KOBELT

6527 Electronic Actuator

Owner's Operation, Installation & Maintenance Manual

NOTES:

RECORD DATA BEFORE INSTALLATION FOR FUTURE REFERENCE	
Model #:	
Serial #:	
Date of Purchase:	
Date of Installation:	

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1 INTRODUCTION

1.1 CONTACT

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This document is intended to clearly present comprehensive product data and provide technical information to assist the end user in design applications. Kobelt reserves the right, without notice, to change the design, or construction, of any products and to discontinue or limit distribution of any products. Kobelt also reserves the right to change, or update, without notice, any technical information contained within this document.

Kobelt recommends that customers visit our website to check for updates to this Manual. Once a product has been selected for use, it should be tested by the user to ensure proper function in all possible applications. For further instructions, please contact our distributors or visit our website.

1.2 SAFETY

1.2.1 Safety Alerts

Throughout this manual, the following symbols, and their accompanying explanation, are used to alert the user to special instructions concerning a service or operation that may be hazardous if performed incorrectly or carelessly. The associated risk levels are stated below.

⚠ DANGER	This symbol indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	This symbol indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	This symbol indicates a hazardous situation, which if not avoided, could result in minor or moderate injury.
NOTICE	This symbol informs the reader of events not related to personal injury but which there is a risk of damage to property or equipment.
SAFETY INSTRUCTIONS	This symbol informs the reader of safety-related instructions or procedures.

1.2.2 Notice to Installer

Disregarding the following safety measures can result in an accident, causing severe injury to personnel and damage to material assets.

- Only use the product as directed in this manual.
- Never put the product into service if there is evidence of visible damage.
- Never put the product into service before fully completing installation and commissioning.
- Do not carry out any modifications to the product.
- Only use authentic Kobelt spare parts.
- Observe all local regulations, directives and laws during the installation of this product.
- All installation, commissioning, and maintenance work must only be conducted by qualified personnel. (For the purpose of this manual, qualified personnel are persons who are familiar with the assembly, installation, commissioning, and operation of the product and who have the qualifications necessary for their occupation.)
- Observe all specifications in this manual. If these guidelines are not followed and damage occurs, the warranty will be voided.

1.2.3 Product Hazards

⚠WARNING	**Disconnect Power:** Turn off power at distribution panel before beginning installation to protect installer from electrical hazards.

⚠CAUTION	**Voltage and Current Compatibility:** Confirm that the power source is compatible with the maximum voltage and current ratings of is product variant. Failure to do so could result in damage or fire.

⚠WARNING	**Equipment Starts Automatically:** Vessel propulsion may activate suddenly while servicing this product, causing bodily harm. Ensure that all power sources are locked out prior to performing work.

⚠WARNING	**Pinch Points:** The 6527 actuator contains pinch points, which can cause bodily harm. Ensure that hands and fingers remain clear of the pinch points when performing work.

2 PRODUCT DESCRIPTION

2.1 OVERVIEW

The Kobelt 6527 actuator is an electro-mechanical actuator that converts rotary motion from a DC motor to produce linear motion on a push/pull cable via the output lever. The 6527-S version has onboard electronics to control the motion and is connected to the Mighty Mariner propulsion control system via a CANbus interface. The onboard electronics receives commands from the control heads and positions its output lever to control engine throttle, clutch engagement, or trolling speed.

The basic Model 6527 comes with manual override and one trim pot per side for stroke adjustment. The actuator does not have an internal resilient link. Hence the stroke must be precisely adjusted to suit the device being controlled.

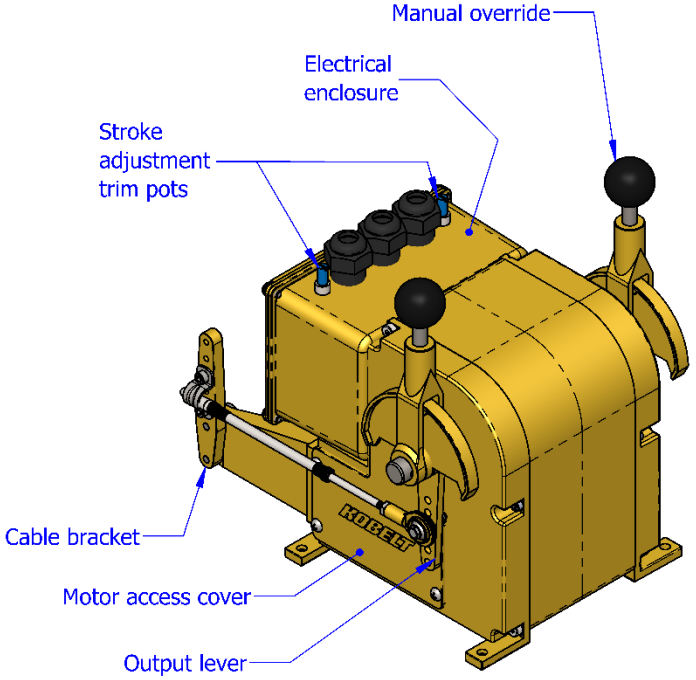


Figure 1: Actuator Overview

2.2 TECHNICAL DATA

Table 1: 6527-S Technical Data

MODEL	6527				
KOBELT PART #	6527-S			6527	
System compatibility	Mighty Mariner			Basic version	
Output	No load	Cont.[2]	Rated	Stall	
Torque	0 [0]	82 [9.3]	180 [20.3]	500 [56.5]	(in-lbs) [Nm]
Force	0 [0]	59 [262]	130 [579]	362 [1611]	(lbs) [N]
Speed	83	67	53	0	(deg/sec)
Current	.3	1.8	3.4	8.6	(A)
Max ON time[1]	∞	54	29	11	(secs)
Duty[1]	100%	25%	13%	5%	(% on)
Stroke	75°				
Supply voltage	24 (+/-25%) VDC				
Terminals	22-16 AWG, screw clamp				
EMC emissions	to IEC 60945				
EMC immunity	to IEC 60945				
Environmental category	ENV2 / Protected				
Operating temperature	41°F … 131°F [5°C … 55°C]				
Vibration resistance	0.7 g				
Product weight	28.7 lbs [13.0 kg]				
Finish	Uncoated Bronze				

Notes:

1. Specified at maximum ambient temperature (55°C)
2. At 25°C ambient temperature

2.3 MODEL CONFIGURATION KEY

The 6527 actuator is manufactured in two versions:

6527-S Mighty Mariner version with onboard electronics

6527 Basic version with positioning motors and feedback potentiometers only

Please ensure you refer to the correct sections of this manual for technical assistance

3 INSTALLATION

3.1 MECHANICAL

The location of the 6527 Electronic Actuator must satisfy the following conditions:

- Vibrations not to exceed rated vibration resistance (see table 1)
- Ambient temperatures not to exceed rated temperature (see table 1)
- Do not install in areas exposed to moisture
- Do not install near high-power devices
- Ensure that the mounting surface flat within .01" [.25 mm]

When installing the unit;

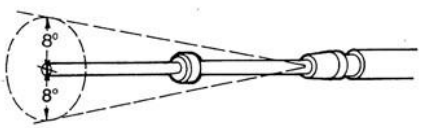
1. Set the unit on the mounting surface and orient to desired operating position.
2. Probe under the feet with a feeler gauge to determine shimming requirement.
3. Insert the shims determined from step 6. Use ANSI shims that straddle the mounting bolts.
4. Insert 1/4in [6 mm] bolts. It is recommended to use a thread locking product such as Loctite® to ensure a vibration resistant and secure joint.
5. Tighten the mounting bolts to 64 in-lbs [7.2 Nm]

⚠WARNING	**Mounting:** Failure to comply with the mounting instructions above may result in failure of the actuator and loss of control over the engine.

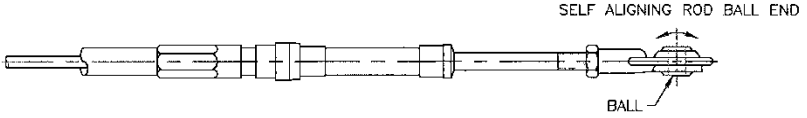
3.2 CONTROL CABLE

3.2.1 Hardware

The 6527 actuator can be used with either 30 series or 40 series control cable. Kobelt Manufacturing does not recommend solid core cables if bends are present in the cable routing. A solid core cable would consist of a single wire that is too stiff. Multi-stranded cores are more flexible and therefore generates less friction during operation.



The cable ends must also be able to articulate approximately 8 degrees in either direction.



NOTICE	**Accurate Positioning:** For applications that require accurate positioning, a tie rod with rod ends is recommended over a push/pull cable.

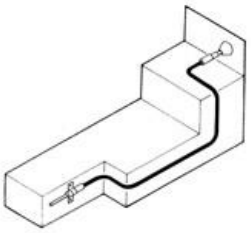
For terminating the cables Kobelt recommends a ball rod end. Rod ends are self-aligning and therefore minimize friction and binding.

When installing hardware to the cable end, do not twist the core. If required, use a pair of pliers to hold the cable core from turning while installing the terminating hardware. When gripping the cable end, apply the pliers immediately under the threads and take care not to score the cable rod. A scored cable rod will damage the cable seal allowing moisture and dirt to enter the casing.

To install the 6527 actuator, the appropriate connection kit must be purchased. Consult the table below for the correct kit:

Table 2: Connection Kits

Use Case	Kit Number
30 series cable	6527-0901
40 series cable	6527-0902



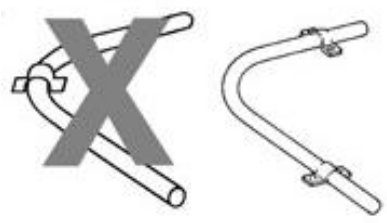
3.2.2 Cable Routing

Measure the cable along the path it will take from where the cable hubs will be anchored at each end. Follow the actual cable path as closely as possible, allowing for the largest practical bend radii.

Do not force the cable into tighter bends than what is listed in the table below:

Optimum Life Bend Radii	
Cable Size	***Min Bend Radius***
30 series	3 inches[1] [76 mm]
40 series	4 inches [127 mm]
Solid core	6 inches [152 mm]

It is important to securely anchor the cable hubs. Any free play in the cable clamp or mounting bracket will result in lost motion.

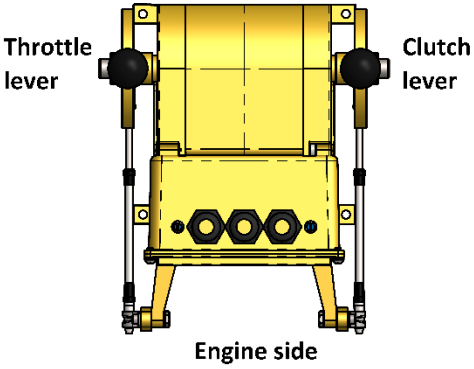


When securing the cable with clamps near bends, position two clamps at the ends of the bend rather than one in the middle.

When installing a push-pull cable, do not kink the cable since this will permanently damage the core and casing, rendering the cable stiff and inoperable. Even minor kinks will result in premature failure.

Avoid routing the cable near sources of heat, such as exhaust pipes.

3.2.3 Cable Connection



The 6527 actuator has a lever mechanism for actuating the clutch and the throttle. Consult the figure at left to select the correct function.

Figure 2: Lever Assignment

Select the appropriate pin position to provide the required stroke and force. Consult the Table below:

Table 3: Actuator Output

Pin	Stroke in [mm]	Force lbs [N]
1	1.67 [42]	130 [580]
2	2.13 [54]	103 [456]
3	2.59 [66]	85 [376]
4	3.05 [77]	72 [320]
5	3.51 [89]	62 [278]
6	4.05 [103]	55 [246]

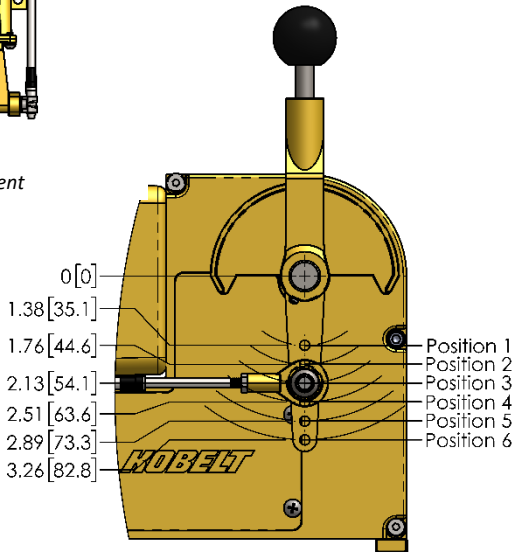


Figure 3: Cable Pin Positions

The clutch valve mechanism on most marine transmissions requires approximately 2¾" [70 mm] to 3" [76 mm] of travel. Consequently, the cable must be attached at pin position 4 of the output lever.

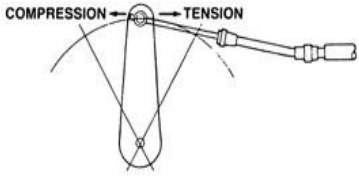
In some marine applications with twin engines, both engines are turning in the same direction and therefore one gear box is running in the reverse to drive the propeller ahead. In this particular installation the actuators must rotate in opposite directions to provide the proper push and pull mode for either gear.

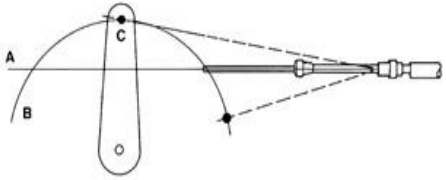
To correctly install the control cables, follow the steps below:

1. Secure the cables to the support bracket with the appropriate cable clamps.
2. Move the output lever to the extreme forward position.
3. Ensure that the cable end extends slightly past the desired pin position.
4. Move the output lever to the extreme aft position.
5. Ensure that the cable end, when in push mode, extends beyond the same desired pin position.
6. If the cable end points from one extreme to the other are unequal, then the cable end fitting must be threaded out or in to correct balance the range of motion.
7. After the proper position is found, the cable end is attached to the output lever and the jam nut tightened.
8. The final step is to test that the actuator goes from neutral to both forward and then reverse gear engaged positions without bottoming.

3.2.4 Actuator End Connection

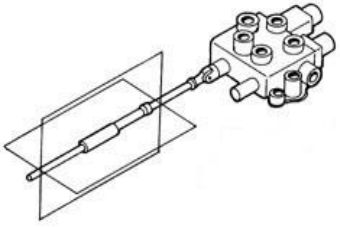
When connecting the actuating end of the cable to the throttle or clutch lever, install the cable so that the greatest loads are in tension (pulling) rather than compression (pushing), if possible.





Where the cable is connected to a lever, the cable must be mounted so that it lies on a plane (A) midway on the arc (B) described by the movement of the connection point on the lever (C).

When connecting the actuating end of the cable to a spool valve such as the Kobelt 4605 servo cylinder, maximum cable life and efficiency is achieved when the cable is aligned with the lever in two planes. Reference the figure at right:



3.2.5 Electric Clutch Adaptor Installation

When connecting the electric clutch adaptor to actuator, make sure to choose the correct position according to Figure 4

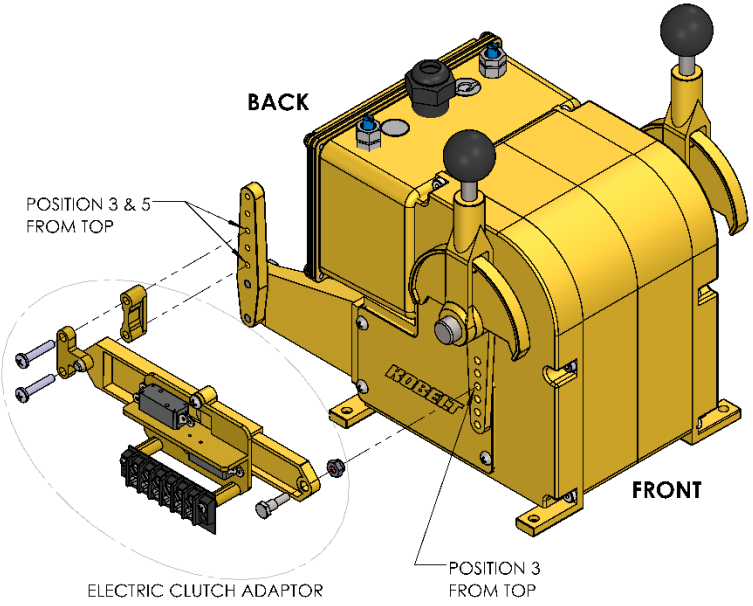
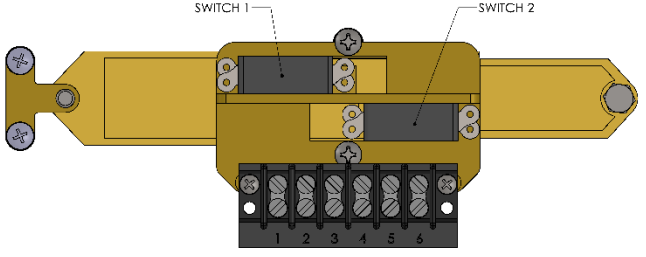


Figure 4: ELECTRIC CLUTCH ADAPTOR CONNECTION



ELECTRIC CLUTCH ADAPTOR

3.3 ELECTRICAL

3.3.1 Mighty Mariner System

The 6527-S actuator is equipped with three cable glands with which to make the electrical connections. Use 0.20 inch [5 mm] to 0.47 inch [12 mm] OD cable with 18 AWG conductors for external connections to the engine controller. The cable must be twisted pair and shielded to protect signal integrity. Use ferrules on the cable ends for all wire connections.

Plug connectors are supplied on the board inside of the electrical enclosure. They can be accessed by removing the enclosure cover. Use these connectors for making the connections to the actuator.

Connectors P1 and P2 are mandatory and required for operation of the 6527-S Electronic Actuator. Connectors P3, P4, and P5 are optional depending on system configuration. Connectors P6 and P7 are factory-installed and should not be modified.

Up to eight control heads and actuators can be connected in a 'daisy chain' fashion to either the P2 or P3 connector for making the communication connections. The last device, whether an actuator or control head must have a 120 ohm resistor installed between the data terminals (pins 3 & 4).

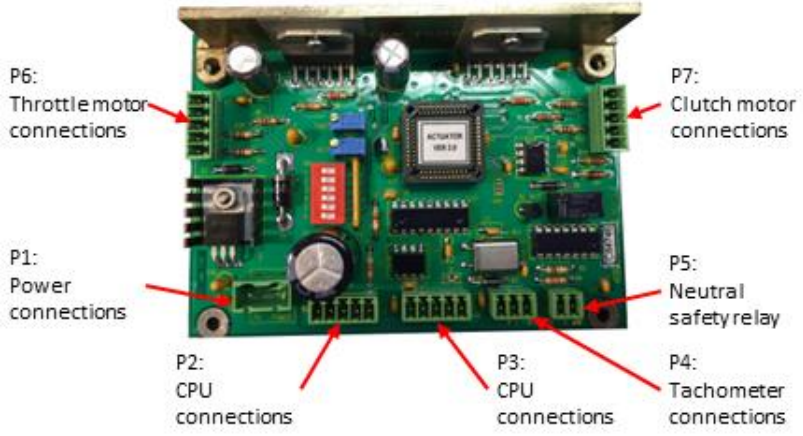


Figure 5: Connector Locations

Table 4: Power Input Connector

P1	POWER INPUT		
Pin #	**Signal**	**Conductor**	**Function**
1	VDC+	RED	Main Power Input
2	COM	BLK	Main Ground

⚠WARNING	**Disconnect Power:** Turn off power at the distribution panel before beginning installation or removing the cover.

Table 5: Primary COM/CPU Port Connector

P2	COM/CPU INPUT		
Pin #	**Signal**	**Conductor**	**Function**
1	VDC+	WHT 2	Bus supply
2	COM	BLK 2	Bus common
3	DATA+	WHT 1	Bus data -H
4	DATA-	BLK 1	Bus data - L
5	Shield	SHIELD	Shield

Table 6: Secondary COM/CPU Port Connector

P3	COM/CPU INPUT		
Pin #	**Signal**	**Conductor**	**Function**
1	VDC+	WHT 2	Bus supply
2	COM	BLK 2	Bus common
3	DATA+	WHT 1	Bus data -H
4	DATA-	BLK 1	Bus data - L
5	Shield	SHIELD	Shield

NOTICE	The last control head must have a 120 ohm resistor between terminals 3 & 4 or network communication will be lost.

3.3.1.1 Synchronizer/Tachometer Connection

The Synchronizer sensor is realized with a three-wire proximity switch connected directly to the 6527-S as shown in the figure below:

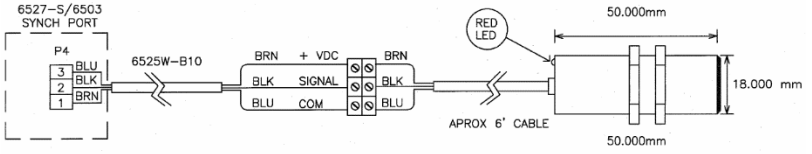


Figure 6: Synchronizer Pickup Wiring Diagram

Table 7: Tachometer Port Connector

P4	SYNCHRO PORT		
Pin #	**Signal**	**Conductor**	**Function**
1	VDC+	BRN	Sensor Power
2	SYNCH PULSE	BLK	Sensor Signal
3	COM	BLU	Sensor Common

3.3.1.2 Shaft Brake/Neutral Safety Connection

The Shaft Brake/Neutral Safety Output is a set of normally open contacts that close when the Clutch is in the neutral position. Configuring the output for Shaft Brake or Neutral Safety is done using external relays and protection diodes.

The Neutral Safety Switch configuration is seen in Figure . The relay is interlocked to Clutch Neutral Position, the engine can only be started when the system is powered and the Control Head levers are in neutral position.

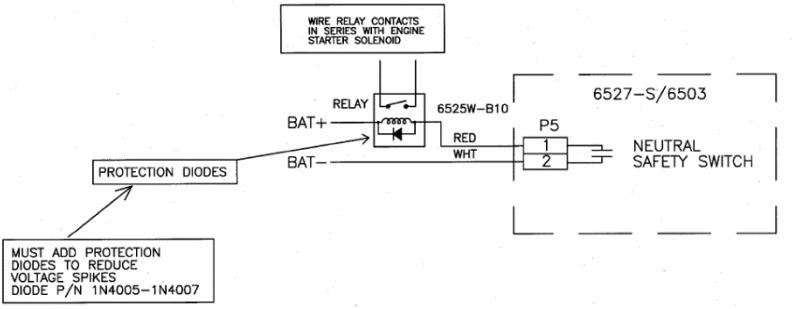


Figure 7: Neutral Safety Switch Wiring Diagram

Table 8: Neutral Safety Port Connector

P5	NEUTRAL SAFETY PORT		
Pin #	**Signal**	**Conductor**	**Function**
1	N/O	RED	Relay Contact, N/O
2	COM	WHT	Relay Contact, Common

Note that the Neutral Safety relay is also used to control the shaft brakes when present. The Shaft Brake configuration is seen in Figure . As the Forward or Reverse Clutch is activated, the Brake Relay disconnects, and the Brake is deactivated.

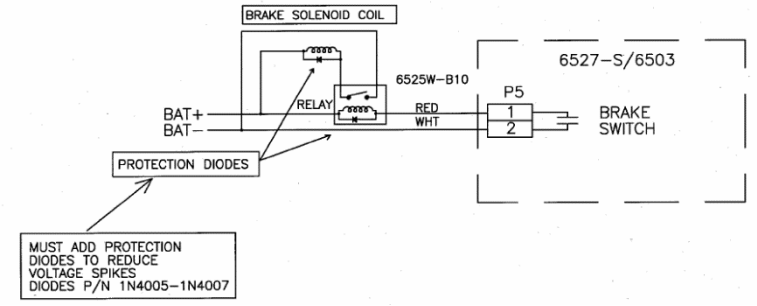


Figure 8: Shaft Brake Switch Wiring Diagram

NOTICE	**Relay Current:** Relay contacts must be able to handle starter solenoid current. Relay is customer supplied.

NOTICE	**Protection Diodes:** Protection diodes must be used on all external relays to avoid damaging the system.

⚠WARNING	**Neutral Safety Switch Bypass:** A bypass for the neutral safety switches must be available to start the engines if the control system has failed.

NOTICE	**Check All Connections:** Improper wiring connections may result in damage to the 6527-S Electronic Actuator.

3.3.2 6525 System

The 6527 basic actuator for use with the 6525 system does not have a circuit board and therefore has a different wiring scheme. Consult the diagram below to connect the actuator correctly:

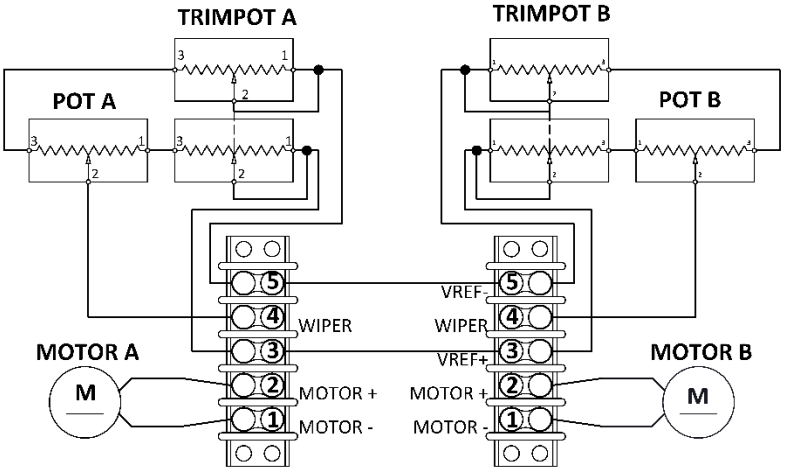


Table 9: 6527 Actuator Terminations

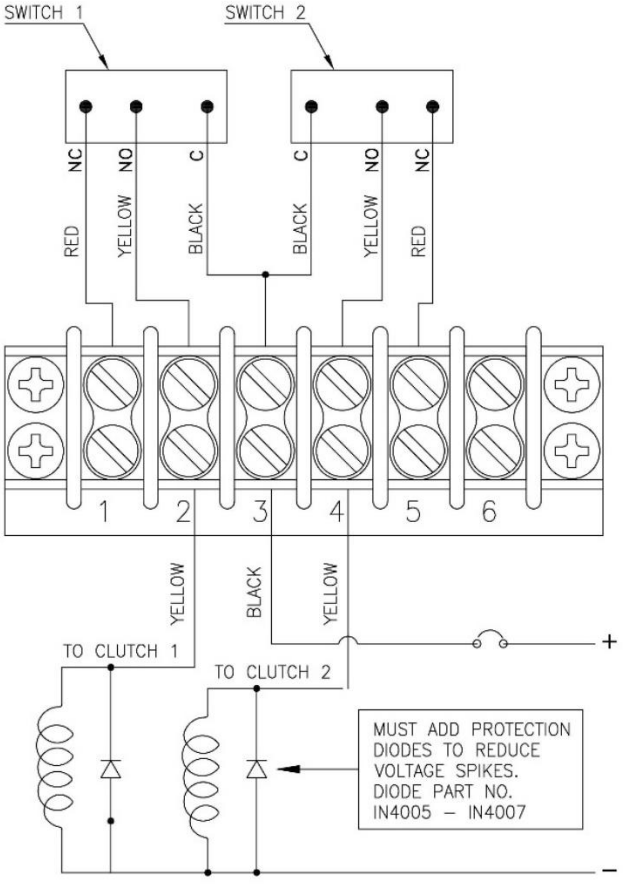
Throttle Lever			
Terminal #	**Signal**	**Wire**	**Function**
1	Motor	BLK	Motor A common
2	Motor	RED	Motor A power
3	Vref+	BLK	Throttle Pot Positive Reference
4	POTA	GRN	Throttle Pot Wiper Input
5	Vref-	WHT	Throttle Pot Negative Reference
Clutch Lever			
1	Motor	BLK	Motor B common
2	Motor	RED	Motor B power
3	Vref+	BLK	Clutch Pot Positive Reference
4	POTB	GRN	Clutch Pot Wiper Input
5	Vref-	WHT	Clutch Pot Negative Reference

Notes:

1. The potentiometers are wired mirror image to synchronize the outputs.
2. Terminals 3 & 5 are internally connected and do not require separate termination.

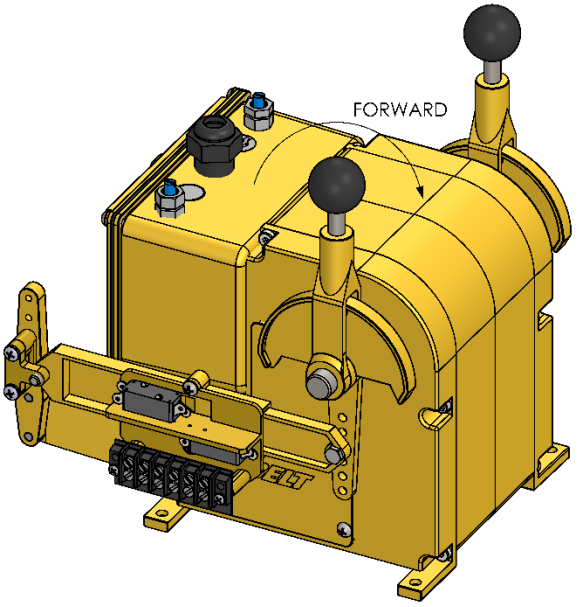
3.3.3 Electric Clutch Adaptor Wiring

For wire connection use the below diagram.



2170 WIRE DIAGRAM

When the “DIP Switch” is in the Normal position (Off position), Switch1 is for FWD and Switch2 is for REV. (for DIP Switch configuration and Clutch Travel Direction see Table 10, number 3)



4 COMMISSIONING

4.1 ELECTRICAL CHECK

⚠CAUTION	Ensure that the cover is installed and secured before powering on the 6527-S.

- Confirm that the electrical connections to the 6527-S have been made.
- Confirm that a breaker has been installed correctly and is turned ON.

4.2 CALIBRATION AND ADJUSTMENT

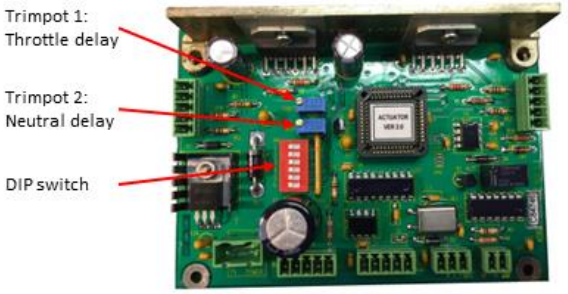
⚠CAUTION	These adjustments should only be performed by qualified personnel, and only while the vessel is at dock.

1. Turn OFF the power to the 6527-S prior to adjusting the trimpots or DIP switches.
1. Remove the enclosure cover
2. Use a **non-conductive** flathead screwdriver to adjust the trimpots or DIP switches.
3. Rotate the trimpots to set the desired system response, adjust the DIP switch positions to configure the system.
4. Turn ON power.
5. Operate system to verify desired response.
1. Repeat as necessary, until the unit functions as desired.
2. Replace the enclosure cover.

⚠CAUTION	To reduce the potential for electrical shock and to avoid damaging the electronics, use a **non-conductive** screwdriver, or other equivalent tool, to adjust the trimpots and DIP switches.

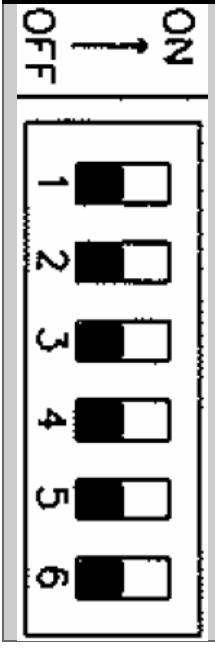
4.2.1 DIP Switches

DIP switch SW1 is used to assign the actuator, set the travel direction and adjust the throttle boost. Locate the DIP switch on the board and consult the timing table below to make the appropriate settings.



Follow the table below to set the DIP switch correctly:

Table 10: DIP Switch Configuration

SW 1 Function			
	**OFF POSITION**	**ON POSITION**	**FUNCTION**
	PORT ACTUATOR	STBD ACTUATOR	PORT/STBD ACTUATOR ASSIGMENT
	NORMAL	REVERSE	THROTTLE ACTUATOR TRAVEL DIRECTION
	NORMAL	REVERSE	CLUTCH ACTUATOR TRAVEL DIRECTION
	AUXILIARY	MAIN	SYNCHRONIZER
	SEE TIMING		THROTTLE BOOST
	SEE TIMING		THROTTLE BOOST

In conventional applications, the throttle actuator rotates in a counterclockwise direction to increase the engine speed and a clockwise rotation to decrease it. If the opposite movement is desired, the actuator travel direction must be reversed using DIP switch 2 (See Table 10).

The standard clutch actuator rotates in a clockwise direction for forward and counter clockwise direction for reverse. The direction can be reversed by setting DIP switch 3 (See Table 10).

NOTICE	**Single Engine Configuration:** SW1 must be set to OFF position (PORT ACTUATOR)

The throttle boost amount and duration are set in one of four possible configurations using the fifth and sixth switches:

Table 11: Throttle Boost Timing

SW 5	SW 6	THROTTLE BOOST	THROTTLE BOOST TIME
OFF	OFF	0%	0 SECONDS
ON	OFF	10%	2 SECONDS
OFF	ON	20%	2 SECONDS
ON	ON	20%	3 SECONDS

4.2.2 System Timing Adjustment

Table 12: System Timing

System Timing					
POT	**FUNCTION**	**DELAY**	**INCREASE**	**DECREASE**	**RATE**
VR 1	THROTTLE DELAY	0-24 SECONDS	CW	CCW	2 TURN/SEC
VR 2	NEUTRAL DELAY	0-24 SECONDS	CW	CCW	2 TURN/SEC

NOTICE	**Twin Engine Configuration:** Neutral delay and throttle delay must be set identical for both actuators. One actuator must be set to PORT and the other to STBD, do not set both to the same switch position (SW 1). One actuator must be set to MAIN and the other to AUXILIARY, do not set both to the same switch position (SW 4).

4.2.3 Stroke Adjustment

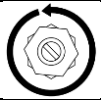
The 6527-S actuator is equipped with manual overrides and one trim pot per side to adjust the stroke. The actuator does not have an internal resilient link. The stroke must, therefore, be adjusted precisely to suit the device being controlled.

NOTICE	Set the clutch actuator stroke accurately; otherwise, the throttle actuator will not respond. The clutch motor must stop running when the correct stroke is obtained. Re-adjust stroke if motor is still trying to rotate.

NOTICE	To increase actuator stroke, turn trimpot CCW and vice versa. Lock trimpot when desired position obtained. Do not adjust actuator near its max stroke. Adjust the stroke accurately to prevent the actuator from alarming.

Fine adjustments to the throttle or clutch levers stroke can be made using trimpots on the actuator (See Figure 1). Trimpot 1 adjusts the throttle lever stroke while trimpot 2 adjusts the clutch lever stroke.

Table 13: Stroke Trimpot Adjustment

Trimpot Adjustment	Stroke Effect
	Decrease actuator stroke.
	Increase actuator stroke.

4.3 FUNCTIONAL TEST

After installation, test that the clutches go from neutral to both forward and then reverse gear engaged positions without the actuator motor tripping on over current.

Also ensure that the full speed range is obtained with full actuator travel.

Ensure that the actuator travel directions are correct, and the time delay settings are appropriate. Adjust if necessary.

⚠CAUTION	Do not put the vessel into service until the control head has been tested. The Functional Test should be carried out while the vessel is still at dock.

5 OPERATION

5.1 MANUAL OVERRIDE

The 6527 has a provision to permit manual control over the actuator functions should a power failure or actuator failure occur. Reference the diagram at right:

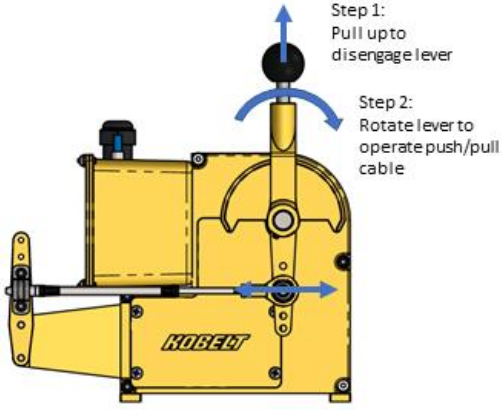


Figure 9: Manual Override

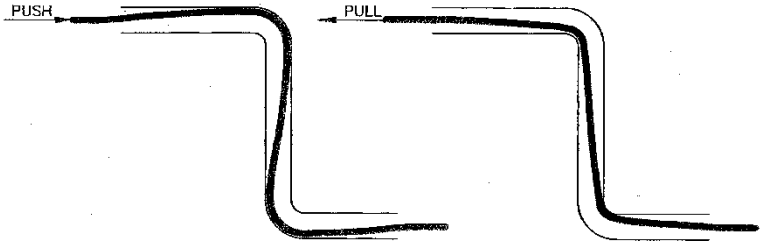
6 MAINTENANCE

6.1 PREVENTATIVE MAINTENANCE

- Quarterly (4 times per year)
  - Visually inspect wire and cable insulation for splits or damage.
  - Ensure there is no visible corrosion on the unit.
- Every 2 years
  - Lubricate gears
  - Inspect push/pull cable
  - Confirm cable glands are secured to cables.
  - Replace seals.
- Every 5 years
  - Replace potentiometers
  - Replace motor brushes

6.2 INSPECTION

When a cable core is pushed, it will take the longest route and, conversely, when pulled, it will take the shortest route. This appears as 'lost motion' at the actuation end. The cable stroke must be measured periodically to confirm adequate stroke.



6.3 CALIBRATION

When replacing the potentiometer or if the setting has become disturbed, follow these steps to center the output:

1. Position the output lever in the center (neutral) position.
2. Remove the motor access cover.
3. Connect a multimeter to the Pot – (white wire) and the Pot Wiper (green wire). Set the meter to read resistance.
4. Loosen the two locking set screws on the pinion gear with a Phillip's screwdriver.

5. Rotate the potentiometer bracket until the meter reads half of the rated output (~2500 ohms for a 5K potentiometer)[1].
6. Tighten the two locking screws and replace the cover.

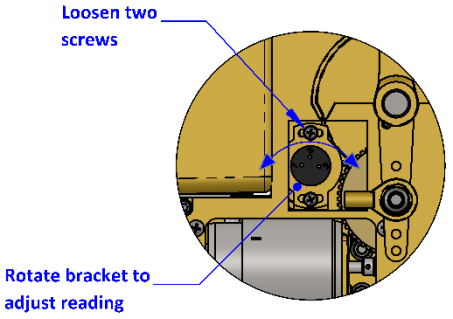


Figure 10: Potentiometer Calibration

Notes:

1. Due to variations in potentiometer ranges, compare the output between the wiper and Vref+ to wiper and Vref-. Adjust the bracket to balance.
2. For large adjustments it will be necessary to remove the bracket to disengage the gear teeth and center the output before making fine adjustments with the bracket.

6.4 Potentiometer Connection

The actuator potentiometers are wired to the two Motor Connectors. When replacing these devices ensure that they are connected as per the table below:

Table 14: Potentiometer Connector Termination

Connector P6: Throttle Lever				
Pin #	**Signal**	**Wire**	**Pot terminal**	**Function**
3	Vref+	BLK	Pot 1, terminal 1	Throttle Pot Positive Reference
4	POT1	GRN	Pot 1, terminal 2	Throttle Pot Wiper Input
5	Vref-	WHT	Pot 1, terminal 3	Throttle Pot Negative Reference
Connector P7: Clutch Lever				
3	Vref-	WHT	Pot 2, terminal 3[1]	Clutch Pot Negative Reference
4	POT2	GRN	Pot 2, terminal 2	Clutch Pot Wiper Input
5	Vref+	BLK	Pot 2, terminal 1[1]	Clutch Pot Positive Reference

1. The potentiometers are wired mirror image to synchronize the outputs.

6.5 LUBRICATION

The actuator drive train must be lubricated to prevent premature wear. Use a grease with MoS_2 additives for best results. The following greases are approved:

Table 15: Approved Lubricants

EP Grease Brand
CHEVRON DELO MOLY 5% EP2
MOBIL XHP-322
SHELL S3 V460

6.6 RECOMMENDED SPARE PARTS

The spare parts kept on hand will depend on the severity of the service. The User should monitor the condition of their actuator to predict necessary spare parts and ensure they are on hand when needed. As a minimum Kobelt recommends keeping the following parts for each actuator in service:

Table 16: Recommended Spare Parts

Part Number	Description	Qty
6531-BK	Motor brush kit	2
6527-1028R	Motor assembly	1
POT-6	Potentiometer	2
YPB-3236	Pinion Gear	2
TRIMPOT-3	Trimming potentiometer	2
6527-1001	Printed circuit board assembly	1
2144-3	Rod end	2

When purchasing spare parts refer to Appendix B: Parts List at the back of this manual for Kobelt component Part Numbers.

NOTICE	It is recommended that any required service work on a Kobelt unit be performed by a factory authorized service representative. Please contact the nearest Kobelt authorized distributor for assistance.

7 TROUBLESHOOTING

If you encounter problems with the operation of your product, please refer to the trouble-shooting suggestions in the 6505 manual or the Mighty Mariner System Manual before contacting Kobelt for assistance. If the steps do not resolve your issue, please reach out to either Kobelt directly or our Dealers in your area.

8 WARRANTY

Kobelt Manufacturing Co. Ltd. ("Kobelt") warrants the Products and Parts manufactured by Kobelt to be free from defects in workmanship or material and that said products are designed mechanically and functionally to perform to specifications.

This warranty is effective providing:

- The equipment is used within the intended operating conditions and in accordance with Kobelt recommendations
- The equipment is installed according to equipment diagrams, specifications and recommendations which Kobelt has provided.

This warranty becomes invalid if the factory supplied serial number has been removed or altered on the product. This warranty does not cover cosmetic damage or damage caused by an act of God, accident, misuse, abuse, negligence or modification of any part of the product. This warranty does not cover damage due to improper operation or maintenance, connection to inappropriate equipment or attempted repair by anyone other than an authorized Kobelt representative.

Upon identification of a potential issue or defect with a Kobelt Product or Part, the Warranty Applicant ("Applicant") must immediately contact Kobelt and describe the issue in writing, by letter, fax, email or other electronic conveyance. Kobelt will then assess the cause of the defect and determine warranty applicability and appropriate remediation.

If any part is found to be defective, Kobelt will replace said part FOB the Kobelt factory provided that any such defective part is returned by the Buyer with freight and applicable forwarding charges prepaid by the Buyer. Kobelt's sole obligation to the Applicant will be to repair or replace the defective part with same or similar product, to a maximum value of the list price of the product or part. The Kobelt warranty does not cover labour charges, travel or any other associated expenses.

All Products and Parts manufactured by Kobelt, are subject to a warranty against manufacturer's defects in materials or workmanship for a period of two (2) years from the date of purchase.

Kobelt will be responsible for all Products or Parts sold by Kobelt but manufactured by 3rd party manufacturing companies. However, these products and parts are subject to applicable 3rd party warranties and may not be the same as the Kobelt warranty.

9 MANUAL REVISIONS HISTORY

Table 17: Table of revision changes

Document Revision	Release Date	Author	Revision Summary
C	2023-12-15	SV	• Added installation picture and wire diagram for Electric Clutch adaptor

10 APPENDIX A: INSTALLATION DIMENSIONS

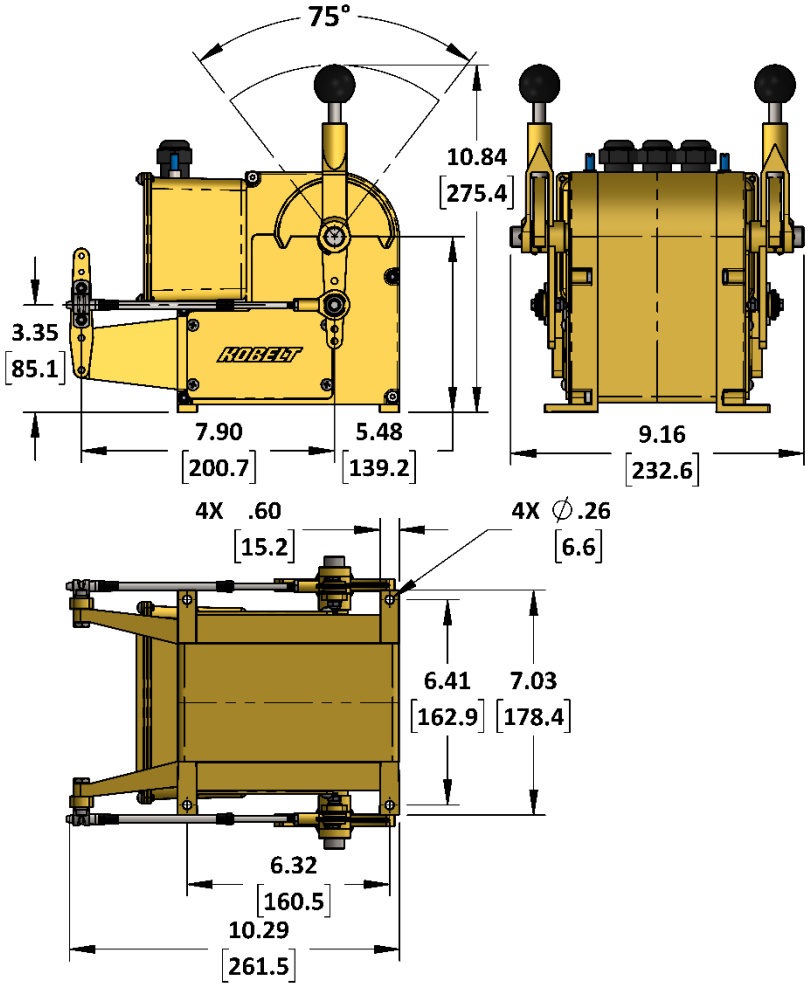
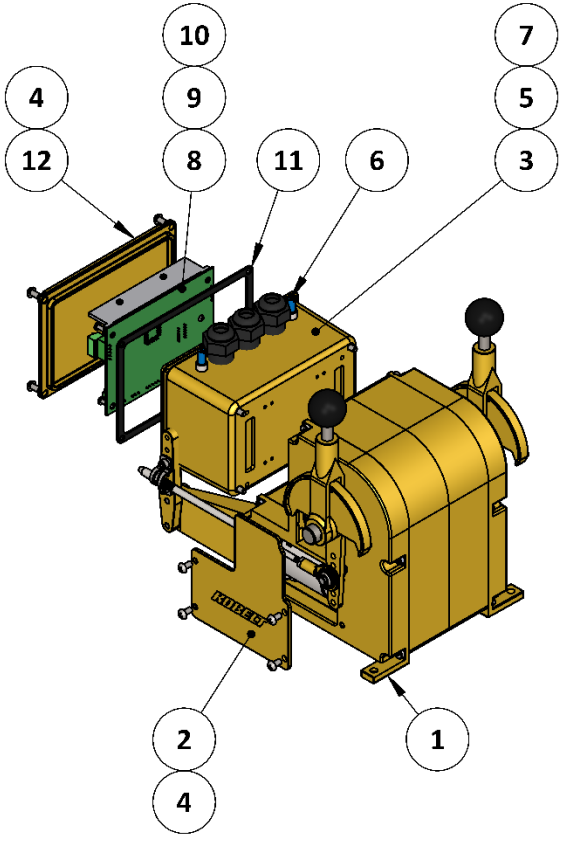


Figure 4: 6527-S Installation Dimensions

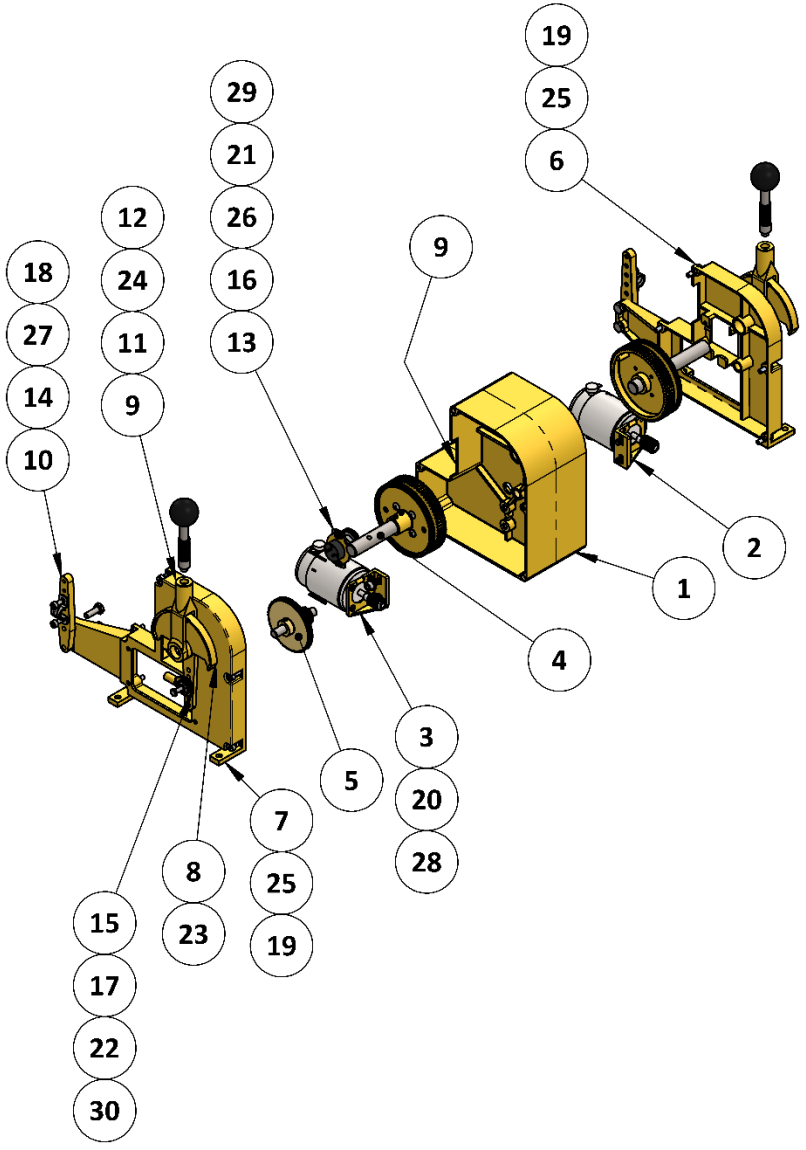
11 APPENDIX B: PARTS LIST

Figure 5: 6527-S Parts List



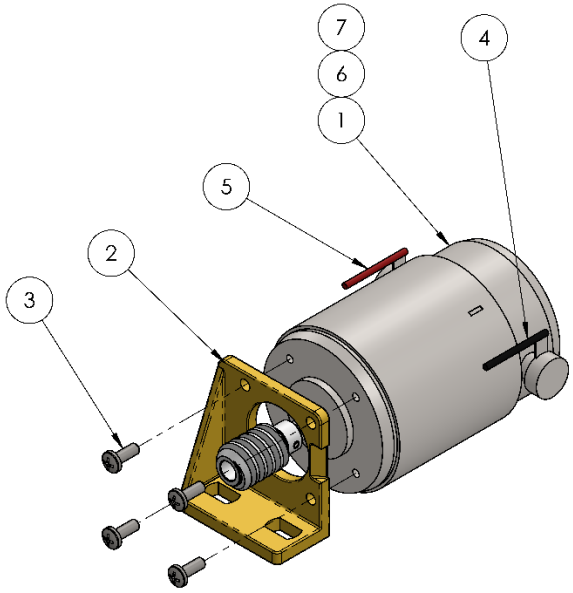
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6527-SUB	ACTUATOR, SUB ASSEMBLY
2	2	6527-0004	COVER, SIDE
3	1	6527-0005	CONNECTION HOUSING
4	12	1010-0806	SCREW, RND HD PHL, 10-24 X 3/8, 18-8 SS
5	4	1002-0806	SCREW, SKT HEAD, 10-24 X 3/8, 18-8 SS
6	2	TRIMPOT-3	TRIMPOT, 1K
7	3	6009-7840	CABLE GLAND, 1/2 NPT, .27 - .48 CORD, NYLON
8	1	6527-1001	BOARD ASSEMBLY; MIGHTY MARINER ACTUATOR
9	2	1012-0608	SCREW, PAN HD, PHL, #6-32 x 1/2, 18-8
10	2	1012-0606	SCREW, PAN HD, PHL DRIVE, 6-32 x 3/8IN, 18-8
11	1	6527-0022	GASKET; ACTUATOR ENCLOSURE
12	1	6527-0014	COVER, TOP

Figure 6: 6527-SUB Parts List



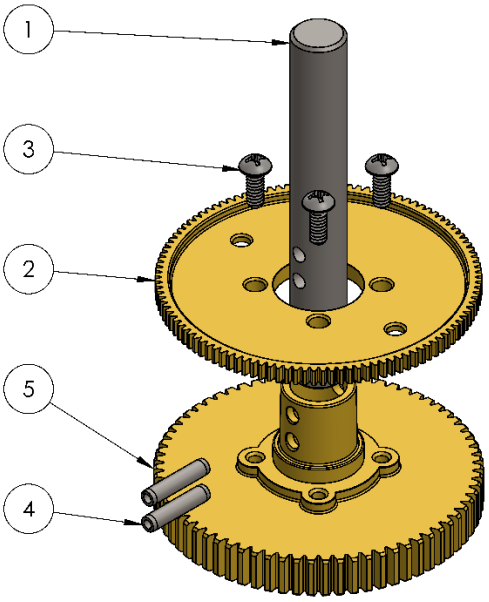
ITEM	QTY.	PART NUMBER	DESCRIPTION
1	1	6527-0001	CENTRE HOUSING
2	1	6527-1028L	MOTOR SUBASSEMBLY; 24VDC / LH
3	1	6527-1028R	MOTOR SUBASSEMBLY; 24VDC / RH
4	2	6527-1012	SPUR GEAR SUB ASSEMBLY
5	2	6527-1015	GEAR ASSEMBLY; ELECTRIC ACTUATOR
6	1	6527-0002	SIDE HOUSING, LEFT
7	1	6527-0003	SIDE HOUSING, RIGHT
8	2	6527-0006	DISCONNECT CAM
9	2	6527-0007	DISCONNECT ARM
10	2	6527-0009	STATIONARY ARM
11	2	6524-0015	SHAFT, HANDLE
12	2	2030-0001	HANDLE KNOB, SPHERICAL, BLACK
13	2	6524-0013-1	POTENTIOMETER BRACKET
14	2	2108-0040	CABLE CLAMP, 40 SERIES
15	2	2144-3	ROD BALL END, 1/4 UNF X 3/16 PIN
16	2	POT-6	POTENTIOMETER; 5K / 340DEG / 22 MM / .25IN SHAFT
17	2	1001-0816	SCREW, HEX HD, #10-24 X 1", 18-8 SS
18	4	1001-1012	SCREW - HEX HD; 1/4-20 X 3/4 UNC; 18-8 SS
19	6	1002-0808	SCREW, SKT HEAD, 10-24 X 1/2, 18-8 SS, ASTM F837
20	4	1002-1008	CAP SCREW - SKT HD; 1/4 UNC X 1/2 LG, 18-8
21	4	1012-0606	SCREW, PAN HD, PHL DRIVE, 6-32 x 3/8IN, 18-8 SS
22	2	1022-0308	LOCKNUT, NYLON, #10-24, ASME B18.16.6, 18-8 SS
23	2	1024-0818	SPRING PIN, 3/16 X 1 1/8, SS
24	2	1201-0140	SPRING, COMP, 1.04 OD X 5.43 LG, AISI 302
25	4	1019-0404	SCREW, SHOULDER, 1/4 DIA X 1/4 LG, 18-8 SS
26	2	YPB-3236	SPUR GEAR - DELRIN; 36T, 32DP, B STYLE
27	4	1002-0806	SCREW, SKT HEAD, 10-24 X 3/8, 18-8 SS, ASTM F837
28	4	1023-0216	FLAT WASHER, 1/4, TYPE B, NARROW, 18-8 SS
29	4	1023-0106	WASHER, FLAT, #6, ANSI B18.22.1 TYPE A, 18-8 SS
30	2	1023-0108	WASHER, FLAT, #10, 7/16 OD, 18-8 SS

Figure 7: 6527-1028R & 6527-1028L



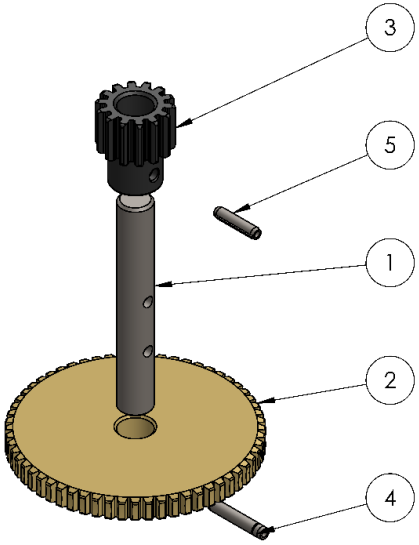
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	MOTOR-14201	MOTOR, 24VDC, 10-OZ-IN, 3330 RPM, 1.79A
2	1	6527-0012A	MOTOR BRACKET, RIGHT
	1	6527-0012	MOTOR BRACKET, LEFT
3	4	1012-0606	SCREW, PAN HD, PHL DRIVE, 6-32 x 3/8IN, 18-8 SS
4	1	6014-0018B	WIRE, TYPE MW, 18 AWG, BLK
5	1	6014-0018R	WIRE, TYPE MW, 18 AWG, RED
6	1	6524-0019	WORM, 0.1307IN PITCH X .576IN OD, AISI C12L14
7	1	1024-0406	PIN, SPRING, SLOTTED, 3/32IN X 3/8IN, AISI 420

Figure 8: 6527-1012



ITEM	QTY.	PART NUMBER	DESCRIPTION
1	1	6527-0010	SPUR GEAR, 70T, 20DP, B-STYLE
2	1	6527-0017	SHAFT, 5/8IN OD X 4.5625IN LG, AISI 303
3	1	6527-0011	SPUR GEAR, FEEDBACK, 112T, 32DP, 1.0IN BORE, B-STYLE
4	4	1010-0808	SCREW, RND HD PHIL, #10-24 X 1/2, 18-8 SS
5	2	1024-0814	SPRING PIN; 3/16 DIA X 7/8 LG, AISI 420

Figure 9: 6527-1015



ITEM	QTY.	PART NUMBER	DESCRIPTION
1	1	6527-0018	SHAFT
2	1	6527-0015	WORM GEAR, 60T, B-STYLE
3	1	1401-0083	SPUR GEAR, 14T, 20DP, B-STYLE
4	4	1024-0512	SPRING PIN, 1/8 X 3/4, AISI 420
5	2	1024-0814	SPRING PIN; 1/8 X 9/16, AISI 420

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