7196 Two Speed Jog Lever

Owner's Operation, Installation & Maintenance Manual

Sept 2023

Kobelt Manufacturing Co. Ltd.

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.

2 PRODUCT DESCRIPTION

The Kobelt 7196 Two Speed Jog Lever is used as a control input to electronic and power hydraulic steering systems. The operator can maneuver the vessel by simply jogging the lever port or starboard to activate its internal micro switches. The Jog Lever contains two sets of switches which can be utilized to provide slow and fast control signals to the steering system. The Jog Lever can be used for marine steering applications, other marine applications, or industrial installations.

The 7196 is designed for indoor and outdoor installation with a robust die cast bronze and stainless-steel construction to provide a long service life in a harsh marine environment.

The 7196 appearance is of a combination of black and chrome. The product contains bottom exit cable glands and standard wiring cables.

2.1 TECHNICAL DATA

Table 1: 7196 Technical Data

MODEL	7196
KOBELT PART #	7196
ELECTRICAL CONTACTS	2X SPDT, NO (Normally Open) (per direction)
MAXIMUM VOLTAGE	250 VAC / 24 VDC
MAXIMUM CURRENT	10 A (per switch contact)
OPERATING TEMPERATURE	-13°F … 158°F [-25°C … 70°C]
PRODUCT WEIGHT	4.0 lbs [1.8kg]
INGRESS PROTECTION (IP) RATING	IP56* (above dash only)

*Requirements to achieve IP56:

- Minimum 3/16” [5mm] thick steel dash, or equivalent
- Requires 4x installation screws to be sealed
- IP rating only applies to units manufactured after March 2022

3 INSTALLATION

3.1 MECHANICAL

The jog lever should be mounted:

- In a central location at each station on-board the vessel
- With sufficient room for the handle to swing to both extreme positions.
- Within 6 feet [1.8 m] of electrical junction box.
- Placed on horizontal or angled dash surface.
- Placed as to protect external electrical cable from damage.

The jog lever must be mounted on a flat surface with a maximum roughness of ra = 125 micro-inches [500 μm]. The mounting surface must have the following minimum thickness to prevent excessive flexing:

Steel consoles: 0.19 inches [4.8 mm]
Aluminum consoles: 0.27 inches [6.8 mm]

The Jog Lever is equipped with (4) four mounting holes for #10 [M5]. Use #10 or M5 sealing screws or bonded sealing washers to prevent water ingress below the dash. Tighten the fasteners to 23 in-lbs [4 Nm] with an anaerobic thread locker such as Loctite 243. Use the template at the back of this manual to make the correct cut-out on the mounting surface.

3.2 ELECTRICAL

The Jog Lever has a pair of 6 foot [1.8 m] long 3C/18 cables for external connections. Connect the cables to an electrical junction box and the electronic or power hydraulic steering system interface. The product's two 3C/18 electrical cables contain the following wires and related functions:

Table 2: 7196 Wire Connections – Low-Speed

7196				
Wire #	**Wire Name**	**Colour**	**Gauge**	**Function**
1	SWA-NO	Black	18AWG	Connects to COM-AB when Switch A is activated.
2	SWB-NO	White	18AWG	Connects to COM-AB when Switch B is activated.
3	COM-AB	Green	18AWG	COM connection for Switches A and B.

Table 3: 7196 Wire Connections – High-Speed

7196				
Wire #	**Wire Name**	**Colour**	**Gauge**	**Function**
1	SWC-NO	Black	18AWG	Connects to COM-CD when Switch C is activated.
2	SWD-NO	White	18AWG	Connects to COM-CD when Switch D is activated.
3	COM-CD	Green	18AWG	COM connection for Switches C and D.

The cable penetration locations are shown in Figure 1 and the internal wire connections are shown in Figure 2.

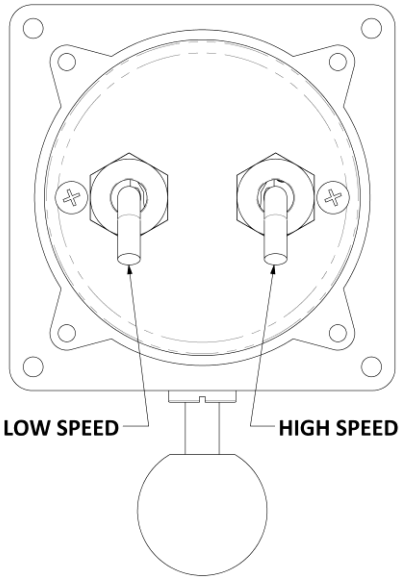

Figure 1: 7196 Cable Penetration Locations

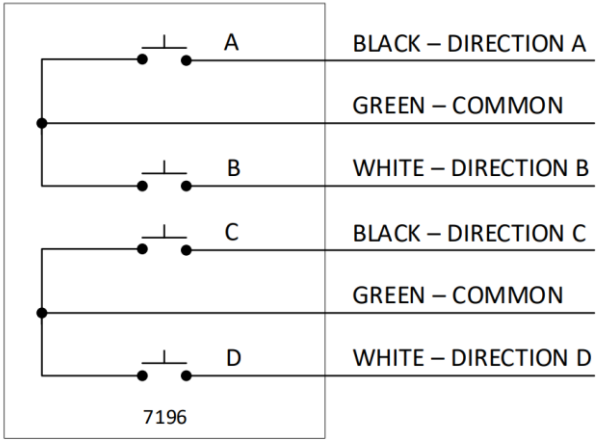

Figure 2: 7196 Internal Wiring Diagram

The operating direction of the Switches in relation to the Jog Lever handle is shown in Figure 3.

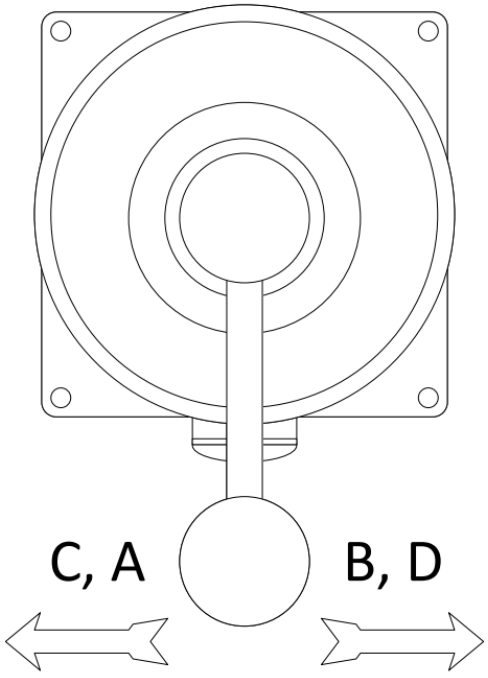

Figure 3: 7196 Switch Direction Diagram

⚠WARNING	Do not operate the Jog Lever if the internal spring has broken. Unexpected operation could result.

NOTICE	This unit contains an internal terminal strip. The supplied external cables can be replaced with installed supplied cables that can be directly connected to the terminal strip with fork terminals if required for the system installation.

4 COMMISSIONING

4.1 ELECTRICAL CHECK

⚠CAUTION	Ensure that the rear cover is installed and secured before powering on the 7196.

- Confirm that the electrical connections to the 7196 have been made.

4.2 FUNCTIONAL TEST

⚠CAUTION	The Functional Test should be carried out while the vessel is still at dock and before it is taken out to sea after installation has been completed.

A complete functional test should be performed on the system that the Jog Lever has been installed within before entering operational use.

5 OPERATION

The Kobelt 7196 Two Speed Jog Lever is a spring-return to centre device that provides Non-Follow-Up (NFU) two speed steering control.

It operates in both a Port and Starboard, or Left and Right, direction with a set of microswitches for each direction of travel. When the handle is released by the operator it returns to centre due to the internal spring force.

The primary application for the Jog Lever is in steering gear control. The first microswitch at 30 degrees activates a solenoid valve providing hydraulic flow to the steering gear. The second microswitch at 55 degrees activates a second solenoid valve providing a faster rudder speed for maneuvering. The same operation is present in the opposite direction but commands the steering gear in the opposite direction.

Releasing the handle results in the steering gear holding position and no longer moving. Two steering (directional control) solenoid valves are required, a rudder feedback unit with limit switches is recommend, but a steering amplifier is not required.

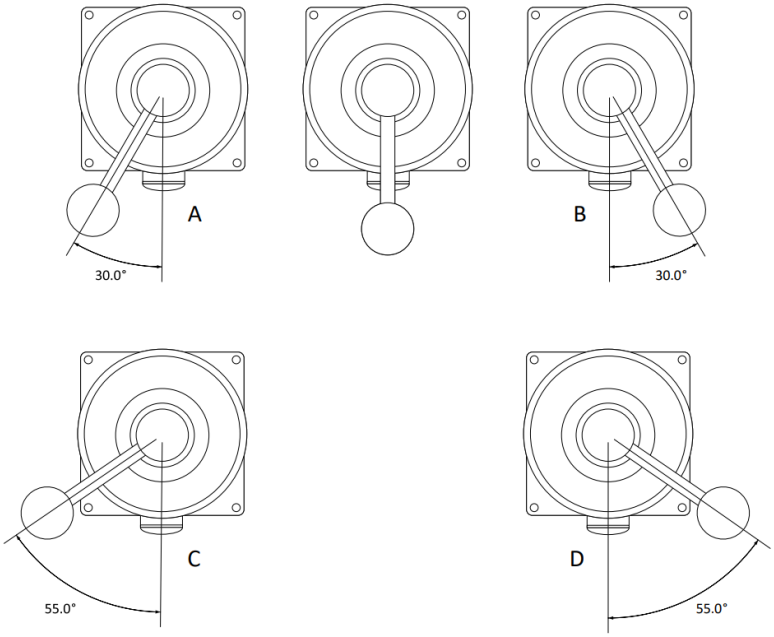

Figure 4: 7196 Positions of Operation, LEFT - CENTRE – RIGHT

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) two years
  - Confirm all electrical screw terminals are secured.
  - Confirm cable glands are secured to cables.
  - Replace and lubricate seals.
  - Replace tension spring.

6.2 RECOMMENDED SPARE PARTS AND KITS

As a minimum Kobelt recommends that a spare 7196 Repair Kit be kept on-hand.

Depending on date of purchase, a retro-fit kit may be required to mount the new more robust spring found in the 7196 Repair Kit as of that date. When ordering a retro-fit kit, all the parts of a repair kit are included and should be installed at the same time.

Table 4: Available Kits

QTY	ITEM	KOBELT PART #
1	7196 REPAIR KIT	7196-RK
1	7196 RETRO-FIT KIT	7196-RF

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 before contacting Kobelt for assistance. If the steps below do not resolve your issue, please reach out either Kobelt directly or our Dealers in your area.

Table 5: Common Solutions

Problem (Issue encountered)	Cause (What it means)	Corrective Action (What to do)
Jog lever action is reversed.	Wiring is backwards.	1. If the low-speed action is reversed, swap the Switch A and Switch B output wires to their respective system connections. 2. If high-speed action is reversed, swap the Switch C and Switch D output wires to their respective system connections.
High-speed activates before low-speed.	The A, B and C, D switch sets are wired in reverse.	1. Swap the wiring connections between the cables extending from the body of the unit. 2. Test the operation to ensure the issue has been resolved.
Jog lever does not move rudder at all.	Wiring is wrong.	1. Check wiring. 2. Refer to system design drawing for proper wiring.
	The rest of the system isn't hooked up correctly.	1. Check system wiring. 2. Confirm wiring to Jog Lever.
	Broken switch or contact.	1. Use a multi-meter to monitor the resistance of the wiring between switch contacts. 2. Check for normal operation of each switch by measuring the connection while jogging the lever. 3. Check all switch directions. Replace any damaged switches.

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 APPENDIX A: INSTALLATION DIMENSIONS

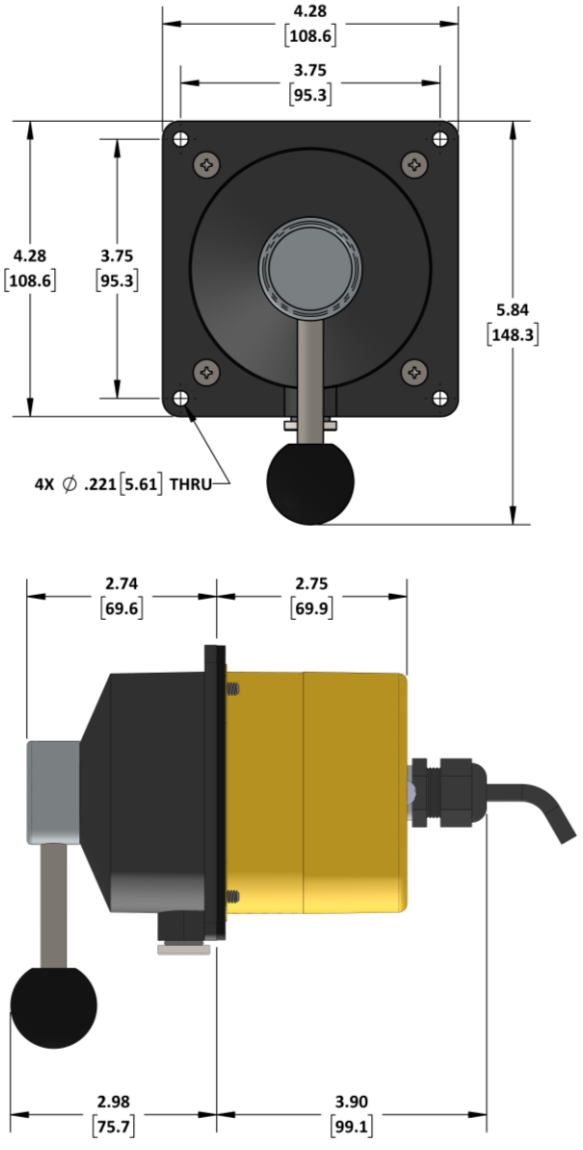

Figure 5: 7196 Installation Dimensions

10 APPENDIX B: PARTS LIST

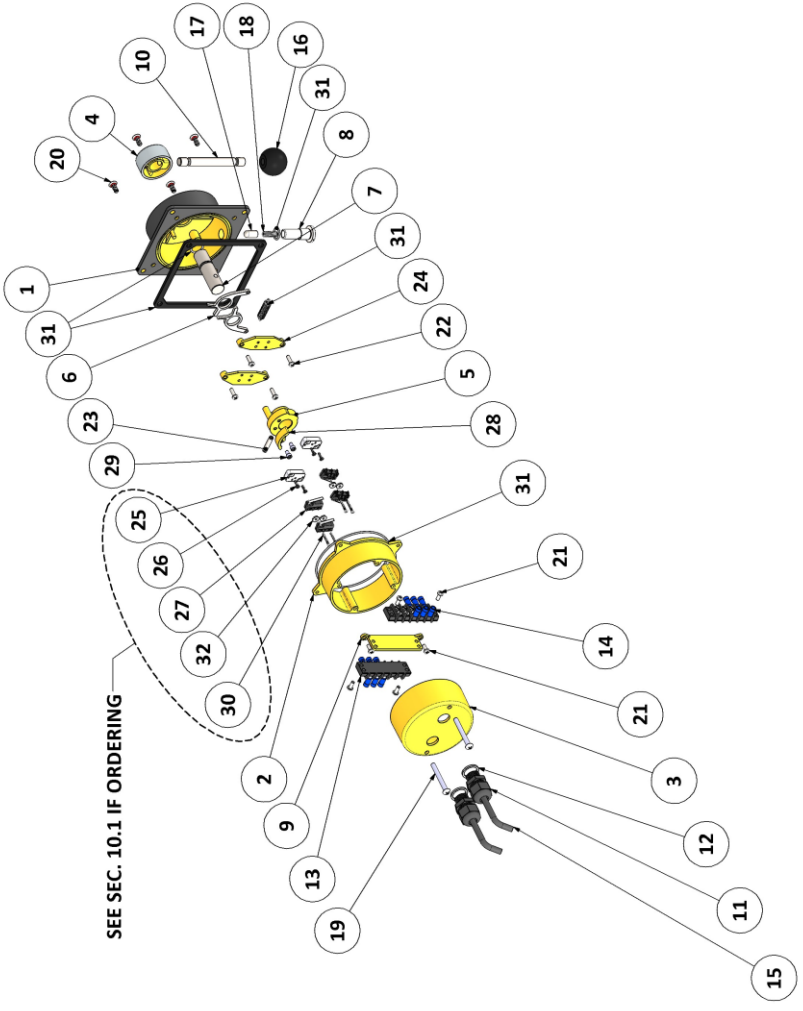

Figure 6: 7196 Parts Diagram

Table 6: 7196 Parts List

		Model Number:	7196	
		Part Number:	7196	
ITEM	**QTY**	**DESCRIPTION**	**PART NUMBER**	**NOTES (SEC. 10.1)**
1	1	HOUSING, TOP, BLACK	7194-0001-B	-
2	1	HOUSING, MIDDLE	7196-0002	-
3	1	HOUSING, BOTTOM	7194-0003	-
4	1	HUB, CHROME	7194-0004-K	-
5	1	CAM, LARGE	7194-0005	-
6	2	BRACKET, SPRING ARM	7196-0006	-
7	1	SHAFT	7196-0008	-
8	1	DETENT PLUG	7196-0009	-
9	1	BRACKET, TERMINAL BLOCK	7196-0011	-
10	1	HANDLE SHAFT	7170-0005	-
11	2	CABLE GLAND; M16 X 1.5, .197-.394 CABLE, PA6, BLACK	6001-0248	-
12	2	WASHER, SEALING, M16, POLYETHYLENE	6001-0248-W-M16	-
13	2	TERMINAL BLOCK, 140 SERIES, 5 POS, 15A, 250V	6009-0005	-
14	6	FORK TERMINAL, 16-14 AWG, #6 STUD	6009-6461	-
15	2	CABLE, 3C/18AWG, SVT, 300V, 105C	6014-0001	-
16	1	HANDLE KNOB, SPHERICAL, BLACK	2030-0001	-
17	1	DETENT PIN	2545-0012	-
18	1	SPRING, DETENT	1201-0206	-
19	2	SCREW, RND HD, PHL, 10-24 X 1 3/4, 18-8	1010-0828	-
20	4	SCREW, FLAT HD, PHILLIPS, 10-24 X 1/2, 18-8, 100DEG, W/SEALING ORING	1009-0808-S	-
21	6	SCREW, PAN HD, PHL DRIVE, 6-32 x 3/8IN, 18-8 SS	1012-0606	-
22	4	SCREW, PAN HD, PHL, #6-32 x 1/2, 18-8	1012-0608	-
23	1	SPRING PIN; 3/16 DIA X 7/8 LG, AISI 420	1024-0814	-

24	2	BRACKET, MICROSWITCH MOUNT	7196-0007	-
25	2	BRACKET, MICROSWITCH, 7196	7196-0017	1
26	4	SCREW, FLT HD PHP, 3-48 X 3/8LG, 18-8	1009-0306	1
27	4	MICRO SWITCH, SUBMINIATURE, STRAIGHT LEVER, SPDT 10A	6001-0112	1
28	1	CAM, SMALL	7196-0005	-
29	2	CAP SCREW - SCKT HD; #6-32 X 1/4, 18-8	1002-0604	-
30	4	SCREW; PAN HD; PHP DR; M2-4 X 18; 18-8	1012-3218	1
31	1	REPAIR KIT, 7196	7196-RK	-
32	4	WASHER; FLAT; #2 X 5/16 OD; 18-8	1023-0202	1

10.1 Parts List Notes:

1. Contained in Microswitch retrofit kit: 7196-RF-01. See section 13.1 to determine if a retrofit kit is required or can purchase standalone part.

11 APPENDIX C: REPAIR KIT INSTALLATION

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.

Steps for replacement of spring and seals:

1. Unthread handle shaft from hub and remove hub.
2. Remove 4 housing screws between front and middle housings.
3. Carefully open unit without stressing any wires.
4. Remove detent plug, take care not to lose internal parts (spring and detent pin).
5. Remove cam assembly.
6. Remove spring arms (with spring attached).
7. Remove and replace large housing O-ring.
8. Remove and replace cam shaft O-ring.
9. Remove and replace detent plug O-ring.
10. Disconnect spring from spring arms.
11. Attach new spring to spring arms.
12. Reassemble unit as shown in Figure 7.
    a. Use Loctite 242 or 243 on handle shaft threads and housing screw threads.
    b. Ensure shaft has sufficient assembly grease for smooth operation (add more if necessary).
    c. Refer to Figure 8 for spring arm orientation/order during re-assembly.

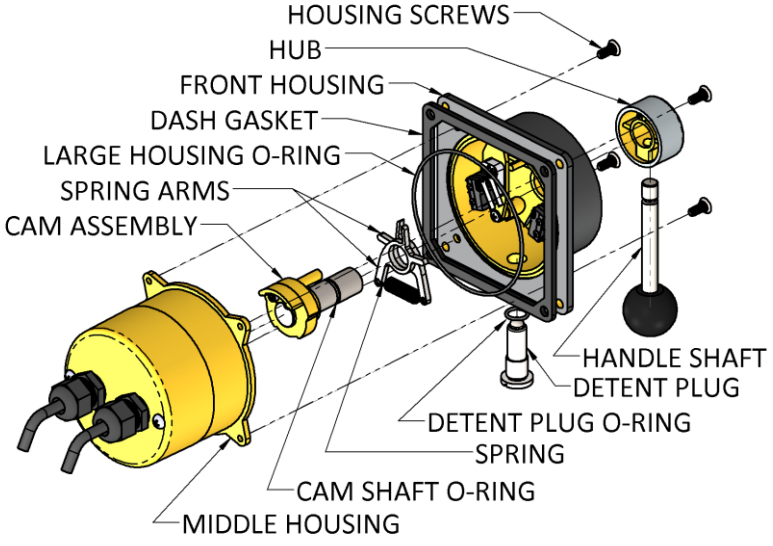

Figure 7: 7196 Parts Diagram for Maintenance

12 APPENDIX D: INSTALLATION OF SPRING RETRO-FIT KIT

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.

NOTICE	If your Jog Lever contains previous generation Spring Arms, indicated by straight spring arms within the unit, this Retrofit Kit should be applied to the unit during seal and tension spring replacement at the next preventative maintenance cycle.

Steps for Installation of the Retro-Fit Kit parts:

1. Complete Steps 1-6 of outlined in Appendix C: Repair Kit Installation.
2. Discard old spring arms and spring.
3. Attach new spring to new spring arms.
4. Replace old detent spring with new detent spring.
5. Replace O-rings as per Steps 7-9 of outlined in Appendix C: Repair Kit Installation.
6. Reassemble unit as per Step 12 of Appendix C: Repair Kit Installation.

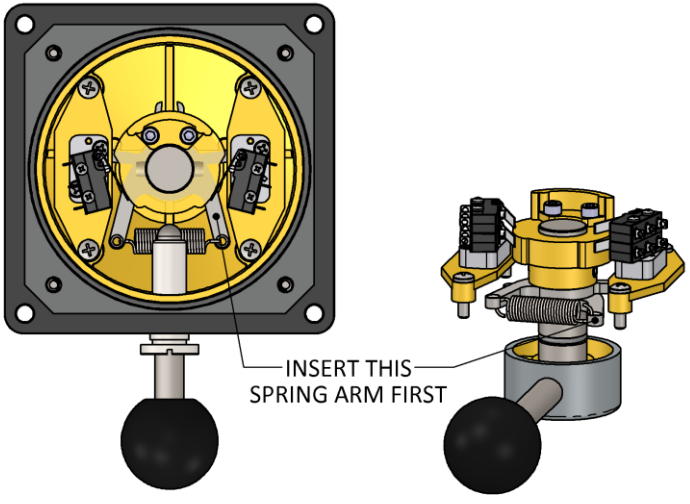

Figure 8: 7196 Spring Arm Order

13 APPENDIX E: MICROSWITCH RETROFIT

In mid 2023, the old plunger style of microswitch, Kobelt PN: 6001-0104 was replaced with a new microswitch, Kobelt PN: 6001-0112. The older style microswitch is a plunger style microswitch, while the new microswitch is a lever-plunger style. Customers that require a replacement microswitch and currently have the older style will need to perform a retrofit to be able to use the new style microswitch.

13.1 DETERMINATION OF MICROSWITCH STYLE

Customers must first determine if their unit has the new or old style of microswitch. Examine the microswitch in your unit and compare to Table 7. If you determine you have the newer style microswitch, Kobelt PN: 6001-0112, you can simply purchase replacement components for the switch and mounting hardware as listed in Table 6 in Appendix B: Parts List.

For customers who identify they have the older style microswitch, Kobelt PN: 6001-0104, they must purchase a retrofit kit, Kobelt PN: 7169-RF-01. This retrofit kit contains the microswitches, and all mounting hardware to replace one set (two switches) of the old style microswitch. Section 13.2 can then be consulted to install the new switches and mounting components in your jog lever unit. Refer to Table 8 for clarification on the components and quantities that are contained in the retrofit kit.

Table 7: Determination of microswitch style

Key Features	Old Microswitch	New Microswitch
Microswitch part number	6001-0104	6001-0112
Picture		
Replacement part number	Retrofit kit, 7169-RF-01. One retrofit kit is required per side that is having a switch replaced.	Microswitch only, 6001-0112.

13.2 INSTALLATION OF MICROSWITCH RETROFIT KIT

⚠WARNING	Replacing the microswitches requires soldering as well as correct placement of the microswitches. This should only be done by Kobelt factory authorized service representatives. Failure to do so could result in a failure of the limit switch and a loss of control.
NOTICE	Please read through and review steps 1-27 and all figures in section 13.2 before starting the removal of the old microswitch and installation of the new microswitch.
NOTICE	Before removing old microswitch, please ensure you have one retrofit kit **PER** side that contains an old style microswitch being replaced.

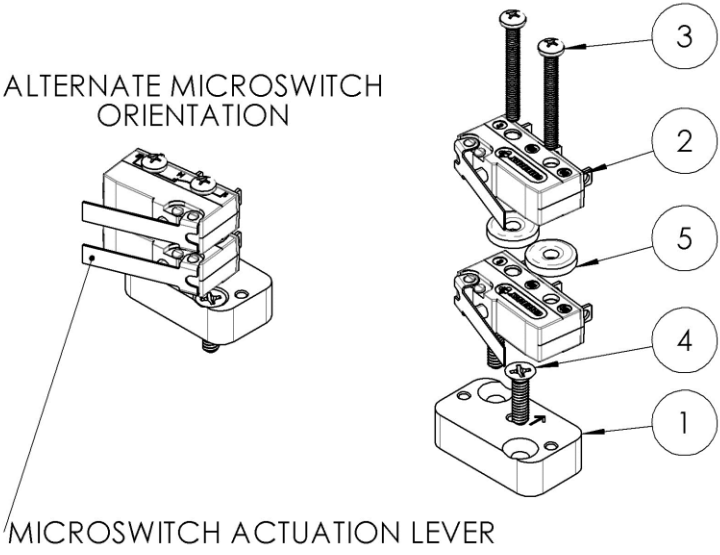

Figure 9: 7196-RF-01 Retrofit kit shown, alternate microswitch arrangement shown on left side.

Table 8: Bill of materials for Microswitch retrofit kit, 7196-RF-01

7170-RF-01 BOM			
Item	Qty	Part Number	Description
1	1	7196-0017	BRACKET, MICROSWITCH, 7196
2	2	6001-0112	MICROSWITCH, SUBMINIATURE, STRAIGHT LEVER, SPDT 10A
3	2	1012-3216	SCREW, PAN HD, PHP DR, M2-0.4 X 16, 18-8
4	2	1009-0306	SCREW, FLAT HD, PHP DR, 3-48 X 3/8LG, 18-8
5	2	1023-0202	WASHER, FLAT, #2 X 5/16 OD, 18-8

In addition to retrofit kits the following items and tools are recommended to have on hand for the retrofit:

1. Loctite 242 or 243
2. Solder
3. Soldering iron
4. No.1 Phillips screwdriver
5. 3/16 2:1 heat shrink tubing.
6. 1/8 2:1 heat shrink tubing.
7. Heat gun
8. Optional - 18 AWG multistrand insulated wire; lengths indicated are estimated maximum required if replacing all switch wires.
    a. Green – 20”
    b. Black – 10”
    c. White – 10”

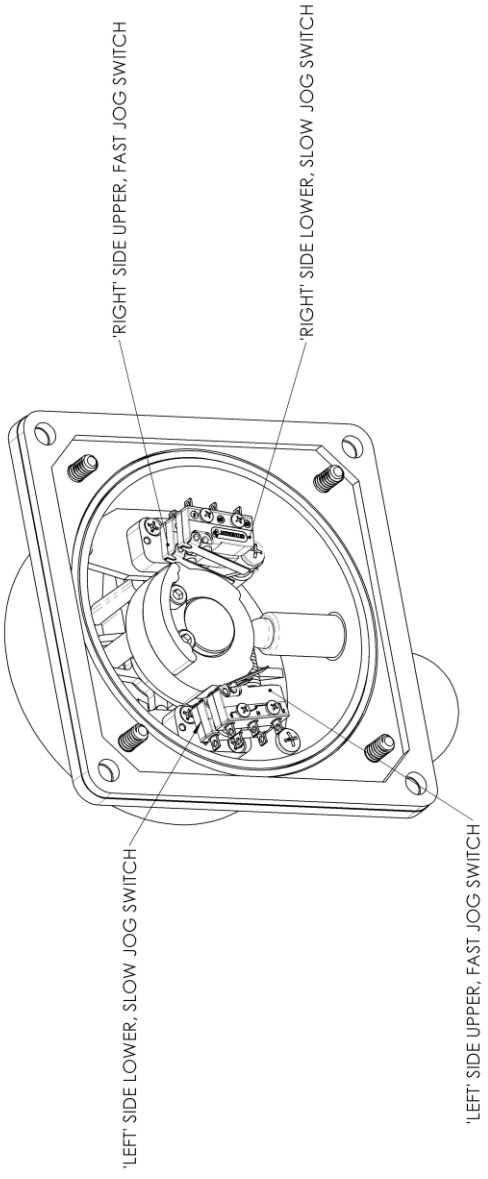

Figure 10: Arrangement of microswitches in jog lever housing

1. Refer to Figure 10 and familiarize yourself with the microswitch positions and what is meant by: left, right, upper and lower switch positions.

2. Loosen off the cable glands and remove the lower housing, sliding it along the external cables until it is out of the way and secured in a manner that it does not put any pressure on the external electrical cables.

3. Note connection of all wires going to the old microswitches prior to disconnecting. It will be imperative to ensure the wires go to the same sides(Left/right) as before or it will reverse the output of the jog lever. Similarly, which side of the terminal block the upper switches go to and which one the lower switches is important. Switching the upper/lower switch connections will reverse the high/low speed functionality.

    a. Note the colour of wire coming from the left side switches (WH/BK):_____.

    b. Note the colour of wire coming from the right side switches (WH/BK):_____.

    c. Refer to Figure 11 and Figure 12; Fill out the side of the terminal block which the upper and lower switches are routed to.

    d. Refer to Figure 11 and Figure 12; Fill out the colour of wire to each of the terminal block positions.

    e. Refer to Figure 11; Use a marking material such as a paint marker to put an indicating mark on the terminal block and housing to ensure terminal block is reinstalled in the same orientation.

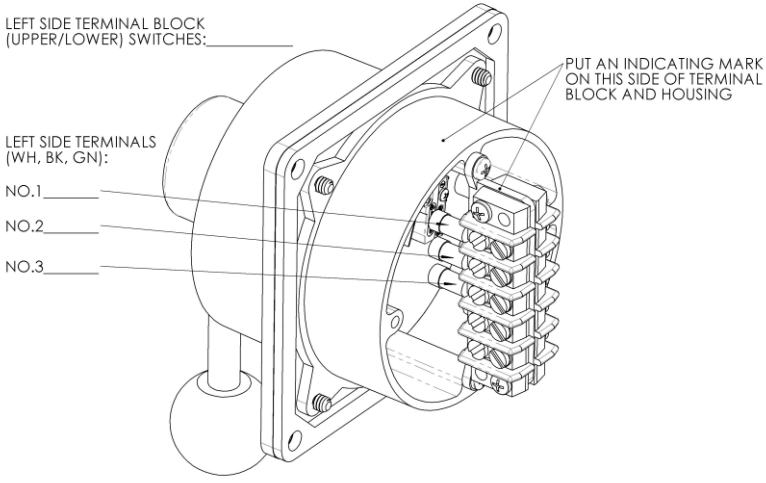

Figure 11: Dual jog left side terminal connections.

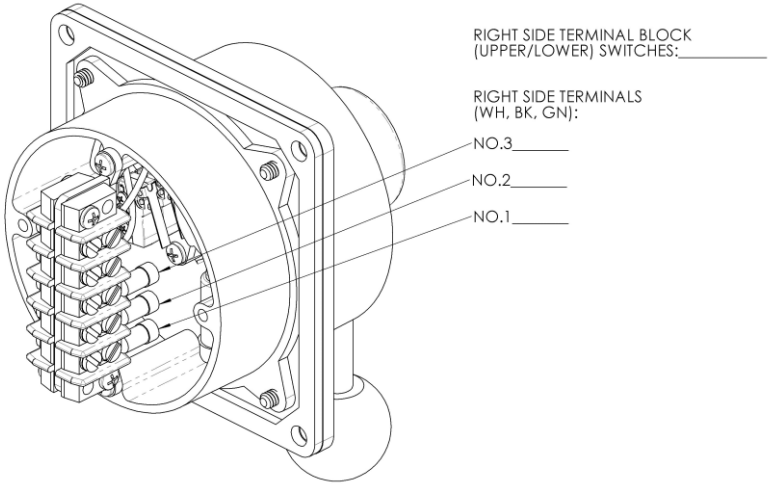

Figure 12: Dual jog right side terminal connections

4. Disconnect the switch wires from the terminal block leaving the external wires attached to the terminal block.
5. Remove the terminal block from the jog unit.
6. Remove the old microswitches from the jog unit with the switch wires attached.
7. Desolder the wire connections on the micro switches for the side that is being replaced.
8. Discard the old microswitches. All the microswitches on a particular side must be replaced together even if only one microswitch is faulty.
9. Refer to Figure 13 and note the engraved arrow on the microswitch bracket ① is facing outwards on both sides of jog lever.
10. Apply Loctite 242 or 243 to X2 Flat head screws ④.
11. Install bracket ① with screws ④ into the jog unit ensuring the engraved arrow is correctly orientated.
12. Refer to Figure 13 and note the orientation of the microswitch② for the side of the jog unit that the microswitch is being replaced on.
13. Place the first microswitch② on top of the bracket① orientating the microswitch so the actuation lever is as shown in Figure 13.
14. Place X2 spacer washers ⑤ on top of the first microswitch lining up with the screw holes.
15. Place the second microswitch② on top of the spacer washers ensuring the same orientation as the first microswitch.
16. Apply Loctite 242 and 243 to X2 pan head screws ③.
17. Use X2 screws③ and tighten to secure the microswitches②, ensure the screws go through the holes on both microswitches② and the spacer washers⑤.
18. If the microswitches on the other side of the jog unit are being replaced, repeat steps 1-17 for the other side.

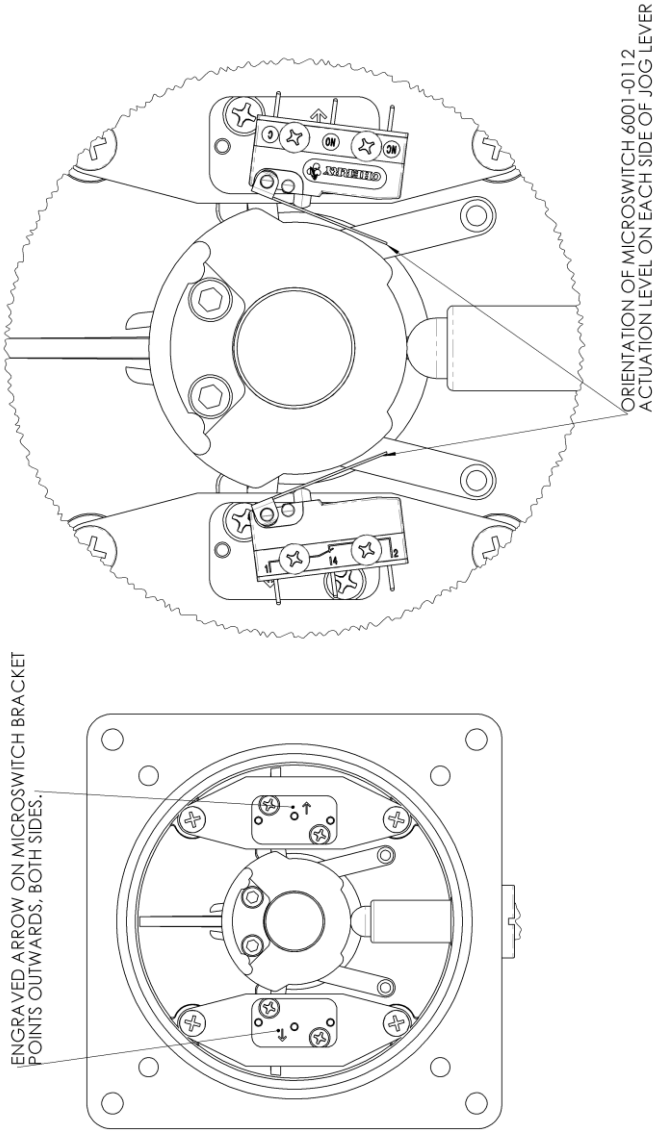

Figure 13: Placement of microswitch and mounting bracket inside jog lever housing

19. Check correct operation of the switches by rotating the jog lever through its full travel, ensure:

    a. The actuation lever of the microswitches② are clear of any obstructions through their range of motion.

    b. The microswitch② lever is depressed enough to actuate the switch contacts when the jog lever is pushed. This can be done by checking for continuity across the Normally Open (N.O) terminal 4 and the Common(C) terminal 1. See Figure 14 for clarity on terminals being checked. When the switch is depressed, terminals 1 and 4 should have continuity. Make sure:

        i. When the jog lever is depressed to the first speed at approximately 30 degrees, the lower switch is closed, and the upper switch is still open.

        ii. When the jog lever is depressed fully, both microswitches should have a closed circuit.

    c. The microswitch② lever is raised enough to open the switch contacts when the jog is in its rest position. This can be done by checking for an open circuit(no continuity) across the Normally Open and Common terminals. When the jog lever is in its rest position, there should be no continuity across terminal 1 and 4 on either microswitch.

    If conditions ‘a’, ‘b’ or ‘c’ are not met, loosen the screws ③ and adjust the microswitch position until conditions are satisfied. Loctite should be reapplied to the microswitch screws if allowed to dry beyond the recommended setup time.

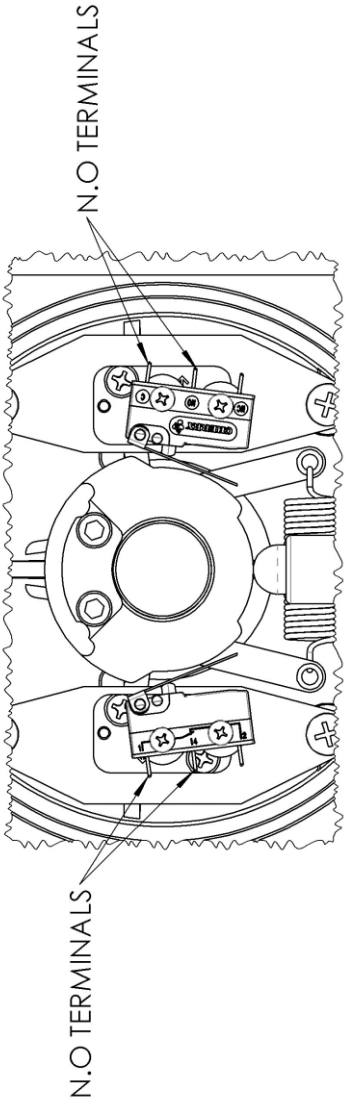

Figure 14: Diagram showing the terminals on each microswitch that make a N.O circuit.

20. Prepare the wires for connecting to the new microswitch. The wires must be positioned when installed so that they are clear from any moving parts in the jog unit. In particular, the extension spring, arms and jog cam must be avoided through their entire range of motion.

    For upper switches, it is recommended to route the wires as shown in Figure 15 and Figure 16. For lower switches, the same path can be followed except the wires go to the right side terminal block. If necessary, replace the old wires with 18 AWG wire of the same insulation colour.

21. Solder the wires to the terminals of the new microswitches as shown in Figure 15. Keep the white and black wires routed to the same side as with the previous switches as noted in step 3, as well as the upper and lower switch connections as noted in Figure 11 and Figure 12.

22. It is recommended to apply heat shrink protective tubing to the exposed wire and connection terminals. The 3/16” heat shrink goes to the two switch terminals that have two wires. All others use 1/8” heat shrink.

23. Use X2 plastic cable ties to secure the routed wires together in the positions indicated in Figure 15.

24. Install the terminal block ensuring the orientation mark that was put on in step 3.e is on the same side as the housing.

25. Reconnect all the switch wires to the terminal block, refer to Figure 11 and Figure 12 for which wires go to which terminal positions.

26. Replace the lower housing and secure the gland nuts.

27. Refer to section 4 for recommissioning the jog unit.

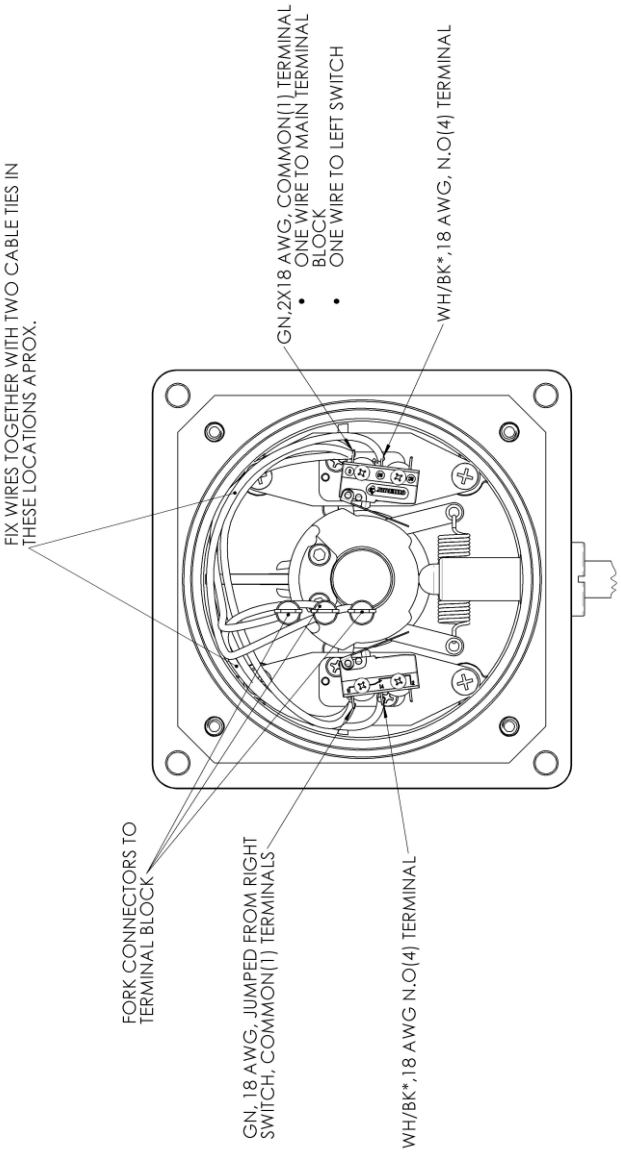

Figure 15: Wiring diagram from upper switches

*Refer to step 3.a and 3.b for which colour wire goes to which side

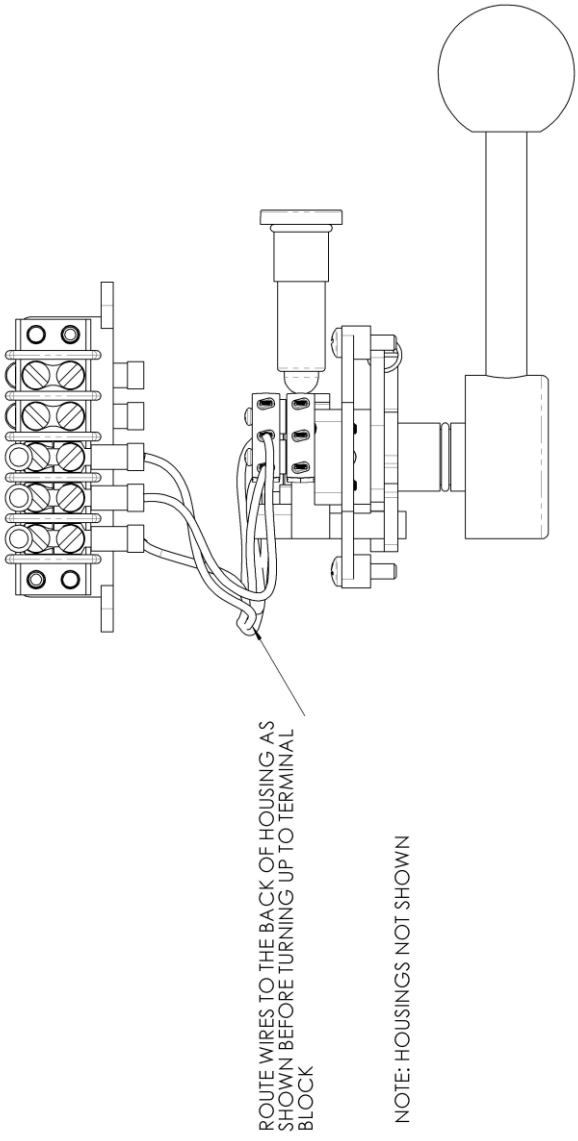

Figure 16: Wiring diagram for upper switches, main terminal block

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14 APPENDIX E: INSTALLATION CUT-OUT TEMPLATE

NOTICE	Scale may not be exactly 1:1 due to PDF and printer scaling. Verify primary dimension with a ruler after printing and before using to cut.

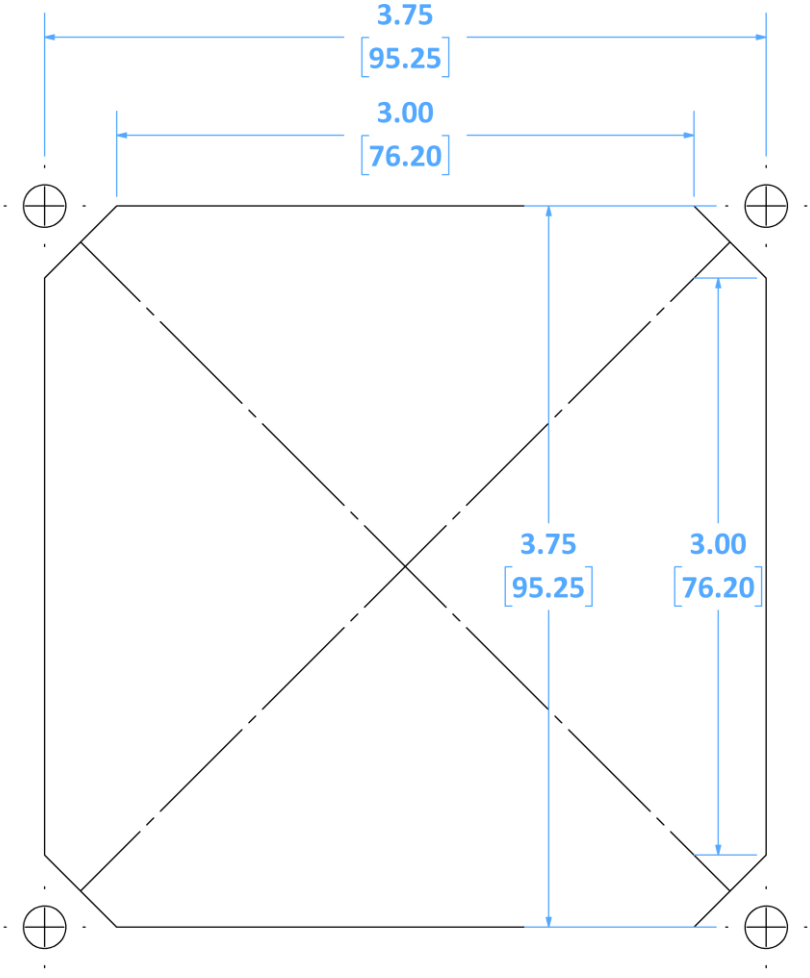

Figure 17: Installation Cut-out Template

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