



7170 Jog Lever

Owner's Operation, Installation & Maintenance Manual



June 2023

Kobelt Manufacturing Co. Ltd.

NOTES:

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

RECORD DATA BEFORE INSTALLATION FOR FUTURE REFERENCE

Model #:	
Serial #:	
Date of Purchase:	
Date of Installation:	

TABLE OF CONTENTS

1	Introduction	4
1.1	Contact	4
1.2	Safety	4
2	Product Description.....	6
2.1	Technical Data	6
3	Installation.....	7
3.1	Mechanical.....	7
3.2	Electrical	7
4	Commissioning.....	10
4.1	Electrical Check	10
4.2	Functional Test.....	10
5	Operation	11
6	Maintenance.....	12
6.1	Preventative Maintenance.....	12
6.2	Recommended Spare Parts and Kits	12
7	Troubleshooting.....	13
8	Warranty	14
9	Appendix A: Installation Dimensions	15
10	Appendix B: Parts List.....	16
10.1	Parts List Notes:	18
11	Appendix C: 7170-RK Repair Kit Installation	19
12	Appendix D: 7170-RF Spring Arm Replacement	22
13	Appendix E: Summary and Determination of Jog Lever Generation	23
13.1	Recommendations For Maintenance And Superseded Component Replacement	23
13.2	Summary of Jog Lever Generations.....	24
14	Appendix F: 7170-RF-01 Microswitch retrofit kit installation	27
15	Appendix G: Installation Cut-out Template	35

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



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



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 7170 Jog Lever is used for input jog control 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 can be used for steering applications, other marine applications, or industrial installations.

The 7170 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 7170 is available in a combination of black and chrome, all black, or all polished chrome to suit your appearance preference and offers cable configurations either from the top or bottom to accommodate a range of connection types and direction to match your application.

2.1 TECHNICAL DATA

Table 1: 7170 Technical Data

MODEL	7170					
KOBELT PART #	7170-A1	7170-A2	7170-B1	7170-B2	7170-C1	7171-C2
ELECTRICAL CONTACTS	1 Form A, NO (Normally Open) (per direction)					
MAXIMUM VOLTAGE	250 VAC / 24 VDC					
MAXIMUM CURRENT	10 A (per switch contact)					
HANDLE TRAVEL	14° (per direction)					
OPERATING FORCE	1.5 lb-f [6.7 N]					
PRODUCT FINISH	Black Body and Chrome Hub		All Black		All Chrome	
GLAND EXIT LOCATION	Top/ Above Dash	Back/ Thru Dash	Top/ Above Dash	Back/ Thru Dash	Top/ Above Dash	Back/ Thru Dash
OPERATING TEMPERATURE	-13°F ... 158°F [-25°C ... 70°C]					
PRODUCT WEIGHT	2.1 lbs [0.95kg]					

3 INSTALLATION

3.1 MECHANICAL

Ideally, the jog lever should be mounted in a central location at each station on-board the vessel to control steering operation.

- 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 is equipped with (4) four clearance holes for #10 (or M5) screws or bolts through the top surface for direct mounting to the dash. Ensure the unit is securely fastened to a suitable surface.

3.2 ELECTRICAL

The Jog Lever has a 6 foot [1.8 m] long 3C/18 AWG cable for external connection. Connect it to an electrical junction box of the electronic or power hydraulic steering system interface.

The product’s 3C/18 electrical cable contains the following wires and related functions:

Table 2: 7170 Wire Connections

7170				
Wire #	Wire Name	Colour	Gauge	Function
1	SWA-NO	Black	18AWG	Connects to COM when Switch A is activated.
2	SWB-NO	White	18AWG	Connects to COM when Switch B is activated.
3	COM	Green	18AWG	COM connection.

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

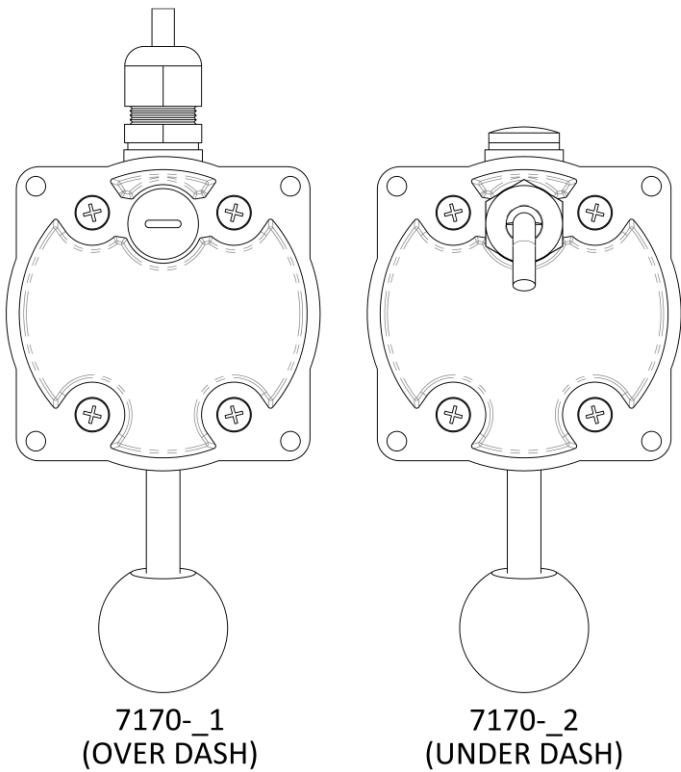


Figure 1: 7170 Cable Penetration Location

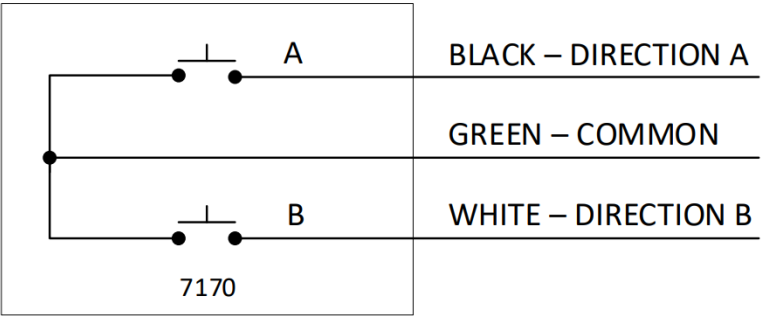


Figure 2: 7170 Internal Wiring Diagram

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

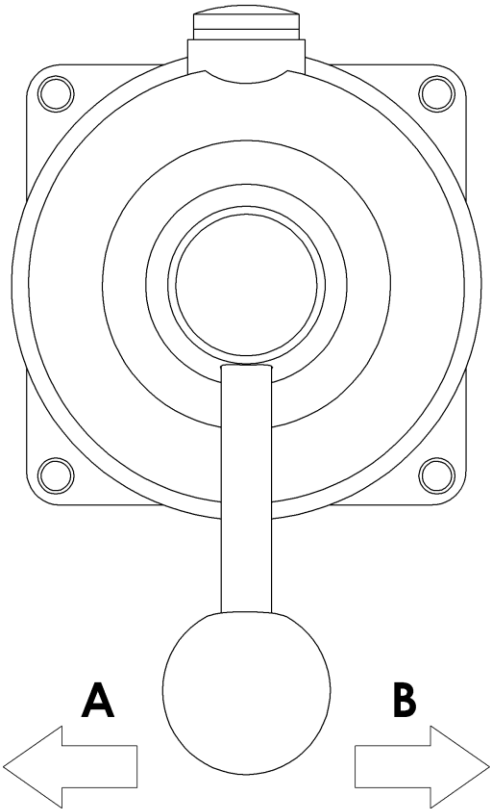



Figure 3: 7170 Switch Direction Diagram

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

4.1 ELECTRICAL CHECK



CAUTION

Ensure that the rear cover is installed and secured before powering on the 7170.

Confirm that the electrical connection to the 7170 have been made and correspond to the requirements of your system.

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 7170 Jog Lever contains a pair of contact switches, one for each direction of travel. The Jog Lever also contains a centering spring that forces the lever back to centre when pressure is not being applied by the operator.

The Jog Lever can be operated either Port or Starboard (Left or Right) to command motion in the system it is controlling. The Jog Lever has three positions of operation as shown below.

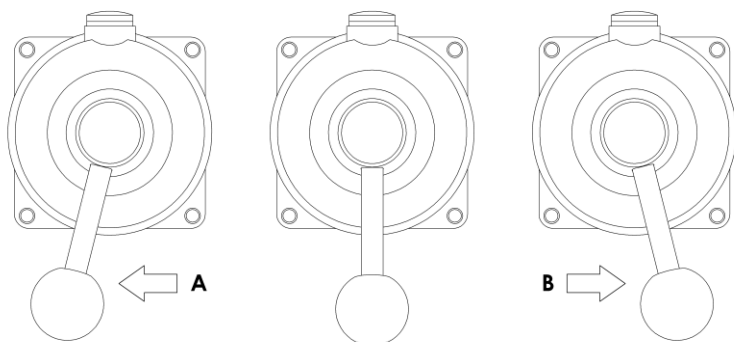


Figure 4: 7170 Positions of Operation, LEFT - CENTRE - RIGHT

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 years
 - Confirm cable glands are secured to cables.
 - Replace seals.
 - Replace tension spring.

6.2 RECOMMENDED SPARE PARTS AND KITS

As a minimum, Kobelt recommends that a spare 7170 Repair Kit (for appropriate generation of unit) be kept on-hand.

If you have a generation 2 unit (see Appendix E:), a retrofit kit is required to mount the new, more robust spring found in the 7170 Repair Kit. Retrofit kits include one repair kit, so all parts can be replaced/installed at once.

Table 3: Available Kits

ITEM	KOBELT PART #	Contents
7170 REPAIR KIT FOR GEN 3 UNITS	7170-RK	Seals, tension spring
7170 RETROFIT KIT FOR GEN 2 UNITS	7170-RF	7170-RK (seals, tension spring), replacement arms (2x), spacer, bushing
7170 REPAIR KIT FOR GEN 1 UNITS	7170-RK-1	Seals, torsion spring

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.

WARNING

Only use spare parts and kits for your generation of unit. Using incompatible parts can lead to device failure and potential loss of control. Appendix E: provides information to determine what generation your unit is.

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 4: Common Solutions

Problem (Issue encountered)	Cause (What it means)	Corrective Action (What to do)
Jog lever action is reversed.	Wiring is backwards.	1. Swap the Switch A and Switch B output wires to their respective system connections.
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 both Switch A and Switch B 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

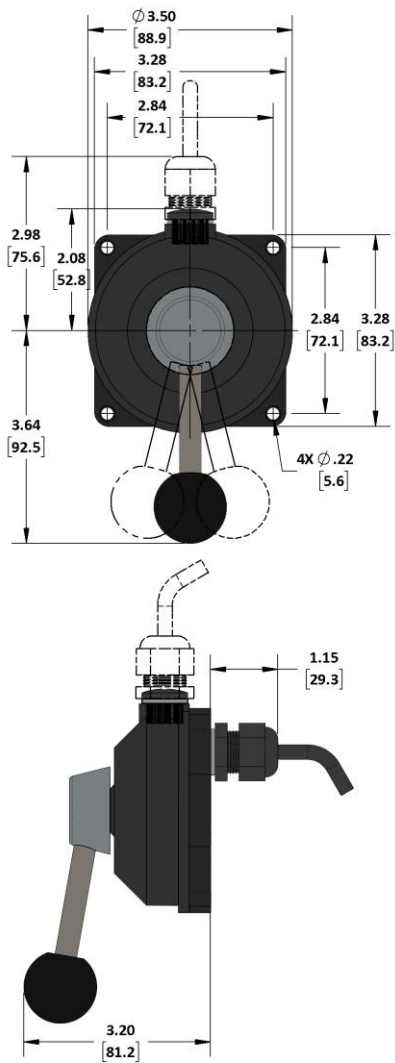


Figure 5: 7170 Installation Dimensions

10 APPENDIX B: PARTS LIST

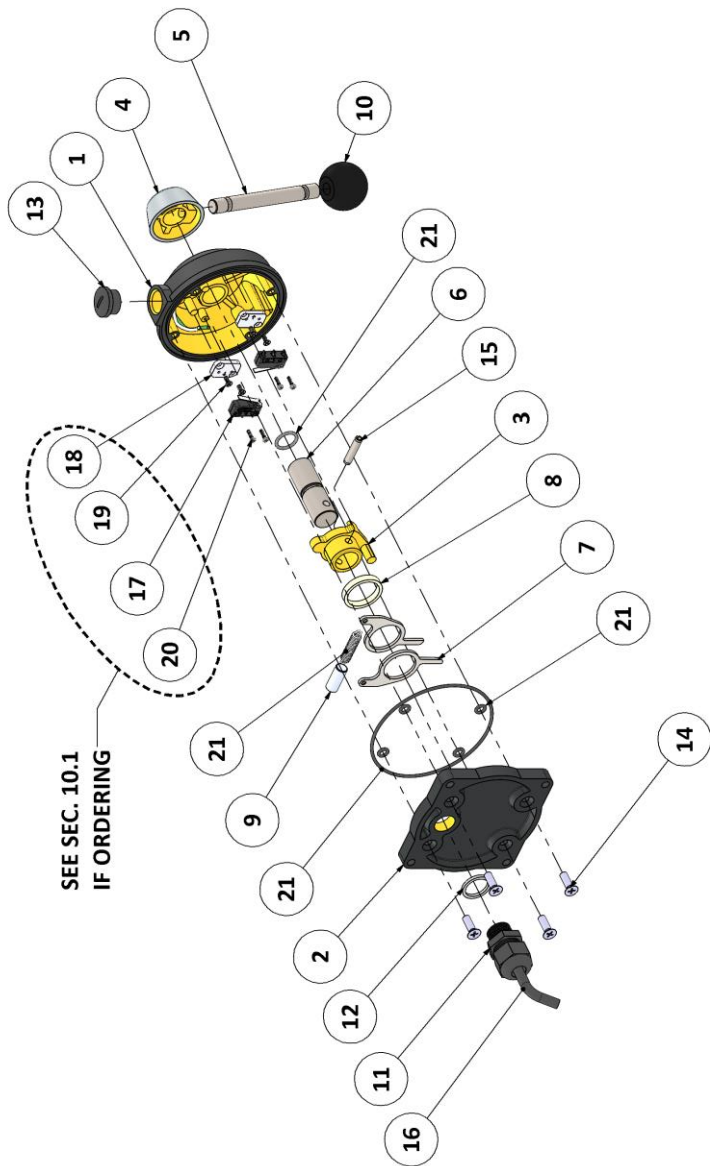


Figure 6: 7170 Parts Diagram, 7170-A2

Table 5: 7170 Parts List

Model Number:		7170				
Part Number:		7170-A_	7170-B_	7170-C_		
ITEM	QTY	DESCRIPTION	PART NUMBER			Notes (Sec 10.1)
1	1	JOG LEVER HOUSING	7170-0001B	7170-0001B	7170-0001-CHROME	-
2	1	JOG LEVER COVER	7170-0002B	7170-0002B	7170-0002-CHROME	-
3	1	CAM	7170-0003			-
4	1	HUB	7170-0004-K	7170-0004B	7170-0004-K	-
5	1	HANDLE SHAFT	7170-0005			-
6	1	SHAFT	7170-0006			-
7	2	BRACKET, SPRING ARM	7170-0007			-
8	1	SPACER, JOG LEVER	7170-0009			-
9	1	BUSHING, SLEEVE, 7MM ID, G300 PLASTIC	7170-0010			-
10	1	HANDLE KNOB, SPHERICAL, BLACK	2030-0001			-
11	1	CABLE GLAND; M16 X 1.5, .197-.394 CABLE, PA6, BLACK	6001-0248			-
12	1	WASHER, SEALING, M16, POLYETHYLENE	6001-0248-W-M16			-
13	1	PLUG, CABLE GLAND, M16 X 1.5, BLACK	6001-0311			-
14	4	SCREW, FLAT HD PHL, 10-24 X 5/8, 18-8	1009-0810			-
15	1	SPRING PIN; 3/16 DIA X 7/8 LG, AISI 420	1024-0814			-
16	2	CABLE, 3C/18AWG, SVT, 300V, 105C	6014-0001			-
17	2	MICRO SWITCH, SUBMINIATURE, STRAIGHT LEVER, SPDT 10A	6001-0112			*1
18	2	BRACKET, MICROSWITCH	7170-0011			*1
19	4	SCREW, FLAT HD, PHP DR, 3-48 X 1/4, 18-8	1009-0304			*1
20	4	SCREW, PAN HD, PHP DR, M2-0.4 X 8, 18-8	1012-3208			*1

21	1	SPRING KIT (SEALS AND SPRING) FOR 7170 GEN 3	7170-RK	-
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10.1 PARTS LIST NOTES:

- 1. Contained in Microswitch retrofit kit: 7170-RF-01. See section 13.2.5 to determine if a retrofit kit is required or can purchase standalone part.

11 APPENDIX C: 7170-RK 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.

WARNING

If your Jog Lever is a previous generation unit (see Appendix E:), installing the repair kit (new spring) can lead to device failure and potential loss of control.

Steps for replacement of spring and seals:

1. Loosen cable gland.
2. Remove housing screws and cover plate.
3. Unthread handle shaft from shaft hub and remove shaft hub.
4. Remove spring arms (with spring and spring bushing attached).
5. Remove shaft assembly (be careful not to lose spacer).
6. Remove and replace small housing O-rings (4x). Refer to Figure 8.
7. Remove and replace large housing O-ring.
8. Remove and replace shaft O-ring.
9. Disconnect spring from spring arms.
10. Slide bushing onto new spring and re-attach to spring arms.
11. 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 (add more if necessary).
 - c. Refer to Figure 9 for spring arm orientation/order.

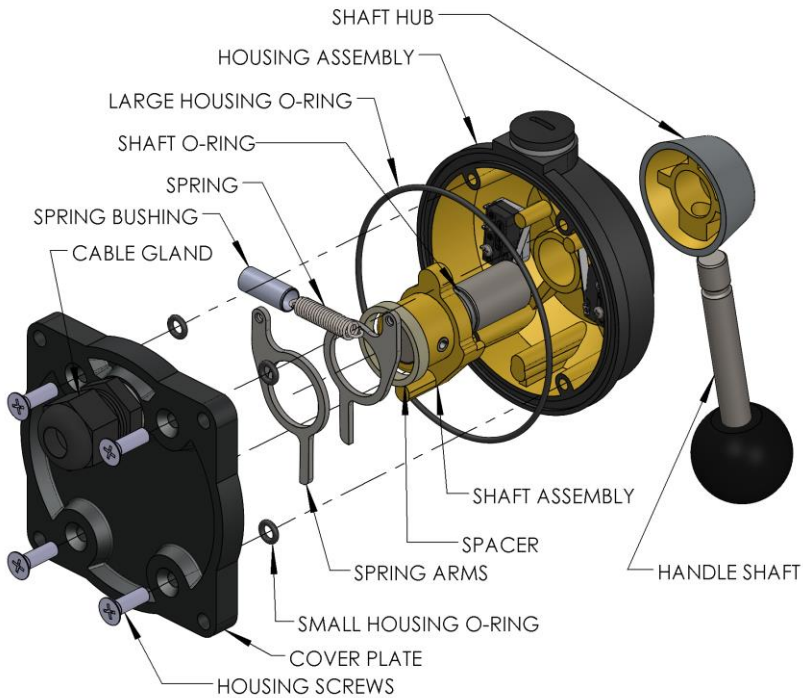


Figure 7: 7170 Parts Diagram for Maintenance

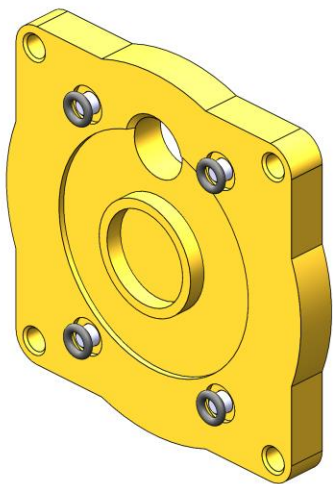


Figure 8: 7170 Maintenance Small Housing O-Rings Close-up

12 APPENDIX D: 7170-RF SPRING ARM REPLACEMENT

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.

WARNING

If your Jog Lever originally used a torsion spring (Generation 1 as per Appendix E:), it is not compatible with the spring arms/tension spring setup

Steps for replacement of spring and seals:

1. Complete Steps 1-5 of outlined in Appendix C: 7170-RK Repair Kit Installation.
2. Discard old spring arms and spring.
3. Slide bushing onto new spring.
4. Attach spring (with bushing) to spring arms.
5. Slide spacer onto shaft assembly (before spring arms).
6. Reassemble unit as per Step 11 of Appendix C: 7170-RK Repair Kit Installation.

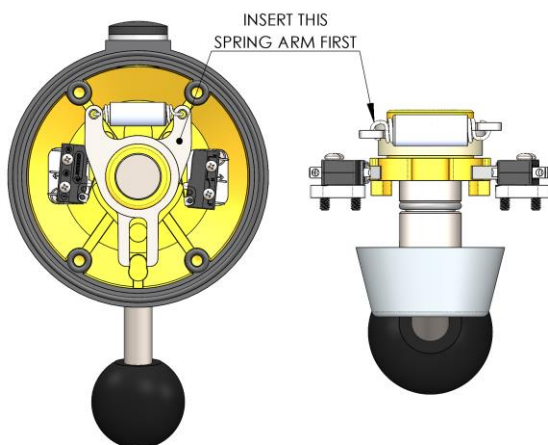


Figure 9: 7170 Spring Arm Order

13 APPENDIX E: SUMMARY AND DETERMINATION OF JOG LEVER GENERATION


NOTICE	For all critical applications, Kobelt recommends replacing older generation units (Gen 1 and Gen 2) with a new unit (Generation 3).
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The 7170 Jog Lever has been through several design updates since its introduction in the 1980s. This appendix will help you determine which generation of product you have and what Kobelt recommends for continued maintenance and repairs.

13.1 RECOMMENDATIONS FOR MAINTENANCE AND SUPERSEDED COMPONENT REPLACEMENT


13.1.1 Generation 1

1st generation units are incompatible with the new tension spring designs. To maintain these 1st generation units, purchase and install Kobelt PN 7170-RK-1 to periodically replace the torsion spring and seals.

 WARNING	Using the spring arms and tension springs designed for 2nd and 3rd generation units or attempting to install a retrofit kit PN (7170-RF) in a 1st generation unit can lead to unit failures and loss of control.
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13.1.2 Generation 2

2nd generation units can be upgraded to be equivalent to a Generation 3 unit by installing a retrofit kit (PN 7170-RF). See Appendix D: 7170-RF Spring Arm Replacement for instructions. Once a retrofit kit has been installed, the unit can now be considered a 3rd generation unit.

 WARNING	Using the spring found in repair kits (PN 7170-RK) with the generation 2 spring arms can lead to unit failures and loss of control. Install a retrofit kit (PN 7170-RF) to upgrade to 3rd generation parts.
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13.1.3 Generation 3

3rd generation units can be maintained by purchasing and installing repair kits (Kobelt PN 7170-RK) to periodically replace the spring and seals as a preventative maintenance measure.

13.1.4 Generation 4

Jog lever Generations 1-3 utilized a plunger style micro switch, Kobelt PN 6001-0104. This microswitch was phased out and replaced with a lever style microswitch, Kobelt PN 6001-0112, in mid 2023. Older generation jog levers can use the new microswitch, but require a retrofit kit, PN 7170-RF-01. This retrofit kit contains all the necessary components, including the new microswitch, to replace a single, generation 1-3 style microswitch.

For instructions on how to replace the old-style micro switch with a newer one, refer to section 14.




Once both microswitches in the jog unit have been retrofitted with Kobelt PN 7170-RF-01, the unit becomes a Generation 4 jog lever. Determination of what microswitch the unit has can be done as described in section 13.2.5.

There is no change to the spring or seals in Generation 4, and the repair and maintenance details of generation 3 can be followed.


13.2 SUMMARY OF JOG LEVER GENERATIONS

Key Features	Section	Generation 1	Generation 2	Generation 3	Generation 4
Spring Type	13.2.1	Torsion	Extension/Tension	Extension/Tension	Extension/Tension
Spring Arms	13.2.2	None	Brass/Straight	Stainless/Horn	Stainless/Horn
Cam Diameter	13.2.3	0.813in (20.7mm)	0.870in (22.1mm)	0.870in (22.1mm)	0.870in (22.1mm)
Housing	13.2.4	No stop posts	Has stop posts	Has stop posts	Has stop posts
Microswitch	13.2.5	6001-0104	6001-0104	6001-0104	6001-0112
Dates	-	Up to late 2000s	Late 2000s - 2019	2019- mid 2023	Mid 2023 onwards

13.2.1 Spring Determination

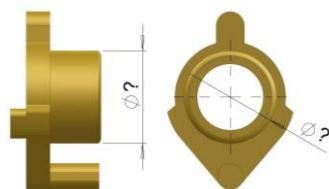
Key Features	Generation 1	Generation 2	Generation 3
Picture			
Shape	Torsion	Tension	Tension with taper at ends
Coils	3	10	21

13.2.2 Spring Arm Determination

Key Features	Generation 1	Generation 2	Generation 3&4
Picture	No Arms		
Shape	N/A	Tangent/Straight Ears	Bull Horn Ear
Material	N/A	Brass*	Stainless Steel

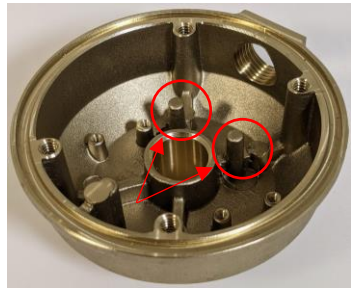
*some arms produced in late 2018 were stainless steel (see far right in gen 2 picture)

13.2.3 Cam Diameter Measurement





Generation 1	Generation 2 -4
0.813in (20.7mm)	0.870in (22.1mm)

13.2.4 Housing Determination




Generation 1	Generation 2 -4
No posts	Posts present

13.2.5 Microswitch determination and replacement ordering

Key Features	Generation 1-3	Generation 4
Microswitch part number	6001-0104	6001-0112
Picture		
Replacement part number	Retrofit kit, 7170-RF-01. One retrofit kit required per switch being replaced.	Microswitch only, 6001-0112

14 APPENDIX F: 7170-RF-01 MICROSWITCH RETROFIT KIT

INSTALLATION

 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 1-17 and all figures in section 14 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 old style microswitch being replaced. Review Figure 10 and Table 6 and compare to your retrofit kits to ensure the correct quantities of components are present.

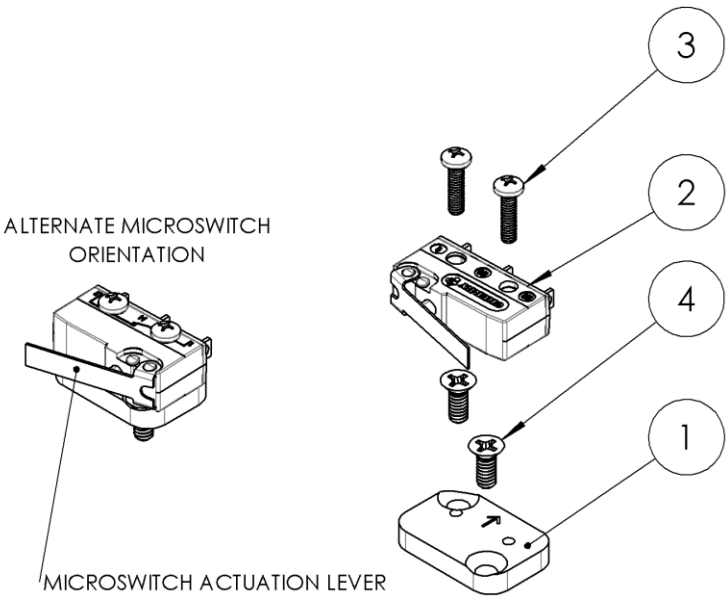


Figure 10: Microswitch retrofit kit, 7170-RF-01.

Table 6: Bill of materials for Microswitch retrofit kit, 7170-RF-01

7170-RF-01 BOM			
Item	Qty	Part Number	Description
1	1	7170-0011	BRACKET, MICROSWITCH
2	1	6001-0112	MICROSWITCH, SUBMINIATURE, STRAIGHT LEVER, SPDT 10A
3	2	1012-3208	SCREW, PAN HD, PHP DR, M2-0.4 X 8, 18-8
4	2	1009-0304	SCREW, FLAT HD, PHP DR, 3-48 X 1/4, 18-8

1. 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 side as before so that the jog lever will move the vessel in the same direction as prior to the retrofit.
2. Desolder the wire connections on the old microswitch.
3. Remove and discard the old microswitch.
4. Refer to Figure 11 and note the engraved arrow on the microswitch bracket ① is facing outwards on both sides of jog lever.
5. Apply Loctite 242(Blue) to X2 Flat head screws ④.
6. Install bracket ① with screws ④ into the jog unit housing, 7170-0001, ensuring the engraved arrow is correctly orientated.
7. Refer to Figure 11 and note the orientation of the microswitch ② for the side of the jog unit that the microswitch is being replaced on.
8. Place the microswitch ② on top of the bracket ① orientating the microswitch so the actuation lever is as shown in Figure 11.
9. Apply Loctite 242(Blue) to X2 pan head screws ③.
10. Use X2 screws ③ and tighten to secure the microswitch ②.

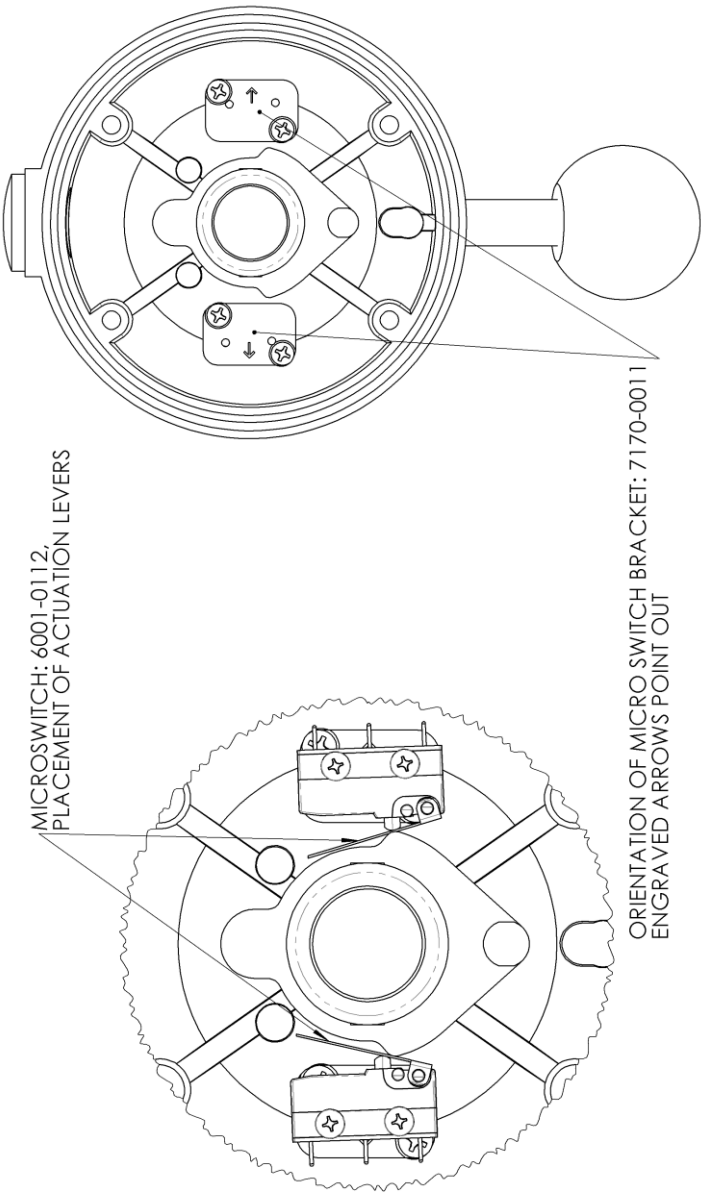


Figure 11: Placement of microswitch and microswitch mounting bracket within the housing.

11. Check correct operation of the switch by rotating the jog lever through its full travel, ensure:
 - a. The actuation lever of microswitch ② is clear of any obstructions through its range of motion.
 - b. The microswitch ② 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 12 for clarity on terminals being checked. When the switch is depressed, terminal 1 and 4 should have continuity.
 - c. The microswitch ② 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.

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.

12. 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.

It is recommended to route the wire as shown in Figure 12 and Figure 13 for an over dash(7170-X1) jog. For the under-dash model(7170-X2), the routing from the switches stays the same as over dash models while the wire routing going into the gland connection can be done as suggested in Figure 14.

13. Solder the wires to the terminals of the new microswitches as shown in Figure 12. Keep the white and black wires routed to the same side as with the previous switches as noted in step 1.
14. It is recommended to apply heat shrink protective tubing to the exposed wire and connection terminals.
15. If the other microswitch is being replaced as well, repeat steps 1-14 on the other microswitch.
16. Use X2 plastic cable ties to secure the routed wires together in the positions indicated in Figure 12.
17. Refer to section 4 for recommissioning the jog unit.

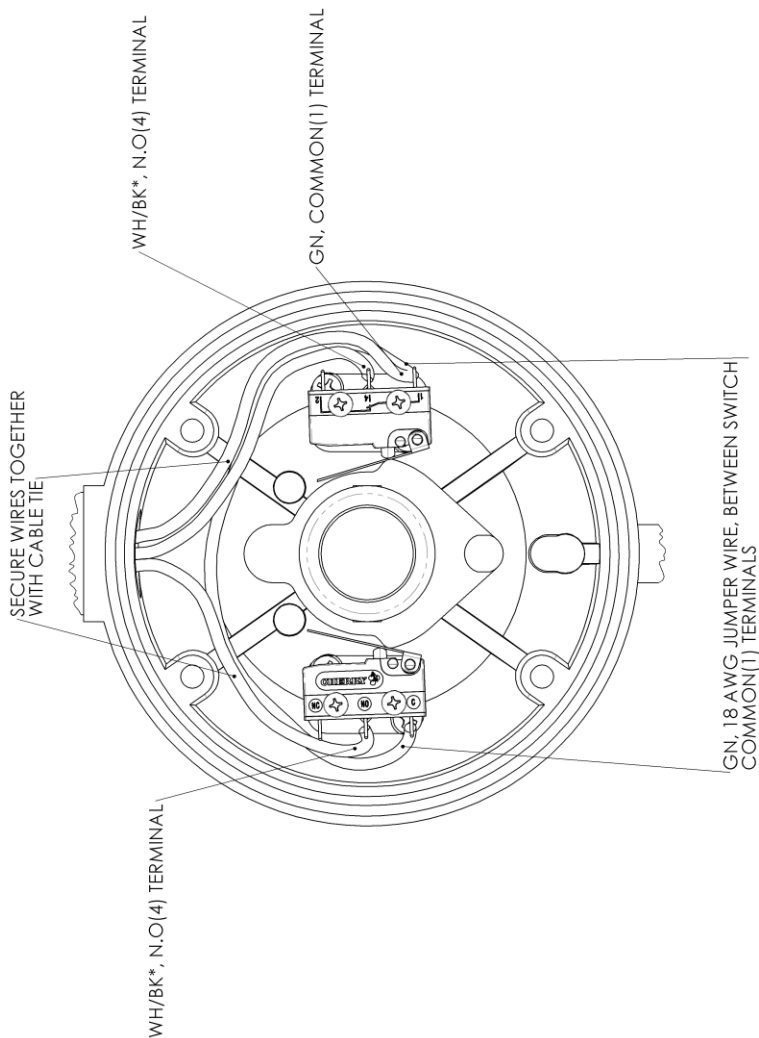


Figure 12: Wire connections and routing for new microswitch, 7170-A1 shown.
*Keep white or black wire going to same side as previous switch

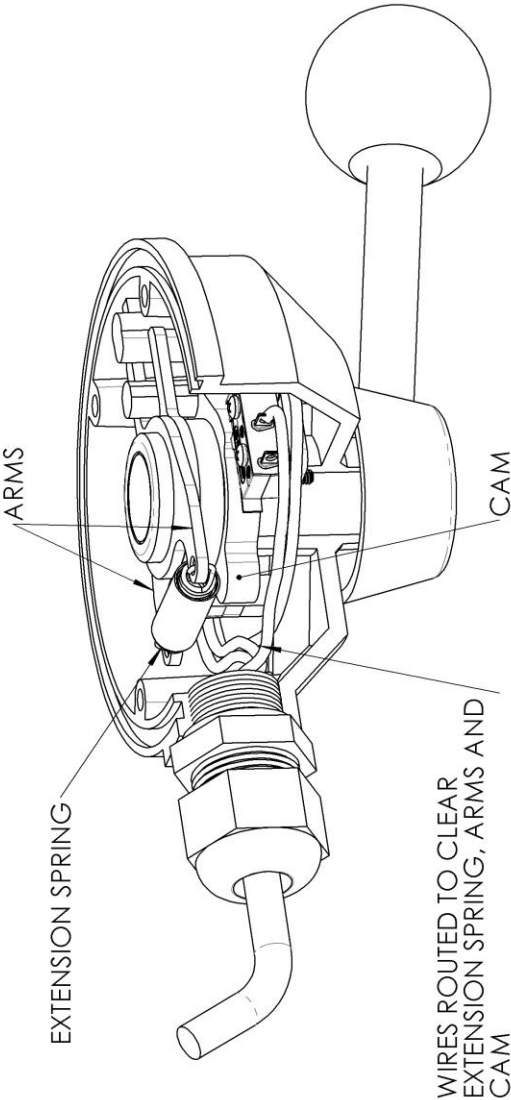


Figure 13: Wire routing showing particular parts to ensure adequate clearance, 7170-A1 shown.

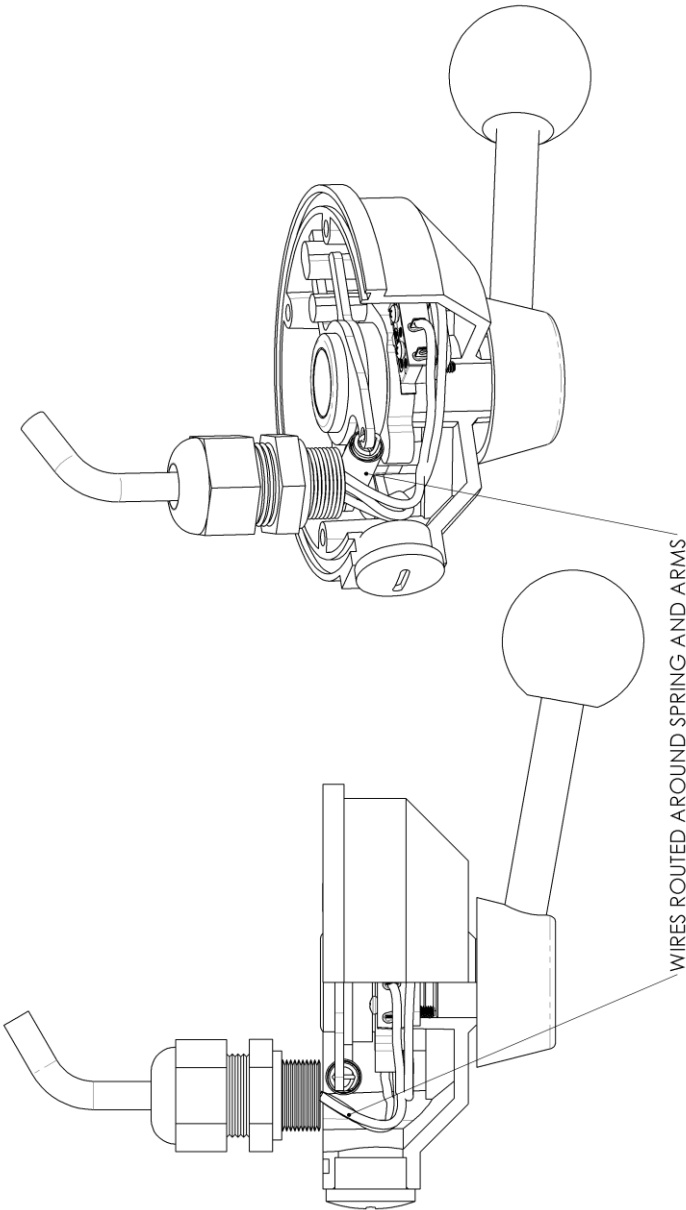


Figure 14: Wire routing for under dash jog levers, 7170-A2 is shown

15 APPENDIX G: 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.

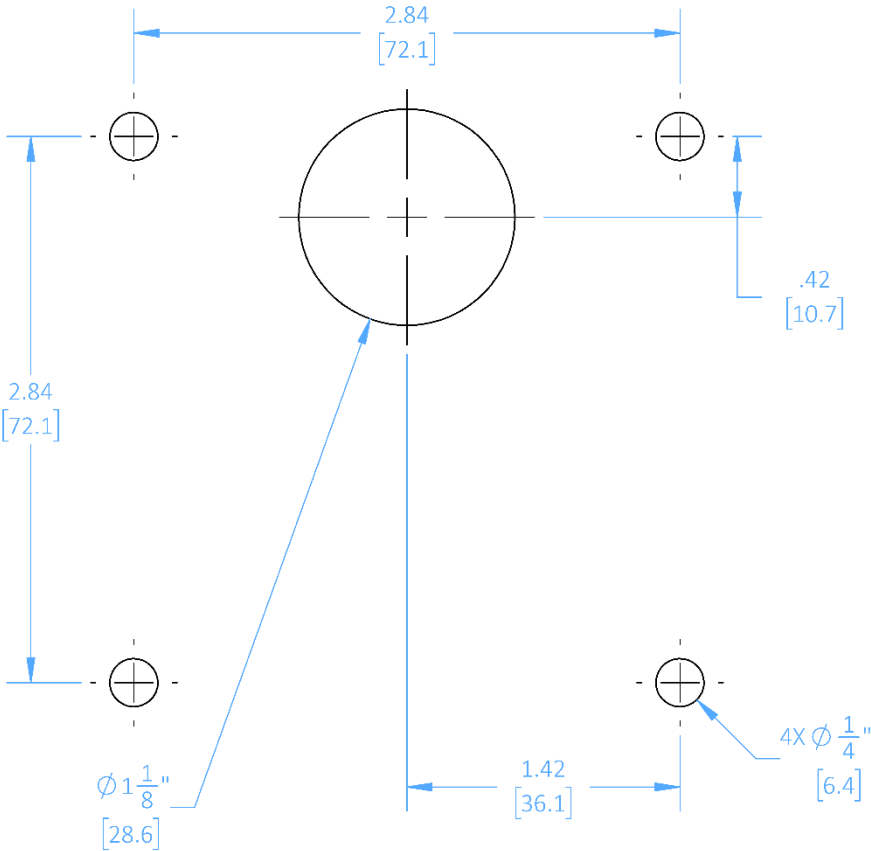


Figure 15: Installation Cut-out Template

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