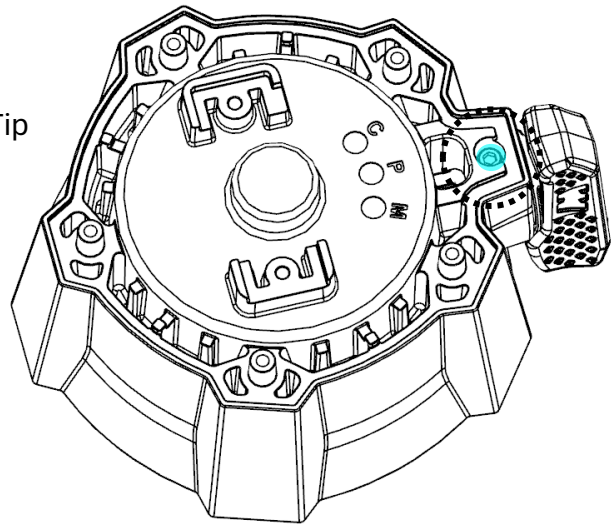
12 Remove end cap and end cap gasket



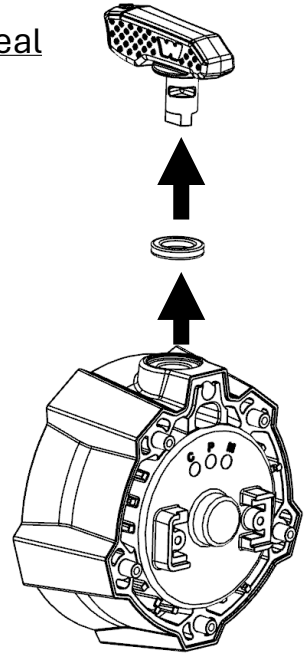
13 Remove clutch lever bolt

Head: 4mm Hex
10-24, Custom Tip
Torque: 3-5Nm
(27-44inlb)

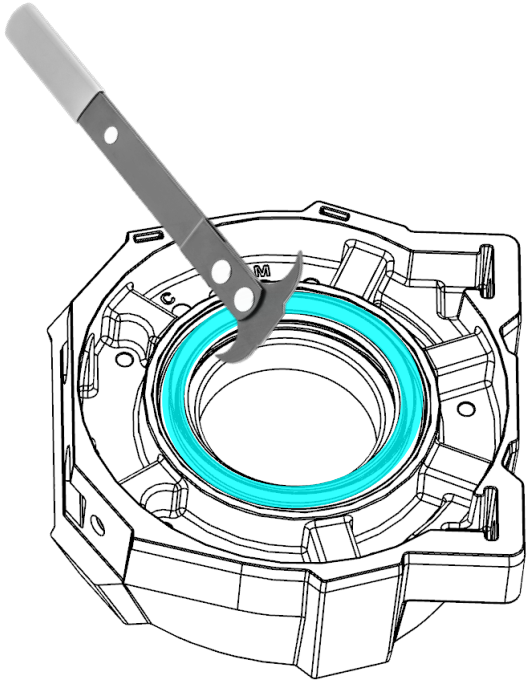




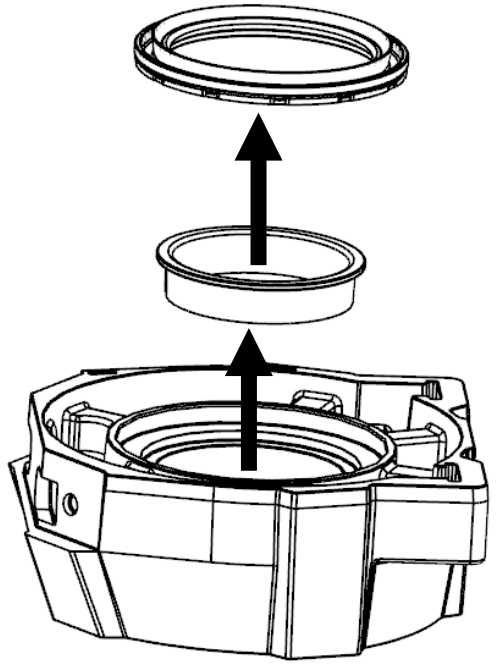
14 Remove clutch lever and X-ring seal



15 Remove geartrain drum seal



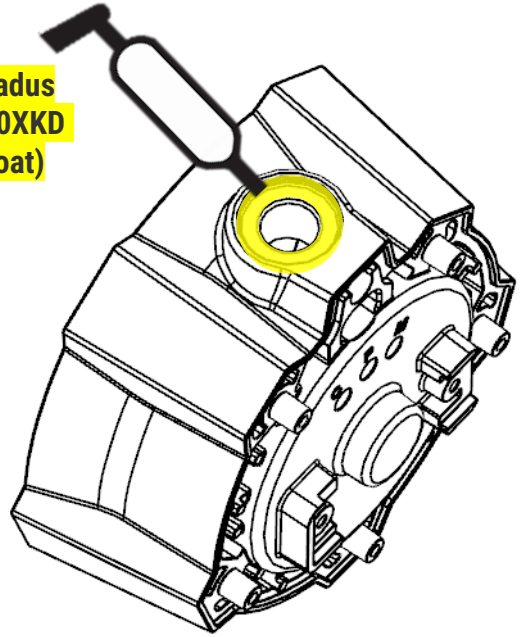
16 Remove geartrain drum bushing



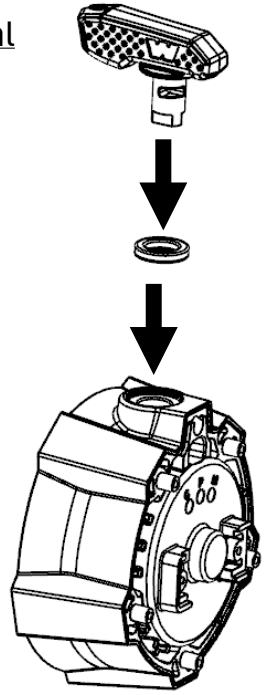
2.7 Geartrain Reassembly

1 Grease X-ring seal

Shell Gadus S5 V150XKD (light coat)

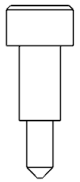


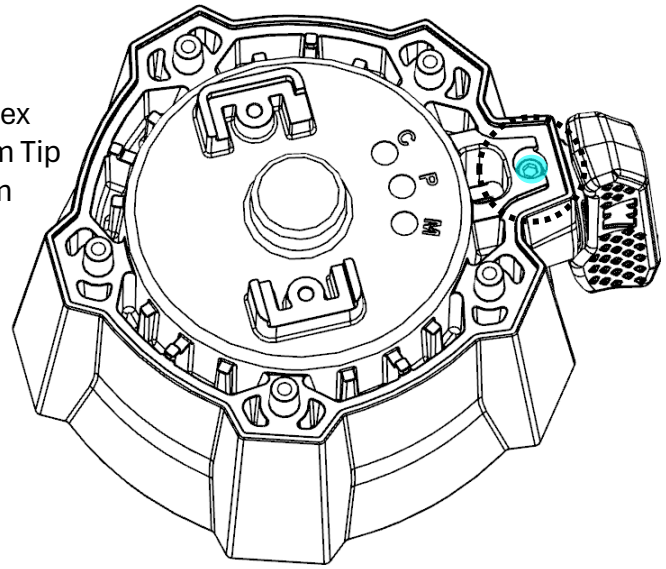
2 Install clutch lever and X-ring seal



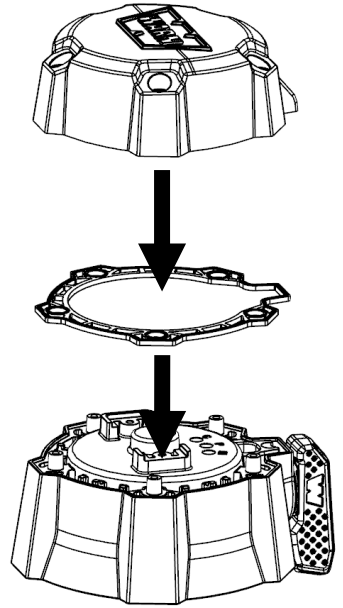
3 Install clutch lever bolt

Head: 4mm Hex
10-24, Custom Tip
Torque: 3-5Nm
(27-44inlb)



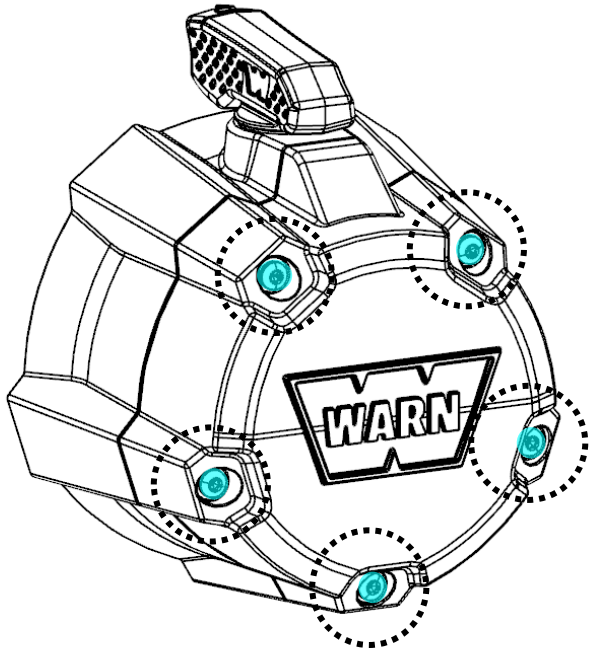


4 Install end cap gasket and end cap

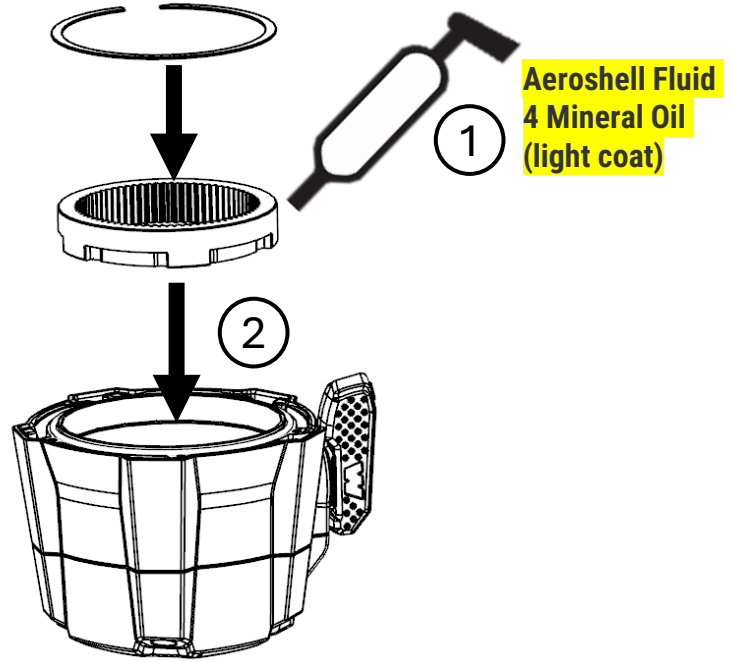


5 Install end cap bolts

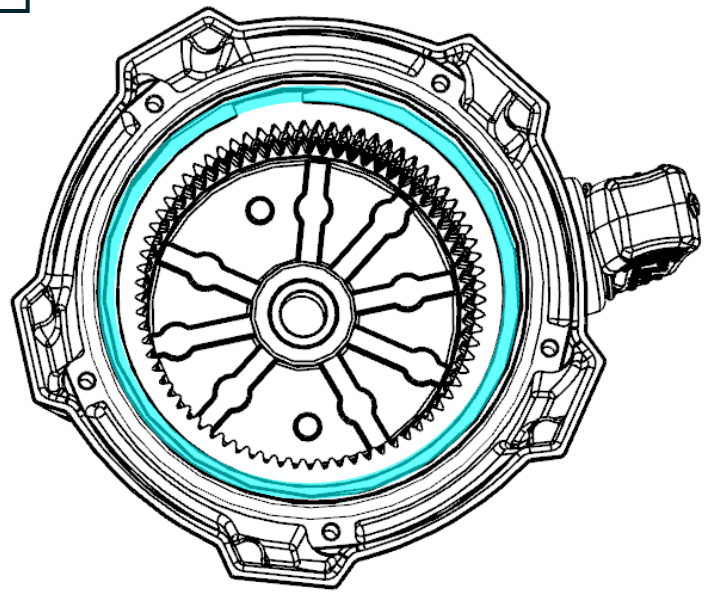
Head: T25 Torx
M5x0.8x35mm
Torque: 5-7Nm
(44-62inlb)



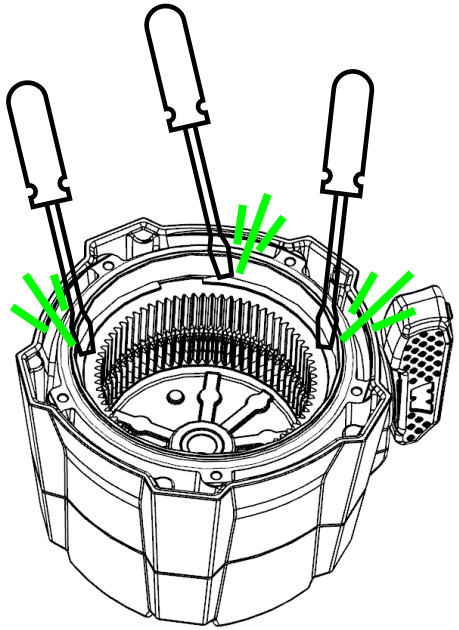
6 Grease and install 2nd stage ring gear and snap ring



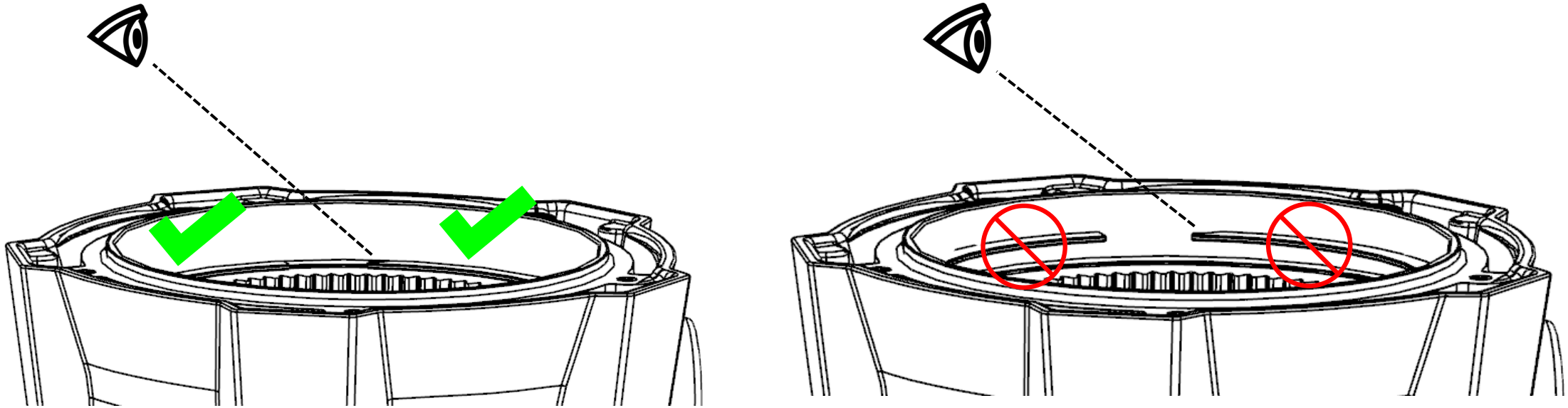
7 Seat 2nd stage ring gear snap ring



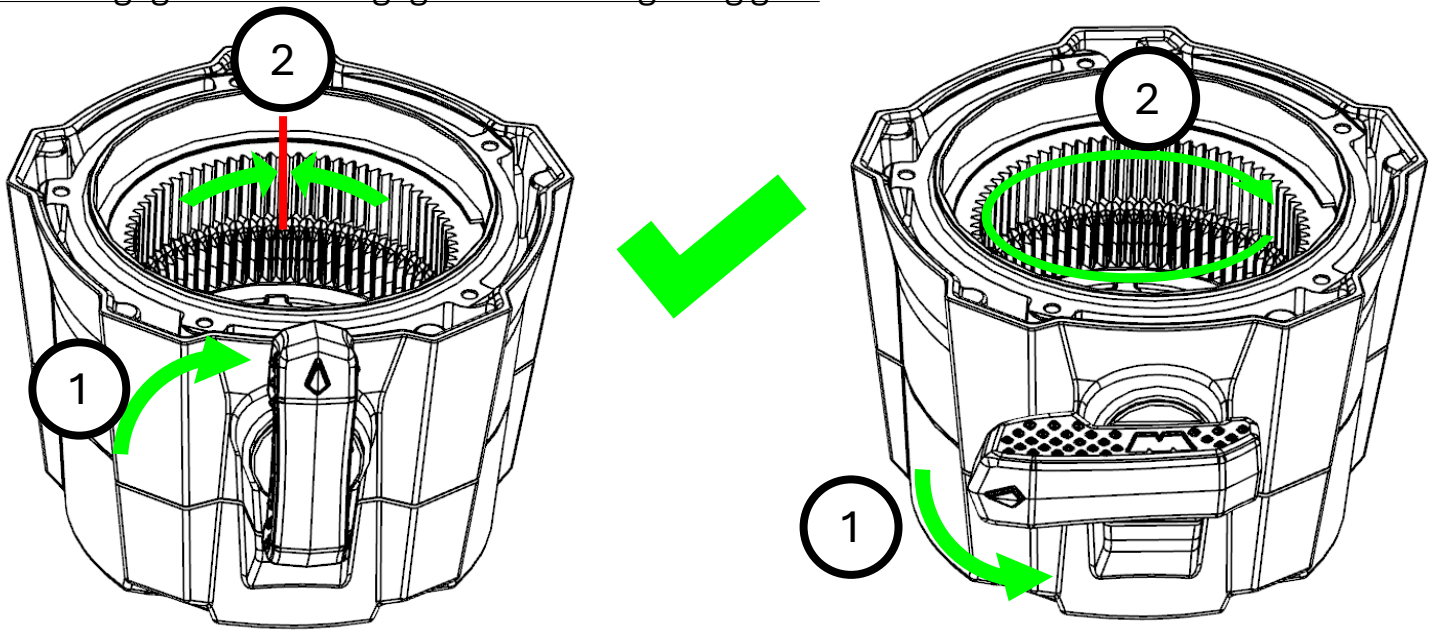
8 Verify snap ring is seated and pushed into snap ring groove



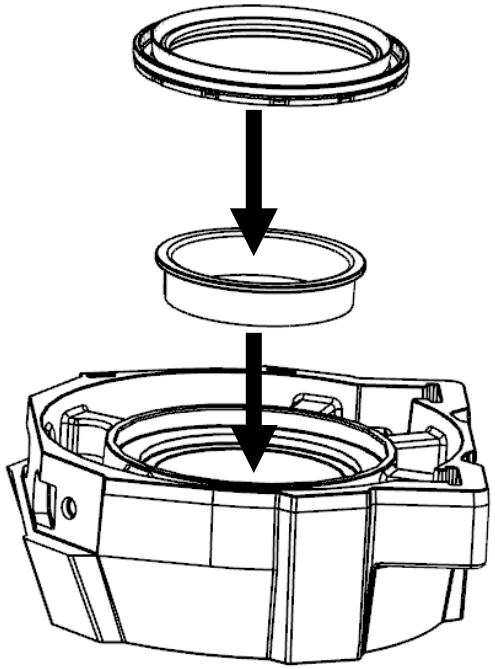
9 Inspect 2nd stage snap ring



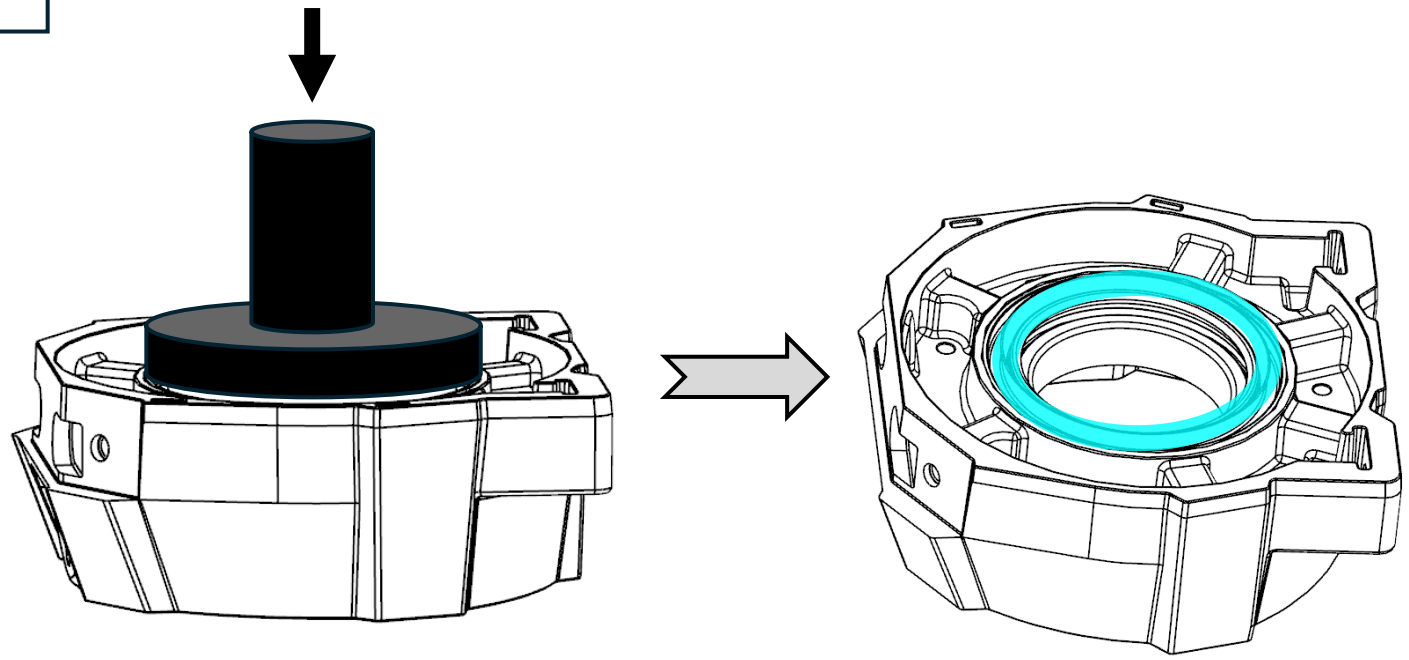
10 Verify turning the clutch handle engages and disengages the 2nd stage ring gear



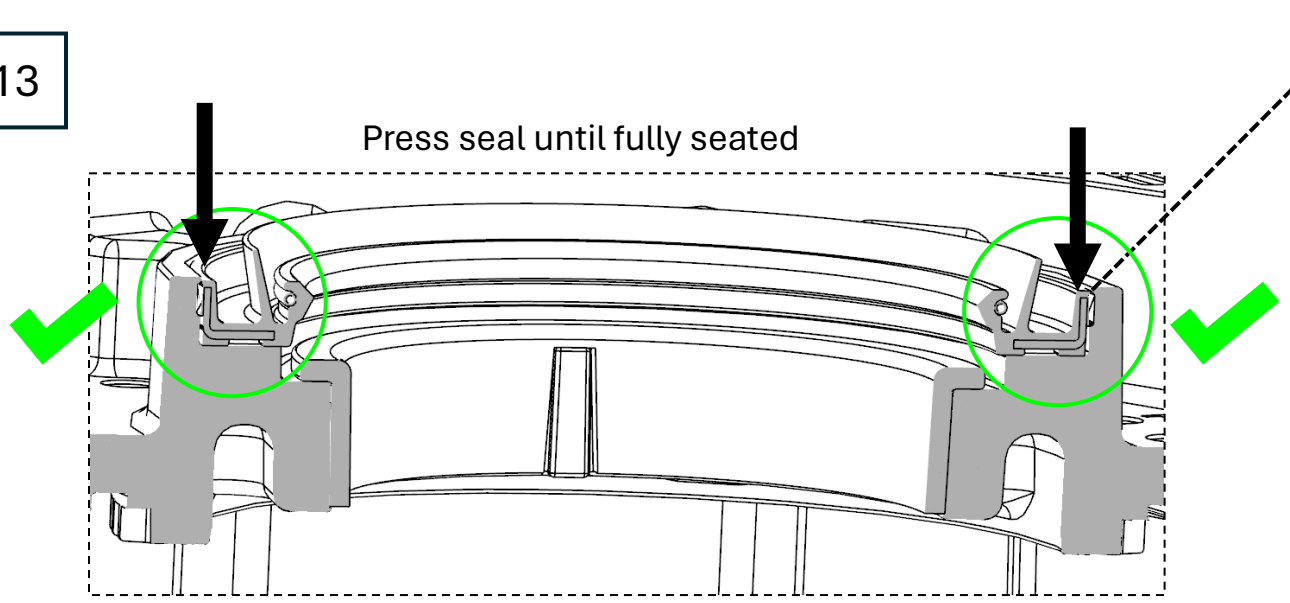
11 Install geartrain drum bushing and seal

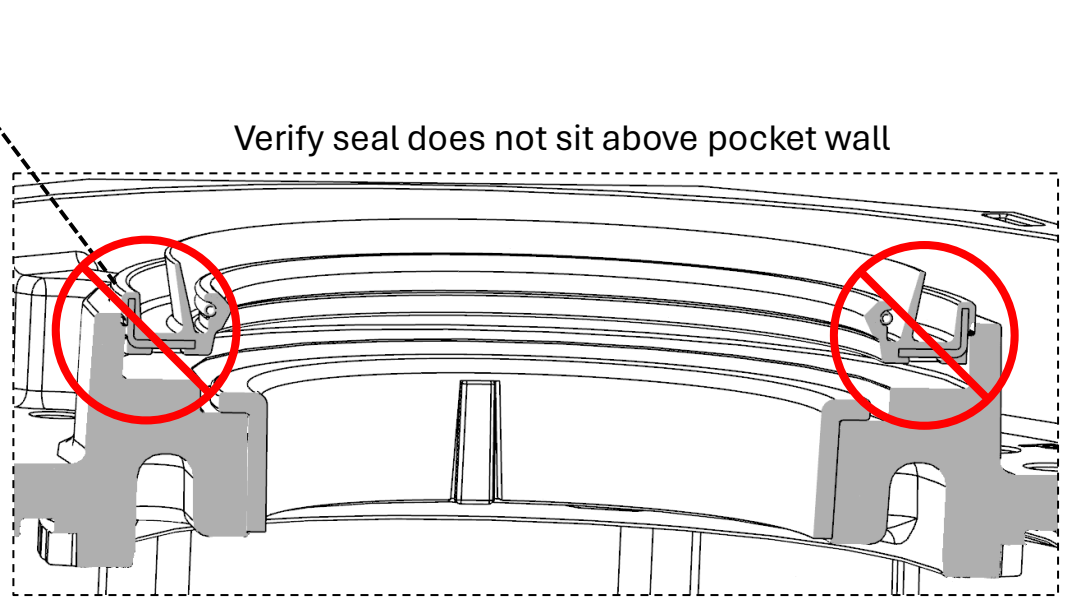


12 Press in geartrain drum seal

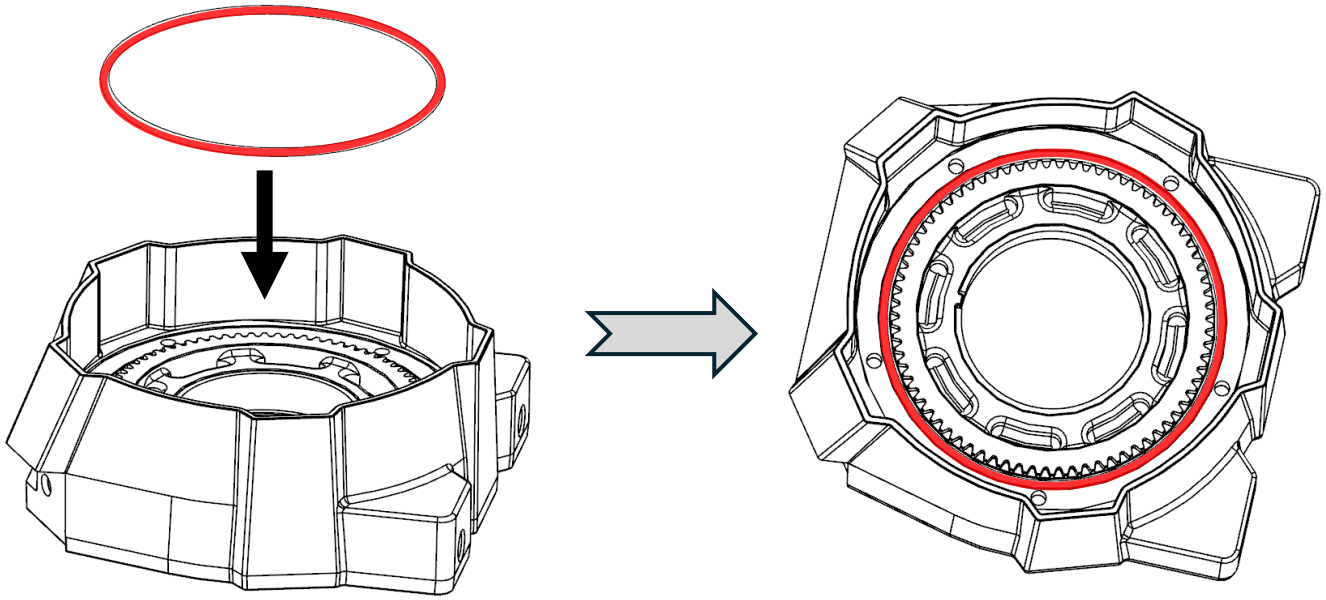


13

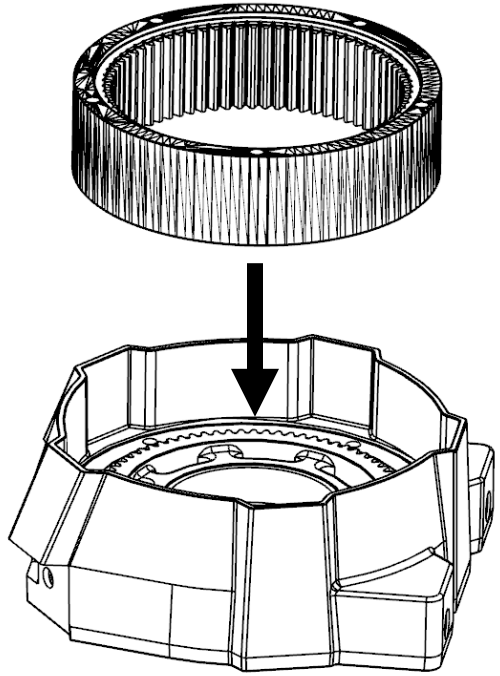




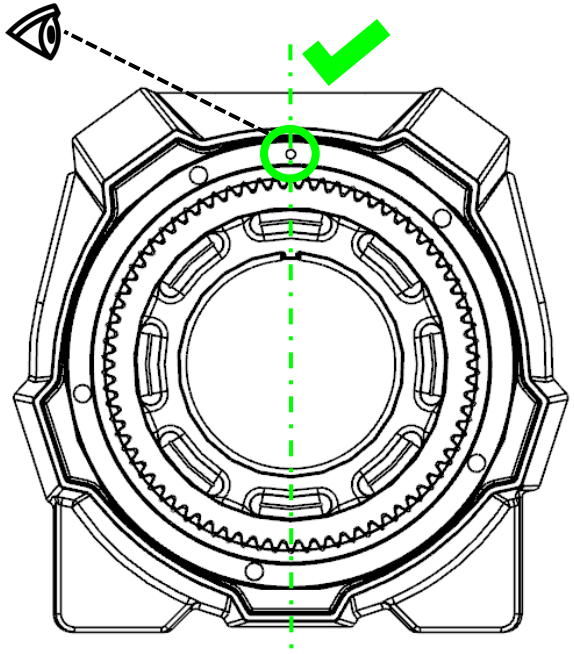
14 Install lower 3rd stage ring gear O-ring



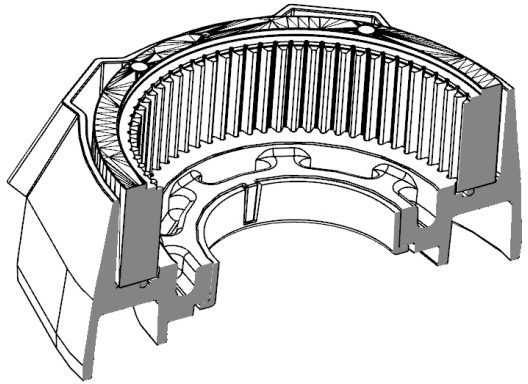
15 Install 3rd stage ring gear

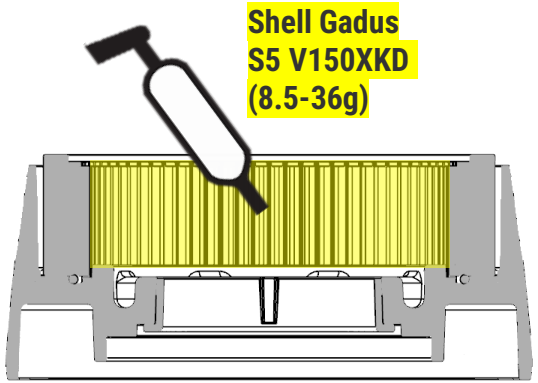


16 Verify the dimple on the 3rd stage ring gear is visible and in the 12’o-clock position

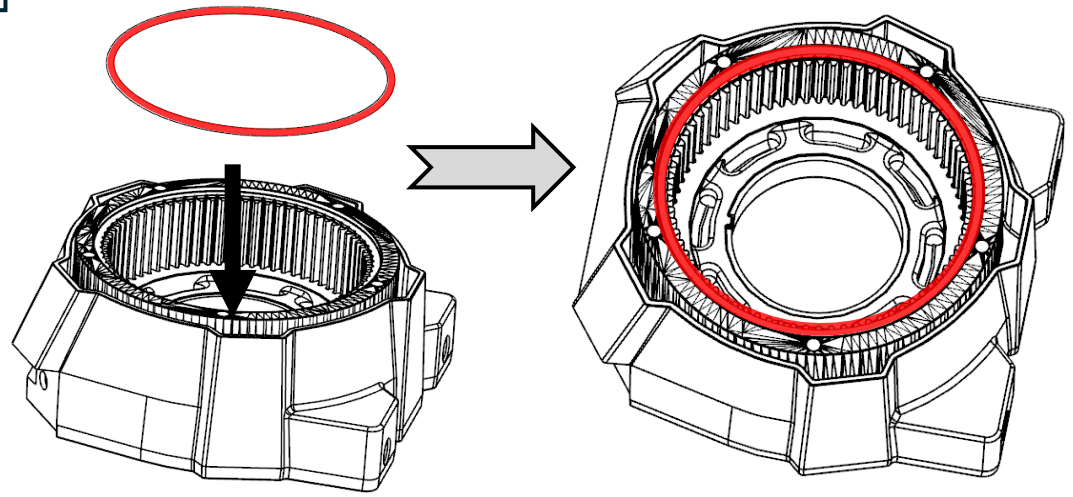


17 Grease the 3rd stage ring gear, filling each tooth completely

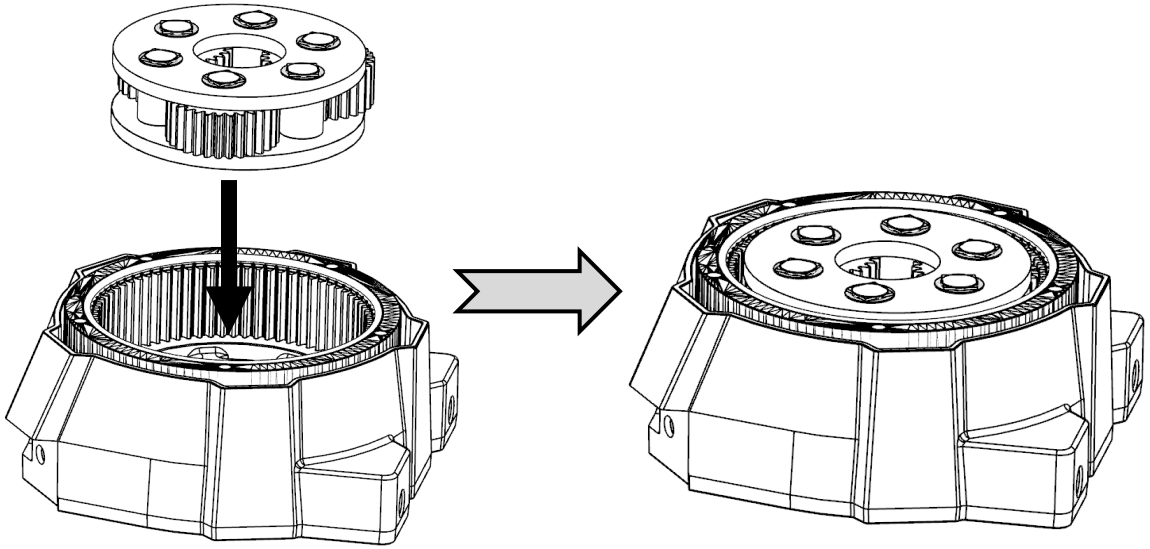




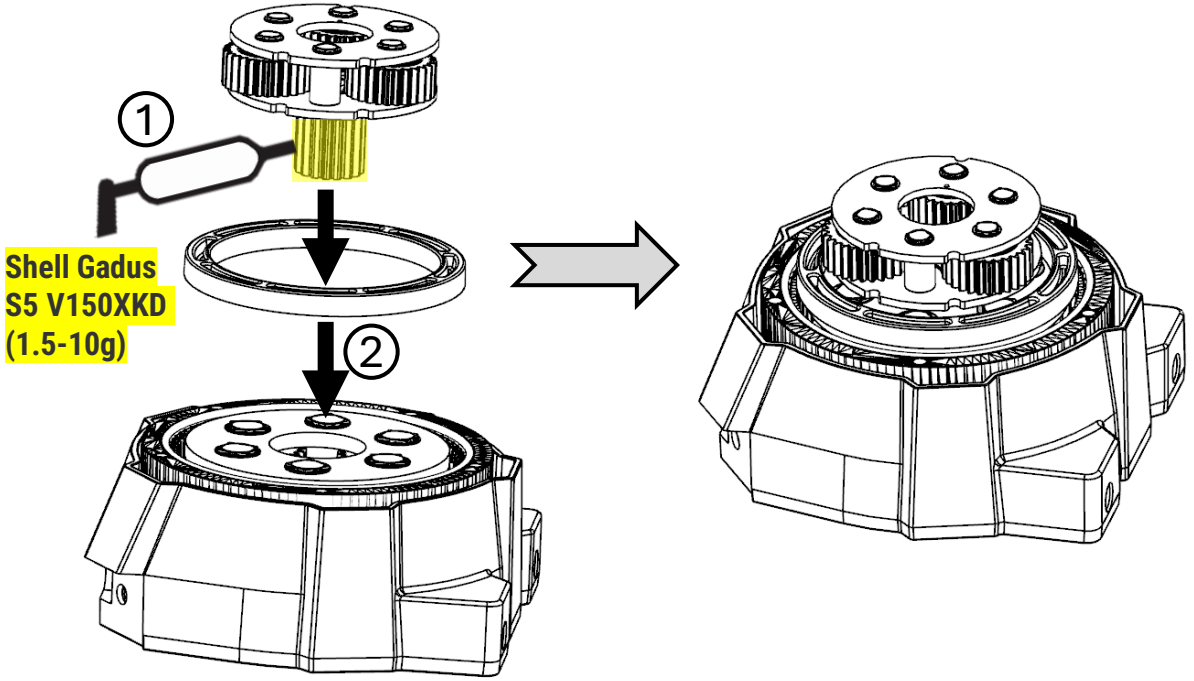
18 Install the upper 3rd stage ring gear o-ring



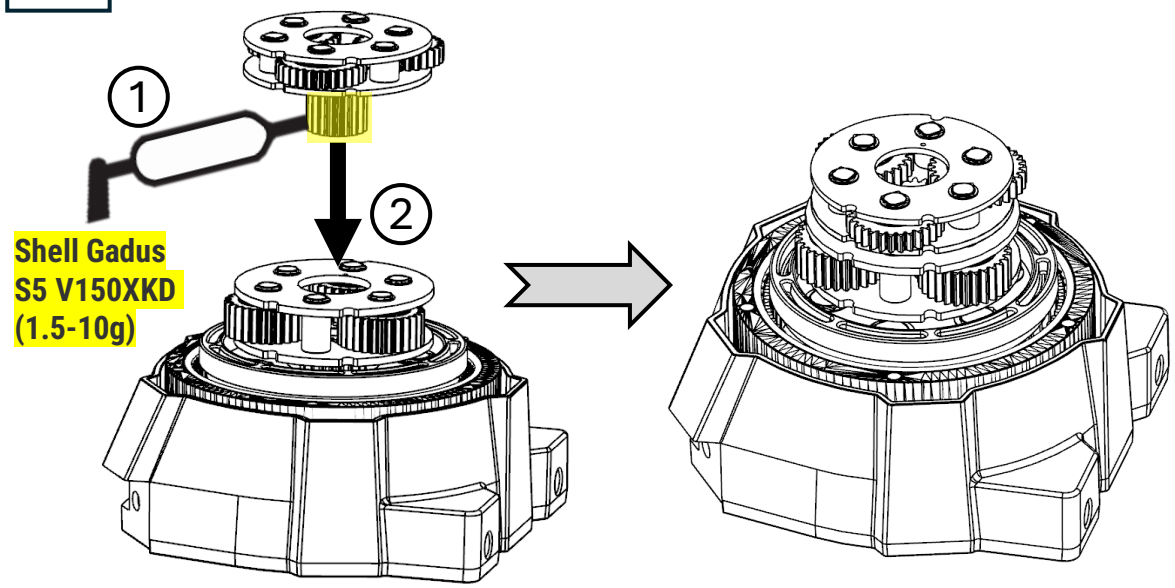
19 Install the 3rd stage carrier



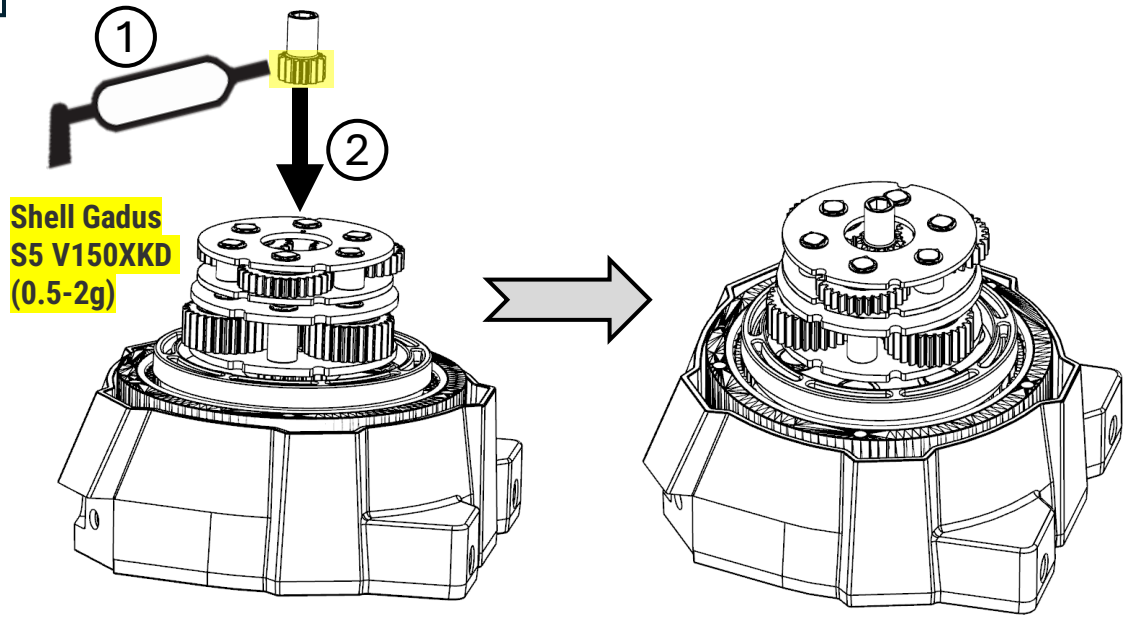
20 Grease 2nd stage sun gear, filling each tooth completely. Install the thrust washer and 2nd stage carrier.



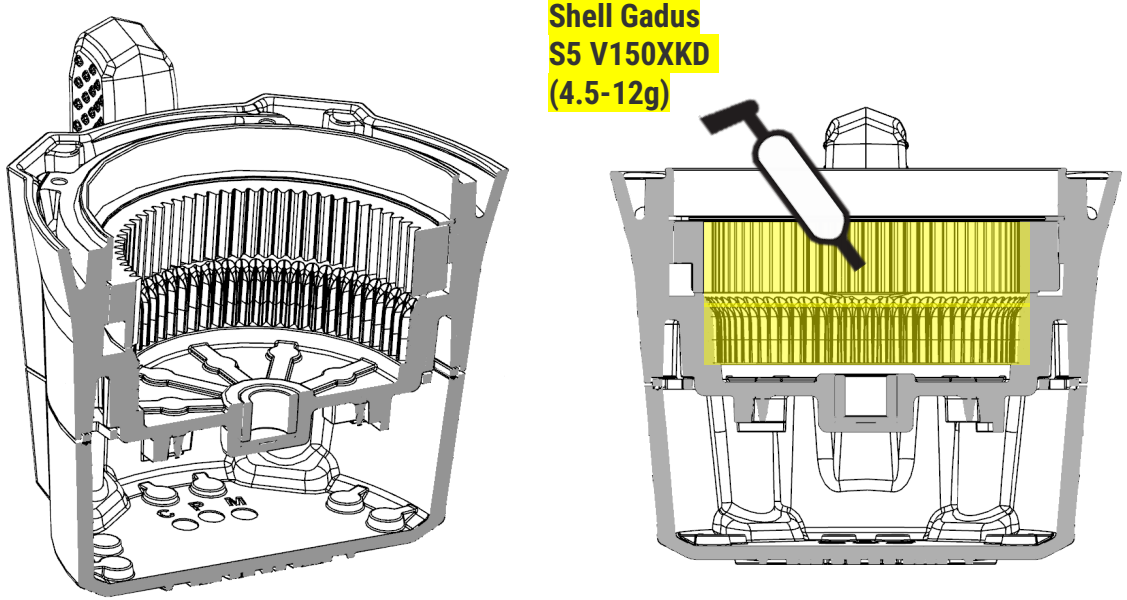
21 Grease and install the 1st stage sun gear, filling each tooth completely.



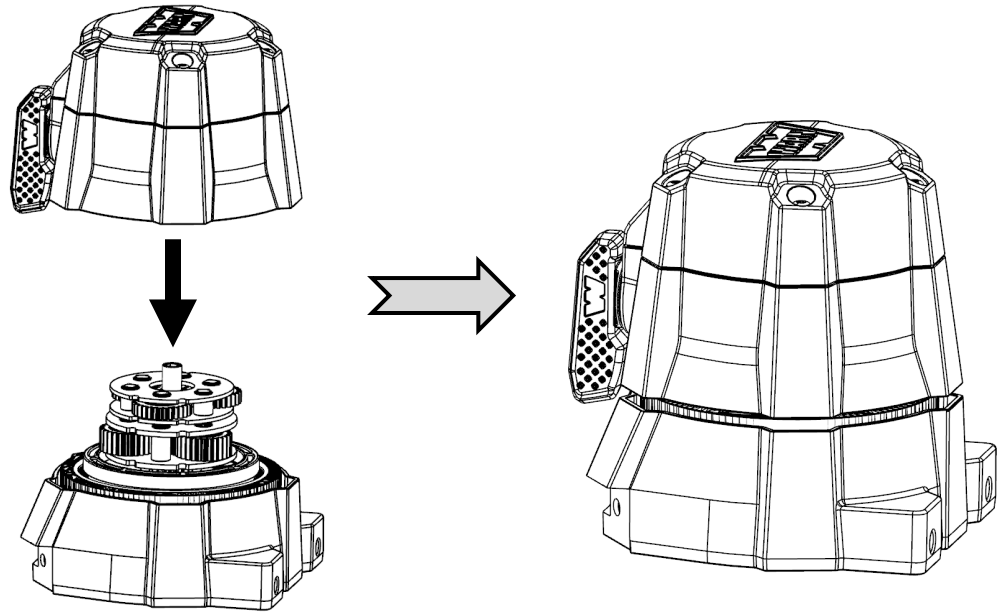
22 Grease and install the input sun gear, filling each tooth completely.



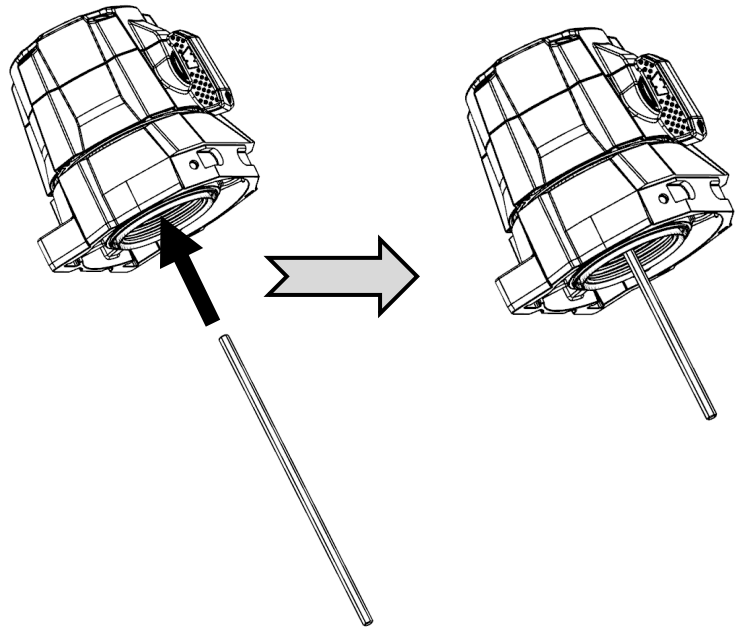
23 Grease the 1st and 2nd stage ring gears inside of the end housing, filling each tooth completely.



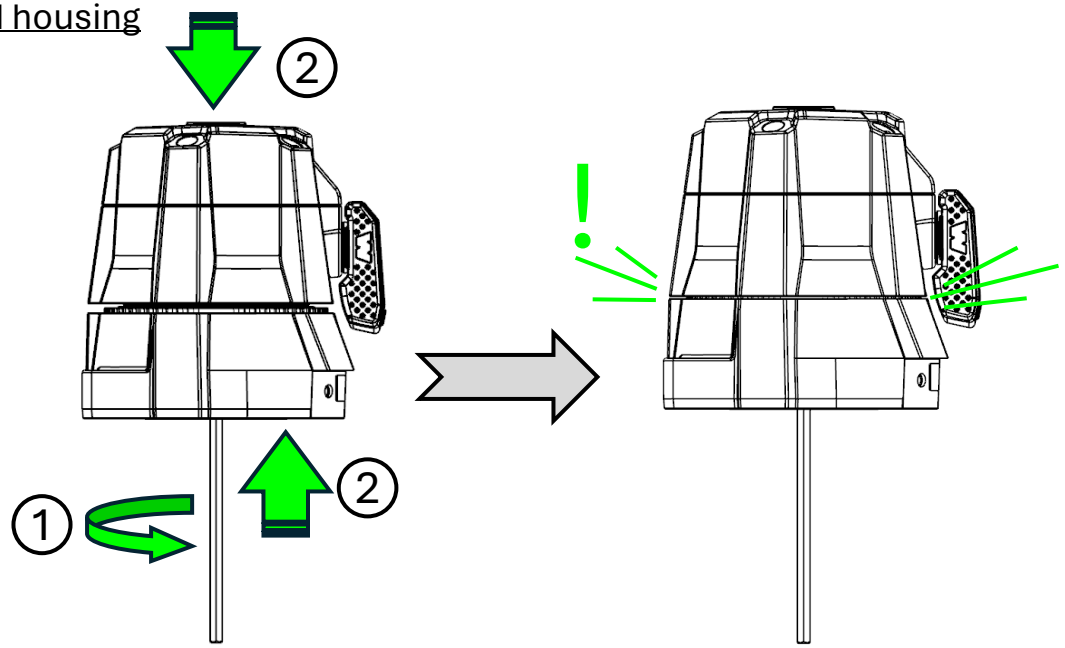
24 Install the end housing



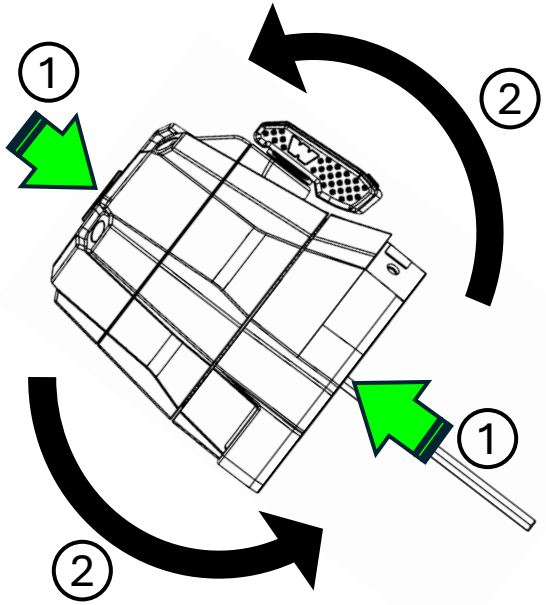
25 Install the driveshaft



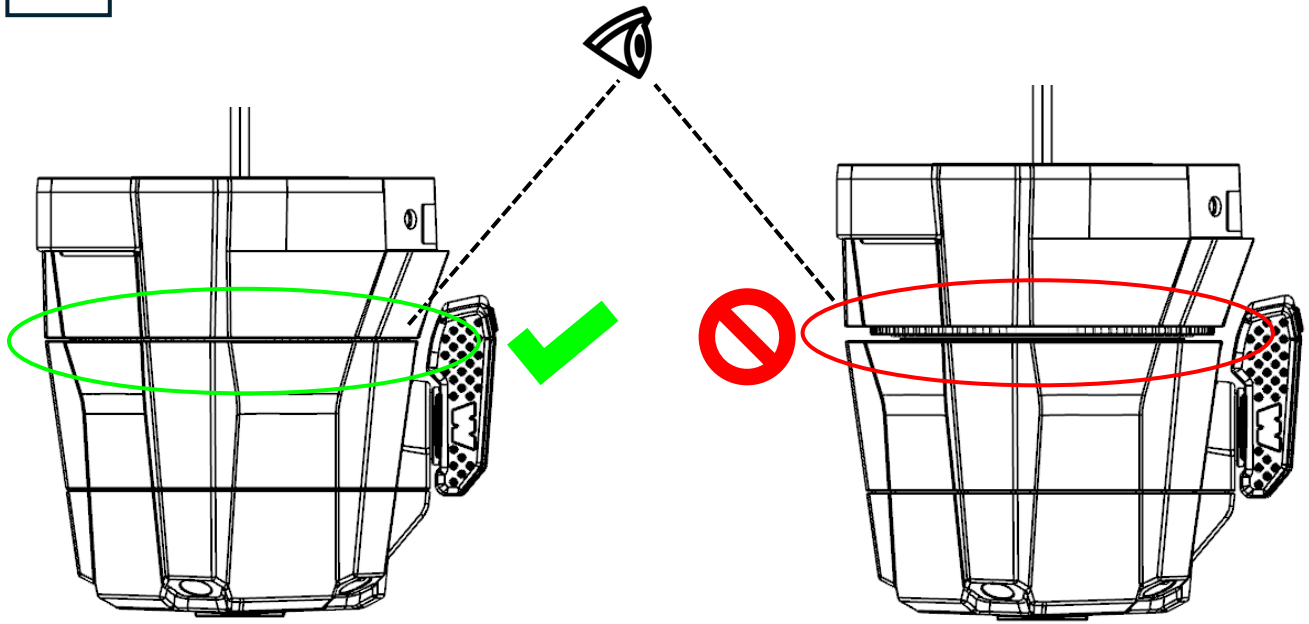
26 Apply light pressure to the end cap while spinning the driveshaft to seat the end housing



27 Hold end housing and drum support together and flip upside down

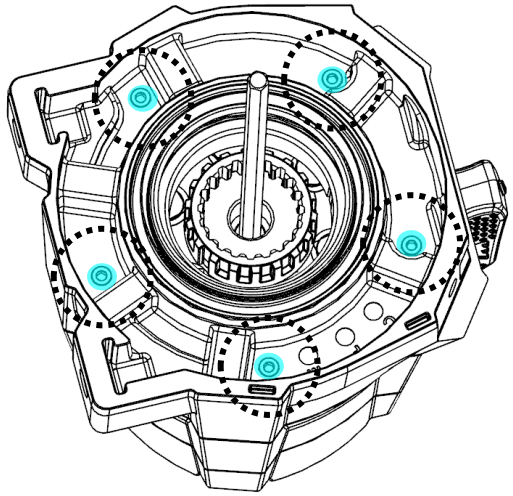


28 Inspect the end housing gap to verify the end housing is seated

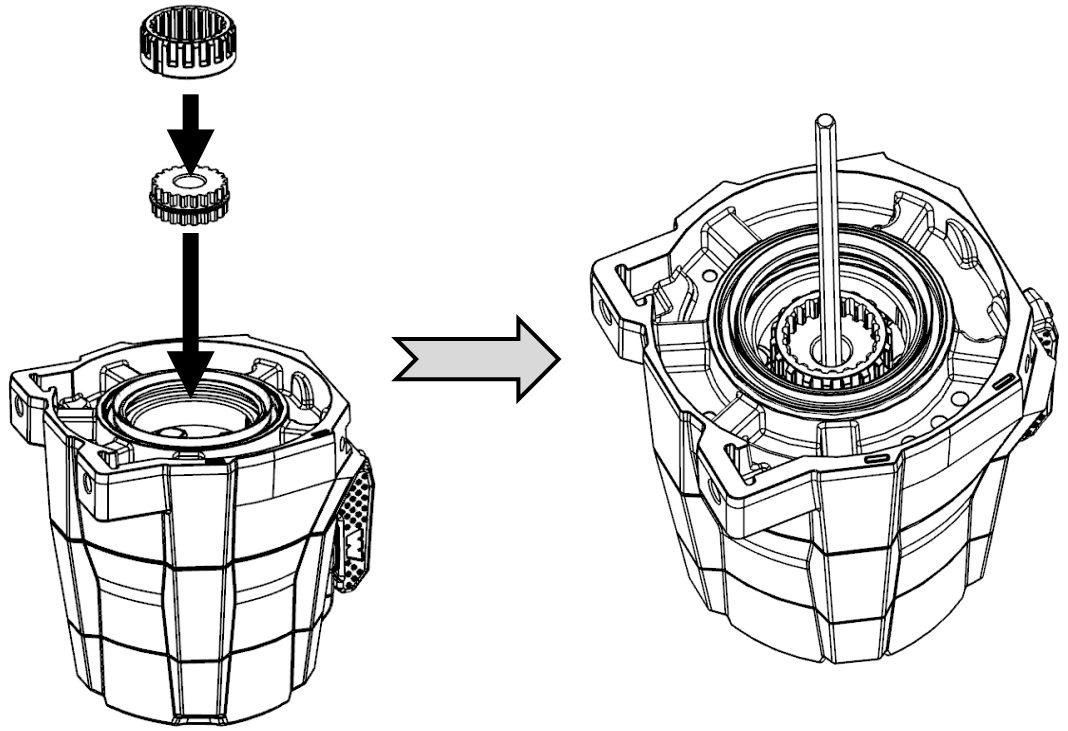


29 Install the geartrain bolts

Head: 4mm Hex
M5x0.8x60mm
Torque: 10.6-13Nm
(94-115inlb)

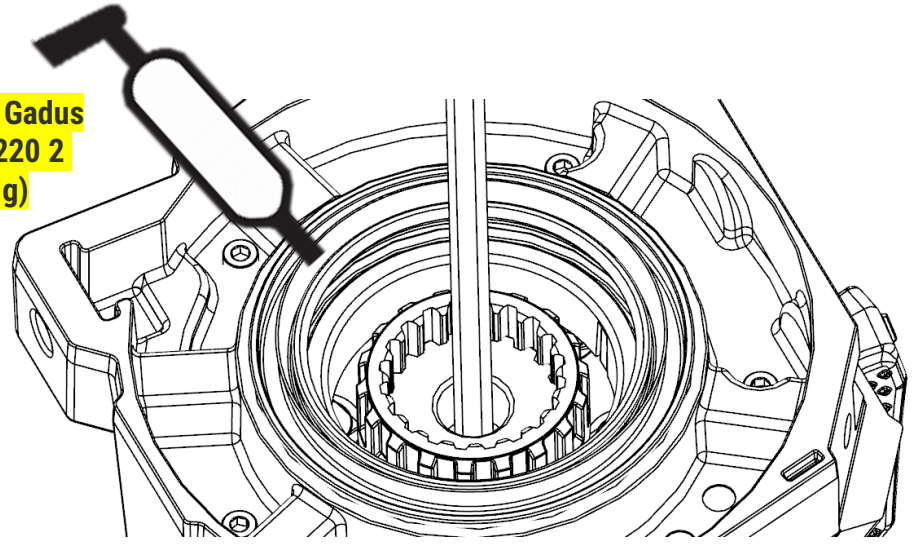


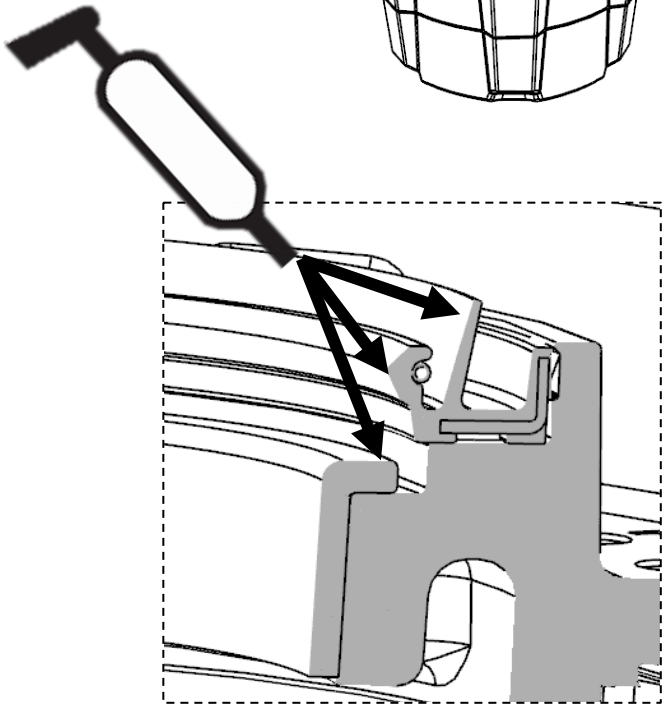
30 Install the drum driver assembly



31 Grease the geartrain drum seal

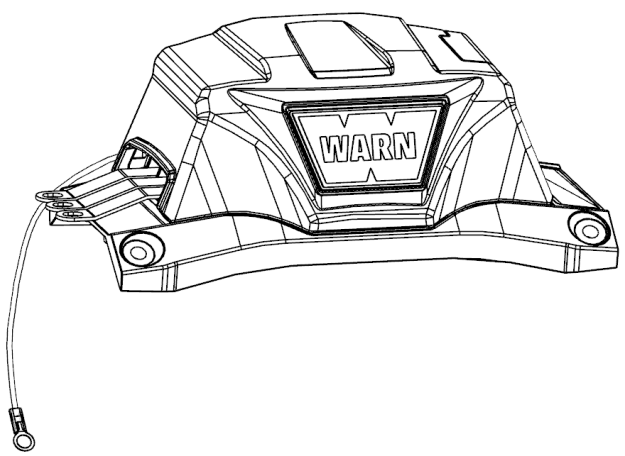
Shell Gadus S5 V220 2 (7-11g)

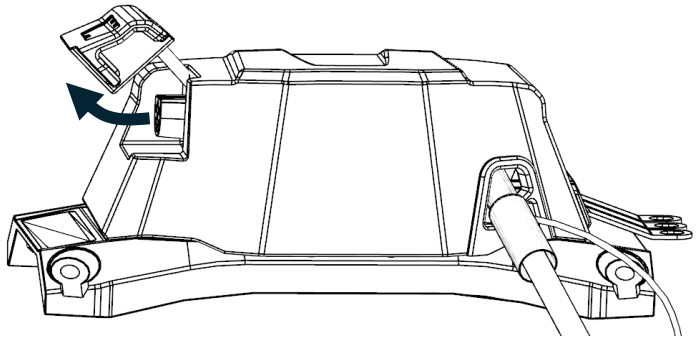




2.8 Control Pack Disassembly

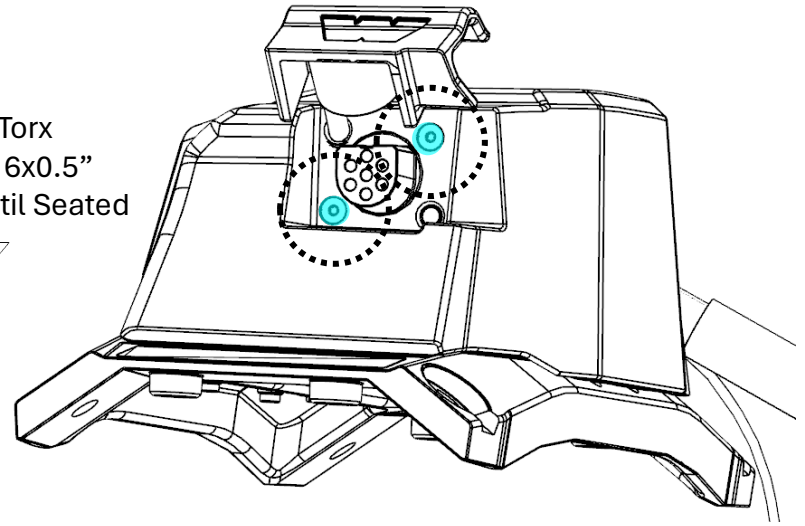
1 Remove Control Pack (Section 2.1, steps 1-5)





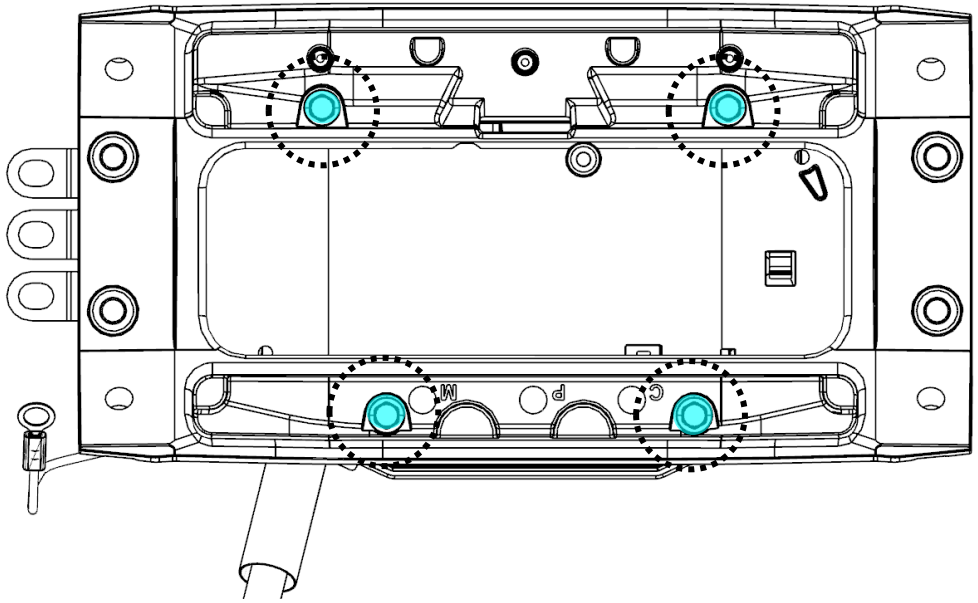
2 Remove D-plug screws (OPTIONAL)

Head: T15 Torx
Plastite 8-16x0.5”
Torque: Until Seated

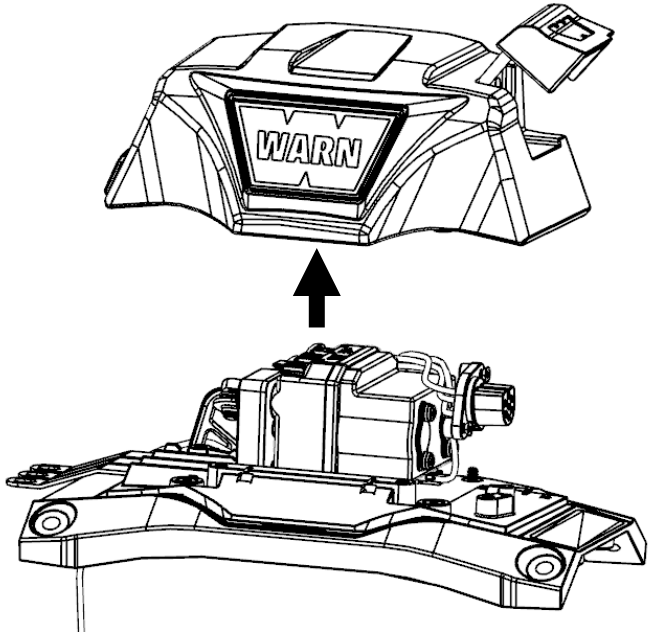


3 Remove control pack cover bolts

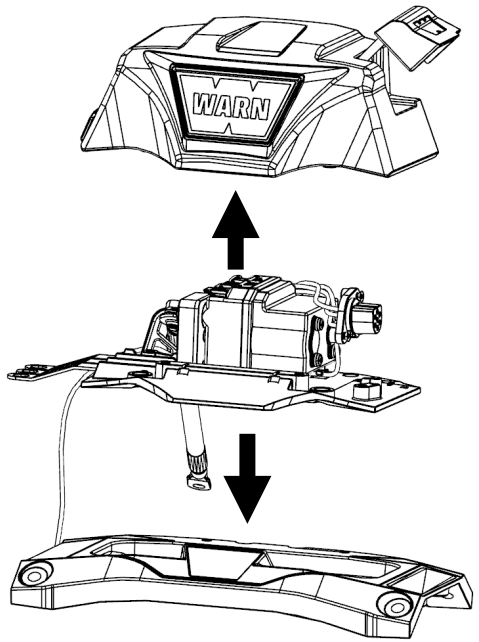
Head: 8mm Hex
M5x0.8x16mm
Torque: 4-5Nm
(35-44inlb)



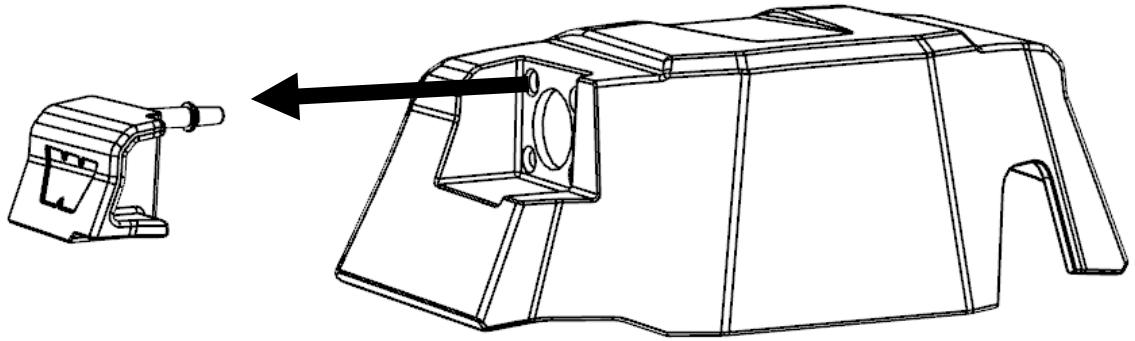
4 Remove control pack cover



5 Separate control pack cover and tie plate from contactor

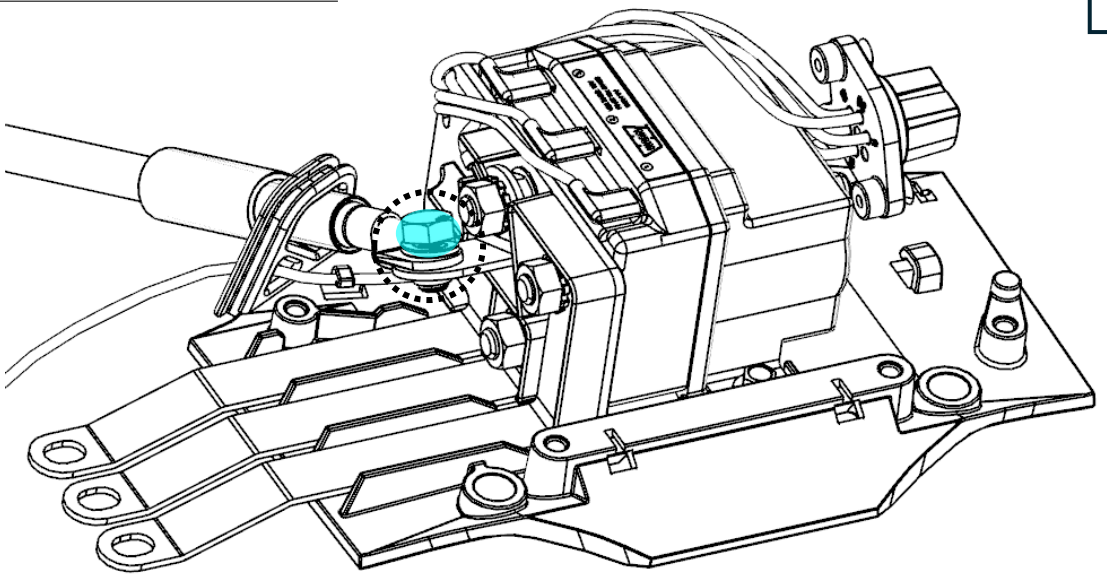


6 Remove dust cover from control pack cover (OPTIONAL)

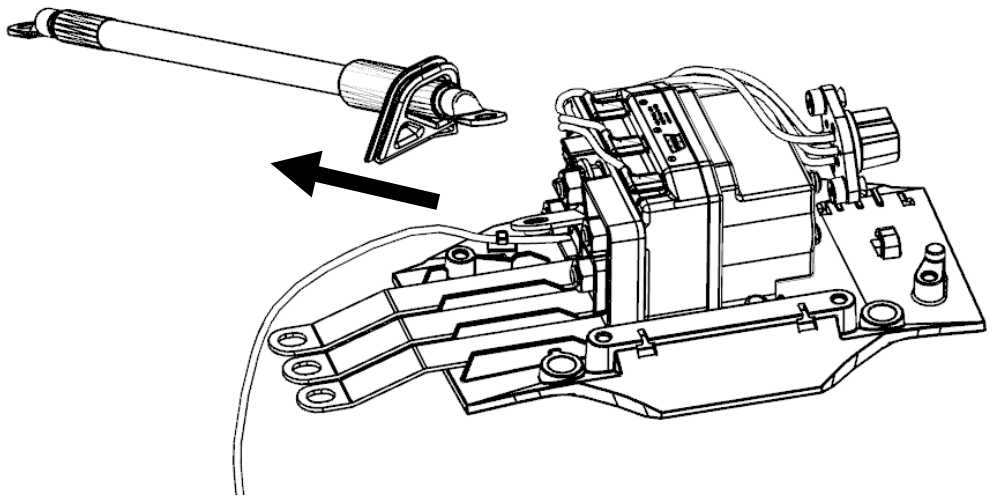


7 Remove Power In bus bar bolt

Head: 13mm Hex
M8x1.25x14mm
Torque: 8-9.5Nm
(71-84inlb)

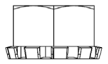


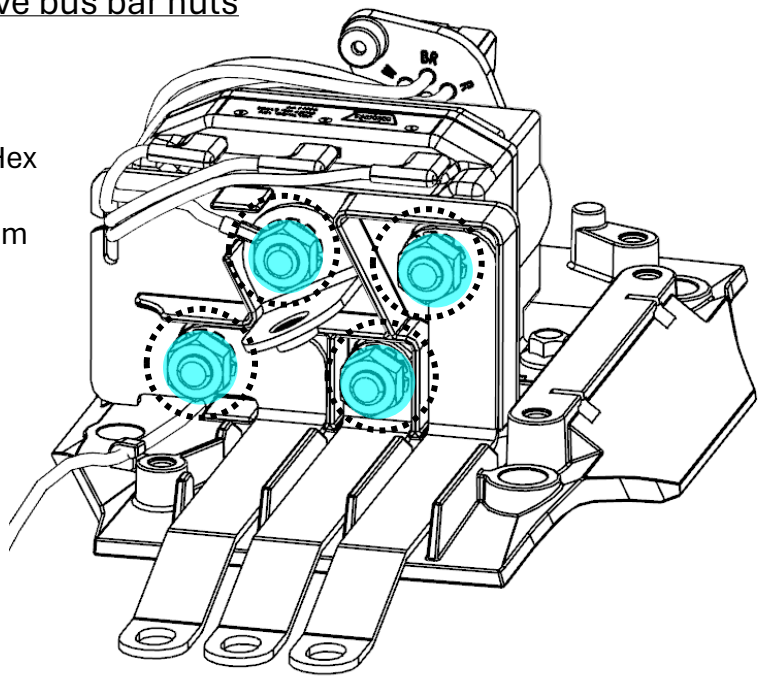
8 Remove Power In cable



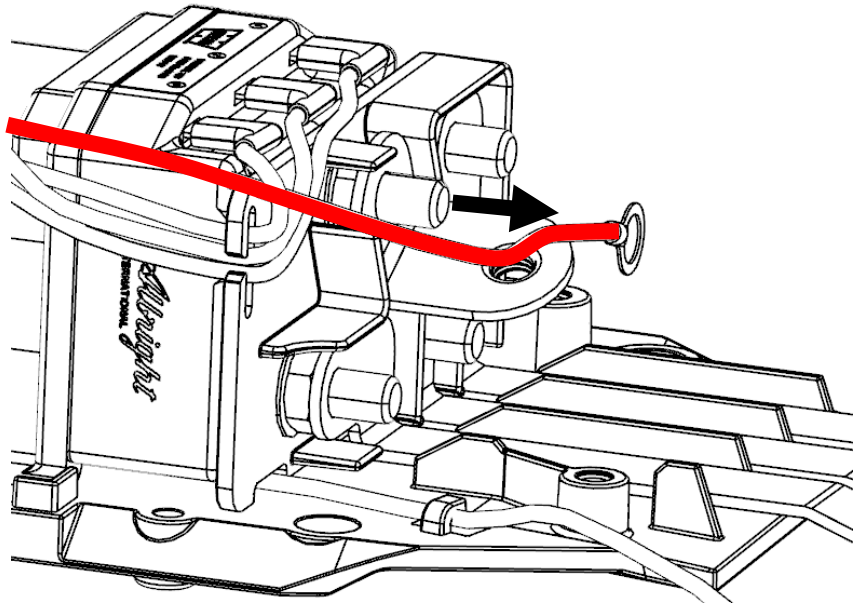
9 Remove bus bar nuts

Head: 13mm Hex
M8x1.25
Torque: 8-9.5Nm
(71-84inlb)

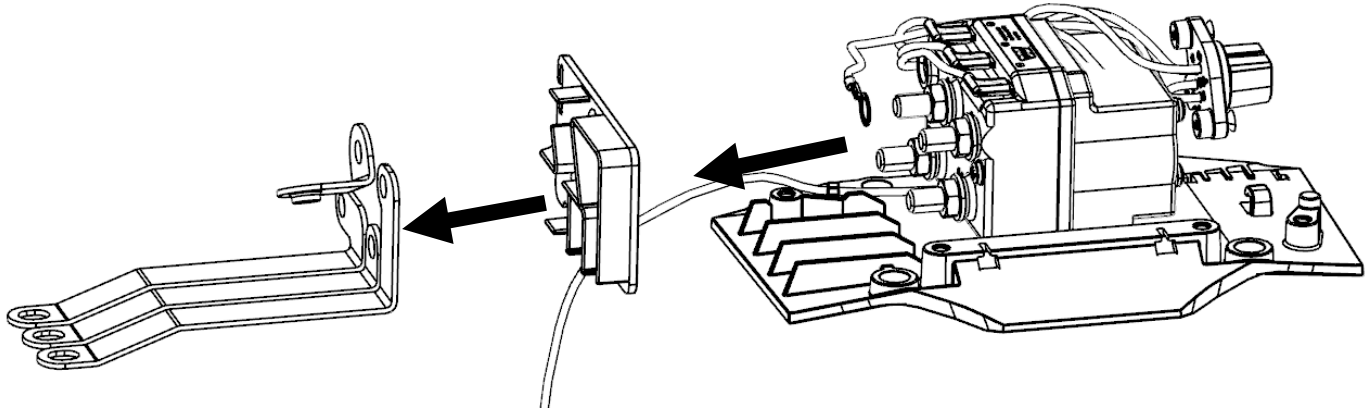




10 Remove red D-plug wire

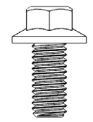


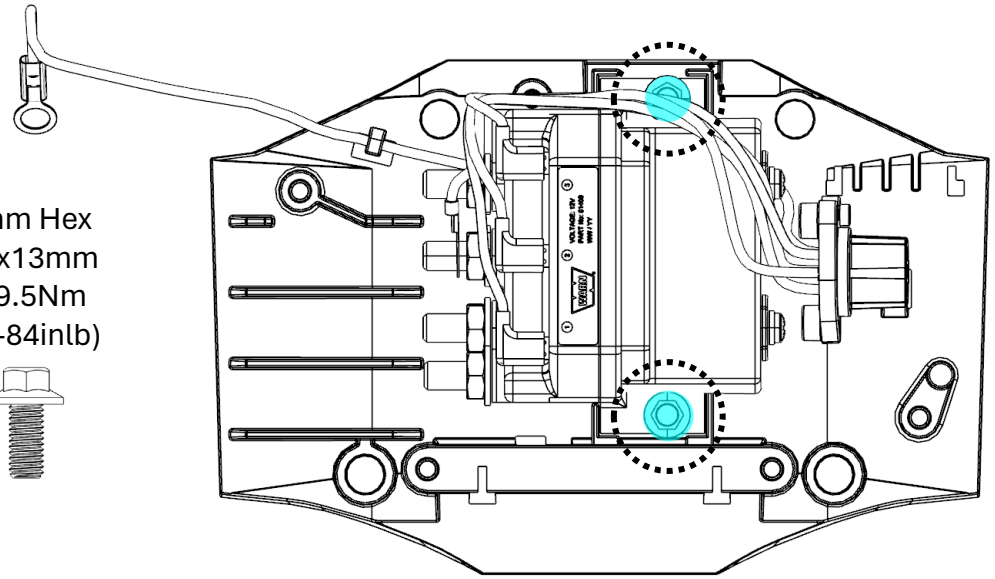
11 Remove bus bars and bus bar separator



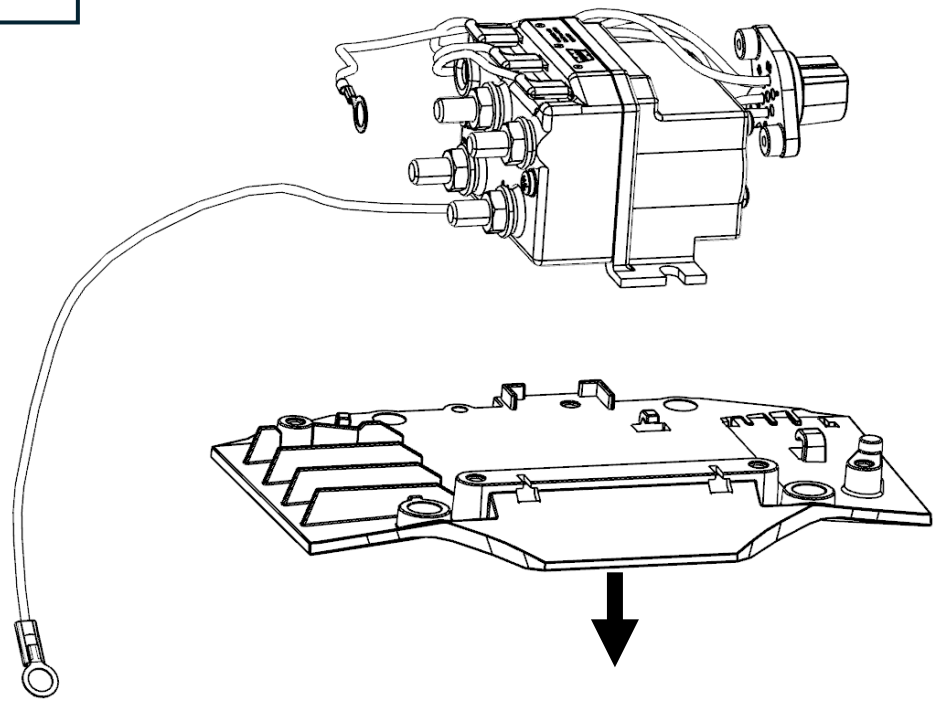
12 Remove contactor screws

8mm Hex
M6x13mm
8-9.5Nm
(71-84inlb)

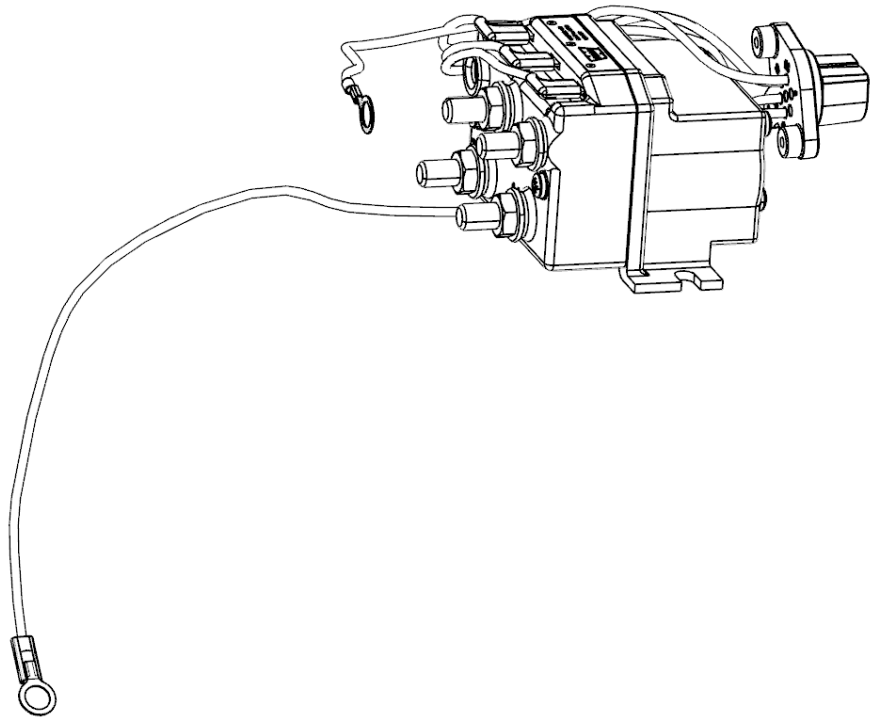




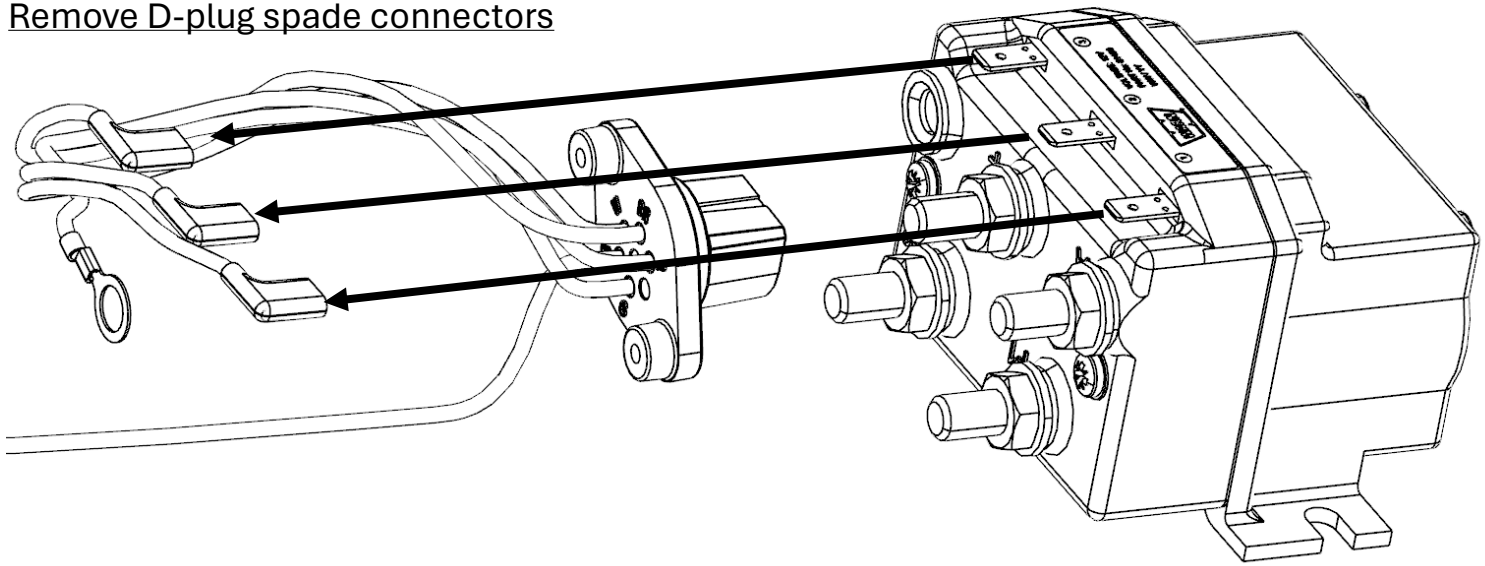
13 Remove baseplate



14

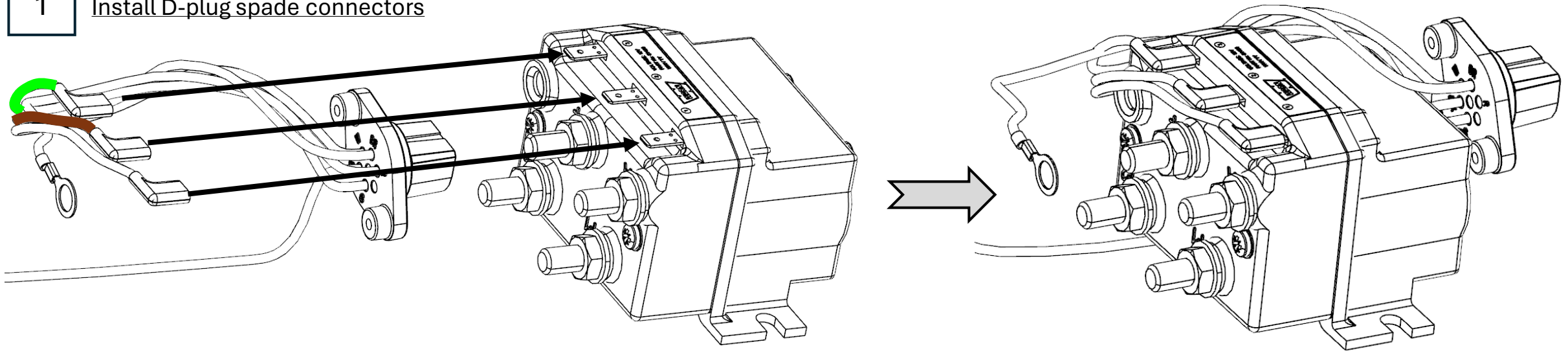


15 Remove D-plug spade connectors

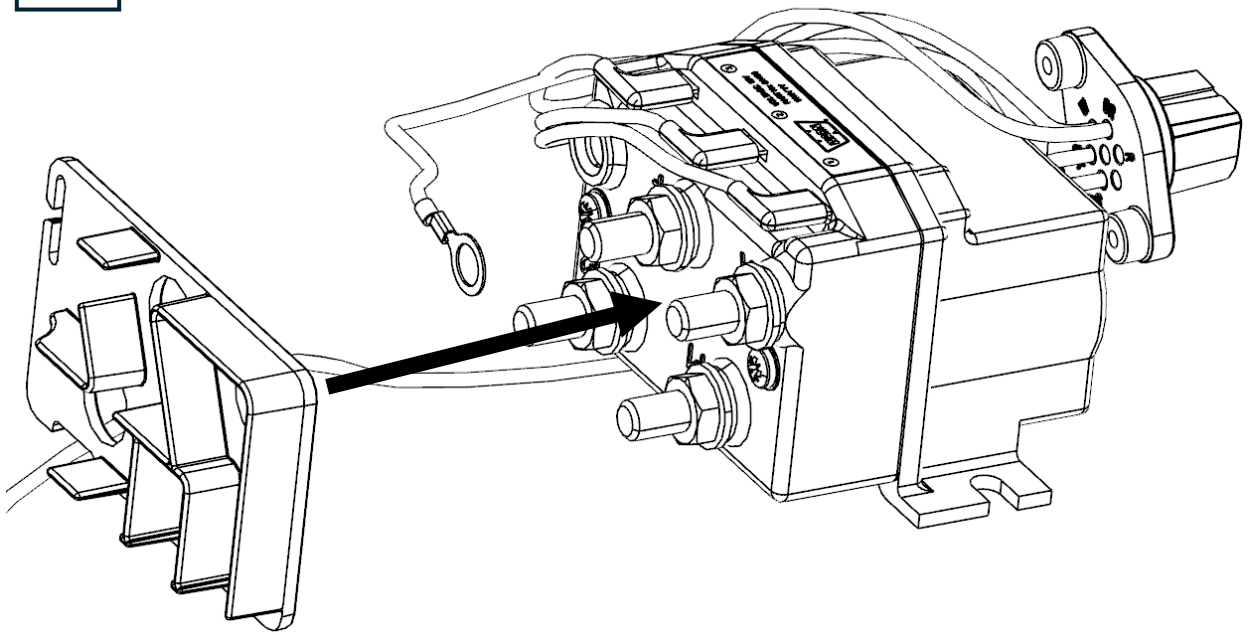


2.9 Control Pack Reassembly

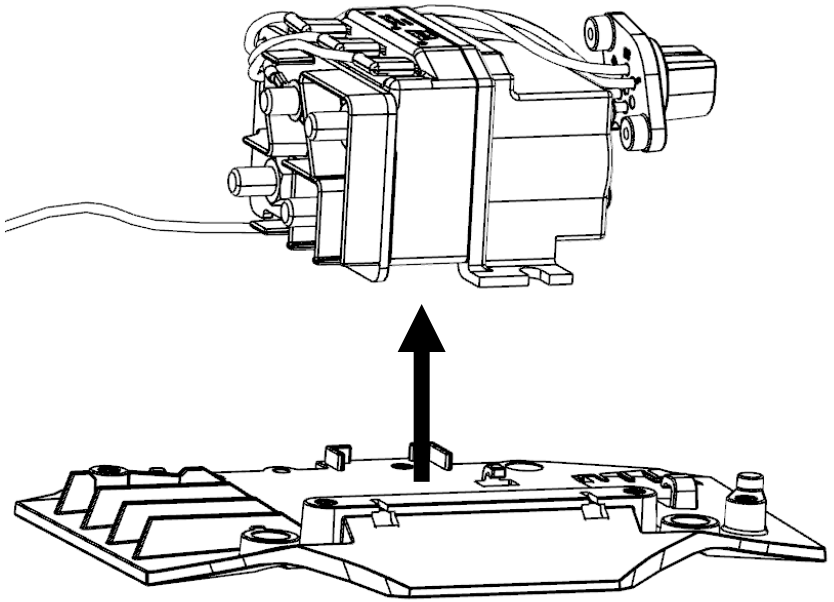
1 Install D-plug spade connectors



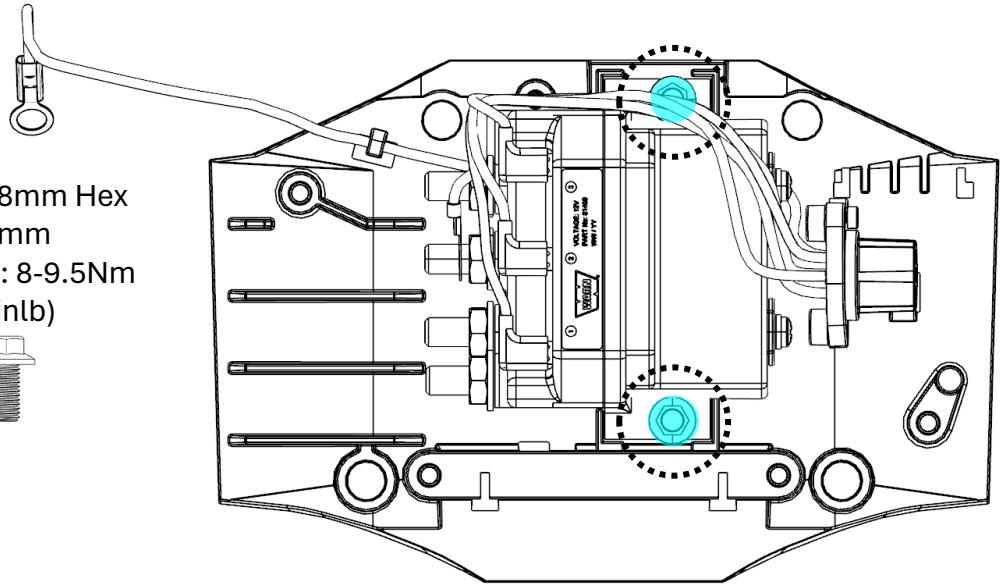
2 Install bus bar separator



3 Install baseplate

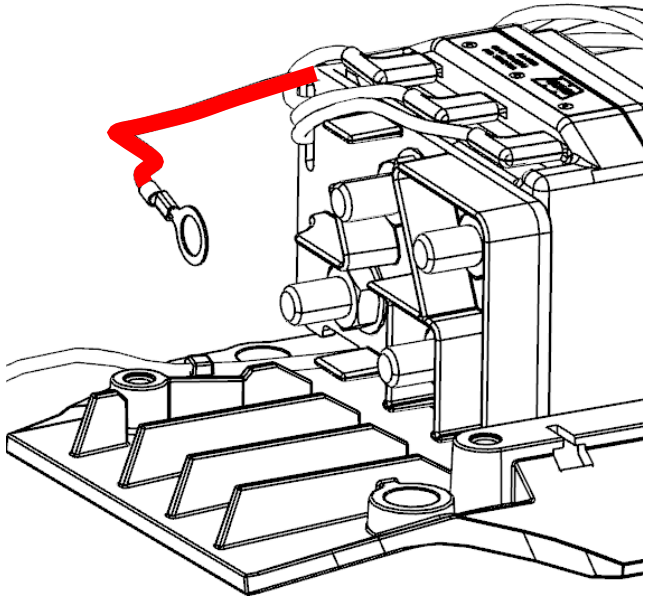


4 Install contactor screws

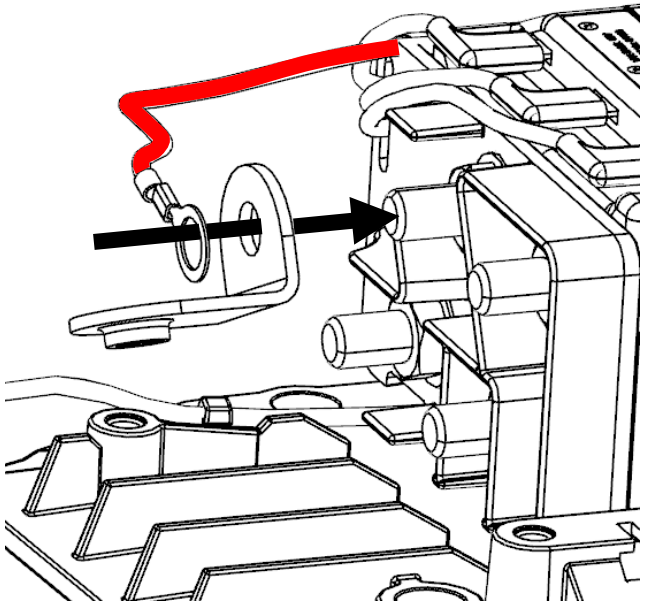


Head: 8mm Hex
M6x13mm
Torque: 8-9.5Nm
(71-84inlb)

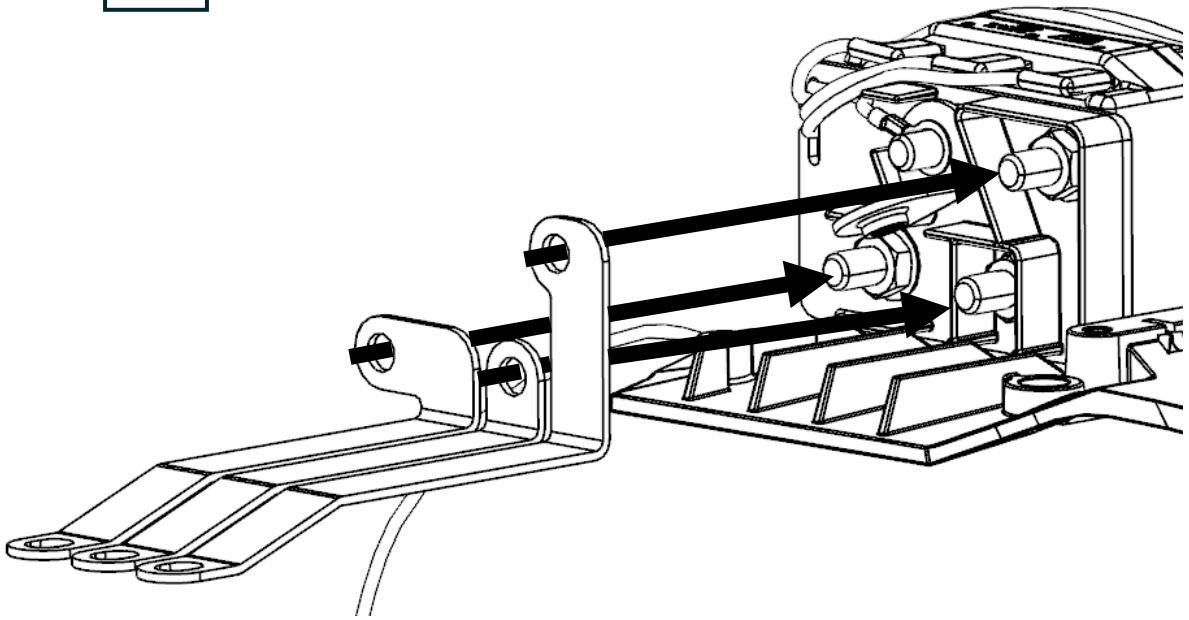
5 Verify red wire is not pinched behind bus bar separator



6 Install red wire and power in bus bar

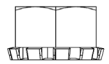


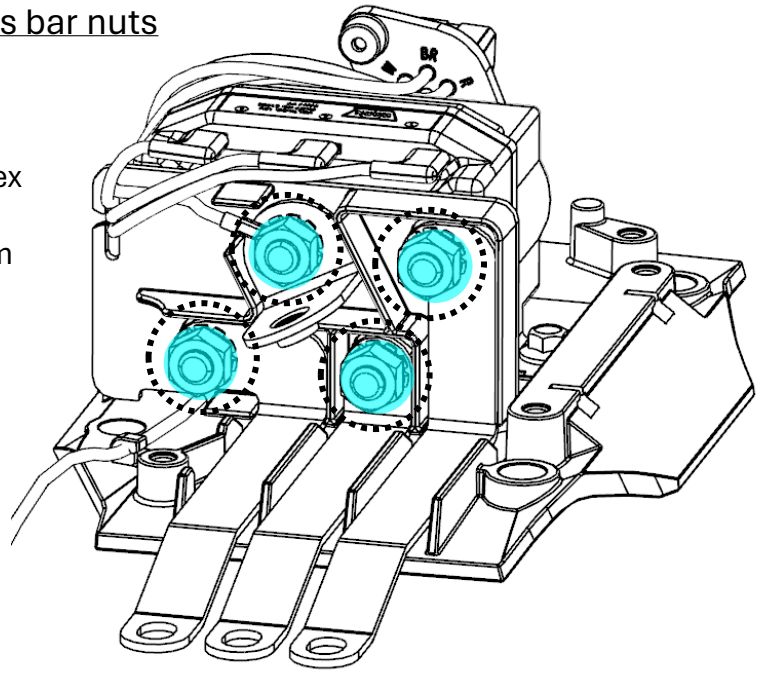
7 Install bus bars



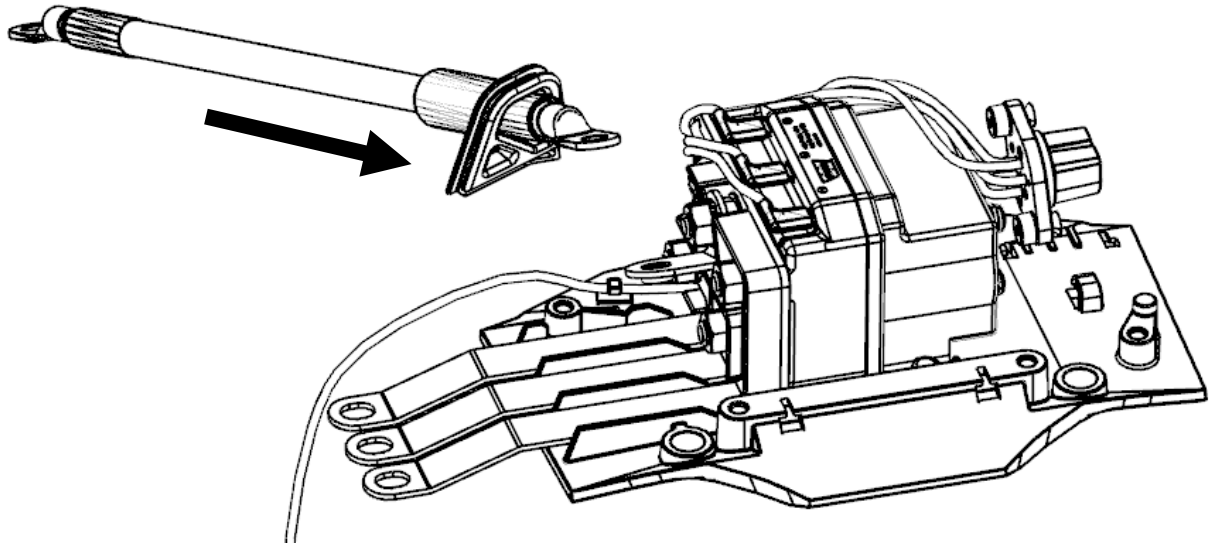
8 Install bus bar nuts

Head: 13mm Hex
M8x1.25
Torque: 8-9.5Nm
(71-84inlb)

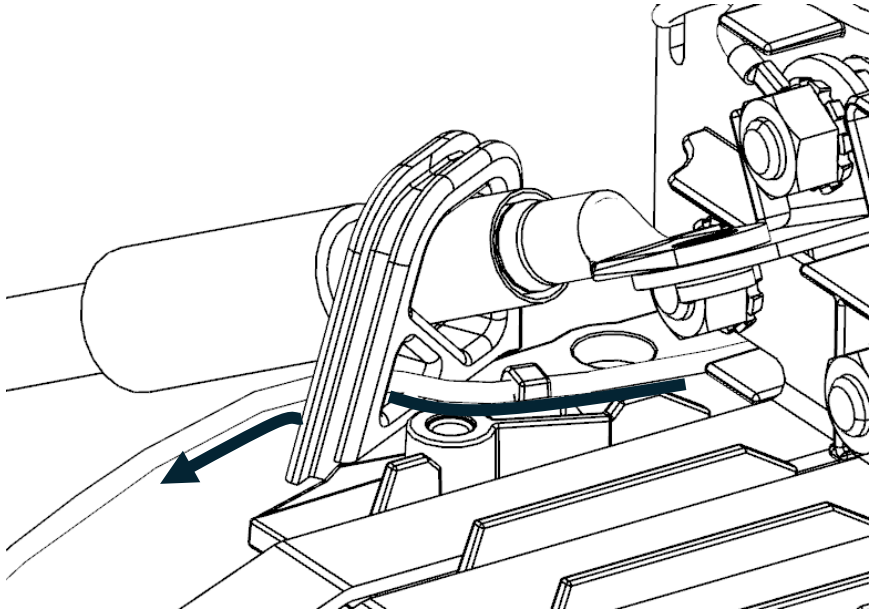




9 Install power in cable

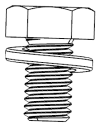


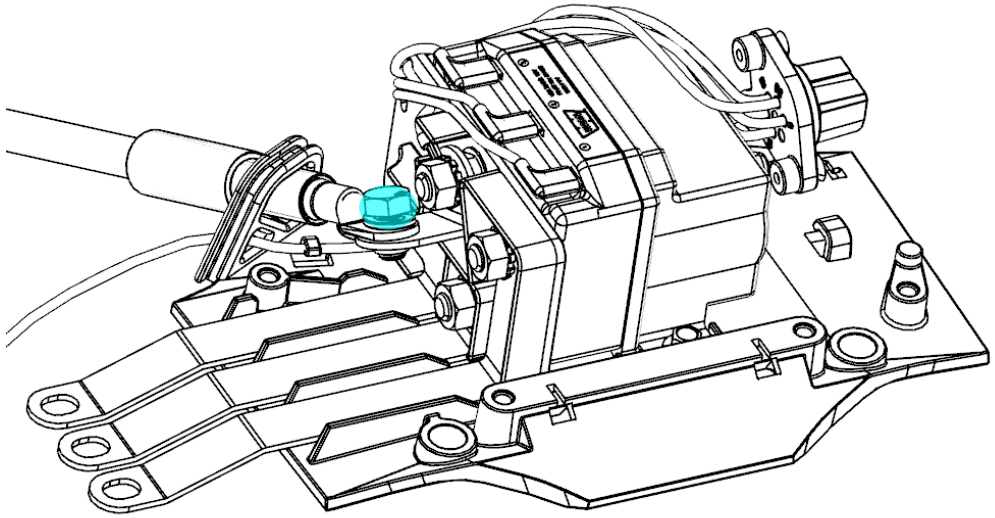
10 Route black D-plug wire through separator



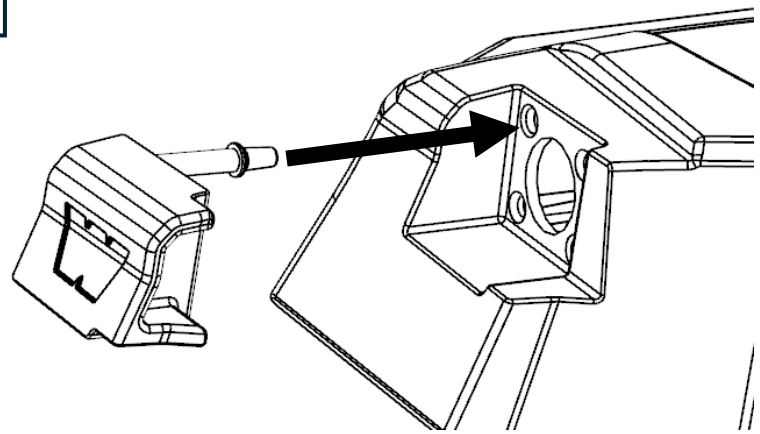
11 Install power in bus bar bolt

Head: 13mm Hex
M8x1.25x14mm
Torque: 8-9.5Nm
(71-84inlb)

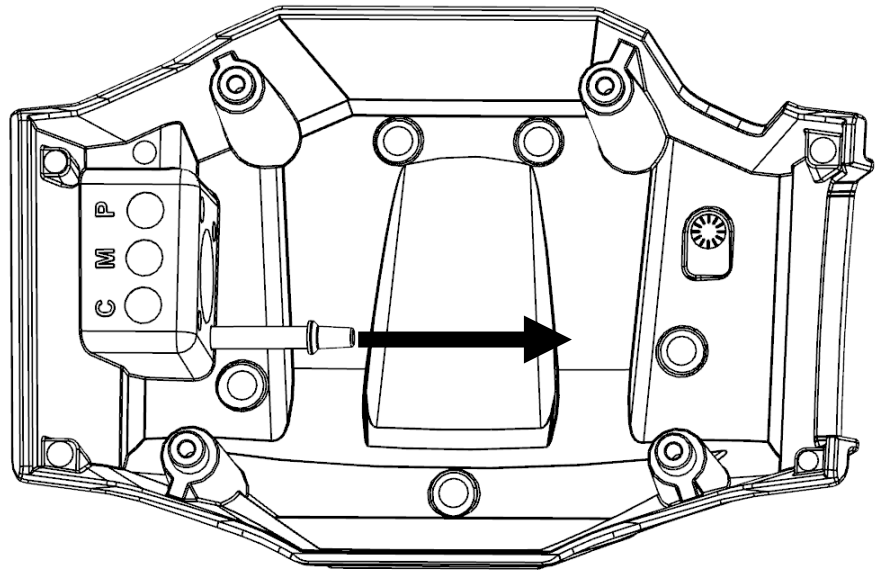




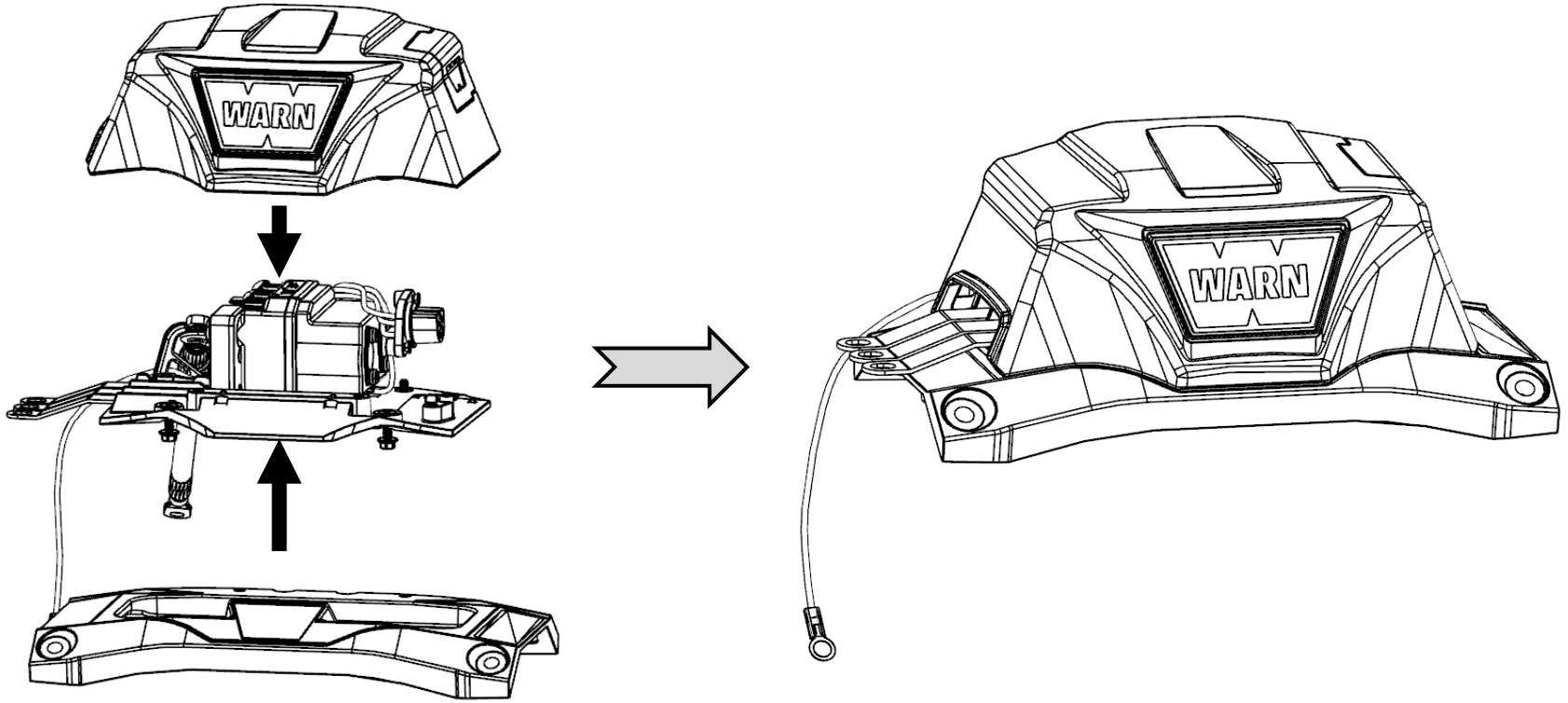
12 Install dust cover



13 Pull dust cover tail through control pack cover

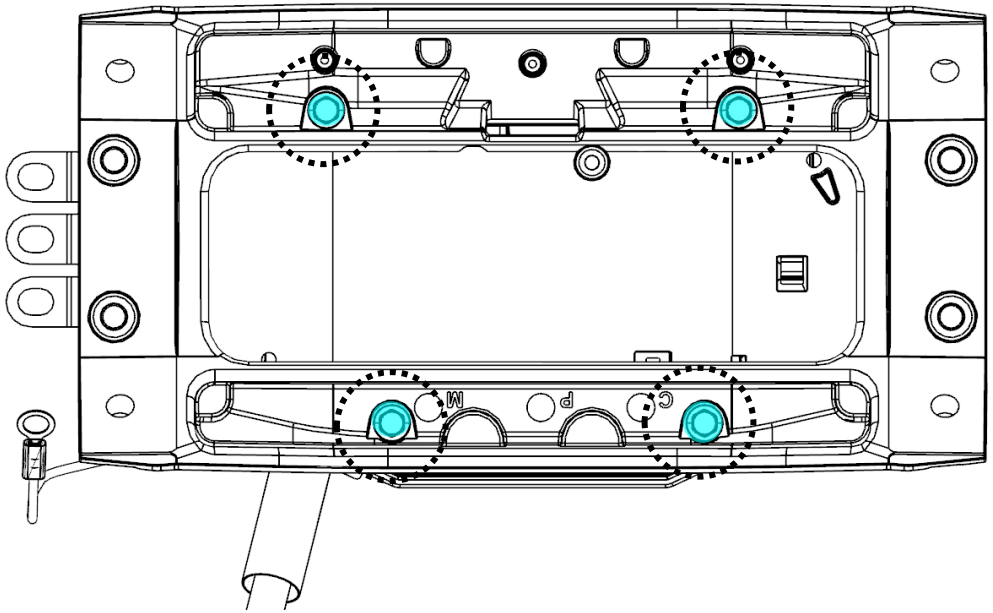


14 Install control pack cover and tie plate to baseplate

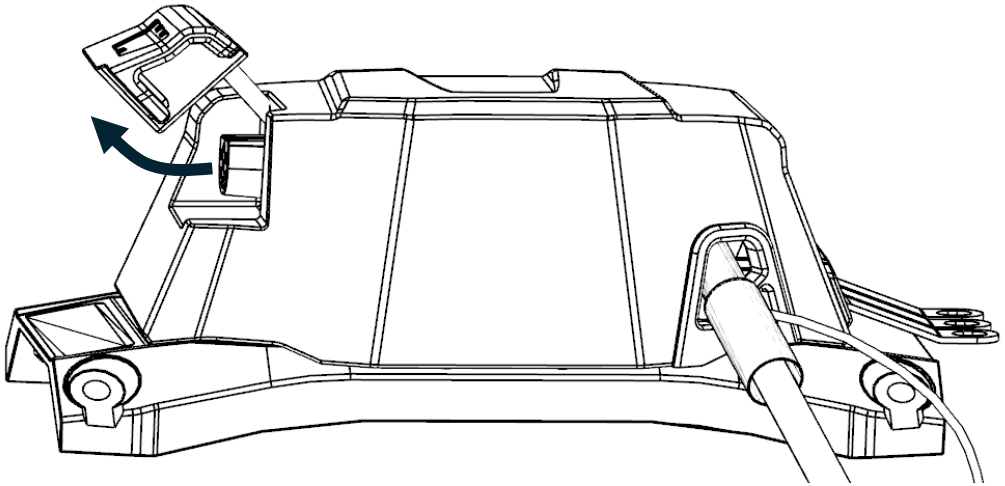


15 Install control pack cover bolts

Head: 8mm Hex
M5x0.8x16mm
Torque: 4-5Nm
(35-44inlb)

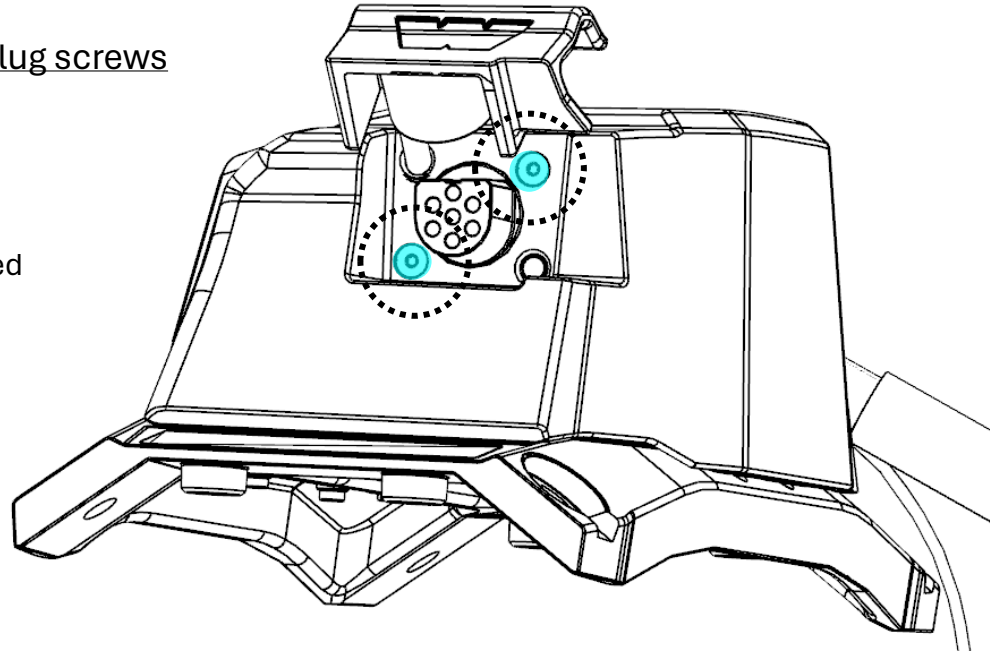


16 Open dust cover



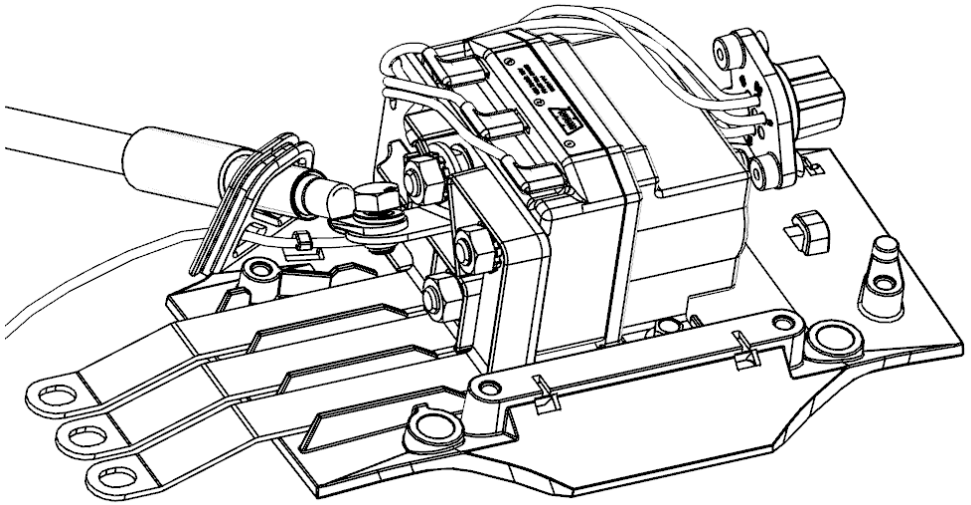
17 Install D-plug screws

Head: T15 Torx
Plastite 8-16x0.5”
Torque: Until seated



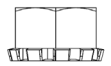
2.10 Control Pack Relocation (31”)

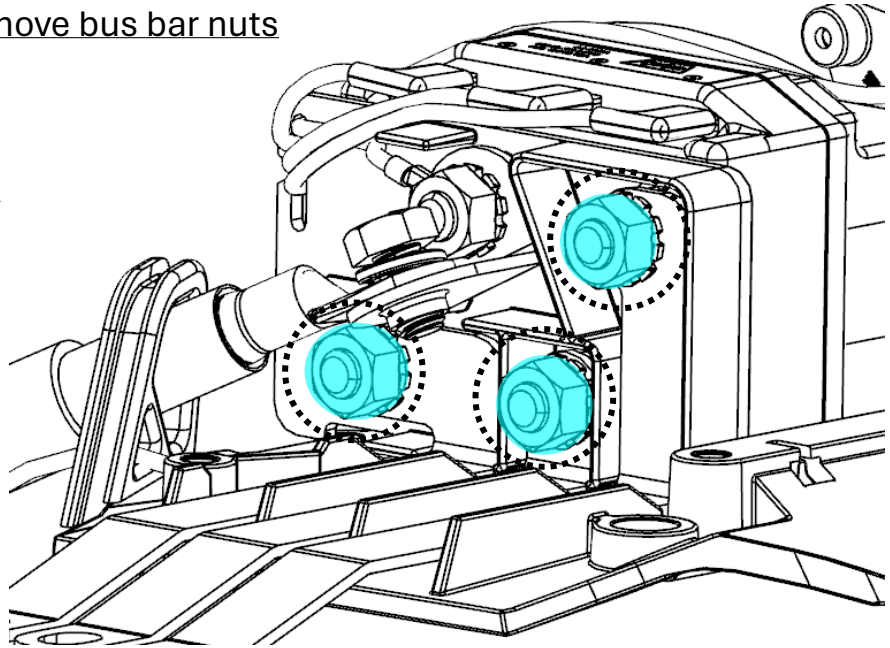
1 Disassemble control pack (section 2.8 steps 1-7)



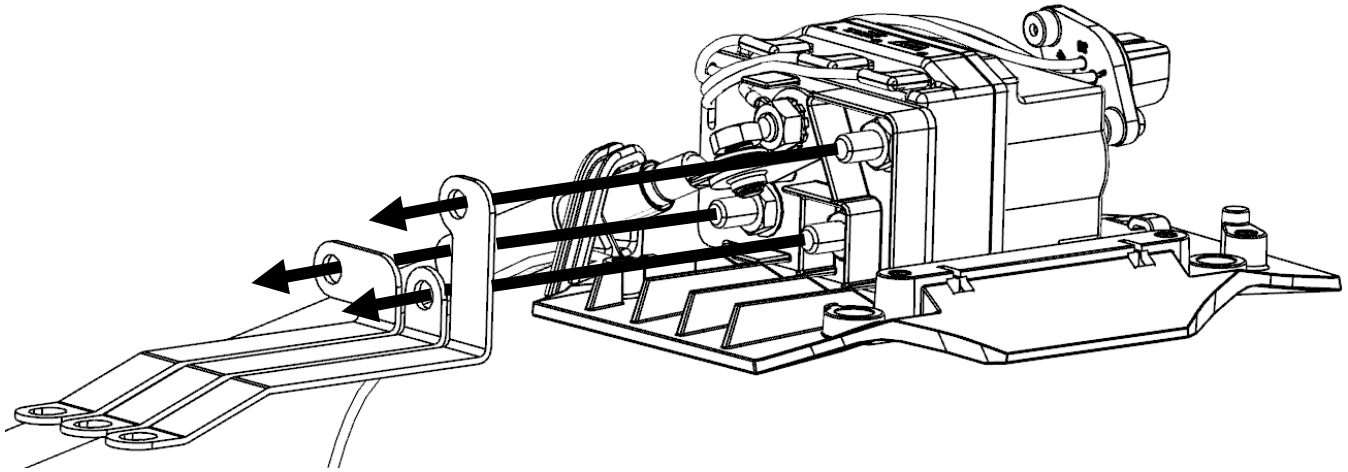
2 Remove bus bar nuts

Head: 13mm Hex
M8x1.25
Torque: 8-9.5Nm
(71-84inlb)



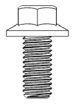


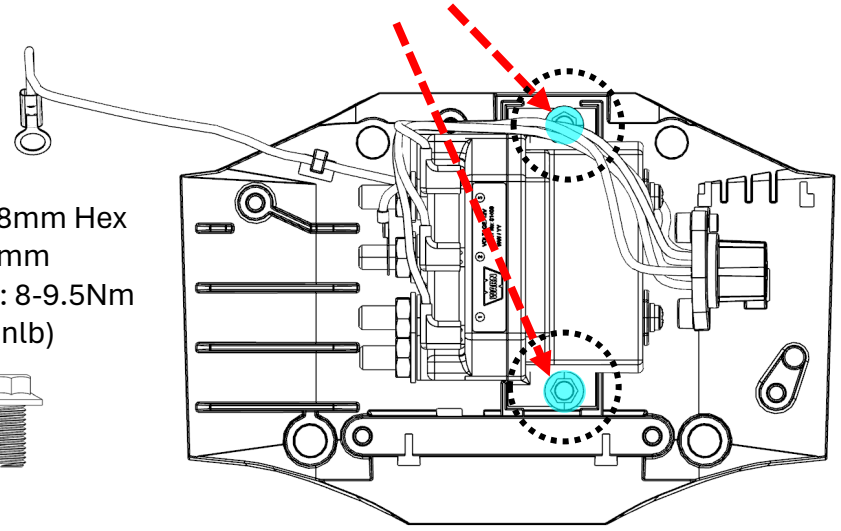
3 Remove A, F1, and F2 bus bars, NOT power in bus bar



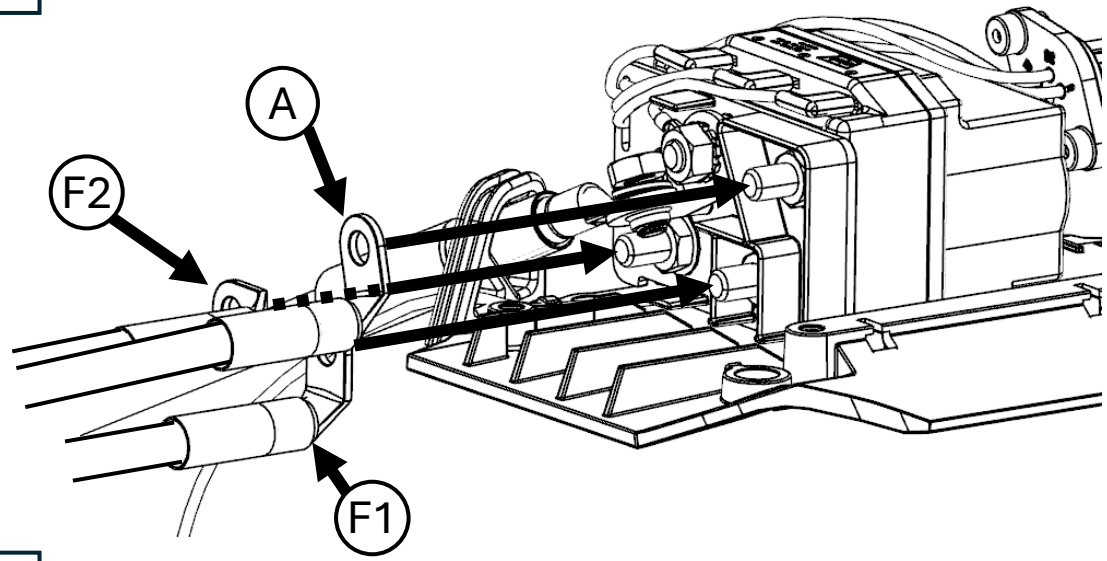
4 Loosen, but do not remove

Head: 8mm Hex
M6x13mm
Torque: 8-9.5Nm
(71-84inlb)



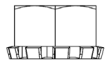


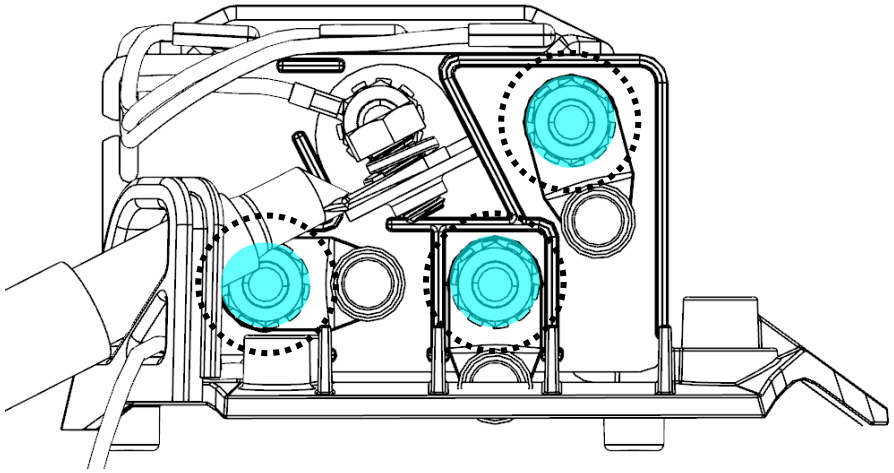
5 Install A, F1, and F2 cables to contactor



6 Install A, F1, and F2 bus bar nuts

Head: 13mm Hex
M8x1.25
Torque: 8-9.5Nm
(71-84inlb)

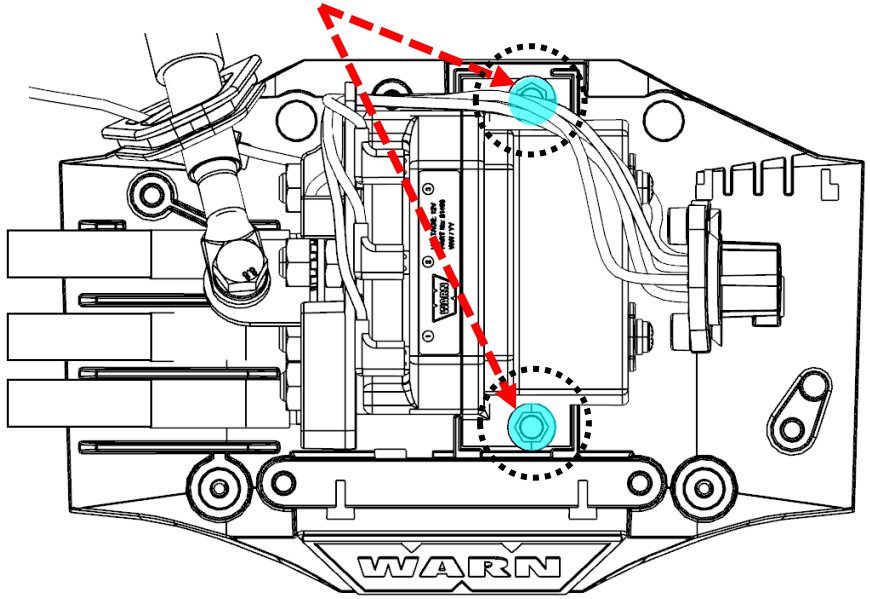




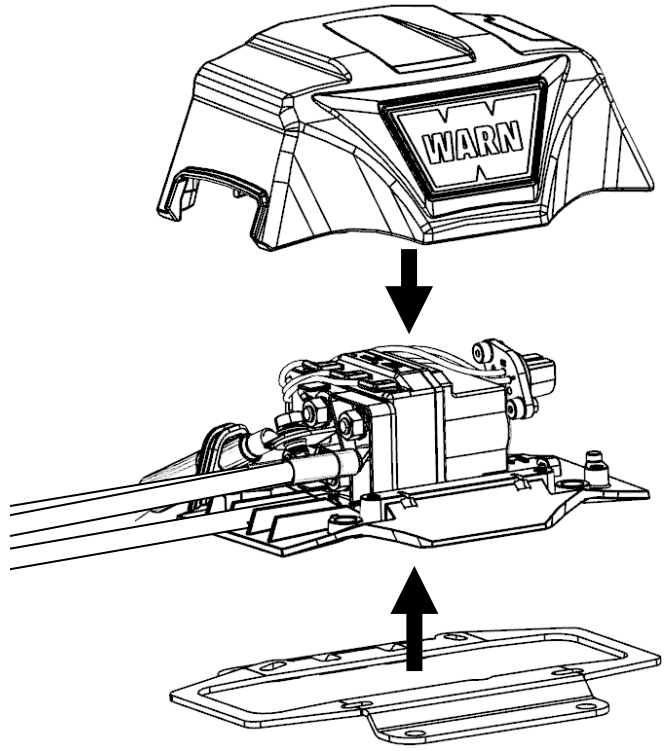
7

Tighten

Head: 8mm Hex
M6x13mm
Torque: 8-9.5Nm
(71-84inlb)

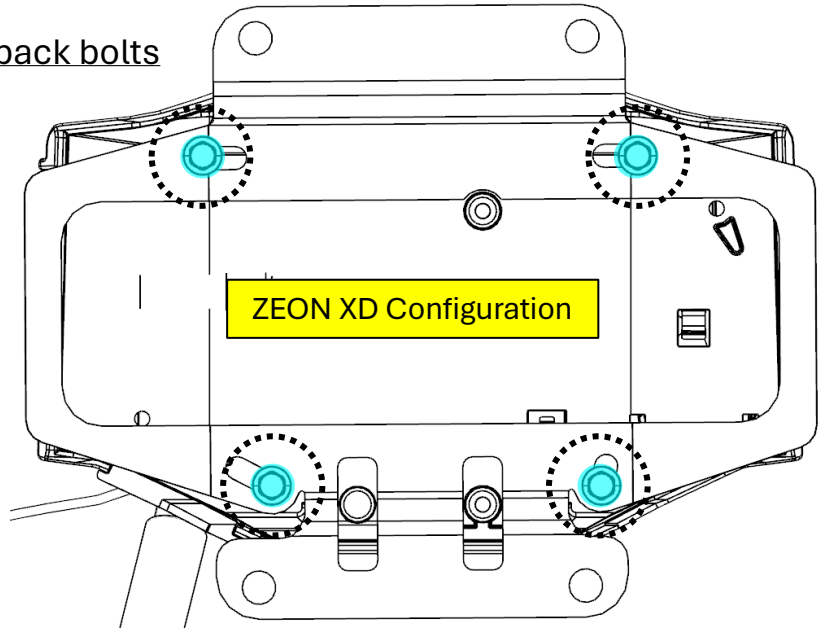


8 Install control pack cover and relocation bracket



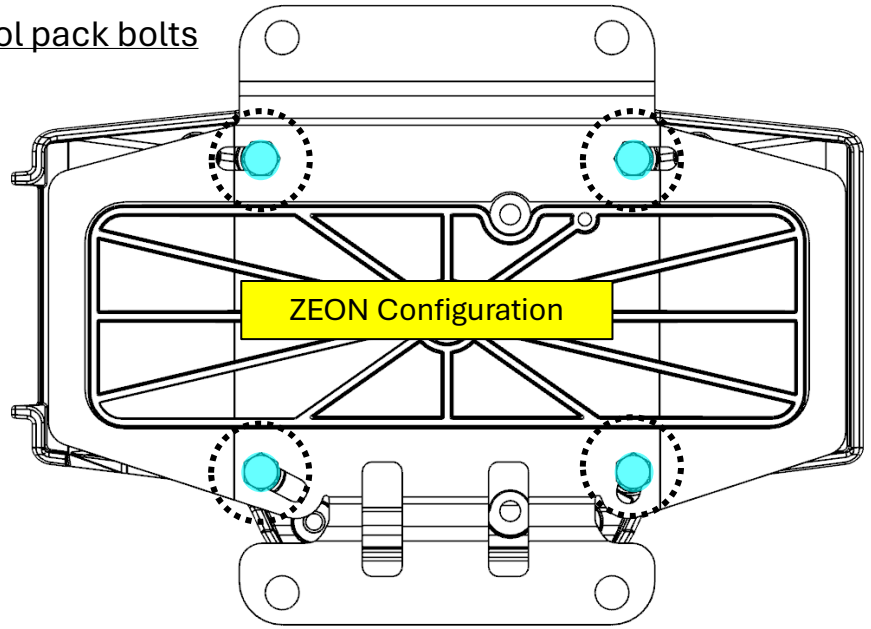
9a Install control pack bolts

Head: 8mm Hex
M5x16mm
Torque: 4-5Nm
(35-44inlb)



9b Install control pack bolts

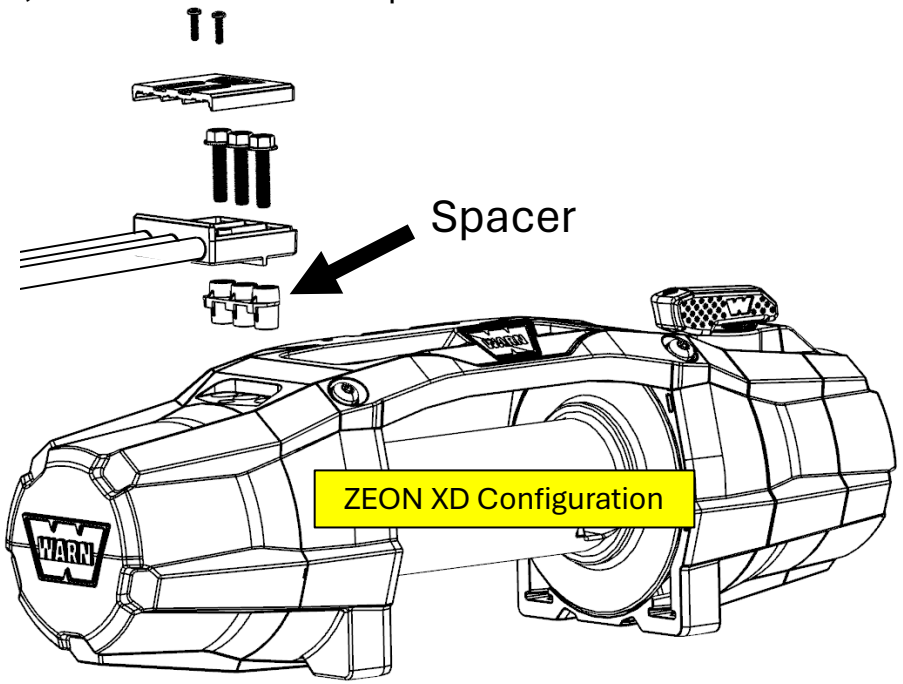
Head: 10mm Hex
M6x16mm
Torque: 4-5Nm
(35-44inlb)



10a Install A, F1, and F2 cables WITH spacer

Head: T20 Torx
M4x16mm
Torque: Until seated

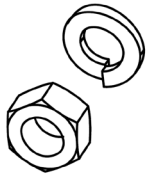
Head: 13mm Hex
M8x35mm
Torque:10.6-13Nm
(94-115inlb)

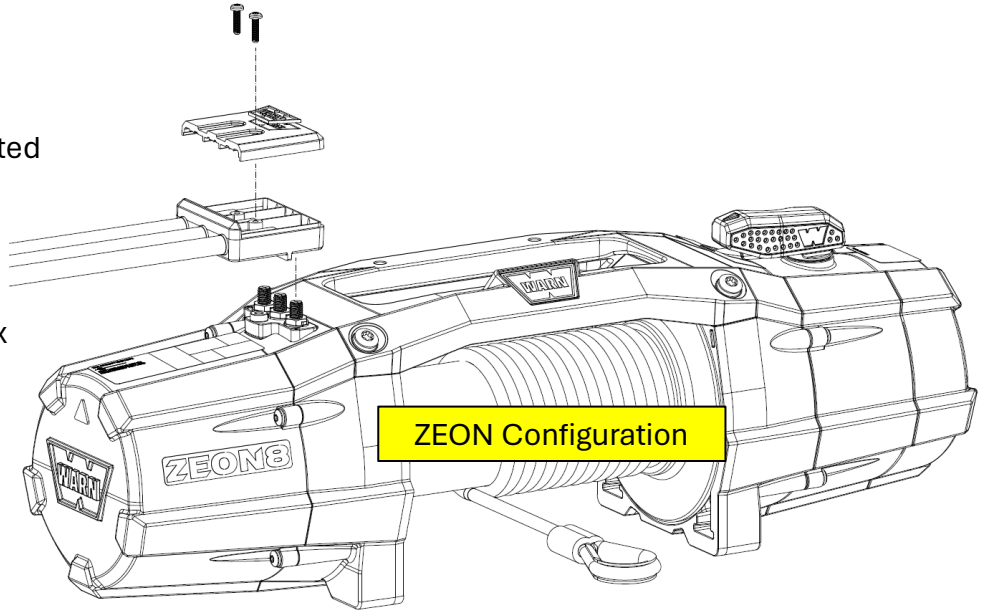


10b Install A, F1, and F2 cables WITHOUT spacer

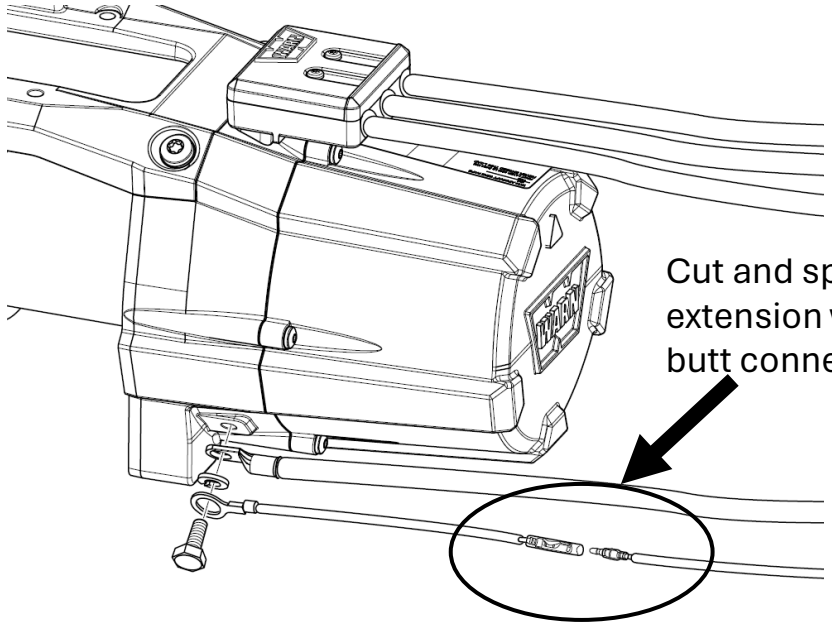
Head: T20 Torx
M4x16mm
Torque: Until seated

Head: 13mm Hex
M8x1.25
Torque: 8-9.5Nm
(71-84inlb)





11 Extend black D-plug wire



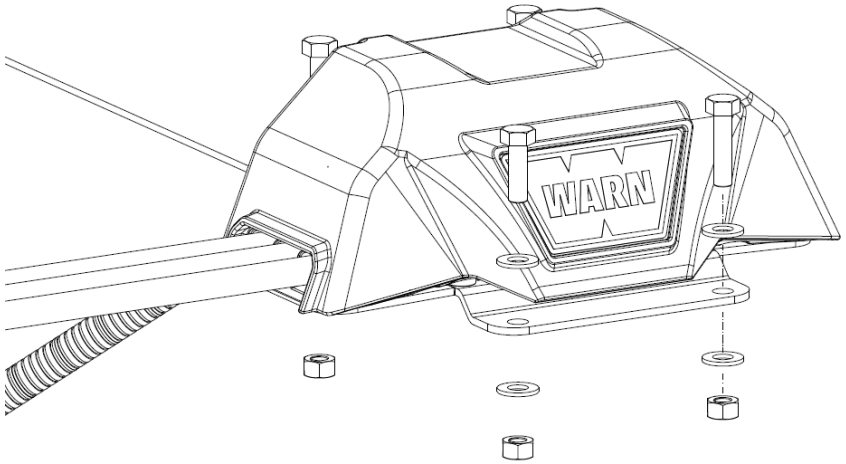
12 Bolt relocation bracket to mounting surface

Head: 13mm Hex
5/16”-18x1”
Torque: 10.6-13Nm
(94-115inlb)

Head: 13mm Hex
5/16-18 Lock Nut
Torque:10.6-13Nm
(94-115inlb)

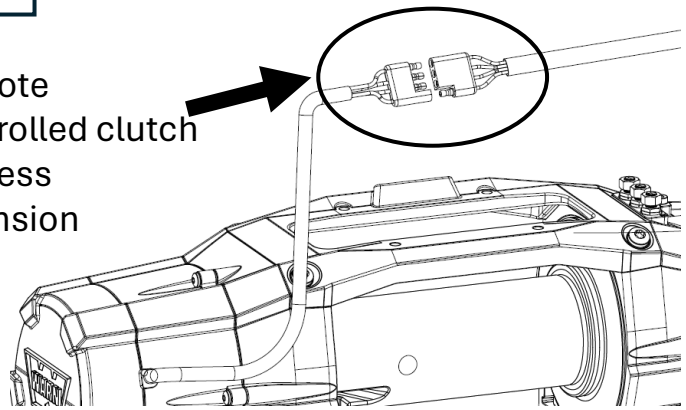
M6 Lock Washer

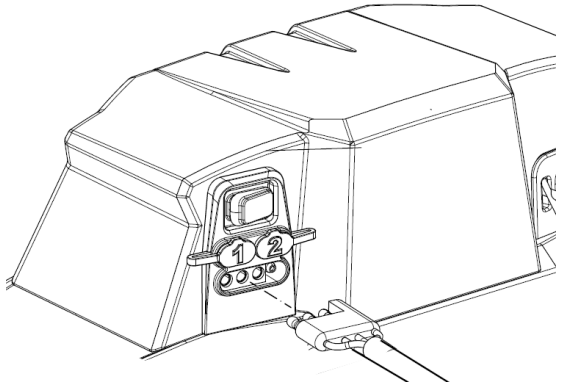
5/16” Washer

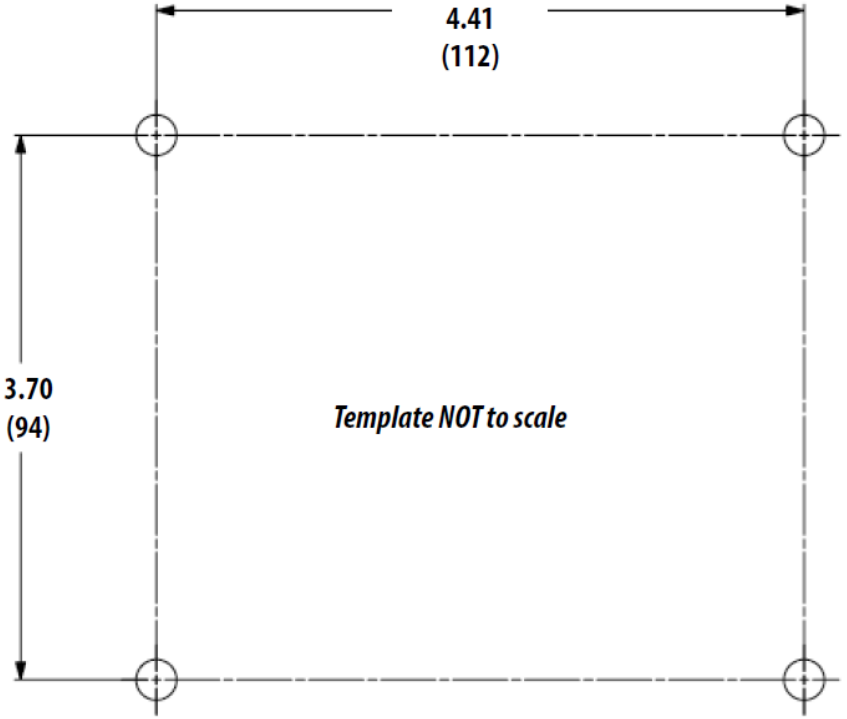


13 (OPTIONAL for Zeon Platinum)

Remote
controlled clutch
harness
extension

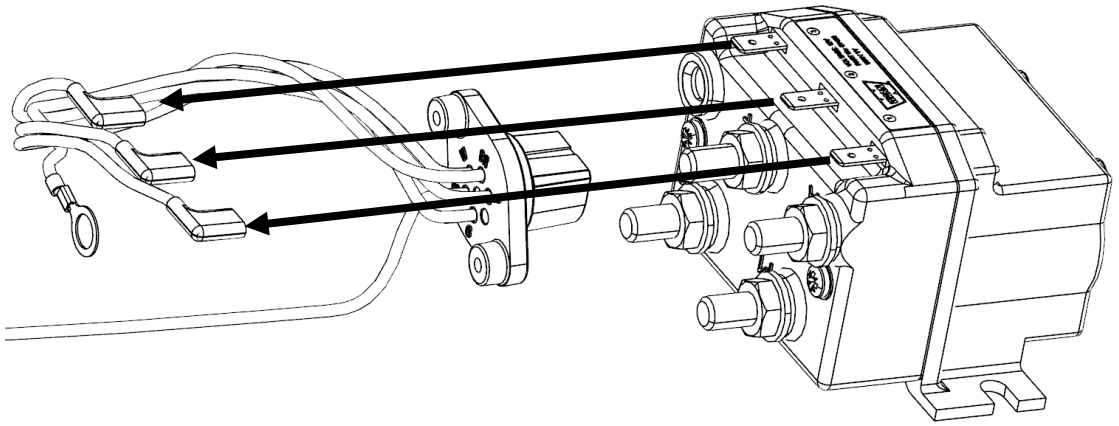






2.11 Control Pack Relocation (78”)

1 Disassemble control pack (section 2.8 steps 1-15)

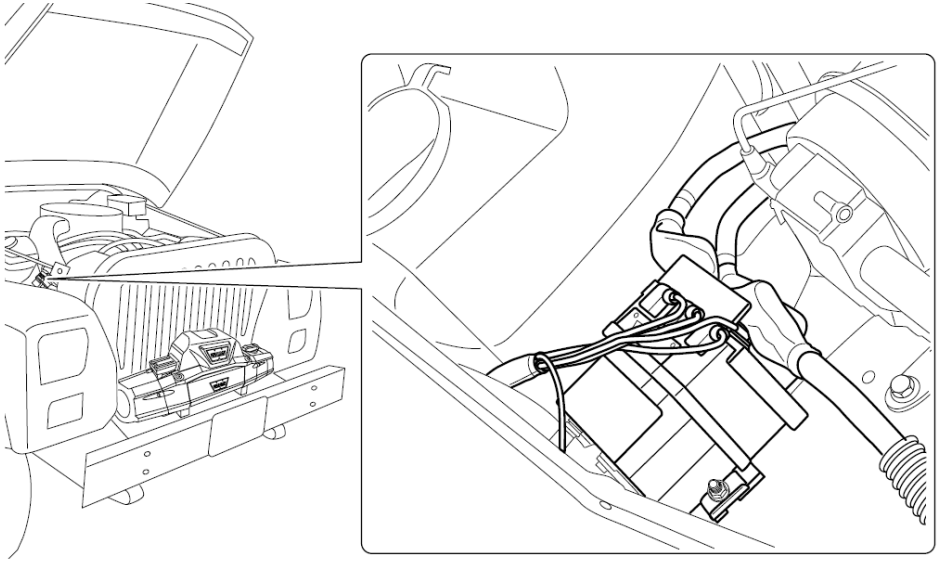


2 DETERMINE CONTACTOR MOUNTING LOCATION AND CABLE ROUTING PATH

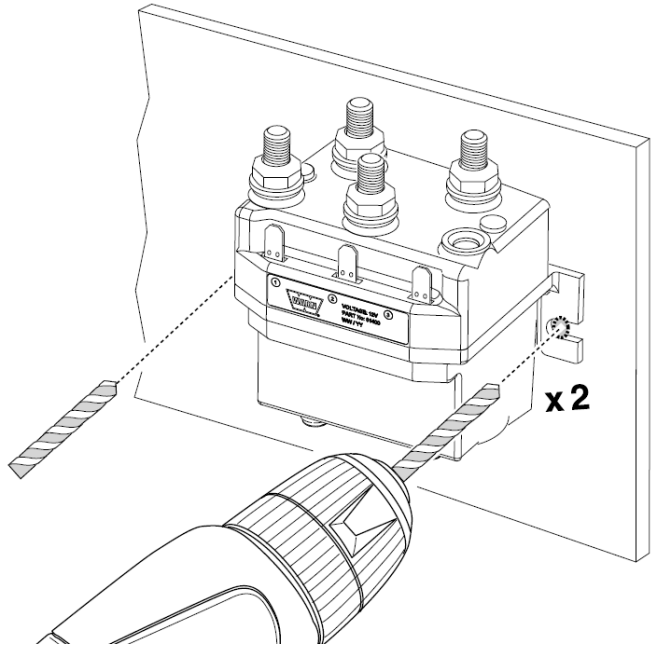
To determine the contactor mounting location it is recommended that the contactor be mounted on a solid mounting surface and easily accessible. Contactor should be in a location that is as clean and dry as possible. Ensure the contactor mounting location selected provides sufficient clearance from all metal structures. Exact location will vary depending on the vehicle.

To determine the winch motor cable assembly and ground wire routing path, verify the path will allow the winch motor cable assembly and ground wire to be routed avoiding sharp edges, parts that get hot and moving parts. Consider chassis flex and vibration which might damage cable.

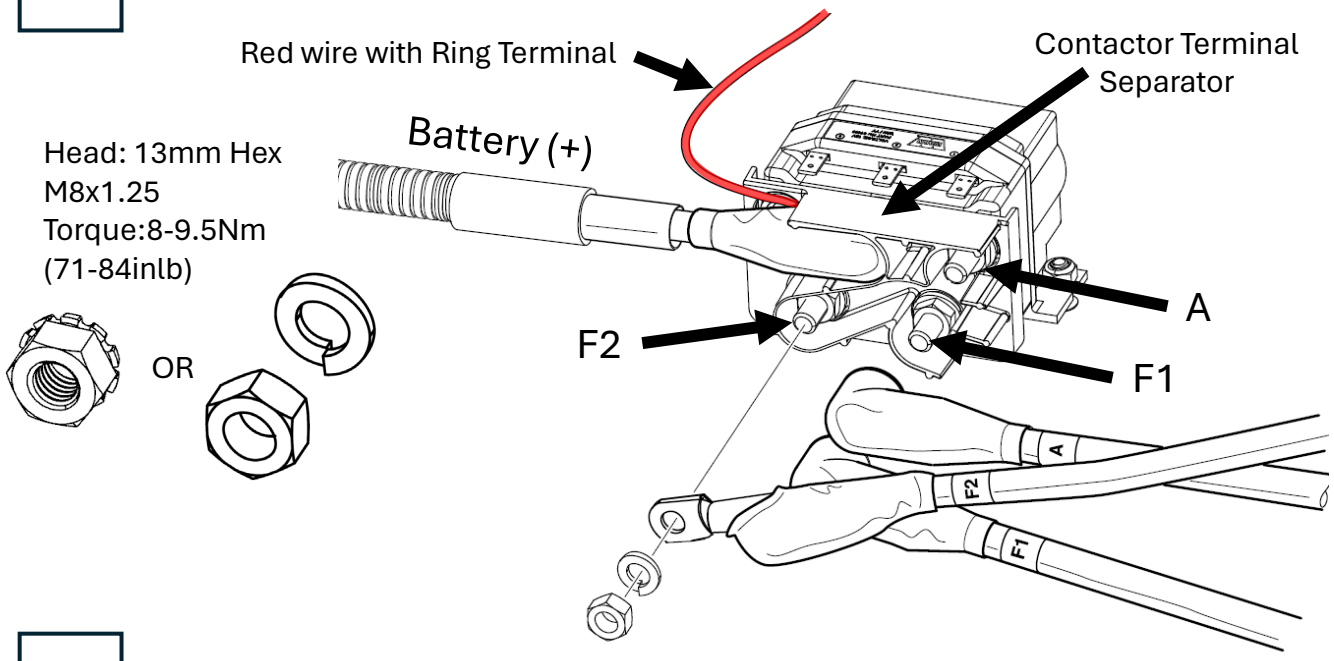
3 Contactor Mounting Location Example



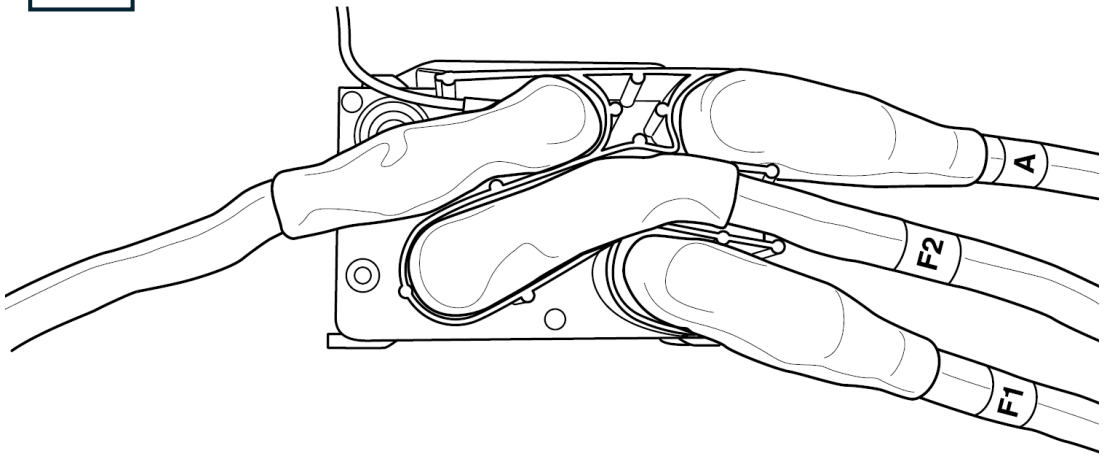
4 Drill mounting holes and bolt contactor to mounting surface



5 Install Red D-plug wire, Battery, F1, F2, and A cables



6 Move cable boots over terminals



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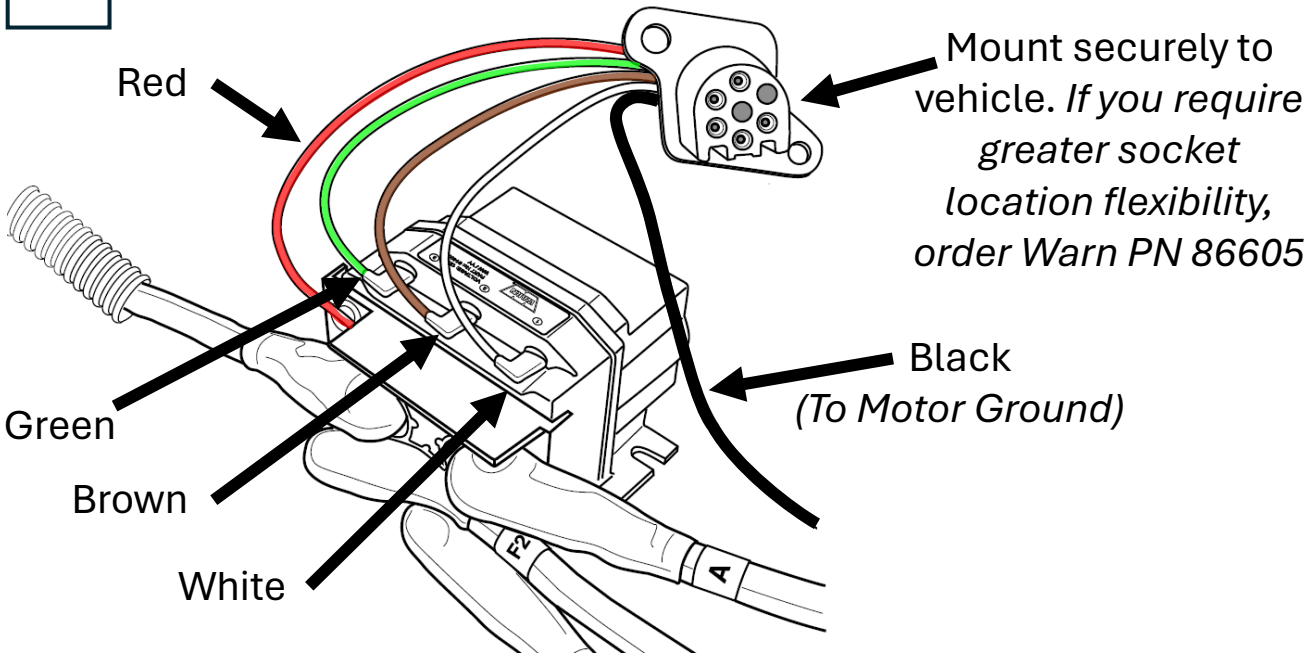
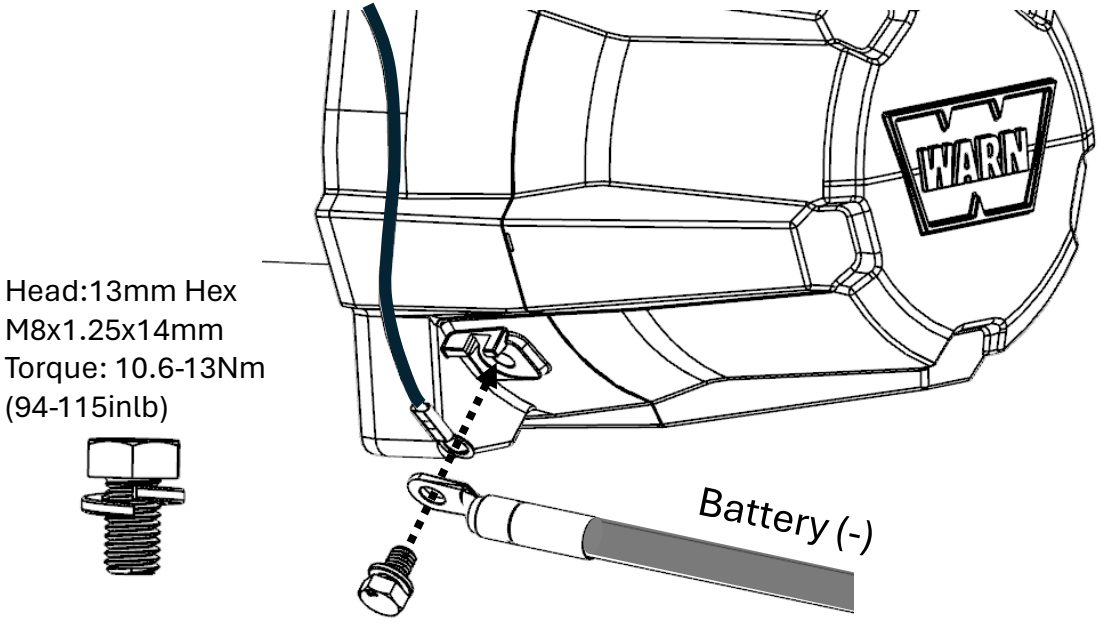


8 Install Battery (-) cable and black D-plug wire

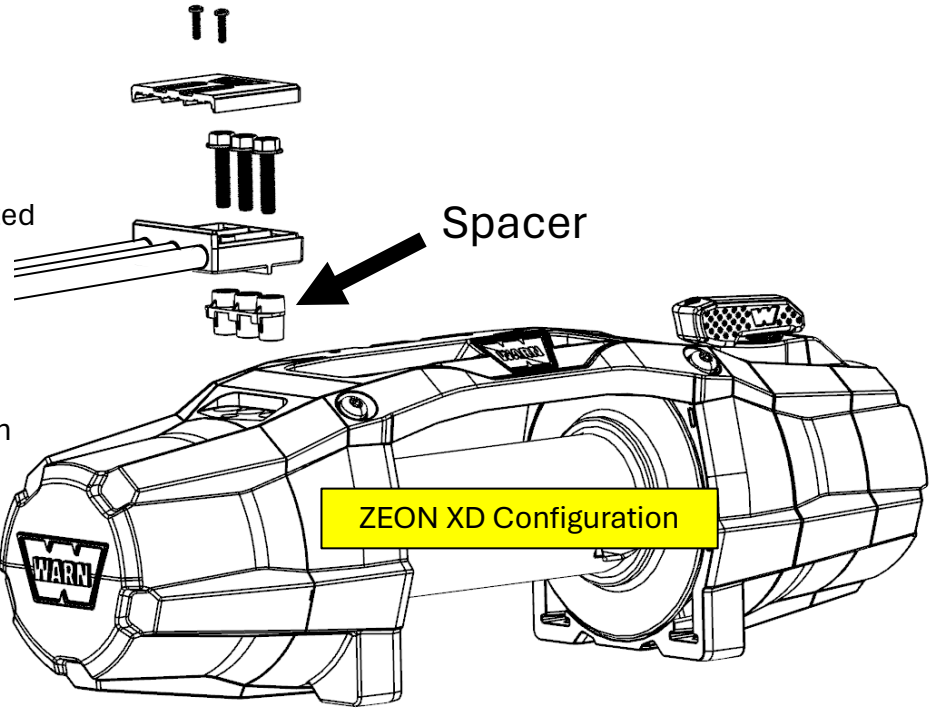


9a

Install A, F1, and F2 cables WITH spacer

Head: T20 Torx
M4x16mm
Torque: Until Seated

Head: 13mm Hex
M8x35mm
Torque: 10.6-13Nm
(94-115inlb)

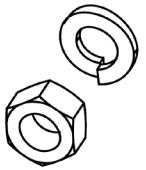


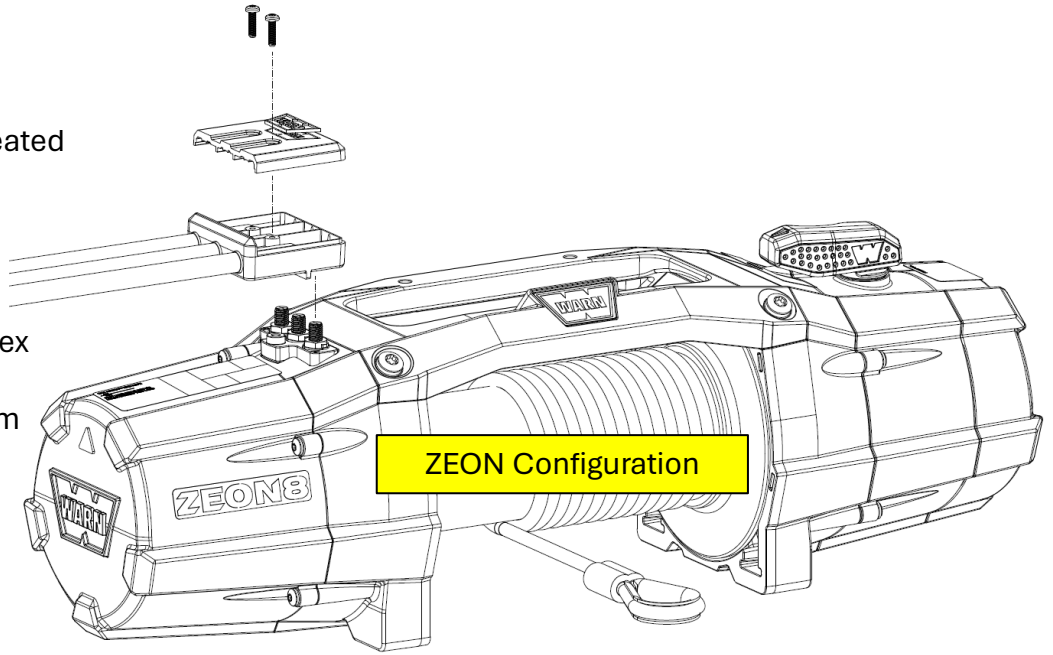
9b

Install A, F1, and F2 cables WITHOUT spacer

Head: T20 Torx
M4x16mm
Torque: Until Seated

Head: 13mm Hex
M8x1.25
Torque: 8-9.5Nm
(71-84inlb)





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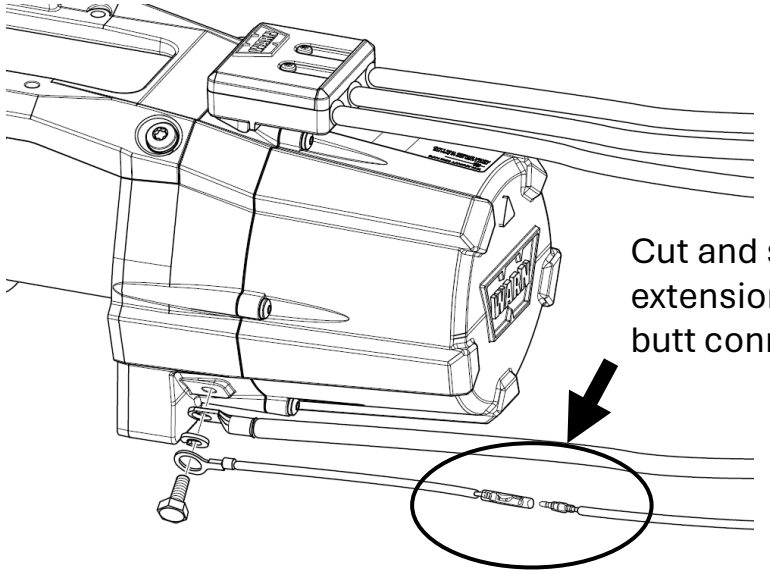


SECTION 4 – WINCH TROUBLE SHOOTING

GENERAL WINCH TROUBLESHOOTING

This section covers general troubleshooting.

NOTICE **You must use a 12VDC battery to perform any analysis on the AXON and Motactor. Using any other type of power supply could result in an incorrect diagnosis.**

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
4.1 Power in/Out		
4.1.1		
Winch will not power in or pulls slowly.	Ground cable is not directly attached to battery.	Attach ground cable to negative post of battery.
	Loose connection on battery or motor terminals.	Be sure all connections are tight and clean. Do not let bottom nut or stud turn while tightening.
	Switch not connected to keyed 12 volt DC source.	Use volt meter to insure 12 volt DC when vehicle is running.
	Vehicle battery is not fully charged.	Charge battery.
	Battery terminals are corroded.	Clean terminals and charge battery.
	One of the solenoids in contactor is sticking or damaged from prolonged use.	Replace contactor.
	Worn or damaged brushes caused by damaged armature commutator or normal wear.	Replace motor.
	Water in motor, caused by submersion or improper installation of motor.	Replace motor.
	Brake is damaged or defective.	Verify winch will power in opposite direction. Service brake.
	Excessive gear train wear, broken gear train components.	Disassemble winch gear train to investigate carriers and ring gear. If excessive tooth damage is present replace gear train.
4.1.2		
Winch will not power out or powers out very slowly.	See section 4.1.1	See section 4.1.1
	Brake is not disengaging.	See section 4.1.2
	Excessive gear train wear, broken gear train components.	Disassemble winch gear train to investigate carriers and ring gear. If excessive tooth damage is present replace gear train.
4.1.3		
Winch/Motor speed varies during power in.	Excessive gear train wear, broken gear train components.	Disassemble winch gear train to investigate carriers and ring gear. If excessive tooth damage is present replace gear train.

4.2 Pull Capacity		
4.2.1		
Reduced Capacity	See section 4.1.1	See section 4.1.1
	Too many layers of rope.	Pull capacity is reduced by approximately 14% per layer. Use winch on first layer of drum for maximum power.
	Rope is interfering with tie rod or other part of winch.	Rewind rope on drum so that it is level and not rubbing on other parts of winch.
	Motor is hot.	Allow winch motor to cool for at least 10 minutes between short pulls. Increase cooling time for heavy loads or long pulls. See winch specification sheet.
	Electrical wires too long.	Reduce distance between winch and battery.
4.2.2		
Excess Capacity	Winch operation in very cold environment.	Exercise Caution. Increase rope size. Change to larger size synthetic rope.
	Incorrectly sized power cables used	Any deviation from factory power cables will modify performance. Install Warn factory power cables.
4.3 Brake		
4.3.1		
Winch will not hold load.	Rope is spooled onto the drum in the wrong direction.	Remove all rope and reinstall in the proper direction.
	Load exceeds rating of winch.	Refer to winch capacity on product label. **DO NOT EXCEED LINE PULL RATING SHOWN ON PRODUCT LABEL**.
	Brake is worn.	The brake is a wear item and will need to be replaced periodically depending on use.
	Assembled incorrectly - motor coupler - (winch is noisy)	Remove brake and inspect. Reinstall brake and couplers.
4.3.2		
Brake will not disengage.	Brake spring is damaged	Replace brake spring. Inspect brake couplers for damage or excess wear. Replace couplers if necessary.
	Motor is damaged, output coupler incorrectly installed.	Check motor. Remove brake and inspect. Reinstall brake and couplers correctly.
	Load exceeds rating of winch	Refer to winch capacity on product label. DO NOT EXCEED LINE PULL RATING SHOWN ON PRODUCT LABEL.
	Power out distance is too long.	Allow winch to cool for at least 10 minutes between short pulls. Increase cooling time for heavy loads or long pulls. ***(See winch specification sheet)***
4.4 Clutch		
4.4.1		
Winch will not shift to freespool.	Rope is under tension.	Power out short distance to release line tension.
	Brake Spring and/or couplers miss-installed	Remove brake and inspect. Reinstall brake and couplers correctly
	Brake spring is damaged	Replace brake spring. Inspect brake couplers for damage or excess wear. Replace couplers if necessary.
	Excessive wear on clutch plate.	Inspect clutch plate. If excessive wear is present (or the drive shaft has worn a hole in the clutch plate) replace the clutch plate.
	Damaged Drive Shaft	Inspect the drive shaft. If the sun gear is damaged replace the gear train. If the drive shaft retaining rings have failed, replace the drive shaft and service the gear train.
	Damaged Gear Train	Disassemble winch gear train to investigate carriers and ring gear. If excessive tooth damage is present replace gear train.
	Excessive Housing Wear	Inspect clutch dial and end housing. If excessive wear on clutch retaining features, replace end housing and clutch dial.

4.4.2		
Winch will not shift to engage.	Missing or damaged return spring	Inspect the drive shaft coupler and return spring. Ensure the return spring is present and properly installed.
	Incorrect mounting bolt pattern	Inspect the mounting bolt pattern. If the mounting bolt pattern is incorrect and forces the drum supports to be non-parallel, the freespool and geartrain engagement will be affected
	Damaged Drive Shaft	Inspect the drive shaft. If the sun gear is damaged replace the gear train. If the drive shaft retaining rings have failed, replace the drive shaft and service the gear train.
	Damaged Gear Train	Disassemble winch gear train to investigate carriers and ring gear. If excessive tooth damage is present replace gear train.

4.5 Rope & Freespool

4.5.1		
Winch will not freespool.	Rope tangled or bound on drum.	Pry rope loose, re-spool rope. **WARNING: DISCONNECT POWER TO WINCH BEFORE WORKING WITH ROPE.**
	Drum seals over compressed.	Make sure that drum supports are parallel and mounting plate has correct bolt pattern.
	Seals are dry.	Power winch in and out a short distance and then try to freespool. Service winch and grease seals.
	Incorrect mounting bolt pattern	Inspect the mounting bolt pattern **(refer to mounting instructions)** If the mounting bolt pattern is incorrect and forces the drum supports to be non-parallel, the freespool and geartrain engagement will be affected.
	Excessive wear on clutch plate.	Inspect clutch plate. If excessive wear is present (or the drive shaft has worn a hole in the clutch plate) replace the clutch plate.

4.5.2		
Winch is difficult to freespool.	See section 4.5.1	See section 4.5.1
	Winch has not been broke in.	Secure rope end to anchor point. Shift the winch to free- spool then slowly back vehicle away from anchor point. Shift to engaged position and then power winch in to stretch the rope and break in winch.
		Shift winch to freespool and then power in for about 30 seconds without drum moving.
	Incorrect mounting bolt pattern	Inspect the mounting bolt pattern. If the mounting bolt pattern is incorrect and forces the drum supports to be non-parallel, the freespool and geartrain engagement will be affected
	Winch operation in very cold environment.	Shift winch to freespool and then power in for about 30 seconds without drum moving.
	Bent drum flange.	Power the winch in and out while watching the drum flanges. A drum with bent flange must be replaced.
4.5.3		
Rope behind drum flange.	Rope stacked to one side of drum forcing rope behind flange.	Avoid sharp angle pulls, make sure rope is wound level on drum. Replace damaged rope and drum.
	Incorrect fairlead used	Make sure a Warn fairlead is used and is correctly sized for the winch. **WARNING: USING AN INCORRECTLY SIZED FAIRLEAD CAN RESULT IN PRODUCT DAMAGE AND PERSONAL INJURY.**

4.6 Electrical

4.6.1		
Winch will not power in or pulls slowly.	See section 4.1.1	See section 4.1.1

4.6.2		
Electrical sparks appear around motor.	Loose connection of wires to motor terminals.	Secure the motor terminal and wires to the terminal.
	Electrical ground is not sufficient. Ground wire was not installed, or battery terminal is corroded.	Install a ground wire to the battery terminal.
	Motor terminal has short circuit to ground under load.	Insure that motor terminals cannot contact frame and mount under load. Install electrical insulation boots provided with the winch.
4.6.3		
Wire harness insulation melted.	Switch held in power in position while winch is stalled.	Replace wire harness winch motor.
	Poor installation near or on a hot surface.	Replace wire harness.
	Poor installation caused wire insulation to be rubbed off or cut, causing direct short.	Replace wire harness.
4.7 Noise		
4.7.1		
Winch makes rattle/ ratchet noise on power in.	Missing 2nd stage spacer allows carrier pins to hit each other.	Install 2nd stage spacer. Inspect for debris and carrier damage.
	Wrong first stage sun used and does not interface with first stage carrier correctly	Check and replace sun gear with correct components.
4.7.2		
Winch makes squeaking/ high pitch noise.	Heavy brake usage (brake is hot).	Under heavy use the brake spring may make noise while working. This typically resolves its self after the brake is allowed to cool.
	Heavy brake wear.	Service brake. Apply anti seize if brake spring is not damaged. Replace brake spring if heavy wear is evident.
	Drum bushing not lubricated.	Grease drum bushings.
	Excessive wear on clutch plate.	Inspect clutch plate. If excessive wear is present (or the drive shaft has worn a hole in the clutch plate) replace the clutch plate.
4.8 Structure		
4.8.1		
Winch will not easily mount to mounting plate.	Incorrect mounting bolt pattern	Inspect the mounting bolt pattern. If the mounting bolt pattern is incorrect and forces the drum supports to be non-parallel, the freespool and geartrain engagement will be affected
	Damaged mounting holes	The threads of the mounting holes may be damaged if frequently mounted and removed. Inspect, repair, or replace components as necessary.

SECTION 5 - MAINTENANCE

5.1 General Winch Maintenance

- Keep winch free of dirt, oil, grease, water and other substances. Remove any overflow grease from bearings.
- Check all mounting bolts and make sure they are tightened to proper torque. Replace any damaged fasteners.
- Periodically check all hydraulic connections to be sure they are tight and free of corrosion.
- Check rope for visible damage every time winch is operated. Examples of damage are: cuts, knots, mashed or frayed portions, and broken strands. Replace rope immediately if damaged. Failure to replace a damaged rope could result in breakage.
- If winch drum continues to turn after controls are released, brake may need to be replaced.

Check	Before first Operation	After Each Use	Monthly	Semi-Annually	Yearly
Take time to fully read the Instructions and/or Operations Guide, and/or Basic Guide to Winching Techniques, in order to understand your winch and its operations	X				
Check fasteners and make sure they are tight and to proper torque.	X			X	X
Replace damaged fasteners	X	X	X	X	X
Check electrical connections.	X			X	X
Verify wiring to all components is correct and be certain that all connections are tight	X			X	X
Verify there is no exposed/bare wiring, terminals or cable insulation damage (chafing, cutting).	X			X	X
Repair or replace damaged electrical cable.	X	X	X	X	X
Visual Check of winch and electrical connections to ensure all components are free from corrosion:	X			X	X
Check Quick Connects and Contact Leads	X			X	X
Check Motor-Sub Assembly (Contactor, Motor/ Motor Terminals, OLI).	X			X	X
Ensure Remote Socket and Remote control connections are not damaged	X	X	X	X	X
Check hydraulic connections	X			X	X
Visual check of winch and control valve	X			X	X

5.2 Winch Rope Maintenance

Cleaning:

- Use low pressure water to clean synthetic rope. Do not use any chemicals.
- Do not direct high pressure water (pressure washers, car washes, etc.) directly between the drum support and drum flange or clutch lever.
- Use low pressure water and a soapy rag or sponge to clean the winch.
- Avoid using chemicals that may damage the finish.
- Thoroughly clean salt residue from the winch as soon as possible to minimize corrosion.

Rope Inspection:

⚠ WARNING Always inspect winch rope, hook, and slings before operating winch. Frayed, kinked or damaged winch rope must be replaced immediately. Damaged components must be replaced before operation. Protect parts from damage.

When rope is first used, the outer filaments of the rope will quickly fuzz up. This is the result of these filaments breaking and this roughened surface will actually protect the fibers underneath. The condition should stabilize, not progress. If the surface roughness increases, excessive abrasion is taking place and strength is being lost.

Look closely at both the inner and outer fibers. When either is worn the rope is obviously weakened. Open the strands and look for powdered fiber—this is a sign of internal wear.

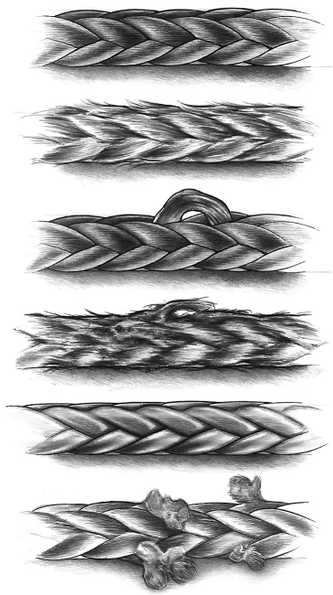
Localized discolorations could potentially represent chemical attack by anything from gear oil to battery acid. When doubt exists, replace the rope.

Maintenance:

- Inspect the winch rope and heat sleeve before and after each winching operation. Frayed or damaged rope must be replaced immediately. See rope care and storage.
- The rope must always spool onto the drum as indicated by the drum rotation decal on the winch.
- Use winch cover to protect winch and synthetic rope when not in use. Prolonged exposure to ultraviolet rays from sunlight can degrade synthetic rope strength over time.
- Avoid using synthetic rope over any rough surfaces without abrasion protection.
- Keep winch rope free of moisture, grease, dirt or other debris. If necessary, clean with a damp cloth.

Rope should be replaced when:

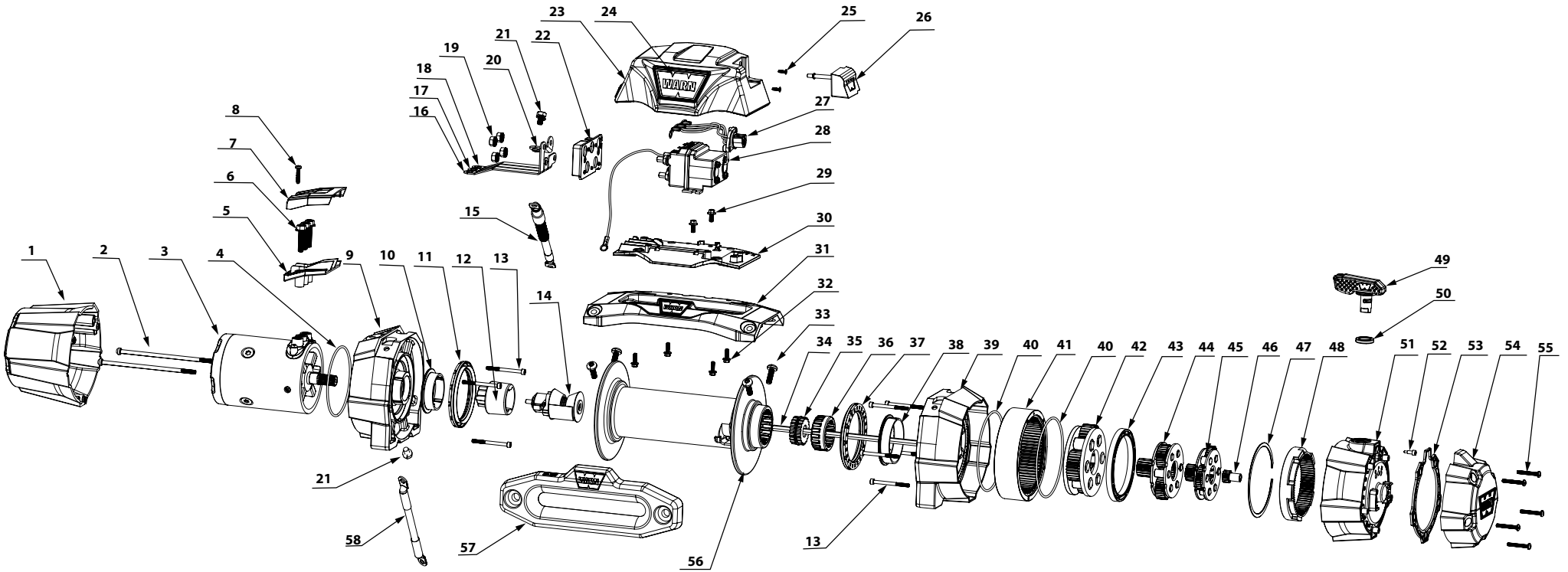
- Rope bulk anywhere along the length is reduced by 10% or more by abrasion.
- Two or more adjacent strands are cut.
- Flat areas or lumps are found that are not eliminated by flexing rope.
- Excessive fused or melted fibers are found. Any such areas will be stiff and the rope will have a glazed appearance.



- Rope with original bulk.
- Rope displaying 25% strand volume reduction from abrasion—rope should be replaced.
- Rope strand showing full volume.
- Rope strand reduced by 25% abrasion—rope should be replaced.
- Rope exhibits fiber-set from compression. A slight sheen is visible. This is not a permanent characteristic and can be eliminated by flexing the rope.
- Rope displays two adjacent cut strands—rope should be replaced.

SECTION 6 - SERVICE PART/KIT LIST AND DIAGRAM

	Kit Contents	DESCRIPTION	ZEON XD 10-S 110010 KIT PART NUMBER	ZEON XD 12-S 110012 KIT PART NUMBER
Service Kits	10, 38, 56	DRUM ASSEMBLY	110976	110976
	14	BRAKE ASSEMBLY	89916	89916
	58	GROUND CABLE 2GA	98399	98399
	15	POWER CABLE 2GA	109452	109452
	57	HAWSE FAIRLEAD	100333	100333
	12, 34	DRIVESHAFT/COUPLER KIT	109662	109662
	31, 33	TIE PLATE	109675	109675
	45, 46	1ST STAGE PLANETARY SET	109774	109685
	43, 44	2ND STAGE PLANETARY SET	109696	109696
	40, 41, 42, 43	3RD STAGE PLANETARY SET	109699	109699
	35, 36	DRUM DRIVER SET	109705	109705
	28	12V CONTACTOR	98381	98381
	26	CONTROL PACK DUST BOOT	109707	109707
	4, 10, 11, 37, 38, 40, 43, 50, 52, 53	GASKET BUSHING KIT	109709	109709
	29, 32, 33	TIE PLATE HARDWARE	109715	109715
	13, 33, 52, 55	TRANSMISSION HARDWARE	109716	109716
	6, 8, 13, 21	MOTOR HARDWARE	109717	109717
	1, 13	MOTOR COVER	109718	109718
	2, 3, 6, 8, 21	MOTOR, 12V	111070	111070
	9, 21, 39, 10, 11, 37, 38, 13, 33, 4, 40	DRUM SUPPORT KIT	111068	111068
	13, 40, 43, 47, 48, 49, 50, 51, 52, 53, 54, 55	TRANSMISSION HOUSING	109719	109719
	53, 54, 55	TRANSMISSION COVER	109721	109721
	16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33	CONTROL PACK ASSEMBLY	109722	109722
	23, 24, 25, 26, 27, 32	CONTROL PACK COVER	109724	109724
	5, 6, 7, 8	BUS BAR COVER KIT	109728	109728
	24 (all labels)	LABEL KIT	109729	109729
	Not Shown	ROPE ASSEMBLY	87915	93120
	Not Shown	REMOTE CONTROL	83665	83665
	Not Shown	MOUNT/FAIRLEAD HARDWARE	109711	109711
	Not Shown	SYNTHETIC ROPE HARDWARE	98526	98526
	Not Shown	CONTROL PACK RELOCATION BRACKET	111141	111141
	Not Shown	CONTROL PACK RELOCATION KIT - SHORT	111142	111142
	Not Shown	CONTROL PACK RELOCATION KIT - LONG	111143	111143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