
CREW PROTECTION KIT APPLIQUE INSTRUCTIONS

0037 01

**ARMOR KIT, SIDE, APPLIQUE
INSTALLATION INSTRUCTIONS AND PARTS LIST
FOR THE
PALLETIZED LOADING SYSTEM (PLS)**


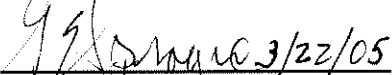

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TABLE OF CONTENTS

1. INTRODUCTION	1
1.1 GENERAL	1
1.2 CRATING / UNCRATING	1
1.3 SAFETY CONSIDERATIONS	1
1.4 WARNINGS, CAUTIONS, AND NOTES	4
2. DESCRIPTION AND OPERATION.....	5
2.1 COLOR OF COMPONENTS	5
2.2 GENERAL	6
2.3 PARTS LIST	6
3. SIDE APPLIQUE ARMOR KIT INSTALLATION	8
3.1 REQUIRED TOOLS, EQUIPMENT, AND MATERIALS	8
3.2 GENERAL INSTALLATION INSTRUCTIONS.....	8
3.3 PERSONNEL SKILL LEVEL	8
3.4 INSTALLATION OF KIT COMPONENTS.....	9
3.4.1 Install Armor Kit, Side Applique, PLS, P/N 113301-1	9

TABLE OF FIGURES

Figure 1-1. PLS Side Applique Armor component locations	2
Figure 1-2. PLS Side Applique Armor crate layout	3
Figure 2. Preparation for Applique Armor Kit installation	11
Figure 3. Installation of the Forward Applique Armor Panel	12
Figure 4. Installation of the Door Applique Armor Panel	14
Figure 5. Installation of the Aft Applique Armor Panel	16

LIST OF TABLES

Table 1. Weight breakdown of the PLS Side Applique Armor Kit	5
Table 2. Parts List "PLS Side Applique Armor Kit" P/N 113301-1	6
Table 3. Parts List "Fasterner Kit, Side Applique Armor Kit" P/N 113397-1	7
Table 4. Equipment and materials required to install the Side Applique Armor Kit.....	8

LIST OF ACRONYMS AND ABBREVIATIONS

AR	as required
Assy	assembly
ft-lb	foot-pounds (torque)
in.	inch
in.-lb	inch-pounds (torque)
MIL-SPEC	Military Specification
P/N	Part Number
PLS	Palletized Loading System

1. INTRODUCTION

1.1 GENERAL

This document provides the Installation Instructions for the Armor Upgrade, Generation III Steel Overlay Kit (the Kit) for the Palletized Loading System (PLS) vehicle. This Kit, which is manufactured by Simula Aerospace and Defense Group, Inc. (Simula), is composed of various armor panels that can be easily attached and detached from the PLS and stored in dedicated storage containers when they are not required.

This Kit provides the PLS with improved ballistic protection against improvised explosive devices (IEDs), light artillery fragments, and 7.62-mm Ball projectiles. The Kit consists of six armor panels (three panels for the right side and three panels for the left side), mounting spacers, and the necessary mounting fasteners (see Figure 1-1).

1.2 CRATING / UNCRATING

Each Kit is contained within a protective shipping container. These containers provide the Kit's armor panels with protection and security when they are not installed on the PLS (see Figure 1-2).

Because of the weight of specific armor panels within the Kit, care should be taken during removal of the panels from the containers or replacement of the panels back into the containers. Two personnel and/or mechanical aids (hoist, forklift, etc.) are required during the installation or removal of the armor panels.

1.3 SAFETY CONSIDERATIONS

The weights of some of the components within the Kit are heavier than allowable for one or two personnel, and the metal armor components may have sharp edges. Appropriate lifting and safety equipment, manpower, and safety precautions shall be utilized to ensure that no injuries are incurred during the installation or removal of the armor panels onto the PLS or during the removal or replacement of the panels into the shipping containers. Warnings, Cautions, and Notes are provided in these Installation Instructions, as appropriate, to advise the maintenance personnel of information necessary for the installation or removal of Kit components.

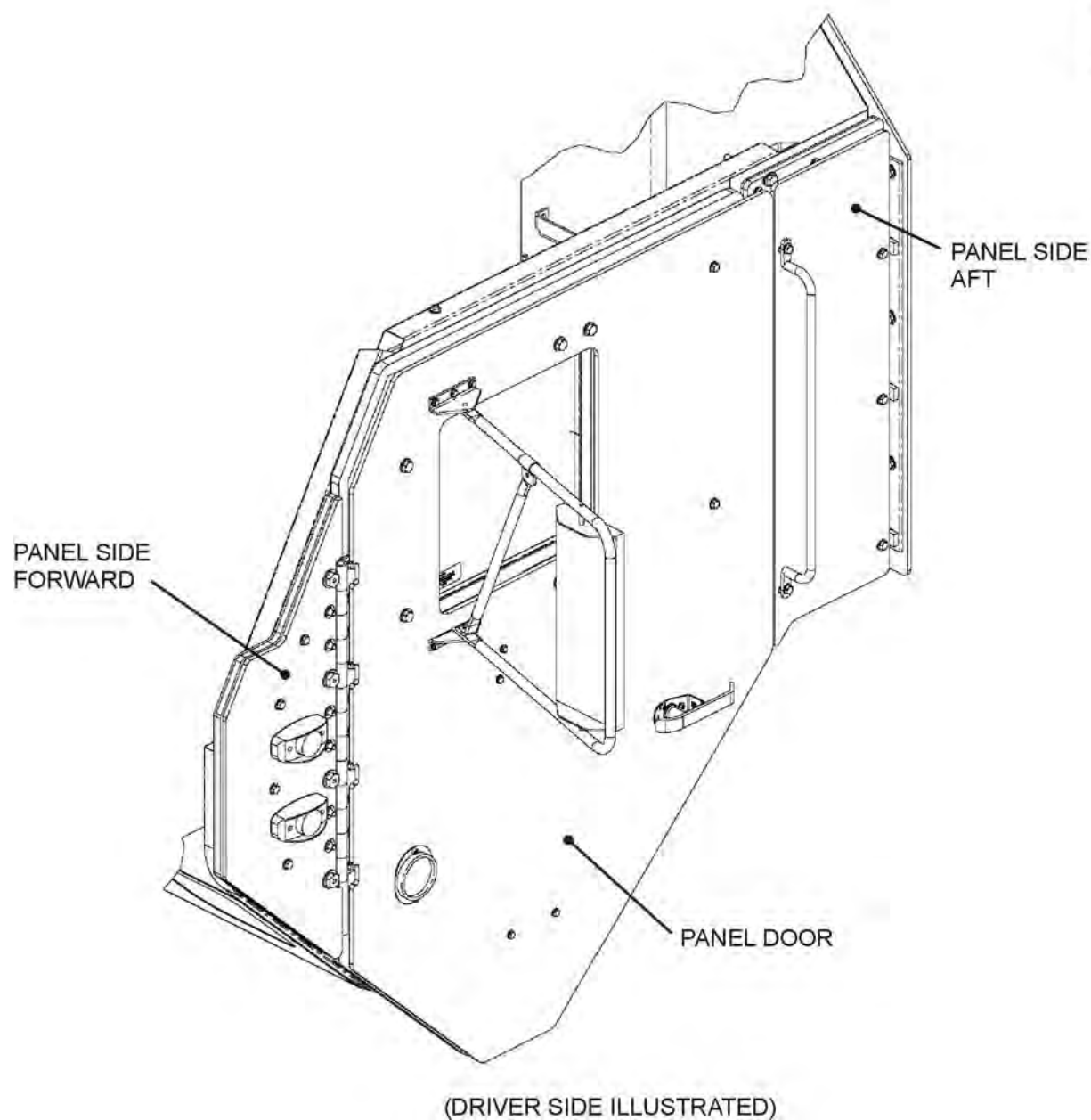


Figure 1-1. PLS Side Applique Armor component locations.

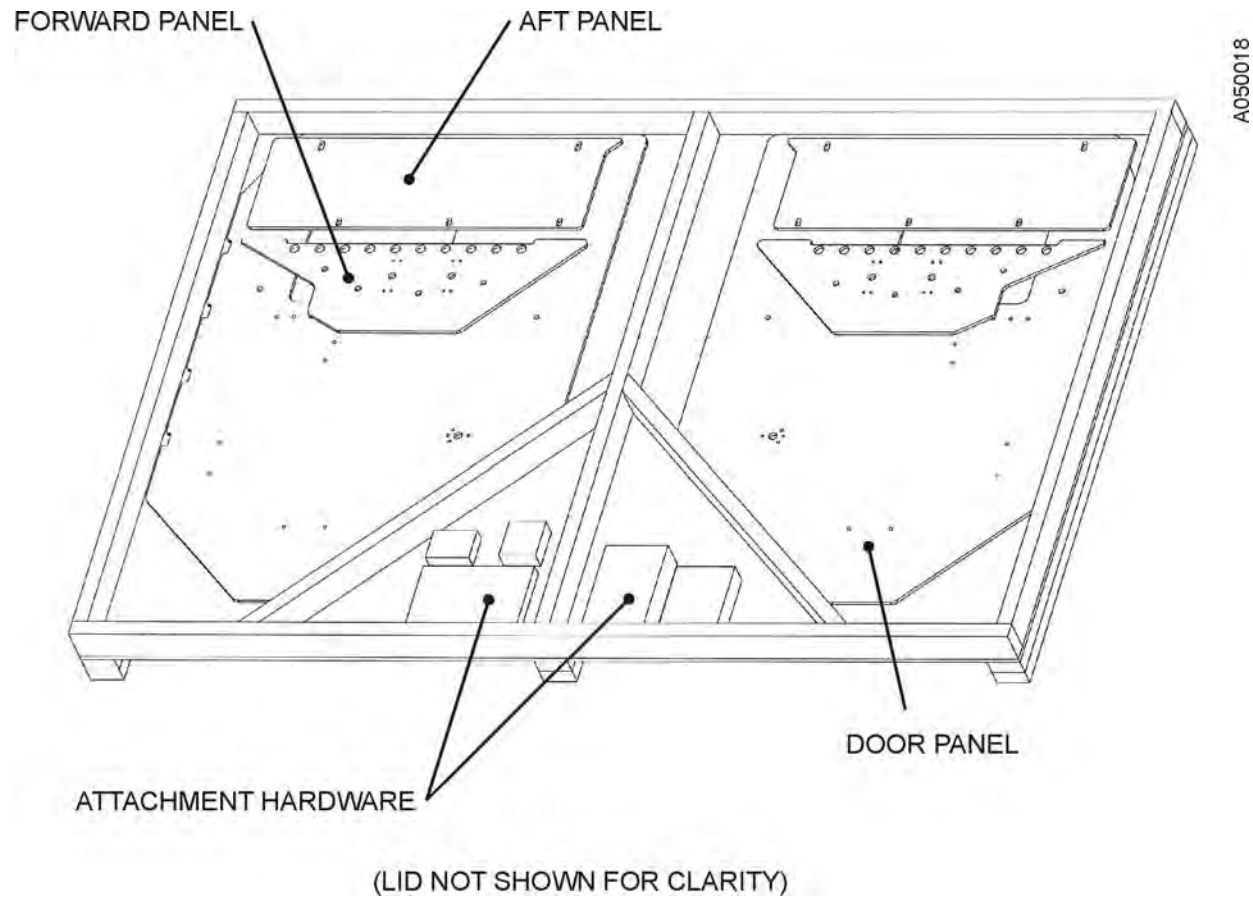


Figure 1-2. PLS Side Applique Armor crate layout.

1.4 WARNINGS, CAUTIONS, AND NOTES

Warnings, Cautions, and Notes are included in these Installation Instructions to provide short, concise statements that emphasize critical or important information. Warnings, Cautions, and Notes precede the text that they affect, but follow the paragraph headings to which they apply. Warnings precede Cautions, and Cautions, in turn, precede Notes. A format example and an explanation of the function of each are provided below.

WARNING

WARNINGS HIGHLIGHT AN OPERATING OR MAINTENANCE PROCEDURE, PRACTICE, CONDITION, STATEMENT, ETC., WHICH, IF NOT STRICTLY OBSERVED, COULD RESULT IN INJURY TO PERSONNEL OR LOSS OF LIFE.

CAUTION

Cautions highlight an operating or maintenance procedure, practice, condition, statement, etc., which, if not strictly observed, could result in damage to, or destruction of, equipment, loss of mission effectiveness, or long-term health hazards to personnel.

NOTE

Notes highlight an essential operating or maintenance procedure, condition, or statement.

2. DESCRIPTION AND OPERATION

The physical characteristics of the PLS Side Applique Armor Kit are listed in Table 1.

Table 1. Weight breakdown of the PLS Side Applique Armor Kit					
Item Number	Part Number	Description	Nominal lb / ea	Nominal Qty / Kit	Nominal lb / Kit
1	113318-3	Spacer, Side - Forward Panel	0.005	8	0.040
2	113335-3	Handle, Exterior, Door	1.190	2	2.380
3	114601-1	Panel, Door, Applique Kit	205.800	2	411.600
4	114602-1	Panel, Side, Forward, Applique Kit	28.510	2	57.020
5	114603-1	Panel, Side, Aft, Applique Kit	44.800	2	89.600
6	114604-1	Mount, Applique Kit	0.480	6	2.880
7	114609-1	Spacer, Door Handle, Applique Kit	0.527	2	1.054
8	114606-1	Spacer, Threaded, Applique Kit	0.218	12	2.616
9	114606-3	Spacer, Threaded, Applique Kit	0.241	8	1.928
10	114606-5	Spacer, Threaded, Applique Kit	0.259	24	6.216
11	114606-7	Spacer, Threaded, Applique Kit	0.200	8	1.600
12	114607-1	Shaft, Door Handle, Applique Kit	0.050	2	0.100
13	114608-1	Collar, Door Handle, Applique Kit	0.022	2	0.044
14	113397-1	Fastener Kit, Side Applique Armor	10.400	1	10.400
Total Weight Increase to Vehicle			587.478		

2.1 COLOR OF COMPONENTS

The primer and paint color of the Kit components are designated by the last three digits of the part number, as shown below

Coating and Color Number	Primer Specification	Paint Specification	Paint Color per FED-STD-595
XXXXXX-XX-101	MIL-P-53022, TYPE I OR II	MIL-C-46168, TYPE II OR IV OR MIL-C-53039	GREEN 383, No. 34094
XXXXXX-XX-103			TAN 686, No. 33446
XXXXXX-XX-105			OLIVE DRAB, No. 34088
XXXXXX-XX-107			BLACK, No. 37030
XXXXXX-XX-109			DARK GREEN, No. 34082

2.2 GENERAL

The PLS Side Applique Armor Kit consists of two Door Armor Appliqué Panels, Forward and Rear Side Armor Appliqué Panels, and attachment hardware.

2.3 PARTS LIST

The PLS Side Applique Armor Kit, P/N 113301-1, consists of the following:

Table 2. Parts List “PLS Side Applique Armor Kit” P/N 113301-1			
Item No.	Name	P/N	Quantity
1	Spacer, Side - Forward Panel	113318-3	8
2	Handle, Exterior, Door	113335-3	2
3	Panel, Door, Applique Kit	114601-1	2
4	Panel, Side, Forward, Applique Kit	114602-1	2
5	Panel, Side, Aft, Applique Kit	114603-1	2
6	Mount, Applique Kit	114604-1	6
7	Spacer, Door Handle, Applique Kit	114609-1	2
8	Spacer, Threaded, Applique Kit	114606-1	12
9	Spacer, Threaded, Applique Kit	114606-3	8
10	Spacer, Threaded, Applique Kit	114606-5	24
11	Spacer, Threaded, Applique Kit	114606-7	8
12	Shaft, Door Handle, Applique Kit	114607-1	2
13	Collar, Door Handle, Applique Kit	114608-1	2
14	Fastener Kit, Side Applique Armor	113397-1	1

The fastener kit for the PLS Side Applique Armor Kit, P/N consists of the following parts:

Table 3. Parts List “Fasterner Kit, Side Applique Armor Kit” P/N 113397-1			
Item No.	Name	P/N	Quantity
1	Washer, Grade 8, Ø 0.190 ID	-	24
2	Washer, Grade 8, Ø 0.250 ID	-	48
3	Washer, Grade 8, Ø 0.375 ID	-	51
4	Washer, Grade 8, Ø 0.500 ID	-	26
5	Washer, Flat, USS, Wide, Grade 8	-	9
6	Nut, Hex, Self-Locking, Grade 8, 0.190-24	-	18
7	Nut, Hex, Self-Locking, Grade 8, 0.375-16	-	7
8	Bolt, Hex Head, Grade 8, 0.250-20 x 1.000 Long	-	21
9	Bolt, Hex Head, Grade 8, 0.250-20 x 1.250 Long	-	13
10	Bolt, Hex Head, Grade 8, 0.250-20 x 4.500 Long	-	13
11	Bolt, Hex Head, Grade 8, 0.375-16 x 1.000 Long	-	17
12	Bolt, Hex Head, Grade 8, 0.375-16 x 1.250 Long	-	11
13	Bolt, Hex Head, Grade 8, 0.375-16 x 2.250 Long	-	9
14	Bolt, Hex Head, Grade 8, 0.375-16 x 3.750 Long	-	5
15	Bolt, Hex Head, Grade 8, 0.375-16 x 4.500 Long	-	5
16	Bolt, Hex Head, Grade 8, 0.500-13 x 1.000 Long	-	13
17	Bolt, Hex Head, Grade 8, 0.500-13 x 4.500 Long	-	5
18	Bolt, Hex Head, Grade 8, 0.500-13 x 4.750 Long	-	9
19	Socket Head Cap Screw, 0.190-24 x 0.875 Long	-	17
20	Socket Head Cap Screw, 0.190-24 x 1.750 Long	-	3
21	Socket Head Cap Screw, 0.190-24 x 2.750 Long	-	7
22	Socket Head Cap Screw, Grade 8, 0.250-20 x 0.750 Long	-	5
23	Pin, Spring, Ø.190 x 0.625 Long	NAS561C6-10	6
24	Threadlocker, Loctite Quickstix 248 (9 grams)	37684	1

3. SIDE APPLIQUE ARMOR KIT INSTALLATION

3.1 REQUIRED TOOLS, EQUIPMENT, AND MATERIALS

The equipment and materials required to install the Side Applique Armor Kit onto the PLS are provided in Table 4.

Table 4. Equipment and materials required to install the Side Applique Armor Kit	
Description	Part Number
Automotive General Mechanics Tool Kit	SC5180-90-N26
Fork Lift / Overhead Hoist	Commercially Available
1/2-in. Drill	Commercially Available
1/4-in. Drill Bit	Commercially Available
Loctite 242 (Blue) or Loctite Quickstix 248	Commercially Available
Lift Straps	Commercially Available
1/2-in.-Drive 0-150 ft-lb Torque Wrench	Commercially Available
3/8-in.-Drive 0-960 in.-lb Torque Wrench	Commercially Available

3.2 GENERAL INSTALLATION INSTRUCTIONS

These Installation Instructions will provide the illustration directly after that installation callout, and the text will be on either the same page or the facing page, where practical.

Before beginning the assembly of a part, remove all corrosion-preventative compound (if any) and any accumulated foreign matter.

Screws and bolts are required to be installed with Loctite 242 or the Loctite Quickstix 248 supplied with the Kit.

Unless otherwise specified in the Installation Instructions, use the torque values provided in Appendix A to torque all fasteners.

3.3 PERSONNEL SKILL LEVEL

The installation skill level required to complete the installation of the Kit shall be MOS 63S, Heavy Wheeled Vehicle Mechanic.

3.4 INSTALLATION OF KIT COMPONENTS

The following sections describe the installation of the Kit components and reinstallation of selected items removed during the installation process. The Kit components should be installed in the order presented. This will ensure that components are properly aligned when fastened together.

WARNING

THE EDGES OF THE METAL ARMOR PANELS HAVE BEEN DE-BURRED. HOWEVER, PROTECTIVE GLOVES SHOULD BE WORN BY THE INSTALLATION TEAM TO PREVENT PERSONAL INJURY.

THE PLS SIDE APPLIQUE ARMOR COMPONENTS ARE HEAVY ITEMS THAT REQUIRE MORE THAN ONE PERSON AND / OR APPROPRIATE MATERIAL-HANDLING EQUIPMENT (HOIST, FORKLIFT, ETC.) FOR HANDLING. THE WEIGHTS OF THE COMPONENTS BEING INSTALLED ARE SUFFICIENT TO CAUSE SERIOUS INJURY. CARE MUST BE TAKEN DURING INSTALLATION TO PREVENT INJURY.

HOISTING OPERATIONS HAVE INHERENT HAZARDS THAT CANNOT BE MECHANICALLY SAFE-GUARDED. PERSONNEL ARE REQUIRED TO WEAR HARD HATS AND SAFETY SHOES DURING INSTALLATION TO PREVENT PERSONAL INJURY.

NOTE

Adjust the installed kit components, as necessary, prior to securing / tightening the attachment hardware.

3.4.1 Install Armor Kit, Side Applique, PLS, P/N 113301-1

- a) Locate and lay out all items listed in the parts list for the Side Applique Armor Kit, P/N 113301-1, and the Fastener Kit, P/N 113397-1 (see Section 2.2).

CAUTION

Discard all removed fastener hardware unless the Instructions specifically direct that an item be retained. Fastener hardware lengths are critical to the installation.

3.4.1.1 Install Driver's-Side Forward Applique Armor Panel (P/N 114602-1)

See Figures 2 and 3 for illustrations showing the location of hardware that is removed during the Kit installation and the installation of the Driver's-Side Forward Applique Armor Panel (P/N 114602-1).

- a. Remove the Side Marker Light Assembly covers (2 ea) (retain the mounting hardware).
- b. Remove (drill out) screw heads from the Side Marker Light Assemblies (4 ea).
- c. Remove and unplug the Marker Light Assemblies (2 ea).
- d. Remove 4 nuts from the hinge bolts (see Figure 3). Counting from the top down, remove nuts No. 1, 4, 7, and 10.
- e. Remove 4 hex-head bolts / washers from the forward armor plate (see Figure 2).
- f. Install the Side Marker Light Assemblies and covers (2 ea) to the Forward Applique Armor Panel (see Figure 3).
- g. Stick Spacers (P/N 113318-3) over the holes on the Forward Applique Armor Panel (4 places) using caulking or the equivalent (see Figure 3).
- h. Lift the Forward Applique Armor Panel (P/N 114602-1) into place, plug in the Side Marker Light Assemblies (2 ea) and attach the panel to the vehicle using the four hinge bolts as a guide. Install 4 bolts / 4 washers into the forward holes. Apply Loctite to 4 threaded spaces (P/N 114606-7) and install the 4 threaded spacers and 4 washers onto the hinge bolts (see Figure 3).
- i. Torque the bolts to the values in Appendix A.

3.4.1.2 Install Passenger-Side Forward Applique Armor Panel (P/N 114602-1)

Repeat Steps a through i from Section 3.5.1.1, to install the Passenger-Side Forward Applique Armor Panel (P/N 114602-1).

See Figures 2 and 3 for illustrations showing the location of hardware that is removed during the Kit installation and the installation of the Passenger-Side Forward Applique Armor Panel.

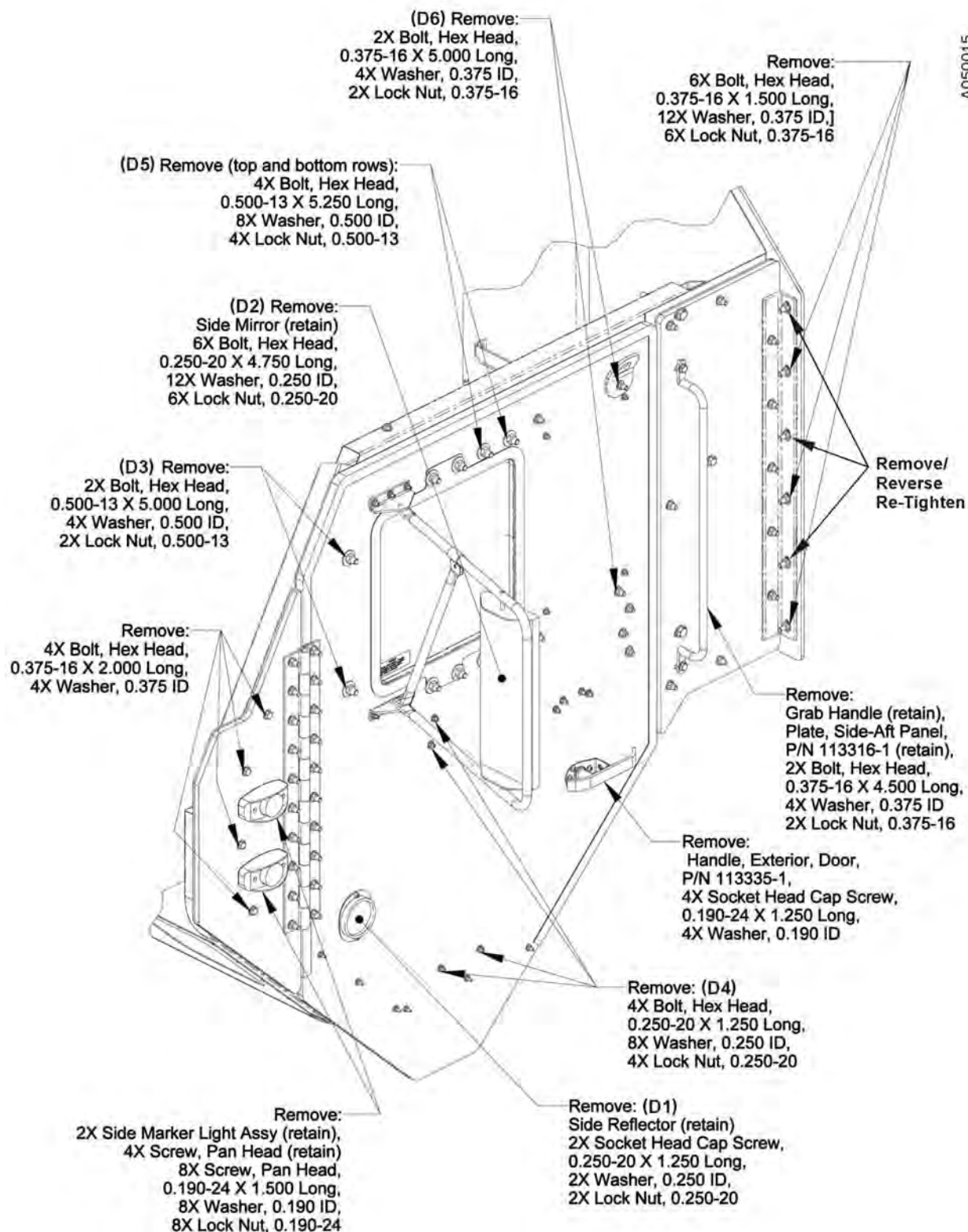


Figure 2. Preparation for Applique Armor Kit installation.

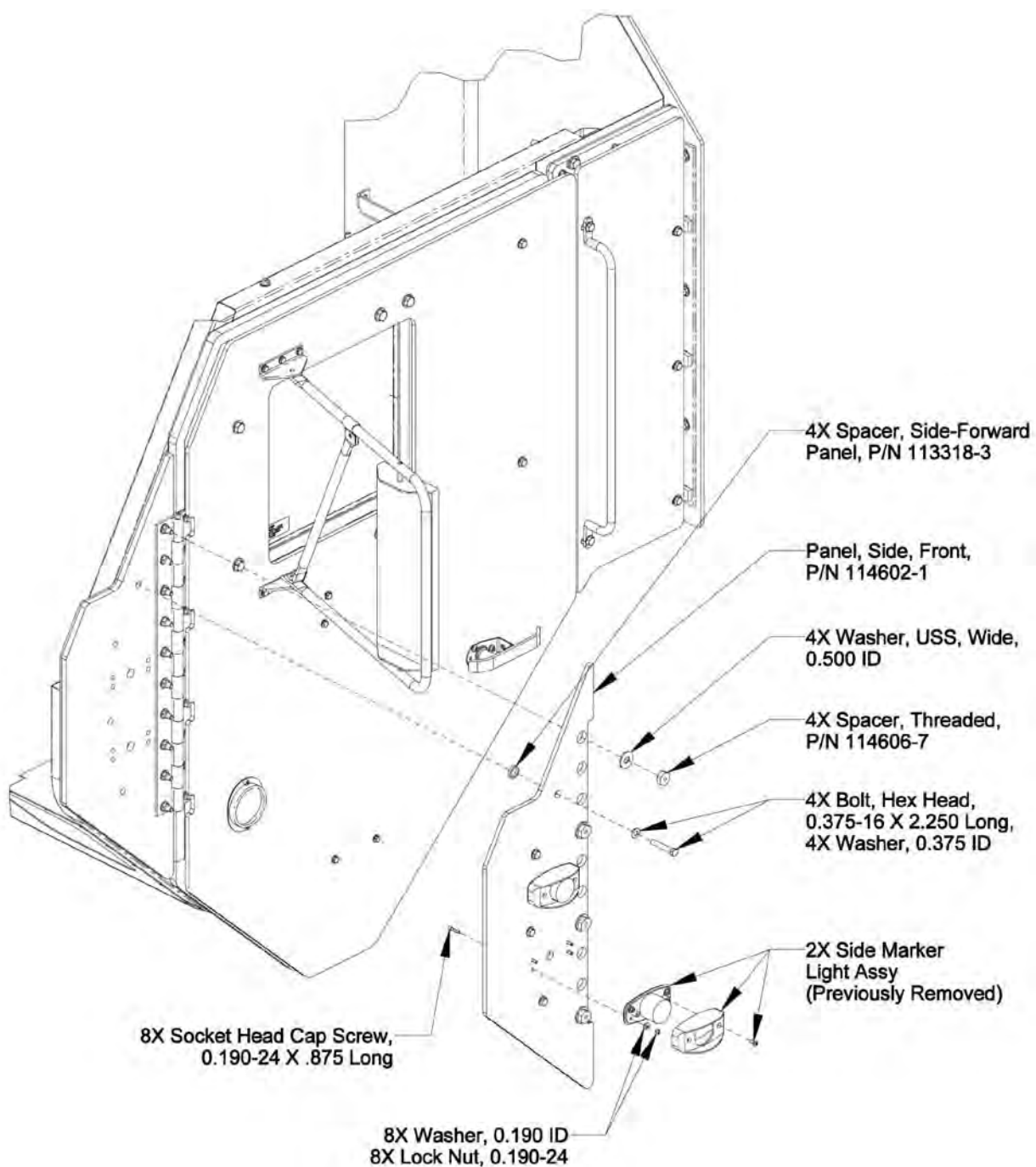


Figure 3. Installation of the Forward Applique Armor Panel.

3.4.1.3 Install Driver's-Side Door Applique Armor Panel (P/N 114601-1)

See Figures 2 and 4 for illustrations showing the location of hardware that is removed during the Kit installation and the installation of the Driver's-Side Door Applique Armor Panel (P/N 114601-1).

- a. Remove the Side Reflector and mounting hardware (D1).
- b. Remove the Side Mirror and mounting hardware (D2).
- c. Remove the forward top bolts / washers / nuts (D3).
- d. Remove the bottom and middle bolts / washers / nuts (D4).
- e. Remove the top and bottom bolts / washers / nuts at the top and bottom of the window (D5).
- f. Remove the rear bolts / washers / nuts (D6).
- g. Remove the Exterior Door Handle mounting screws / washers (D7).
- h. Remove the Interior Door Handle by loosening the set screw (see Figure 4).
- i. Remove the Exterior Door Handle Assembly.
- j. Insert bolts / washers through from inside the Door Assembly and apply Loctite to the threads on the Spacers (P/Ns 114606-1, -3, -5) [(D8), (D9), (D10), (D11), (D12), (D13)], and torque the bolts to the values in Appendix A.

NOTE

All bolts threading into the Spacers (P/Ns 114606-1, -3, and -5) shall be secured with the Threadlocker (Loctite) (P/N 37684) or its equivalent.

- k. Attach Spacer, Door Handle (P/N 114609-1) (D14) to the Door Armor Panel using the socket head cap screw (D15).
- l. Lift the Door Armor Panel (P/N 114601-1) into place using a lift strap through the window opening and an overhead crane or forklift.
- m. Align the Door Armor Panel with the threaded spacer holes and insert a bolt / washer at the top and bottom of the window opening (D16). Snug the bolts down tight.
- n. Insert bolts / washers at forward top of the Door Armor Panel (D17).
- o. Insert bolts / washers at the bottom and middle of the top of the Door Armor Panel (D18).
- p. Mount the Side Reflector (removed previously) (D19) with socket head screws (D20).

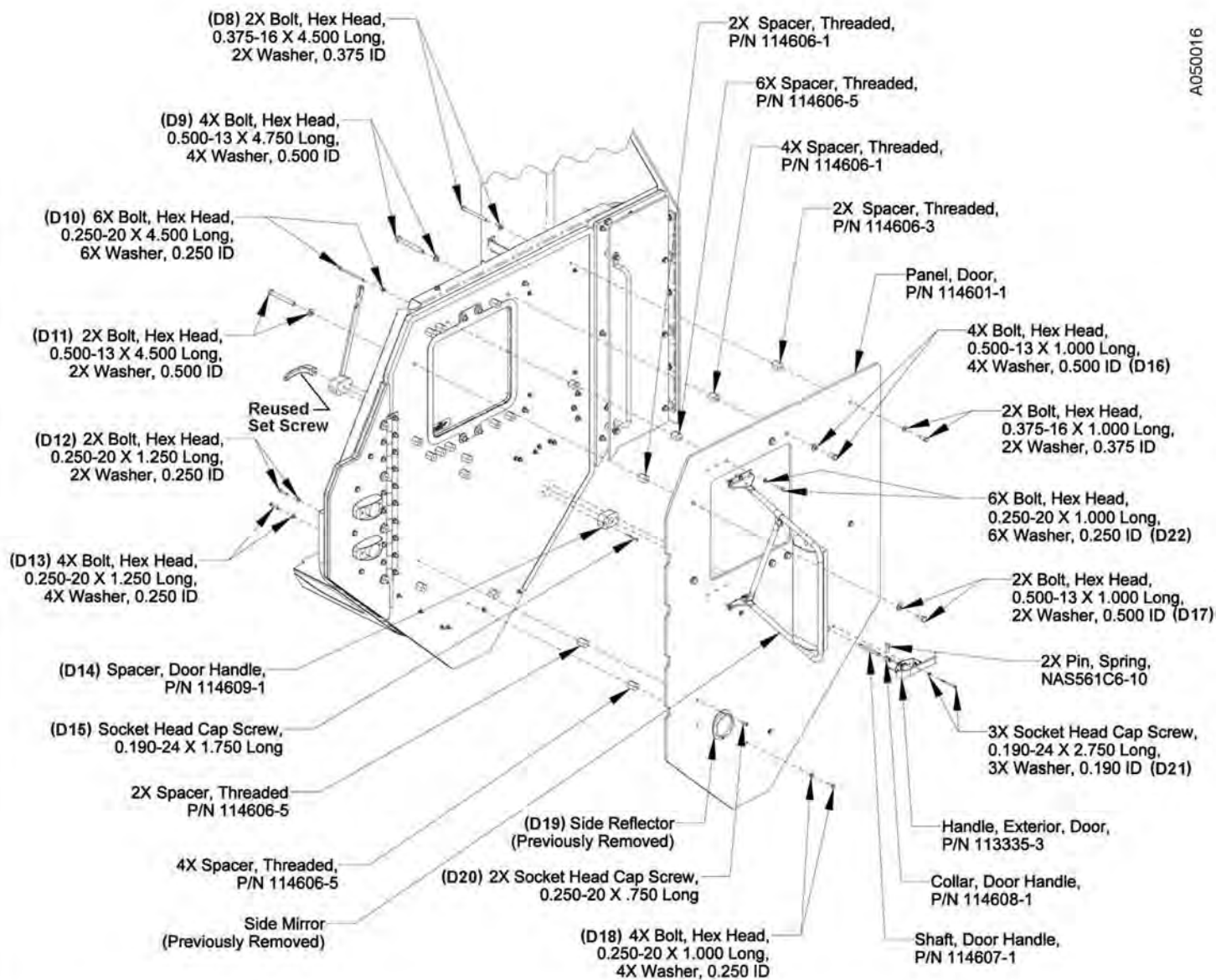


Figure 4. Installation of the Door Applique Armor Panel.

- q. Assemble the Door Handle Shaft (P/N 114607-1) to the existing shaft of the new Door Handle (P/N 113335-3) using the Collar (P/N 114608-1) and two Spring Pins (see Figure 4).
- r. Insert the Door Handle Assembly Shaft through the Door Armor Panel and secure it with socket head screws / washers (D21).
- s. Re-attach the Inside Door Handle (removed previously) by tightening the Handle set screw.
- t. Mount the Side Mirror (removed previously) using mounting bolts / washers (D22).
- u. Torque the bolts to the values in Appendix A.

3.4.1.4 Install Passenger-Side Door Applique Armor Panel (P/N 114601-1)

Repeat Steps a through u from Section 3.5.1.3, to install the Passenger-Side Door Armor Panel (P/N 114601-1).

See Figures 2 and 4 for illustrations showing the location of hardware that is removed during the Kit installation and the installation of the Passenger-Side Door Applique Armor Panel.

3.4.1.5 Install Driver's-Side Aft Applique Armor Panel (P/N 114603-1)

See Figures 2 and 5 for illustrations showing the location of hardware that is removed during the Kit installation and the installation of the Driver's-Side Door Applique Armor Panel (P/N 114603-1).

- a. Remove the aft Grab Handle, mounting hardware, and Plate (see Figure 2).
- b. Remove and reverse (with the bolt heads to the nut side) three bolts / nuts / washers on the Aft Angle Bracket (see Figure 2). Re-torque to the values listed in Appendix A.
- c. Remove three bolts / nuts / washers from the Aft Angle Bracket (see Figure 2).

NOTE

All bolts threading into the Spacers (P/N 114606-3) or Mounts (114604-1) shall be secured with the Threadlocker (Loctite) (P/N 37684) or its equivalent.

- d. Attach three Mounts (P/N 114604-1) to the Aft Angle Bracket using locknuts / washers (A1). Snug the locknuts tight.
- e. Insert bolts / washers (A2) through the Aft Armor Panel Plates (A3) from inside of the cab and attach threaded spacers (A4) (see Figure 5).
- f. Lift the Armor Panel Side, Aft (P/N 114603-1) and attach it to the Mounts (P/N 114604-1) on the Aft Angle Bracket using mounting bolts / washers (A5). Snug the bolts tight.
- g. Attach the Grab Handle (removed previously) using bolts / washers (A6). Snug the bolts tight.
- h. Align the gap between the Aft Armor Panel and the Door edge to a 1/8-in.-minimum gap.

- i. Torque the bolts to the values in Appendix 1.
- j. Verify operation of the door and window, and the security of the fasteners. Adjust as necessary.

3.4.1.6 Install Passenger-Side Aft Applique Armor Panel (P/N 114603-1)

Repeat Steps a through j from Section 3.5.1.5, to install the Passenger-Side Aft Applique Armor Panel (P/N 114603-1).

See Figures 2 and 5 for illustrations showing the location of hardware that is removed during the Kit installation and the installation of the Passenger-Side Aft Applique Armor Panel (P/N 114603-1).

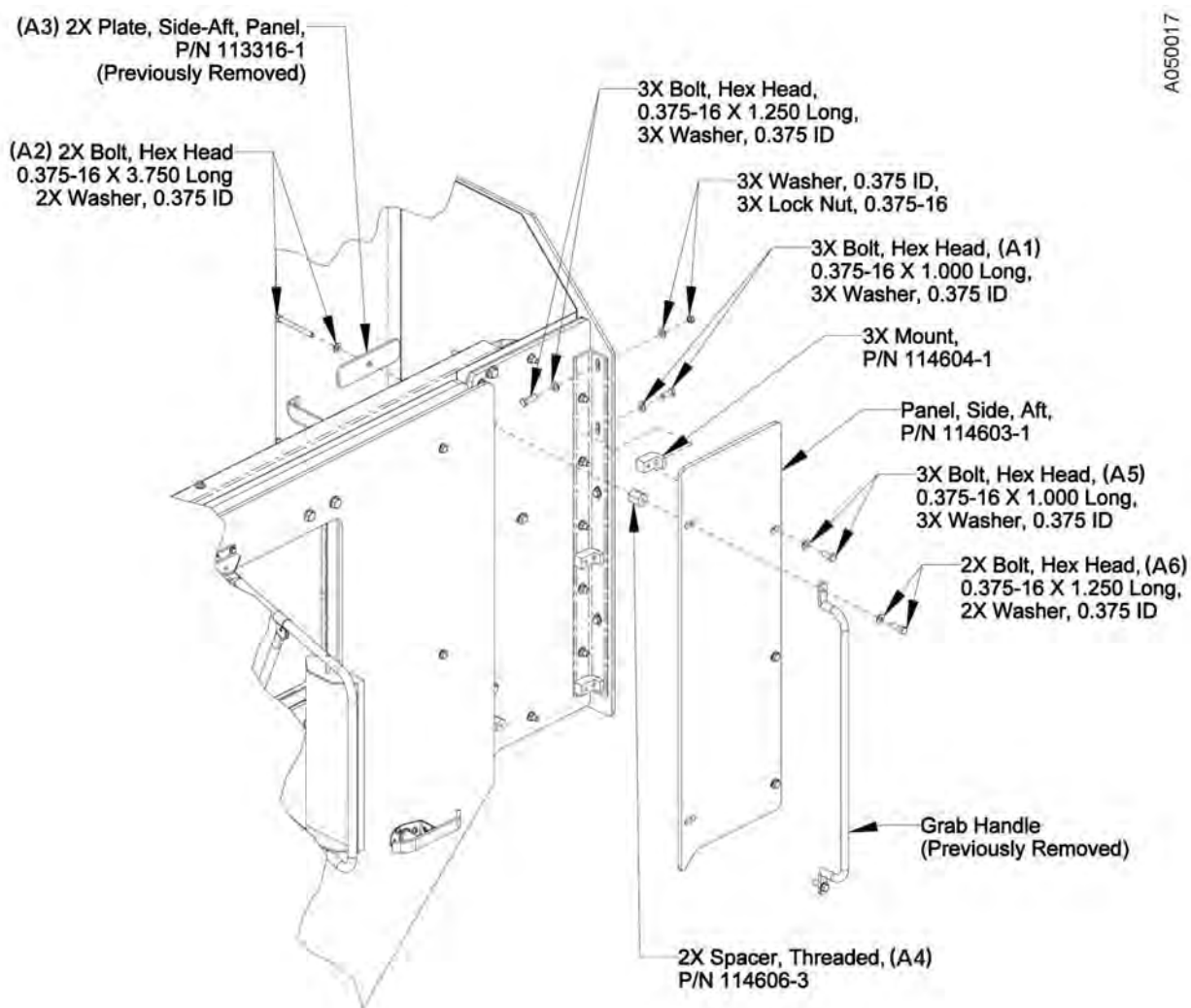


Figure 5. Installation of the Aft Applique Armor Panel.

APPENDIX A
FASTENER TORQUE VALUES

Table A-1. Torque limits for fasteners	
Size	Torque value
1/4 – 20	9 ft-lb
3/8 – 16	35 ft-lb
1/2 - 13	80 ft-lb
#10	25 in.-lb

NOTE: DO NOT EXCEED THE LISTED TORQUE VALUES.

INDEX

<i>Subject</i>	<i>Work Package/Page</i>
A	
Abbreviations/Acronyms, List of	0001 00-2
Adjustment, Door Latch	0016 00-1
B	
Ballistic Glass and Frame Assembly Replacement, Door	0014 00-1
Ballistic Glass Replacement	
Door	0014 00-1
Windshield	0017 00-1
Ballistic Glass, Cleaning	0010 00-1
Blackout Drive Light Replacement	0021 00-1
Blast Deflector Replacement	
Center	0027 00-1
Side	0026 00-1
Brush Guard Replacement	
Lower	0019 00-1
Upper	0018 00-1
C	
Catch and Lock Pin Replacement, Door	0013 00-1
Characteristics, Capabilities, and Features	0002 00-1
Characteristics, Capabilities, and Features, Equipment	0002 00-1
Cleaning Ballistic Glass	0010 00-1
Composite Light Replacement	0020 00-1
Corrosion Prevention and Control (CPC)	0001 00-1
Crew Protection Kit Applique Instructions	0037 01-1
D	
Data, Equipment	0002 00-5
Decals	0007 00-1
Description and Use of Operator Controls	0004 00-1
Description, Equipment	0002 00-1
Destruction of Army Materiel to Prevent Enemy Use	0001 00-1
Door	
Applique Replacement	0015 01-1
Assembly Replacement	0015 00-1
Ballistic Glass and Frame Assembly Replacement	0014 00-1
Handle Assembly Replacement	0012 00-1
Latch Adjustment	0016 00-1
Latch and Lock Pin Replacement	0013 00-1

INDEX - Continued*Subject**Work Package/Page***E**

Equipment	
Characteristics, Capabilities, and Features	0002 00-1
Data	0002 00-5
Equipment Description and Data	0002 00-1
Equipment Improvement Recommendations (EIRs), Reporting	0001 00-1
Escape Hatch Assembly Maintenance	0022 00-1
Expendable and Durable Items List	0033 00-1

G

General Maintenance Instructions	0011 00-1
--	-----------

H

Handle Assembly Replacement, Door	0012 00-1
Hatch Assembly Maintenance, Escape	0022 00-1
Headlight Replacement	0020 00-1

I

Initial Adjustments and Daily Checks	0005 00-1
--	-----------

L

List	
Abbreviations/Acronyms	0001 00-2
Expendable and Durable Items	0033 00-1
Location and Description of Major Components	0002 00-2
Location and Description of Major Components, Applique	0002 00-4
Lower Brush Guard Replacement	0019 00-1

M

Maintenance Allocation Chart (MAC)	
Introduction	0031 00-1
Tables	0032 00-1
Maintenance Forms, Records, and Reports	0001 00-1
Major Components, Location and Description of	0002 00-2

O

Operating PLS	0005 00-1
Operation	
Under Unusual Conditions	0006 00-1
Under Usual Conditions	0005 00-1
Operator Controls	0004 00-1


INDEX - Continued

<i>Subject</i>	<i>Work Package/Page</i>
P	
Preparation for Storage or Shipment	0001 00-1
Preventive Maintenance Checks and Services (PMCS)	
Introduction	0008 00-1
Table	0009 00-1
Q	
Quality of Material	0001 00-2
R	
Rear Cab Armor Replacement	
Left	0025 00-1
Right	0024 00-1
References	0030 00-1
Reporting Equipment Improvement Recommendations (EIRs)	0001 00-1
Roof Armor Replacement	0023 00-1
S	
Safety, Care, and Handling	0001 00-2
Side Applique Replacement	
Front	0029 01-1
Rear, Cab	0028 01-1
Side Armor Replacement	
Front	0029 00-1
Rear, Cab	0028 00-1
Side Marker Replacement	0029 00-1
Storage or Shipment, Preparation for	0001 00-1
Stowage and Data Plates	0007 00-1
T	
Theory of Operation	0003 00-1
Torque Limits	0034 00-1
U	
Upper Brush Guard Replacement	0018 00-1
W	
Warning Summary	-a
Windshield Ballistic Glass Replacement	0017 00-1

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DISTRIBUTION: To be distributed in accordance with the initial distribution requirements for IDN: 344823, requirements for TB 9-2320-364-13&P-2.

THE METRIC SYSTEM AND EQUIVALENTS

<p>Linear Measure</p> <p>1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches 1 Kilometer = 1000 Meters = 0.621 Miles</p> <p>Weights</p> <p>1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces 1 Kilogram = 1000 Grams = 2.2 Pounds 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons</p> <p>Liquid Measure</p> <p>1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces</p>	<p>Square Measure</p> <p>1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches 1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet 1 Sq Kilometer = 1,000,000 Sq Meters = 0.0386 Sq Miles</p> <p>Cubic Measure</p> <p>1 Cu Centimeter = 1,000 Cu Millimeters = 0.06 Cu Inches 1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet</p> <p>Temperature</p> <p>$5/9 (^{\circ}\text{F} - 32) = ^{\circ}\text{C}$ 212° Fahrenheit is equivalent to 100° Celsius 90° Fahrenheit is equivalent to 32.2° Celsius 32° Fahrenheit is equivalent to 0° Celsius $9/5 \text{ C}^{\circ} + 32 = \text{F}^{\circ}$</p>
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APPROXIMATE CONVERSION FACTORS

To Change	To	Multiply By
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Sq Inches	Sq Centimeters	6.451
Sq Feet	Sq Meters	0.093
Sq Yards	Sq Meters	0.836
Sq Miles	Sq Kilometers	2.590
Acres	Sq Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Sq Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

To Change	To	Multiply By
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Sq Centimeters	Sq Inches	0.155
Sq Meters	Sq Feet	10.764
Sq Meters	Sq Yards	1.196
Sq Kilometers	Sq Miles	0.386
Sq Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Sq Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621

