

UFC 4-420-10  
29 September 2006

# UNIFIED FACILITIES CRITERIA (UFC)

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## INTERNAL LOCKING DEVICE FOR MAGAZINE DOORS



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## **UNIFIED FACILITIES CRITERIA (UFC)**

### **INTERNAL LOCKING DEVICE FOR MAGAZINE DOORS**

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Naval Facilities Engineering Service Center (Preparing Activity)

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## CHAPTER 1

### INTRODUCTION

1-1           **OBJECTIVE.** To describe the Internal Locking Device (ILD) for magazine doors and to provide information necessary to procure, design, and install ILD systems at Department of Defense (DoD) and contractor facilities.

1-2           **BACKGROUND.** DoD Directive 3224.3 (Appendix A, Reference 1) assigns the Navy as Executive Agent for DoD locks, safes, vaults, seals, and containers. Based on this Directive, the Chief of Naval Operations (OP-09N) was identified as the program sponsor, and the Naval Facilities Engineering Command (NAVFAC) was assigned responsibility as program manager. The Naval Facilities Engineering Service Center (NFESC) is the technical manager of the DoD Lock Program. NFESC provides technical expertise and support on all technical issues related to research, development, test, and evaluation for locks, safes, vaults, seals, and containers to all DoD organizations.

In 1994, to address the security and operational deficiencies of exterior mounted padlock and hasp systems, the NFESC Security Engineering Division (OP66) developed the ILD system, which can replace existing high security padlock and hasp systems, or be installed during the construction of new magazines. The primary application of the ILD is for magazines used to store sensitive munitions (conventional, nuclear, and chemical) and has been approved for use on magazines storing these munitions as an alternative to a high security hasp and padlock. The ILD is specified in the following DoD manuals and directives:

- DoD Manual S5210.41-M (Appendix A, Reference 2), for the protection of nuclear weapons. Paragraph C6.4.2.2.3.2. This paragraph also states “Deadbolt locking systems (such as the ILD), or equivalent deadbolt locking systems, will be installed on nuclear weapons storage and maintenance structures no later than 3 years from the date of this publication.”
- **Draft** DoD Manual 5100.76-M (Appendix A, Reference 3), for the protection of conventional arms, ammunition, and explosives. The draft version of this manual, paragraphs C3.1.4, C3.2.4, and AP2.3.1 state that new construction or planned upgrades to access doors for Category I and II areas (magazines or production/maintenance facilities) require the installation of ILDs.
- DoD Directive 5210.65 (Appendix A, Reference 4) for the protection of chemical agents. This directive refers to DoD Manual 5100.76-M for security, storage, and transportation guidance.

1-3           **ILD DESCRIPTION AND SYSTEM OPTIONS.** The ILD is a mechanical locking device that operates boltwork systems designed for specific magazine door applications. The ILD and boltwork function as a complete locking system for sliding and swinging magazine doors. The ILD can be modified for use with electronic access control, hard-wired intrusion detection systems (IDS), and wireless IDS. The exterior

dimensions of the ILD unit are 8 X 5 X 3 inches and weighs less than 10 pounds. A complete description of the ILD is provided in Chapter 2.

The ILD is available in single or dual key configurations and can be used with either swinging or sliding door boltwork. The dual key ILD meets the requirement for two-person integrity (TPI) required by Appendix A, Reference 2, and eliminates the need to install two separate padlock and hasp systems on magazine doors. A unique option of the dual key ILD is that it can be converted to single key operation with only slight modifications. **The dual key ILD is recommended for applications that have or anticipate a TPI requirement in the future.**

1-4 **FACTORS TO CONSIDER.** ILD systems replace high security hasps, padlocks, associated anti-intrusion bars (AIB), and universal hasps currently in use on magazine doors. Most standard steel sliding or swinging magazine doors can accept the ILD system with minor modifications to the door. Once compatibility with the magazine door has been established, the following factors should be considered when deciding to replace existing padlock and hasp systems:

- 1) The level of security protection required (the ILD system provides significantly higher levels of forced entry and surreptitious resistance than traditional padlock and hasp systems).
- 2) Performance goals and security requirements (the ILD system provides single key/dual key control capability in a single system, resistance to adverse environmental conditions, elimination of key breakage, tested reliability, etc.).
- 3) Operational requirements (the ILD system allows integration with IDS and access control systems, easy operation, etc.).
- 4) Cost (the ILD system is slightly more expensive than traditional hasp, padlock, AIB, and universal hasp systems but can be expected to last much longer).

1-4.1 **Magazine Doors Compatible with the ILD.** NAVFAC and the Army Corps of Engineers (ACE) are responsible for the design and construction of weapons storage magazines and igloos. ILDs can be retrofitted or installed as part of the construction phase on the following magazines:

- NAVFAC Steel arch (NAVFAC drawings 1059128-1059130, 1059132, 1069906, and 1355460-1355461)
- NAVFAC Concrete arch (Navy drawings 357428-357430, August 9, 1944 and NAVFAC drawings 627954-627957, 764597, 658384-658388, 724368, 751861, 764596, 793746 and 793747). For new construction, use NAVFAC drawings 104310-140324, September 12, 1983

- Navy Oval arch (NAVFAC drawings 10404026-1404034) (No longer approved for new construction)
- NAVFAC Earth-covered circular composite arch (NAVFAC drawings 10404375-10404389 October 31, 1985)
- NAVFAC Earth-covered oval composite arch (NAVFAC drawings 1404390-1404398, October 31, 1985)
- Earth-covered magazines (NAVFAC drawings 649602-649605, 793748, and 803060)
- NAVFAC Type A box (NAVFAC drawings 1404000-1404007)
- NAVFAC Type B box (NAVFAC drawings 1404018-1404025)
- NAVFAC Type C box (NAVFAC drawings 1404430-1404444, Sept 1985)
- NAVFAC Type D box (NAVFAC drawings 1404465B-1404478, Sept 1985)
- NAVFAC Type E box (NAVFAC drawings 14023-14037, June 1985)
- NAVFAC Type F box (NAVFAC drawings 14041-14055, June 1985)
- NAVFAC Type M box (missile magazine)
- ACE Semicircular steel arch 33-15-65
- ACE Reinforce concrete arch 33-15-74 for new construction
- ACE Semicircular steel arch 421-80-01
- ACE Steel oval arch 421-80-02
- ACE Steel and concrete large box 421-80-02
- ACE Steel oval arch 421-80-03
- ACE Mounded concrete 33-15-06, revised March 14, 1942
- ACE Atomic blast resistant 33-15-16 and 33-15-58
- ACE Stradley 33-15-61
- ACE Steel arch AW 33-15-63
- ACE Steel arch AW 33-15-64
- ACE Steel arch AW 33-15-65
- ACE Steel oval arch 33-15-73 (no longer approved for new construction)
- ACE Semicircular mounded concrete 652 series (drawings 652-686 through 652-693), December 27, 1941

ILDs can also be installed on magazine doors not listed here and on other doors that require increased levels of security or operational flexibility. Contact the NFESC for an evaluation of any door not listed, to determine compatibility with the ILD system.

1-4.2 **Advantages of the ILD.** The ILD system provides the following advantages over high security padlocks used with Naval Ammunition and Production Engineering Center (NAPEC) shrouded hasps, Natick Laboratory Army Research, Development and Engineering Center (NATICK) hasps, or the NAPEC Universal Security System:

- Approved by the DoD for use on all storage magazines (conventional, nuclear, and chemical)
- Easy one handed operation
- Significant increase in forced, covert, and surreptitious entry resistance
- Accepts wireless electronic monitoring, intrusion detection, and access control systems
- Resistant to hostile environmental conditions (e.g., sand, dust, rain, ice, corrosion, extreme heat and cold)
- Tolerances in critical areas to compensate for door misalignment, temperature changes, and sagging
- Low maintenance
- Reduced key breakage
- Can be switched from single key to dual key control depending on security requirements

## CHAPTER 2

### DESIGN AND SPECIFICATIONS

2-1           **INTRODUCTION.** ILD systems are made up of the ILD, a housing or mounting plate, and a boltwork assembly designed for the type of door (swinging or sliding). The following paragraphs explain the design and functions of the ILD systems. Complete descriptions of the components that make up the ILD systems are provided in this chapter. The definitions provided highlight key terms that are used in the discussions that follow.

#### 2-2           **REFERENCE DOCUMENTS**

2-2.1       **Government Documents.** The following publications form a part of this UFC to the extent specified herein. These documents are listed in the Department of Defense Index of Specifications and Standards (DoDISS).

- *NAVFACINST 5100.11J, "NAVFACENGCOM Command Safety and Health Program," 18 January 2000* (Appendix A, Reference 5)

#### 2-2.2       **Non-Government Documents**

- *ASME Y 14.100M, "Engineering Drawing Practices" 6 January 1998* (Appendix A, Reference 6)

#### 2-3           **ILD FUNCTIONAL AND PHYSICAL DESCRIPTIONS**

2-3.1       **General Physical Description.** This UFC covers the single key and dual key configurations of the ILD. **Swinging and sliding door ILD locking systems are designed to accept either the single or dual key configuration of the ILD.**

The single and dual key ILD locking systems for swinging doors consist of five main assemblies:

- Single or dual key ILD
- Boltwork housing assembly
- Sliding lock bolt assembly
- Key guide assembly
- IDS switch

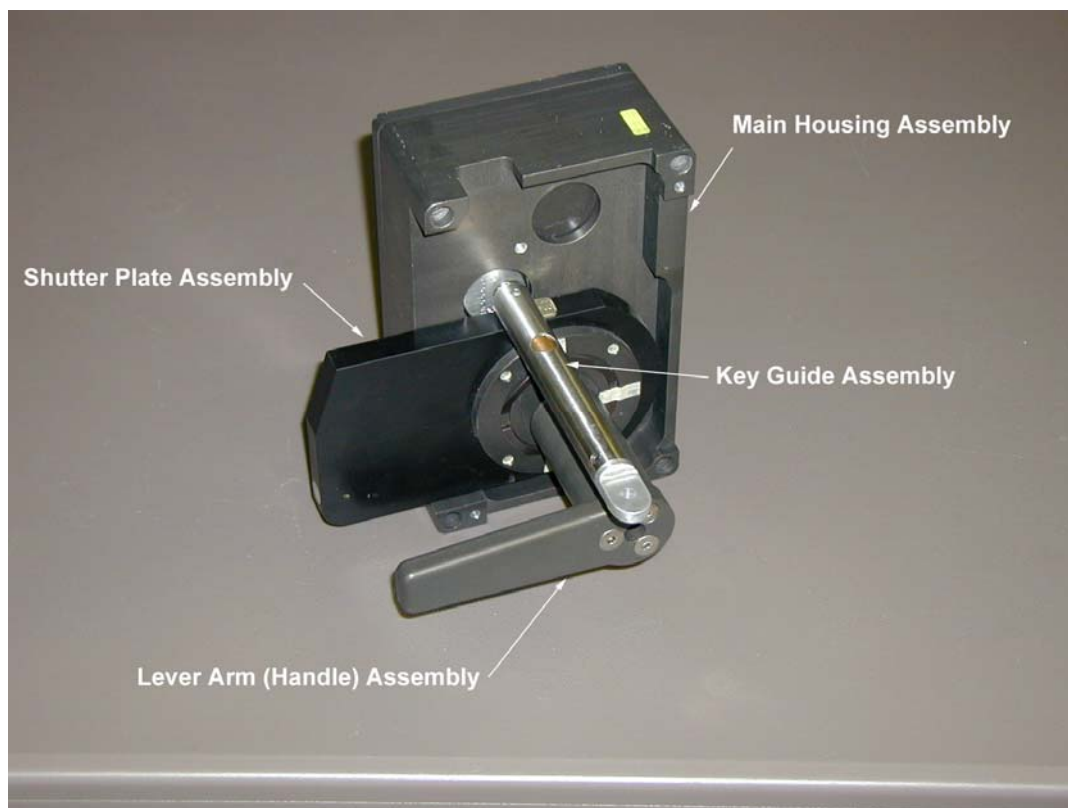
The single and dual key ILD locking system for sliding doors consist of five main assemblies:

- Single or dual key ILD
- Boltwork housing assembly
- Locking “T” bolt assembly
- Key guide assembly
- IDS Switch

2-3.2 **Single Key ILD.** The single key ILD is made up of four assemblies (see Figure 2-1). The single key ILD was designed for most locking applications where a single locking device is required to secure the door.

- Main housing assembly
- Shutter plate assembly
- Lever arm (handle) assembly
- Key guide assembly

**Figure 2-1. Single Key ILD**



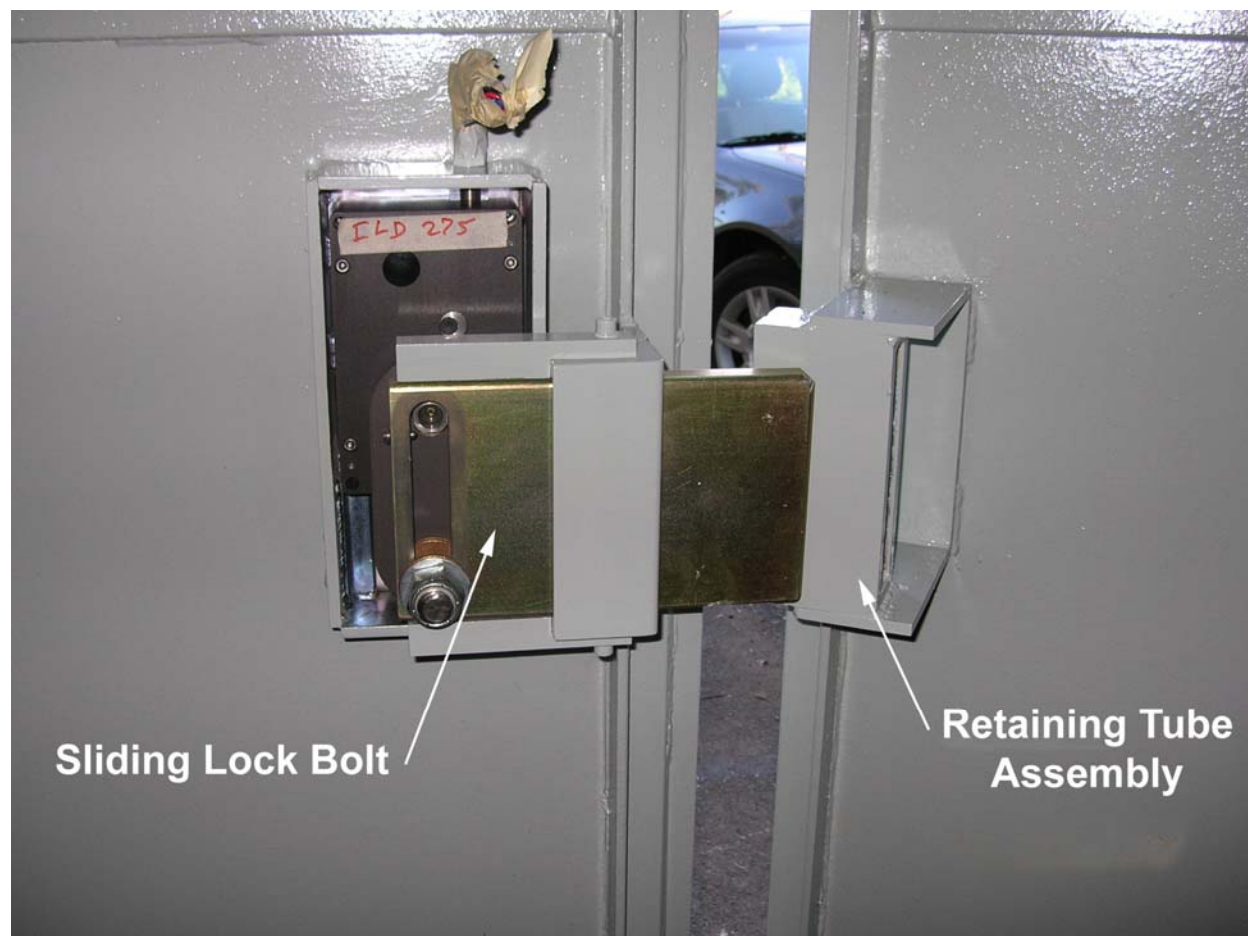
**2-3.3 Dual Key ILD.** The dual key ILD replaces two padlock and hasps, while meeting the two-person integrity (TPI) requirement. This configuration has two lock cylinders and two internal locking bolts. Both lock cylinders must be unlocked before the ILD can be opened. The lock cylinders are keyed differently, making it mandatory for two people to be involved in the unlocking and locking process as long as the keys are stored and issued separately.

The dual key ILD is made up of the same four sub-assemblies as the single key ILD. The two ILD locks are identical except for the internal boltwork and camshaft sleeve sub-assembly (the single key ILD uses one internal lock bolt and camshaft sleeve sub-assembly, while the dual key ILD uses two). Figure 2-2 shows the dual key version of the ILD.

**Figure 2-2. Dual key ILD**



**2-3.4 Swinging Door Boltwork Housing Assembly.** The boltwork housing assembly for swinging doors is designed to house and protect the lock while allowing the bolt to be connected to the ILD lock in a secure/non-binding manner. The swinging door boltwork housing assembly is designed for installation on either single or double swinging doors and can be installed on either the active or inactive door. The swinging boltwork housing assembly is coupled to the ILD by means of a driver cam assembly. The driver cam assembly rotates when the ILD is operated. This assembly engages the sliding locking bolt into a retaining tube assembly mounted on the opposite door. Figure 2-3 shows the sliding lock bolt mounted on swinging magazine doors.

**Figure 2-3. Sliding lock bolt and retaining tube assembly for swinging doors**

The ILD boltwork assembly for interior mounting on swinging doors is shown in Appendix B, Figure B-3 and part numbers are described in Table B-1.

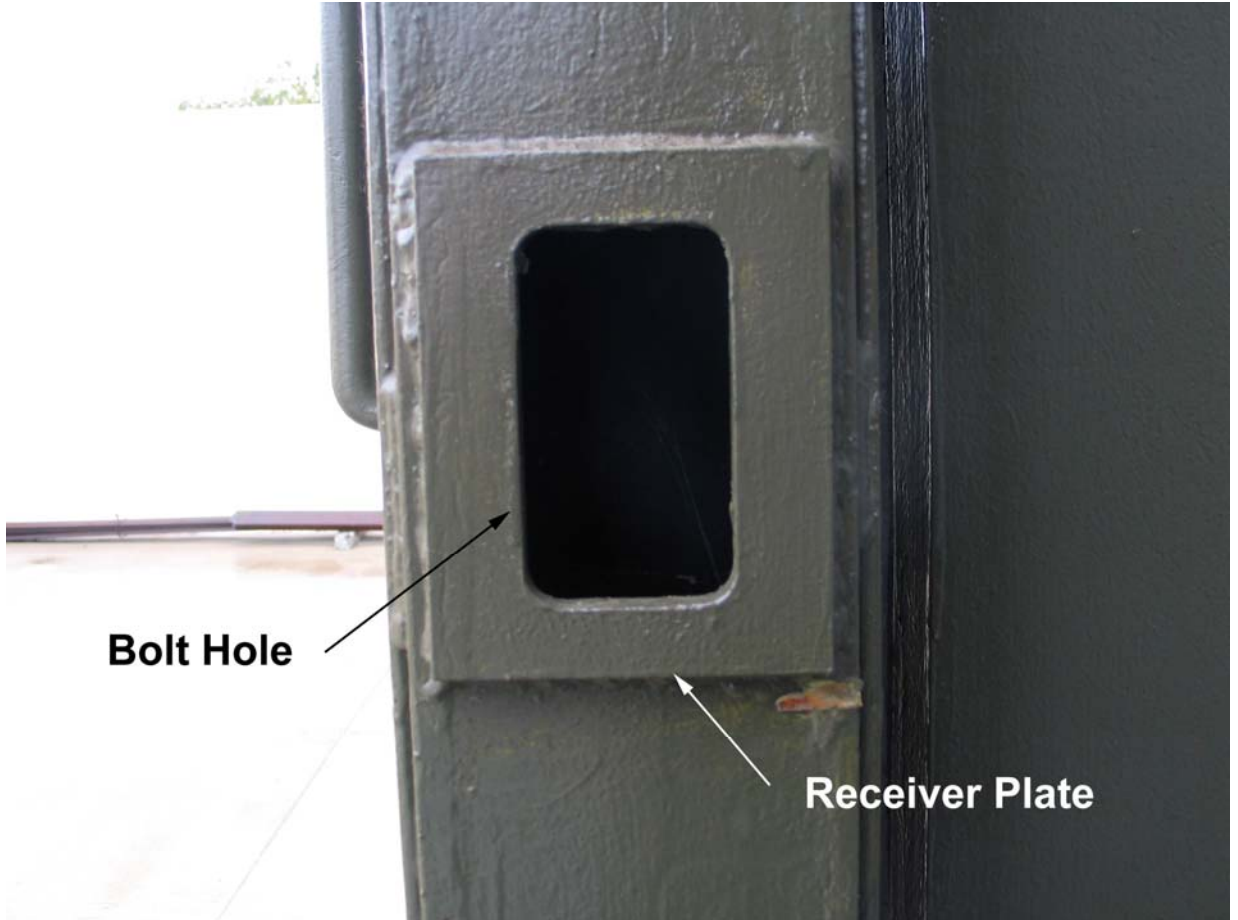
2-3.5 **Sliding Door Boltwork Housing Assembly.** The boltwork housing assembly for sliding doors is designed to house and protect the lock while allowing the bolt to be connected to the ILD lock in a secure/non-binding manner. The sliding door boltwork has an external housing that allows for mounting the ILD to the headwall by either welding or bolting. The headwall is the front exposed wall of a magazine on which the magazine door is mounted. The headwall is usually made of concrete. Figure 2-4 shows a typical headwall for magazines with sliding doors.



**Figure 2-4. Typical headwall for a magazine with sliding doors**

On sliding magazine doors, a locking bolt hole is cut into the leading edge of the magazine door during retrofit ILD installation, or during new construction. The hole in the door is cut in a circular pattern to allow the locking “T” bolt to rotate. The hole in the receiver plate is rectangular in shape and slightly larger than the rectangular shaped locking bolt. This hole allows the locking “T” bolt to engage the door receiver hole upon closure of the door. When the locking bolt is locked, it is rotated 90 degrees to the hole and prevents the door from being pulled open. Figure 2-5 shows a receiver plate installed on a sliding magazine door. Figure 2-6 shows the locking “T” bolt and boltwork assembly for sliding magazine doors.

Figure 2-5. Bolt hole and receiver plate installed on sliding door



**Figure 2-6. Locking “T” bolt and boltwork assembly for sliding magazine doors**

ILD sliding door boltwork assemblies are shown in Appendix C, Figures C-1, C-2, and C-3 and part numbers are described in Tables C-1, C-2, and C-3 for 10-inch thick doors, 5 to 8-inch thick doors and 3 to 4-inch thick doors, respectively.

**2-3.6 Key Guide Assembly.** The key guide assembly consists of a guide tube, guide plug, guide stop, and a key. This unit enables the user to insert the key through the ILD housing and into the lock cylinder. It is designed in a manner that aligns the key to enter the lock cylinder in only one orientation. This minimizes operator error during key operation and reduces the possibility of the key breaking off in the cylinder. The key guide assembly is also designed to protect the key when not in use. When removed from the cylinder, the key is retracted inside the guide tube. The ILD key guide assembly is shown in Figure 2-7.

**Figure 2-7. ILD Key guide assembly**

ILD keys are manufactured with a specific key profile that enables insertion into the key cylinder plug via the keyway (Figure 2-8). ILD keys are specifically designed for use with the ILD key guide assembly. Part of the bow protrudes outside the guide and fits into a slot in the key guide assembly bushing mounted on the front plate of the ILD. This protrusion prevents the key from being turned until the key is fully inserted into the cylinder. Keys made to operate ILDs are designed to break at a specific point outside the cylinder if excessive force is applied. This allows easy removal of a broken key using needle nose pliers. Figure 2-9 shows an ILD key made specifically for use with the ILD.

**Figure 2-8. Keyway for ILD lock cylinders**

Figure 2-9. ILD Key



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## CHAPTER 3

### INSTALLATION

3-1           **INTRODUCTION.** The following instructions provide guidance and advice for installing ILD locking systems on new or near new door systems. However, one set of installation instructions cannot be applied universally to all magazine doors. Each magazine door type will require some modification of the general installation instructions provided in this Chapter.

3-1.1         **Installing the ILD System on Swinging Doors.** Instructions for installing an ILD system on swinging magazine doors are provided in Appendix B. Installation diagrams and parts lists for mounting the ILD on the interior of swinging doors are shown in Appendix B, Figure B-3 and Table B-1.

3-1.2         **Installing the ILD System on Sliding Doors.** Instructions for installing an ILD system on sliding magazine doors are provided in Appendix C. Installation diagrams and parts lists for 10-inch thick doors, 5- to 8-inch thick doors and 3- to 4-inch thick doors are shown in Appendix C, Figures C-1, C-2, and C-3, and parts are listed in Tables C-1, C-2, and C-3, respectively.

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## **APPENDIX A**

### **REFERENCES**

1. DoD Directive 3224.3 “Physical Security Equipment (PSE): Assignment of Responsibility for Research, Development, Testing, Evaluation, Production, Procurement, Deployment and Support” – 17 February 1989.
2. DoD Manual S5210.41-M, “Nuclear Weapons Security Manual” – 22 November 2004.
3. DoD Manual 5100.76-M, “Physical Security of Sensitive Conventional Arms, Ammunition and Explosives” – **Draft** – August 2005.
4. DoD Directive 5210.65, “Chemical Agent Security Program” – 15 October 1986.
5. NAVFACINST 5100.11J, “NAVFACENGCOM Command Safety and Health Program,” – 18 January 2000.
6. ASME Y14.100M, “Engineering Drawing Practices” – 06 January 1998.

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## APPENDIX B

### INSTALLATION GUIDE SWINGING DOOR

**B-1 INSTALLATION INSPECTION.** This installation guide provides general instructions for installing the Internal Locking Device (ILD) on swinging doors. **This guide is intended for doors that are in new or near new operating condition.** These instructions should be considered a procedural guide only and each door should be evaluated to determine if a modified installation procedure is needed. For doors that are sagging, in poor condition, or where there are significant gaps between the doors, changes to the installation procedure are required to accommodate these anomalies. If this is the case, contact the DoD Lock Program for additional guidance.

**B-1.1 Miscellaneous Information.** When measuring existing doors for ILD installation, gaps between the wall and the door should be measured at the top and bottom to find any conditions that would affect installation.

**B-1.2 Recommendations.** Listed below are recommendations that will make installation easier.

1. Have more than one welding unit available if possible.
2. The following power tools are needed for installation (When the installation is outside the United States, electric tools must be capable of running at the proper voltage and have an appropriate style plug.):
  - a. 4-inch disc grinder with extra discs.
  - b. 7-inch body grinder with extra discs.
  - c. Heavy-duty hammer-drill.
3. When working on multiple magazines have two complete sets of installation equipment available so the installation team can be staging the next magazine while the welding is being completed on the first.
4. The welding unit should have 300 to 500 amps of welding power and a generator that can handle the load. A plasma cutter, if available, is very helpful in cutting the circular holes to receive the lever arm (handle) and key guide bushings.
5. Additional tools and equipment required:
  - a. Drill bits (multiples of each size and type for concrete and steel drilling). Sizes are provided in the installation instructions.
  - b. Electrical cord sized large enough to run two pieces of equipment at the same time.
  - c. Inside and outside calipers large enough to measure parts and distances (6- and 8-inch).
  - d. Twenty-five-foot tape measure.
  - e. Thirty-six-inch square and scribes.
  - f. Spray paint for touch ups after installation is complete.
6. ILD Installation drawings (if available).

**B-2 INSTALLATION INSTRUCTIONS.** Listed below are the steps that are common to most **new or near new** door installations. Before any work is done, examine the existing door system to determine if there are any differences from the as-built installation drawings. Use Appendix B, Figures B-1, and B-2 to collect the necessary information (the active door must be opened first, while the inactive door is held in place by head and foot bolts). Installation graphics (Figure B-3) can be used for reference as needed. Index numbers (IN) (Table B-1) are referenced in the installation instructions below.

### **B-2.1 Preparing the new Internal Locking Device (ILD)**

1. Check to make sure the four blind ¼-20 UNC threaded holes of the boltwork housing, used to mount the ILD, are clean. Chase with hand tap if necessary.
2. Inspect the mounting door surface to ensure it is flat to accommodate the ILD boltwork housing. If necessary, grind the surface smooth so the surfaces will mate together.
3. Install a lock cylinder according to the instructions provided in Appendix E.
4. Install the cylinder key in the key guide according to the instructions provided in Appendix F.

### **B-2.2 Installing the hardware**

1. Disconnect grounding straps from the door(s).
2. Remove all hardware and material (door handle, locks, hasps, brackets, signs, etc.) on the door that will interfere with the ILD installation (see Figure B-4).
3. Thoroughly clean the door surface in the area that will be used for the boltwork installation.
4. Locate the ILD on the door. Hold a template (cardboard, paper or steel provided by the manufacturer) that represents the footprint of the ILD up against the inside face of the door to determine the best location and height. Trace the outline of the ILD boltwork footprint on the door. The template should be as close to the active leaf as possible to ensure proper engagement of the bolt. The installation drawings show a typical location. In this case the mounting plate is positioned so it is flat on the inside of the door and is butted up to the 3-inch angle on the vertical edge of the door, as shown in Figure B-5.
5. Grind surface so that paint, rust, and imperfections are removed and the surface is ready for welding as shown in Figure B-6.
6. Use a level to align a support angle at the bottom of the ILD boltwork and tack weld to the interior face of the door.
7. Rest the ILD boltwork housing on the angle support and align horizontally for proper bolt engagement.
8. When the ILD boltwork housing is properly aligned, tack weld the unit at several locations to temporarily secure it to the door as shown in Figure B-7.
9. Open and close the door(s) to confirm that there is no interference with the ILD.

10. Use drill guides to properly mark and drill pilot holes for the location of the lever arm (handle) and key guide holes (see Figure B-8). Drill guides are provided by the manufacturer.
11. Break the tack welds and remove the boltwork from the door.
12. Use a 2 1/4 inch diameter hole saw to drill the hole for the lever arm (handle) and a 1 7/8 inch diameter hole saw to drill the two key guide holes. As an alternative, the hole saws can be used to score the exterior face of the door and a plasma cutter can be used to cut the holes (see Figure B-9).
13. Bolt the ILD boltwork assembly to the door using the cylinder and lever arm (handle) bushings, along with washers and bolts, to ensure the bushings are flush against the boltwork housing. The ILD boltwork will still be loose at this point (see Figure B-10).
14. With the bushings still bolted to the ILD boltwork assembly, align the boltwork assembly on the door and tack weld in place and tack weld the bushings to the exterior of the door.
15. Locate the ILD retaining tube assembly on the opposite door to match the location of the ILD boltwork assembly. Grind surface so that paint is removed and the surface is ready for welding as shown in Figure B-11.
16. Use the ILD installation drawings as a guide for initial horizontal placement. It is critical that the retaining tube assembly be mounted directly in line with the bolt guide. A bolt alignment tool is available from the manufacturer that will aid in proper alignment of the retaining tube assembly (see Figure B-12).
17. Tack-weld the retaining tube mounting plate on the opposite door (Figure B-13).
18. Install the ILD lock according to the instructions in Appendix D and verify the system is working properly, not binding, there is adequate bolt engagement, and the door is held securely in place relative to the IDS switch.
19. Operate the ILD to verify that the bolt slides inside the bolt receiver tack welded on the opposite door. The bolt should slide completely through the receiver without any interference or binding.
20. Disengage the bolt and verify that the bolt receiver will not interfere when the door(s) are opened and closed.
21. When the receiver is properly aligned, tack weld to the bracket (see Figure B-14).
22. Remove the ILD lock according to the instructions in Appendix D. Weld the boltwork assembly, lever arm (handle), and key guide bushings, retaining tube mounting bracket, and retaining tube to the active and inactive leaf respectively (see Figure B-15).
23. After allowing the door to cool, reinstall the ILD lock according to the instructions in Appendix D.
24. To install IDS switch (Figure B-3, IN-5), move the lever arm (handle) to the secured position (lever arm (handle) should be over the key holes) as shown in Figure B-16. Screw the switch into the ILD boltwork housing until it just touches the shutter plate as shown in Figure B-3. Tighten the locknut (or jam nut) to secure the ILD switch in place. This will back the ILD switch off the shutter plate and provide the proper clearance (about 1/8 inch). Test the switch with an ohm meter by attaching the leads to the IDS switch wiring and turn the lever arm

- (handle) to the unlock position and back. The ohm meter should indicate an open and closed switch position. If it does not, tighten the lock nut a little more and repeat the continuity check.
25. Weld the door stop (optional, Figure B-3, IN-6) to the door if the door swing will potentially damage the ILD lever arm (handle) when the door is opened.
  26. Paint all bare metal, including welds, to prevent rust and corrosion (see Figure B-16).
  27. Install the keyhole covers (Figure B-3, IN-7 and -8).
  28. Weld or reattach the grounding straps and seal brackets.
  29. Retest the door for proper operation.
  30. Lock the door.

If the ILD is being installed by a construction contractor, the contractor will install a construction lock cylinder. Whether the installation is commercial or for the Department of Defense, the permanent approved cylinder will be shipped directly to the installation by the DoD Lock Program. See Appendices E and F for instructions on ordering and replacing keys and cylinders.

**B-3 INSPECTION REQUIRED AFTER ILD IS INSTALLED.** After installation is complete, operate the lock to ensure free operation. The door should open and close without any binding or interference. Inspect the welds completed during the installation. Look for any cracks or pockets. These may indicate a poor or weak weld. Make sure all exterior surfaces of the boltwork assembly have been painted (do not paint the ILD, lever arm (handle), key guide covers, or bolt). Any bare metal will be subject to rusting. Make sure the access holes don't have paint build up that would cause key binding during operation.

**B-3.1 Magazine Specific Procedures.** If the ILD needs to be disassembled after installation, follow the instruction in Appendix D and use anti-seize compounds when reassembling the boltwork assembly.

### ILD PRE-INSTALLATION CHECKLIST

Activity Name \_\_\_\_\_

Magazine Number \_\_\_\_\_

Security Risk Category of contents:	1	2	3	4
Magazine is currently	Empty	Contains SRC level ___		
Welding, on the magazine door is okay	YES	NO		
Is Two Person Integrity (TPI) needed now?	YES	NO		
Will TPI be needed in the future?	YES	NO		
Is the magazine wired for IDS now?	YES	NO		
Is there IDS on this magazine now?	YES	NO		
Do you want the ILD to incorporate an IDS?	YES	NO		

Figure B-1. Dimensions needed for ILD installation

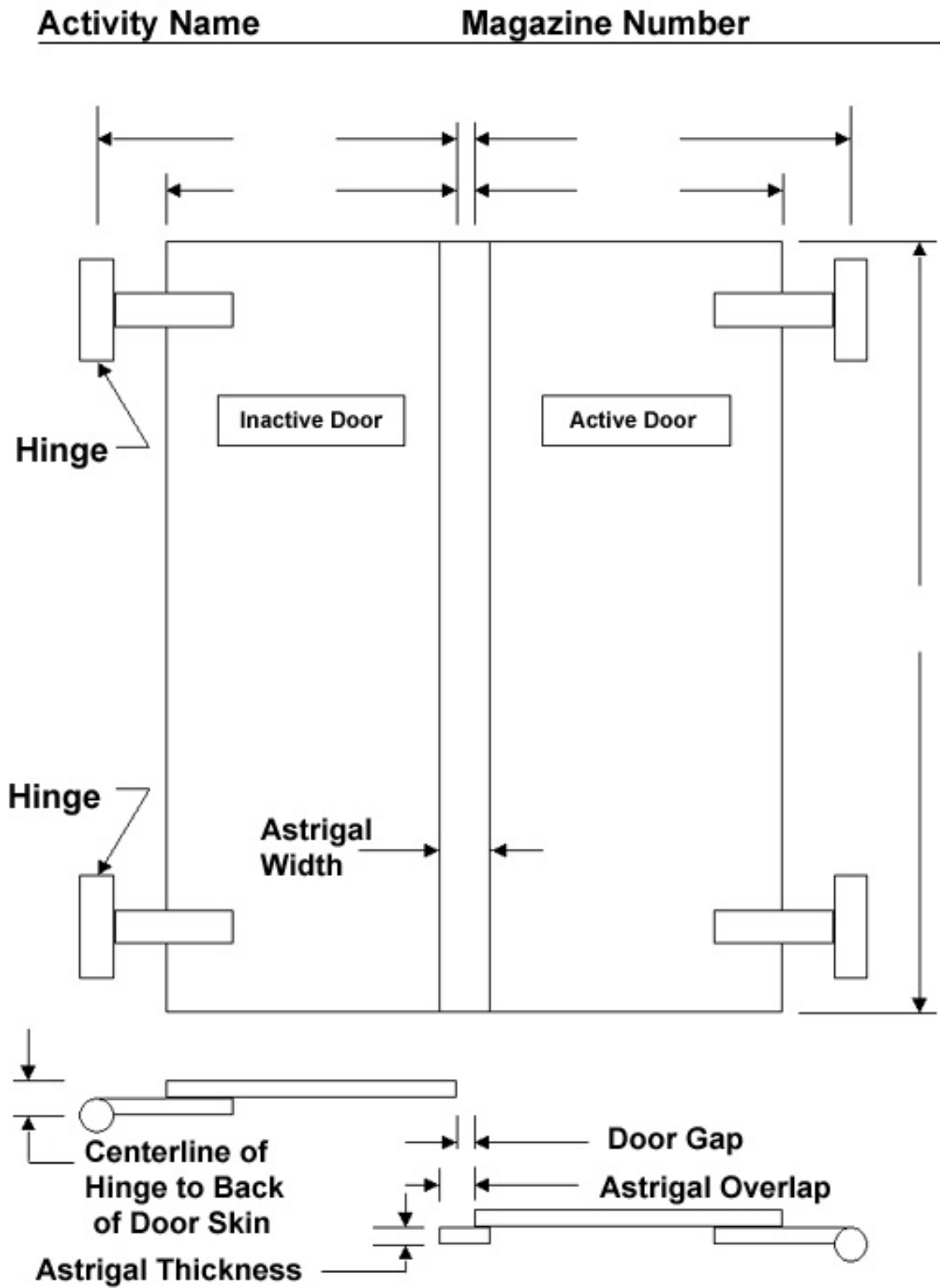
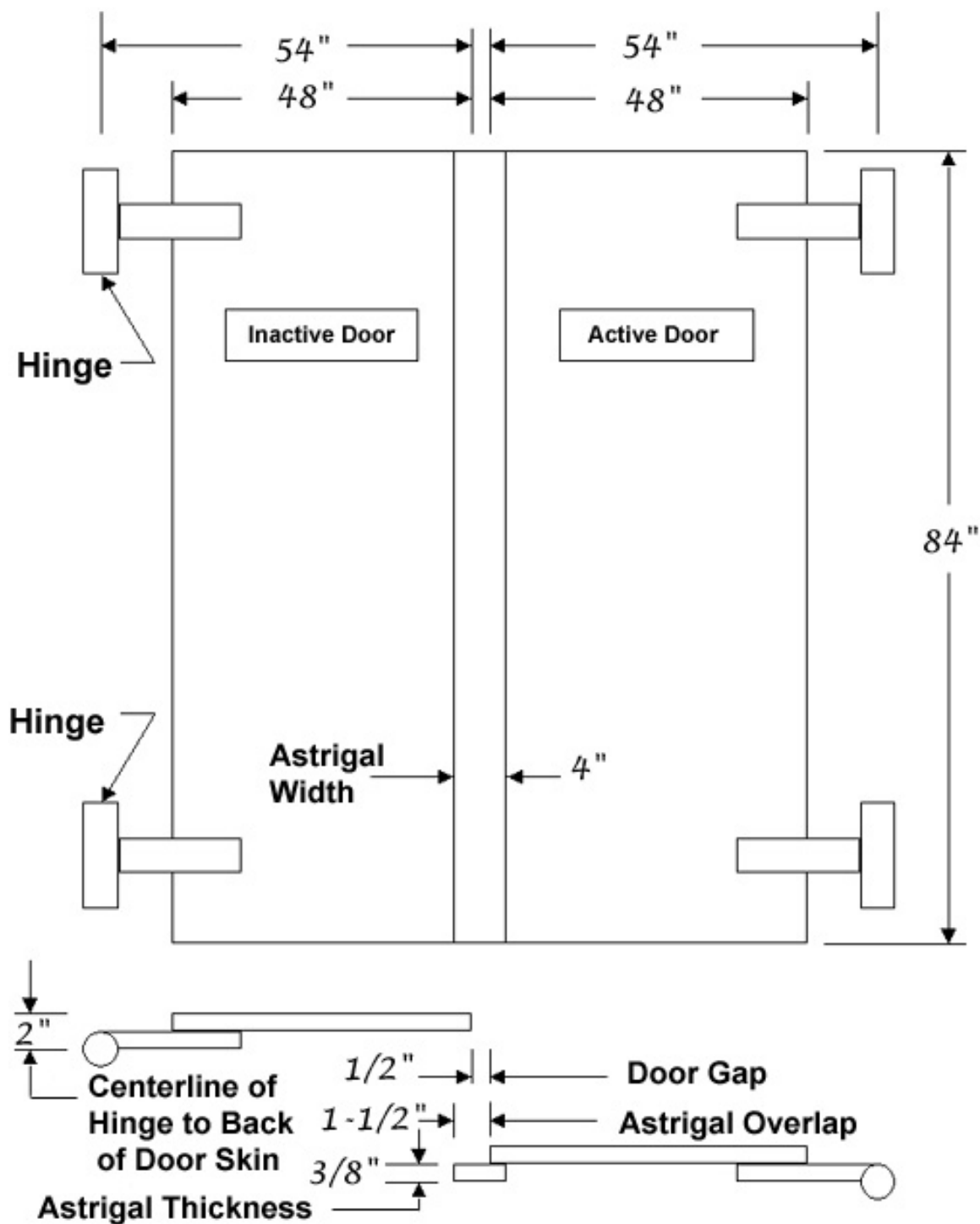




Figure B-2. Sample dimensions needed for ILD installation

**Activity Name** *Fort Bravo* **Magazine Number** *B1013*





**Table B-1. Installation parts list for mounting the ILD on swinging doors  
(PN 301200)**

<b>Figure and Index Number</b>	<b>Part Number</b>	<b>Description Nomenclature</b>	<b>Units Per Assy.</b>	<b>Cage Code</b>
B-3-1	301201	Boltwork Assembly, Swinging Door	1	80091
B-3-2	301209	Key Guide Bushing (Qty 1 for Single Key ILD) (Qty 2 for Dual Key ILD)	1 Or 2	80091
B-3-3	301210	Lever arm (handle) Bushing	1	80091
B-3-4	550101-1 Or 550101-3	ILD Assembly (550101-1 Single Key) (550101-3 Dual Key)	1	80091
B-3-5	75-13523-A2	Proximity Switch (Topworx Company)	1	
B-3-6	301213	Door Stop	1	80091
B-3-7	301214-1	Keyhole Cover "A"	1	80091
B-3-8	301214-2	Keyhole Cover "B" (Not Required for Single Key ILD)	1	80091
B-3-9	94035A202	Screw, Shoulder Socket Cap, No. 8-32,19 Diameter x 0.19 L, Stainless Steel (Qty 1 Single Key, Qty 2 Dual Key)	2 Or 1	3A054
B-3-10	90945A740	Washer, Flat, Stainless Steel (Qty 1 Single Key, Qty 2 Dual Key)	2 Or 1	3A054

Figure B-4. Remove obstructions from the door



Figure B-5. Locate the ILD on the door



**Figure B-6. Prepare the surface for welding**



**Figure B-7. Tack weld the boltwork housing assembly**



**Figure B-8. Drill guide holes for handle and key guide bushings using drill guides**



**Figure B-9. Drill holes for handle and key guide bushings using hole saws or a plasma cutter**



**Figure B-10. Install handle and key guide bushings (2 key guides for dual key ILD)**



**Figure B-11. Prepare surface for welding retaining tube bracket**



**Figure B-12. Use receiver alignment tool to properly align retaining tube with boltwork assembly**



**Figure B-13. Install the retaining tube bracket on inactive door**





**Figure B-14. Tack weld the retaining tube to the bracket**



**Figure B-15. Weld all assemblies in place**



**Figure B-16. Completed ILD installation**



## APPENDIX C

### INSTALLATION GUIDE SLIDING DOOR

C-1 **INSTALLATION INSPECTION.** This installation guide provides general instructions for installing the Internal Locking Device (ILD) on sliding doors. **The guide is intended only for doors that are in new or near new operating condition.** This is a procedural guide only and each door should be evaluated to determine if a modified installation procedure is needed. For doors that are sagging, in poor condition, or where there are significant gaps between the door and headwall, changes to the installation procedure are required to accommodate these anomalies. If this is the case, contact the DoD Lock Program for additional guidance.

C-1.1 **Recommendations.** Listed below are recommendations that will make installation easier.

1. Have more than one welding unit available if possible.
2. The following power tools are needed for installation (When the installation is outside the United States, electric tools must be capable of running at the proper voltage and have an appropriate style plug.):
  - a. 4-inch disc grinder with extra discs.
  - b. 7-inch body grinder with extra discs.
  - c. Heavy-duty hammer-drill.
3. When working on multiple magazines have two complete sets of installation equipment available so the installation team can be staging the next magazine while the welding is being completed on the first.
4. The welding unit should have 300 to 500 amps of welding power and a generator that can handle the load. A plasma cutter, if available, is very helpful in cutting the circular holes to receive the lever arm (handle) and key guide bushings.
5. Additional tools and equipment required:
  - a. Drill bits (multiples of each size and type for concrete and steel drilling). Sizes are provided in the installation instructions.
  - b. Enough electrical cord sized large enough to run two pieces of equipment at the same time.
  - c. Inside and outside calipers large enough to measure parts and distances (6- and 8-inch).
  - d. Twenty-five-foot tape measure.
  - e. Thirty-six-inch square and scribes.
  - f. Spray paint for touch ups after installation is complete.
6. ILD Installation drawings (if available).

C-2 **INSTALLATION INSTRUCTIONS.** Listed below are steps that are common to most **new or near new** door installations. Before any work is done, examine the existing door system to determine if there are any differences from the as-built installation drawings. For convenience, installation graphics (Figure C-1) and index

numbers (IN) (Table C-1) for 10-inch sliding door installations are referenced in the installation instructions below. Other door sizes (5- to 8-inch (Figure C-2 and Table C-2) and 3- to 4-inch (Figure C-3 and Table C-3) have similar IN. IDS installation graphics are provided in Figure C-4.

### **C-2.1 Preparing the new Internal Locking Device (ILD)**

1. Check to make sure the four blind ¼-20 UNC thread holes of the boltwork housing, used to mount the ILD, are clean. Chase with hand tap if necessary.
2. Inspect the mounting surface to ensure it is flat enough to accommodate the ILD boltwork housing (the mounting surface will either be an imbedded steel plate that the housing assembly will be welded to, or concrete where the housing assembly will be anchored with imbedded concrete anchors). If necessary, make the surface smooth enough so the surfaces will mate together.
3. The sliding door ILD boltwork assembly will come preassembled with the ILD lock and IDS switch. If disassembly is required, follow the instructions in Appendix D and always use anti-seize compounds when reassembling the boltwork assembly.
4. Install a lock cylinder according to the instructions provided in Appendix E.
5. Install the cylinder key in the key guide according to the instructions provided in Appendix F.

### **C-2.2 Installing the ILD**

1. Disconnect grounding straps from the door.
2. Remove all door hardware (door handle, locks, brackets, protection plate, etc.) on the door that will interfere with the ILD installation (see Figure C-5).
3. Thoroughly clean the door and wall surface in the area that will be used for the boltwork installation.
4. Close the door and mark the ILD position in preparation for anchoring to the headwall or pilaster.
5. Grind surfaces smooth where obstructions have been removed from the headwall and the sliding door (Figure C-5). Grind around the template outline on the headwall to remove paint and other material that would interfere with welding of the ILD boltwork housing assembly to the headwall.
6. Close the sliding magazine door and let it stop at its normal stopping position. This will dictate the horizontal position of the ILD boltwork housing assembly. Vertical position is established wherever convenient and at a working level between 45 and 50 inches.
7. Position the ILD boltwork housing assembly on the wall, flush with the door end (Figure C-6).
8. Tack-weld the boltwork assembly to the headwall (see Figure C-7). For concrete wall installations, mark the anchor hole locations, drill and set anchors and bolt the ILD to the wall.
9. Use the "T" bolt alignment tool (provided by the manufacturer) to locate the receiver plate on the end of the magazine door (see Figure C-8).

10. Mark the circular cutout using the template attached to the end of the alignment tool (see Figure C-9). The circular area is required to allow the "T" bolt to rotate in back of the receiver plate.
11. Cut out the circular section of the magazine door end marked by the circular template (see Figure C-10).
12. Reattach the "T" bolt alignment tool and use it to align the receiver plate on the end of the magazine door (see Figure C-11).
13. Tack weld the receiver plate to the end of the magazine door (see Figure C-12).
14. Remove the alignment tool and check for proper alignment and operation of the ILD boltwork (see Figure C-13).
15. Weld the receiver plate to the door and the ILD boltwork assembly to the headwall.
16. The IDS switch should already have been installed and adjusted by the manufacturer. If not, move the lever arm (handle) to the secured position (lever arm (handle) should be over the key holes) as shown in Figure C-14. Screw the switch into the ILD boltwork housing until it just touches the shutter plate as shown in Figure C-4 (the IDS alignment tool can be used to align the IDS switch if provided by the manufacturer). Tighten the locknut (or jam nut) to secure the IDS switch in place. This will back the IDS switch off the shutter plate and provide the proper clearance (about 1/8 inch). Test the switch with an ohm meter by attaching the leads to the IDS switch wiring and turn the lever arm (handle) to the unlock position and back. The ohm meter should indicate an open and closed switch position. If it does not, tighten the lock nut a little more and repeat the continuity check.
17. Weld the nuts used to mount the boltwork assembly so they cannot be removed if the attachment is to a concrete wall using anchor bolts.
18. Drill a hole through the headwall. Run the conduit and connect the IDS wires to the alarm panel.
19. Cement the conduit into the hole. Epoxy soft tubes are the easiest to use for this purpose.
20. If previously removed, weld on the door handle so it does not interfere with the ILD operation.
21. Weld or reattach any grounding straps and seal brackets previously removed.
22. Paint receiver plate, headwall and all bare metal including welds to prevent rust and corrosion (see Figure C-14).
23. Shut and lock the door.

If the ILD is being installed by a construction contractor, the contractor will install a construction lock cylinder. Whether the installation is commercial or for the Department of Defense, the permanent approved cylinder will be shipped directly to the installation by the DoD Lock Program. See Appendices E and F for instructions on ordering and replacing keys and cylinders.

**C-3 INSPECTION REQUIRED AFTER ILD IS INSTALLED.** After installation is complete, operate the lock to ensure free operation. The door should open and close without any binding or interference. Inspect the welds completed during the installation.

Look for any cracks or pockets. These may indicate a poor or weak weld. Make sure all exterior surfaces of the boltwork assembly have been painted (do not paint the ILD, lever arm (handle), key guide covers, or bolt). Any bare metal will be subject to rusting. Make sure the access holes don't have paint build up that would cause key binding during operation.

**C-3.1 Miscellaneous Information.** Occasionally when the door is locked, it may be difficult to turn the locking bolt to the open position. This occurs when the door pulls away from the lock in the resting position (i.e., if the overhead track is not perfectly level, the door could roll backward placing pressure on the locking bolt). If the door has a chain pull, make sure the door is completely closed before operating the ILD. This will take the load off the locking bolt and allow smooth operation.

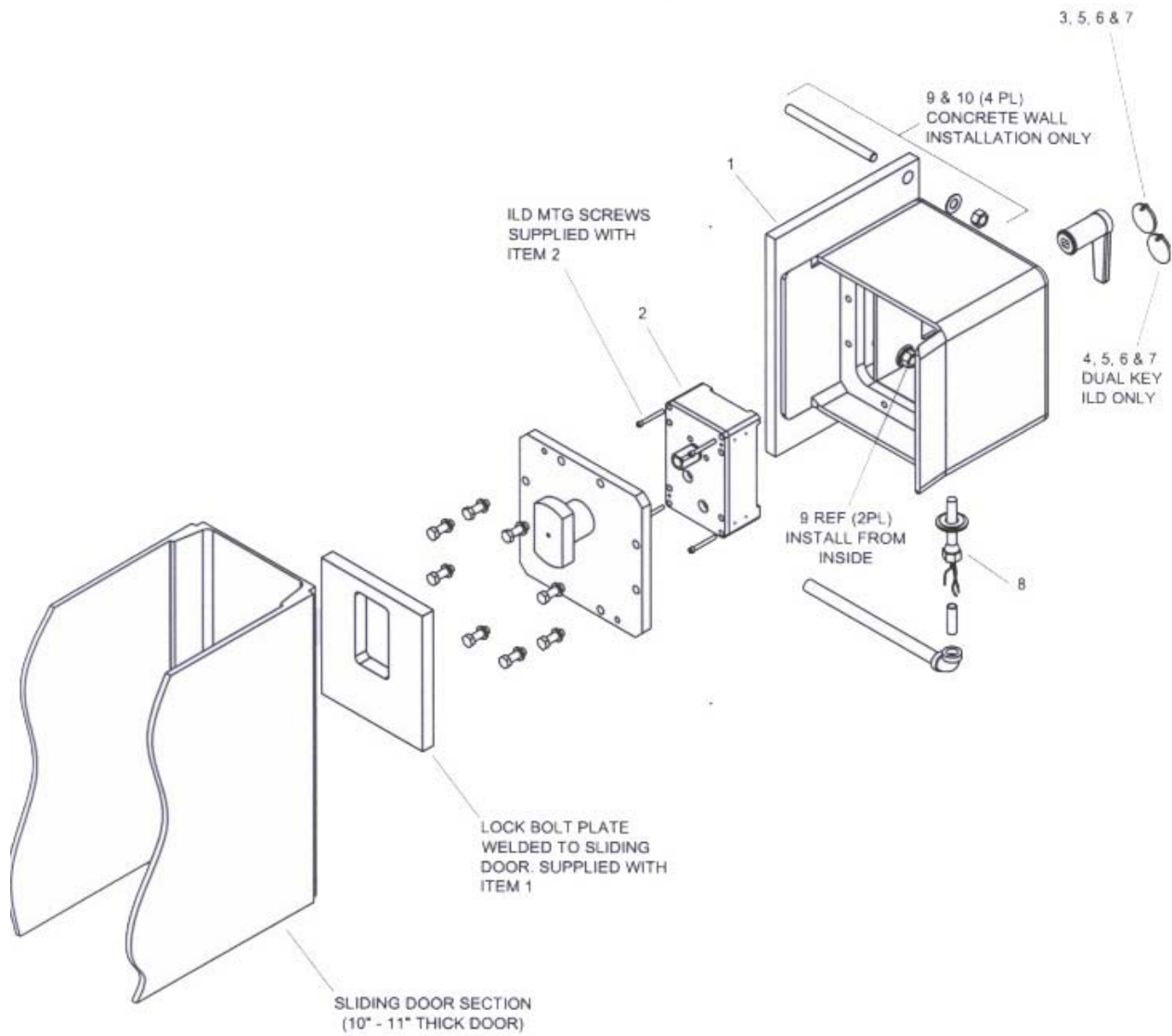
### ILD PRE-INSTALLATION CHECKLIST

Activity Name \_\_\_\_\_

Magazine Number \_\_\_\_\_

Security Risk Category of contents:	1	2	3	4
Magazine is currently	Empty	Contains SRC level ____		
Welding, on the magazine door is okay	YES	NO		
Is Two Person Integrity (TPI) needed now?	YES	NO		
Will TPI be needed in the future?	YES	NO		
Is the magazine wired for IDS now?	YES	NO		
Is there IDS on this magazine now?	YES	NO		
Do you want the ILD to incorporate an IDS?	YES	NO		

Figure C-1. Installation diagram for 10-inch sliding doors

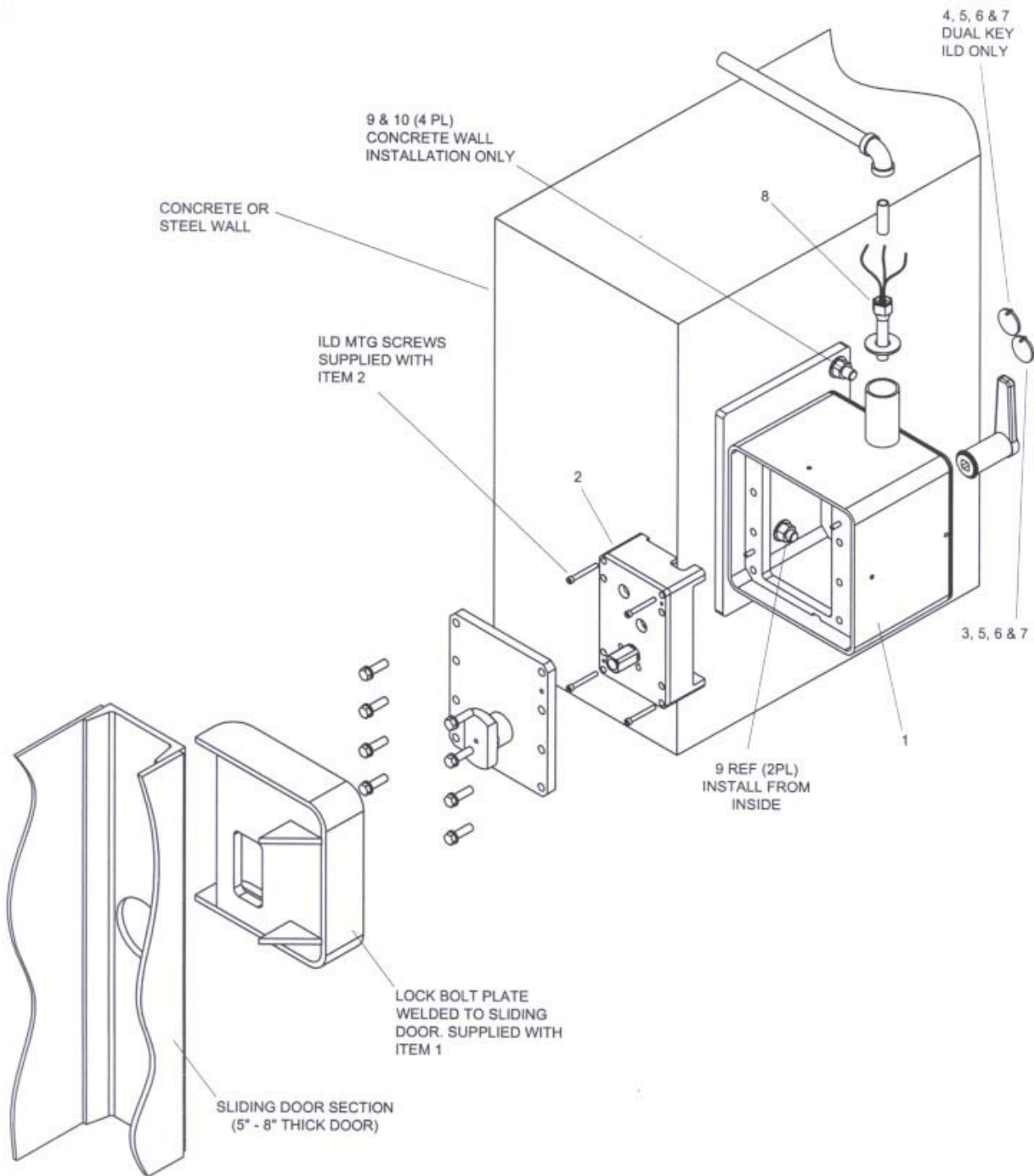




**Table C-1. Installation parts list for 10-inch sliding doors (PN 400600)**

Figure and Index Number	Part Number	Description Nomenclature	Units Per Assy.	Cage Code
C-1-1	400601	Boltwork Housing Assembly	1	80091
C-1-2	550101 550101-2	ILD Assembly (Dual Key Sliding Door) ILD Assembly (Single Key Sliding Door)	1 1	80091
C-1-3	301214-1	Key Hole Cover ("A")	1	80091
C-1-4	301214-2	Keyhole Cover ("B") Dual Key ILD Only	1	80091
C-1-5	94035A202	Screw, Shoulder, Socket Cap, No.8-32, 0.19 Diameter x 0.19 L Stainless Steel	1 Or 2	3A054
C-1-6	90945A740	Washer, Flat, No.10, Stainless Steel (Qty 1 Single Key, Qty 2 Dual Key)	1 Or 2	3A054
C-1-7	9716K41	Disc Spring Washer, 0.37 OD x 0.009 Thick, Stainless Steel (Qty 1 Single Key, Qty 2 Dual Key)	1 Or 2	3A054
C-1-8	75-13523-A2	Proximity Switch (Topworx Company)	1	
C-1-9	HAS-R 5/8 x 7-5/8	HVA Threaded Rod Anchor, 5/8 Diameter x 7-5/8 L, Stainless Steel (Hilti) Concrete Wall Only	4	11239
C-1-10	HVU 5/8 x 5	HVA Adhesive Capsule (Hilti) Concrete Wall Only	4	11239

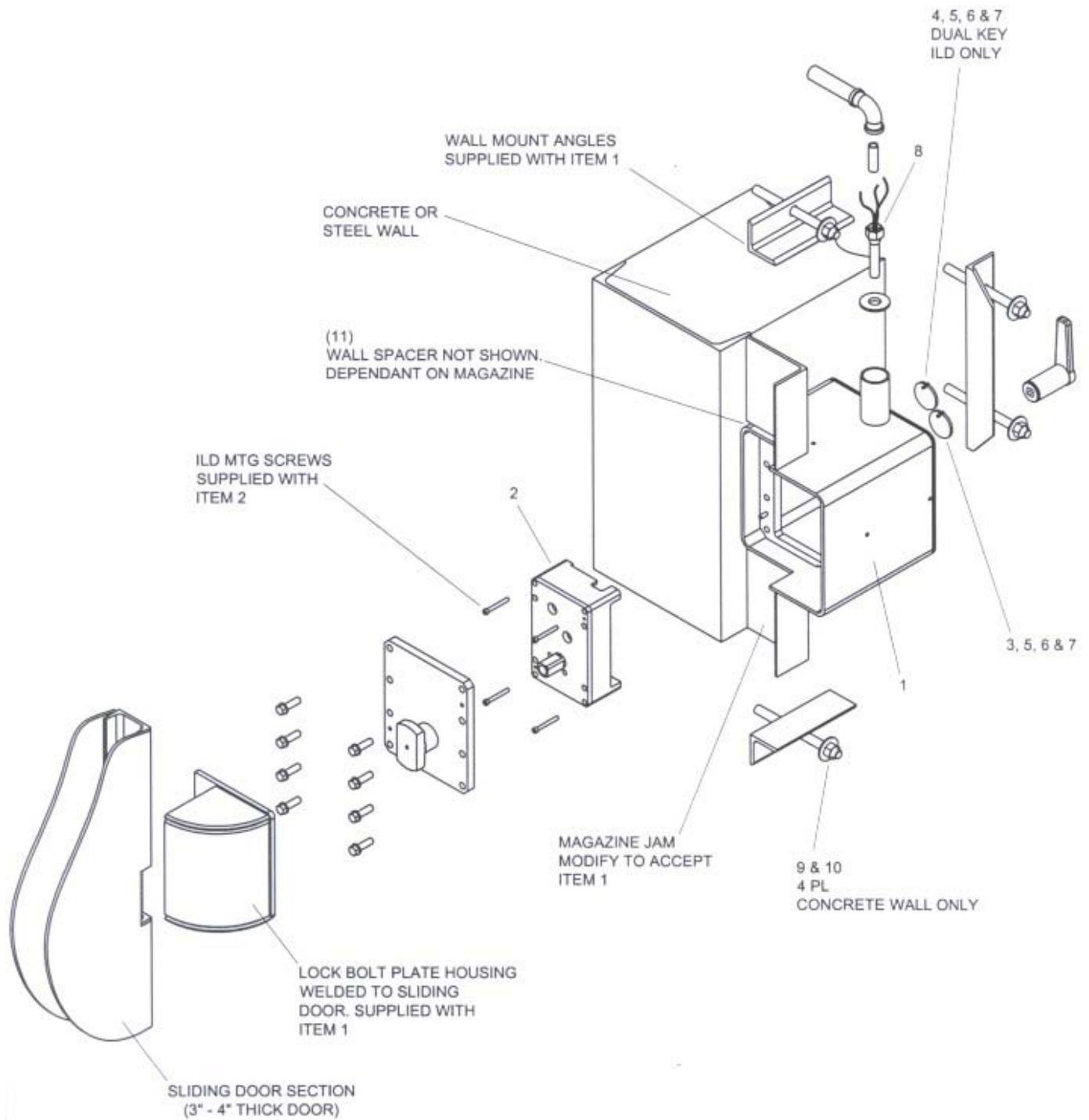
Figure C-2. Installation diagram for 5- to 8-inch sliding doors



**Table C-2. Installation parts list for 5- to 8-inch sliding doors (PN 660400)**

Figure and Index Number	Part Number	Description Nomenclature	Units Per Assy.	Cage Code
C-2-1	660401	Boltwork Housing Assembly	1	80091
C-2-2	550101 550101-2	ILD Assembly (Dual Key Sliding Door) ILD Assembly (Single Key Sliding Door)	1 1	80091
C-2-3	301214-1	Key Hole Cover ("A")	1	80091
C-2-4	301214-2	Keyhole Cover ("B") Dual Key ILD Only	1	80091
C-2-5	94035A202	Screw, Shoulder, Socket Cap, 8/32, 0.19 Diameter x 0.19 L Stainless Steel	1 Or 2	3A054
C-2-6	90945A740	Washer, Flat, #10, Stainless Steel (Qty 1 Single Key, Qty 2 Dual Key)	1 Or 2	3A054
C-2-7	9716K41	Disc Spring Washer, 0.37 OD x 0.009 Thick, Stainless Steel (Qty 1 Single Key, Qty 2 Dual Key)	1 Or 2	3A054
C-2-8	75-13523-A2	Proximity Switch (Topworx Company)	1	
C-2-9	HAS-R 5/8 x 7-5/8	HVA Threaded Rod Anchor, 5/8 Diameter x 7-5/8 L, Stainless Steel (Hilti) Concrete Wall Only	4	11239
C-2-10	HVU 5/8 x 5	HVA Adhesive Capsule (Hilti) Concrete Wall Only	4	11239

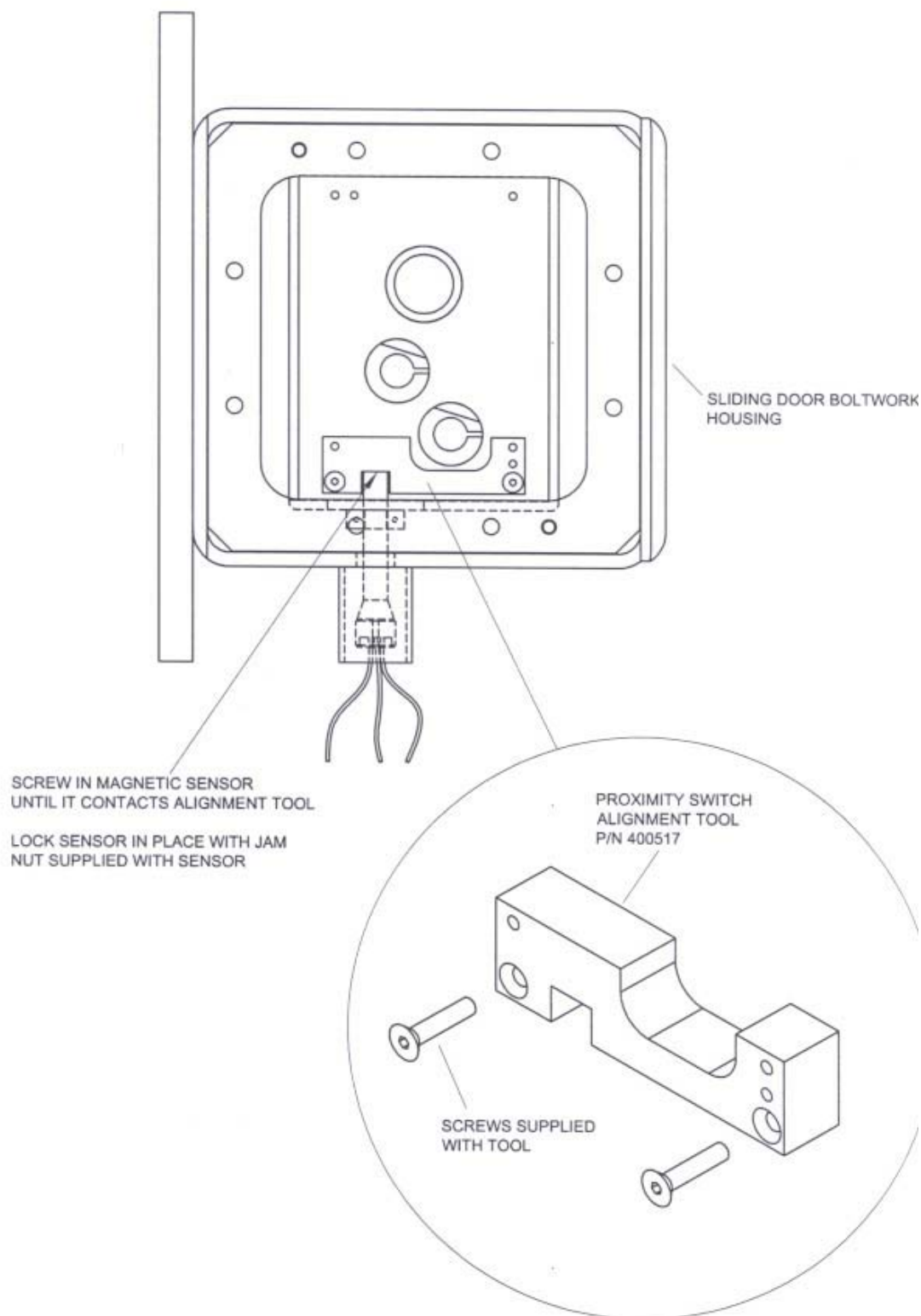
Figure C-3. Installation diagram for 3- to 4-inch sliding doors



**Table C-3. Installation parts list for 3- to 4-inch sliding doors (PN 660200)**

<b>Figure and Index Number</b>	<b>Part Number</b>	<b>Description Nomenclature</b>	<b>Units Per Assy.</b>	<b>Cage Code</b>
C-3-1	660201	Boltwork Housing Assembly	1	80091
C-3-2	550101 550101-2	ILD Assembly (Dual Key Sliding Door) ILD Assembly (Single Key Sliding Door)	1 1	80091
C-3-3	301214-1	Key Hole Cover ("A")	1	80091
C-3-4	301214-2	Keyhole Cover ("B") Dual Key ILD Only	1	80091
C-3-5	94035A202	Screw, Shoulder, Socket Cap, No. 8-32, 0.19 Diameter x 0.19 L Stainless Steel	1 Or 2	3A054
C-3-6	90945A740	Washer, Flat, No.10, Stainless Steel (Qty 1 Single Key, Qty 2 Dual Key)	1 Or 2	3A054
C-3-7	9716K41	Disc Spring Washer, 0.37 OD x 0.009 Thick, Stainless Steel (Qty 1 Single Key, Qty 2 Dual Key)	1 Or 2	3A054
C-3-8	75-13523-A2	Proximity Switch (Topworx Company)	1	
C-3-9	HAS-R 5/8 x 7-5/8	HVA Threaded Rod Anchor, 5/8 Diameter x 7-5/8 L, Stainless Steel (Hilti) Concrete Wall Only	4	11239
C-3-10	HVU 5/8 x 5	HVA Adhesive Capsule (Hilti) Concrete Wall Only	4	11239
C-3-11	660210-X	Wall Mount Spacer (Dependant on Magazine)	1	80091

Figure C-4. Proximity switch installation and adjustment



**Figure C-5. Sliding door edge showing interfering hardware removal**



**Figure C-6. Position the ILD boltwork assembly on the headwall**



**Figure C-7. Tack weld the ILD boltwork assembly to the headwall**



**Figure C-8. Locate the receiver plate position using the "T" bolt alignment tool**





**Figure C-9. Mark the circular path of the “T” bolt using the alignment tool template**



**Figure C-10. Cut circular hole to receive the “T” bolt**



**Figure C-11. Align receiver plate on the magazine door using the alignment tool**



**Figure C-12. Tack weld the receiver plate to the magazine door**



**Figure C-13. Check ILD boltwork for proper operation and alignment**



**Figure C-14. Paint bare metal surfaces to protect against corrosion**



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## APPENDIX D

### ILD REMOVAL AND RE-INSTALLATION

D-1           **INTRODUCTION.** This appendix describes the removal and re-installation of the ILD on both the swinging door and sliding door boltworks for either replacement or maintenance.

#### D-2           **ILD REMOVAL AND INSTALLATION (SWINGING DOOR BOLTWORK)**

##### D-2.1       **Tools and Supplies Required**

- a) 3/16" hex key wrench (T-handle or L) 3" minimum length
- b) 5/16" hex key wrench (T-handle or L)
- c) 1-7/16" open end or combination wrench (alternate; 1-7/16" socket wrench)
- d) 1-1/2" open end or combination wrench
- e) Thread anti-seize compound
- f) Tape, masking, packing, or office (1/4" wide x 1.0" long strips, Qty 3)

##### D-2.2       **ILD Removal**

Step 1: Place ILD and locking bolt in the "**un-locked**" position.

Step 2: Remove upper support guide by unscrewing the 3/8"-16UNC x 1.00" long socket head cap screw using a 5/16" hex key wrench (see Figure D-1). Set aside support guide, screw, and lock washer hardware for reassembly.

**Figure D-1. Removal of upper support bar**



Step 3: Remove the 1.00"-8UNC nylon locking nut that connects the steel lock bolt to the aluminum cam driver using a 1-1/2" open end wrench on the bolt head and a 1-7/16" open end wrench on the nut (see Figure D-2).

**Figure D-2. Removal of cam driver nut**



Step 4: Remove cam driver bolt, thrust bearings, and washers. Note location of thrust bearings and washers for reassembly (see Figure D-3). Remove the 1.0" thick steel lock bolt and set aside all hardware for reassembly.

**Figure D-3. Disassembly of bolt, thrust bearings, and washers**



**Step 5:** Place the ILD into the “**locked**” position. Remove ILD lever arm (handle) by unscrewing the ¼”-20UNC x 1.25” long socket head cap screw using a 3/16” hex key wrench (see Figure D-4).

**Figure D-4. Removal of ILD lever arm (handle)**



**Step 6:** Remove ILD from its mounting surface by unscrewing the four (4) ¼”-20UNC x 2.00” long socket head cap screws using a 3/16” hex key wrench (Figure D-5). Remove the ILD and take care to not lose the wave spring positioned between the ILD shutter plate and the ILD mounting surface. The aluminum cam driver may be removed at this time by removing the spiral retaining ring. Note position of cam driver for reassembly.

**Figure D-5. Removal of ILD mounting screws****D-2.3 ILD Installation**

Step 7: Clean ILD mounting surface before re-installing ILD. Install the wave spring to the ILD shutter plate **with the ears of the spring pointing down towards the shutter plate** and secure with (2) strips of ¼" wide tape (masking, packing, or office) placed in the troughs of the spring as shown in Figure D-6. If installing a new ILD it should already have the wave spring attached with tape.



**Figure D-6. Installation of ILD shutter plate wave spring**

**Step 8:** Installation of the ILD is the reverse of Steps 1 through 5, with the following additional operations: 1) the ILD should be mounted to the boltwork mounting plate in the “locked” position and cycled to the “un-locked” position before installation of the door locking bolt. Cycling the ILD from “locked” to “un-locked” positions a number of times will ensure the ILD is operating properly before proceeding with final installation of the door locking mechanism; 2) Take care when tightening the 1.00”-8UNC nylon locking nut. The nut should be tightened so that clearance remains between all moving parts. If over tightened, the mechanism will bind; 3) Anti-seize compound should be applied to threads of all screws during reassembly. Do not over tighten screws. Recommended torque for ¼” ILD mounting screws is 8-10 ft-lbs, but a torque wrench is not mandatory; 4) Tighten the detent (Figure D-7) enough so it will keep the cam driver bolt from dropping by itself when the lock bolt is cycled. The reassembled ILD boltwork is shown in Figure D-8.

Figure D-7. Reassembled swinging door boltwork

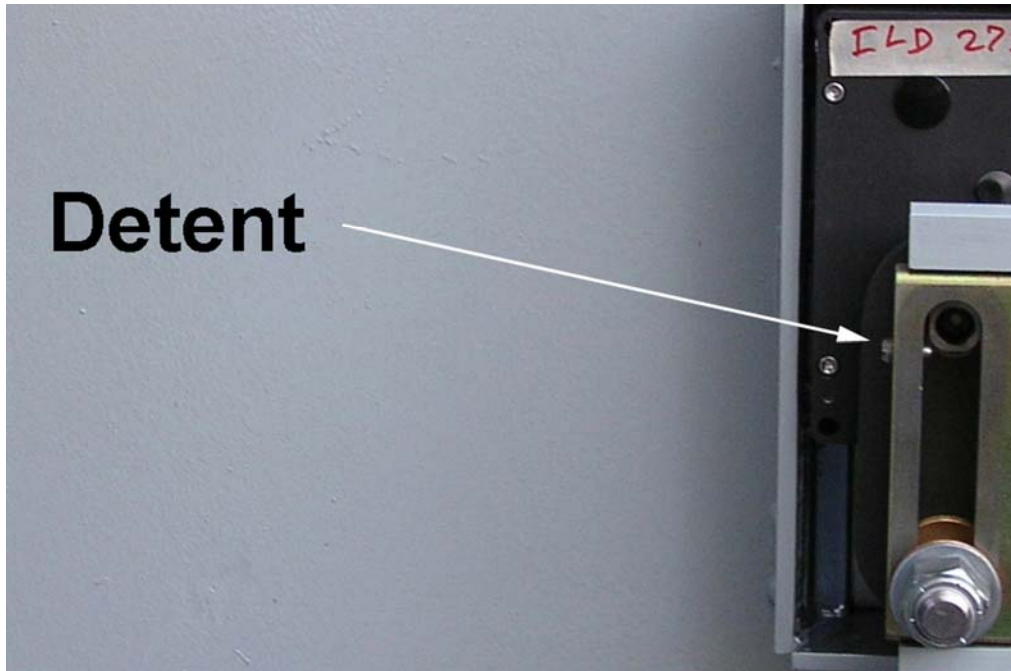


Figure D-8. Reassembled swinging door boltwork



**D-3 ILD REMOVAL AND INSTALLATION (SLIDING DOOR BOLTWORK)****D-3.1 Tools and Supplies Required**

- a) 3/16" hex key wrench (T-handle or L) 6" minimum length
- b) 5/8" and/or 3/4" socket and socket wrench with 3" long extension
- c) Thread anti-seize compound
- d) Tape, masking, packing, or office (1/4" wide x 1.0" long strips, Qty 3)

Configurations of sliding door boltworks and associated hardware vary slightly depending on size of magazine door, but the following procedures apply to all sliding door boltworks.

**D-3.2 ILD Removal**

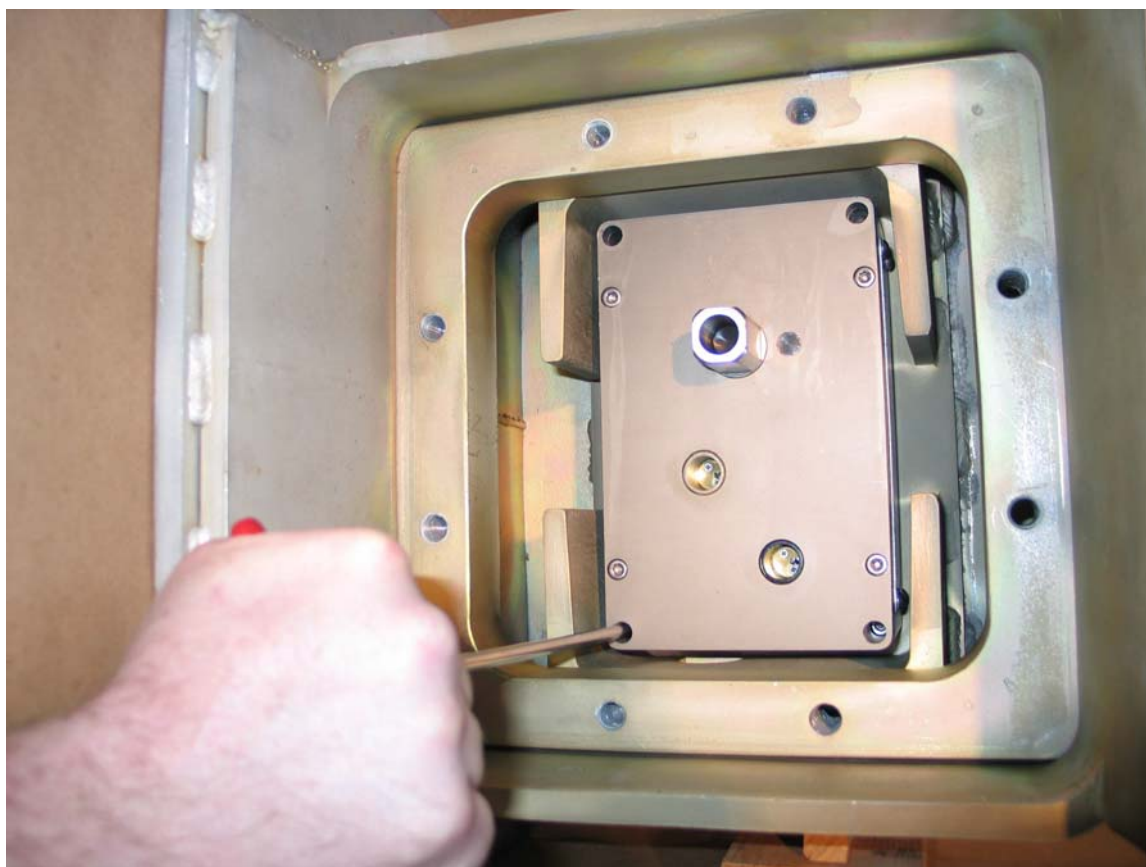
Step 1: Place ILD and locking bolt in the "**locked**" position. Remove either the 7/16" bolts (using 5/8" socket) or 1/2" bolts (using 3/4" socket) that attach the boltplate to the boltwork housing. Remove the boltplate by grabbing locking "T" bolt and pulling the plate out of the housing (see Figure D-9).

**Figure D-9. Removal of bolts and boltplate**



Step 2: Remove ILD from its mounting surface by unscrewing the four (4) ¼"-20UNC x 2.00" long socket head cap screws using a 3/16" hex key wrench (see Figure D-10). Remove the ILD and take care to not lose the wave spring positioned between the ILD shutter plate and the ILD mounting surface.

**Figure D-10. Removal of ILD mounting screws**



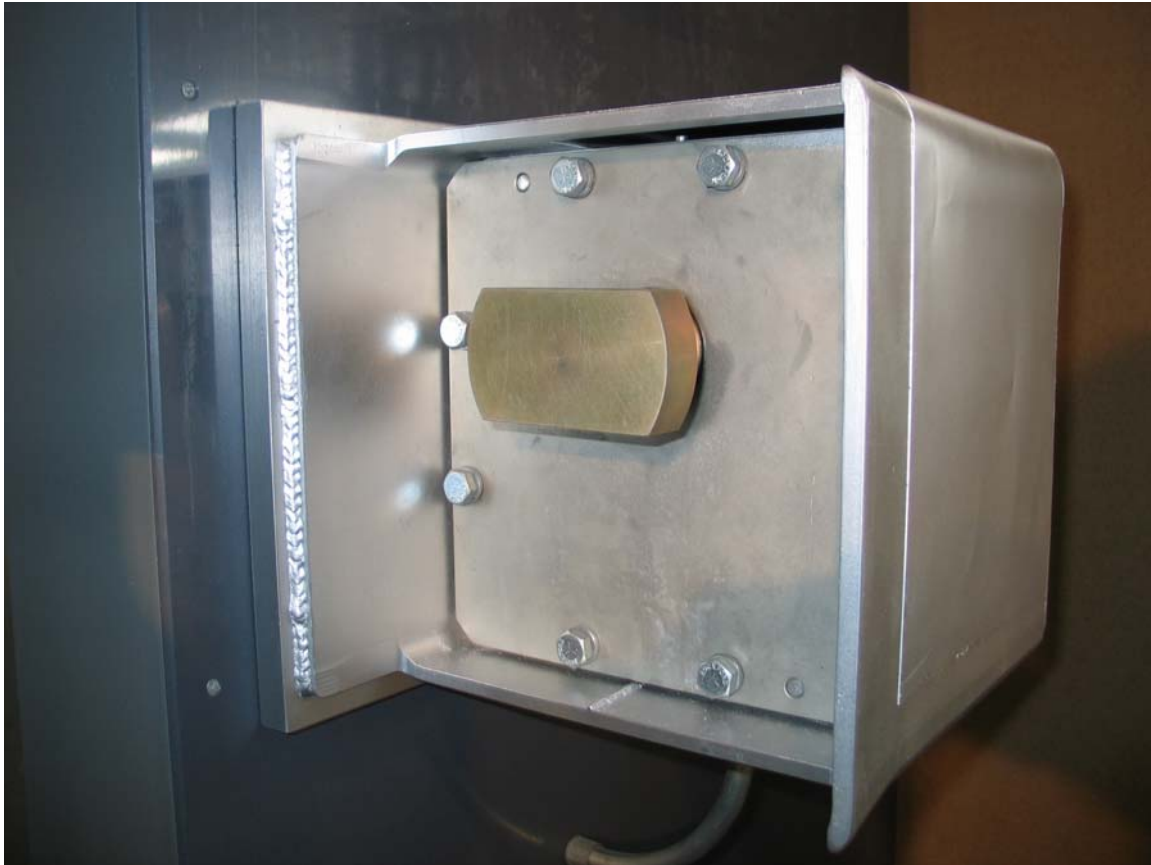
### D-3.3 ILD Installation

Step 3: Clean ILD mounting surface before re-installing ILD. Install the wave spring to the ILD shutter plate **with the ears of the spring pointing down towards the shutter plate** and secure with (2) strips of ¼" wide tape (masking, packing, or office) placed in the troughs of the spring as shown in Figure D-11. If installing a new ILD it should already have the wave spring attached with tape.

**Figure D-11. Installation of ILD shutter plate wave spring**

**Step 4:** Installation of the ILD is the reverse of Steps 1 and 2, with the following additional operations: 1) the ILD should be mounted to the boltwork housing in the “locked” position. Cycling the ILD from “locked” to “un-locked” positions a number of times will ensure proper operation of the ILD before preceding with the final installation of the door locking boltplate and the locking “T” bolt; 2) With the ILD in the “locked” position, assemble the boltplate with the locking “T” bolt in the “locked” position shown in Figure D-11. Cycle the ILD and locking “T” bolt to ensure a smooth operation before closing the door; 3) Anti-seize compound should be applied to threads of all bolts and screws during reassembly. Do not over tighten the bolts and screws. Recommended torque for ¼” ILD mounting screws is 8-10 ft-lbs, but a torque wrench is not mandatory. Figure D-12 shows the reassembled sliding door boltwork.

**Figure D-12. Reassembled sliding door boltwork**



**APPENDIX E****REMOVING AND REPLACING ILD LOCK CYLINDERS**

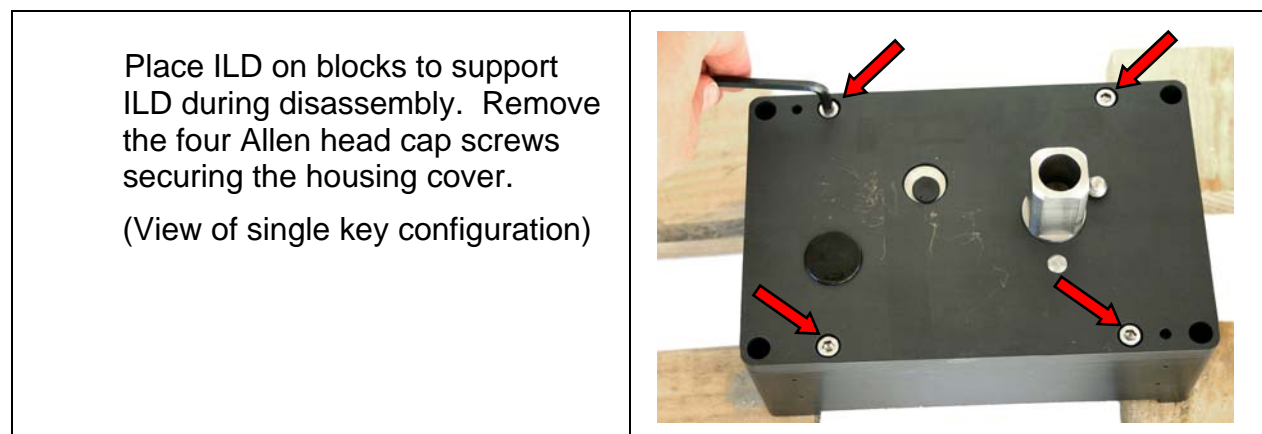
**E-1 INTRODUCTION.** ILD lock cylinders are controlled by the DoD Lock Program, NFESC, Port Hueneme, California, Code OP66. Upon completion of the ILD installation, contact the DoD Lock Program, (800) 290-7607, (805) 982-1212, or DSN 551-1212, to obtain permanent approved cylinders and keys. The DoD Lock Program will ship the cylinders, keys, and key guides to the government POC at the installation site. The Government POC will acknowledge receipt of the approved high security cylinders and keys with the DoD Lock Program

In the event of an ILD lock cylinder failure, replacement lock cylinders and keys are available from the DoD Lock Program. NFESC personnel may visit the activity where the failure occurs and repair the problem or furnish a repair procedure, keys, and lock cylinders to qualified personnel at the activity. New keys can come pre-installed in protective key guides or shipped separately depending on how they are ordered. Return old keys, cylinders, and protective key guides to the NFESC (see Appendix F).

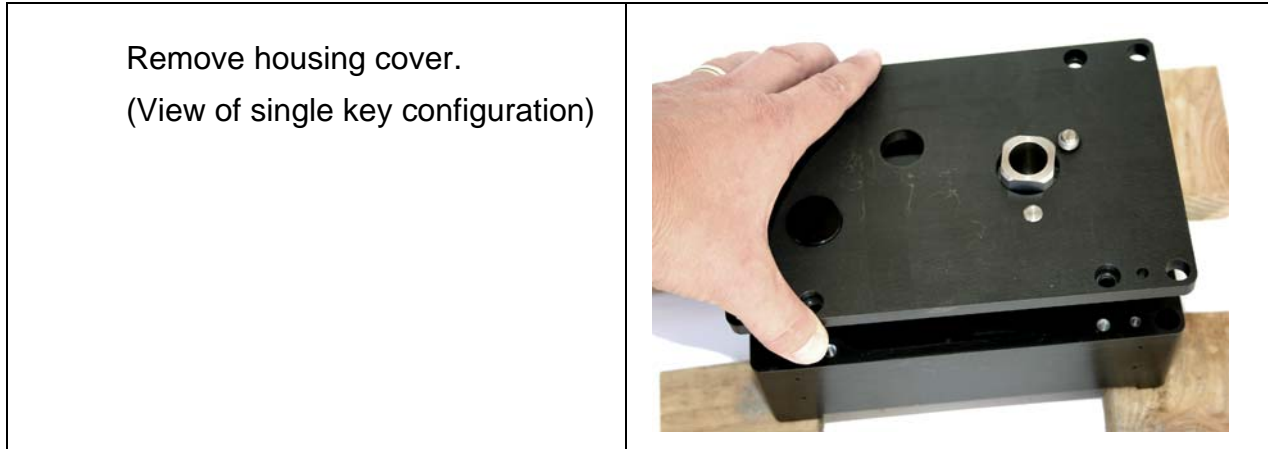
If you need to remove or replace cylinders because of requirements in References 2 through 6, instructions are as follows and as shown in Figures E-1 through E-21.

**E-2 PROCEDURE****E-2.1 Tools required for ILD lock cylinder change-out**

- a. 3/16" hex Allen wrench
- b. Phillips screwdriver
- c. 1-3/8" deep socket or adjustable wrench
- d. Blocks to support ILD

**E-2.2 Lock cylinder assembly removal, ILD main housing****Figure E-1. Removing Allen head cap screws securing housing cover**

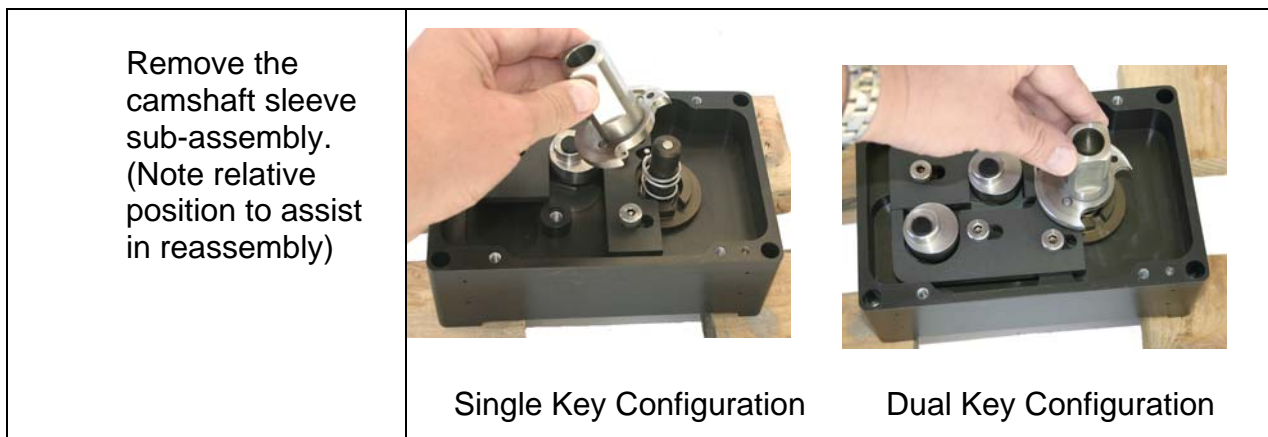
**Figure E-2. Removing housing cover**



**Figure E-3. Viewing of internal mechanisms**

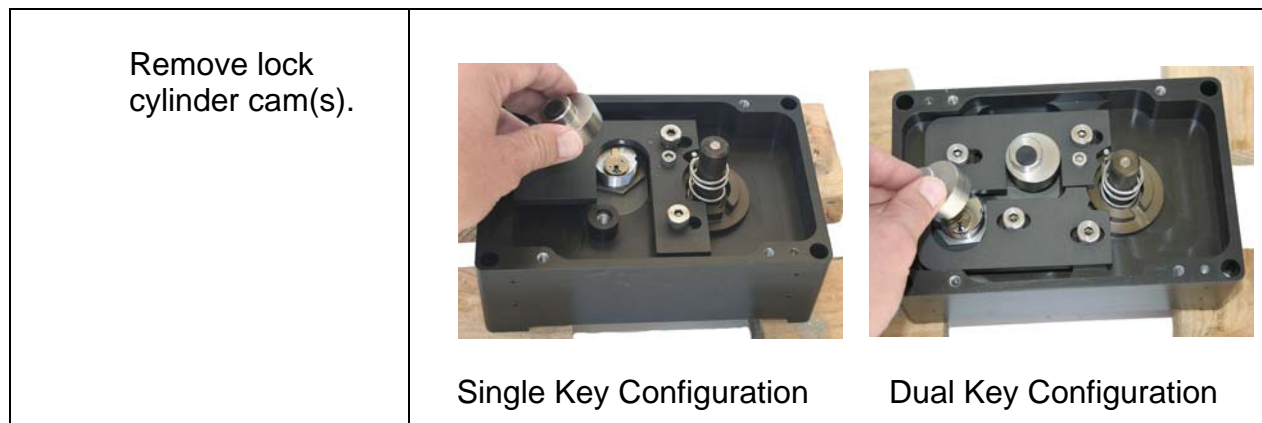


**Figure E-4. Removing camshaft sleeve sub-assembly**

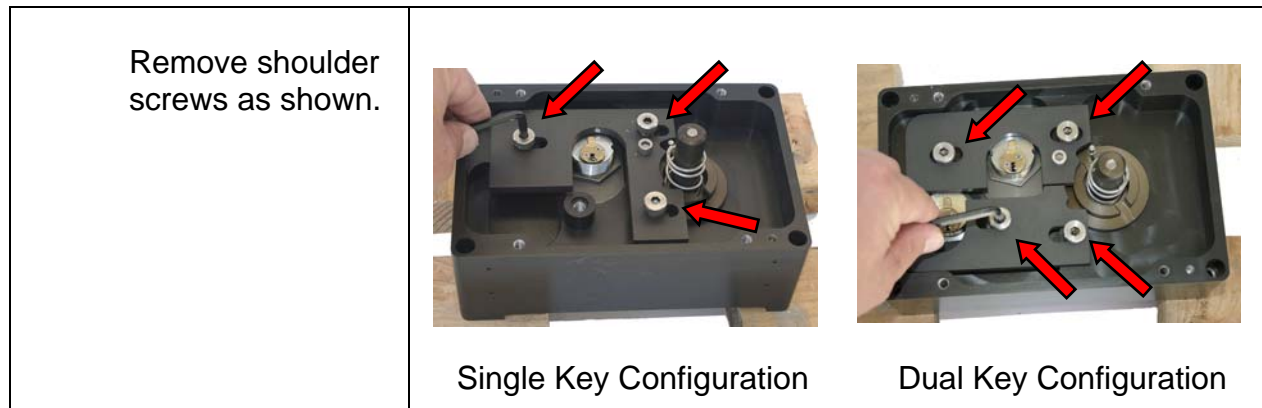




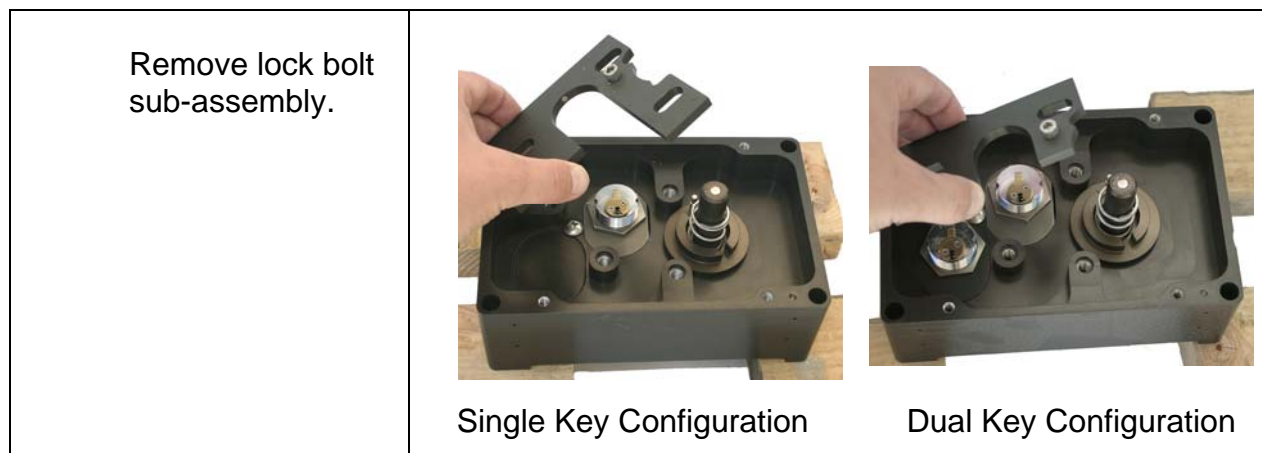
**Figure E-5. Removing lock cylinder cam(s)**



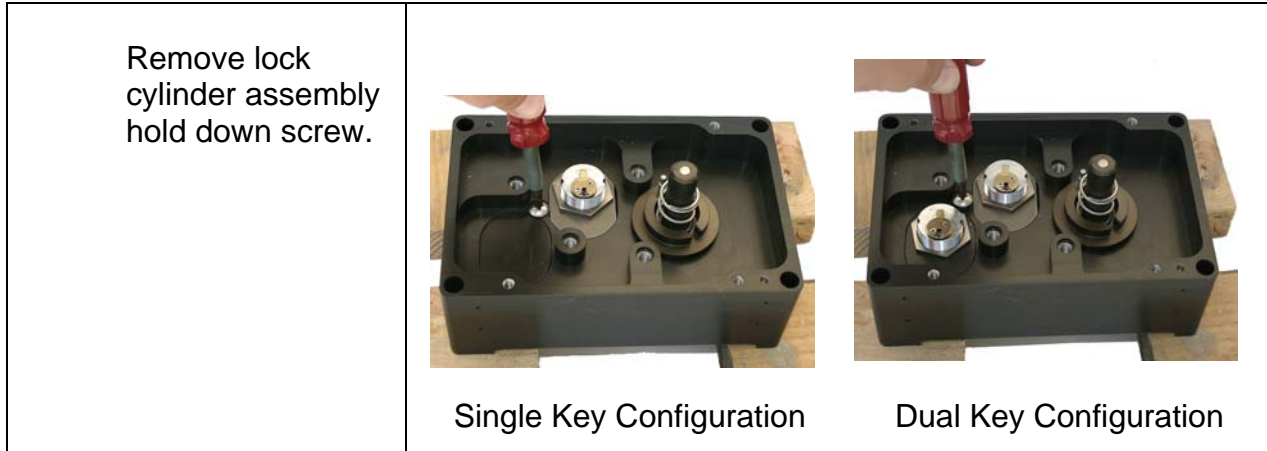
**Figure E-6. Removing shoulder screws**



**Figure E-7. Removing lock bolt sub-assembly**



**Figure E-8. Removing lock cylinder assembly hold down screw**



**Figure E-9. Removing lock cylinder assembly**



## E-2.3 Lock cylinder assembly

Figure E-10. Lock cylinder and assembly components



Figure E-11. Lock cylinder orientation

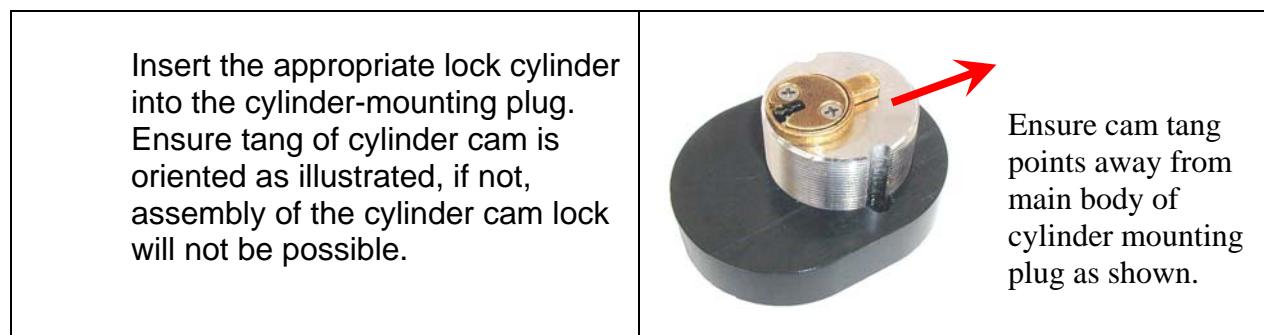
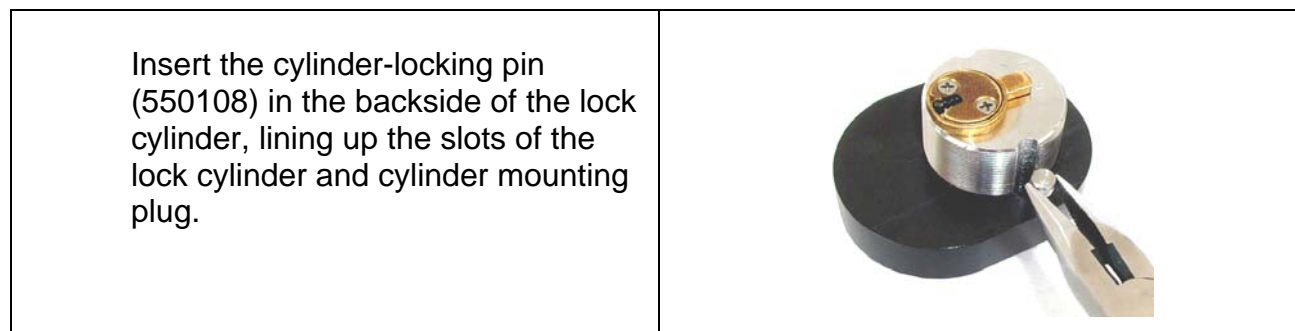
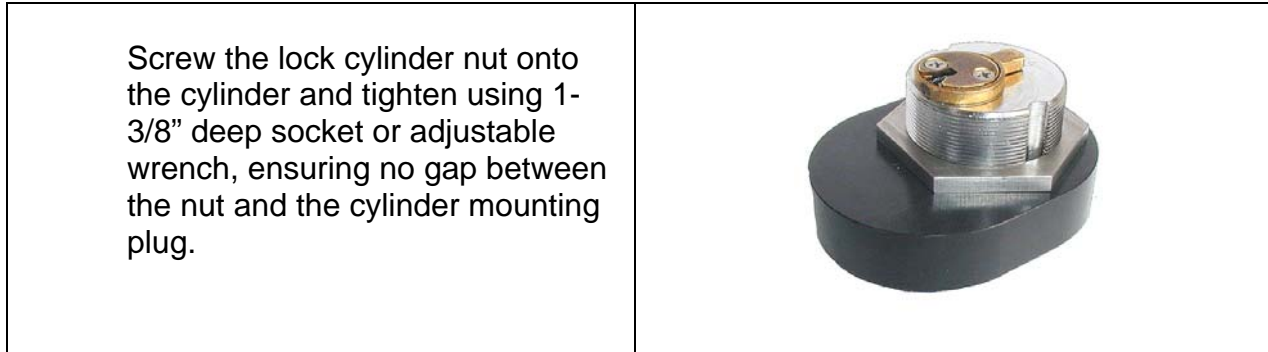


Figure E-12. Inserting cylinder locking pin

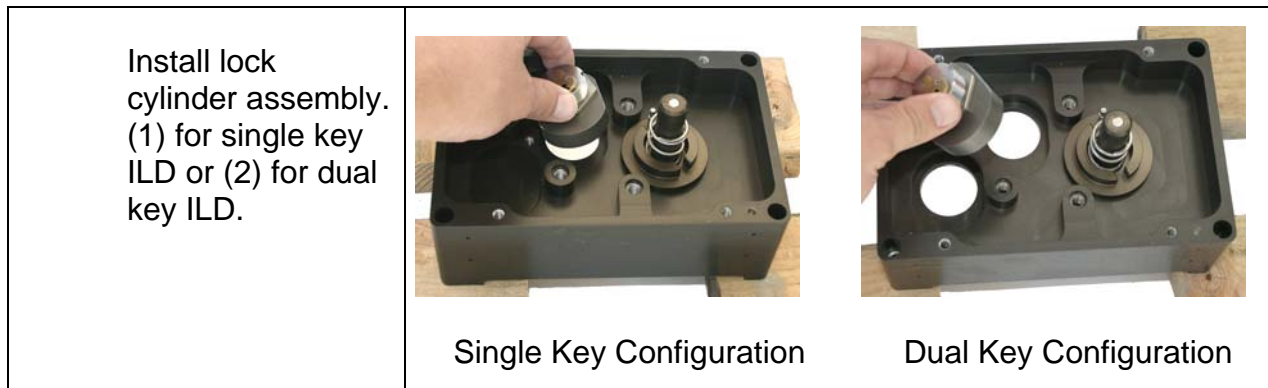


**Figure E-13. Completed lock cylinder assembly**

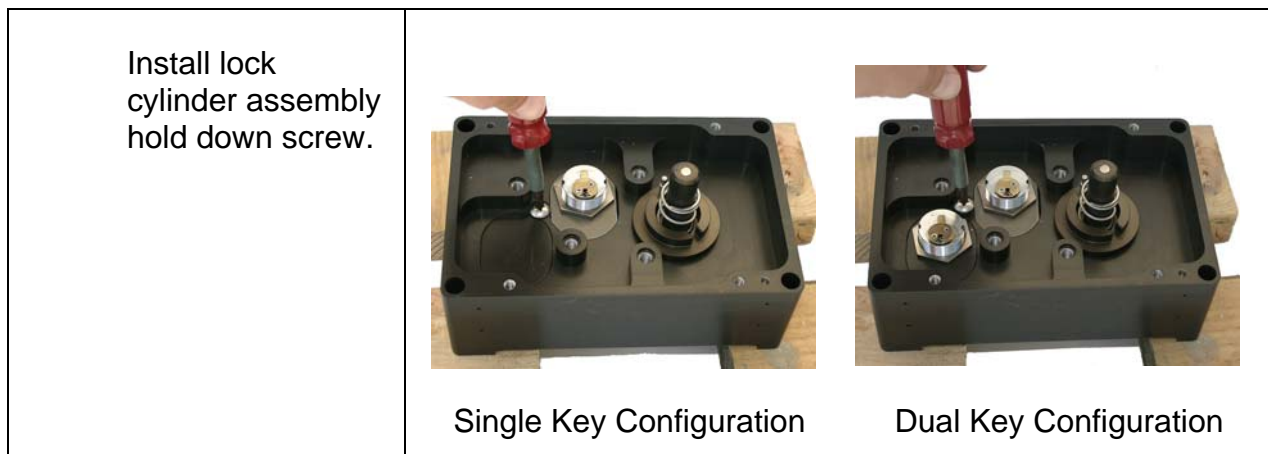


**E-2.4 Lock cylinder assembly installation, ILD main housing**

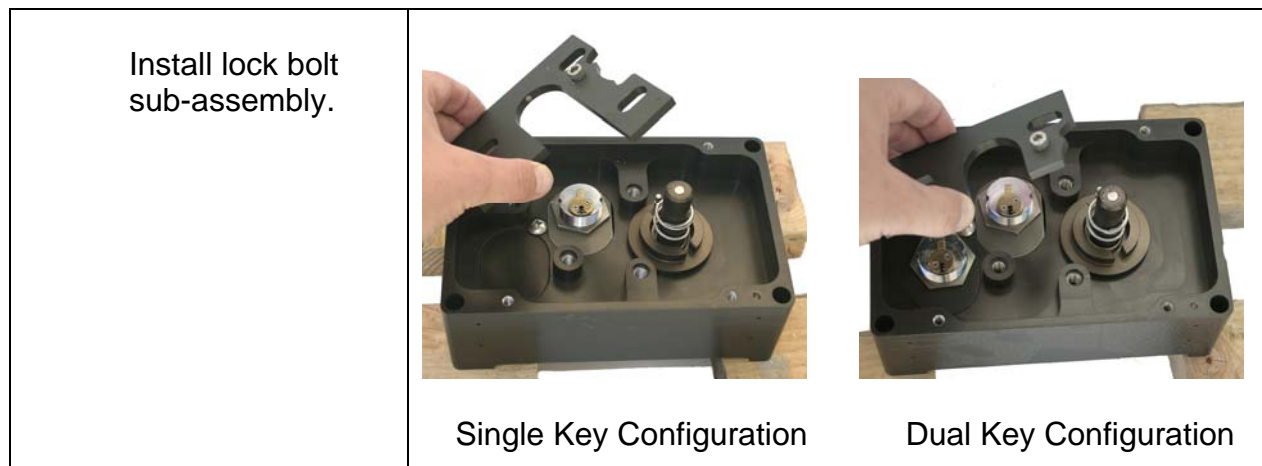
**Figure E-14. Installing lock cylinder assembly**



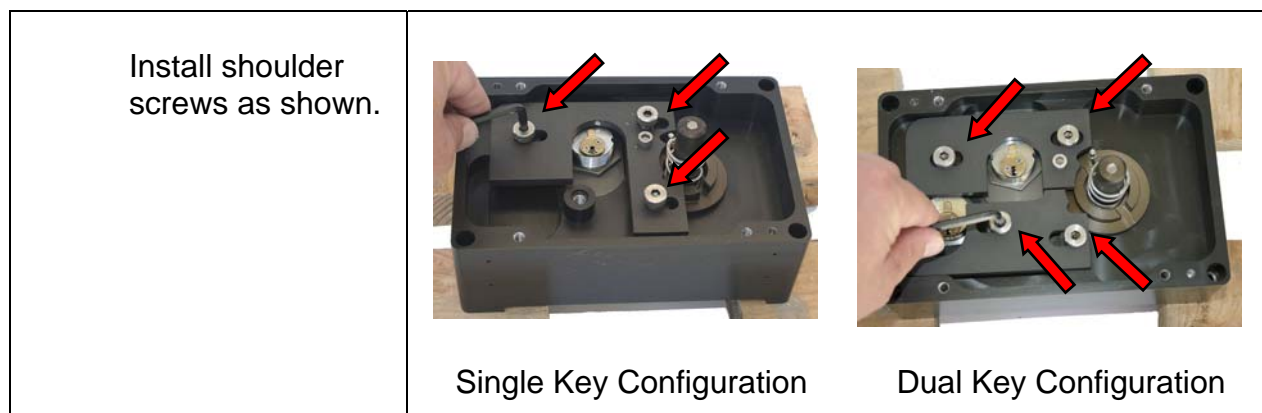
**Figure E-15. Installing lock cylinder assembly hold down screw**



**Figure E-16. Installing lock bolt sub-assembly**



**Figure E-17. Installing shoulder screws**



**Figure E-18. Installing lock cylinder cam(s)**

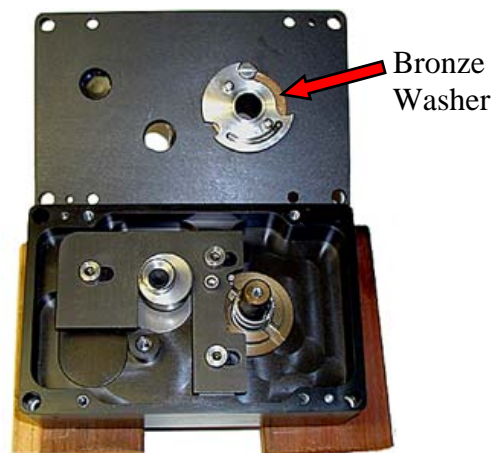


**Figure E-19. Installing camshaft sleeve sub-assembly**

Install the camshaft sleeve sub-assembly. Ensure bronze washer is flush in its counterbore and that the camshaft sleeve sub-assembly is clocked correctly in the position shown.

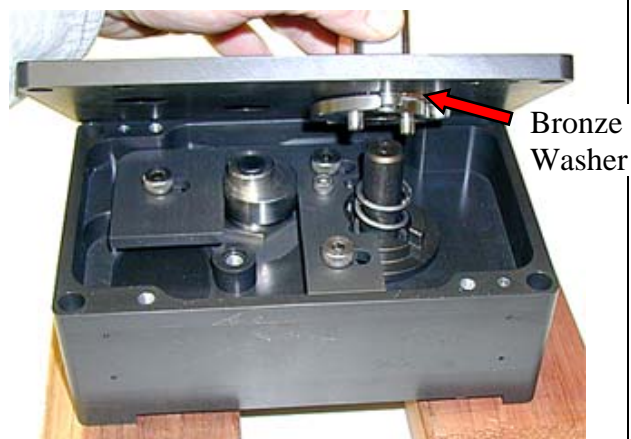
**Note:** If the bronze thrust washer is not seated flush within its counterbore at assembly, damage to the ILD will occur when it is operated.

(View of single key ILD configuration)

**Figure E-20. Install ILD housing cover**

Install ILD housing cover. Ensure bronze thrust washer is seated flush within its counterbore by holding the camshaft sleeve sub-assembly as shown during assembly.

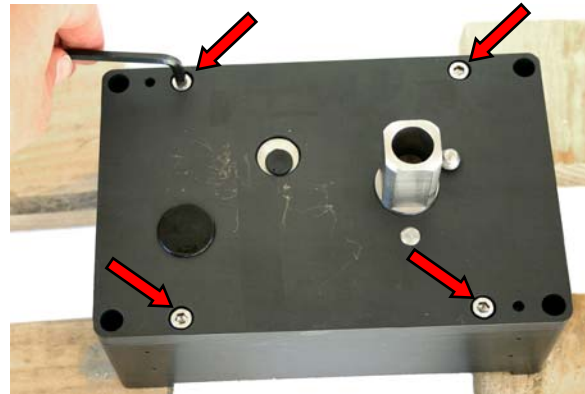
(View of single key ILD configuration)



**Figure E-21. Installing Allen head cap screws securing housing cover**

Install the four Allen head cap screws securing the housing cover.

(View of single key ILD configuration)



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## APPENDIX F

## KEYS AND KEY GUIDES

F-1 **REMOVING AND REPLACING KEYS IN THE ILD KEY GUIDE.** There are times when the keys will need to be replaced in the key guide. Instructions for changing out the key follow.

F-1.1 **Tools required for key change-out**

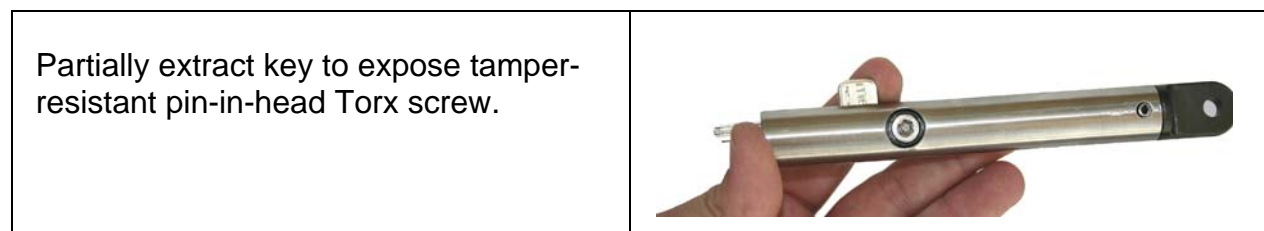
- a. T30 tamper-resistant pin-in-head Torx bit
- b. Small flat screwdriver/rigid wire or spare key

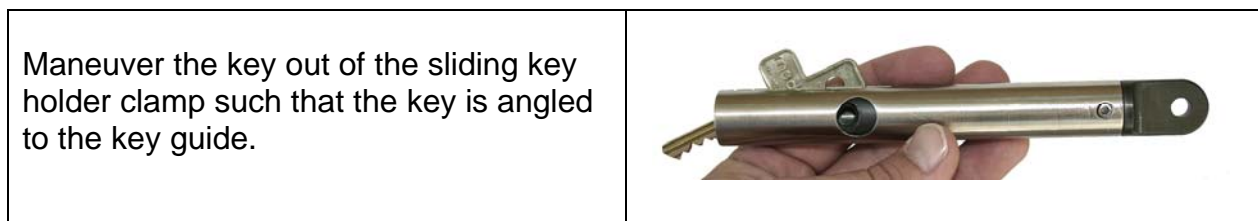
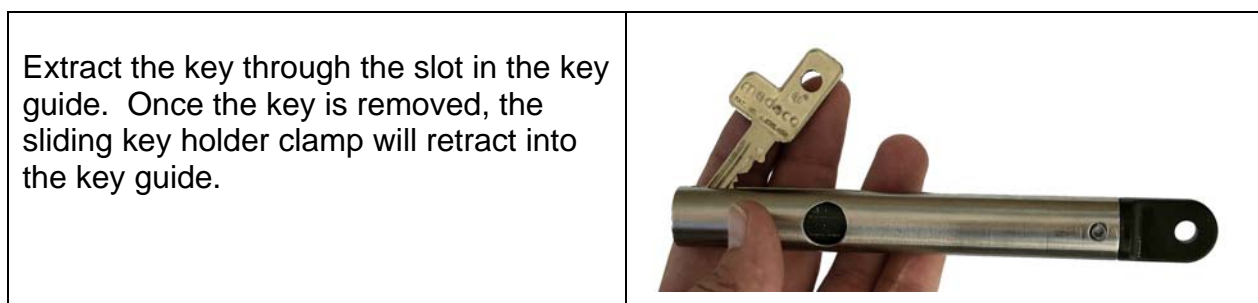
F-1.2 **Key change-out instructions, key guide assembly**

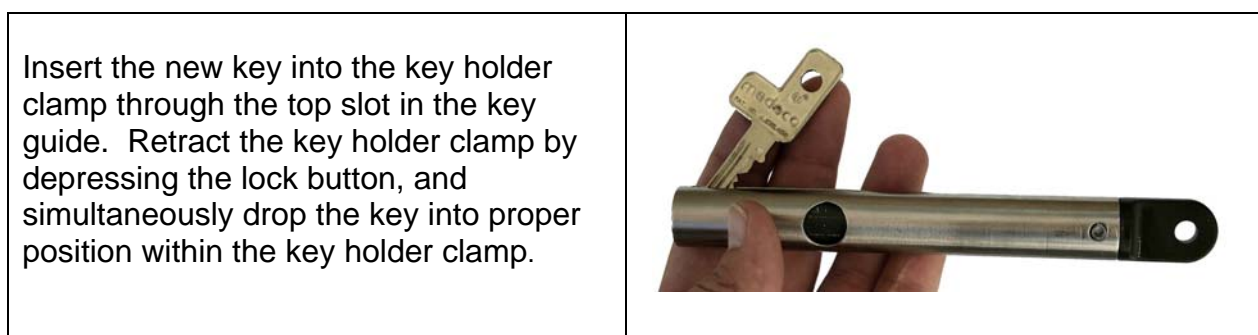
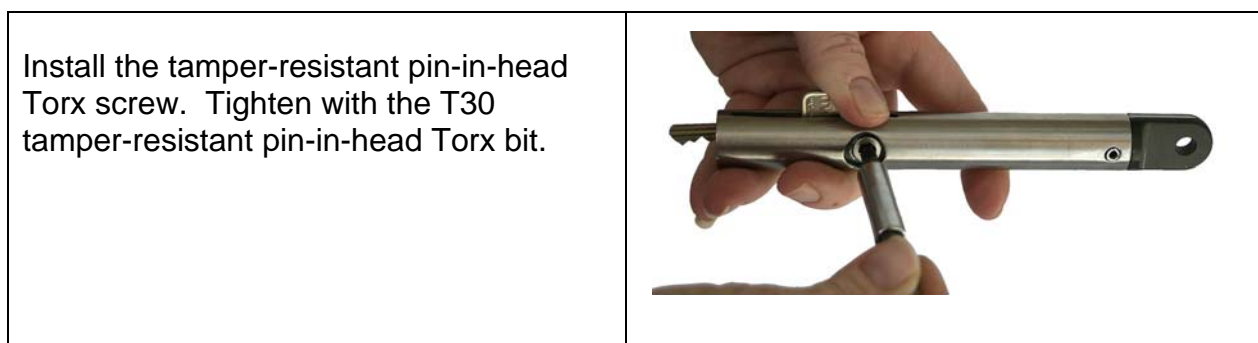
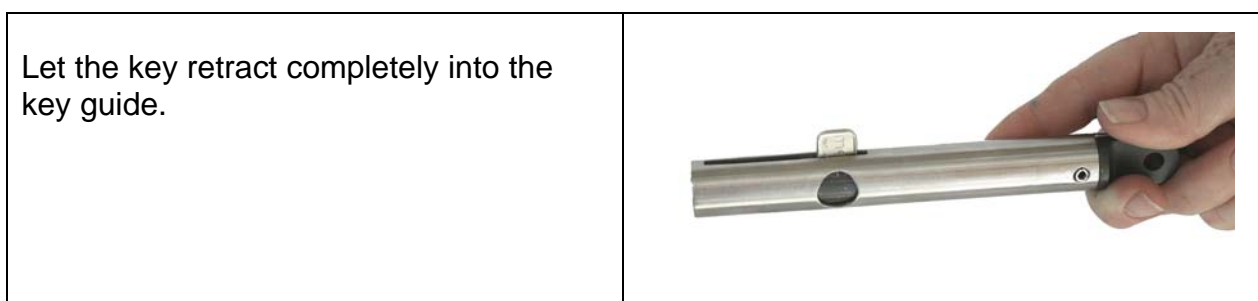
**Figure F-1. Key guide assembly**



**Figure F-2. Expose the Torx screw**



**Figure F-3. Remove the Torx screw****Figure F-4. Tilt key out of key guide****Figure F-5. Remove key from key guide**

**Figure F-6. Move empty key holder clamp forward****Figure F-7. Insert new key into key guide****Figure F-8. Install the tamper-resistant pin-in-head Torx screw****Figure F-9. New key retracted in key guide**

F-2           **REMOVING BROKEN KEYS FROM LOCK CYLINDERS.** The ILD key design allows broken keys to be easily removed from either the primary or secondary lock cylinders. It is unlikely that keys will break if they are properly mounted on protective key guides. If a key is bent, damaged, or is difficult to use, contact NFESC Code OP66, (800) 290-7607.

ILD keys are mounted in protective key guides shown in the Appendix F, Figures F-1 through F-9. The ILD key is notched and designed to break at a specific point outside the cylinder if excessive force is applied, leaving a small portion of the key protruding. This protrusion makes it easily removable with needle nose pliers. However, in the rare instance a key breaks off inside the ILD cylinder, push the broken key section through the lock cylinder by inserting another key in the cylinder. Another key mounted in the protective key guide works best. When a key is pushed through the primary or secondary lock cylinder of the ILD, it will fall out into the boltwork housing. **There is a possibility that pushing the key through the lock cylinder could jamb the ILD and prevent it from opening.**

F-3           **ILD KEY AND CYLINDER CONTROL PROCESS.** The construction key and cylinder (see Figure F-10) is not for operational use. Upon completion of the ILD installation, contact the DoD Lock Program, (800) 290-7607, (805) 982-1212, or DSN 551-1212, to obtain permanent approved cylinders and keys. The DoD Lock Program will ship the cylinders, keys, and key guides to the government POC at the installation site (see Appendix E, Paragraph E-1 for instructions on cylinder change out). The Government POC will acknowledge receipt of the approved high security cylinders and keys with the DoD Lock Program.

Once the approved high security cylinders are received and installed, the construction cylinders, keys, and key guides **must be** returned to the DoD Lock Program using the mailing label provided on the DoD Lock Program web site at <http://locks.nfesc.navy.mil/ILDCyl.htm>.

Figure F-10. Construction key and cylinder

