

COMPONENT MAINTENANCE MANUAL

TO: HOLDERS OF THE FIRE EXTINGUISHER COMPONENT MAINTENANCE MANUAL 26-22-02, DATED JUL 18/11.

REVISION NO. 6 DATED JUL 18/11

HIGHLIGHTS

THIS PUBLICATION HAS BEEN REPRINTED IN ITS ENTIRETY. REPLACE ALL PREVIOUSLY ISSUED COPIES OF THE COMPONENT MAINTENANCE MANUAL.

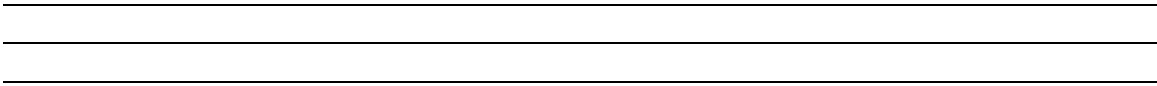
The highlights of the revision are outlined below. The pages have been revised and maintain the format of ATA 100 and the AECMA Simplified English guidelines.

CHAPTER/SECTION & PAGE NO.	DESCRIPTION OF CHANGE	EFFECTIVITY
All Pages	Added new business name “AMETEK Ameron LLC” and updated formatting and revision date	All models
All Tables	Updated business name “AMETEK Ameron LLC”	All models
Page T-1	Updated logo & revision date.	All models
Page T-2	Updated business name “AMETEK Ameron LLC”	All models
Page RR-1	Added revision status and date	All models
Page LEP-1	Updated effectivity dates	All models
Page INTRO-1	Updated manufacturing entity & production support info. & updated business name “AMETEK Ameron LLC”	All models
Page 3	Updated TCPS Section	All models
Page 4	Removed “A Unit of Ameron Global, Inc.” and updated Container Weldment and Hydrostatic Testing sections	All models
Page 5	Revised weight check interval & bridgewire check	All models
Page 104	Revised Hydrostatic Testing requirements	All models
Page 105	Added Note not to remove TCPS from bottle	All models
Page 503	Updated TCPS section & included Note not to machine TCPS	All models



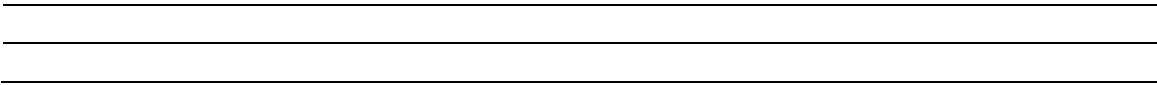
COMPONENT MAINTENANCE MANUAL

CHAPTER/SECTION & PAGE NO.	DESCRIPTION OF CHANGE	EFFECTIVITY
Page 704, 710	Removed IPL Figure number	All models
Page 712	Updated DOT marking	All models
Page 6, 104, 601, 1001, 1003	Updated business name "AMETEK Ameron LLC"	All models



**FIRE EXTINGUISHER
HERMETIC AND METAL-TO-METAL
SEALED SERIES
ENGINE – APU – CARGO COMPARTMENTS**

**COMPONENT MAINTENANCE MANUAL
USE WITH TECHNICAL PROPERTIES AND
ILLUSTRATED PARTS LIST SUPPLEMENTS**





CONFIDENTIALITY NOTICE

This document contains confidential and proprietary information, which is the property of AMETEK Ameron, LLC, MASS Systems and shall not be copied or reproduced, in whole or in part, or the contents divulged or used for manufacture, without the specific written permission of AMETEK Ameron, LLC, MASS Systems. Recipient, by acceptance, use, or retention of this document, acknowledges and agrees to the foregoing and covenants to maintain the contents in confidence.

TECHNICAL DATA EXPORT NOTICE

This data is exported to the requirements of the United States Government Export Administration Act of 1969, as amended, and promulgated by the export administration regulations as issued by the U. S. Department of Commerce. The data may not be reproduced and shall not, without the written permission of AMETEK Ameron, LLC, MASS Systems be used for purposes of manufacture, or shall it be disclosed, re-exported, nor transmitted directly or indirectly from the importing country to any person, government, governmental entity or institution of another foreign government. It is understood and agreed that the use of this data shall be limited to the following purposes: (i) use by Support Service Contractors (except for manufacture), (ii) emergency repair or overhaul work, (iii) receiving inspection of hardware, (iv) evaluation of a bid or proposal. By acknowledgement of receipt of data containing this legend, importer agrees to comply thereto.

PMA PARTS NOTICE

AMETEK Ameron, LLC, MASS Systems will provide full warranty on all fire extinguishers provided the component parts used in the repair and overhaul process have formal after market FAA-PMA authority for use on the fire extinguisher application.



RECORD OF REVISIONS

REV. NO.	ISSUE DATE	DATE FILED	APVD. BY
0	Jun 30/98	Jun 30/98	ER
1	Apr 30/02	Apr 30/02	ER
2	Aug 15/02	Aug 15/02	ER
3	Feb 15/04	Feb 15/04	ER
4	Oct 30/06	Oct 30/06	ER
5	Feb 20/09	Feb 20/09	MM
6	Jul 18/11	Jul 18/11	MM

REV. NO.	ISSUE DATE	DATE FILED	APVD. BY



RECORD OF TEMPORARY REVISIONS

REVISION NO.	PAGE NUMBER	ISSUE DATE	APVD. BY	DATE REMOVED	APVD. BY



LIST OF EFFECTIVE PAGES

SUBJECT	PAGE	DATE	SUBJECT	PAGE	DATE
Title Page Notices	T-1	Jul 18/11	Disassembly (con't)	305	Aug 15/02
	T-2	Jul 18/11		306	Aug 15/02
Record of Revisions	RR-1	Jul 18/11		307	Aug 15/02
				308	Aug 15/02
Record of Temporary Revisions	RTR-1	Aug 15/02	Cleaning	401	Jul 18/11
				402	Oct 30/06
Service Bulletin List	SBL-1	Aug 15/02	Check	501	Jul 18/11
List of Effective Pages	LEP-1	Jul 18/11		502	Aug 15/02
				503	Jul 18/11
Table of Contents	TC-1	Aug 15/02	Repair	601	Jul 18/11
Introduction	Intro-1	Jul 18/11		602	Aug 15/02
		Intro-2	Feb 20/09	Assembly (Including Storage)	701
Description and Operation	1	Aug 15/02	702		Feb 20/09
	2	Aug 15/02	703		Aug 15/02
	3	Jul 18/11	704		Jul 18/11
	4	Jul 18/11	705		Aug 15/02
	5	Jul 18/11	706		Aug 15/02
	6	Jul 18/11	707		Aug 15/02
Testing and Fault Isolation	101	Jul 18/11	708	Aug 15/02	
	102	Jul 18/11	709	Oct 30/06	
	103	Oct 30/06	710	Jul 18/11	
	104	Jul 18/11	711	Aug 15/02	
	105	Jul 18/11	712	Jul 18/11	
	106	Feb 20/09	Fits and Clearances	801	Oct 30/06
	107	Aug 15/02		Special Tools, Fixtures, And Equipment	901
	108	Aug 15/02	902		Jul 18/11
Disassembly	301	Jul 18/11	903		Jul 18/11
	302	Jul 18/11	Illustrated Parts List	1001	Jul 18/11
	303	Aug 15/02		1002	Feb 20/09
	304	Aug 15/02		1003	Jul 18/11
1004				Aug 15/02	



TABLE OF CONTENTS

Introduction	INTRO-1
Description and Operation	1
Testing and Fault Isolation	101
Disassembly	301
Cleaning	401
Check	501
Repair	601
Assembly (Including Storage)	701
Fits and Clearances	801
Special Tools, Fixtures, and Equipment	901
Illustrated Parts List	1001

FIGURES

1 Primary Components	2
101 Temperature Compensated Pressure Switch (TCPS) Test Setup	108
301 Outlet Disc, Filler Valve, Pressure Switch, and TCPS Removal Setup	308
601 Cartridge Disposal Setup	602
701 Outlet Disc and Filler Valve Weld Setup	703
702 Recharge Setup	706
801 Minimum Height	801

TABLES

101 Test Equipment and Materials	101
301 Disassembly Tools and Materials	301
401 Cleaning Materials	401
501 Check Tools and Materials	501
601 Repair Tools and Equipment	601
701 Assembly Tools and Materials	701
702 Welding Schedule	702
703 Fill Chart Record	707
704 Nitrogen Gas Charge Pressure	708
705 Nitrogen Gas Charge Pressure (Metric)	709
706 Storage Materials	711
707 Cardboard Carton Size	712
801 Torque Limits	801
901 Special Tools, Fixtures, and Equipment	901



INTRODUCTION

SCOPE

This Component Maintenance Manual covers the maintenance and overhaul procedures for a line of hermetic and metal to metal sealed fire extinguishers. The fire extinguishers are used in the Engine, Auxiliary Power Unit, and Cargo compartments of commercial and general aviation aircraft. They are electrically activated from the cockpit to operate a pyrotechnic device and discharge the extinguishing agent.

MANUFACTURING ENTITY & PRODUCT SUPPORT

AMETEK Ameron LLC /	Telephone: 626-337-4640
MASS Systems	FAX No: 626-337-1641
4750 Littlejohn Street	service@mass.ametek.com
Baldwin Park, California 91706	CAGE Code: 0FRR4
U.S.A.	

In addition to our factory Product Support, Overhaul and Recharge stations are available worldwide.

USE MANUAL WITH SUPPLEMENT FOR SPECIFIC PART NUMBERS

This Component Maintenance Manual is written to cover a range of fire extinguishers manufactured by AMETEK Ameron LLC / MASS Systems (0FRR4). All of these fire extinguishers are common in their maintenance and overhaul procedures. A Supplement with the Technical Properties and an Illustrated Parts List related to the specific part number is provided separately and constitutes a part of this manual.

This manual covers all fire extinguishers wherein the discharge outlet disc, filler valve, and/or pressure switch are weld sealed to the container weldment. Some fire extinguishers in this category utilize a pressure gauge that is not welded, but thread sealant sealed to the container weldment.

When requesting copies of this Component Maintenance Manual, always provide the specific part number of the fire extinguisher.

USE MANUAL FOR SPECIFIC FUNCTIONS

This manual covers the following topics: Description and Operation, Testing and Fault Isolation, Disassembly, Cleaning, Check, Assembly and Storage, Special Tools, Fixtures, and Equipment. For the Technical Properties and the Illustrated Parts List refer to the Supplement for the specific part number.

Recommended tools and materials are listed in each section and in the Special Tools, Fixtures, and Equipment section. Equivalent items may be used.



COMPONENT MAINTENANCE MANUAL

REVISION SERVICE

Revised pages will be issued when necessary throughout the service life of the fire extinguisher. The revised part of the page will be identified with a change bar or capital **R** in the left margin.

ABBREVIATIONS AND UNIT SYMBOLS

Abbreviations and unit symbols used in this manual are defined below.

Amp.	Amperes	Min	Minimum
Assy.	Assembly	mm	Millimeter (1 mm = 0.0394 inch)
ATA	Air Transport Association	m ³ /hr	Cubic meter per hour
CAA	Civil Aviation Authority	N.C.	Normally Closed
CAGE	Commercial and Government Entity	N-m	Newton-meter (1 N-m = 8.3 inch-pound)
cfh	Cubic feet per hour	N.O.	Normally Open
CFR	Code of Federal Regulations	No.	Number
cm	Centimeter (1 cm = 0.394 inch)	OD	Outside Diameter
DOT	Department of Transportation	Psig	Pounds per square inch-gauge
FAA	Federal Aviation Administration	Rev.	Revision
GN ₂	Nitrogen Gas	RJA	Regional Jet Association
ID	Inside Diameter	rpm	Revolutions per minute
IPL	Illustrated Parts List	SB	Service Bulletin
JAA	Joint Aviation Authorities	scc/sec	Standard cubic-centimeter per second
Kg	Kilogram (1 kg = 2.205 pounds)	TCPS	Temperature Compensated Pressure Switch
kPag	Kilo Pascal-gauge (1 kPag = 0.15 psig)	Temp	Temperature
mA	Milliamperes	VDC	Voltage-Direct Current
Max	Maximum		



DESCRIPTION AND OPERATION

PURPOSE

Fire Extinguishers are used to protect the Engine, Auxiliary Power Unit, and Cargo compartments. The fire extinguishers store extinguishing agent under pressure. When electrically activated from the cockpit, the fire extinguishers very rapidly discharge extinguishing agent into the affected fire zone, most under one second. The fire extinguishers, even the hermetic welded, are refurbishable with replacement of appropriate parts.

WARNING: THE FIRE EXTINGUISHERS ARE PRESSURIZED VESSELS WITH PYROTECHNIC ACTUATED CARTRIDGES. EXTREME CAUTION MUST BE EXERCISED IN THE HANDLING OF THESE FIRE EXTINGUISHERS. SEVERE PERSONNEL INJURIES MAY RESULT IF NOT HANDLED PROPERLY.

DESCRIPTION AND BREAKDOWN OF PRIMARY COMPONENTS

The fire extinguishers are generally spherical or cylindrical in shape and have some of the following primary components. See Figure 1 for identification of the primary components.

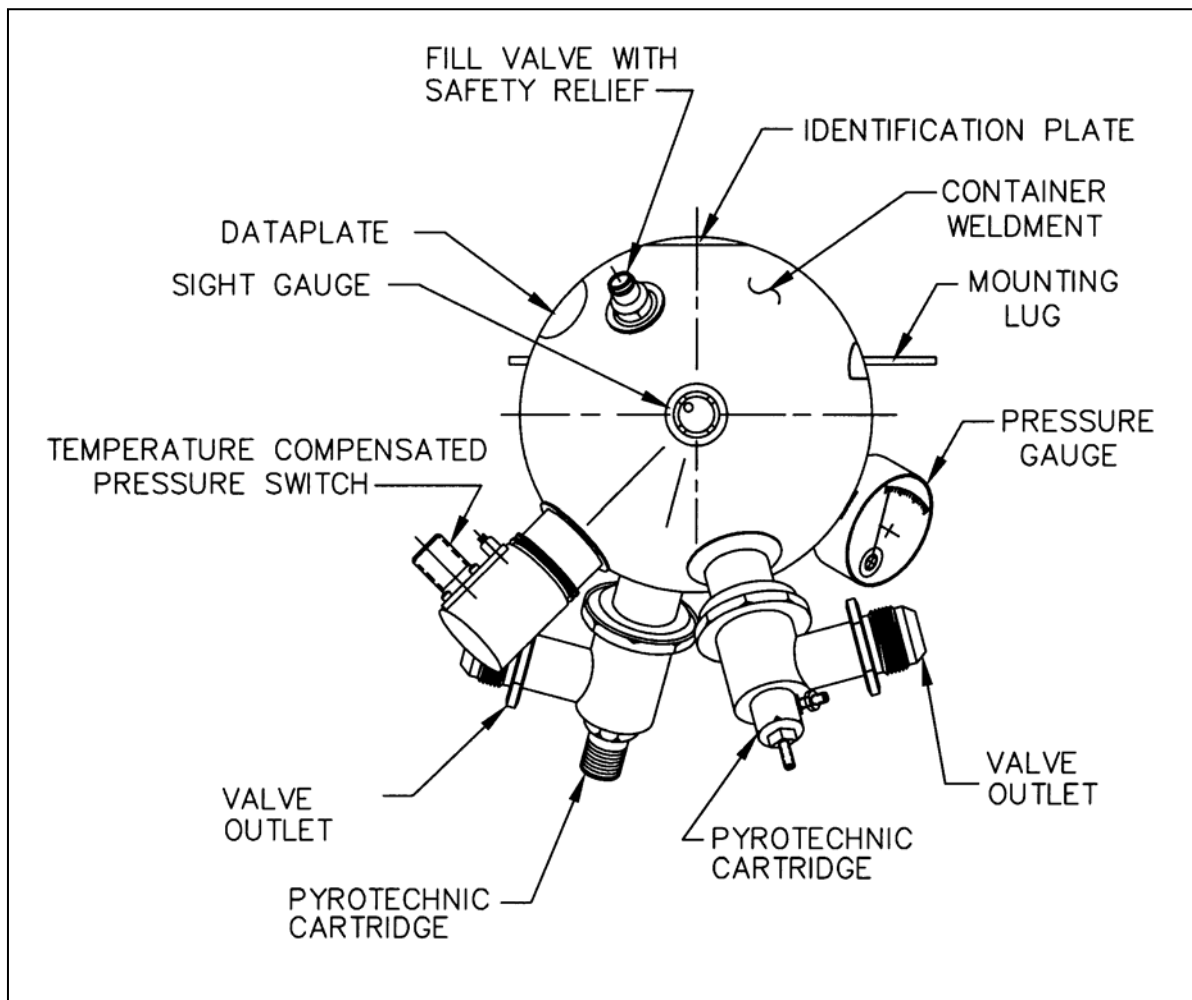
- | | |
|--|--|
| A. Container Weldment | F. Pressure Gauge |
| B. Class 1.4s Actuating Cartridge | G. Pressure Switch |
| C. Filler Valve With Safety Relief | H. Pressure Switch Gauge |
| D. Outlet Disc (Secondary Safety Relief) | I. Sight Gauge |
| E. Outlet Valve | J. Temperature Compensated Pressure Switch |

CONTAINER WELDMENT

The container weldments are generally made from an advanced stainless steel alloy. The container weldments incorporate integral mounting lugs or mounting brackets, and bosses for mounting the outlet disc, outlet valve, filler valve, pressure gauge, pressure switch gauge, pressure switch, and/or Temperature Compensated Pressure Switch. Some of the larger models have carrying handles attached to the container weldment with standard bolts.

CLASS 1.4s ACTUATING CARTRIDGE

The pyrotechnic cartridge after electrical activation produces a shock wave that ruptures the outlet disc and releases the pressurized extinguishing agent. The cartridge must be shunted during transportation and storage for safe handling.



Primary Components
Figure 1

OUTLET VALVE

1. The outlet valve threads onto the outlet boss of the container weldment. The outlet valve connects to the aircraft distribution network. The outlet valve rotates 360 degrees for installation alignment, and is designed with a captured nut. The outlet valve houses the cartridge and provides the proper gap between the pyrotechnic end of the cartridge and the outlet disc. A steel screen weldment filters out the debris from the cartridge pyrotechnic and the outlet disc preventing downstream contamination.
2. Some of the fire extinguishers feature a unique by-pass outlet valve to prevent the extinguishing agent from filling an empty fire extinguisher container in a dual shot system. This outlet valve is referred to as a "BY-PASS OUTLET VALVE."
3. The outlet valves and cartridges can be safely removed from all pressurized fire extinguishers.

**COMPONENT MAINTENANCE MANUAL****FILLER VALVE/FILLER VALVE WITH SAFETY RELIEF**

The filler valve or filler valve with safety relief is used to charge the fire extinguisher with the extinguishing agent and the Nitrogen gas using a special charging fixture. Some of the filler valves are subsequently welded in place. To protect the fire extinguisher from any overheat condition; a thin calibrated safety disc inside some of the filler valves ruptures, relieving the pressure in the fire extinguisher. Some of the filler valves contain a thermal compound that melts when the temperature exceeds safe operating conditions. The pressure relief and temperature relief are at levels lower than the proof pressure of the fire extinguisher.

OUTLET DISC (SECONDARY SAFETY RELIEF)

The outlet disc welded to the outlet boss of the container weldment serves as the discharge and safety device for the fire extinguisher. The outlet disc is a thin, calibrated metal disc welded to a ring, pre-stressed, and leak checked. The outlet disc fractures releasing the extinguishing agent after cartridge activation. The outlet disc also fractures at a pre-determined pressure level providing an additional safety relief for the fire extinguisher.

PRESSURE GAUGE

The pressure gauge provides a rough visual indication of the fire extinguisher pressure. Without knowing the exact temperature of the fire extinguisher fluid, it is difficult to assess the exact status of the fire extinguisher. The pressure gauge can be welded to the gauge boss.

PRESSURE SWITCH

The pressure switch is normally set to activate below the lowest pressure at -65°F (-53.9°C). This type of switch is utilized mainly to indicate a fire extinguisher discharge after cartridge activation with a remote signal to the cockpit. The pressure switch can be welded to the switch boss.

PRESSURE SWITCH GAUGE

This device is a combination of a visual pressure gauge with a remote electrical signal to the cockpit. It can only provide a rough indication of the fire extinguisher status with the remote readout upon discharge. The pressure switch gauge can be welded to the switch boss.

TEMPERATURE COMPENSATED PRESSURE SWITCH (TCPS)

The extinguishing agent and Nitrogen gas mixture undergo substantial pressure changes as the fire extinguisher container cycles from -65°F to +250°F (-53.9°C to +121.1°C). To accurately sense the condition of the fire extinguisher under all operating conditions, a Temperature Compensated Pressure Switch (TCPS) is required. MASS Systems manufactures and uses both mechanical (no electronics) and digital (solid state) TCPS types. The digital TCPS features a solid state control module with temperature sensor and pressure transducer. These signals are converted by a preprogrammed microcontroller within the TCPS to signal a GO/NO-GO status to the cockpit. A press-to-test feature, checks the TCPS and fire extinguisher integrity. The TCPS is welded to the fire extinguisher switch boss.

**COMPONENT MAINTENANCE MANUAL****SIGHT GAUGE**

Some of the fire extinguishers utilize a unique sight gauge installed into the container weldment. The sight gauge provides a quick visual indication of the liquid level of the extinguishing agent within the fire extinguisher container. When used with the TCPS, it provides an accurate status of the fire extinguisher container at any temperature thus eliminating costly removal and periodic weight checks.

GENERAL MAINTENANCE AND SERVICE LIFE DATA**CONTAINER WELDMENT**

1. The container weldment is constructed of stainless steel alloys. The container weldment cannot be heat-treated. All of the strength is obtained from cold work during forming. No rework of the container weldment by grinding and/or rewelding is authorized, as this will severely impact the strength of the container weldment.
2. Replacement of the bosses is not permitted as the container weldment material is already weakened during fabrication of the weldment.
3. Replacement of the mounting lugs when welded to a doubler can be accomplished. Only MASS Systems can perform any mounting lug replacement.
4. Replacement of the outlet disc, fill fitting, pressure switch, and pressure gauge to the weldment bosses is authorized provided the proper procedures as outlined in this manual are followed.
5. **HYDROSTATIC TESTING:** Periodic hydrostatic testing of the container weldment is required to comply with the U.S. Department of Transportation requirement section 180.205, contained in the Code of Federal Regulations Title 49. This required retest period for the MASS Systems, container weldment (design specification 4DS) is 5 years.

**COMPONENT MAINTENANCE MANUAL****6. WEIGHT CHECK PERIODS**

- Fire Extinguisher with a Temperature Compensated Pressure Switch and Sight Gauge.

These fire extinguishers are accurately monitored regardless of temperature variation. A Press-To-Test feature on the Temperature Compensated Pressure Switch (TCPS) establishes the integrity of the system. A Sight Gauge provides visual indication of the liquid level. The fire extinguishers with these two devices need not be removed for periodic weight checks for the life of the fire extinguisher except for hydrostatic test purposes.

- Fire Extinguisher with a Pressure Gauge, Pressure Switch Gauge, or Pressure Switch.

Weight check intervals for these fire extinguishers may be performed at any time in accordance with the aircraft maintenance manual or applicable MASS Systems CMM Supplement. Use whichever value is lower.

CLASS 1.4s ACTUATING CARTRIDGE

1. The total life (storage and service) of the MASS Systems cartridges is listed in the applicable supplement for the fire extinguisher.
2. Cartridge bridgewire check intervals for these fire extinguishers may be performed at any time in accordance with the aircraft maintenance manual or applicable MASS Systems CMM Supplement. Use whichever value is lower.

SHIPMENT OF CHARGED FIRE EXTINGUISHERS

- For any charged fire extinguisher being shipped the following rules must be complied with:
 1. Fire extinguishers must have the outlet valve and cartridge installed to protect the outlet disc. If the outlet valve and cartridge are not available, the outlet boss must be protected with the outlet safety cap, refer to the Supplement Table 901.
 2. Cartridges must be shunted with a conductive rubber shunt plug in the electrical connector or a shunt wire across the external terminal posts. See the Supplement IPL for the specific part numbers.
 3. Fire extinguishers must be packed properly in a suitable shipping container. The shipping container, markings, labels, and shipping document must comply with the requirements of the Department of Transportation; refer to the Storage Instructions and Table 706.

**COMPONENT MAINTENANCE MANUAL**

4. The shipping container and the shipping document must be identified in accordance with DOT requirements and the UN1044 number must appear on the shipping container and the shipping document. The AMETEK Ameron LLC / MASS (0FRR4) exemption number is stamped or engraved on the container weldment mounting lugs. For a container weldment that does not have mounting lugs, this information is on the container weldment discharge boss.

SHIPMENT OF CLASS 1.4s EXPLOSIVE CARTRIDGE

1. All cartridges must be shunted either with a conductive rubber shunt plug in the electrical connector or a shunt wire across the external terminal posts (grounded to case).
2. Cartridges must be packed in a special cardboard carton complying with DOT requirements and identified as Hazardous Material.
3. The shipping container, markings, labels, and shipping documents must be in complete compliance with DOT requirements, refer to the Storage Instructions and Table 706.
4. The explosive charge in each unit is approximately 0.4 gram and must be identified on the shipper's documentation.
5. Unless otherwise specified in listed Supplement for the fire extinguisher, the cartridge classification is UN0323 and the pyrotechnic class is 1.4s.

TESTING AND FAULT ISOLATION

TEST EQUIPMENT AND MATERIALS

Recommended test equipment and materials are listed in Table 101. Equivalent items may be used.

**Test Equipment and Materials
Table 101**

NOMENCLATURE	PART OR SPECIFICATION NUMBER	SOURCE (CAGE)*
Cap, Discharge Boss	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Cradle	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Fitting, Fill Boss	91011-1	AMETEK Ameron LLC / MASS Systems (0FRR4)
Ground Strap and Circuit Tester	WT 25	Walter G. Legge, Co. (84832)
Hydrostatic Test Setup	---	Retest facility DOT approved
Leak Detector, Halogen	HLD 5000	Inficon, Inc. (56507)
Multimeter	8808A	Fluke Corp (89536)
Nitrogen Gas (GN ₂) or Dry Air	2000 psig (13790 kPag)	Commercially available
Oven or Heater, 250°F (121°C)	---	Commercially available
Plug, Gauge Boss	---	Customer supply
Plug, Sight Gauge Boss	---	Customer supply
Plug, Switch Boss	---	Customer supply
Power Supply, 28 VDC	---	Commercially available
Pressure Gauge, Test TCPS (2 req.)	0 to 1000 psig (6895 kPag)	Commercially available
Pressure Gauge, Master	0 to 1000 psig (6895 kPag)	Commercially available

**Test Equipment and Materials
Table 101 (con't)**

NOMENCLATURE	PART OR SPECIFICATION NUMBER	SOURCE (CAGE)*
Safety Chamber, Cartridge	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Tape, Foam Backed, 1 inch (25.4 mm) square, 1.4 inch (6.35 mm) thick	---	The 3M Company (04963)
Test Cable, TCPS	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Thermometer/Thermocouple	51	Fluke Corp (89536)
Weighing Scale, 0 to 100 pounds (0 to 45 kg), ± 0.01 pound (0.005 kg)	3000E (Electronic)	Pennsylvania Scale Co. (03964)

* Refer to the IPL, paragraph 2, for the address.

LEAK TEST

1. Place the fire extinguisher in a suitable cradle on a level, solid surface. Orient the fire extinguisher for access to the filler valve, outlet valve, pressure switch, pressure gauge, etc.

WARNING: THE CARTRIDGE IS A CLASS 1.4s EXPLOSIVE DEVICE, FOR SAFE HANDLING, PERSONNEL MUST BE GROUNDED AND A SHUNT DEVICE MUST BE INSTALLED ON EACH CARTRIDGE (EXCEPT WHEN SPECIFIED IN THE PROCEDURE). INADVERTENT DETONATION OF A CARTRIDGE MAY CAUSE INJURY.

2. Wrap the ground strap around your wrist and connect the ground strap to the circuit tester. Test the ground circuit.
3. Verify the shunt device is installed on the cartridge.

WARNING: THE OUTLET DISC IN EACH DISCHARGE BOSS IS A THIN, CALIBRATED METAL BURST DIAPHRAGM. RUPTURE OF AN OUTLET DISC WILL IMMEDIATELY DISCHARGE THE HIGH PRESSURE EXTINGUISHING AGENT AND POSSIBLY CAUSE INJURY.

4. Remove the outlet valve (refer to the Disassembly section) and the protective caps. Do not remove the cartridge from the outlet valve.



COMPONENT MAINTENANCE MANUAL

5. Repeat above procedure to remove additional outlet valves, if required.

CAUTION: DO NOT USE COMPRESSED AIR AT SHOP PRESSURES TO BLOW CONTAMINANTS FROM THE DISCHARGE BOSS (ES) AND THE FILLER VALVE. COMPRESSED AIR CAN DAMAGE THE OUTLET DISC (S) AND THE FILLER VALVE SAFETY DISC (IF APPLICABLE). COMPRESSED AIR AT LOWER PRESSURES MAY BE USED.

6. Using a cotton swab, contaminants from the discharge boss and the filler valve, as applicable.
7. Set the sensitivity scale on the leak detector to 1×10^{-5} or 1×10^{-6} standard cubic centimeter per second, as applicable. Refer to the Supplement Technical Properties.
8. Hold the leak detector probe at each discharge boss, filler valve, pressure gauge, pressure switch etc., then slowly move probe over weld joints and thread sealant joints. Replace leaking components, as applicable, if leakage exceeds the requirement.

REQUIREMENT: Refer to the Supplement Technical Properties.

9. After completion of the leak test, reinstall the protective caps and the outlet valve with the cartridge installed (refer to the Assembly section).
10. Repeat above procedure to install additional outlet valves, if required.

ACTUATING CARTRIDGE TEST

WARNING: THE CARTRIDGE MUST BE TESTED IN A SAFETY FIXTURE THAT PROVIDES PROTECTION FOR PERSONNEL. THE CARTRIDGE SAFETY CHAMBER IS DESIGNED FOR THIS PURPOSE.

1. Ground the cartridge safety chamber.
2. Wrap the ground strap around your wrist and connect the ground strap to the circuit tester. Test the ground circuit.
3. Verify the shunt device is installed on the cartridge.

WARNING: THE CARTRIDGE IS A CLASS 1.4s EXPLOSIVE DEVICE, FOR SAFE HANDLING, PERSONNEL MUST BE GROUNDED AND A SHUNT DEVICE MUST BE INSTALLED ON EACH CARTRIDGE (EXCEPT WHEN SPECIFIED IN THE PROCEDURE). INADVERTENT DETONATION OF A CARTRIDGE MAY CAUSE INJURY.

4. Thread the cartridge, with the shunt device installed, into the cartridge safety chamber.

COMPONENT MAINTENANCE MANUAL

CAUTION: TEST DEVICES THAT PASS MORE THAN 50 MILLIAMPERES CURRENT CAN DAMAGE THE CARTRIDGE, REDUCING THE LIFE AND RELIABILITY OF THE CARTRIDGE. HIGHER CURRENT TEST DEVICES CAN CAUSE INADVERTANT DETONATION OF THE CARTRIDGE MAY CAUSE INJURY.

- 5. Setup the digital multimeter in accordance with the manufacturer's instruction.
- 6. Remove the shunt device from the cartridge.
- 7. Measure the bridgewire resistance by connecting the multimeter leads to the required connector pins or terminal posts. Refer to the Supplement Technical Properties.

REQUIREMENT: Refer to the Supplement Technical Properties.

- A. If the cartridge fails, reinstall the shunt device on the cartridge and dispose of the cartridge in accordance with an approved procedure for disposal of explosive devices. Refer to the Repair section for suggested detonation procedure.
 - B. After satisfactory completion of test, disconnect the multimeter and reinstall the shunt device on the cartridge.
- 8. Remove the cartridge from the cartridge safety chamber.
 - 9. Repeat above procedure for additional cartridges, if required.

HYDROSTATIC PRESSURE TESTING

Hydrostatic testing of the container weldment in an approved facility is required to comply with the Department of Transportation (DOT) regulations and specifications. The approved method of testing is by water jacket volumetric expansion, which uses an internal water pressure (proof pressure) to determine total volumetric expansion. The pressure is then removed and the permanent volumetric expansion of the container weldment is determined. The percent of total expansion that is permanent is then calculated to determine if the container weldment can be reused or must be replaced.

HYDROSTATIC TESTING: Periodic hydrostatic testing of the container weldment is required to comply with the U.S. Department of Transportation requirement section 180.205, contained in the Code of Federal Regulations Title 49. The required retest period for the AMETEK Ameron LLC / MASS Systems (0FRR4) container weldment (design specification 4DS) is 5 years.

**COMPONENT MAINTENANCE MANUAL****HYDROSTATIC TEST PROCEDURE**

1. Use DOT approved hydrostatic test equipment or a DOT approved outside facility.
2. Verify the hydrostatic test water jacket calibration dates.
3. Prepare the fire extinguisher for hydrostatic test, as follows:

NOTE: The identification plate and caution plate may remain installed on the container weldment during hydrostatic testing. The Temperature Compensated Pressure Switch or a welded pressure switch need not be removed from the container weldment. All other component parts must be removed.

4. Disassemble the fire extinguisher to remove the filler valve, pressure gauge, pressure switch gauge, sight gauge, and outlet discs (as applicable) from the container weldment. Removal of the identification plate and the TCPS is not necessary.

NOTE: Removal of any digital (electronic solid state, "SS" Series) TCPS from the bottle weldment, unless it is deemed non-functional, will result in voiding the factory warranty. Purchase and/or installation of a new or unwelded TCPS unit will be required to return fire extinguisher to aircraft service condition.

5. Install the proper sealing plugs and the discharge boss caps. On the TCPS, install a protective cap on the electrical connector and cover the black electrical housing with a closed end rubber boot. Press the open end of the rubber boot into the boss groove next to the container weldment to seal out the water.
6. Place the container weldment in the cradle with the fill boss up. Completely fill the container weldment with water. Install a test fitting into the fill boss.
7. Place the filled container weldment into the water jacket of the hydrostatic test equipment and connect to the pressure source through the test fitting in the fill boss.
8. Close the lid to the water jacket and pressurize to seal the lid to the water jacket.
9. Adjust burettes to reference level.
10. Pressurize the container weldment to the required hydrostatic test pressure for the container weldment and maintain at this pressure for a minimum of three minutes. For the required hydrostatic test pressure refer to the Supplement Technical Properties.
11. After stabilization read the water level in the burette. This reading is the total expansion of the container weldment.
12. Depressurize the container weldment and record water level in burette. This reading is the permanent expansion of the container weldment.



COMPONENT MAINTENANCE MANUAL

13. Calculate and record the permanent volumetric expansion as percentage of total expansion.

Permanent volumetric expansion in cubic centimeters

Percent (%) = $X 100$

Total volumetric expansion in cubic centimeters

REQUIREMENT: The permanent volumetric expansion must not exceed 10 percent of the total volumetric expansion.

14. Retest if the container weldment decreases in size. Repeat the test once if system error is suspected. Replace the container weldment if the container weldment fails.
15. Remove the container weldment from the water jacket.
16. Remove the discharge boss cap(s), the sealing plugs, and the test fitting, then drain the water from the container weldment.

CAUTION: IT IS EXTREMELY IMPORTANT TO COMPLETELY DRY THE CONTAINER WELDMENT, ANY WATER LEFT INSIDE DEGRADES PERFORMANCE OF THE CONTAINER WELDMENT.

17. Place the container weldment in an oven or dryer heated at 212°F to 250°F (100°C to 121°C) for one hour or until completely dry and all traces of moisture are removed.
18. Inspect the container weldment for any signs of damage.
19. Impression stamp the test date on the container weldment mounting lug.

TEMPERATURE COMPENSATED PRESSURE SWITCH (TCPS) FUNCTIONAL TEST

TCPS Installed in the Container Weldment - Charged Fire Extinguisher

1. Weigh the fire extinguisher. Compare the weight with the last charge weight marked on the identification plate to verify that the fire extinguisher is fully charged.
2. Install the TCPS test cable in the electrical connector; connect the color-coded cable ends to a 28 VDC power supply. Red is Positive and Black is Negative.
3. Push in the Press-To-Test button and hold for two seconds, the light in the test cable must light.
4. Release the Press-To-Test button, the light in the test cable must be OFF.

NOTE: For some of the TCPS, reset by switching the power supply slowly OFF then ON.

**COMPONENT MAINTENANCE MANUAL**

5. **FAULT ANALYSIS** – If the light in the test cable does not light, the TCPS closed contacts are open on the charged fire extinguisher:

TEMPERATURE COMPENSATED PRESSURE SWITCH (TCPS) FUNCTIONAL TEST

TCPS Installed in the Container Weldment – Discharged or Empty Fire Extinguisher

For TCPS Out of Container Weldment - See Figure 101 for Test Setup.

1. Connect regulated air or Nitrogen gas source to the fill boss. Cap all open ports.

CAUTION: DO NOT EXCEED CHARGE PRESSURE OF THE FIRE EXTINGUISHER AT AMBIENT TEMPERATURE. FILLING THE CONTAINER WELDMENT AT A HIGH RATE WITH NITROGEN GAS WILL OVERHEAT THE CONTAINER WELDMENT AND THE PRESSURE SWITCH.

2. Install the TCPS test cable in the electrical connector; connect the color-coded cable ends to a 28 VDC power supply. Red is Positive and Black is Negative.
3. Attach a thermocouple with foam backed tape to the fire extinguisher. Slowly apply pressure through the fill boss until normal charge pressure of the fire extinguisher is reached at 70°F (21.1°C). Refer to the Supplement Technical Properties, the N.O. or N.C. should be open or close respectively.
4. Push in the Press-To-Test button and hold for two-seconds, the light in the test cable must light.
5. Release the Press-To-Test button, the light in the test cable must be OFF.

NOTE: For some of the TCPS, reset by switching the power supply slowly OFF then ON.

6. Wait a minimum of three minutes for the container weldment temperature to stabilize. Bleed pressure slowly while observing the pressure gauge reading and the light in the test cable for reversal of the switch contacts.
7. Contact reversal should occur between 10 to 20 percent less than the charge pressure corresponding to the temperature. Refer to the Supplement Technical Properties.

PRESSURE SWITCH AND PRESSURE SWITCH GAUGE

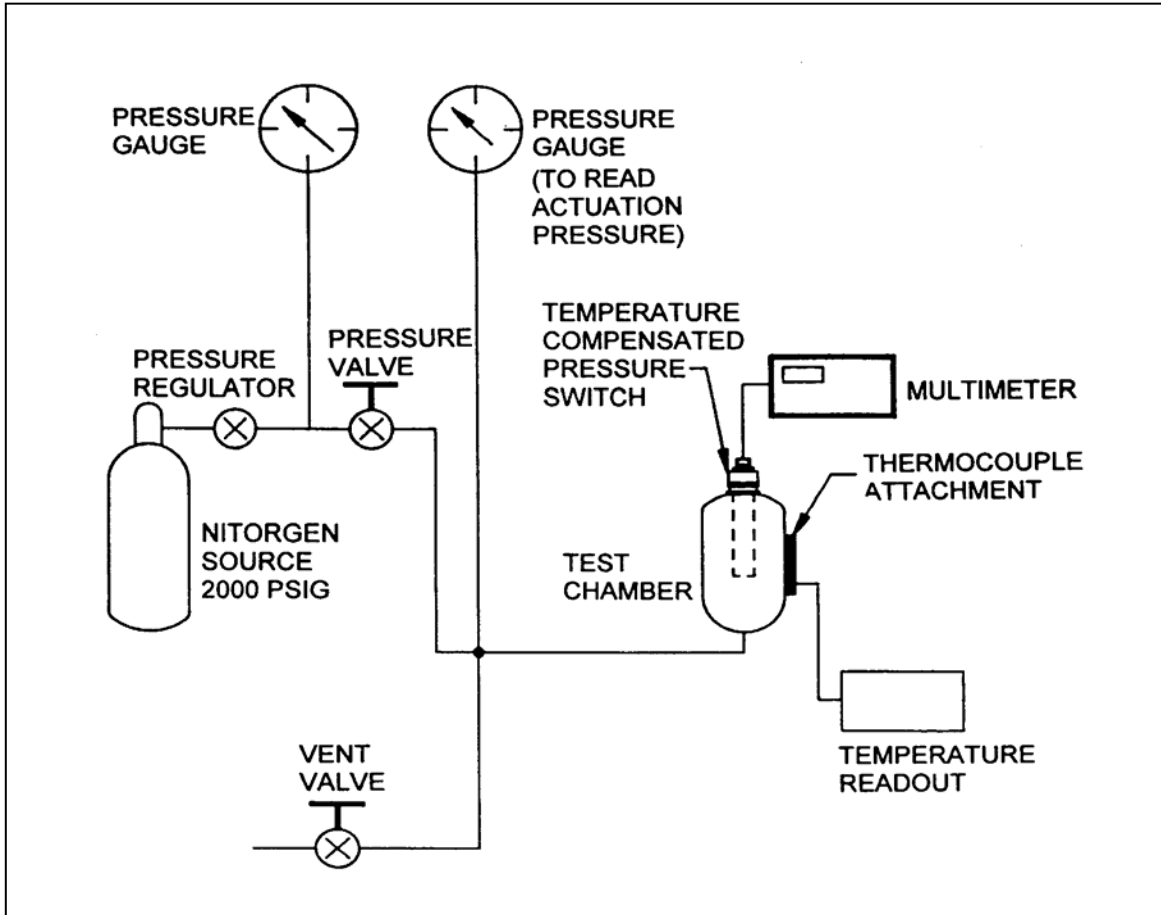
1. The pressure switch and the pressure switch gauge should employ the same test outlined above. Refer to the Supplement Technical Properties.
2. The pressure switch and the pressure switch gauge do not require the 28 VDC power energization or the temperature sensor.
3. Additionally, check the pressure switch gauge accuracy with a Master Gauge. Refer to the Supplement Technical Properties.



COMPONENT MAINTENANCE MANUAL

PRESSURE GAUGE

Check the pressure gauge for accuracy with a Master Gauge. Refer to the Supplement Technical Properties.



**Temperature Compensated Pressure Switch (TCPS) Test Setup
Figure 101**

DISASSEMBLY

GENERAL

Perform the Testing and Fault Isolation or the Check procedures, as applicable, to determine probable cause of malfunction. Then use the appropriate procedure listed below to remove the component part. Before proceeding with any removal or disassembly, personnel must familiarize themselves with the various components, their locations, and terminology.

DISASSEMBLY TOOLS AND MATERIALS

Recommended disassembly tools and materials are listed in Table 301. Equivalent items may be used.

**Disassembly Tools and Materials
Table 301**

NOMENCLATURE	PART OR SPECIFICATION NUMBER	SOURCE (CAGE)*
Air Tool, Hand-Held	---	Ingersoll Rand Co. (03990)
Bearing Puller	4059	Stanley Canada, Inc. (09669)
Cradle	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Cutting Oil	Truslide Product Code 15081	Atlantic Richfield Co. (56242)
Discharge Tool	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Drill Press or End Mill Machine, 80 rpm	---	Commercially available
Flat File Mill Smooth Second Cut	---	Commercially available
Ground Strap and Circuit Tester	WT 25	Walter G. Legge, Co. (84832)
Outlet Safety Cap	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Resurfacing Tool, Discharge Boss	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)

**Disassembly Tools and Materials
Table 301 (con't)**

NOMENCLATURE	PART OR SPECIFICATION NUMBER	SOURCE (CAGE)*
Resurfacing Tool, Fill Boss	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Rotary Table Mounted on Machine Cutting Tool, 80 rpm	---	Customer supply
Safety Bag, Black, Heat Sealable, Electrostatic (for cartridge)	---	Commercially available
Sandpaper, 100 grit	---	Commercially available
Saw Cutter, 0.020 inch (0.51 mm)	---	Commercially available

*Refer to the IPL, paragraph 2, for the address.

IDENTIFICATION AND CAUTION PLATES

The identification and caution plates are bonded to the container weldment. Do not remove the plates. Refer to the Assembly section to install new identification and caution plates.

CARTRIDGE

WARNING: THE CARTRIDGE IS AN EXPLOSIVE DEVICE. FOR SAFE HANDLING, PERSONNEL MUST BE GROUNDED AND A SHUNT DEVICE MUST BE INSTALLED ON THE CARTRIDGE PRIOR TO REMOVAL. INADVERTENT DETONATION OF A CARTRIDGE MAY CAUSE INJURY. THE SHUNT DEVICE GROUNDS THE CARTRIDGE TO PREVENT INADVERTENT FIRING FROM A STATIC CHARGE.

1. Wrap the ground strap around your wrist and connect the ground strap to the circuit tester. Test the ground circuit.
2. Install a shunt device on the cartridge.
3. Cut the safety wire and unthread the cartridge from the outlet valve. Remove and discard the o-ring.
4. Place the cartridge in an electrostatic safety bag.
5. Repeat above procedure to remove additional cartridges, if required.

**COMPONENT MAINTENANCE MANUAL****OUTLET VALVE**

WARNING: THE OUTLET DISC IN EACH DISCHARGE BOSS IS A THIN, CALIBRATED METAL BURST DIAPHRAGM. RUPTURE OF AN OUTLET DISC WILL DISCHARGE THE HIGH PRESSURE EXTINGUISHING AGENT AND POSSIBLY CAUSE INJURY.

CAUTION: ANY SCRATCHES OR DENTS ON THE SURFACE OF AN OUTLET DISC WILL CHANGE ITS CALIBRATION, MAKING IT UNUSABLE.

1. Remove the safety wire and unthread the captive retaining nut on the outlet valve. Remove the outlet valve from the discharge boss. Remove and discard the o-ring from the discharge boss.
2. Install an outlet safety cap on the discharge boss.
3. Examine the screen weldment. The screen weldment in the outlet valve prevents large particles from the cartridge's pyrotechnic and the fractured outlet disc from entering the discharge stream. If undamaged, do not remove.
4. Repeat above procedure to remove additional outlet valves, if required.

<p><u>WARNING:</u> DO NOT DISASSEMBLE THE FIRE EXTINGUISHER FURTHER UNTIL THE EXTINGUISHING AGENT HAS BEEN DISCHARGED OR SEVERE INJURY TO PERSONNEL CAN OCCUR.</p>
--

DISCHARGE PROCEDURE

NOTE: Use this procedure to discharge the extinguishing agent before removing the filler valve, outlet disc, pressure gauge, pressure switch, or TCPS.

WARNING: CONCENTRATED EXTINGUISHING AGENT CAN CAUSE LUNG IRRITATION AND NARCOSIS. DISCHARGE EXTINGUISHING AGENT IN A WELL-VENTILATED AREA.

1. Remove the cartridge and outlet valve as previously described above.
2. Secure a cradle to work surface.

WARNING: DO NOT PUNCTURE THE FILLER VALVE UNTIL INSTALLING THE FIRE EXTINGUISHER IN A CRADLE OR SIMILAR HOLDING FIXTURE. THE FILLER VALVE AND CONTAINER WELDMENT WILL ICE OVER WHILE THE EXTINGUISHING AGENT IS BEING DISCHARGED.

3. Place the fire extinguisher in the cradle, with the filler valve facing forward.

**COMPONENT MAINTENANCE MANUAL**

WARNING: HALON 1301 IS A KNOWN OZONE DEPLETING AGENT. THE AGENT MUST NOT BE DISCHARGED INTO THE ATMOSPHERE, TRANSFER THE AGENT INTO ANOTHER CONTAINER AND RECYCLE OR SEND TO THE CLOSEST RECYCLING CENTER.

4. Verify the discharge tool probe is retracted, then attach the discharge tool to the filler valve. Connect the fire extinguisher to a recovery unit and discharge the extinguishing agent. Turn the fire extinguisher upside down to completely drain.
5. Disconnect the fire extinguisher from the recovery unit.

FILLER VALVE/FILLER VALVE WITH SAFETY RELIEF**• METAL TO METAL SEALED**

1. Discharge the extinguishing agent.

CAUTION: DO NOT SCRATCH SEATING SURFACE IN FILL BOSS.

2. Unscrew the filler valve or filler valve with safety relief and remove the copper filler seal from inside the fill boss.
3. Remove and discard the o-ring, if applicable.

• WELD SEALED

1. Discharge the extinguishing agent.
2. Secure a cradle to a millwork surface. Place the fire extinguisher in the cradle with the fill boss facing up.
3. Thread the resurfacing tool onto the fill boss. See Figure 301.
4. Adjust the resurfacing tool to remove the filler valve flange (refer to the Supplement Technical Properties for the flange thickness), as follows:
5. Loosen the setscrew on the locking collar. Attach the resurfacing tool to a drill press or similar machine tool.

NOTE: A dial indicator mounted on the machine tool arm guide may be used to control the amount of material removed, rather than calibrating the resurfacing tool.

6. Lower the resurfacing tool until its cutting face rests on the filler valve flange.
7. Insert a shim or gauge of required removal thickness between the collar and the tool sleeve.

**COMPONENT MAINTENANCE MANUAL**

8. Tighten the setscrew to lock the collar in position.
9. Apply electric power to the surfacing tool.

CAUTION: DO NOT REMOVE EXCESS MATERIAL FROM THE FILL BOSS WHILE CUTTING THE FILLER VALVE FLANGE. DOING SO WILL REDUCE THE NUMBER OF TIMES THE FIRE EXTINGUISHER CAN BE REFILLED, THE MINIMUM HEIGHT FOR THE FILL BOSS IS SHOWN IN FIGURE 802.

10. Feed the cutter onto the fill boss until it touches the filler valve flange.
11. Apply cutting oil, and continue cutting through filler valve flange until the collar hits the stop.
12. Turn off electric power and remove the resurfacing tool.
13. Using pliers, remove the remains of the filler valve and discard.

NOTE: Limited surface roughness or chatter marks around the fill boss are acceptable.

14. Using sandpaper wrapped around a flat metal block or flat files, deburr outside of the fill boss. Use sandpaper or flat files to deburr inside of the fill boss and square the edge between outside of the fill boss and the machined surface.
15. Deburr inside edge of the fill boss.
16. Clean the container weldment per the Cleaning instructions to remove chips and cutting oil.

OUTLET DISC

1. Discharge the extinguishing agent.
2. Secure a cradle to a millwork surface. Place the fire extinguisher in the cradle with the discharge boss facing up.
3. Thread the resurfacing tool “A” (for the ID of the outlet disc) onto the discharge boss. See Figure 301.
4. Adjust the resurfacing tool “A” to remove the outlet disc ID (refer to the Supplement Technical Properties for ID length), as follows:
5. Loosen the setscrew on the locking collar. Attach the resurfacing tool to a drill press or similar machine tool.

NOTE: A dial indicator mounted on the machine tool arm guide may be used to control the amount of material removed, rather than calibrating the tool.

6. Lower the resurfacing tool until its cutting face rests on the outlet disc flange.

**COMPONENT MAINTENANCE MANUAL**

7. Insert a shim or gauge of required removal thickness between the collar and the tool sleeve.
8. Tighten the setscrew to lock the collar in position.
9. Apply electric power to the resurfacing tool.
10. Apply cutting oil, and continue cutting through the outlet disc ID until the collar hits the stop.
11. Turn off electric power and remove the resurfacing tool.
12. Thread the resurfacing tool “B” (for the flange of the outlet disc) onto the discharge boss. See Figure 301.
13. Adjust the resurfacing tool “B” to remove the outlet disc flange (refer to the Supplement Technical Properties for flange thickness), as follows:
14. Loosen the setscrew on the locking collar. Attach the resurfacing tool to a drill press or similar machine tool.

NOTE: A dial indicator mounted on the machine tool arm guide may be used to control the amount of material removed, rather than calibrating the tool.

15. Lower the resurfacing tool until its cutting face rests on the outlet disc flange.
16. Insert a shim or gauge of required removal thickness between the collar and the tool sleeve.
17. Tighten the setscrew to lock the collar in position.
18. Apply electric power to the resurfacing tool.
19. Apply cutting oil, and continue cutting through the outlet disc flange until the collar hits the stop.

CAUTION: DO NOT REMOVE EXCESS MATERIAL FROM THE DISCHARGE BOSS WHILE CUTTING THE OUTLET DISC FLANGE. DOING SO WILL REDUCE THE NUMBER OF TIMES THE FIRE EXTINGUISHER CAN BE REFILLED, THE MINIMUM HEIGHT FOR THE DISCHARGE BOSS IS SHOWN IN FIGURE 802.

20. Turn off electric power and remove the resurfacing tool.

NOTE: Limited surface roughness or chatter marks around the discharge boss are acceptable.

21. Using sandpaper wrapped around a flat metal block or flat files, deburr outside of the discharge boss. Use sandpaper or flat files to deburr inside of the discharge boss and square the edge between outside of the discharge boss and the machined surface.

**COMPONENT MAINTENANCE MANUAL**

22. Deburr inside edge of the discharge boss.
23. Repeat above procedure to remove additional outlet discs, if applicable.
24. Clean the container weldment per the Cleaning instructions to remove chips and cutting oil.

PRESSURE GAUGE/PRESSURE SWITCH GAUGE

Unthread the pressure gauge or pressure switch gauge from the container weldment. The thread sealant in the joint does not require heating or any other chemicals added to remove the pressure gauge or pressure switch gauge.

TEMPERATURE COMPENSATED PRESSURE SWITCH (TCPS)/PRESSURE SWITCH

1. Discharge the extinguishing agent.
2. Securely fasten a cradle to rotary table installed on millwork surface.
3. Install the container weldment in the cradle and orient the body of the TCPS or pressure switch perpendicular to the work surface. Securely fasten the container weldment to the cradle.
4. Install a 0.020 inch (0.51 mm) saw cutter in the spindle of a hand held air tool or a milling machine. Align the cutting edge along the circumference of the weld between the TCPS or pressure switch flange and the switch boss, as shown in Figure 301.
5. Apply electric power to the hand held air tool or the milling machine. Shaft speed should not exceed 80 rpm.

CAUTION: DO NOT REMOVE EXCESS MATERIAL FROM THE SWITCH BOSS WHILE CUTTING INTO THE WELD JOINT. DOING SO WILL REDUCE THE NUMBER OF TIMES THE FIRE EXTINGUISHER CAN BE REFILLED, THE MINIMUM HEIGHT FOR THE SWITCH BOSS IS SHOWN IN FIGURE 801. DO NOT REMOVE EXCESS MATERIAL FROM THE PRESURE SWITCH FLANGE, THE MINIMUM THICKNESS IS NOTED IN THE CHECK SECTION.

6. Move the saw cutter into the weld until it breaks through weld (approximately 0.060 inch or 1.52 mm).
7. Rotate the turntable through 360 degrees to cut the entire circumference of the weld. Turn off electric power to the saw cutter.
8. Unthread the TCPS or pressure switch from the switch boss.

NOTE: Limited surface roughness or chatter marks around the switch boss are acceptable.

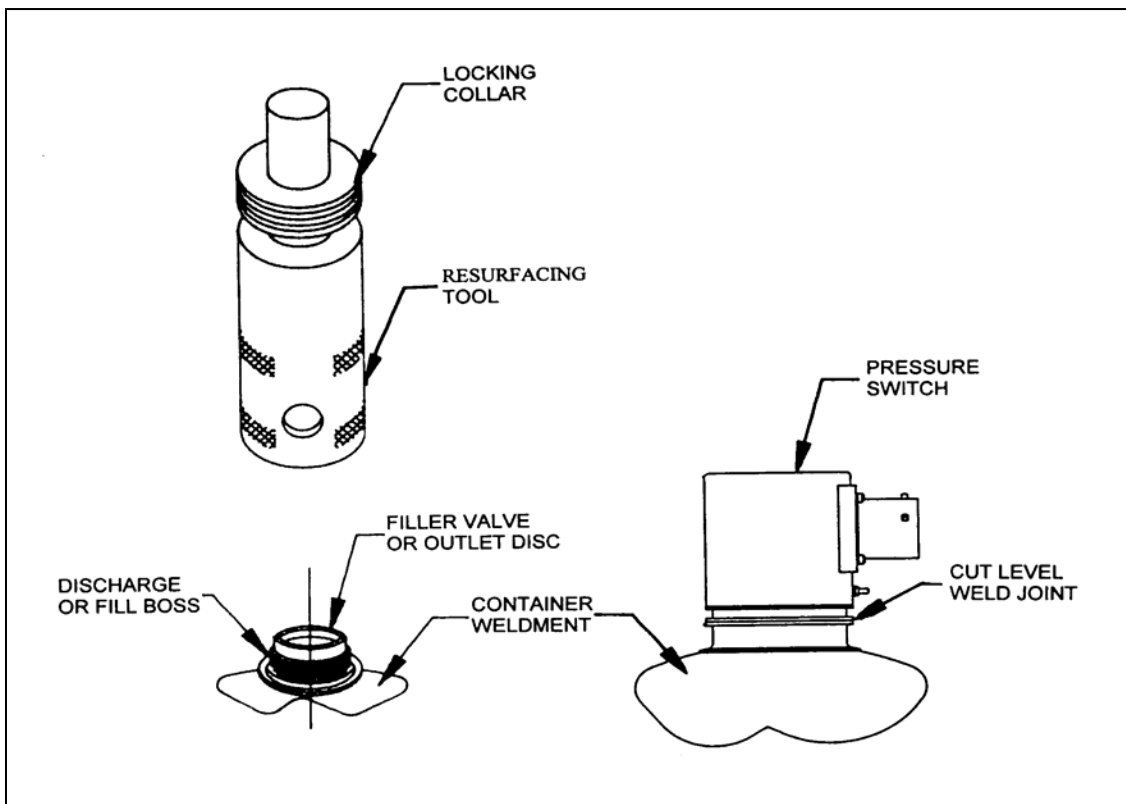


COMPONENT MAINTENANCE MANUAL

- 9. Remove all excess material from the outer surface of the switch boss and machine surface. If required, use sandpaper wrapped around flat metal block or flat files to smooth the machined surface.
- 10. Remove burrs and chamfer 0.007 to 0.010 inch (0.18 to 0.25 mm) by 45 degrees inside the switch boss.
- 11. Clean the container weldment per the Cleaning instructions to remove chips and cutting oil.
- 12. Machine the mounting flange of the TCPS or pressure switch flat, as required. Refer to the Check section for minimum flange thickness.

SIGHT GAUGE

Unthread the sight gauge from the sight gauge boss. Remove and discard the o-ring. Using cleaning solvent, clean the o-ring groove in the sight gauge boss.



Outlet Disc, Filler Valve, Pressure Switch, and TCPS Removal Setup
Figure 301

CLEANING

CLEANING MATERIALS

Recommended cleaning materials are listed in Table 401. Equivalent items may be used.

**Cleaning Materials
Table 401**

NOMENCLATURE	PART OR SPECIFICATION NUMBER	SOURCE (CAGE)*
Alcohol, Isopropyl	Federal Specification TT-I-735	Commercially available
Cloth, Lint-Free	---	Commercially available
Cradle	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Detergent Solution	---	Commercially available
Light Probe	---	Commercially available
Oven or Heater, 250°F (121°C)	---	Commercially available
Tape, Duct	---	Commercially available

* Refer to the IPL, paragraph 2, for the address.

METAL PARTS

WARNING: IMPROPER HANDLING OF A CHARGED FIRE EXTINGUISHER CAN CAUSE INJURY. DO NOT APPLY PRESSURE TO OR INSERT ANYTHING INTO THE FILLER VALVE OR DISCHARGE BOSS (ES).

WARNING: USE CLEANING SOLVENT IN A WELL-VENTILATED AREA. AVOID PROLONGED INHALATION OF FUMES. KEEP THE CLEANING SOLVENT AWAY FROM OPEN FLAMES.

CAUTION: ANY SCRATCHES OR DENTS ON THE SURFACE OF AN OUTLET DISC WILL CHANGE ITS CALIBRATION, MAKING IT UNUSABLE.

1. Clean all metal parts (except the outlet disc) by wiping parts with a lint-free cloth moistened with a detergent solution.
2. Dry the parts thoroughly using a clean, lint-free cloth.



CONTAINER WELDMENT

1. Clean the interior of the container weldment after removal of the filler valve, outlet disc, pressure gauge, pressure switch, and/or TCPS as follows:
2. Pour a small amount of detergent solution (1/4 to 1/2 cup) into the container weldment.
3. Shake the container weldment in a circular motion, and drain into a disposal container.
4. Repeat steps 1 and 2 using isopropyl alcohol until no further metal chips or filings are evident in the drained alcohol. Use a light probe; inspect the interior of the container weldment.
5. Glass bead hone the exterior of the container weldment, if necessary.
6. Plug and protect all boss threads. Cover the identification plate and caution plate with duct tape.
7. Glass bead hone the exterior of the container weldment (wet or dry glass bead), except the threads on the fill, discharge, and switch bosses.
8. Remove the plugs, the duct tape, and thoroughly clean the container weldment.

CAUTION: IT IS EXTREMELY IMPORTANT TO COMPLETELY DRY THE CONTAINER WELDMENT, ANY WATER LEFT INSIDE DEGRADES PERFORMANCE OF THE CONTAINER WELDMENT.

9. Place the container weldment in an oven or dryer heated at 225°F to 250°F (107°C to 121°C) for one hour or until completely dry and all traces of moisture are removed.

CHECK

CHECK TOOLS AND EQUIPMENT

Recommended check tools and equipment are listed in Table 501. Equivalent items may be used.

**Check Tools and Equipment
Table 501**

NOMENCLATURE	PART OR SPECIFICATION NUMBER	SOURCE (CAGE)*
Cradle	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Depth Micrometer or Indicator	---	Commercially available
Ground Strap and Circuit Tester	WT 25	Walter G. Legge Co. (84832)
Light Probe	---	Commercially available
Power Supply, 28 VDC	---	Commercially available
Safety Chamber, Cartridge	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Weighing Scale, 0 to 100 pounds (0 to 45 kg) ± 0.01 pound (0.005 kg)	3000E (Electronic)	Pennsylvania Scale Co. (03964)

* Refer to the IPL, paragraph 2, for the address.

FIRE EXTINGUISHER WEIGHT CHECK

1. Weigh the fire extinguisher; refer to the Supplement Technical Properties for the charge weight.

NOTE: Some fire extinguishers are weighed without the cartridge(s) and/or outlet valve(s). Therefore, the cartridge(s) and/or outlet valve(s) will have to be removed for the weight check. Refer to the Supplement Technical Properties.

2. Place a cradle on the weighing scale (Table 501) and adjust the weighing scale to zero.

WARNING: THE CARTRIDGE IS AN EXPLOSIVE DEVICE. FOR SAFE HANDLING, PERSONNEL MUST BE GROUNDED AND A SHUNT DEVICE MUST BE INSTALLED ON EACH CARTRIDGE. INADVERTENT DETONATION OF A CARTRIDGE MAY CAUSE INJURY.

3. Place the fire extinguisher in the cradle.

**COMPONENT MAINTENANCE MANUAL**

4. Remove the protective caps from the outlet valve(s) and pressure switch/pressure switch gauge.
5. Weigh the fire extinguisher. Record the weight to nearest 0.01 pound (0.005 kg).
6. Compare the current weight of the fire extinguisher to the last weight etched on the identification plate. If the fire extinguisher is more than 0.10 pound (0.05 kg) below last marked weight, test the fire extinguisher for leakage per Testing and Fault Isolation section.

REQUIREMENT: Maximum weight loss allowed is minus 0.10 pound (0.05 kg).

7. Reinstall the protective caps.

CONTAINER WELDMENT

1. Inspect the container weldment for scratches or dents that could reduce its strength as a pressure vessel. Dents deeper than 1/16 inch per inch (1.59 mm per mm) of average dent diameter, or scratches deeper than 0.005 inch (0.13 mm) or longer than 2 inches (50.8 mm) shall be cause for rejection.
2. Inspect all welded joints for fine cracks, or other irregularities, especially at the mounting lugs.

WARNING: THE OUTLET DISC IN EACH DISCHARGE BOSS IS A THIN, CALIBRATED METAL BURST DIAPHRAGM. RUPTURE OF AN UNPROTECTED OUTLET DISC COULD CAUSE SEVERE INJURY. KEEP PROTECTIVE CAPS OVER THE OUTLET DISCS AT ALL TIMES.

CAUTION: ANY SCRATCHES OR DENTS ON THE SURFACE OF AN OUTLET DISC WILL CHANGE ITS CALIBRATION, MAKING IT UNUSABLE.

3. Under a strong light, and preferably under magnification, inspect the outlet disc for nicks, dents, or cracks. The presence of any of these conditions could cause leakage or improper function and is cause for rejection.

FILLER VALVE/ FILLER VALVE WITH SAFETY RELIEF

Verify the color code of the thermal compound; refer to the Supplement Technical Properties.

OUTLET VALVE

Under a strong light, and preferably under magnification, inspect the outlet valves for cracks, corrosion, crossed threads, chafing, or scoring. Dark stains on internal surfaces, caused by previous firing of the cartridge, are not harmful. Examine the screen weldment, if damaged due to a cartridge firing, the screen weldment must be replaced.

**COMPONENT MAINTENANCE MANUAL****CARTRIDGE**

WARNING: THE CARTRIDGES ARE EXPLOSIVE DEVICES. FOR SAFE HANDLING, PERSONNEL MUST BE GROUNDED AND A SHUNT DEVICE MUST BE INSTALLED ON EACH CARTRIDGE (EXCEPT WHEN SPECIFIED IN PROCEDURE). INADVERTENT DETONATION OF A CARTRIDGE MAY CAUSE INJURY.

1. Wrap a ground strap around your wrist and connect the ground strap to the circuit tester. Test the ground circuit.
2. Check the service date (month/year) etched on a wrench flat of the cartridge. Dispose of the cartridge if the total life exceeds the life limit specified in the applicable supplement for the fire extinguisher, in accordance with approved procedures for disposal of explosive devices. Refer to the Repair section for recommended detonation procedure.
3. Remove the shunt device, if required, to inspect the cartridge electrical connector pins or terminal posts for security and corrosion. If the connector pins or terminal posts are loose or corroded, reinstall the shunt device, if required, and dispose of the cartridge. Refer to the Repair section for recommended detonation procedure.
4. Verify the bridgewire check has been successfully completed. If the bridgewire check has not been performed, remove the cartridge from the outlet valve and refer to the Testing and Fault Isolation section.
5. Repeat above procedure to inspect additional cartridges, if applicable.

PRESSURE GAUGE

Verify functional test has been successfully completed per Testing and Fault Isolation section.

PRESSURE SWITCH/PRESSURE SWITCH GAUGE

1. Pressure switch/pressure switch gauge should both record the appropriate N.C. or N.O. signal on a charged fire extinguisher in accordance with the Supplement Technical Properties.
2. Verify functional test has been successfully completed per Testing and Fault Isolation section.

TEMPERATURE COMPENSATED PRESSURE SWITCH (TCPS)

1. Remove the protective cap and inspect the electrical connector pins for damage.
2. Ensure functional test has been successfully completed per Testing and Fault Isolation section.
3. Measure the flange thickness (welded boss and TCPS flange). The required minimum combined flange thickness is 0.080 inch (2.03 mm) for the mechanical TCPS and 0.115 inch (2.92 mm) for the electronic TCPS.

NOTE: A functional electronic TCPS flange shall not be machined under ANY circumstances. Only a defective electronic TCPS can be machined off in order to replace it.

REPAIR

GENERAL

The repair instructions are limited. Refer to the Disassembly and Assembly sections to replace component parts.

REPAIR TOOLS AND MATERIALS

Recommended repair tools and materials are listed in Table 601. Equivalent items can be used.

**Repair Tools and Materials
Table 601**

NOMENCLATURE	PART OR SPECIFICATION NUMBER	SOURCE (CAGE)*
Alcohol, Isopropyl	Federal Specification TT-I-735	Commercially available
Cloth, Lint-Free	---	Commercially available
Cradle	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Power Supply, 28 VDC	---	Commercially available
Safety Chamber, Cartridge	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)

* Refer to the IPL, paragraph 2, for the address.

WARNING: DO NOT ATTEMPT ANY REPAIRS TO THE CONTAINER WELDMENT UNTIL THE EXTINGUISHING AGENT HAS BEEN DISCHARGED.

Replace all the component parts that fail to meet the Check or Test requirements or are damaged beyond minor repair.

WELD REPAIRS

- Repairs that require welding, except those covered in the Assembly section of this manual, are not permitted unless authorized in writing by AMETEK Ameron LLC / MASS Systems.
- After AMETEK Ameron LLC / MASS Systems authorization, the welding repairs must be made in accordance with the latest FAA directives and under the supervision of a certified FAA mechanic with an airframe rating. If any doubt exists regarding penetration of the weld, inspect the welded component parts in accordance with MIL-STD-453.

COMPONENT MAINTENANCE MANUAL

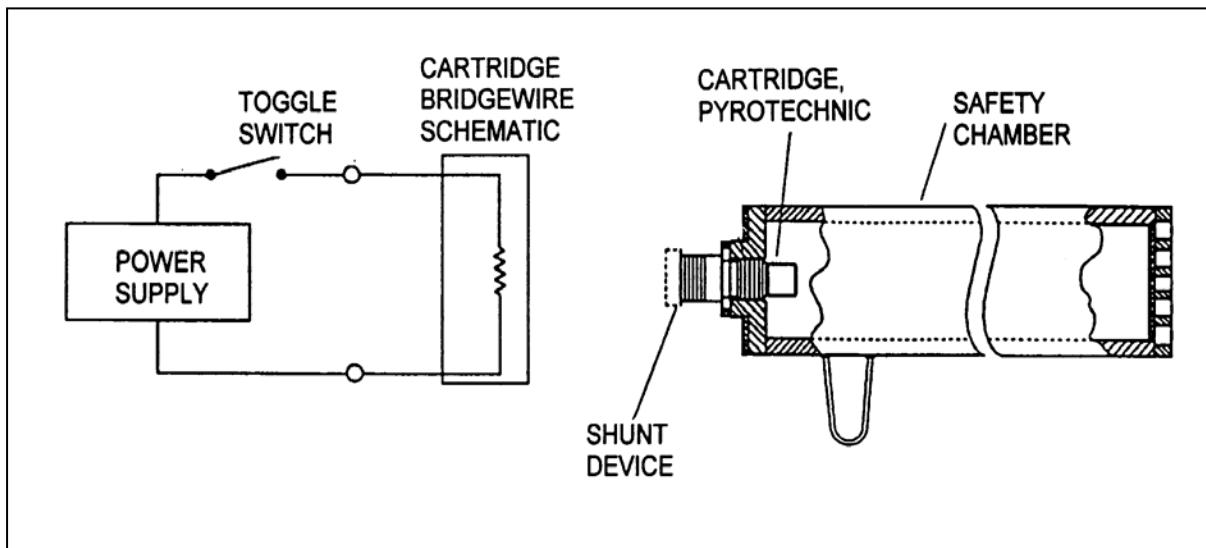
CARTRIDGE DISPOSAL

WARNING: THE CARTRIDGE MUST BE DETONATED IN A SAFETY FIXTURE THAT PROTECTS PERSONNEL FROM SERIOUS INJURY. THE CARTRIDGE SAFETY CHAMBER IS DESIGNED FOR THIS PURPOSE.

1. Ground the cartridge safety chamber.
2. Wrap the ground strap around your wrist and connect the ground strap to the circuit tester. Test the ground circuit.

WARNING: THE CARTRIDGE IS AN EXPLOSIVE DEVICE. FOR SAFE HANDLING, PERSONNEL MUST BE GROUNDED AND A SHUNT DEVICE MUST BE INSTALLED ON THE CARTRIDGE. INADVERTENT DETONATION OF A CARTRIDGE MAY CAUSE INJURY.

3. Make sure the shunt device and the o-ring are installed on the cartridge.
4. Thread the cartridge into the cartridge safety chamber. See Figure 601.
5. Remove the shunt device and connect the power supply. Stand back five feet (1.5 meters) minimum and apply 28 VDC, 3.5 AMPERES MINIMUM to detonate the cartridge.
6. Remove the detonated cartridge from the cartridge safety chamber and discard in accordance with approved procedure.



**Cartridge Disposal Setup
Figure 601**

ASSEMBLY (INCLUDING STORAGE)

ASSEMBLY TOOLS AND MATERIALS

The recommended assembly tools and materials are listed in Table 701. Equivalent items may be used.

**Assembly Tools and Materials
Table 701**

NOMENCLATURE	PART OR SPECIFICATION NUMBER	SOURCE (CAGE)*
Adapter, Discharge Boss	Included with the Weld Fixture	AMETEK Ameron LLC / MASS Systems (0FRR4)
Adapter, Fill Boss	Included with the Weld Fixture	AMETEK Ameron LLC / MASS Systems (0FRR4)
Adhesive, Epoxy	Scotchweld 1838 B/A	The 3M Company (04963)
Alcohol, Isopropyl	Federal Specification TT-I-735	Commercially available
Charging Fixture	91036-1	AMETEK Ameron LLC / MASS Systems (0FRR4)
Cradle	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Extinguishing Agent	Refer to the Supplement	Commercially available
Ground Strap and Circuit Tester	WT 25	Walter G.Legge Co. (84832)
Lubricant	DC 4	Dow Corning Co. (71984)
Nitrogen Gas (GN ₂)	2000 psig (13790 kPag)	Commercially available
Recharge Stand	91026-1	AMETEK Ameron LLC / MASS Systems (0FRR4)
Rotary Table, 80 rpm	---	Customer supply
Safety Wire	Refer to the Supplement	Commercially available
Sealant, Thread (Refrigerant)	55441	Loctite Corp. (05972)



COMPONENT MAINTENANCE MANUAL

**Assembly Tools and Materials
Table 701 (con't)**

NOMENCLATURE	PART OR SPECIFICATION NUMBER	SOURCE (CAGE)*
Spanner Assembly, Welding Fixture	91110-1	AMETEK Ameron LLC / MASS Systems (0FRR4)
Tape, Foam Backed, 1 inch (25.4 mm) square, 1/4 inch (6.35 mm) thick	---	The 3M Company (04963)
Thermometer/Thermocouple	54-2	Fluke Corp (89536)
Weighing Scale, 0 to 100 pounds (0 to 45 kg) ± 0.01 pound (0.005 kg)	3000E (Electronic)	Pennsylvania Scale Co. (03964)
Welding Fixture	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Welding Torch	---	Commercially Available

* Refer to the IPL, paragraph 2, for the address.

WELDING SCHEDULE

Specifications for welding the outlet disc(s), filler valve/filler valve with safety relief, pressure switch, and TCPS are listed in Table 702.

**Welding Schedule
Table 702**

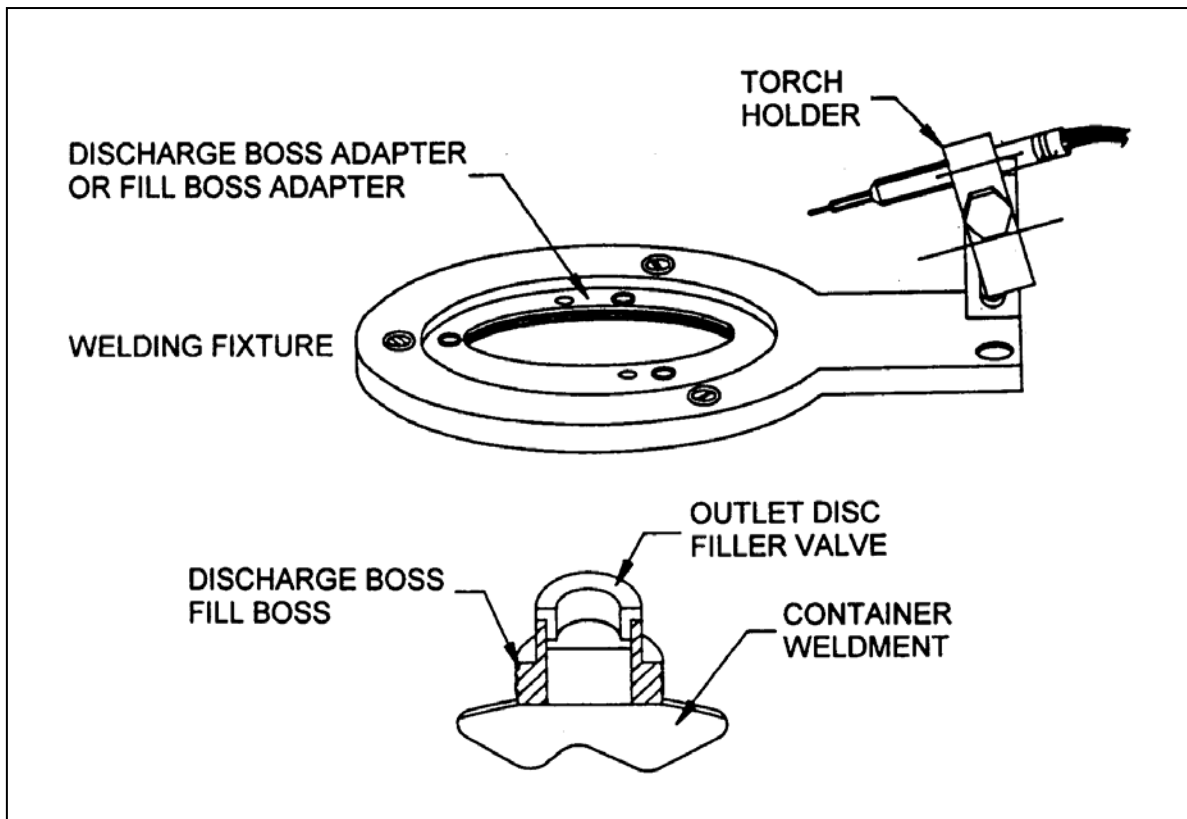
ITEM	CHARACTERISTICS
Argon Cup Size	1/ 4 inch (6.35 mm) ID
Argon Flow Rate	10 to 15 cfh (0.3 to 0.4 m ³ /hour)
Current Setting, Maximum	25 amps for filler valve/filler valve with safety relief 30 amps for outlet disc 30 amps for pressure switch 30 amps for TCPS
Electrode	1/16 inch (1.59 mm) OD, tungsten (2 % thoriated), ground to a sharp, tapered point
Electrode Gap	0.125 inch (3.17 mm)
Position of Electrode	Protrudes 3/16 inch (4.76 mm) from torch holder and points 0.005 to 0.008 inch (0.13 to 0.20 mm) above seam line between flange and boss, with torch pointing upward away from seam at 5 to 10 degree angle



COMPONENT MAINTENANCE MANUAL

OUTLET DISC

1. Fasten a cradle securely to a rotary table.
2. Clean the discharge boss and the outlet disc with isopropyl alcohol.
3. Place the outlet disc in the discharge boss. The outlet disc flange must make 360 degree contact with the discharge boss or a satisfactory weld cannot be accomplished.
4. Using the adapter wrench, thread the discharge boss adapter into the welding fixture and install the welding fixture onto the discharge boss. Tighten the setscrew to lock the adapter and welding fixture onto the discharge boss. See Figure 701.
5. Install the welding torch holder. Refer to Table 702 for welding schedule. Adjust the tip of the welding torch to the outlet disc and discharge boss joint.
6. Attach a ground wire to the welding fixture.



**Outlet Disc and Filler Valve Weld Setup
Figure 701**

**COMPONENT MAINTENANCE MANUAL**

WARNING: AFTER THE OUTLET DISC IS WELDED, CONTINUE THE PURGE GAS FROM THE ELECTRODE AND IN ADDITION BLOW AIR FROM AN AIR HOSE NOZZLE TO COOL THE WELD JOINT.

7. Hold the welding fixture by hand to keep it from turning, and weld the outlet disc to the discharge boss. Use an air hose for extra cooling in addition to the purge gas from the electrode.
8. After completing the weld, remove the welding fixture.
9. Install a safety relief cap on the discharge boss.
10. Repeat above procedure to weld additional outlet discs, if required.

TEMPERATURE COMPENSATED PRESSURE SWITCH (TCPS) /PRESSURE SWITCH

1. Thread the TCPS or pressure switch into the switch boss until hand tight. Orient the electrical connector of the TCPS or pressure switch as described in the Technical Properties and shown in the IPL Figure of the Supplement. Use shims (refer to the Supplement IPL) if the electrical connector does not orient as described in the Technical Properties and shown in the IPL Figure of the Supplement.

NOTE: Addition of the 0.005 inch (0.13 mm) shim changes the orientation by approximately 25 degrees.

CAUTION: OVERHEATING THE TCPS DURING WELDING WILL DESTROY THE ELECTRONIC COMPONENTS, RENDERING THE TCPS INOPERABLE. CONTINUE THE PURGE GAS FROM THE ELECTRODE AND IN ADDITION BLOW AIR FROM AN AIR HOSE NOZZLE TO COOL WELD JOINT.

2. Hold the electrode manually and weld the TCPS or pressure switch to the switch boss in six rapid pass sections. Refer to Table 702 for welding schedule. Use an air hose for extra cooling in addition to the purge gas from the electrode between each rapid pass.

PRESSURE GAUGE/PRESSURE SWITCH GAUGE

1. Apply a light coating of the thread sealant to the threads of the pressure gauge or pressure switch gauge. Curing time of thread sealant is 24 hours.
2. Thread the pressure gauge or pressure switch gauge into the gauge boss and work it back and forth to work the sealant into the boss threads.
3. Tighten or torque, as required, the pressure gauge or pressure switch gauge. If required, orient as described in the Technical Properties and shown in the IPL Figure of the Supplement.

**SIGHT GAUGE**

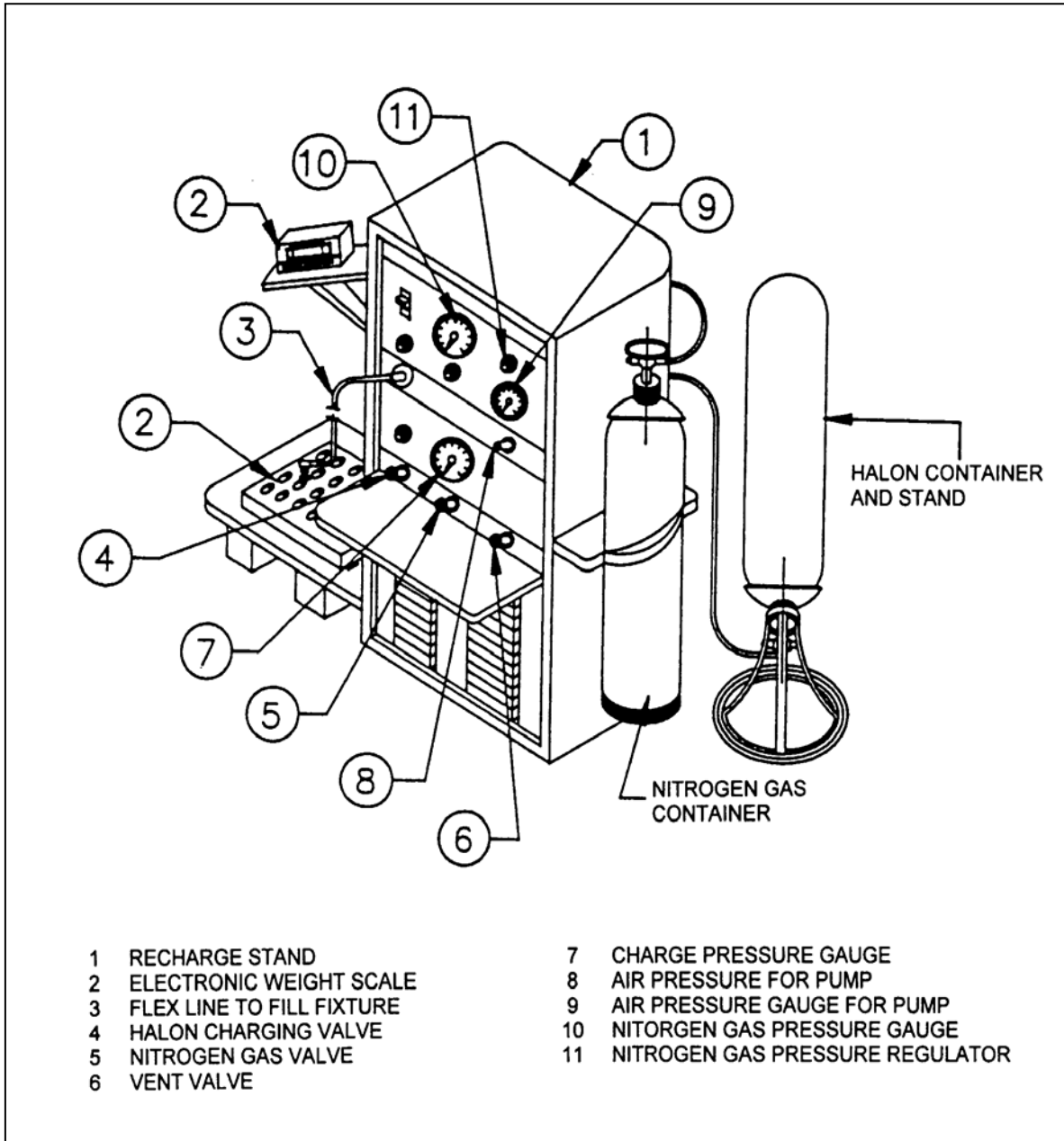
Install the o-ring on the sight gauge housing, apply light coating of the thread sealant to the threads and o-ring, and thread the sight gauge into the sight gauge boss. Curing time of the thread sealant is 24 hours.

FILLER VALVE/FILLER WITH SAFETY RELIEF

Insert the copper filler seal inside the fill boss, if required. Lubricate the o-ring (refer to Table 701 for lubricant) and install on the filler valve or filler valve with safety relief. Install the filler valve or filler valve with safety relief into the fill boss. Back off the filler valve or filler valve with safety relief, turn back one turn and a half turn from the seated position for filling the fire extinguisher, if applicable.

FIRE EXTINGUISHER RECHARGE See Figure 702

1. Weigh the fire extinguisher; enter weight on a copy of the fill chart Table 703.
2. Attach the charging fixture to the filler valve or filler valve with safety relief of the fire extinguisher. Attach a thermocouple with foam backed tape to the fire extinguisher next to a discharge boss.
3. Install the fire extinguisher on an electronic scale with a suitable cradle and attach the flexible hose from the recharge stand to the shut off valve on the charging fixture. Zero the tare reading on the electronic scale.
4. Adjust the air pressure valve to the pump inlet 50 to 60 psig (345 to 414 kPag). Open the outlet valve of the extinguishing agent container.
5. Open the recharge stand charging valve and the pump will start introducing extinguishing agent into the fire extinguisher. Open the shut off valve on the charging fixture and pump to desired extinguishing agent weight plus approximately 0.1 pound (0.05 kg) to allow for extinguishing agent trapped in the flexible hose.
6. Shut off the charging fixture valve on the filler valve or filler valve with safety relief. Vent the flexible hose and disconnect.
7. Weigh the fire extinguisher and enter weight on the fill chart. Verify the extinguishing agent weight, Line 4 on the fill chart.



Recharge Setup
Figure 702



**Fill Chart Record
Table 703**

Part Number _____	Serial Number _____
Date of Refill _____	Press Switch S/N _____
Certified By _____	Hydrostatic Test Date _____

1. Weight – Empty Fire Extinguisher With Cartridge(s) <input type="checkbox"/> Y <input type="checkbox"/> N With Outlet(s) <input type="checkbox"/> Y <input type="checkbox"/> N _____	Pounds (kgs)
2. Weight – Empty Fire Extinguisher With Charging Fixture Attached _____	Pounds (kgs)
3. Weight – Charged Fire Extinguisher With Charging Fixture Attached _____	Pounds (kgs)
4. Weight – Charged Fire Extinguisher Line 3 minus Line 2 _____	Pounds (kgs)
5. Nitrogen Gas Charge Pressure _____	Psig (kPag)
Reference Table 704 _____	°F (C°)
6. Final Charged Weight of Fire Extinguisher _____	Pounds (kgs)

8. Reconnect the flexible hose to the valve on the charging fixture and replace the fire extinguisher onto the cradle. The cradle need not be on the scale for the Nitrogen gas charge.
9. Open the valve on the Nitrogen gas cylinder and set the regulator to 850 psig maximum (5861 kPag).
10. Open the Nitrogen gas valve to read at least 300 psig (2069 kPag) on the charge pressure gauge. Open the valve on the charging fixture. Re-open the Nitrogen gas valve to charge the fire extinguisher to the required charge pressure of Nitrogen gas, refer to the Supplement Technical Properties and Table 704 or Table 705 for the metric equivalent.

NOTE: The Nitrogen gas is soluble in the extinguishing agent and the charge pressure will drop. The fire extinguisher must be agitated to ensure complete solubility, hold the fire extinguisher with the pressure gauge (if applicable) facing away from all personnel.

COMPONENT MAINTENANCE MANUAL

11. Open and close the Nitrogen gas valve until the charge pressure gauge reads the required charge pressure after the fire extinguisher has been agitated.
12. Tighten the filler valve or filler valve with safety relief clockwise until firmly seated into the fill boss. Close the Nitrogen gas valve; open the vent valve on the recharge stand. Disconnect the flexible hose.
13. Remove the charging fixture from the filler valve or filler valve with safety relief. Torque the filler valve or filler valve with safety relief; refer to the Supplement Technical Properties (if it is not to be welded).
14. Weigh the charged fire extinguisher. Enter the weight on the fill chart. The final charged weight should not be entered on the identification plate until the fire extinguisher is leak checked.

**Nitrogen Gas Charge Pressure
Table 704**

TEMP °F	360 to 385 PSIG		450 to 475 PSIG		600 to 625 PSIG		800 to 825 PSIG	
	at 70°F		at 70°F		at 70°F		at 70°F	
	Min	Max	Min	Max	Min	Max	Min	Max
60	330	355	418	443	565	590	765	790
61	333	358	421	446	568	593	769	794
62	336	361	424	449	572	597	773	798
63	339	364	427	452	575	600	777	802
64	342	367	431	456	579	604	781	806
65	345	370	434	459	582	607	785	810
66	348	373	437	462	585	610	788	813
67	351	376	440	465	589	614	791	816
68	354	379	444	469	592	617	794	819
69	357	382	447	472	597	622	797	822
70	360	385	450	475	600	625	800	825
71	363	388	453	478	603	628	804	829
72	366	391	457	482	607	632	807	832
73	370	395	460	485	610	635	811	836
74	373	398	464	489	614	639	814	839
75	376	401	467	492	618	643	818	843
76	379	404	470	495	621	646	821	846
77	383	408	474	499	625	650	825	850
78	386	411	477	502	629	654	828	853
79	390	415	481	506	632	657	832	857
80	393	418	484	509	637	662	835	860

**Nitrogen Gas Charge Pressure (Metric)
Table 705**

TEMP °C	2482 to 2655 kPag		3103 to 3275 kPag		4137 to 4309 kPag		5516 to 5688 kPag	
	at 21.1°C		at 21.1°C		at 21.1°C		at 21.1°C	
	Min	Max	Min	Max	Min	Max	Min	Max
15.6	2275	2448	2882	3055	3896	4068	5275	5447
16.1	2296	2468	2903	3075	3916	4089	5302	5475
16.6	2317	2489	2924	3096	3944	4116	5330	5502
17.2	2337	2510	2944	3117	3965	4137	5357	5530
17.8	2358	2531	2972	3144	3992	4165	5385	5557
18.3	2379	2551	2992	3165	4013	4185	5413	5585
18.9	2400	2572	3013	3186	4034	4206	5433	5606
19.4	2420	2593	3034	3206	4061	4234	5454	5526
20.0	2441	2613	3061	3234	4082	4254	5475	5647
20.6	2462	2634	3082	3254	4116	4289	5495	5668
21.1	2482	2655	3103	3275	4137	4309	5516	5688
21.7	2503	2675	3123	3296	4158	4330	5544	5716
22.2	2524	2696	3151	3323	4185	4358	5564	5737
22.8	2551	2724	3172	3344	4206	4378	5592	5764
23.3	2572	2744	3199	3372	4234	4406	5613	5785
23.9	2593	2765	3220	3392	4261	4434	5640	5813
24.4	2613	2786	3241	3413	4282	4454	5661	5833
25.0	2641	2813	3268	3441	4309	4482	5688	5861
25.6	2662	2834	3289	3461	4337	4509	5709	5881
26.1	2689	2861	3317	3489	4358	4530	5737	5909
26.7	2710	2882	3337	3510	4392	4565	5757	5930

FIRE EXTINGUISHER LEAK CHECK

Using a leak detector, set the sensitivity to 1×10^{-5} or 1×10^{-6} standard cubic-centimeter-per-second and using the probe, leak check the outlet boss, fill boss, gauge boss and/or switch boss. Refer to the Supplement Technical Properties.

NOTE: After charging, use an air hose to blow out all areas of the fire extinguisher because the extinguishing agent tends to accumulate in certain areas of the filler valve or filler valve with safety relief immediately after charging.

FILLER VALVE/FILLER VALVE WITH SAFETY RELIEF WELD

1. Fasten a cradle securely to a rotary table.
2. Clean the filler valve or filler valve with safety relief and fill boss joint with isopropyl alcohol.

**COMPONENT MAINTENANCE MANUAL**

3. Using a wrench, thread the fill boss adapter into the welding fixture and install the welding fixture onto the fill boss. Tighten the setscrew to lock the adapter and welding fixture onto the fill boss. See Figure 701.
4. Install the welding torch holder. Refer to Table 702 for welding schedule. Adjust the tip of the welding torch to the filler valve or filler valve with safety relief and fill boss joint.
5. Attach a ground wire to the welding fixture.

WARNING: AFTER THE FILLER VALVE IS WELDED, CONTINUE THE PURGE GAS FROM THE ELECTRODE AND IN ADDITION BLOW AIR FROM AN AIR HOSE NOZZLE TO COOL THE WELD JOINT.

6. Hold the welding fixture by hand to keep it from turning and weld the filler valve or filler valve with safety relief to the fill boss. Use an air hose for extra cooling in addition to the purge gas from the electrode.
7. After completing the weld, remove the welding fixture.
8. Install a protective cap on the filler valve or filler valve with safety relief.

OUTLET VALVE AND CARTRIDGE

1. Lubricate new o-ring (refer to Table 701 for lubricant) and install on the discharge boss. Install the screen weldment into the outlet valve and thread the outlet valve onto the discharge boss, tighten the captive retaining nut to finger-tight only. If the fire extinguisher has dual outlet valves, see the Supplement IPL Figure for the proper outlet valve installation.

NOTE: The outlet valve captive retaining nut is torqued 45 to 50 foot-pounds (61 to 68 N·m) and safety wired after final installation in the aircraft.

WARNING: THE CARTRIDGE IS AN EXPLOSIVE DEVICE. FOR SAFE HANDLING, PERSONNEL MUST BE GROUNDED AND A SHUNT DEVICE MUST BE INSTALLED ON EACH CARTRIDGE. INADVERTENT DETONATION OF A CARTRIDGE MAY CAUSE INJURY.

2. Lubricate new o-ring (refer to Table 701 for lubricant), install on the cartridge, and thread the cartridge into the outlet valve. Torque the cartridge 90 to 100 inch-pounds (10 to 11 N·m).
3. Safety wire the cartridge to the outlet valve in accordance with MS33540. Refer to the Supplement Technical Properties for the lockwire size.
4. Repeat above procedure to install additional outlet valves and cartridges, if applicable.

COMPONENT MAINTENANCE MANUAL

IDENTIFICATION AND CAUTION PLATES

1. If the identification or caution plates are damaged or illegible, install the new plates next to the old plate. Do not remove the old plate.
2. Bond the new plates to the container weldment as follows:
3. Clean the back of the plates and the mating surfaces with cleaning solvent.
4. Mix the epoxy adhesive one-to-one by weight, and apply to the back of the plate. The working life of the epoxy adhesive is one hour at 75°F (24°C).
5. Press the plate on the container weldment and tape in place. Allow 24 hours for epoxy adhesive to cure before removing the tape.

STORAGE INSTRUCTIONS

The recommended storage materials are given in Table 706. Equivalent items may be used.

**Storage Materials
Table 706**

NOMENCLATURE	PART OR SPECIFICATION NUMBER	SOURCE (CAGE)*
Cardboard Carton (for fire extinguisher)	See Table 707	Commercially available
Fiber Drum (for fire extinguisher larger than 1600 cubic inch – 26.2 liter)	23 inch diameter 26 inch height (58 cm x 66 cm)	Greif Bros. Corp. (10836)
Packing Material	---	Commercially available
Plastic Bag (for fire extinguisher)	Suitably sized	Commercially available
Safety Bag, Black, Heat Sealable, Electrostatic (for cartridge)	---	Commercially available
Special Cardboard Carton (for cartridge)	Suitably sized	Commercially available

**Cardboard Carton Size
Table 707**

FIRE EXTINGUISHER		CARDBOARD CARTON	
Cubic-Inch	Liter	Inch	CM
Up to 275	Up to 4.5	12 x 12 x 12	31 x 31 x 31
300 to 500	4.9 to 8.2	14 x 14 x 14	36 x 36 x 36
525 to 1,075	8.6 to 17.2	18 x 18 x 18	46 x 46 x 46
1100 to 1500	18.0 to 24.6	22 x 22 x 18	56 x 56 x 46

The following instructions apply to the fire extinguishers and cartridges not to be placed in service.

FIRE EXTINGUISHER

1. Install the protective caps on all threaded ports, the electrical connectors, and the shunt device on the cartridge.
2. Place the fire extinguisher in a suitable sized storage container. Seal the storage container.
3. Mark the storage container.
 - a. Part number
 - b. Serial number
 - c. Last hydrostatic test date
 - d. Overhaul date
 - e. DOT-SP 10440
 - f. Fire extinguisher
 - g. UN1044
 - h. Class 2.2
 - i. Bromotrifluoromethane
 - j. Net weight of extinguishing agent
4. The storage temperature is +40°F to +100°F (+4°C to +38°C).

CARTRIDGE

WARNING: THE CARTRIDGE IS AN EXPLOSIVE DEVICE. FOR SAFE HANDLING, PERSONNEL MUST BE GROUNDED AND A SHUNT DEVICE MUST BE INSTALLED ON EACH CARTRIDGE. INADVERTENT DETONATION OF A CARTRIDGE MAY CAUSE INJURY.

1. Install a shunt device on the cartridge.
2. Place the cartridge in an electrostatic safety bag, then into a special cardboard carton.
3. Seal and identify the special cardboard carton. Mark the part number, Service Date, expiration date, and the pyrotechnic classification (refer to the Supplement Technical Properties) on the special cardboard carton.
4. The storage temperature is +40°F to +100°F (+4°C to +38°C).

FITS AND CLEARANCES

TORQUE LIMITS

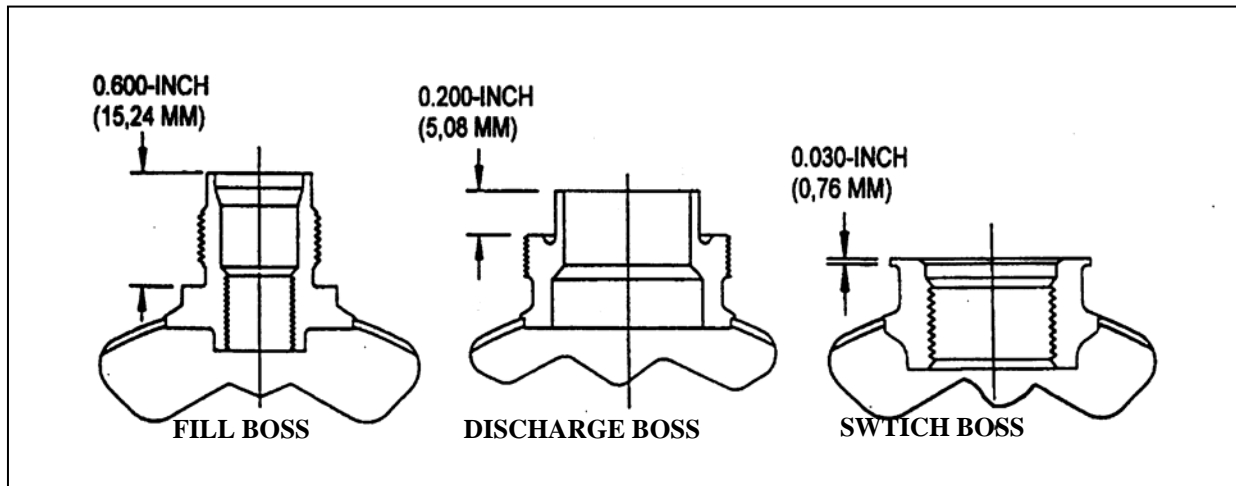
Torque limits for the fire extinguishers are listed in Table 801. Refer to the Supplement Technical Properties.

**Torque Limits
Table 801**

NOMENCLATURE	TORQUE RANGE
Cartridge	90 to 100 inch-pounds (10.2 to 11.3 N·m)
Filler Valve	110 to 130 inch-pounds (12.4 to 14.7 N·m)
Filler Valve with Safety Relief	110 to 130 inch-pounds (12.4 to 14.7 N·m)
Pressure Switch	150 to 170 inch-pounds (16.9 to 19.2 N·m)
Retaining Nut – Outlet Valve	25 to 30 foot-pounds (33.9 to 40.7 N·m)
Retainer – Outlet Disc	45 to 55 foot-pounds (61.0 to 74.6 N·m)

MINIMUM HEIGHT DIMENSIONS

The minimum height dimensions for the fill switch, and discharge bosses are shown in Figure 801



**Minimum Height
Figure 801**

SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

Special tools, fixtures, and test equipment required for maintenance of the fire extinguishers are listed in Table 901. Equivalent items may be used.

**Special Tools, Fixtures, and Equipment
Table 901**

NOMENCLATURE	PART OR SPECIFICATION NUMBER	SOURCE (CAGE)*
Adhesive, Epoxy	Scotchweld 1838 B/A	The 3M Company (04963)
Air Tool, Hand-Held	---	Ingersoll Rand Co. (03990)
Alcohol, Isopropyl	Federal Specification TT-I-735	Commercially available
Bearing Puller	4059	Stanley Canada, Inc. (09669)
Cap, Hydrostatic Test, Discharge Boss	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Charging Fixture	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Cloth, Lint-Free	---	Commercially available
Cradle	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Detergent Solution	---	Commercially available
Discharge Tool	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Drill Press or End Mill Machine, 80 rpm	---	Commercially available
Extinguishing Agent	Refer to the Supplement	Commercially available
Fill Tool	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Fitting, Hydrostatic Test, Fill Boss	---	Customer Supply
Ground Strap and Circuit Tester	WT 25	Walter G. Legge, Co. (84832)

COMPONENT MAINTENANCE MANUAL

**Special Tools, Fixtures, and Equipment
Table 901 (con't)**

NOMENCLATURE	PART OR SPECIFICATION NUMBER	SOURCE (CAGE)*
Hydrostatic Test Setup	---	DOT approved hydrostatic test facility
Leak Detector, Halogen	HLD 5000	Inficon, Inc. (56507)
Light Probe	---	Commercially available
Lubricant	DC 4	Dow Corning Co. (71984)
Multimeter	630	Triplett Corp. (60741)
Nitrogen Gas (GN ₂)	2000 psig (13790 kPag)	Commercially available
Outlet Safety Cap	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Safety Cap, Outlet Boss	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Oven or Heater, 250°F (121°C)	---	Commercially available
Plug, Gauge Boss	---	Customer supply
Plug, Sight Gauge Boss	---	Customer supply
Plug, Switch Boss	---	Customer supply
Power Supply, 28 VDC	---	Commercially available
Pressure Gauge, Master	0 to 1000 psig (6895 kPag)	Commercially available
Recharge Stand	91026-1	AMETEK Ameron LLC / MASS Systems (0FRR4)
Resurfacing Tool, Discharge Boss	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Resurfacing Tool, Fill Boss	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Rotary Table, 80 rpm	---	Commercially available
Safety Bag, Black, Heat Sealable, Electrostatic (for cartridge)	---	Commercially available

**Special Tools, Fixtures, and Equipment
Table 901 (con't)**

NOMENCLATURE	PART OR SPECIFICATION NUMBER	SOURCE (CAGE)*
Safety Chamber, Cartridge	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Safety Wire	Refer to the Supplement	Commercially available
Saw Cutter, 0.020 inch (0.51 mm)	---	Commercially available
Sealant, Thread (Refrigerant)	55441	Loctite Corp. (05972)
Spanner Assembly, Welding Fixture	91110-1	AMETEK Ameron LLC / MASS Systems (0FRR4)
Tape, Duct	---	Commercially available
Tape, Foam Backed, 1 inch (25.4 mm) square, 1/4 inch (6.35 mm) thick	---	The 3M Company (04963)
Test Box, TCPS	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)
Thermometer/Thermocouple	54-2	Fluke Corp (89536)
Weighing Scale, 0 to 100 pounds (0 to 45 kg), ± 0.01 pound (0.005 kg)	3000E (Electronic)	Pennsylvania Scale Co. (03964)
Welding Fixture	Refer to the Supplement	AMETEK Ameron LLC / MASS Systems (0FRR4)

* Refer to IPL, paragraph 2, for the address

ILLUSTRATED PARTS LIST

INTRODUCTION

1. Purpose

This IPL illustrates and lists the spare parts with attaching hardware.

2. Manufacturer Name and Address

CAGE CODE	NAME AND ADDRESS	TELEPHONE FAX
0FRR4	AMETEK Ameron LLC / MASS Systems 4750 Littlejohn Street Baldwin Park, CA 91706-2285 U.S.A.	626-337-4640 FAX 626-337-1641 service@mass.ametek.com
03964	Pennsylvania Scale Company 1042 New Holland Ave. Lancaster, Pennsylvania 17601-5606 U.S.A.	800-233-0473 FAX 800-768-6350
03990	Ingersoll-Rand Company ARO Fluid Products 1 ARO Center P. O. Box 151 Bryan, Ohio 43506-1100 U.S.A.	202-256-1789 FAX 419-633-1674
04963	The 3M Company Adhesives Coatings and Sealers Division 3M Center St. Paul, Minnesota 55144-1000 U.S.A.	651-733-1110 FAX 888-427-0511
05972	Loctite Corporation 1001 Trout Brook Crossing Rocky Hill, Connecticut 06067-3582 U.S.A.	203-571-5100 FAX 203-571-5465
09669	Stanley Canada, Inc. Stanley Proto Division 1100 Corporate Drive Burlington, Ontario L7L 5R6 Canada	416-355-0075
10836	Grief Bros. Corp. Fibre Drum Division 175 East Hoffman Avenue P. O. Box 601 Lindenhurst, New York 11767 U.S.A.	516-957-7600



COMPONENT MAINTENANCE MANUAL

CAGE CODE	NAME AND ADDRESS	TELEPHONE FAX
56242	ARCO – Atlantic Richfield Company Products Division 5 Centerpointe Drive La Palma, California 90623-1028 U.S.A.	310-549-6204
56507	Inficon, Inc. Two Technology Place East Syracuse, New York 13057-9714 U.S.A.	315-434-1129 FAX 315-437-3803
60741	Triplett Corporation One Triplett Drive Bluffton, Ohio 45817-1055 U.S.A.	419-358-5015 FAX 419-358-7956
71984	Dow Corning Corporation 2200 West Salzburg Road Midland, Michigan 48640-8531 U.S.A.	800-248-2481 FAX 989-496-6731
84832	Walter G. Legge Company, Inc. 444 Central Avenue Peekskill, New York 10566-2033 U.S.A.	914-737-5004 FAX 914-737-2636
89536	Fluke Corp. 6920 Seaway Blvd. Everett, WA 98203-5829 U.S.A.	800-903-5853 FAX 425-446-5716

EXPLANATION OF PARTS LIST COLUMN

The Detail Parts List is arranged in general sequence of disassembly. The parts are illustrated in an exploded-view illustration and listed in the related parts list.

FIG. ITEM Column

1. The first number at the top of each FIG. Item column is the figure number of the corresponding illustration. The number given opposite each part number is the item number assigned to the part in the illustration.
2. A dash (-) in front of an item means the part is not illustrated.
3. Alpha-variants A through Z (except I and O) are assigned to item numbers, when necessary to identify:

COMPONENT MAINTENANCE MANUAL

- Added parts
- Alternate parts
- Service bulletin modified parts

PART NUMBER column

This column contains the manufacturer's part number for each part, as modified to meet the requirements of ATA 200/2000. These modifications can include.

1. Removal of blank spaces and special characters, with the possible exception of dashes. Dashes are permitted only between numeric characters.
2. Insertion of a reference part number compatible with ATA 200 if the manufacturer's part number exceeds 15 characters. In these cases, the manufacturer's part number is listed in the NOMENCLATURE column.

NOMENCLATURE Column

1. This column contains descriptive nomenclature for each part, the manufacturer's CAGE code (if the part is not manufactured or modified by AMETEK Ameron, LLC, MASS Systems), part number (if longer than 15 digits), service bulletins affecting the part, and obsolete part numbers.
2. The indenture system used in the NOMENCLATURE column indicates the relationship of one part to another, as follows:

 1 2 3
 End Item or Major Assembly
 ATTACHING PARTS
 Attaching Parts for End Item or Major Assembly
 * * *
 . Detail Parts for End Item or Major Assembly
 . Subassemblies
 ATTACHING PARTS
 Attaching Parts of Subassemblies
 * * *
 . . Detail parts for Subassemblies
3. Assemblies, subassemblies, and detail parts subject to modification, deletion, addition, or replacement by an issued Service Bulletin are annotated to indicate both pre- and post-Service Bulletin configurations. The term (PRE SB XXXX) in designates the original configuration, and the term (POST SB XXXX) identifies assemblies and parts after the modification has been completed.
4. The terms listed below are used when applicable to indicate the interchangeability of parts.



COMPONENT MAINTENANCE MANUAL

<u>TERM</u>	<u>ABBREVIATION</u>	<u>DEFINITION</u>
Optional	OPT	The listed part is optional to and interchangeable with other parts with the same item number variant group or other item numbers if designated.
Superseded By	SUSPD BY	The part is replaced by and is not interchangeable with the item number shown in the notation.
Supersedes	SUPSDS	The part replaces and is not interchangeable with the item number shown in the notation.
Replaced By	REPLD BY	The part is replaced by and interchangeable with the item number shown in the notation.
Replaces	REPLS	The part replaces and is interchangeable with the item number shown in the notation.

EFF CODE Column

This column contains letter codes (A, B, etc.) to indicate the alternate models or configurations of the end item to which the listed parts apply. Where this column has been left blank, the listed parts apply to all models or configurations included in the parts list.

UNITS PER ASSY Column

The quantity shown in this column represents the units required for one NHA or, when referring to attaching parts, the quantity to attach one such item. The abbreviation RF (reference) indicates that the end item or assembly is shown completely assembled on the illustration referenced in the NOMENCLATURE column.

Refer to appropriate Supplement for Illustrated Parts List.