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TECHNICAL MANUAL

Fueler/Defueler Cart (FDC)

Spokane Industries Model CNV600-EA12

Limited Warranty Agreement
Aviation Products

Spokane Industries (SI) of Spokane, Washington hereby Warrants to the purchaser (the Warrantee) that all products explicitly covered by this Warranty Agreement have been thoroughly inspected upon completion and that they and their component parts are free of defects in materials and workmanship. SI further warrants that in the event the product fails due to defects in materials and/or workmanship within a period of twenty-four (24) months from the effective date of this warranty that SI will provide replacement parts free of charge except for those components which are covered by an Original Equipment Manufacturer's (OEM)Warranty, in which case coverage will be provided by that OEM.

Coverage

The SI Sealvac Products Limited Warranty Agreement covers all products manufactured for use as Ground Support, Defueling equipment. Certain components of these products are manufactured by third party Original Equipment Manufacturers (OEMs) and are covered by these manufacturers' Warranties. SI Warranty coverage is contingent upon proper installation, operation, maintenance and repair of the product. Refer to the appropriate manuals and documentation for assistance. In cases of uncertainty, SI must be consulted prior to any service work being performed. Failure to do so may result in the termination of Warranty coverage.

Terms and Conditions

Requests for Warranty Coverage

Requests for Warranty Coverage should be addressed to the SI, Spokane Metal Products Customer Support and Service Department N. 3808 Sullivan Road, Building #4, Spokane, WA, 99216, 800-541-360, Fax: 509-927-0826. Please provide the Model Number, Ship Date, Original Purchaser, and Point of Installation, and, if possible, our original Sales Order number. The Service Department will make a Warranty determination based upon this information and our internal records. If Warranty coverage is in effect replacement parts will be sent provided that credit terms have been established. If Warranty coverage is not in effect, the cost of replacement parts will be quoted.

Transferability

This warranty is extended only to the original purchaser named on this warranty certificate and is not transferable without the express written consent of SI. Transferability is contingent on the product being in warrantable condition. SI reserves the right to verify product warrantability by whatever means is deemed appropriate, and the right to refuse to transfer the warranty with or without cause. Warranty transfer requests must be made in advance of the sale or transfer of the product. SI accepts no responsibility for any costs associated with the transfer of existing warranties including any costs associated with verification of product warrantability. Requests for Warranty transfers should be addressed c/o SI, Spokane Metal Products Customer Support and Service Department *at the address above*.

Return of Warranty Parts ("Exchange")

For the purposes of quality assurance, SI requires that certain parts and assemblies covered under the SI Limited Warranty Agreement be returned by the Warrantee upon receipt of replacements (known as "Exchange"). In these cases, SI will authorize the shipment of replacement parts immediately and provide a Returned Merchandise Authorization (RMA) number along with a full retail invoice for the replacement parts pending receipt of the Warranty ("defective") parts. The Warranty parts must be returned to SI within 30 days with the RMA number CLEARLY marked on the shipping materials. At this time SI will inspect the Warranty parts to verify Warranty coverage. If the Warranty parts are deemed defective due to materials and workmanship SI will issue a full credit for the replacement parts. If the Warranty parts are not returned within thirty days the Warrantee's account will not be credited. Payment in full is then due and subject to the standard terms and conditions of SI credit.

* *In cases where returned parts are deemed* ***not to be defective,*** *SI reserves the right to* ***refuse to cancel the applicable invoice.***
* *Exchange parts must be properly packed and sealed and shipped to SI by prepaid freight. Under no circumstances does SI accept C.O.D. shipments.*

* *SI Warranty replacement parts are provided subject to the terms and conditions of the SI Sales and Service Agreement which states that where no other Warranty coverage is in place, Service and Warranty parts are covered by a ninety day limited Warranty.*

LIMITATIONS

The following limitations apply to the SI Limited Warranty Agreement:

* *SI shall not be liable under any circumstances for any incidental or consequential damages including, but not limited to, loss of time, inconvenience, expenses incurred by purchaser in order to remedy defects, or liability purchaser may have with respect to any other person for loss or damage arising from the operation of the product or the product's failure to operate in any way, or any other type of consequential damage or economic loss.*
* *This warranty is limited to defects in materials and workmanship. SI assumes no liability whatsoever for damages arising from the inability of the product to perform a certain task. Damage arising during shipping and handling, improper installation, use, maintenance, repair, or any unauthorized modifications, whether performed by qualified service personnel or not, neglect, Acts of God, etc., are expressly excluded.* ***In any case, SI's liability shall be limited only to the provision of suitable replacement parts for those which failed due to defects in materials and workmanship. Incidental damage resulting from the failure, and labor costs associated with the repair and/or replacement of the product, its assemblies, and component parts, are excluded.***
* *SI reserves the right to limit or terminate warranty coverage in instances where repeated product failures are a result of failure to correct operating conditions which are in any way abnormal or exceed operating condition specifications. It is the purchaser's responsibility to remedy such conditions as may be likely to cause initial and/or repeated failures of the equipment. SI assumes no responsibility whatsoever for any costs incurred for this purpose.*
* *The SI Limited Warranty Agreement covers only replacement parts supplied by SI. SI makes every reasonable effort to ensure an adequate supply of replacement parts. However, in cases where the exact replacement part is no longer available, SI reserves the right to provide a suitable substitute.*
  Components such as batteries, which are subject to normal wear and tear are pro-rated under the provisions of this Warranty. Warranty coverage shall be pro-rated according to the amount of Warranty coverage remaining.

EXCLUSIONS

The following exclusions apply to the SI Limited Warranty Agreement:

* *The SI Limited Warranty Agreement applies only to authentic new and, where applicable, refurbished products. Products sold "As Is", demonstration units, and any other products subjected to previous use are explicitly excluded.*
* *The SI Limited Warranty Agreement excludes any and all parts and assemblies which are covered by another manufacturer's Warranty (see above).*
* *This Limited Warranty Agreement constitutes the complete and entire SI Warranty statement. Any items and/or circumstances not expressly covered by this Warranty Agreement are hereby excluded. This includes, but is not limited to, such additional offerings as SI may make available from time to time. These offerings are independent of this Agreement and, as such, do not in any way extend, modify, or otherwise alter the coverage, terms, conditions, limitations, and exclusions as they are set forth here unless* ***explicitly stated.***
* *The failure to observe any and all of the terms and conditions of this warranty will render it null and void.*
* *Although all reasonable precautions are taken to ensure that shipping damage is avoided, any damage incurred during the shipment and installation of the product is explicitly excluded. Any and all damage during shipment is the sole responsibility of the transportation carrier(s). Product should be thoroughly inspected prior to acceptance from the freight carrier. All SI products are shipped F.O.B. Spokane Washington.*
* *This Warranty is in lieu of all other warranties whatsoever, express, implied and statutory, including, without limitation, the implied warranties of merchantability and fitness for a particular purpose, and all such warranties express or implied, shall be excluded from this transaction and shall not apply to the goods sold. Product should be thoroughly inspected prior to acceptance from the freight carrier. All SI products are shipped F.O.B. Spokane Washington.*

Warranty inquiries are welcome and should be addressed to:

SI Service Department
Spokane Industries, Spokane Metal Products Division
Spokane Industrial Park Building 4
N3808 Sullivan Rd.
Spokane, Washington 99216
(800) 541-3601

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Section 1.0 Introduction

1.1 This operating manual contains information necessary for the operation and maintenance for the unit labeled as the Fueler/Defueler Cart (FDC). Spokane Industries model number is CNV600-EA12. **Throughout this manual the unit will be referred to as the FDC.** The FDC is designed to provide a portable, self-contained fueling/ defueling system for the UAV program.

Table 1.0 Specifications for Fueler/Defueler Cart (FDC)

Dimensions	
Capacity	600 U.S gallons
Tank Construction	T304 stainless steel
Under Carriage rating	6,400 lbs.
Tires/ Wheels	195-75/14 mounted on stamp rims
Brakes	Drum Style, manually operated
Batteries -2 each	12 Volt, Group 24
Battery Charger	120 Volt AC input/ 12 Volt DC dual output
Pump	Dixon Blade Master 1583
Fuel Meter	Fill-Rite model 901
Fuel Filter housing	Facet VF-22
Fueling Hose	35 feet X 1 inch ID, Goodyear Wingcraft
Fueling Nozzle	1 inch automotive
Defueling	Depuddling hose & Rigid deppudling wand

Section 2.0 Safety Guidelines for Fueler/ Defueler Cart (FDC)

2.1 Within this manual are guidelines and safety recommendations for use of the FDC. It is the responsibility of the end user to completely read this manual and comply with all local, state and federal laws and regulations applicable for fueling and defueling aircraft.

2.2 Spokane Industries Inc. is not responsible for industry specific information on safety management, employment safety, health standards, safety codes, etc. Contact your local safety manager or industrial safety representative.

NOTE: Spokane Industries does not allow any field modifications to be performed by the user without written permission from a Spokane Industries representative. Unauthorized field modifications may result in an unsafe condition for either personnel or equipment and will void the manufacturers warranty.

2.3 It is the responsibility of the end user to ensure persons operating this equipment:

- Are trained, authorized and permitted to use the equipment.

- Have physical and the mental ability to operate this equipment safely.

- Are aware of the potential hazards associated with this equipment, i.e. static electricity, electrical shock, fuel spills, pinch points.

Section 3.0 CONTROLS & INDICATORS

3.1 The Controls and Indicators section is designed to provide a description of the various controls and indicators found on the FDC. All physical references are made from the rear looking forward towards the tow bar.

Table 3.0 CONTROLS & INDICATORS FOR THE FDC

Tow bar - Lunette style, removable	Located at the forward end of the FDC. Tow bar can be locked upright.
Liquid level gauge	Located on top of tank. Indicates level of fuel in 1/4 tank increments .
Parking Brake Handle	Located on front / left . Used to set park brake during operation and storage. Not intended to STOP the unit underway, this is a parking brake system only.
Low Point drain (moisture drain valve)	Located left lower side, in front of rear tire. Used to remove moisture from tank or take samples.
Emergency Stop	Located left side, at control panel.
Lighted indicators	Yellow - “POWER” - meaning battery on. Green - “RUN” - meaning pump running.
Push Buttons	Left PB—”Start” - starts pump. Right PB—”Stop” - stops pump.
Dispensing Meter	Located left side pump cabinet.
Filter Housing GO/NO-GO indicator	Indicates when filter element needs to be changed.
Pump mode selection handle	Handle pulled out—defuel position Handle pushed in—fueling position
Tank-to-Pump Valve	Master valve allowing fuel into or out of main tank.
Battery Box	Houses two 12 volt batteries 125 Amp thermal circuit breaker with indicator 12 VDC Battery Charge Condition Indicator Battery Charger (externally mounted) Master ON/OFF switch

Section 4.0 BASIC OPERATION OF THE FDC

4.1 This section contains information necessary for the safe operation and maintenance of the FDC. The FDC is designed to provide a portable, safe, self-contained, fueling/ defueling system .

4.2 **Pre-Towing requirements.** Items in Table 4.0 need to be accomplished before towing the FDC .

CAUTION: **DO NOT back up the FDC using a tow vehicle. Damage to under carriage, steering assembly or tow bar may occur.**

Table 4.0 PRE-TOWING SAFETY CHECKLIST

ITEM DESCRIP-TION	PRE-TOWING CHECK	VISUAL INSPECTION	CORRECTIVE ACTION
Tires, Tire Pressure		Check for damage and proper tire inflation.	Replace tire if damaged. Inflate to manufacturers specifications on tire side-wall
Brakes		Ensure brakes lever is released	Release brake.
Tank		Visually inspect for cracks or leaks. Ensure Man way cover is closed and latched. Ensure tank is securely fastened to the rolling undercarriage.	Repair cracks or leaks before use. Tighten fasteners if loose.
Hoses, Nozzle, Grounding Clamps and wires		Ensure all hoses and ground wires clamps are secured for transportation. Inspect hoses, clamps and wires for servicea-bility.	Replace hoses, grounding clamps or wires before use if found to be beyond repair.
Valves		Visually inspect to ensure all valves are in the closed position. Check for leaks.	If leaks are found, repair or replace item before using.
Pump cabinet doors		Ensure all cabinet doors are closed and latched.	

4.3 Operational Definitions.

Top Loading Loading fuel by using the Man way cover for access to the tank.

Fueling Actions requiring fuel to be discharged through the FDC fuel nozzle.

Defueling Actions that involve removing fuel from an item other than the FDC

CAUTION Indicates an operation or condition that, if not observed, could result in equipment or property damage.

WARNING Indicates an operation or condition that, if not observed, could result in possible injury or death.

4.4 TOP LOADING:

WARNING: No overfill protection, visually monitor tank fluid level during Top Filling operations

A. Set Brake Lever forward
B. Chock tires if chocks are available

CAUTION: Improper grounding may result in an ignition source.

C. Connect static ground clamp to approved grounding point.
D. Ensure Tank to Pump valve is closed.
E. Open Man way cover.
F. Ground Source loading hose to FDC tank opening
G. Fill tank to required capacity.
H. Remove hose and ground connection.
I. Close and latch Man way cover.
J. Disconnect and store static ground clamps.

4.5 FUELING THE Equipment:

WARNING: Never operate the FDC in an enclosed area. Proper ventilation must be maintained at all times. All fuels are flammable, do not allow sources of ignition within 50 feet of the FDC.

A. Set brakes.
B. Chock tires if chocks are available.

CAUTION: Improper grounding may result in an ignition source.

C. Connect static ground wire with clamp to earth grounding point and ground wire with pin to approved aircraft grounding point.
D. Open cabinet doors.

E. From left side of pump cabinet reach in and open Tank-to-Pump valve.

WARNING: Do not attempt to charge batteries while using the FDC 12 Volt electric fuel pump, damage to charger will occur.

F. Uncoil and fully extend hose.
G. Remove Nozzle from stowed position and attach to hose end.
H. Reset meter.
I. At the control panel ensure fuel direction valves are pushed IN for fueling operations.
J. On battery box turn main power switch ON.
K. Ensure battery charge indicator indicates enough charge for operation.
L. Turn main pump ON by moving ON/OFF lever up.
M. Open fuel tank and insert nozzle.
N. Fill tank to desired capacity.
O. Remove nozzle, close fuel tank and turn off pump.
P. Turn main power switch OFF at battery box.
Q Remove nozzle and stow in nozzle holder.
R. Recoil hose and store.
S. Close Tank-to-Pump valve.
T. Close and secure pump cabinet doors.

4.6 DEFUELING THE Equipment:

WARNING: Never operate the FDC in an enclosed area. Proper ventilation must be maintained at all times. All fuels are flammable, do not allow sources of ignition within 50 feet of the FDC.

WARNING: No overfill protection during defueling operations. Ensure there is sufficient tank capacity to receive the amount of fuel being removed from the aircraft.

A. Set brakes
B. Chock tires if chocks are available.

CAUTION: Improper grounding may result in an ignition source.

C. Connect static ground wire.
D. Open cabinet doors.
E. From left side of pump cabinet reach in and open Tank-to-Pump valve.

F. Uncoil and fully extend hose.
G. Attach defuel adapter to end of hose.
H. Connect defuel adapter to appropriate defuel point.

CAUTION: Ensure proper venting of the fuel cell is accomplished prior to beginning defuel operations.

K. Reset fuel meter.
L. At the control panel ensure fuel direction valves are pulled OUT for defu eling operations.

M. Ensure battery charge indicator indicates enough charge for operation.
N. On battery box turn main power switch ON.
O. Turn main pump ON by moving ON/OFF lever up.
P. Turn off main pump.
Q. Remove fuel adapter from fuel tank and remove from hose end, stow in storage cabinet.
R. Turn off main battery switch.
S. Recoil hose and store.
T. Close Tank-to-Pump valve.
U. Close and secure pump cabinet doors.

4.7 FUEL MOISTURE REMOVAL: Low Point Drain/ Fuel Filter Housings.

The low point drain is located left side / lower. A brass valve with lever manu ally discharges a fuel/water sample or to drain the tank. The lever is spring loaded in the CLOSED position.

A. Set brakes.
B. Chock tires if chocks are available.
C. Procure approved fuel container that will assure containment for amount of liquid to be drained. Place under Low Point Drain Valve.
D. Open low point drain valve by pushing lever downward.
E. Drain sufficient quantity to remove water or attain sample.
F. Release handle to shut off flow.

Fuel Filter Housing - drain using same type of container

A. Open air vent on top of housing. (turn counter clockwise).
B. Place container under housing and open drain. (turn clockwise as viewed from the top).
C. Drain sufficient quantity to remove water from housing.
D. Close drain.

SECTION 5.0 INSPECTION AND MAINTENANCE

5.1 This section provides the basic requirements to maintain the FDC. The chassis and tank of the FDC requires minimal preventive maintenance. The tow bar and steering spindles use Oil Lite bronze bushings which require NO lubrication.

Table 5.0 Inspection Intervals and Component Maintenance Guide

COMPONENT	INTERVAL	CRITERIA	MAINTENANCE
Fueling Nozzle	Each use	- Cracks, Leaks	- Replace before using
Fuel Meter	Each use	- Leaks	- Repair or replace before using
Fuel Hose	Each Use	- Cuts, leaks	- Replace before using
Fuel Filter Housing	Each use	- Cracks, leaks	- Replace if cracked, determine cause of leaks and repair if possible, if leaks can not be repaired replace housing.
Pump cabinet plumbing	Each use	- Inspect all plumbing lines, tubes and clamps for cracks and leaks	- Cracks are unserviceable and item shall be replaced. Leaks should be repaired if possible, if item can not be repaired then replacement is due.
12 Volt batteries	6 Months	- Inspect battery cell fluid level	- Service as required - **To service batteries** disconnect 2 bolts holding pump cabinet to frame outboard of the filter housings, lift cabinet up and off, disconnect fuel pump wiring harness from battery box, remove battery box from right side of pump frame, place on level ground, remove box cover - Service batteries.
Wheel bearings	2 years	- Grooves, chips, discoloration	- Lubricate using approved wheel bearing grease. Slight discoloration is allowed. Severe discoloration, chips or grooves in bearing surfaces is cause for replacement.
Brakes	Each use	- Proper engagement	- Adjust as needed

SECTION 6.0 TROUBLESHOOTING THE FDC

6.1 The following troubleshooting guidelines are designed to cover most common types of problems with probable solutions to repair the condition.

TABLE 6.1 TROUBLE SHOOTING FOR FUELING/ DEFUELING OPERATIONS

FAULT	POSSIBLE CAUSE	CORRECTIVE ACTION
Low/ No discharge pressure at fuel nozzle	- Low battery charge - Fuel filter(s) restricted - Tank-to-Pump valve partially open - Fuel/Defuel T-handle not pushed in - Y-Strainer screen restricted	- Charge batteries - Inspect and replace if needed - Ensure valve is open (handle vertical) - Ensure T-handle is pushed in completely - Remove/ clean Y-Strainer screen
Low/ No Defueling Capability	- Low battery charge - Fuel filter(s) restricted - Tank-to-Pump valve partially open - Fuel/Defuel T-handle not pulled out - Y-Strainer screen restricted	- Charge batteries - Inspect and replace if needed - Ensure valve is open (handle vertical) - Ensure T-handle is pulled out completely - Remove/ clean Y-Strainer screen
12 Volt pump – weak or will not work	- Low/ No battery charge - Battery terminals/ cables corroded - Battery Cell(s) fluid low - Main Power switch in OFF position - Pump has internal damage - Pump has reached duty cycle - Circuit breaker has tripped	- Fully charge batteries - Inspect & clean, replace if necessary - Service cell(s) with distilled water - Turn Main Power switch ON - Replace pump - Wait 30 minutes and retry - Wait 30 minutes and retry
Fuel Meter has no indication of flow	- Main pump not turned ON - Tank-to-Pump valve CLOSED - Main tank empty - Fuel Meter internally broken	- Turn ON pump - OPEN Tank-to-Pump valve - Load fuel into tank - Replace fuel meter