

TB 10-8145-222-23

**TECHNICAL BULLETIN
FOR
REPLACEMENT OF REFRIGERATION SYSTEM ON MULTI-TEMPERATURE
REFRIGERATED CONTAINER SYSTEM (MTRCS)
NSN 8145-01-534-3597**

**THIS TECHNICAL BULLETIN CONTAINS SUPPLEMENTAL DATA FOR
AND IS INCOMPLETE WITHOUT TM 10-8145-222-13.**

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**HEADQUARTERS, DEPARTMENT OF THE ARMY
1 DECEMBER 2013**

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HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 1 DECEMBER 2013

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REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this publication. If you find any errors, or if you would like to recommend any improvements to the procedures in this publication, please let us know. The preferred method is to submit your DA Form 2028 (Recommended Changes to Publications and Blank forms) through the Internet on the TACOM Unique Logistics Support Applications (TULSA) Web site. The Internet address is <https://tulsa.tacom.army.mil>. Access to all applications requires CAC authentication, and you must complete the Access Request form the first time you use it. The DA Form 2028 is located under the TULSA Applications on the left-hand navigation bar. Fill out the form and click on SUBMUT. Using this form on the TULSA Web site will enable us to respond more quickly to your comments and to better manage the DA Form 2028 program. You may also mail, e-mail, or fax your comments or DA Form 2028 directly to the U.S. Army TACOM Life Cycle Management Command. The postal mail address is U.S. Army TACOM Life Cycle Management Command, ATTN: AMSTA-LCL-MPP/TECH PUBS, MS 727, 6501 E. 11 Mile road, Warren, MI 48397-5000. The e-mail address is TACOMLCMC.DAFORM2028@us.army.mil. The fax number is DSN 786-1856 or Commercial (586) 282-1856. A reply will be furnished to you.

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CHAPTER 1: REPLACEMENT OF REFRIGERATION SYSTEM

1.1. PURPOSE.

This Technical Bulletin (TB) is being released to provide procedures for replacement of the refrigeration unit (RU), original model number 182K0070-1 (MTRCS01) with the new model number 182K1017-1 (MTRCS02) in the Multi-Temperature Refrigerated Container System (MTRCS). The capacitor box, power input box, and associated cables are also removed in this procedure. The power box is modified by adding new cables and installing the K1 relay that was removed from the power input box. Refer to Table 1 and Figure 1 for a description and location of components.

Table 1. Description of MTRCS Components.

Item No.	Component Name	Component Description
1	Refrigeration Unit Assembly	Driven by integral engine or external power source.
2	Capacitor Box	Contains capacitors C1, C2, and C3, which were used for storing energy for heaters. (Removed)
3	Power Input Box	Contains motor contactor and voltage monitor relay. (Removed)
4	Power Box Assembly	Power switch, transformer, circuit breakers, power cords.
5	Control Box Assembly	Metal-enclosed, Electro-Magnetic Interference (EMI) protection for control panels.
6	Fuel Tank Assembly	Diesel or JP-8 fuel only, used in engine driven mode, 75 gallons.
7	Fuel Pump	Housed inside shielded box. Provides fuel pumping capability, from fuel tank to diesel engine.
8	Battery	12VDC (volt direct current) on-board power supply.
9	Power Supply Cables	Two 50-foot electrical dual voltage cables: One rated at 230V 60 Hz (hertz) and 190V 50 Hz and one rated at 460V 60 Hz and 380V 50 Hz.
10	Roof Access	Metal tubing with non-slip steps provides personnel with access to equipment from atop the MTRCS.

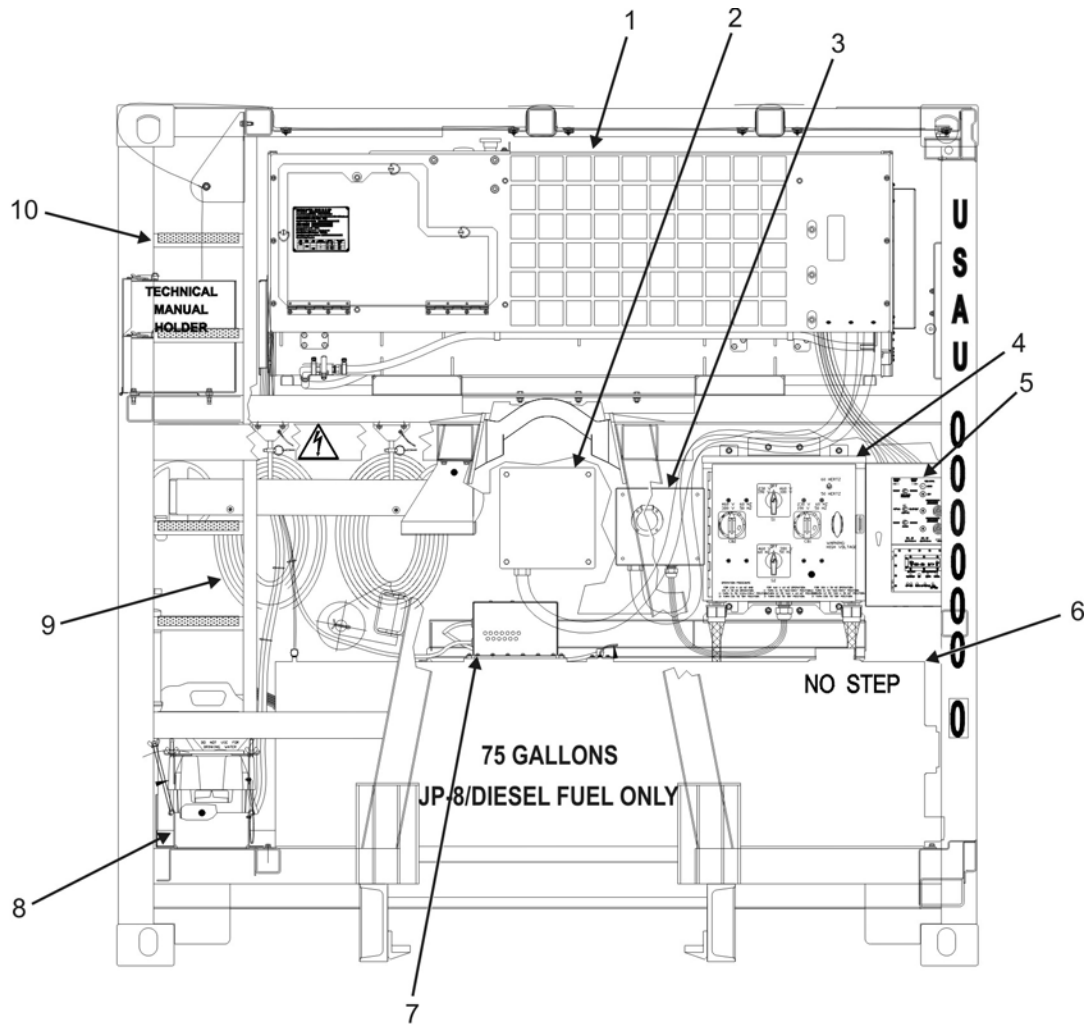


Figure 1. Location of MTRCS Components.

1.2. END ITEM(S) OR SYSTEM(S) TO BE MODIFIED.

This modification may be applied to MTRCS Part Number 182K0000-1.

1.3. MODULE(S), (COMPONENTS, ASSEMBLIES, SUBASSEMBLIES, BOARDS, AND CARDS) TO BE MODIFIED.

The following items, whether installed or in PLL/ASL or depot stock, shall be modified. Not applicable.

1.4. PARTS TO BE MODIFIED.

The following item(s), whether installed or in PLL/ASL or depot stock, shall be modified. Stocked parts shall be modified prior to issue and shall be so marked that it can be easily determined that modification has been accomplished. Not Applicable.

1.5. APPLICATION.

1.5.1. Time Compliance Schedule. None.

1.5.2. Level of Maintenance. The lowest level of maintenance authorized to apply the TB is Field.

1.5.3. Work Force and Man-Hour Requirements. Approximately 8.0 hours is required to apply this modification.

Table 2. Requirements.

Work Force/Skills	Man-Hours	Man-Hours w/o Disassembly
Utilities equipment repairers (2)	4.0 hours each (8.0 hours total)	Not applicable

1.6. TECHNICAL PUBLICATIONS AFFECTED/CHANGED.

Refer to Table 3 for a list of affected/changed technical publications.

Table 3. Publications Affected/Changed.

Technical Manual Number	Date
TM 10-8145-222-13	01 September 2010
TM 10-8145-222-23P	22 December 2010

1.7. TB KIT(S)/PART(S) AND THEIR DISPOSITION.

Refer to Table 4 for kit(s)/part(s) needed to apply the TB.

Table 4. Kit(s)/Part(s) Needed.

NSN	Nomenclature	CAGEC	Part No.	Weight	Dimensions	Cubic Displacement
	Refrigeration System Replacement Kit	94833	182K1669	1500 lb (680 kg)	96" x 36" x 36"	124,416 cu in (cubic inches)

1.7.1. Contents of TB Kit(s). Refer to Table 5 for the contents of the TB Kit(s).

Table 5. Contents of Technical Bulletin (TB) Kit(s).

Item No.	Nomenclature	National Stock Number (NSN)	CAGEC	Part No.	Quantity
1	Refrigeration Unit Assembly	4130-01-595-4758	5RQL2	182K1017-1	1
2	Plug		39428	9688K125	1
3	Bolt		96906	MS35307-360	4
4	Nut, Hex		96906	MS35649-2384	4
5	Washer, Flat		96906	MS15795-814	8
6	Washer, Lock		96906	MS35338-141	4
7	Cable Tag		5RQL2	182K1670	1
8	Cable, J13		5RQL2	182K1016-1	1
9	Screw, Cap		39428	91287A167	4
10	Washer, Lock		39428	92148A210	4
11	Nameplate		5RQL2	182K1006	1
12	Cable, J9		5RQL2	182K1628-1	1
13	Adapter, Terminal (POS (positive))		81348	A52425-1	1
14	Adapter, Terminal (NEG (negative))		81348	A52425-2	1
15	Washer, O-Ring Assembly		96906	13211E8321-3	1
16	Bushing, Strain Relief		57958	5054519-13	1
17	Black Filament Tape		76381	Filament Tape 894	1 RL (roll)
18	Plate, Operating Instruction		5RQL2	182K0057	1
19	Fitting, Strain Relief		57958	5054519-3	1
20	Locknut		57958	5054520-2	1
21	Washer, Sealing		98750	9454295-1	1
22	Locating Tool		5RQL2	182K1671	1

1.7.2. Bulk and Expendable Material. Refer to Table 6 for a list of Bulk and Expendable Material.

Table 6. Bulk and Expendable Material.

Item No.	Nomenclature	National Stock Number (NSN)	CAGEC	Part No.	Quantity
1	Rags, Lint-free	7920-00-205-1711	80244	1711	2
2	Tie Wraps	5975-00-156-3253	81343	MS3367-2-9	12
3	Tape, Insulating	5640-00-510-4199	14451	5958	1 RL (roll)
4	Sealant, Silicone	6850-01-518-9990	0YJB5	01516	1

1.7.3. Parts Disposition: Replaced/removed parts and components, and those items in excess of the requirements for the completion of the TB, are to be disposed to Defense Reutilization and Marketing Office (DRMO) by following SOPs (Standard Operating Procedures).

1.7.4. Mandatory Replacement Parts: Not applicable.

1.8. SPECIAL TOOLS; TOOL KITS; JIGS; TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT (TMDE); AND FIXTURES REQUIRED.

Refer to Table 7 for a list of special tools required.

Table 7. Special Tools.

Nomenclature	National Stock Number (NSN)	Tool Number
Chain Hoist	3950-00-965-0116	2502, 1/2-Ton
Face Shield	4240-00-202-9473	ANSI Z87.1
Forklift	3930-01-496-0409	
Rubber Gloves	8415-01-013-7384	MIL-G-87066
Safety Glasses	4240-01-527-4051	4-0078-9800
Service Refrigeration Ordnance Tool Kit	5180-00-596-1474	SC 5180-90-CL-N18
Spill Kit	4235-01-423-7221	11056
Shorting Probe	5975-01-029-4176	DSCR-PC-4176
Standard Automotive Tool Set (SATS)	4910-01-490-6453	SC 4910-95-A81

1.9. MODIFICATION PROCEDURES.

a. MTRCS Preparation.

(1) Refer to TM 10-8145-222-13, WP 0005, and set Microprocessor Controller Display (MCD) "ON/OFF" switch to "OFF."

(2) Power "ON/DOWN" switch "DOWN."

- (3) S1, S2, CB1, and CB2 to "OFF."
- (4) Disconnect external supply cables from the RU.
- (5) Refer to TM 10-8145-222-13, WP 0070, and disconnect battery.
- (6) Refer to TM 10-8145-222-13, WP 0031, and remove all RU access panels.

b. Refrigeration Unit Model Number 182K0017-1 Removal.

- (1) Refer to TM 10-8145-222-13, WP 0075, and remove RU.
- (2) Cut tie wraps and tape, and remove positive (red) and negative (black) battery cables (Figure 2) from MTRCS. Discard cables.

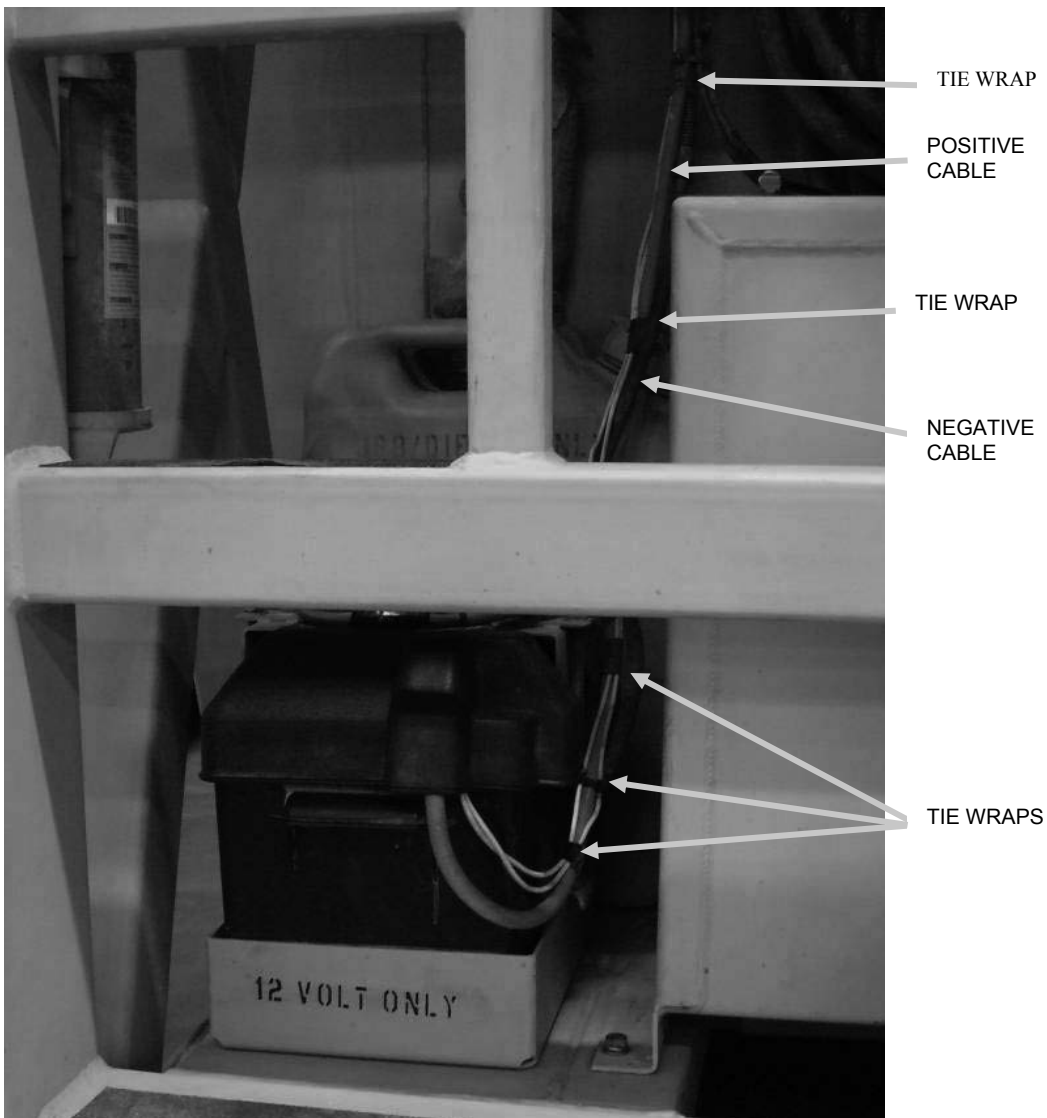


Figure 2. Battery Cables.

- (3) Remove and discard Fuel Pump P1 cable (Figure 3) and “RUN/STOP” J5 cable on top of control panel.



Figure 3. Fuel Pump P1 Cable.

- (4) Remove capacitor box as follows:



Capacitors are electrical storage devices that are designed to hold a charge after power is disconnected from them. For this reason, extreme care must be taken when working on or around capacitors. Discharge capacitor with a shorting probe before performing maintenance on capacitors. Failure to comply with this warning can result in severe electrical shock resulting in serious injury or death.

- (a) Remove four bolts (Figure 4, Item 1), washers (Figure 4, Item 2), and cover (Figure 4, Item 3) from capacitor box (Figure 4, Item 4).
- (b) Discharge capacitors with shorting probe.
- (c) Remove four bolts (Figure 4, Item 5), lock washers (Figure 4, Item 6), washers (Figure 4, Item 7), and capacitor box (Figure 4, Item 4) from MTRCS. Discard capacitor box and hardware.
- (d) Install four 15795-814 washers (Figure 4, Item 7), four 92148A210 lock washers (Figure 4, Item 6) and four 91287A167 screws (Figure 4, Item 5) into mounting holes in MTRCS.

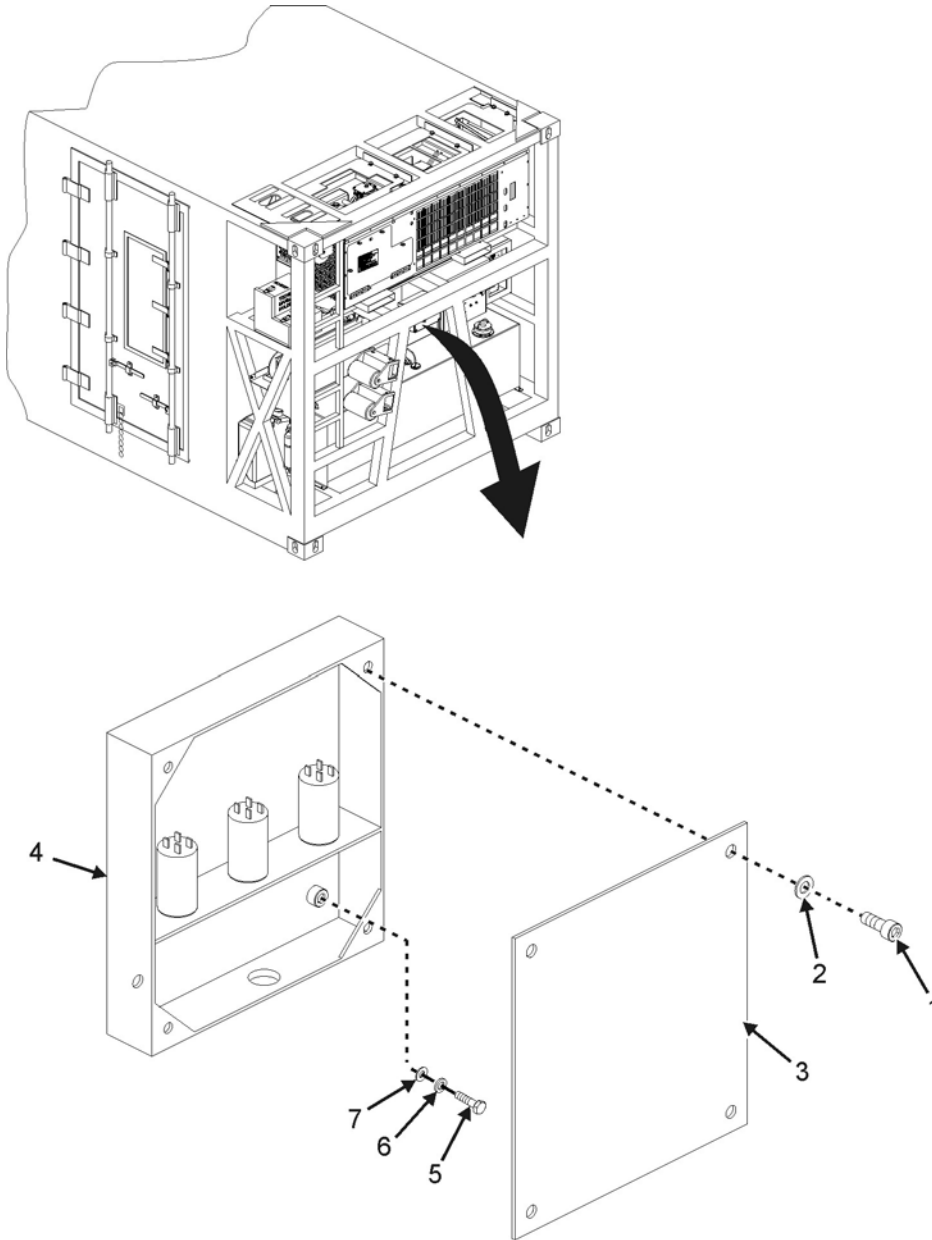


Figure 4. Capacitor Box Removal.

- (5) Open power box door (Figure 5, Item 1) and control panel assembly door (Figure 5, Item 2) to access transformer terminal block (Figure 6).



Figure 5. Power Box and Control Panel Assembly Door.

- (6) To remove J13 cable, refer to Figure 6; and disconnect the following wires from the transformer terminal block:
- (a) TR1-X1 \leftrightarrow MC-T1 from TR1-X1 terminal. Leave MC-T1 connected.
 - (b) TR1-X2 \leftrightarrow MC-T2 from TR1-X2 terminal. Leave MC-T2 connected.
 - (c) TR1-X3 \leftrightarrow MC-T3 from TR1-X3 terminal. Leave MC-T3 connected.



Figure 6. Transformer Terminal Block.

- (7) Remove TR1-X0 wire (Figure 7, Item 1) from ground lug terminal at bottom of power box.
- (8) Note locations of wire ties for J-13 wires (including ground wire). Remove wire ties.
- (9) Completely loosen conduit locknut (Figure 7, Item 2) from strain relief bushing (Figure 7, Item 3) for the J-13 cable. Pull strain relief (with J-13 wires) out of power box.

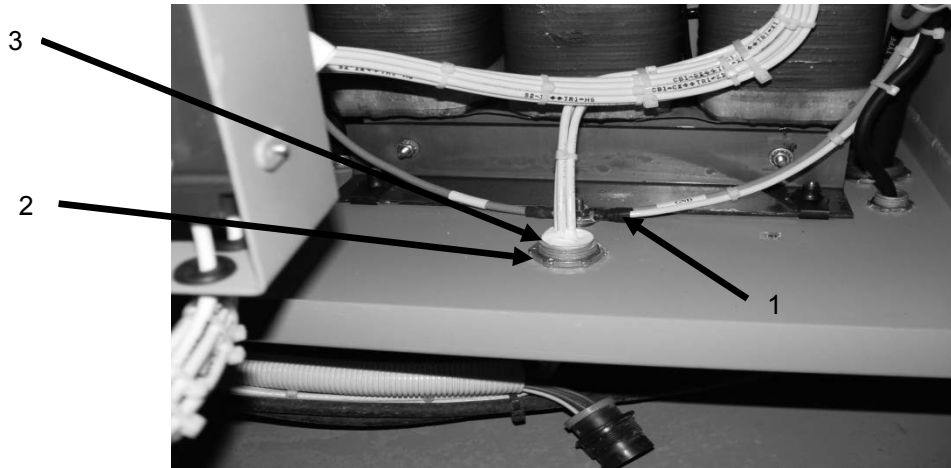


Figure 7. J13 Cable Removal.

- (10) On the power input box, remove four screws (Figure 8, Item 1), four washers (Figure 8, Item 2), and cover (Figure 8, Item 3) from power input box (Figure 8, Item 4).

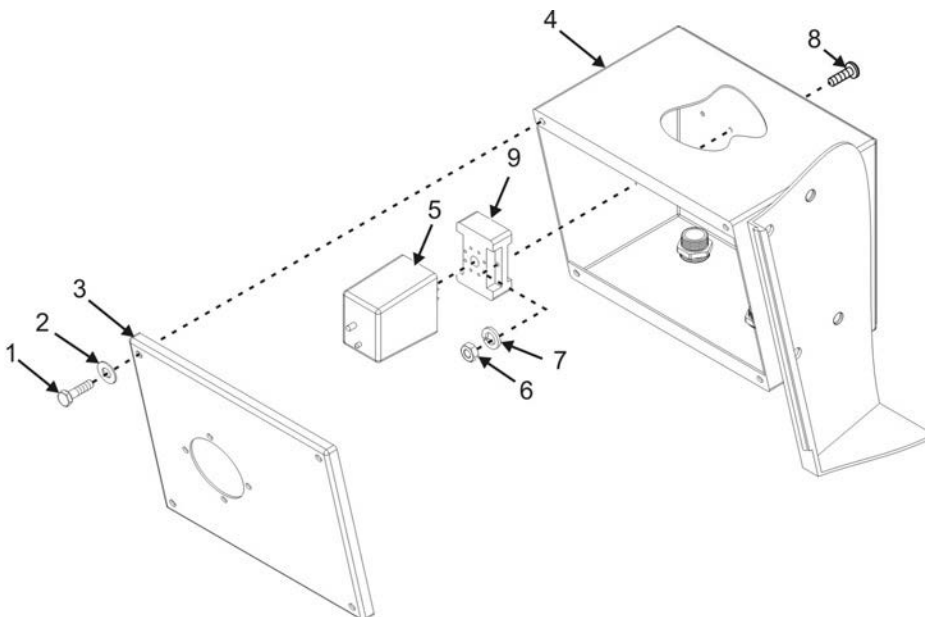


Figure 8. Power Input Box K1 Relay Removal.

- (11) Remove four nuts (Figure 9, Item 1), four lock washers (Figure 9, Item 2), four washers (Figure 9, Item 3), and four rubber washers (Figure 9, Item 4) securing power input box (Figure 9, Item 5) to power box (Figure 9, Item 6). Discard hardware.

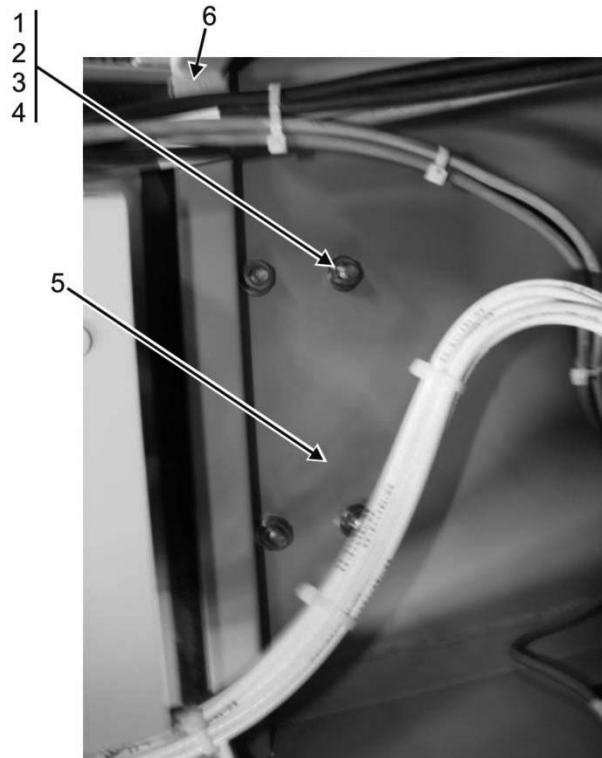


Figure 9. Power Input Box Removal.

- (12) Remove power input box, J9, and J13 cables (with strain relief).
- (13) Unplug K1 relay (Figure 8, Item 5); and remove two nuts (Figure 8, Item 6), two lock washers (Figure 8, Item 7), two screws (Figure 8, Item 8), and relay socket (Figure 8, Item 9) from electrical box (Figure 8, Item 4). Retain hardware for installation.
- (14) Disconnect J9 cable wires from relay socket (leave jumper wire between K1-1 and K1-2 installed). Retain relay and socket for installation into power box. Discard electrical box, J9 and J13 cables (with strain relief).
- (15) In the power box, plug four power input box mounting holes with four MS35307-360 bolts, four MS15795-814 washers (Figure 9, Item 3), four MS35338-141 lock washers (Figure 9, Item 2), and four MS35649-2384 nuts (Figure 9, Item 1).

- (16) On the power box door (Figure 10, Item 1), tag and disconnect wiring (Figure 10, Item 2) to toggle switch (Figure 10, Item 3).

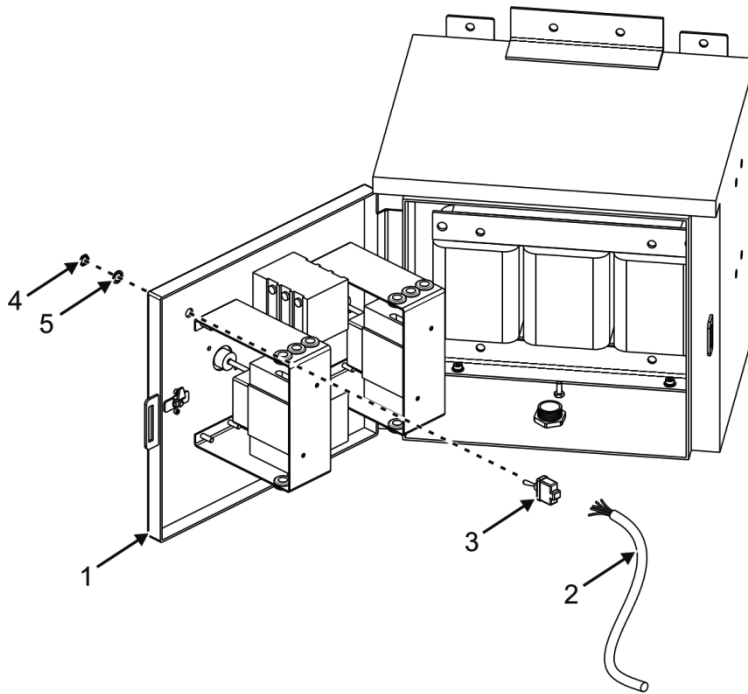


Figure 10. S7 Toggle Switch Removal.

- (17) Remove nut (Figure 10, Item 4) and washer (Figure 10, Item 5) securing toggle switch (Figure 10, Item 3) to power box door (Figure 10, Item 1).
- (18) Remove toggle switch (Figure 10, Item 3).
- (19) Plug hole in power box with 9688K125 plug. Discard switch.

- (20) Cut and discard J11 cable (Figure 11, Item 1) near the wire tie closest to the switch (Figure 11, Item 2). Cut other end of cable near wire tie closest to the bottom of the box (Figure 11, Item 4). Pull remaining J11 cable from strain relief at bottom of power box. Remove strain relief from power box. Discard strain relief, cable, and P11 plug. Attach 182K1670 cable tag (Figure 11, Item 3) using two MS3367-2-9 tie wraps.

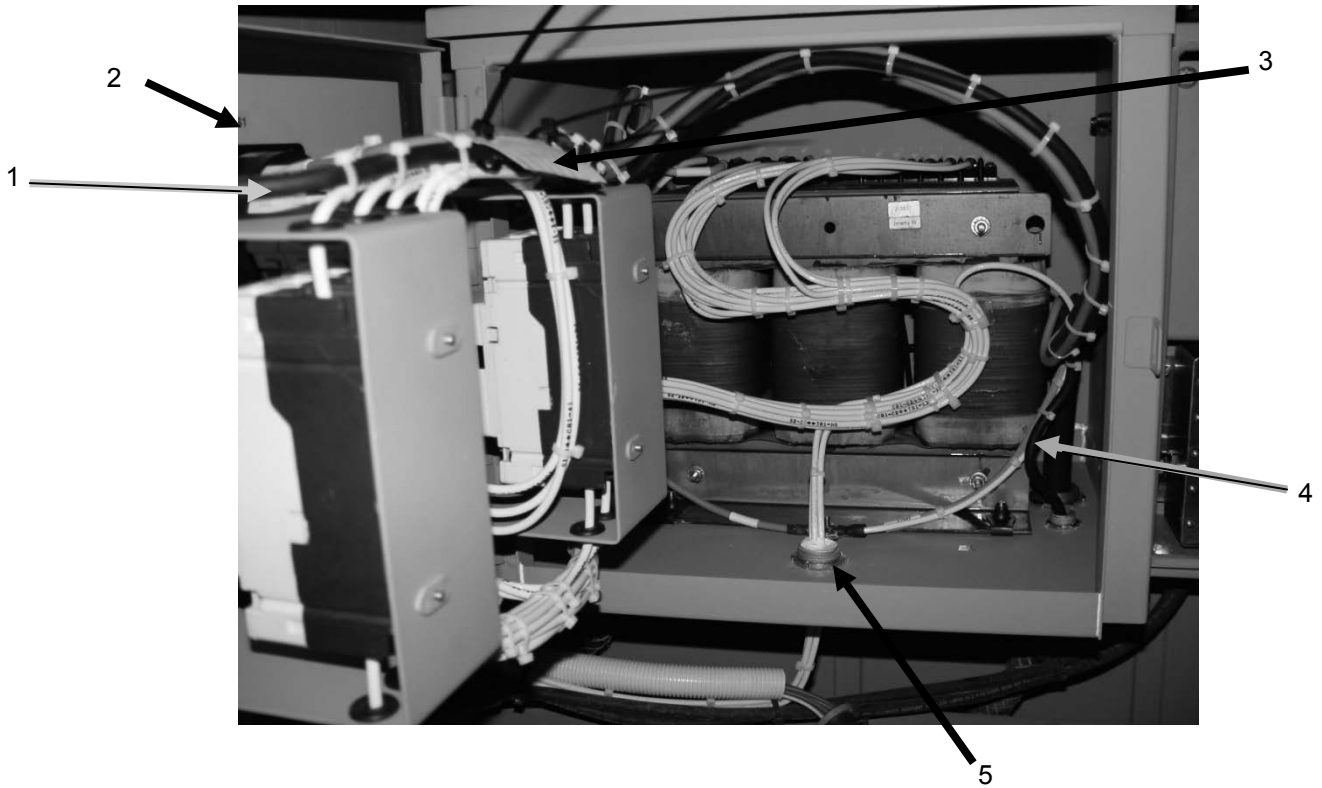


Figure 11. J-11 Cable Removal.

c. Refrigeration Unit Model Number 182K1017-1 Installation.

(1) In the power box, mount the K1 relay and socket (retained from removal) as follows:

- (a) Position 182K1671 locating tool (Figure 12, Item 1) underneath lower right corner of the power box (Figure 12, Item 2).

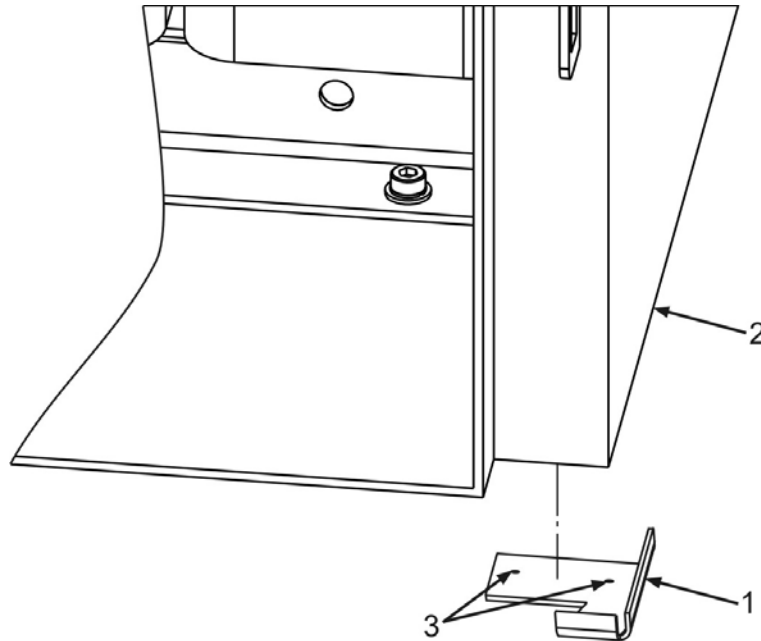


Figure 12. K1 Relay Locating Tool.

- (b) Use locating tool as a template to mark the location of the relay socket two mounting holes (Figure 12, Item 3), one for each side of the socket.
- (c) Drill two 11/64-inch holes through the power box. Remove filings.
- (d) Position K1 relay socket (Figure 13, Item 1) in the lower, right corner of the power box (Figure 13, Item 2), with key in socket facing forward, as shown in Figure 13.
- (e) Install 5054519-3 strain relief fitting (Figure 13, Item 10), 9454295-1 sealing washer (Figure 13, Item 11), and 5054520-2 locknut (Figure 13, Item 12) into hole formerly used by J11 cable.
- (f) Route new 182K1628-1 J9 cable (Figure 13, Item 7) up through strain relief.
- (g) Connect J9 cable (Figure 13, Item 7) tagged wires to relay socket (Figure 13, Item 1) with jumper wires in place between K1-1 and K1-2. Attach green ground wire to ground lug at bottom of panel, and finger tighten at this time.
- (h) Mount relay socket (Figure 13, Item 1) with relay keyway pointing towards front of panel, and secure with two screws, (Figure 13, Item 4), two MS35338-136 lock washers (Figure 13, Item 5), and two nuts (Figure 13, Item 6) retained from removal.
- (i) Plug K1 relay (Figure 13, Item 8) into relay socket (Figure 13, Item 1).
- (j) Ensure dial (Figure 13, Item 9) on relay is set to 85 percent.

NOTE

Disassembling strain relief will ease installation of wires through bushing, in the following step.

- (2) Install replacement 5054519-13 strain relief bushing (Figure 14, Item 1) with 13211E8321-3 o-ring, into hole in bottom of power box. Install nut (Figure 14, Item 2) onto bushing. Route new 182K1016-1 J13 cable (Figure 14, Item 3) up through strain relief, in bottom of power box.

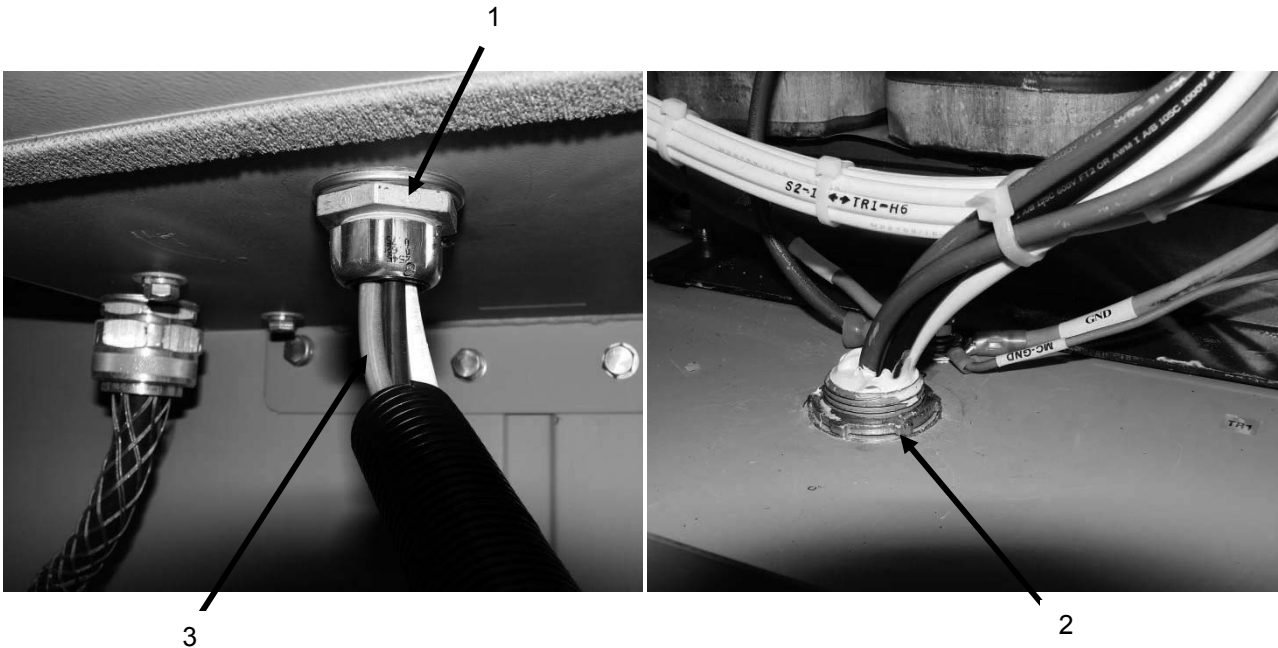
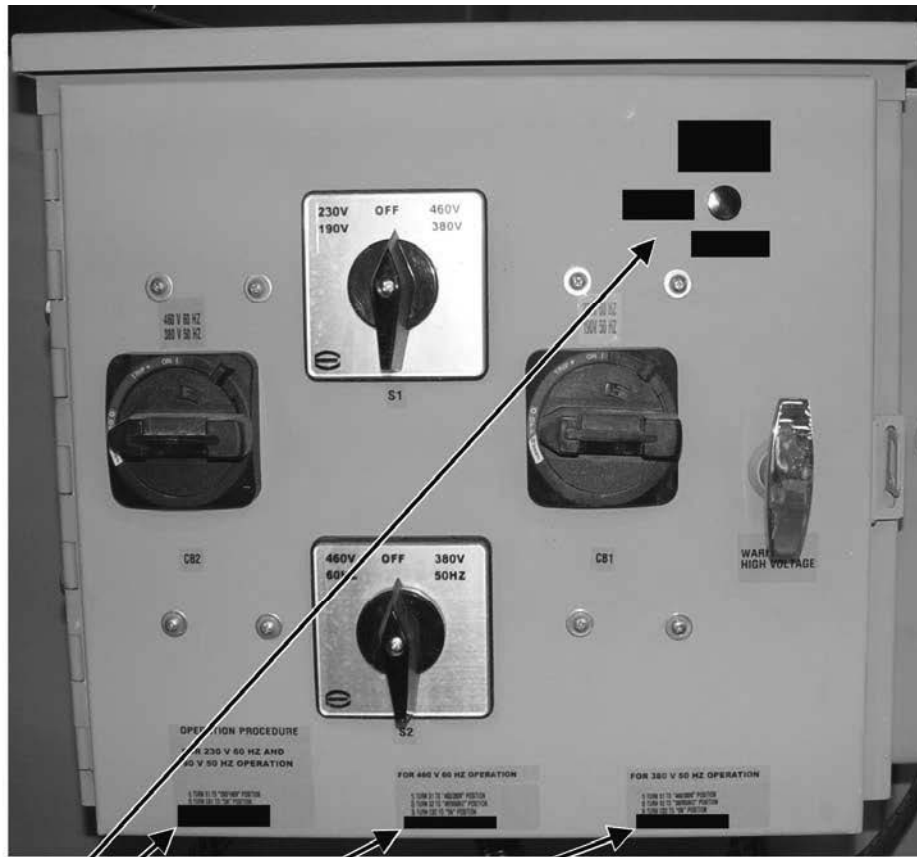


Figure 14. Strain Relief Installation.

- (3) Connect J13 cable wires to transformer TR1 as tagged. Use MS3367-2-9 tie wraps to secure J-13 wires, as noted in step b of removal. Connect J9 and J13 ground wires to stud with two other wires. Tighten strain relief nut. Fill strain relief with silicone sealant.
- (4) Connect J9 connector to P9 plug, located on top of the control panel.
- (5) Close power box cover.
- (6) Refer to TM 10-8145-222-13, WP 0075.1, and install new 182K1017-1 RU.
- (7) Route battery positive (red) and negative (black) cables (connected to RU) down to the battery.
- (8) Refer to TM 10-8145-222-13, WP 0070, to connect battery cables. Use new A52425-1 negative and A52425-2 positive terminal adapters on battery. Two small white wires are connected to the positive terminal.

(9) Use black filament tape to cover "S7" references on power box door, as shown in Figure 15.



FILAMENT
TAPE

Figure 15. Tape Location on Power Box.

(10) Replace Operating Instructions plate (to the right of the chart recorder) with new Operating Instructions plate 182K0057.

(11) Replace nameplate (rear of MTRCS, lower, left door) with new nameplate 182K1006.

1.10. RETURN EQUIPMENT TO SERVICE OPERATION IN ACCORDANCE WITH TM 10-8145-222-13, WP 0005.

1.11. CALIBRATION REQUIREMENTS.

Not applicable.

1.12. WEIGHT AND BALANCE DATA.

Weight and balance are not affected.

1.13. QUALITY ASSURANCE REQUIREMENTS.

General quality inspection criteria shall be in accordance with TM 750-245-4, Direct Support and General Support for Quality Control Inspector's Inspection Criteria.

1.14. RECORDING AND REPORTING OF THE MODIFICATION.

- a. Records and reports. The organization responsible for TB application will report application information as stated in AR 750-10, Army Modification Program:
Reporting will be accomplished by electronic means. TB application information can be input directly into the Modification Management Information System (MMIS) over the Internet. Entry into the MMIS system is password protected. New users can register on-line at: <https://www.mmis.army.mil/mmis/>. Passwords are normally approved and issued within 48 hours.
- b. Marking Equipment. Install new MTRCS nameplate as follows:
 - (1) Locate the nameplate on the back door of the MTRCS, and drill out four rivets securing nameplate.
 - (2) Position new 182K1006 nameplate on door, and secure with four rivets.
- c. Identification Data. Not applicable.

1.15. MATERIEL CHANGE (MC) NUMBER.

This TB is authorized by ECP 11CE0011.

1.16. MODIFICATION IDENTIFICATION.

Refrigeration unit replacement.

These are the instructions for sending an electronic 2028

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

From: "Whomever" <whomever@avma27.army.mil>
To: TACOMLCMC.DAForm2028@us.army.mil

Subject: DA Form 2028

1. From: Joe Smith
2. Unit: home
3. Address: 4300 Park
4. City: Hometown
5. St: MO
6. Zip: 77777
7. Date Sent: 19-OCT-93
8. Pub no: 55-2840-229-23
9. Pub Title: TM
10. Publication Date: 04-JUL-85
11. Change Number: 7
12. Submitter Rank: MSG
13. Submitter FName: Joe
14. Submitter MName: T
15. Submitter LName: Smith
16. Submitter Phone: 123-123-1234
17. Problem: 1
18. Page: 2
19. Paragraph: 3
20. Line: 4
21. NSN: 5
22. Reference: 6
23. Figure: 7
24. Table: 8
25. Item: 9
26. Total: 123
27. Text:

This is the text for the problem below line 27.

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30; the proponent agency is ODISC4.	Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE 21 October 2003
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TO: (Forward to proponent of publication or form) (Include ZIP Code) U.S. Army TACOM Life Cycle Management Command ATTN: AMSTA-LCL-MPP/TECH PUBS 6501 E. 11 Mile Road, Warren, MI 48397-5000	FROM: (Activity and location) (Include ZIP Code) <i>PFC JANE DOE</i> <i>Co A 3RD Engineer Br.</i> <i>Ft Leonard Wood, MO 63108</i>
--	---

PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER TM 10-1670-296-20&P	DATE 30 October 2002	TITLE Unit Manual for Ancillary Equipment for Low Velocity Air Drop Systems
--	-------------------------	--

ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON <i>(Provide exact wording of recommended changes, if possible).</i>
	0036 00-2				1	<p><i>In Table 1, Sewing Machine Code Symbols, the second sewing machine code symbol should be MDZZ not MD22</i></p> <p><i>Change the manual to show Sewing Machine, Industrial: Zig-Zag; 308 stitch; medium-duty; NSN 3530-01-181-1421 as a MDZZ code symbol.</i></p>

**Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE Jane Doe, PFC	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION (508) 233-4141 DSN 256-4141	SIGNATURE Jane Doe <i>Jane Doe</i>
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TO: (Forward direct to addressee listed in publication) U.S. Army TACOM Life Cycle Management Command ATTN: AMSTA-LCL-MPP/TECH PUBS 6501 E. 11 Mile Road, Warren, MI 48397-5000	FROM: (Activity and location) (Include ZIP Code) PFC JANE DOE Co A 3 RD Engineer Br. Ft Leonard Wood, MO 63108	DATE 21 October 2003
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PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER TM 10-1670-296-20&P	DATE 30 October 2002	TITLE Unit Manual for Ancillary Equipment for Low Velocity Air Drop Systems
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PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION
0066 00-					4			<i>Callout 16 in figure 4 is pointed to a <u>D-Ring</u>. In the Repair Part List key for Figure 4, item 16 is called a <u>Snap Hook</u>. Please correct one or the other.</i>

PART III – REMARKS (Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)

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TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
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TO: <i>(Forward to proponent of publication or form) (Include ZIP Code)</i> U.S. Army TACOM Life Cycle Management Command ATTN: AMSTA-LCL-MPP/TECH PUBS 6501 E. 11 Mile Road, Warren, MI 48397-5000	FROM: <i>(Activity and location) (Include ZIP Code)</i>	DATE
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PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION/FORM NUMBER TB 10-8145-222-23	DATE 1 DECEMBER 2013	TITLE: Replacement of Refrigeration System on Multi-Temperature Refrigerated Container System (MTRCS) NSN 8145-01-534-3597
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For use of this form, see AR 25-30; the proponent agency is ODISC4.							
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ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended changes, if possible).	
<i>*Reference to line numbers within the paragraph or subparagraph.</i>							
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PUBLICATION/FORM NUMBER TB 10-8145-222-23				DATE 1 DECEMBER 2013			TITLE Replacement of Refrigeration System on Multi-Temperature Refrigerated Container System (MTRCS) NSN 8145-01-534-3597	
PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION
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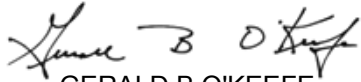
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By Order of the Secretary of the Army:

RAYMOND T. ODIERNO
General, United States Army
Chief of Staff

Official:



GERALD B O'KEEFE
Administrative Assistant to the
Secretary of the Army
1328403

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
 1 decimeter = 10 centimeters = 3.94 inches
 1 meter = 10 decimeters = 39.37 inches
 1 dekameter = 10 meters = 32.8 feet
 1 hectometer = 10 dekameters = 328.08 feet
 1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
 1 decigram = 10 centigrams = 1.54 grains
 1 gram = 10 decigrams = .035 ounce
 1 dekagram = 10 grams = .35 ounce
 1 hectogram = 10 dekagrams = 3.52 ounces
 1 kilogram = 10 hectograms = 2.2 pounds
 1 quintal = 100 kilograms = 220.46 pounds
 1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
 1 deciliter = 10 centiliters = 3.38 fl. ounces
 1 liter = 10 deciliters = 33.81 fl. ounces
 1 dekaliter = 10 liters = 2.64 gallons
 1 hectoliter = 10 dekaliters = 26.42 gallons
 1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
 1 cu. meter = 1000 cu. decimeters = 35.31 feet

Approximate Conversion Factors

<i>To change</i>	<i>To</i>	<i>Multiply by</i>	<i>To change</i>	<i>To</i>	<i>Multiply by</i>
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pound-inches	newton-meters	.11296			

Temperature (Exact)

$\frac{5}{9}$ Fahrenheit temperature $- 32$ Celsius temperature

PIN: 087558