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TRANSMITTAL LETTER

Revision 7 of the COMPONENT MAINTENANCE MANUAL 38-34-41 for Revolution™ Toilet, PNs 14330-514-205, 14330-514-206, 14330-514-207, and 14330-514-208 dated Apr 07/22 is attached and covers all components held by every operator.

FILING INSTRUCTIONS:

Replace previous revision with this document.
All page dates reflect the date of the most current revision.

HIGHLIGHTS

Pages which have been added, revised or deleted are outlined below together with the Highlights of the revision.

38-34-41 - Revision 7: List of Changes

Chapter-Section-Unit / Page No.	Description of Change
Front Matter - all pages	Revised all Front Matter to reflect this revision.
Pages:	
page INTRO-1, INTRO-2	Updated paragraph 2.A. Who To Contact.
page 3008	Updated paragraph 3.A. (7).
page 3013, 3014	Updated paragraphs 4.C. (10), (11), (16) & (22).
page 7008	Removed paragraphs 3.A. (13) thru (16). Re-numbered subsequent steps.
page 7011	Updated paragraphs 3.A. (17) thru (20).
page 7019, 7020	Updated paragraphs 4.C. (2), (18) & (20).
page 10011, 10013	Updated Numerical Index. (No change bars were used on these pages)
page 10022	IPL Figure 1: Revolution™ Toilet Assembly - Detail Parts List, Added /Updated items: -185A.
page 10032	Updated IPL Figure 4: Orbital™ Flush Valve (Sheet 2 of 2) graphic. Added item 360 call out.
page 10036	IPL Figure 4: Orbital™ Flush Valve - Detail Parts List, Added /Updated items: 360, 370, -370A.

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(29780)

COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST

REVOLUTION™ TOILET

PART NUMBER
14330-514-205
14330-514-206
14330-514-207
14330-514-208

RECORD OF REVISIONS

REVISION NO.	ISSUE DATE	DATE INSERTED	BY
0	Jan 18/16	Jan 18/16	
1	Jun 14/16	Jun 14/16	
2	Apr 16/18	Apr 16/18	
3	Dec 13/18	Dec 13/18	
4	Sep 20/19	Sep 20/19	SAU
5	Nov 04/20	Nov 04/20	SAU
6	Feb 01/21	Feb 01/21	WWS
7	Apr 07/22	Apr 07/22	WWS

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RECORD OF TEMPORARY REVISIONS

TEMPORARY REVISION NO.	ISSUE DATE	DATE INSERTED / INSERTED BY	DATE REMOVED / REMOVED BY	DATE INCORPORATED

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SERVICE BULLETIN LIST

SERVICE BULLETIN NO.	TITLE	ISSUE DATE	REVISION NO.	DATE INCORPORATED
14330-004-38-003	Toilet Assy Replacement	Apr 28/18	3	Dec 13/18
14330-514-38-001	Toilet Flush Valve Replacement	Mar 11/20	0	Sep 20/19

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LIST OF EFFECTIVE PAGES

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LIST OF FIGURES

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LIST OF TABLES

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INTRODUCTION

TASK 38-34-41-990-801-A01

1. General

A. Overview

This publication pertains to the Revolution™ Toilet, part number 14330-514-205, 14330-514-206, 14330-514-207, and 14330-514-208.

The design of the Revolution™ Toilet is such that removal of the main LRU's (rinse ring and anti-siphon valve assembly, toilet bowl, rinse valve, and flush valve / flush control unit) can be performed while the Revolution™ Toilet is installed in the aircraft.

This manual describes the units and their operation, gives detailed information about the components, and provides shop maintenance instructions for maintenance, fault isolation, and testing the units. The assemblies are manufactured by Water & Waste Systems.

TASK 38-34-41-990-802-A01

2. Product Support Services

A. Who To Contact

The unit is manufactured and supported by:

SAFRAN CABIN - WATER & WASTE SYSTEMS
1500 Glenn Curtiss St.
Carson, CA 90746
TEL: +1-310-884-7000
FAX: +1-310-884-7300

Spare Parts

Request for Quotation (Price, leadtime, availability)
spares.quote.wws@safrangroup.com

Orders (PO, shipping, Logistics, status)
spares.order.wws@safrangroup.com

AOGs
aog.wws@safrangroup.com

Repairs

Repairs/Warranty (capabilities, price, TAT, status)
repairs.wws@safrangroup.com

Products Technical Support

Technical question (product operations & maintenance)
techsupport.wws@safrangroup.com

Technical Publications

Tech Pubs Contact
techpubs.wws@safrangroup.com

Technical Publication Access and Index
https://techpub.services.safran-aerosystems.com

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3. Layout of Manual

A. This Manual

The information in this manual is divided into sections in accordance with Air Transportation Association, Specification i2200 to enable maintenance personnel to disassemble, clean, check, repair, assemble, troubleshoot, and test the assembly and its major components. An illustrated parts list is provided to locate, identify, and requisition parts.

TASK 38-34-41-990-804-A01

4. Revision Service

A. Revision Method

To ensure that the information contained in this manual reflects the most current maintenance procedures and parts list data, periodic revisions are provided to the customer. The revision includes:

* a letter of transmittal describing the reason for the changes,
* a highlights page with instructions on how to perform the revision process, and
* the revised data to be incorporated into the manual.

B. Service Bulletins

Service Bulletins, which are used to quickly disseminate new procedures or part availability, can be released at any time and their relevant information will be incorporated into the next revision of the manual.

C. Temporary Revisions

Temporary revisions can also be released at any time in order to provide a rapid means of providing new instructions to resolve transitory issues, and as their name implies, are temporary in nature. Temporary revisions are inserted in the manual as an ordinary revision, but are later removed from the manual upon their expiration date.

TASK 38-34-41-990-805-A01

5. Shop Verification

A. Verification Procedure

The sections within this manual have been verified at the manufacturer's facility by actual performance of the procedures, such as disassembly, assembly, and testing.

Testing / Fault Isolation	verified Sep 25, 2014
Disassembly	verified Sep 25, 2014
Assembly	verified Sep 25, 2014

TASK 38-34-41-990-806-A01

6. Facility and Equipment Requirements

A. Critical Component

This component is critical to the certified performance of the aircraft. It is therefore equally critical that all maintenance activities performed on this component be carried out strictly in accordance with the provisions of this publication. Only those parts identified in the Illustrated Parts List (IPL) of the CMM are approved replacement parts.

B. Calibrated Tools

All special tools and equipment must be calibrated within the intervals specified by the manufacturer, or a maximum interval of six months. All calibration procedures and standards must be traceable to the U.S. National Bureau of Standards, British Standards Institute, or equivalent national standards.

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7. Applicable Documents

This document can make reference to the following other documents:

FAA Advisory Circular AC 43.13-1b Acceptable Methods, Techniques, and Practices

FAA document H-8083-30 Aviation Maintenance Technician Handbook - General

CASA AC 21-99(0) Aircraft Wiring and Bonding

TASK 38-34-41-990-808-A01

8. MTOSS Codes

A. Explanation of MTOSS Codes

The Maintenance Task Oriented Support System (MTOSS) puts together standard and unique numbers to identify maintenance tasks and Subtasks.

A task is a procedure, such as testing or repairing an assembly or component. Tasks can be divided into Subtasks to specify processes for components or subassemblies.

B. Elements

(1) Elements 1, 2, and 3

Element Nos. 1, 2, and 3 of the MTOSS code are the ATA standard numbers for the chapter, section, and subject of a given task. No two manuals that are about different equipment made by the same manufacturer will have the same first three elements.

(2) Element 4

Element No. 4 is a three character code that defines the maintenance task to be done. Characters 1 and 2 are defined in "MTOSS Element 4 Codes" table on page INTRO-5. The third character is available for the user to develop more detailed codes.

(3) Element 5

Element No. 5 gives a unique, three character number to all tasks or Subtasks that have the same first four elements.

* Tasks use numbers 801 through 899.
* Subtasks use numbers 000 through 800.

(4) Element 6

Element No. 6 is a three character alphanumeric value that shows differences in such things as configurations and standard shop procedures.

(5) Element 7

Element No. 7 is a three character alphanumeric value for customer/airline use. It is not used in this manual.

MTOSS Element 4 Codes

00x	**REMOVAL/ DISASSY**	**40x**	**INSTALLATION**	**80x**	**MISCELLANEOUS**
01x	Removal	41x	Installation	81x	Fault isolation
02x	Remove modular sect.	42x	Install modular item	82x	Adjust, align, calibrate
03x	Disassemble section	43x	Assemble mod. item	83x	Rigging
04x	Disassemble subassy	44x	Install subassy	84x	SB incorporation
05x	Remove accessory	45x	Install removed items	85x	PN change
06x	Disassemble accessory	46x	Assemble accessory	86x	(unassigned)
07x	Disassemble subassy	47x	Install subassy	87x	Desc and Operation
08x	Remove test equipment	48x	Install test equipment	88x	Vendor process
09x	Disassemble support	49x	Assemble support equip	89x	Airline maint. program
10x	**CLEANING**	**50x**	**MATERIAL HANDLING**	**90x**	**UNASSIGNED**
11x	Chemical	51x	Shipping	91x	Special equip. maint.
12x	Abrasive	52x	Receiving	92x	Std. equip. maint.
13x	Ultrasonic	53x	Packing	93x	Tool fabrication
14x	Mechanical	54x	Unpacking	94x	Special tools, materials
15x	(unassigned)	55x	Storage	95x	IPL - detail parts list
16x	Misc. cleaning	56x	Positioning	96x	IPL - equip designator
17x	Washing	57x	Engine ferry	97x	(unassigned)
18x	Testing solutions	58x	(unassigned)	98x	(unassigned)
19x	(unassigned)	59x	(unassigned)	99x	Illustrations, tables, etc.
20x	**INSPECTION, CHECK**	**60x**	**SERVICING**		
21x	General visual	61x	Servicing		
22x	Detailed dimensional	62x	Preserving		
23x	Penetrant	63x	Depreserving		
24x	Magnetic	64x	Lubricating		
25x	Eddy current	65x	Fueling / defueling		
26x	X-Ray	66x	(unassigned)		
27x	Ultrasonic	67x	(unassigned)		
28x	Special	68x	(unassigned)		
29x	Borescope	69x	(unassigned)		
30x	**REPAIR**	**70x**	**TESTING**		
31x	Welding, brazing	71x	Oil flow		
32x	Machining	72x	Air flow		
33x	Stripping, plating	73x	Fuel flow		
34x	Plasma/flame spraying	74x	Water flow		
35x	Misc. repair	75x	Electrical / rtn to svc		
36x	Bonding/sealing	76x	Engine		
37x	Heat treating	77x	Accessory / BITE		
38x	Surface treating	78x	Pressure check		
39x	Riveting/flaring	79x	Leak check		

x = user-defined

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9. Abbreviations

Abbreviations that can be used in this manual are defined as follows:

Abbreviation	Description
AC	Alternating Current
ALT	Alternate
AMM	Aircraft Maintenance Manual
AR	As Required
ASSY	Assembly
ATA	Air Transport Association
ATP	Acceptance Test Procedure
CAGE	Commercial and Government Entity
Ch	Chapter
cm	Centimeter
CMM	Component Maintenance Manual
DPL	Detail Parts List
EFF	Effectivity
FCU	Flush Control Unit
Fig.	Figure
FRO	Future Replacement Order
HD	Head
ID	Inside Diameter
IPL	Illustrated Parts List
LG	Long
LH	Left-Hand
mA	Milli-amps (0.001 Amp)
max	Maximum
min	Minute (60 seconds)
min	Minimum
mm	Millimeter
NA	Not Applicable
NHA	Next Higher Assembly
No	Number
NONPROC	Non-Procurable

Abbreviation	Description
OD	Outside Diameter
PCB	Printed Circuit Board
PN	Part Number
PRFD	Preferred
REPLD BY	Replaced By
REPLS	Replaces
RF	Reference
RH	Right-Hand
RTV	Room Temperature Vulcanizing (silicone adhesive)
S/N	Serial Number
SB	Service Bulletin
SKT	Socket
SL	Service Letter
SUBS	Subsequent
SUPSD BY	Superseded By
SUPSDS	Supersedes
TBD	To Be Determined
THK	Thick
V	Vendor
V	Volts
VAC	Volts, Alternating Current
VDC	Volts, Direct Current

TASK 38-34-41-990-810-A01

10. Weights and Measures

A. English Values

All weights and measurements in the manual are in English units with metric equivalents in parentheses, unless otherwise noted.

B. Measurement Conversion Table

FROM SI MEASUREMENT	TO U.S. STANDARD SYSTEM
1 kPa	0.1450 psi
1 cm	0.3937 in.
1 cm^2	0.1550 in^2
1 N	0.2248 lbf
1 g	0.0353 oz
1 kg	2.2046 lb
1 kg/min	2.2046 lb/min
1 L	0.2642 gal (U.S.)
1 L/min	0.2642 gal(U.S.)/min
1 mm	0.0394 in.
1 N-m	8.8507 lbf-in
1 N-m	0.7376 lbf-ft

FROM U.S. STANDARD SYSTEM	TO SI MEASUREMENT
1 psi	6.8948 kPa
1 in.	2.54 cm
1 in.	25.4 mm
1 in^2	6.4516 cm^2
1 lbf	4.4482 N
1 oz	28.3495 g
1 inHg	3.3864 kPa
1 lb	0.4536 kg
1 lb/min	0.4536 kg/min
1 gal (U.S.)	3.7854 L
1 gal (U.S.)/min	3.7854 L/min
1 lbf-in	0.1130 N-m
1 lbf-ft	1.3558 N-m

C. Temperature Conversion Table

SI MEASUREMENT Degrees Celsius (°C)	TO U.S. STANDARD SYSTEM Degrees Fahrenheit (°F)
Degrees °C = (°F - 32) x 0.5555	Degrees °F = (°C x 1.8000) +32

D. Measurement Abbreviations Used in the Component Maintenance Manual

U.S. STANDARD SYSTEM		SI - METRIC SYSTEM	
ABBREVIATION	**DEFINITION**	**ABBREVIATION**	**DEFINTITION**
°F	degrees Fahrenheit	°C	degrees Celsius
ft	Foot	m	meter
gal (U.S.)	gallon (United States)	L	liter
in.	Inch	mm	millimeter
in^2	inch squared	mm^2	millimeter squared
ft^2	foot squared	cm^2	centimeter squared
lb	pound	kg	kilogram
lbf	pound force	N	newton
lbf-in	pound-inch (Torque)	N-m	newton-meter
lbf-ft	pound-foot (Torque)	N-m	newton-meter
inHg	inches of mercury	kPa	kilopascal
oz	ounce (weight)	g	gram
psi	pounds per square inch	kPa	kilopascal
gal (U.S.)/min	gallons (United States) per minute	L/min	liters per minute
lb/min	pounds per minute	kg/min	kilograms per minute

TASK 38-34-41-990-811-A01

11. Safety Advisory

A. Safety Procedures

The user of this publication must know the manufacturer / supplier information and follow the procedures, recommendations, warnings and cautions set forth for safe use, handling, storage, and disposal of such materials used in the Revolution™ Toilet.

WARNING: BEFORE USING ANY MATERIAL SPECIFIED IN THIS PUBLICATION, KNOW THE HANDLING, STORAGE, AND DISPOSAL PRECAUTIONS RECOMMENDED BY THE MANUFACTURER / SUPPLIER. IF THE MANUFACTURER'S OR SUPPLIER'S RECOMMENDATIONS ARE NOT OBEYED, ILLNESS OR PERSONAL INJURY CAN RESULT.

To prevent physical injury, all personnel directly or indirectly involved with the inspection, maintenance, repair, and/or overhaul of the equipment described in this manual must observe the following precautions:

* Observe all standard company safety rules and regulations.
* Ensure that the work area is well ventilated.
* Do not eat, drink, or smoke in equipment handling areas.
* Wear the proper personal protection equipment, including rubber gloves and a face splash shield during removal of assembly components.
* Thoroughly wash hands using soap and water after removing protective gear. This also applies after working on any assembly component.
* Use caution when working on or near electrical components.
* Some assembly components can be heavy and/or awkward to lift. To avoid injury or damage to other components, us an appropriate lifting device.
* Always wear safety goggles when working on or near equipment that is or can be pressurized.
* Follow all WARNINGS, CAUTIONS, and NOTES in this manual.

TASK 38-34-41-990-812-A01

12. Deleterious Materials

A. Assembly Materials

The assembly is constructed of a number of different high strength and light weight components, and is built to high standards and close tolerances to assure long life and minimal maintenance.

During the maintenance or repairs, service personnel can be tempted to use alternative cleansers, solvents, lubricants, and adhesives other than those recommended by this publication. Be advised that there are many common everyday chemicals which will have a corrosive or damaging effect on various parts, such as rubber seals and O-rings, flexible hoses, and other plastic and electrical components.

B. Incompatible Materials

To assure a long service life, avoid using chemicals and materials known to be incompatible or harmful to the materials used in the construction of the Revolution™ Toilet.

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DESCRIPTION AND OPERATION

TASK 38-34-41-991-801-A01

1. General

A. Overview

The toilet assembly covered in this manual is part of the vacuum waste system designed to provide an aircraft sanitation system for in-flight and ground operations, serving as an inlet point for receiving waste products and transporting waste to an aircraft waste holding tank.

The Revolution™ Toilet is provided in two configurations (see Figure 1). The -205 and -207 assemblies are for left hand installations, and the -206 and -208 assemblies are for right hand installations. The primary differences between the toilet assemblies are the direction of the discharge outlet, and the location of the Maintenance switch.

TASK 38-34-41-991-802-A01

2. Description

A. Toilet Assembly (Refer to Figure 1)

The Revolution™ Toilet is innovatively designed to enhance performance with low maintenance features. The essential components of the toilet, such as the rinse ring, rinse valve, toilet bowl, and flush valve can easily and quickly be removed for service, replacement, or repair either on-wing or while the toilet is in the shop for overhaul. Refer to DISASSEMBLY section, paragraph 3. and ASSEMBLY section, paragraph 3. of this CMM for easy removal and installation steps.

(1) Toilet Bowl

The toilet bowl is made of a high density polyethylene (HPDE) with a smooth inside surface. The bowl mounts onto a support pedestal constructed of carbon fiber laminate. The top of the bowl is large and has steep sides to allow waste to collect at the vacuum inlet for evacuation. The surface curves in a continuous fashion and is free from any recesses or inaccessible areas. Mounted at the top rim of the bowl is the rinse ring.

(2) Rinse Ring

The rinse ring, fabricated from injected molded plastic and fitted with spray nozzles, is mounted on the upper rim of the bowl. The spray nozzles direct an even spray of rinse water onto the sides of the toilet bowl. The rise ring's inlet connects to the anti-siphon valve.

NOTE: After a shroud is installed over the toilet, the rinse ring is hidden from the passengers' view. Only a small portion of the lower shield is visible to the passenger.

(3) Rinse Valve

The rinse valve is an electronically controlled solenoid valve. Upon activation, water flows through the valve to the anti-siphon valve. The rinse valve incorporates an integral water inlet fitting for the aircraft interface and an inlet screen.

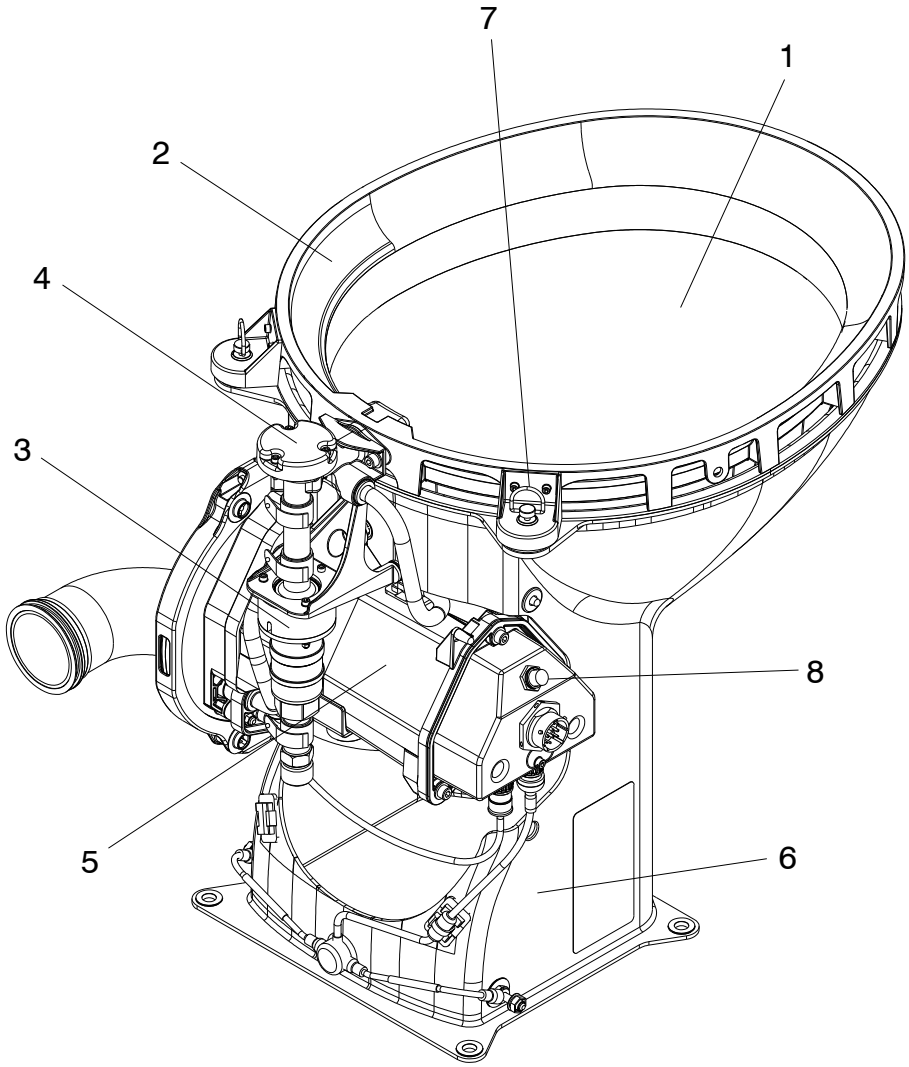
(4) Anti-siphon Valve

The anti-siphon valve is designed to prevent contamination of the aircraft potable water supply by breaking contact of the fluid and providing an air gap which prevents reverse flow from the toilet bowl. Rinse water is supplied to the anti-siphon valve by the rinse valve.

(5) Integrated Flush Valve / Flush Control Unit

The Orbital flush valve assembly connects the toilet bowl to the vacuum discharge line. This valve is a motor-actuated, self-contained unit. The gate of the valve is an arc-shaped plate with a concentric hole of the same diameter as those in the valve housings. This opening provides the connection between the toilet bowl and discharge plumbing. During the flush cycle, a spur-gear train in the assembly revolves the slide plate on its center. As the disc revolves, it slides between the seals and orbits the hole into alignment with the openings in the valve housings, thereby permitting passage of waste from the toilet to the discharge plumbing.

Integral to the flush valve is a Flush Control Unit (FCU) - a modular electronic assembly mounted within the same Ultem case of the flush valve's motor and gear train. A discrete logic circuit monitors and controls operation of the toilet by timing and sequencing the various components during the flush cycle. The flush control unit is electrically connected to the flush switch, rinse valve, flush valve motor and sensors, and aircraft vacuum generator control module. A maintenance switch permits operation of the flush valve and vacuum generator for ground maintenance.



1. Bowl
2. Rinse Ring
3. Rinse Valve
4. Anti-siphon Valve
5. Integrated Flush Valve / FCU
6. Pedestal
7. Quick Release Fastener
8. Maintenance Switch

Figure 1: Vacuum Toilet Assembly
(14330-514-205 shown)

B. Other Components

Other additional (customer supplied) components necessary or convenient for the proper operation of the toilet assembly are:

(1) Toilet Paper / Sanitary Napkins

Sanitary wipes necessary in the later phases of toilet usage.

(2) Toilet Seat and Lid

The toilet seat and lid fit over the toilet bowl.

(3) Shroud

The shrouds fits over the toilet bowl, covering the toilet assembly.

(4) Flush Switch

An electrical switch used to initiate a flush cycle, instead of the usual flush lever.

(5) Toilet Rinse Water

The aircraft's on-board potable water system connects to the rinse valve supplying the toilet with rinse water used during a flush cycle.

(6) Vacuum

The vacuum waste system utilizes the natural low pressure available outside the aircraft cabin at cruising altitudes, resulting in a motive force that requires no power.

As long as the cabin differential pressure is greater than 7.36 psi (approximately the difference between sea level and 18,000 ft (5486 m)), the cabin/ambient differential pressure is sufficient to move the waste material unaided. At lower altitudes, a vacuum generator is activated to create the differential pressure necessary to move the waste material.

(7) Toilet Drain Plumbing

Plumbing and piping connections connecting the toilet(s) to the waste storage tank.

(8) Waste Storage Tank

A on-board storage tank that holds the materials collected from the toilet(s).

(9) Other indicators and switches

Other indicators (Toilet Fault, Waste Tank Full, Waste Tank In Service, Status 1, Status 2, Status 3) and/or switches can be installed elsewhere in the aircraft which display and control other vacuum toilet and waste management system functions.

These components can be mentioned in following sections, but their operation and maintenance are outside the scope of this manual.

TASK 38-34-41-991-803-A01

3. Operation

A. Overview

Unlike ordinary household toilets that use gravity-driven water to remove waste from the toilet bowl, this system uses differential air pressure (vacuum) to draw the waste from the bowl through the plumbing into a waste storage tank located elsewhere in the aircraft.

This design allows for a robust waste collection system that performs well on the ground or in flight, in smooth air or in turbulence, eliminates unwanted odors from the cabin, uses a minimum of aircraft power and water resources, and is easy to service and maintain.

B. The Flush Cycle

The operation of the toilet begins and ends with the flush cycle. Pressing an electrical switch in the aircraft lavatory (the Flush switch) initiates the flush request, and the following steps occur:

(1) Flushing Is Enabled

The flush control unit checks to see if there are any disabling conditions that would prevent a flush. Such disabling conditions are:

(a) A flush cycle is already underway

The toilet is already performing a flush. The flush switch will be ignored until the current flush cycle in progress has completed.

(b) The waste tank is full

The waste tank's quantity indicator reports to the system controller that the waste tank is full, and cannot accept any more material. The toilet is disabled until the waste tank's "not full" condition is restored.

(c) Servicing is in progress

The "Service Panel Door Open" sensor reports to the system controller that the aircraft's service panel door (on the aircraft's exterior) is open. The toilet is disabled until the service panel door is closed.

If none of these conditions are present, the flush cycle can proceed.

(2) Vacuum Generator Activated

A signal is sent to the vacuum generator to spool up, creating the differential pressure (vacuum) necessary to transport material through the waste lines.

NOTE: If the aircraft is at an altitude of approximately 16,000 ft (4876 meters), the differential pressure between the cabin and the outside ambient pressure is sufficient vacuum to transport the material, and use of the vacuum generator will not be required.

After approximately 3 seconds, the flush cycle proceeds.

(3) Flush Valve Opens

The flush valve motor activates, rotating the flush valve's slide plate until the flush valve detects the "open" position, when dynamic braking is applied to stop the motor, leaving the valve open.

The vacuum then sucks the contents out of the toilet's bowl, past the flush valve, through the drain lines and into the waste storage tank.

(4) Rinse Valve Opens

Concurrently with the flush valve, the flush control unit energizes the rinse valve solenoid, opening the valve. Potable water flows through the rinse valve to the anti-siphon valve, unseating the poppet. The water continues to flow out to the rinse ring, mixes with air, and discharges through the rinse ring's spray nozzles, covering the sides of the bowl, moving the waste toward the open flush valve.

(5) Rinse Valve Closes

After approximately 1 second, the flush control unit de-energizes the rinse valve solenoid, closing the valve and shutting off the flow of water. Gravity pulls any water remaining in the rinse ring to drain into the bowl, introducing an air gap and simultaneously re-seating the anti-siphon valve poppet. This feature prevents contamination of the potable water supply by breaking fluid continuity between the potable water in the supply passage and the waste water in the toilet bowl.

(6) Flush Valve Closes

Approximately 4 seconds after it had opened, the flush valve motor activates, rotating the flush valve's slide plate until the flush valve senses the "close" position, when dynamic braking is applied to stop the motor, leaving the valve closed.

(7) Vacuum Generator Shuts Off

The vacuum generator (if it was called upon) is deactivated.

The toilet stands ready to perform another flush.

C. Abnormal Conditions

(1) Jammed Flush Valve

The toilet is capable of detecting a flush valve that cannot close (jammed). The condition is detected by sensing an overload in the flush motor, and/or the flush valve's reed switch not being sensed.

If the valve remains jammed after three flush cycles, an alert signal is generated, which can be routed to a maintenance panel to alert the crew to the toilet's status. The signal will remain active until the obstruction is cleared.

The toilet remains operable, although noisy, even with a jammed valve.

(2) Maintenance Mode

For ease of maintenance, a switch (the Maintenance switch) is included to aid the ground crew in clearing obstructions and fault isolation problems. For more information, refer to paragraph D., ”Maintenance Mode” on page 8.

D. Maintenance Mode

A Maintenance switch on the integrated flush valve and flush control unit permits the flush valve to be operated for ground maintenance.

(1) Open Flush Valve

Pressing the Maintenance switch initiates a maintenance mode, which opens the flush valve and maintains it in the open position, but does not activate the vacuum generator.

(2) Run Vacuum Generator for 10 Seconds

Pressing the Maintenance switch and holding it for at least one full second activates the vacuum generator for 10 seconds.

(3) Close Flush Valve and Exit Maintenance Mode

Pressing the Flush switch closes the flush valve, exits maintenance mode, and restores the toilet to normal operating status.

NOTE: Turning the power off, then on, also exits maintenance mode and restores the toilet to normal operating status.

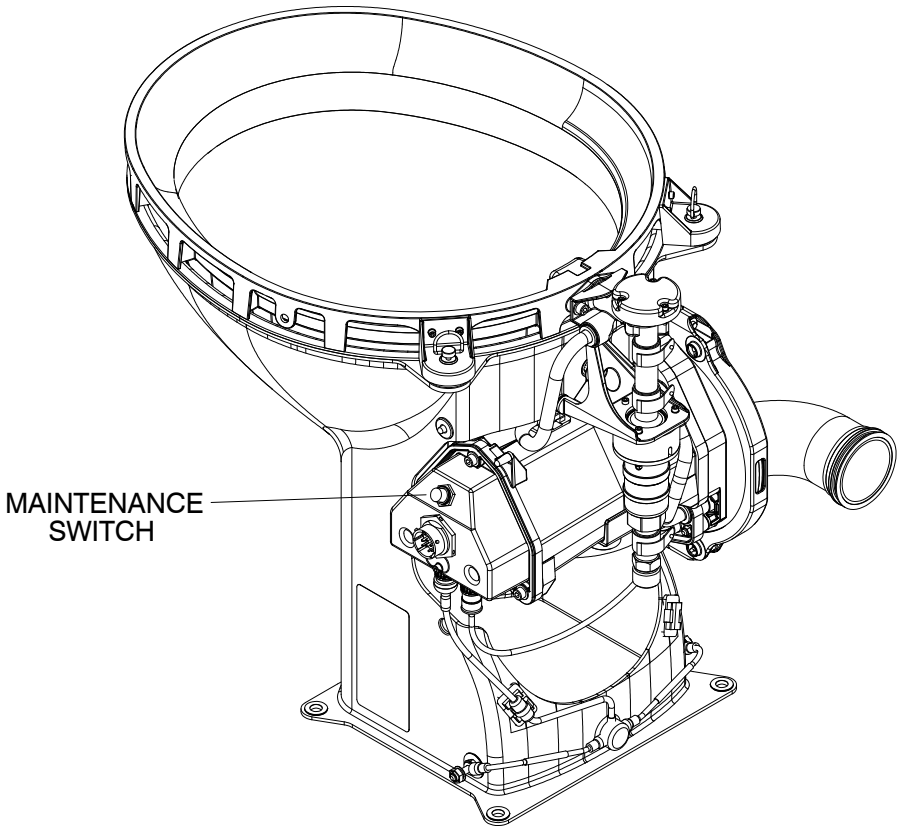


Figure 2: Maintenance Switch Location

TASK 38-34-41-991-804-A01

4. Leading Particulars

A. Revolution™ Toilet

Refer to Table 1 for the leading particulars for the Revolution™ Toilet.

Table 1: Leading Particulars

Part Number	14330-514-205	(LH, Elbow outlet)
	14330-514-206	(RH, Elbow outlet)
	14330-514-207	(LH, Stub outlet)
	14330-514-208	(RH, Stub outlet)
Dimensions		
Height	16.01 in.	(406.7 mm)
Width	13.67 in.	(347.2 mm)
Depth (incl. anti-siphon valve)	18.63 in.	(473.2 mm)
Weight		
Empty weight	9.5 lbs	(4.3 Kg)
Power Requirements		
Standby	0.17 amps @ 28 VDC	
Operating	5.0 amps @ 28 VDC, max	
Operating Limitations		
Pressure altitude limits	-1000 to 10,000 ft.	(-305 m to 3,048 m)
Ambient temperature limits	33 to 160°F	(0.6 to 71°C)

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TESTING AND FAULT ISOLATION

TASK 38-34-41-700-801-A01

1. General

This section describes the equipment and procedures used for testing and fault isolation of the Revolution™ Toilet. These procedures must be performed to determine the extent of disassembly required for repair, and/or following overhaul of the unit.

TASK 38-34-41-700-802-A01

2. Test Equipment and Materials

Subtask 38-34-41-700-001-A01

A. Test Equipment Requirements

Calibration of test equipment and measuring instrumentation must be current and in conformance with established quality control procedures when tests are conducted. All measurements must be made with precision instruments whose accuracy has been certified. All equipment used must be in good operating condition.

Subtask 38-34-41-700-002-A01

B. Required Equipment

Standard shop equipment, along with the equipment listed in Figure 1001, “Test Equipment,” on page 1002 can be used to test the Revolution™ Toilet.

NOTE: Equivalent substitutes can be used for listed items.

Table 1001: Test Equipment

Equipment	Equipment's Specification		Source or CAGE Code	Representative Type (Model, Part No)
	Characteristics	Range Accuracy Tolerance		
Test setup for Revolution™ Toilet (IPL 1, 1) with:				
Test fixture for vacuum toilet (IPL 1, 1)			Fabricated by the operator; refer to Figure 1004	
Test harness for vacuum toilet (IPL 1, 1)			Fabricated by the operator; refer to Figure 1005	
Water pressure regulator	0 to 125 psi (0 - 862 kPa)	± 2%	McMaster Carr Supply Co. (V39428)	3823T32
Water pressure gauge	0 - 125 psi (0 - 862 kPa)	± 2%	Ashcroft Inc. (V38056)	451010A02L125
Shutoff valve (vacuum line)	Size as req'd		Commercially available	
Vacuum gauge	0 - 30 in. Hg (0-1016 mbar)	± 2%	Ashcroft Inc. (V38056)	451010A02L -100
Water tank w/ drain valve & water separator	5 gal (20 L)		Commercially available	
Shutoff valve (drain line)	Size as req'd		Commercially available	
Catch pan	1/2 gal (2 L)		Commercially available	
Various plumbing & connections	Size as req'd		Commercially available	

Table 1001: Test Equipment (Continued)

Equipment	Equipment's Specification		Source or CAGE Code	Representative Type (Model, Part No)
	Characteristics	Range Accuracy Tolerance		
Power Supply, DC	0 - 36 VDC 0 - 6 Amps	0.01%	TDK-Lambda Americas, Inc. (V89022)	Z36-6-U
-or- Alternate test setup for Revolution™ Toilet (IPL 1, 1) with:				
Vacuum Toilet Test Stand (VTTS)	110 VAC -or- 220 VAC		(V29780) Refer to Figure 1006	18000-001 (non-procurable) -or- 18000-003-203 -or- 18000-003 (non-procurable) -or- 18000-003-201
VTTS test harness for vacuum toilet (IPL 1, 1)			(V29780) Refer to Figure 1007	18300-011

Table 1001: Test Equipment (Continued)

Equipment	Equipment's Specification		Source or CAGE Code	Representative Type (Model, Part No)
	Characteristics	Range Accuracy Tolerance		
Additional test equipment for Revolution™ Toilet (IPL 1, 1)				
Digital Multimeter	0 - 500 VDC	± 0.5%	Fluke Corporation (V89536)	83-III -or- 83 series V -or- 87 series V
Stopwatch	0 - 60 min.	± 0.1 sec	Commercially available	
Dielectric & insulation resistance tester	1240 VAC, 60 Hz 1000 VDC	hi limit: 10 mA lo limit: 0 mA hi trip: 0 Megohms lo trip: 1 Megohms	Slaughter Co. (V05611)	2975

Table 1001: Test Equipment (Continued)

Equipment	Equipment's Specification		Source or CAGE Code	Representative Type (Model, Part No)
	Characteristics	Range Accuracy Tolerance		
Test setup for Rinse Valve (IPL 1, 185) with:				
Test fixture for rinse valve (IPL 1, 185)			Fabricated by the operator; refer to Figure 1009	
Test harness for rinse valve (IPL 1, 185)			Fabricated by the operator; refer to Figure 1010	
Power supply, DC	0 - 36 VDC 0 - 6 Amps	0.01%	TDK-Lambda Americas, Inc. (V89022)	Z36-6-U
Water pressure regulator	0 - 200 psi (0 - 862 kPa)	± 2%	McMaster-Carr (V39428)	9796K19
Water pressure gauge	0 - 200 psi (0 - 862 kPa)	± 2%	Ashcroft Inc. (V38056)	451010A02L200
Shutoff valve (2 req'd)	Size as req'd		Commercially available	
Various plumbing connections	Clear, size as req'd		Commercially available	
Clamp, hose	Size as req'd		Murray Corp. (V76599)	HXXSS XX= size 6: 0.44 to 0.78 8: 0.44 to 0.91 10: 0.56 to 1.06 12: 0.69 to 1.25 16: 0.75 to 1.50 20: 0.81 to 1.75
Bucket	Clear with graduated markings	22 qt (20 L)	Cambro Manufacturing Co. (V21669)	RSFCW22

Table 1001: Test Equipment (Continued)

Equipment	Equipment's Specification		Source or CAGE Code	Representative Type (Model, Part No)
	Characteristics	Range Accuracy Tolerance		
-or- Alternate test setup for Rinse Valve (IPL 1, 185) with:				
Vacuum Toilet Test Stand (VTTS) -or- 220 VAC	110 VAC		(V29780) Refer to Figure 1011, Figure 1012	18000-001 (non-procurable) -or- 18000-003-203 -or- 18000-003 (non-procurable) -or- 18000-003-201
VTTS test harness for rinse valve (IPL 1, 185)			Fabricated by the operator; refer to Figure 1013	

Table 1001: Test Equipment (Continued)

Equipment	Equipment's Specification		Source or CAGE Code	Representative Type (Model, Part No)
	Characteristics	Range Accuracy Tolerance		
Additional Test Equipment for Rinse Valve (IPL 1, 185)				
Digital Multimeter	0 - 30.0 VDC 0 - 3.0 Amps	± 0.1 VDC ± 0.1 Amps	Fluke Corporation (V89536)	83-III -or- 83 series V -or- 87 series V
Dielectric & insulation resistance tester	1240 VAC, 60 Hz 1000 VDC	hi limit: 10 mA lo limit: 0 mA hi trip: 0 Megohms lo trip: 1 Megohms	Slaughter Co. (V66M98)	2975
Stopwatch	0 - 60 min.	± 0.1 sec	Commercially available	
Test setup for flush valve (IPL 1, 215) with:				
Vacuum Toilet Test Stand (VTTS)	110 VAC -or- 220 VAC		(V29780) Refer to Figure 1014	18000-001 (non-procurable) -or- 18000-003-203 -or- 18000-003 (non-procurable) -or- 18000-003-201
VTTS test harness for Airbus A320 series			(V29780) Refer to Figure 1007	18300-011

Table 1001: Test Equipment (Continued)

Equipment	Equipment's Specification		Source or CAGE Code	Representative Type (Model, Part No)
	Characteristics	Range Accuracy Tolerance		
Additional test equipment for flush valve (IPL 1, 215)				
Stopwatch	0 - 60 min.	± 0.1 sec	Commercially available	
Hose	Flexible vinyl, 3/4" OD x 12" lg (1.9 cm x 30.5 cm lg)		Commercially available	
Measuring cup	0 - 16 oz. (0 500 ml)		Dow Corning Corp. (V71984)	PYREX beaker, Low Form, 500 ml

Subtask 38-34-41-700-003-A01

C. Required Materials

Standard shop materials can be used to test the Revolution™ Toilet.

TASK 38-34-41-710-801-A01

3. Assembly Testing

Subtask 38-34-41-710-001-A01

A. Toilet Assembly

(See IPL Figure 1)

(1) Test Unit

Prior to testing, the Revolution™ Toilet must be in a clean condition, free of all waste and residue. Refer to CLEANING as required.

(2) Test Conditions

Refer to the following for the test condition guidelines.

*	Temperature	+40º - 100º F (+4.4º - 37.8º C)
*	Atmospheric Pressure	28.0 - 31.0 in. Hg (948 - 1050 mbar)
*	Relative Humidity	0% - 90%

(3) Test Fluid

The Test fluid listed herein must be ordinary unfiltered tap water.

(4) Visual Inspection

(a) Perform a visual inspection of the Revolution™ Toilet for general appearance, completeness of assembly, and workmanship.

There must be no defects, anomalies, sharp edges or corners on the unit.

(b) Examine the test unit for loose or missing fasteners, fittings, and electrical connectors.

1 Make sure that the bowl -to- flush valve connector is properly engaged.

2 Make sure that the rinse valve -to- rinse ring connector is properly engaged.

3 Make sure that the anti-siphon valve -to- rinse ring connector is properly engaged.

4 Make sure that the rinse ring quarter-turn fasteners -to- the bowl are properly engaged.

There must be no loose, missing, or damaged, or corroded fasteners, fittings, or electrical connectors.

(c) Examine all placards and part identification.

Placards must be firmly affixed with no curling, peeling, bubbling, or other signs of de-bonding from the test unit. All information on the placards must be visible with no scratches, pits, or discoloration impairing its readability. Ink-stamped information must be clearly visible without signs of fading, peeling, cracking, or chipping.

(5) Electrical Test Inspection

CAUTION: BONDING RESISTANCE AND DIELECTRIC TESTING CAN USE HIGH VOLTAGES THAT CAN DEGRADE THE INSULATION OF THE COMPONENT.
TO AVOID DAMAGE TO THE TEST UNIT, THE LISTED TEST VOLTAGES ARE 80% OF THE MAXIMUM ALLOWABLE VOLTAGE. PERFORMING THE TESTS USING A HIGHER VALUE CAN DAMAGE THE COMPONENT OR ITS INSULATION.

(a) Dielectric Strength Test.

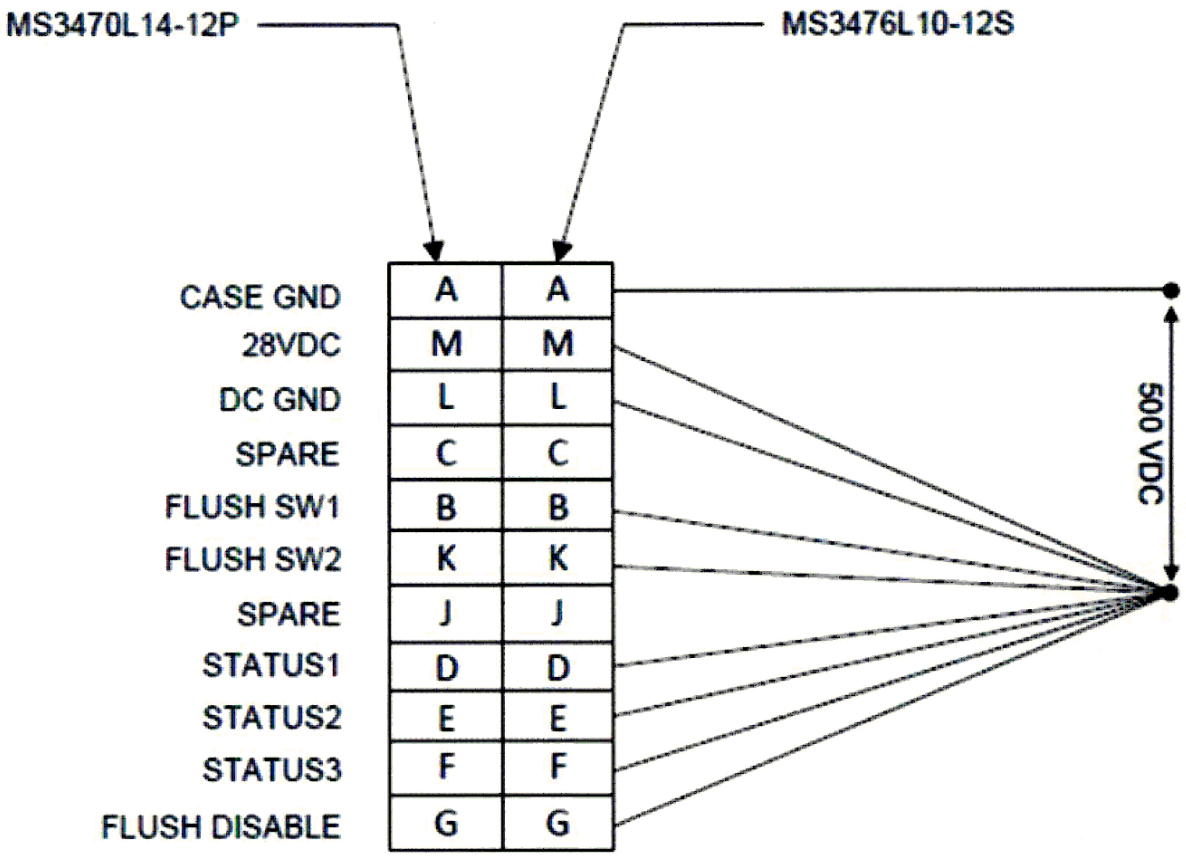


Figure 1001: Dielectric Test Connection

1 Connect all pins except pin A (Case Ground pin) together as one bundle.

2 Apply 400 VDC progressively over a period of 20 seconds between the individually isolated bundle and pin A.

3 Wait for at least 1 minute, then examine the leakage current.

The leakage current must not exceed 1.0 mA.

No perforation, evidence of damage due to arcing, flashover, or insulation breakdown must be permitted.

The test voltage must not have decreased greater than 10% during the dielectric test.

4 Gradually remove 400 VDC.

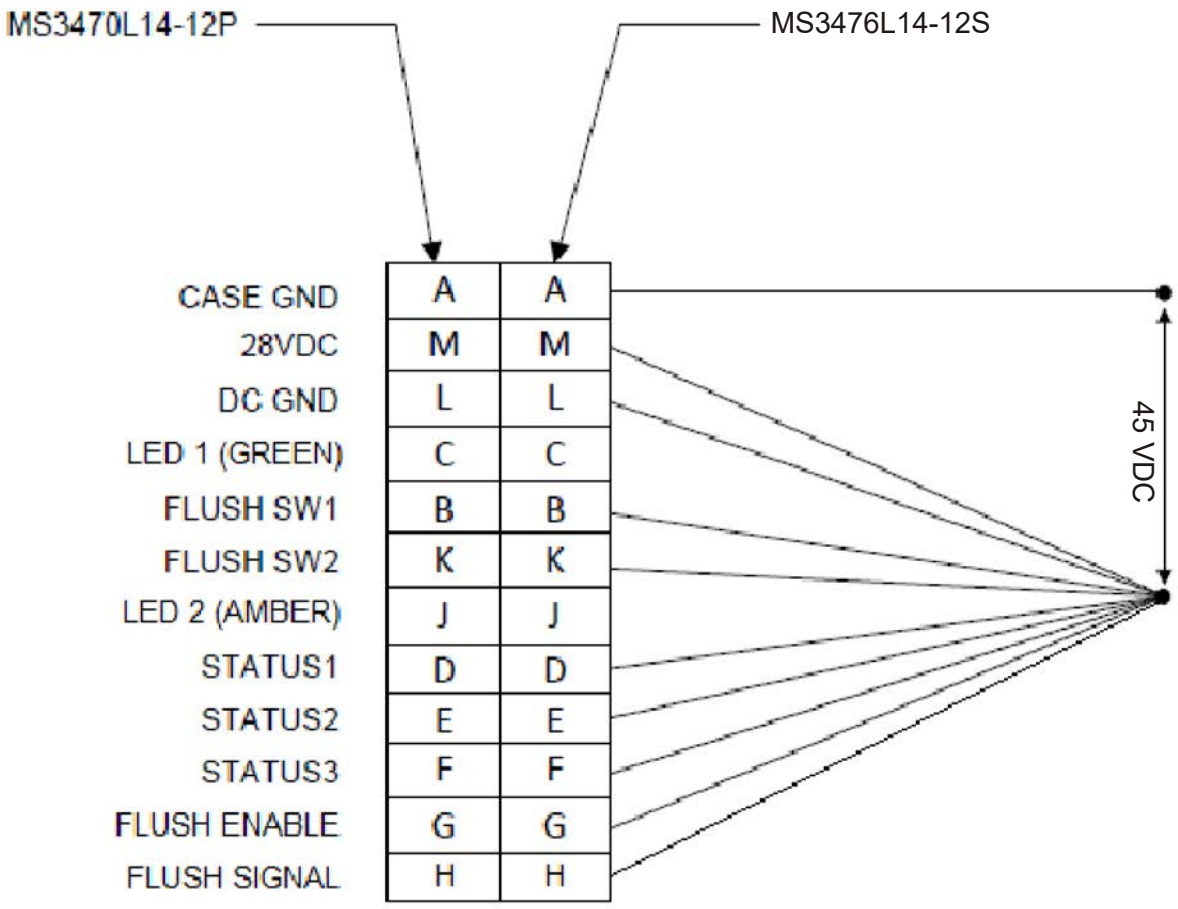


Figure 1002: Insulation Resistance Test Connection

(b) Insulation Resistance

1 Refer to Figure 1002. Consider pin A as “Group 1.”

2 Connect pins B, C, D, E, F, G, J, K, L, M together as one bundle as “Group 2.”

3 Apply a potential of 45 VDC ± 2% between Group 1 and Group 2.

The insulation resistance must be greater than 100 Megohms.

(c) Grounding and Bonding Resistance

1 Connect the insulation resistance tester (Table 1001) to the toilet as required.

2 Measure the resistance between the grounding fastener and the following toilet locations (refer to Figure 1003):

a Aircraft connector housing [A]

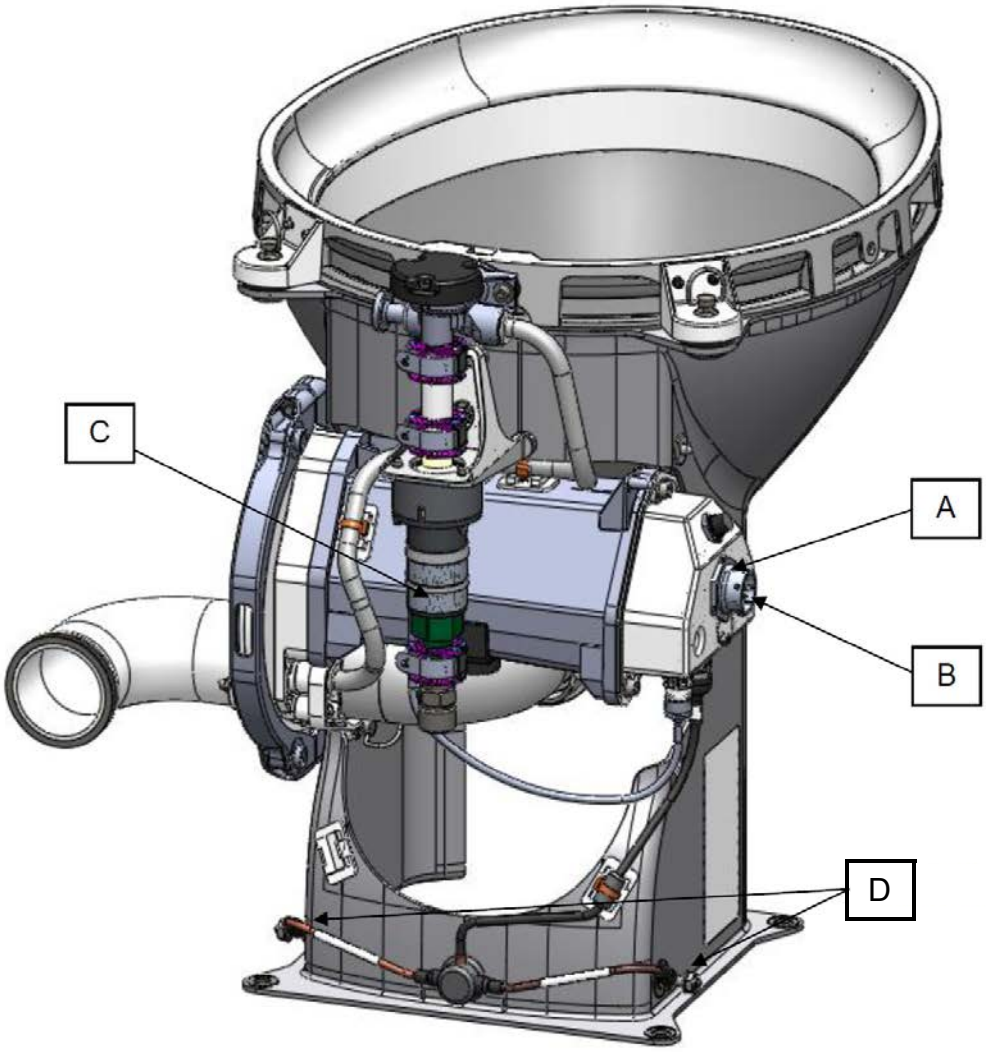
The resistance value must not exceed 0.020 ohms.

b Aircraft connector Pin A [B]

The resistance value must not exceed 0.020 ohms.

c Rinse Valve housing [C]

The resistance value must not exceed 0.020 ohms.



[A] Aircraft connector housing
[B] Aircraft connector Pin 1
[C] Rinse Valve housing
[D] Grounding locations

Figure 1003: Maintenance Switch and Bonding Locations

(6) Test Setup

The test setup simulates the operation of the assembly. All supply connections are incorporated in the test setup.

(a) Place the test unit (the Revolution™ Toilet) on the test setup. Refer to Figure 1004 or Figure 1006.

NOTE: Tests can be performed using the alternate test setup shown in Figure 1006 as a source of water, vacuum, and power. For additional testing and diagnostic features that the VTTS can offer, refer to the VTTS documentation.

(b) Connect a water source to the rinse valve inlet. Adjust the water pressure to 25 ± 1 psi (1.72 ± 0.07 bar).

(c) Connect a vacuum source to the drain outlet. Adjust the vacuum to 17.5 ± 0.4 in. Hg (593 ± 14 mbar).

(d) Connect the test harness (refer to Figure 1005 or Figure 1007) to the test unit.

(e) Connect the power supply (Table 1001) to the test harness. Turn on the power supply and adjust the voltage to 28.0 ± 0.1 VDC. Turn Off the Flush Enable switch.

(f) Verify the functioning of all supply systems (water, vacuum, electrical).

(g) Perform a flush cycle (press the Flush switch) two (2) times to make sure that all water supply lines are free of air pockets, etc.

(h) Verify the Flush-In-Progress LED illuminates for approximately 15 seconds during each flush.

(i) Check for any water or vacuum leaks. Repair the test setup as necessary.

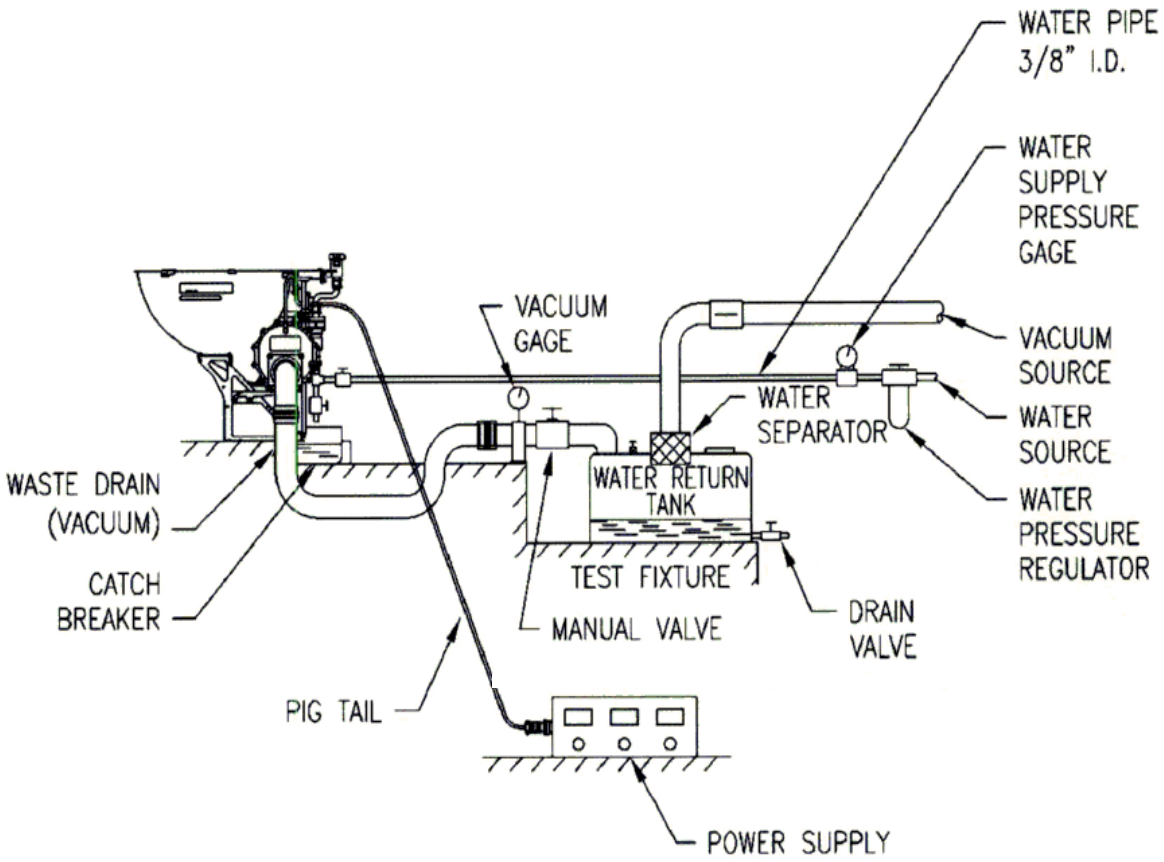
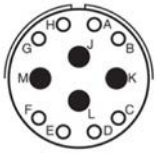
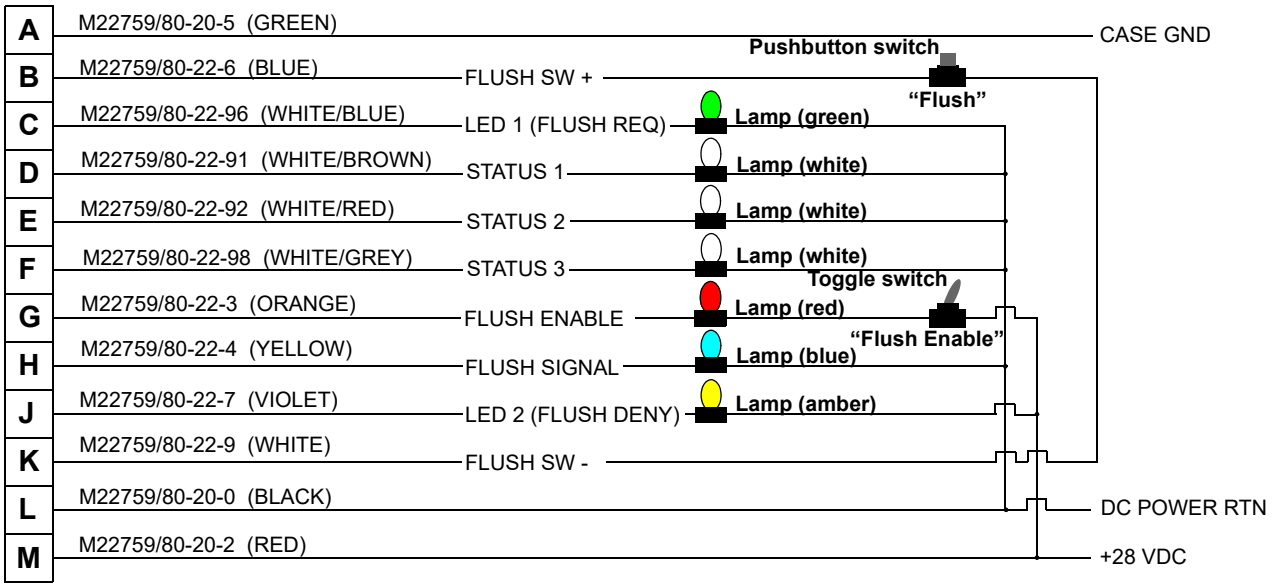


Figure 1004: Test Setup for Toilet Assembly 14330-514-series
(To be Fabricated by the Operator)

To Orbital Flush Valve / FCU PN 18587-201 connector J4





SUGGESTED PARTS LIST

NOTE: Equivalent substitutes can be used for listed items.

QTY	ITEM	PN:	SOURCE
(1)	CONNECTOR, RECEPTACLE	MS3470L14-12S	Commercially available
(7)	SOCKET, LAMP, T 3 1/4	BA9s	Commercially available
(1)	LAMP, WHITE, T3 1/4 BAYONET 28V	586-2406-105F	Dialight (V83330)
(1)	LAMP, BLUE, T 3 1/4 BAYONET 28V	586-2405-105F	Dialight (V83330)
(1)	LAMP, GREEN, T3 1/4 BAYONET 28V	586-2402-105F	Dialight (V83330)
(1)	LAMP, YELLOW, T3 1/4 BAYONET 28V	586-2403-105F	Dialight (V83330)
(1)	LAMP, RED, T3 1/4 BAYONET 28V	586-2401-105F	Dialight (V83330)
(1)	SWITCH, TOGGLE, SPST, OFF-ON ("Flush Enable")	MS24523-22	Commercially available
(1)	SWITCH, PUSHBUTTON, OFF-(ON) ("Flush")	MS25089	Commercially available
(AR)	Wire (sizes and colors as shown)	- - -	Commercially available

Figure 1005: Test Harness for Toilet Assembly PN 14330-514-series (To be Fabricated by the Operator)

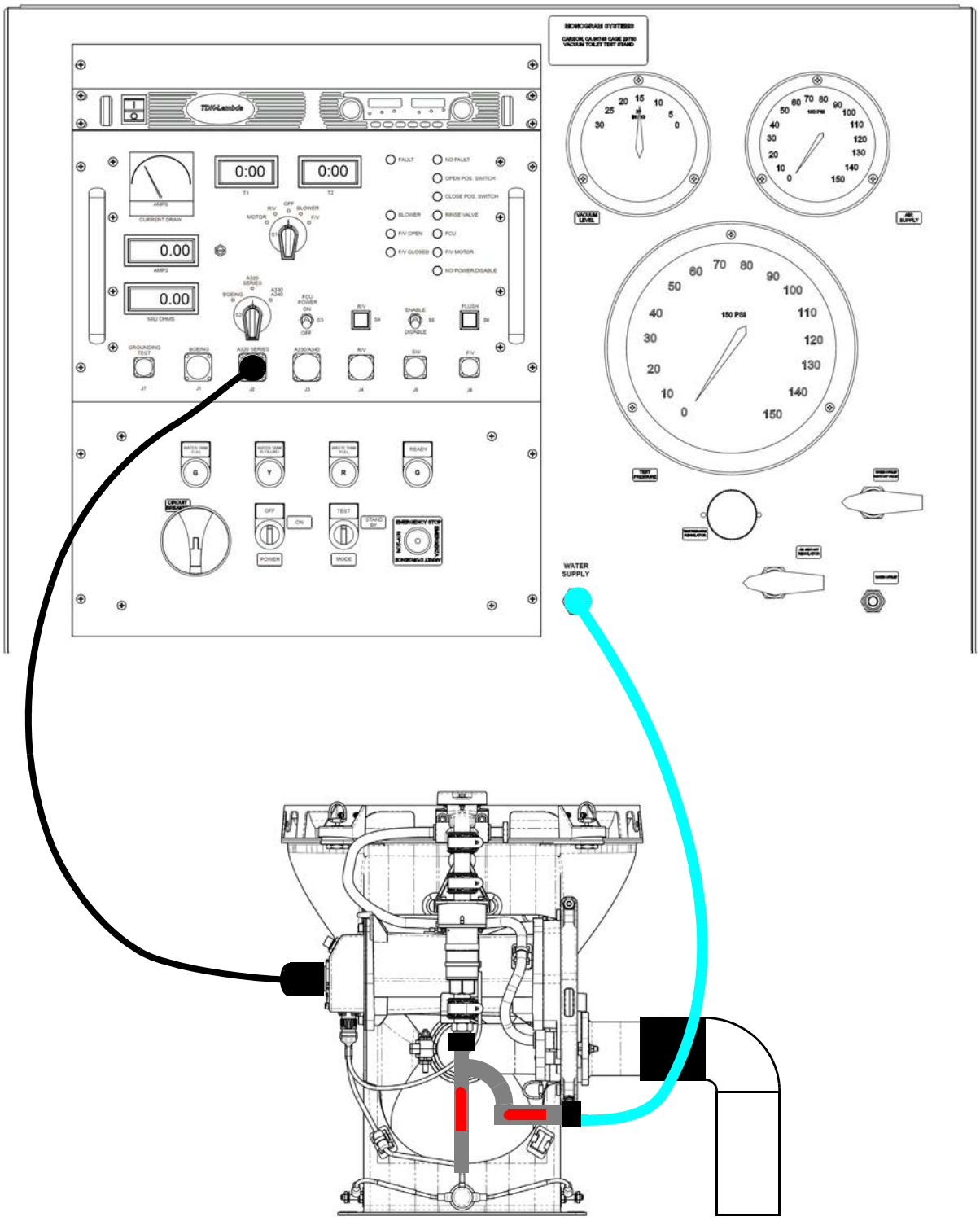


Figure 1006: Alternate Toilet Test Setup Using VTTS
(Sheet 1 of 2)

SUGGESTED PARTS LIST

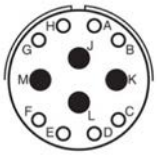
NOTE: Equivalent substitutes can be used for listed items.

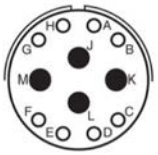
QTY	ITEM	PN:	SOURCE
(1)	VACUUM TOILET TEST STAND	18000-003-201 or 18000-003-203 or 18000-001 (non-procurable) or 18000-003 (non-procurable)	(V29780)
(1)	VTTS ADAPTER HARNESS	18300-011	(V29780)
(AR)	TUBING, CLEAR PVC, 0.375 ID x 0.50 OD x 48.0 LG	Kuri Tec series K050 PN K050-0608	Plastixs (V4J2Y7)
(1)	VTTS RINSE INLET ADAPTER	18200-012	(V29780)
(1)	O-RING	3-906E3609-70	Parker Seals (V02697)
(1)	FITTING, RINSE VALVE	15801-140-1	(V29780)
(1)	O-RING	2-012N0602-70	Parker Seals (V02697)
(1)	SCREEN	15800-192	(V29780)
(AR)	LUBRICANT	MOLYKOTE 111	Dow Corning (V71984)
(2)	O-RING	2-132N0602-70	Parker Seals (V02697)
(1)	CLAMSHELL ASSY	14J02-32C	Hydraflow (V24984)
(AR)	LUBRICANT	MOLYKOTE 111	Dow Corning (V71984)

Figure 1006: Alternate Toilet Test Setup Using VTTS
(Sheet 2 of 2)(To be Fabricated by the Operator)

To Toilet Flush Valve with integrated FCU PN 18587-201 connector J2

To VTTS 'Airbus A320' connector J2





A	CASE GND	M22759/80-20-5 (GREEN)	A
B	FLUSH SWITCH +	M22759/80-22-6 (BLUE)	B
C	FLUSH REQ / LED 1 (GREEN)	M22759/80-22-96 (WHITE/BLUE)	C
D	STATUS 1	M22759/80-22-91 (WHITE/BROWN)	D
E	STATUS 2	M22759/80-22-92 (WHITE/RED)	E
F	STATUS 3	M22759/80-22-98 (WHITE/GREY)	F
G	FLUSH ENABLE	M22759/80-22-3 (ORANGE)	G
H	FLUSH SIGNAL	M22759/80-22-4 (YELLOW)	H
J	FLUSH DENY / LED 2 (AMBER)	M22759/80-22-7 (VIOLET)	J
K	FLUSH SWITCH -	M22759/80-22-9 (WHITE)	K
L	DC RTN	M22759/80-20-0 (BLACK)	L
M	+28 VDC	M22759/80-20-2 (RED)	M

SUGGESTED PARTS LIST

NOTE: Equivalent substitutes can be used for listed items.

QTY	ITEM	PN:	SOURCE
(1)	CONNECTOR	MS3476L14-12SN	Commercially available
(1)	CONNECTOR	MS3476L14-12PN	Commercially available
(AR)	Wire (sizes and colors as shown)	M22759/80-XX-X	Commercially available

Figure 1007: VTTS Adapter Harness for Toilet PN 14330-514-series (PN 18300-011)

(7) Toilet Operation and Flush Pattern

(a) Perform 1 flush cycle (press the Flush switch) and monitor the flush cycle.

There must be no evidence of malfunction.

(b) Check for plumbing leaks.

There must be no leaks; repair any leaks as necessary.

(c) Check for vacuum leaks.

There must be no leaks; repair any leaks as necessary.

(d) Check the flush pattern for uniform coverage of the bowl interior and for vigorous action.

No misting of the rinse water above the toilet bowl rim is permitted.

(e) Repeat steps (a) through (d) two (2) more times (for a total of 3 flush cycles).

(f) Adjust the power supply voltage to 23.5 ± 0.1 VDC.

(g) Repeat steps (a) through (d).

There must be no evidence of malfunction.

(h) Adjust the power supply voltage to 32.5 ± 0.1 VDC.

(i) Repeat steps (a) through (d).

There must be no evidence of malfunction.

(8) Maintenance Switch Function Test

NOTE: This test can be performed without vacuum.

(a) Adjust the power supply voltage to 28.0 ± 0.1 VDC.

(b) Press the Maintenance switch (refer to Figure 1003).

The flush valve must open and remain open for at least 1 minute.

(c) Press and hold the Maintenance switch for at least 2 seconds.

The flush valve must remain open, and the vacuum generator circuit must energize.

(d) Press and hold down the Flush switch for at least 1 second.

The flush valve must close without performing a flush cycle.

(e) If using the VTTS,

1 Check the VTTS' front panel lamps for faults.

There must be no faults indicated.

(f) If using the test harness (Figure 1005),

1 Check the test harness's STATUS 1, STATUS 2, and STATUS 3 indicator lamps for faults.

There must be no faults indicated.

(9) Subsystem Leakage and Current Draw Test

(a) Adjust the power supply voltage to 32.5 VDC.

(b) Add water into the toilet bowl until the water level is approximately 2 inches (5.1 cm) below the rim of the bowl.

(c) Adjust the vacuum to 17.5 ± 0.4 in. Hg (592 ± 14 mbar), and apply the vacuum to the test unit's drain outlet.

(d) Wait at least 2 minutes, then examine the test unit's water level for any discernible leakage.

There must be no discernible leakage.

(e) Perform a flush cycle (press the Flush switch), and during the flush cycle, measure the current draw, and maintain vacuum on the outlet.

The current must not exceed 2.5 amps.

(f) Check for any audible leakage of air past the closed flush valve.

There must be no discernible leakage.

(10) Jammed Flush Valve Test

NOTE: This test can be performed without water pressure or a vacuum source.

(a) Adjust the power supply voltage to 28.0 ± 0.1 VDC.

(b) Press the Flush switch to flush the toilet. While the flush valve is open, insert a 3/4 inch (1.9 cm) diameter flexible vinyl hose (Table 1001) inside the flush valve, simulating a jam of the flush valve. Make sure that the flush valve closes onto the hose.

(c) Perform 2 more flush cycles.

The FAULT LED (on the VTTS or the test harness) must turn On after the third flush cycle jam.

(d) Press the Flush switch again, and while the flush valve is open, remove the flexible vinyl hose from the drain valve.

With the hose removed, the FAULT LED (on the VTTS or the test harness) must turn Off.

(11) Water Quantity Test

(a) Adjust the water supply pressure to 38 ± 1 psi (262.0 ± 6.9 kPa) at the rinse valve inlet.

(b) Adjust the voltage to 28 ± 0.1 VDC.

(c) Disconnect the vacuum supply line from the drain outlet.

(d) Place a measuring cup (Table 1001) under the drain outlet.

(e) Press the Flush switch to flush the toilet. Collect the rinse water in the measuring cup.

The quantity of water collected in the measuring cup must be 4.7 - 5.7 oz (140 - 170 ml).

(f) Close the water supply's manual shutoff valve.

(g) Place a beaker under the outlet of the rinse valve manual drain back valve.

(h) Open the manual drain back valve below the water supply connection.

(i) Verify that water drains back and collects in the empty beaker.

(12) Rinse Valve Leakage Test

NOTE: The test in paragraph (a) does not have to be performed if there is documented evidence that it was performed at the rinse valve sub-assembly level.

(a) With the rinse valve in the OFF position, gradually increase the water pressure at a uniform rate from 0 to 2 psi (0 to 13.8 kPa) or until the rinse valve closes. Hold at 2.0 ± 0.25 psi (13.8 ± 1.7 kPa) for at least 2 minutes.

The rinse valve must close at a maximum pressure of 1.0 psi (6.9 kPa) with no discernible leakage.

The rinse valve must not leak when held at 2.0 psi (13.8 kPa).

(b) Adjust the water pressure to 17.5 ± 1 psi (120.6 ± 6.9 kPa).

(c) Wait for at least 1 minute, then check for any discernible leakage.

There must be no discernible leakage.

(d) Adjust the water pressure to 41 ± 1 psi (282.7 ± 6.9 kPa).

(e) Wait for at least 1 minute, then check for any discernible leakage.

There must be no discernible leakage.

(f) Adjust the water pressure to 125 ± 2 psi (861.8 ± 13.8 kPa).

(g) Wait for at least 1 minute, then check for any discernible leakage.

There must be no discernible leakage.

(13) Conclusion of Test

(a) Shut off the water source, and disconnect the water source from the test setup.

(b) Shut off the vacuum source, and disconnect the vacuum source from the test setup.

(c) Make sure that all water is removed from the system by pressing the Flush switch at least 3 times and by blowing low-pressure dry compressed air through the rinse valve.

(d) Shut off the power supply and disconnect the power supply from the test setup.

(e) Remove the toilet assembly from the test fixture.

(f) Cap the waste drain outlet and rinse valve outlet, and all electrical connectors.

TASK 38-34-41-720-801-A01

4. Component Testing

Subtask 38-34-41-720-001-A01

A. Rinse Valve

(Refer to IPL Figure 1, item 185)

The rinse valve is tested as part of the complete toilet assembly (refer to paragraph A., "Toilet Assembly" on page 1010). An alternate method of testing the unit is described below.

(1) Test Unit

Prior to testing, the unit must be in a clean condition, free of debris and residue. Refer to CLEANING as required.

(2) Test Fluid

Test fluid listed herein must be ordinary unfiltered tap water.

(3) Test Conditions

Refer to the following for the test condition guidelines.

* Temperature +40º - 110º F (+4º - 43º C)
* Atmospheric Pressure 28.0 - 31.0 in. Hg (948 - 1050 mbar)

(4) Visual Inspection

(a) Perform a visual inspection of the test unit for general appearance, completeness of assembly, and workmanship.

There must be no defects, anomalies, sharp edges or corners on the unit.

(b) Examine the test unit for loose or missing fasteners, fittings, and electrical connectors.

There must be no loose, missing, or damaged, or corroded fasteners, fittings, or electrical connectors.

(c) Examine all placards and part identification.

Placards must be firmly affixed with no curling, peeling, bubbling, or other signs of de-bonding from the test unit. All information on the placards must be visible with no scratches, pits, or discoloration impairing its readability. Ink-stamped information must be clearly visible without signs of fading, peeling, cracking, or chipping.

(5) Grounding and Bonding Resistance Test

CAUTION: BONDING RESISTANCE AND DIELECTRIC TESTING CAN USE HIGH VOLTAGES THAT CAN DEGRADE THE INSULATION OF THE COMPONENT.
TO AVOID DAMAGE TO THE TEST UNIT, THE LISTED TEST VOLTAGES ARE 80% OF THE MAXIMUM ALLOWABLE VOLTAGE. PERFORMING THE TESTS USING A HIGHER VALUE CAN DAMAGE THE COMPONENT OR ITS INSULATION.

(a) Connect the insulation resistance tester (Table 1001) to the test unit as required. Refer to Figure 1008.

(b) Measure the resistance between the rinse valve connector Pin A and the rinse valve housing.

The resistance must not exceed 0.009 ohms.

(6) Dielectric Strength Test

(a) Connect the pins B and C to one terminal of the dielectric tester (Table 1001), and connect pin A to the other terminal of the dielectric tester.

(b) Gradually increase the voltage (over a period of 1-2 seconds) from 0 VDC to 400 VDC. Examine the leakage.

The maximum allowable leakage is 0.5 mA

(7) Insulation Resistance Test

(a) Connect the pins B and C to one terminal of the resistance tester (Table 1001), and connect pin A to the other terminal of the resistance tester.

(b) Gradually increase the voltage (over a period of 1-2 seconds) from 0 VDC to 36 VDC. Examine the resistance.

The resistance must be at least 100 Megohms.

(8) Diode Test

(a) Connect the test unit to the test setup as shown in Figure 1008.

(b) Adjust the power supply to 7 ± 0.2 VDC.

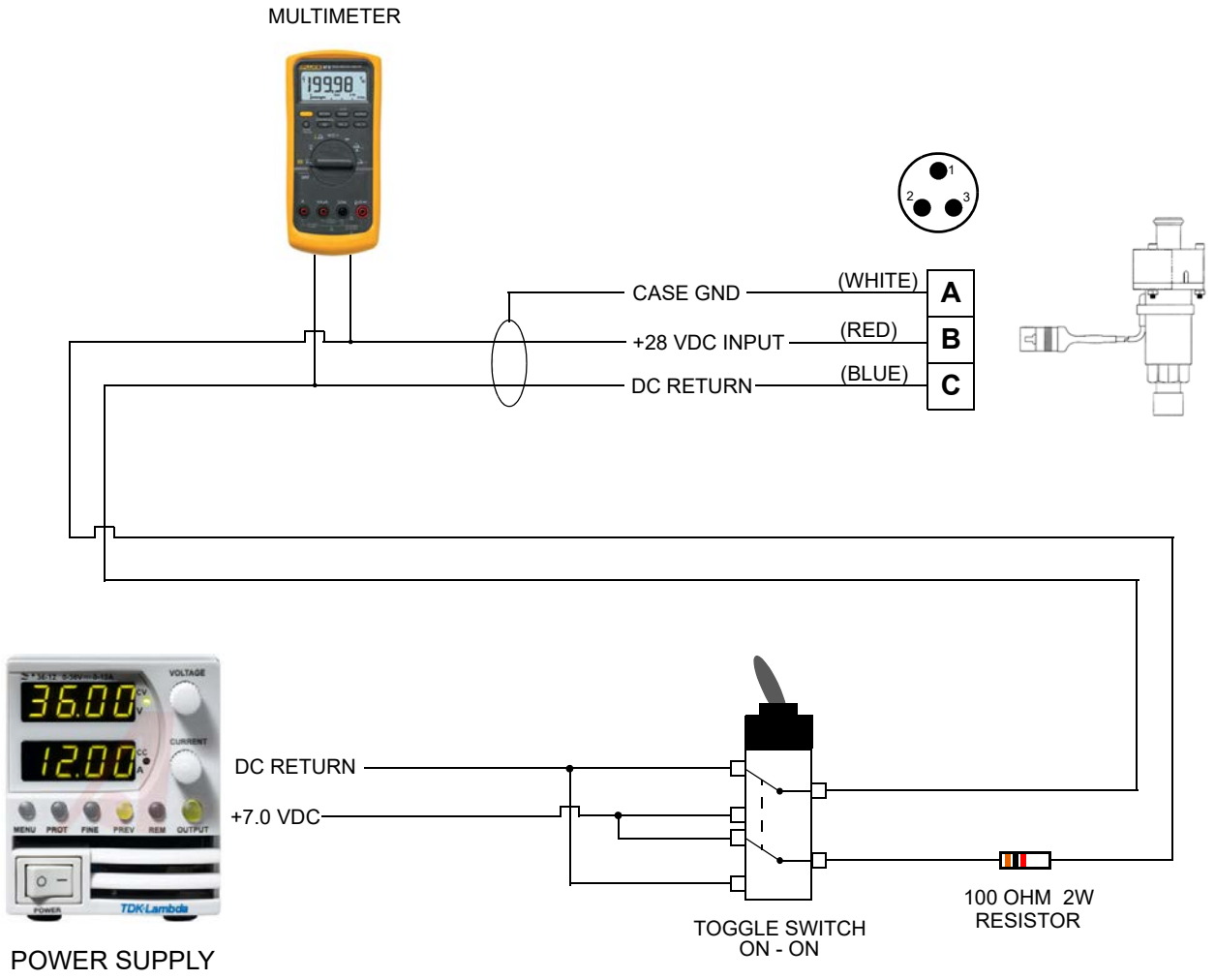
(c) Connect pin B to +VDC through a 100 ohm, 2 watt resistor, and connect pin C to DC RTN.

(d) Verify that the voltage between pins B and C is greater than 1.0 volt.

(e) Connect pin C to +VDC and connect pin B to power RTN through the 100 ohm, 2 watt resistor.

The voltage must be within the range of -0.9 and -0.5 volt.

NOTE: Do not continue the test if the Diode Test fails.



SUGGESTED PARTS LIST

NOTE: Equivalent substitutes can be used for listed items.

QTY	ITEM	PN:	SOURCE
(1)	CONNECTOR	SJS840330	Amphenol (V00779)
(1)	DIGITAL MULTIMETER	87 SERIES V	Fluke (V89536)
(1)	RESISTOR, 100 OHM, 2W	PR1000101000JR500	Vishay (V0LCA7)
(1)	SWITCH, TOGGLE, DPDT ON-ON ("+ POLARITY / - POLARITY")	MS24524-23	Commercially available
(1)	POWER SUPPLY, DC	Z36-6-U	TDK-Lambda (V89022)
(AR)	WIRE, sizes and colors as shown	M22759/34-20-X	Commercially available

Figure 1008: Diode Test Setup for Rinse Valve PN 18604
(To be Fabricated by the Operator)

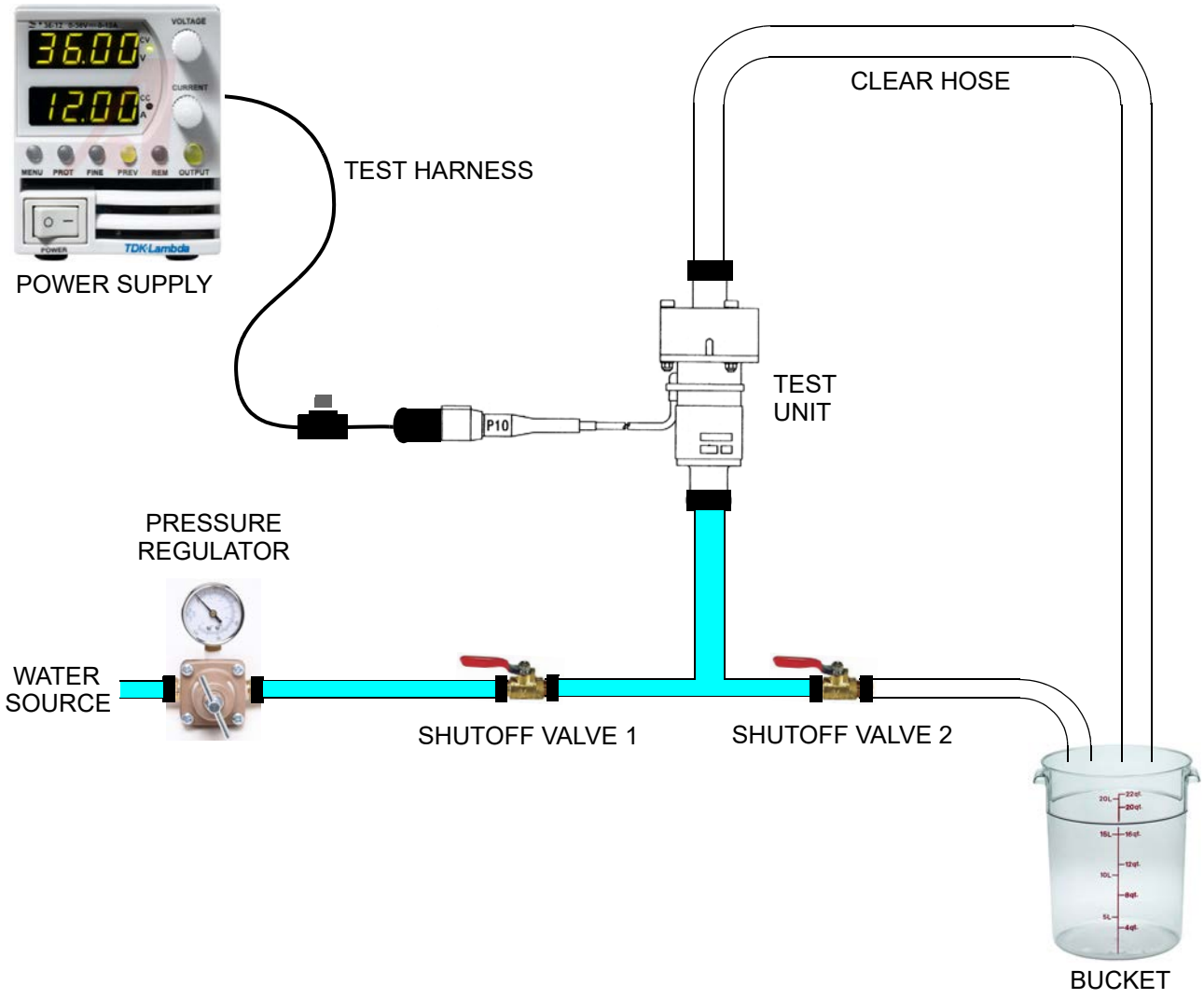
(9) Test Setup

The test setup simulates the operation of the assembly. All supply connections are incorporated in the test setup.

(a) Set up the assembly to be tested as shown in Figure 1009 or Figure 1011

(b) Turn on the power supply and adjust the voltage to 28.0 ± 0.1 VDC.

(c) Open valve #1 and close valve #2.



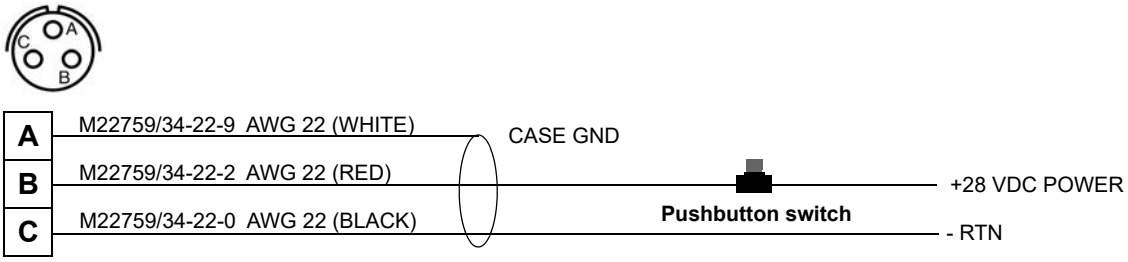
SUGGESTED PARTS LIST

NOTE: Equivalent substitutes can be used for listed items.

QTY	ITEM	PN:	SOURCE
(1)	POWER SUPPLY, 28 VDC, 0-6A	Z36-6-U	TDK-Lambda (V89022)
(1)	WATER PRESSURE REGULATOR	9796K19	McMaster Carr(V39428)
(1)	PRESSURE GAUGE (0 - 200 PSI)	451010A02L200	Ashcroft (V38056)
(2)	SHUTOFF VALVE	as required	Commercially available
(1)	BUCKET, CLEAR	176RNDCL22	Cambro (V21669)
(1)	TEST HARNESS FOR RINSE VALVE	See Figure 1010	Fabricated by the operator
(AR)	HOSE CLAMP	H 10 SS	Murray (V76599)
(AR)	TUBING, CLEAR PVC, 0.375 ID x 0.50 OD x 48.0 LG	Kuri Tec series K050 PN K050-0608	Plastixs (V4J2Y7)

Figure 1009: Test Setup for Rinse Valve PN 18604
(To be Fabricated by the Operator)

To Rinse Valve PN 18604
connector P1



SUGGESTED PARTS LIST
NOTE: Equivalent substitutes can be used for listed items.

QTY	ITEM	PN:	SOURCE
(1)	CONNECTOR	AMC02RA03R-W/C	Viking (V05574)
(1)	SWITCH, PUSHBUTTON, OFF-(ON) ("Rinse Valve On")	MS25089	Commercially available
(AR)	WIRE (colors as shown)	M22759/34-22-X	Commercially available

Figure 1010: Test Harness for Rinse Valve PN 18604
(To be Fabricated by the Operator)

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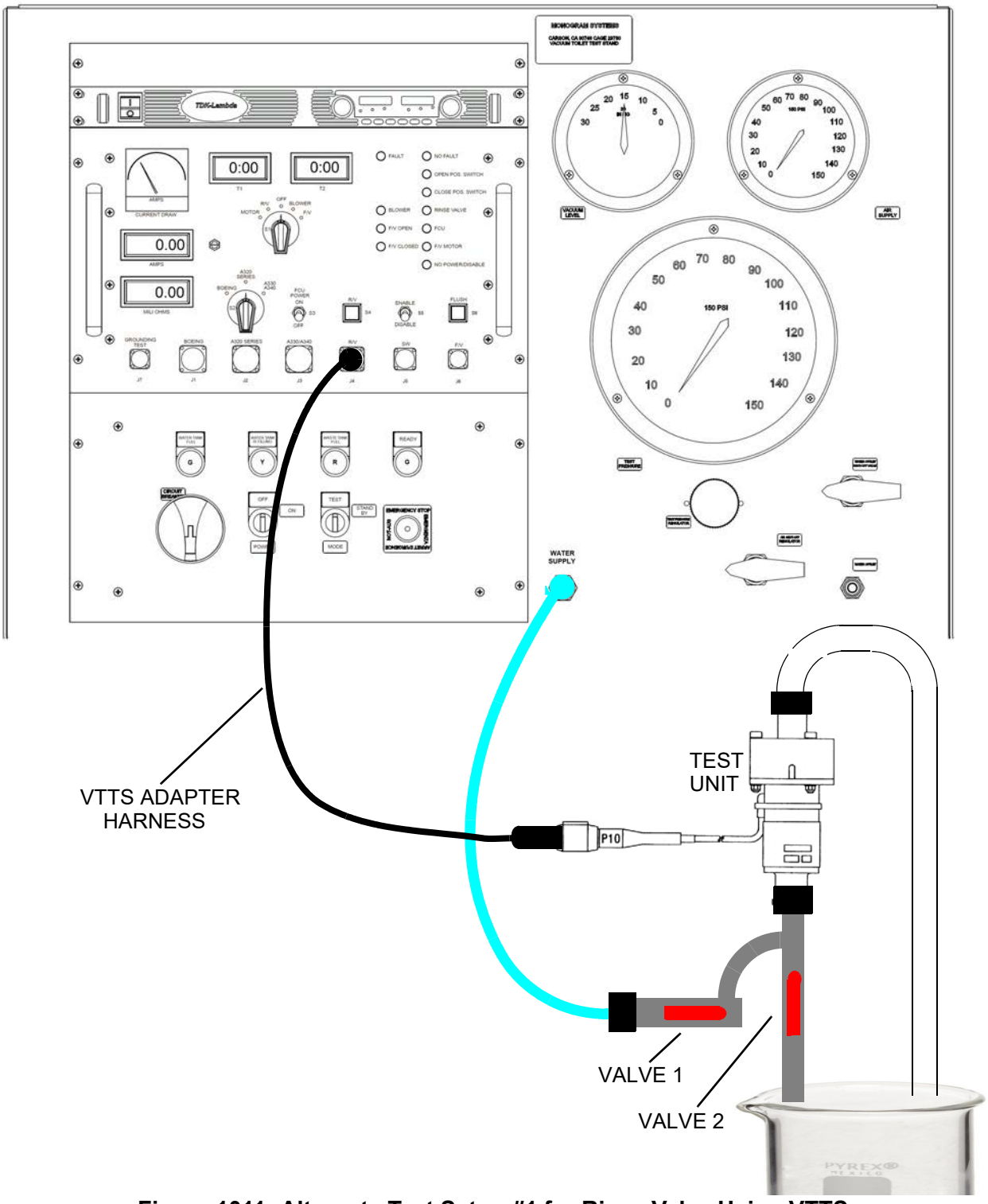


Figure 1011: Alternate Test Setup #1 for Rinse Valve Using VTTS (Leakage Test, Sheet 1 of 2)

SUGGESTED PARTS LIST
NOTE: Equivalent substitutes can be used for listed items.

QTY	ITEM	PN:	SOURCE
(AR)	TUBING, CLEAR PVC, 0.375 ID x 0.50 OD x 48.0 LG	Kuri Tec series K050 PN K050-0608	Plastixs (V4J2Y7)
(2)	SHUTOFF VALVE	as required	Commercially available
(6)	HOSE CLAMP	H 10 SS	Murray (V76599)
(1)	O-RING	3-906E3609-70	Parker Seals (V02697)
(1)	FITTING, RINSE VALVE	15801-140-1	(V02697)
(1)	O-RING	2-012N602-70	Parker Seals (V02697)
(1)	SCREEN	15800-192	(V02697)
(1)	MEASURING CUP, 16 oz.	500ml, Low Form	Dow Corning (V71984)
(1)	VTTS ADAPTER HARNESS	See Figure 1013	Fabricated by the Operator
(AR)	Hose connections	as required	Commercially available

Figure 1011: Alternate Test Setup #1 for Rinse Valve Using VTTS
(Leakage Test, Sheet 2 of 2)

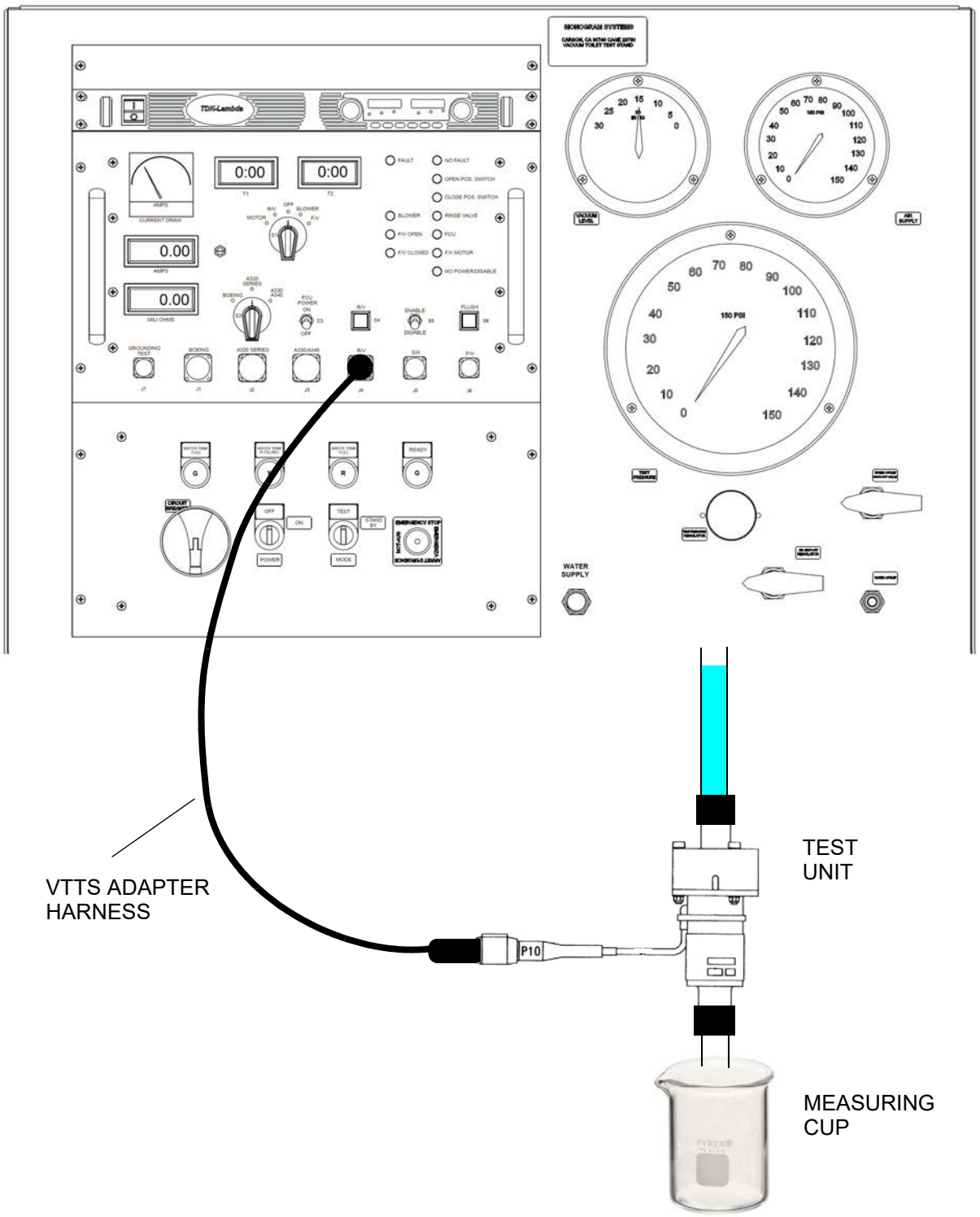


Figure 1012: Alternate Test Setup #2 for Rinse Valve Using VTTS (Drainback Test, Sheet 1 of 2)

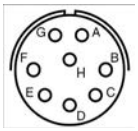
SUGGESTED PARTS LIST
NOTE: Equivalent substitutes can be used for listed items.

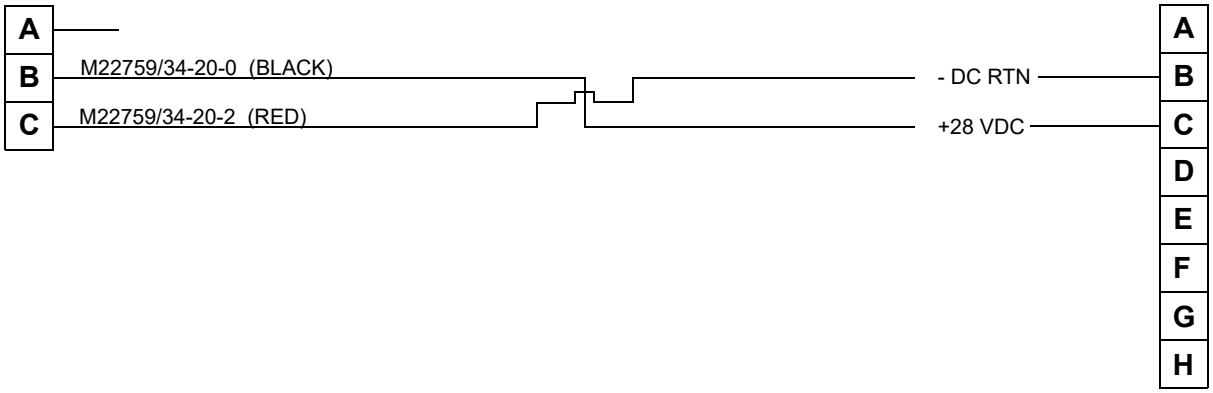
QTY	ITEM	PN:	SOURCE
(AR)	TUBING, CLEAR PVC, 0.375 ID x 0.50 OD x 48.0 LG	Kuri Tec series K050 PN K050-0608	Plastixs (V4J2Y7)
(2)	SHUTOFF VALVE	as required	Commercially available
(6)	HOSE CLAMP	H 10 SS	Murray (V76599)
(1)	O-RING	3-906E3609-70	Parker Seals (V02697)
(1)	FITTING, RINSE VALVE	15801-140-1	(V02697)
(1)	O-RING	2-012N602-70	Parker Seals (V02697)
(1)	SCREEN	15800-192	(V02697)
(1)	MEASURING CUP, 16 oz.	500ml, Low Form	Dow Corning (V71984)
(1)	VTTS ADAPTER HARNESS	See Figure 1013	Fabricated by the Operator
(AR)	Hose connections	as required	Commercially available

Figure 1012: Alternate Test Setup #2 for Rinse Valve Using VTTS
(Drainback Test, Sheet 2 of 2)

To Rinse Valve PN 15800-488, -997, or
To Rinse Valve / Anti-Siphon Valve PN 18604
connector J1

To VTTS
'RV' connector J4





SUGGESTED PARTS LIST
NOTE: Equivalent substitutes can be used for listed items.

QTY	ITEM	PN:	SOURCE
(1)	CONNECTOR	AMC02RA03R-W/C	Viking (V05574)
(1)	CONNECTOR	M24266R14B12PN	Commercially available
(AR)	WIRE, colors as shown	M22759/34-20-X	Commercially available

Figure 1013: VTTS Rinse Valve Adapter Harness
For Rinse Valve / Anti-Siphon Valve PN 18604
(To be Fabricated by the Operator)

(10) Rinse Valve Leakage Test

(a) With the rinse valve in the OFF position, gradually increase the water pressure from 0 to 2 psi (0 to 13.8 kPa) at a uniform rate until the rinse valve closes. Hold at 2.0 ± 0.25 psi (13.8 ± 1.7 kPa) for at least 2 minutes.

The rinse valve must close at a maximum pressure of 1.0 psi (6.9 kPa) with no discernible leakage.

The rinse valve must not leak when held at 2.0 psi (13.8 kPa).

(b) Adjust the water pressure to 17.5 ± 1 psi (120.6 ± 6.9 kPa).

(c) Wait for at least 1 minute, then check for any discernible leakage.

There must be no discernible leakage.

(d) Adjust the water pressure to 41.5 ± 1 psi (286.1 ± 6.9 kPa).

(e) Wait for at least 1 minute, then check for any discernible leakage.

There must be no discernible leakage.

(f) Adjust the water pressure to 125 ± 2 psi (861.8 ± 13.8 kPa).

(g) Wait for at least 1 minute, then check for any discernible leakage.

There must be no discernible leakage.

(11) Solenoid Actuation Test

(a) Adjust the static rinse valve inlet pressure to 38 ± 1 psi (2.62 ± 0.07 bar).

(b) Adjust the power supply voltage to 16.0 ± 0.1 VDC with the solenoid coil at ambient temperature.

(c) Energize the rinse valve (press and hold the pushbutton switch).

The valve must open when energized.

(d) De-energize the rinse valve (release the pushbutton switch).

The valve must close when de-energized.

(12) Conclusion of Test

(a) Disconnect water source from the test setup.

(b) Disconnect the electrical source from the test setup.

(c) Remove the test assembly from the test setup.

(d) Cap the water inlet, water outlet, and the electrical connector.

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Subtask 38-34-41-720-002-A01

B. Orbital™ Flush Valve

(Refer to IPL Figure 4)

(1) Test Unit

Prior to testing, the Flush Valve must be in a clean condition, free of all waste and residue. Refer to CLEANING as required.

(2) Test Conditions

Refer to the following for the test condition guidelines.

Refer to the following for the test condition guidelines.

* Temperature +40º - 110º F (+4º - 43º C)
* Atmospheric Pressure 28.0 - 31.0 in. Hg (948 - 1050 mbar)

(3) Visual Inspection

(a) Perform a visual inspection of the flush valve for general appearance, completeness of assembly, and workmanship.

There must be no defects, anomalies, sharp edges or corners on the unit.

(b) Examine the test unit for loose or missing fasteners, fittings, and electrical connectors.

There must be no loose, missing, or damaged, or corroded fasteners, fittings, or electrical connectors.

(c) Examine all placards and part identification.

Placards must be firmly affixed with no curling, peeling, bubbling, or other signs of de-bonding from the test unit. All information on the placards must be visible with no scratches, pits, or discoloration impairing its readability. Ink-stamped information must be clearly visible without signs of fading, peeling, cracking, or chipping.

(4) Test Setup

The test setup simulates the operation of the assembly. All supply connections are incorporated in the test setup.

(a) Place the test unit on the test setup. Refer to Figure 1014.

(b) Orient the flush valve so that valve opening can be observed.

(c) Connect the Flush Valve Test Harness (PN 18300-011) to the test unit's electrical connector.

(d) Connect the rinse valve (PN 18604) to the flush valve.

(e) Turn on the power supply and adjust the voltage to 28 ± 0.1 VDC.

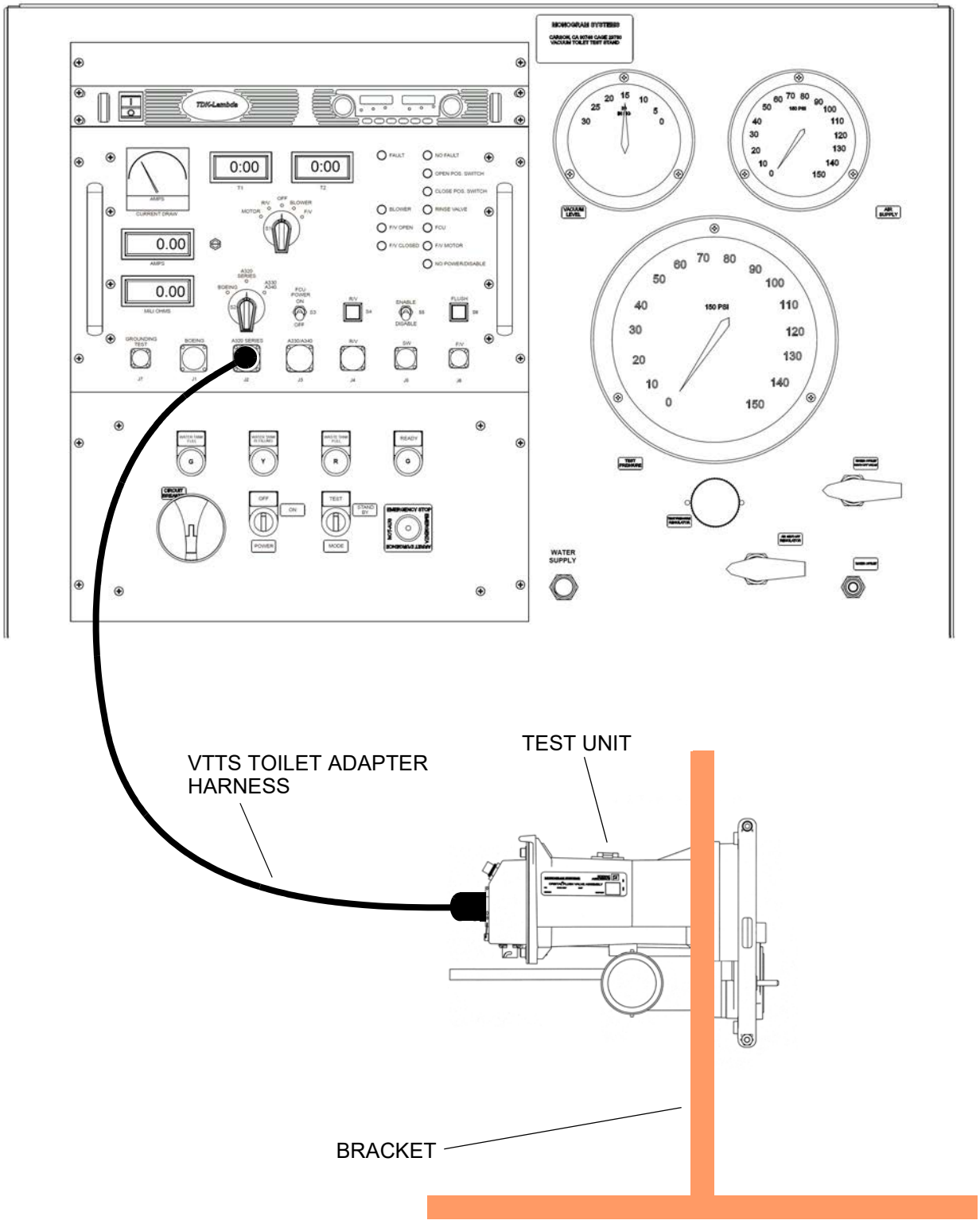

Figure 1014: Test Setup for Flush Valve (IPL 1, 185)
(Sheet 1 of 2)

SUGGESTED PARTS LIST

NOTE: Equivalent substitutes can be used for listed items.

QTY	ITEM	PN:	SOURCE
(1)	VACUUM TOILET TEST STAND (VTTS)	18000-003-201 or 18000-003-203 or 18000-001 (non-procurable) or 18000-003 (non-procurable)	W&W Systems (V29780)
(1)	VTTS FLUSH VALVE ADAPTER HARNESS 1	18300-011	W&W Systems (V29780)

Figure 1014: Test Setup for Flush Valve (IPL 1, 185)
(Sheet 2 of 2)

(5) Flush Valve Functional Test

(a) Adjust the voltage to 28 ± 0.1 VDC.

(b) Actuate the flush valve (Press the Flush switch) and note operation.

The flush valve must open completely and close completely after approximately 4 seconds.

Throughout the flush cycle, the VTTS control panel's FAULT indicator must remain Off.

(c) Repeat step (b) one additional time for a total of 2 cycles.

There must be no evidence of malfunction.

(d) Adjust the voltage to 23.5 ± 0.1 VDC.

(e) Repeat steps (b) through (c).

There must be no evidence of malfunction.

(f) Adjust the voltage to 32.5 ± 0.1 VDC.

(g) Repeat steps (b) through (c).

There must be no evidence of malfunction.

(6) Maintenance Switch Functional Test

(a) Press the flush valve's Maintenance switch (refer to Figure 1003).

The flush valve must open, and remain open for at least 1 minute.

(b) Press and hold the Maintenance switch for at least 2 seconds.

The flush valve must open, and
the VTTS control panel's FLUSH REQ or BLOWER indicator will turn On.

(c) Press and hold the Maintenance switch for at least 1 second.

The flush valve must close without beginning a flush cycle.

(d) Check to confirm that the VTTS control panel's FAULT indicator is Off.

(7) Current Draw (Maximum Operating Condition) Test

(a) Adjust the power supply voltage to 32.5 ± 0.1 VDC.

NOTE: Vacuum does not have to be applied for this test.

(b) Actuate the flush valve (Press the Flush switch) 2 times to perform a flush cycle 2 times, and record the maximum current draw .

The maximum current draw must be 2.5 Amps.

(8) Jammed Flush Valve Test

(a) Adjust the power supply voltage to 28.0 ± 0.1 VDC.

NOTE: Vacuum does not have to be applied for this test.

(b) Press the Flush switch to perform a flush cycle, and while the valve is open, insert a 3/4 inch (1.9 cm) diameter flexible hose into the valve. Allow the valve to close upon the hose.

(c) Press the Flush switch 2 more times to perform 2 more flush cycles.

After the 3rd jammed flush cycle,
the VTTS control panel's FAULT indicator must turn On.

(d) Press the Flush switch again to perform another flush cycle, and while the valve is open, remove the vinyl hose from the valve.

The flush valve must close, and
the VTTS control panel's FAULT indicator must turn Off.

(9) Conclusion of Test

(a) Turn off the electrical power to the flush valve.

(b) Disconnect the test harness from the flush valve.

(c) Remove the flush valve from the test setup.

(d) Cap the flush valve's inlet and outlet.

(e) Cap the flush valve's electrical connectors.

TASK 38-34-41-810-801-A01

5. Fault Isolation

A. The fault isolation procedure deals with problems encountered during testing of the Revolution™ Toilet. To avoid unnecessary repairs, before beginning disassembly to replace any component always ensure the following conditions are met:

(1) Check all wiring and electrical connections.

(2) Check all water and pressurized hose connections.

(3) Check drain piping for general condition.

B. Test Harness Lamps

The Test Harness (refer to Figure 1005) contains several indicator lamps which show the condition of the flush control unit and the status of the flush cycle. The lamp(s), when illuminated, can indicate the source of the fault.

(1) LED 1

Indicates that the FCU has received a Flush Request (recognizes that the Flush Switch has been pressed.)

(2) STATUS 1

(3) STATUS 2

(4) STATUS 3

The three status lamps, when taken together, can indicate a probable fault condition with the Flush Control Unit. Refer to Table 1002 for possible faults.

Table 1002: Test Harness Status Lamp Indication

Status 3	Status 2	Status 1	Indication
On	On	On	System is ready (no fault)
On	On	Off	Rinse valve solenoid failure
On	Off	On	Flush valve limit switch failure (open)
On	Off	Off	Flush valve motor failure
Off	On	On	Rinse valve driver failure
Off	On	Off	FCU fault
Off	Off	On	Flush valve limit switch failure (close)
Off	Off	Off	FCU power loss

(5) FLUSH ENABLE

Indicates that an external disabling condition exists, prohibiting the flush cycle from proceeding (waste tank full, aircraft's waste service panel door is open).

NOTE: There is a toggle switch on this line to deliberately induce a "Flush Enable" condition to facilitate additional fault isolation actions.

(6) FLUSH SIGNAL

Indicates that a Flush Cycle is in progress. The lamp will extinguish when the flush cycle is complete.

NOTE: This signal is also used to energize the vacuum generator.

(7) LED 2

Indicates that the Flush Request has been denied (waste tank is full, aircraft's waste service panel door is open, fault with the FCU, etc.). The flush cycle will not proceed.

C. VTTS Status Lamps

The Vacuum Toilet Test Stand (refer to Figure 1015) contains several indicator lamps which show the condition of the flush control unit and the status of the flush cycle. The lamp(s), when illuminated, can indicate the source of the fault. Refer to Table 1003.

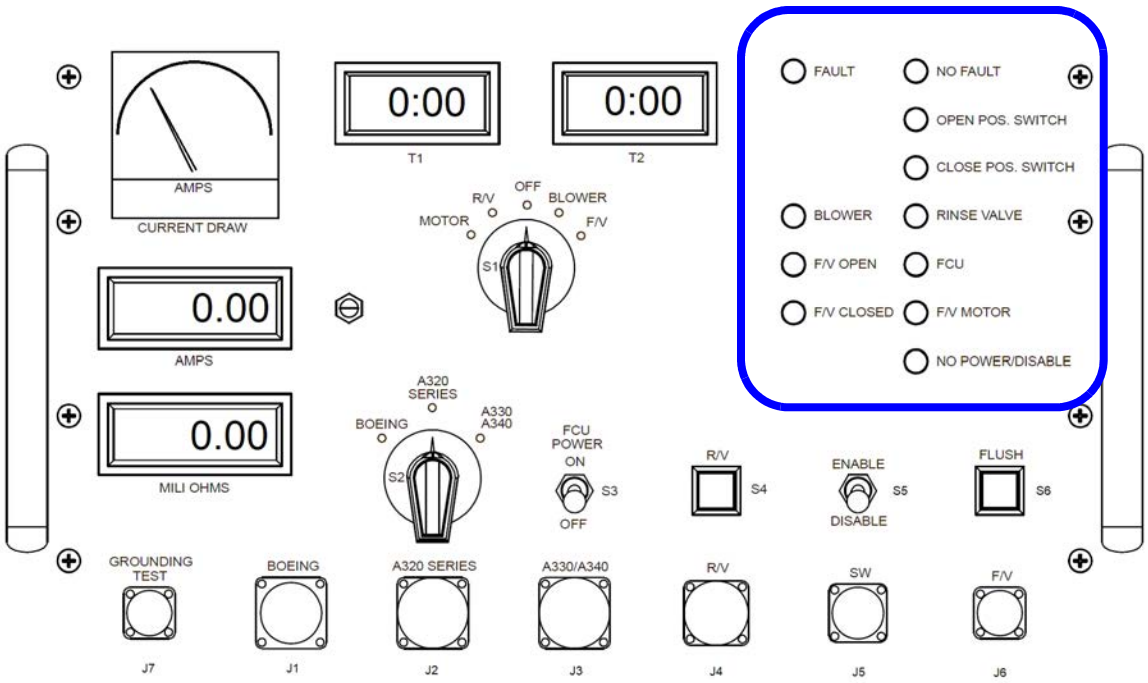

Figure 1015: VTTS Status Lamps

Table 1003: VTTS Status Lamps

	LEGEND	DESCRIPTION
●	FAULT	The Toilet Assembly has encountered a problem of some kind. Refer to the following indicators which can determine the cause of the fault.
●	BLOWER	The vacuum generator (“Vacuum Blower”) is operating. The FCU has called upon the vacuum generator to generate enough vacuum for the toilet to operate. This is a normal condition -- as long as the vacuum generator runs for a short period of time, such as 10 seconds or less.
●	F/V OPEN	The Flush Valve is Open; The ‘Open’ position switch is indicating that the flush valve is fully open.
●	F/V CLOSED	The Flush Valve is Closed; The ‘Close’ position switch is indicating that the flush valve is fully closed.
●	NO FAULT	The Toilet Assembly appears to be working properly; No fault has been detected by the Flush Control Unit
●	OPEN POS. SWITCH	The Flush Valve’s ‘Open’ Position switch can have failed; The flush valve was commanded to open, The motor has run long enough for the valve to have opened, but the ‘Open’ limit switch still indicates ‘Not Open.’ Either the switch has failed, or the motor has failed, or the valve is jammed.
●	CLOSE POS. SWITCH	The Flush Valve’s ‘Open’ Position switch can have failed; The flush valve was commanded to close, The motor has run long enough for the valve to have closed, but the ‘Close’ limit switch still indicates ‘Not Closed.’ Either the switch has failed, or the motor has failed, or the valve is jammed.
●	RINSE VALVE	The rinse valve can have failed. The rinse valve was commanded to open, but the controller has sensed an abnormal current flow condition, indicating that it can be jammed.

Table 1003: VTTS Status Lamps (Continued)

	LEGEND	DESCRIPTION
●	FCU	The Flush Control Unit (“FCU”) has detected an internal problem of some kind, such as a too-high or too-low voltage, or no feedback from the connected components (position switches, flush valve motor, rinse valve solenoid).
●	F/V MOTOR	The Flush Valve Motor can have failed; The flush valve was commanded to Open or Close, The motor was given power to rotate the flush valve, but the controller has sensed an abnormal current flow condition, indicating that the flush valve motor can not be responding.
●	NO POWER / DISABLED	There is no +28 VDC power to the Flush Control Unit, or there is a Disabling condition prohibiting a flush from occurring, such as: * A flush cycle is currently underway * A failure has been previously detected. NO POWER can also indicate that: * the FCU could be disconnected from the aircraft’s power (or the voltage is inadequate to power the FCU), or * the FCU has experienced some kind of internal failure.

D. For other possible troubles and corrective measures, refer to Table 1004. If multiple corrective actions are advised, perform one action at a time in the order listed until the fault is corrected.

Table 1004: Revolution™ Toilet Fault Isolation

STEP	TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION
3. A.	Toilet Assembly (Refer to IPL Figure 1, item 1)		
(4)	Toilet fails Visual Inspection.	Defect(s) in appearance, assembly, or workmanship.	Repair or replace defective components.
		Loose, missing or damaged fasteners, fittings, or connectors.	Repair or replace defective components.
		Damaged or illegible placards.	Replace defective placards.
		Unacceptable finish.	Reapply finish. Refer to REPAIRS.
(5)(a)	Unit fails Dielectric Strength Test.; leakage current does not meet test specifications.	Connectors not properly cleaned.	Clean as necessary.
		Missing or loose wire.	Connect wire or tighten connections.
		Faulty Flush Control Unit	Repair or replace Flush Control Unit.
(5)(b)	Unit fails Insulation Resistance test; resistance does not meet test specifications.	Connectors not properly cleaned.	Clean as necessary.
		Missing or loose wire.	Connect wire or tighten connections.
		Faulty Flush Control Unit	Repair or replace Flush Control Unit.
(5)(c)	Unit fails Grounding and Bonding Resistance test; resistance does not meet test specifications.	Connectors not properly cleaned.	Clean as necessary.
		Missing or loose wire.	Connect wire or tighten connections.

Table 1004: Revolution™ Toilet Fault Isolation (Continued)

STEP	TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION
		Faulty Flush Control Unit	Repair or replace Flush Control Unit.
(7)(a)	Unit fails Toilet Operation and Flush Pattern test; unit does not flush. At all.	Defective or disconnected Flush switch.	Reconnect or replace the Flush switch as necessary
		Loose connection to toilet assembly or components.	Check and secure cable and connections from power source to integrated flush control unit.
		FCU not permitted to flush. (waste tank is full)	Empty (service) the waste tank.
		FCU not permitted to flush. (waste tank is being serviced)	Wait for waste tank servicing to be concluded.
	Rinse valve heard to actuate, but flush does not start when Flush switch is pressed.	No water pressure.	Check water pressure to the toilet assembly.
		Poppet sticking.	Inspect, clean or replace rinse valve as necessary.
		Defective rinse valve.	Replace rinse valve.
	Rinse valve actuates, but insufficient rinse water during flush cycle.	Clogged rinse ring.	Inspect and clean or replace rinse ring as necessary.
		Clogged rinse valve inlet screen.	Clean or replace rinse valve inlet screen.
		Defective rinse valve.	Replace rinse valve.
		Low water pressure.	Check and adjust aircraft's water pressure.
		Rinse valve "ON" time too short.	Repair / replace FCU.

Table 1004: Revolution™ Toilet Fault Isolation (Continued)

STEP	TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION
	Rinse valve actuates, but excessive rinse water during flushing (normal flush).	Water pressure set too high.	Check and adjust aircraft's water pressure.
		Defective rinse valve.	Replace rinse valve.
	Rinse valve never closes after completion of flush cycle (continuous rinsing).	Stuck or defective rinse valve.	Check and clean rinse valve. Replace if inoperative.
		Defective rinse valve.	Replace rinse valve.
	Toilet flushes, but waste does not exit (flush valve does not open).	Defective electrical connection to flush valve motor.	Inspect connectors to motor assembly and repair or replace as necessary.
		Defective flush valve motor.	Inspect motor assembly. Repair / replace if inoperative.
		Flush valve motor gear train jammed.	Inspect gears for debris or damage. Clean or replace as necessary.
	Toilet flushes, but waste does not exit (flush valve operates properly).	Insufficient vacuum.	Check vacuum supply.
		Blockage in drain line.	Check and remove blockage.
	Toilet flushes, waste exits, but audible noise after completion of flush cycle (flush valve does not close).	Object jamming flush valve.	Clear blockage as necessary.
		Worn flush valve seal.	Remove flush valve assembly and inspect flush valve seals. Replace as necessary.
	Vacuum generator never turns on (system below 18,000 ft.).	Defective wiring.	Inspect and connect, repair or replace wiring as required.
		Defective flush control unit.	Repair / replace flush control unit.

Table 1004: Revolution™ Toilet Fault Isolation (Continued)

STEP	TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION
		Faulty vacuum generator.	Repair / replace vacuum generator.
(7)(b)	Unit fails Toilet Operation and Flush Pattern test; unit has plumbing leaks.	Worn O-rings, gaskets, or seals.	Replace O-rings, gaskets, or seals as necessary.
		Loose connection to toilet assembly or components.	Check and secure cable and connections from power source to integrated flush control unit.
		Loose or missing plug (IPL Figure 1, item 30).	Replace plug.
		Faulty component (leaks).	Repair or replace leaking component.
(7)(c)	Unit fails Toilet Operation and Flush Pattern test; unit has vacuum leaks.	Worn O-rings, gaskets, or seals.	Replace O-rings, gaskets, or seals as necessary.
		Loose connection to toilet assembly or components.	Check and secure cable and connections from power source to integrated flush control unit.
		Faulty component (leaks).	Repair or replace leaking component.
(7)(d)	Unit fails Toilet Operation and Flush Pattern test; unit flush pattern does not meet test specifications.	Water pressure too low.	Adjust water pressure.
		Water pressure too high.	Adjust water pressure.
		Debris in rinse inlet screen.	Clean or replace rinse ring.
		Faulty or clogged rinse valve.	Clean, repair, or replace rinse valve.
		Faulty or clogged rinse ring.	Clean, repair, or replace rinse ring.

Table 1004: Revolution™ Toilet Fault Isolation (Continued)

STEP	TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION
(8)(b)	Unit fails Maintenance Switch Function Test; valve does not open.	Faulty maintenance switch	Replace maintenance switch.
		Faulty maintenance switch wiring.	Repair maintenance switch wiring.
		Faulty FCU	Repair or replace FCU.
	Flush valve opens, but remains open less than 1 minute.	Faulty FCU	Repair or replace FCU.
(8)(c)	Vacuum Generator circuit does not energize.	Faulty FCU	Repair or replace FCU.
(8)(d)	Flush valve does not close.	Faulty maintenance switch	Replace maintenance switch.
		Faulty maintenance switch wiring.	Repair maintenance switch wiring.
		Faulty FCU	Repair or replace FCU.
(8)(e) -or- (8)(f)	Toilet will not flush; the status lamps are indicating a fault.	Flush Control Unit has determined a fault. **TEST HARNESS STATUS LAMPS** **3 2 1** (0=Off, 1 =On) - - - ---------- 1 1 1 System ready 1 1 0 Rinse valve solenoid fault 1 0 1 Open limit switch fault 1 0 0 Flush valve motor fault 0 1 1 Rinse driver fault 0 1 0 FCU fault 0 0 1 Closed limit switch fault 0 0 0 No power to FCU	Refer below for the individual STATUS codes. (no fault) Repair or replace rinse valve Repair or replace switch harness assy Repair or replace flush valve motor Repair or replace rinse valve Repair or replace FCU Repair or replace switch harness assy Replace fuse in FCU
	FAULT lamp does not turn on.	Faulty FCU	Repair or replace FCU.

Table 1004: Revolution™ Toilet Fault Isolation (Continued)

STEP	TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION
	FAULT lamp does not turn off.	Hose is still blocking the flush valve.	Remove the hose.
		Faulty FCU.	Repair or replace FCU.
(9)(d)	Unit fails Subsystem Leakage and Current Draw Test; unit is leaking.	Rinse valve leaks; loose rinse valve connection(s).	Tighten rinse valve connection(s).
		Rinse valve leaks; faulty or missing O-ring.	Replace O-ring.
		Rinse valve leaks; faulty rinse valve.	Repair or replace rinse valve.
		Rinse ring leaks; faulty or missing O-ring.	Replace O-ring.
		Rinse ring leaks; faulty rinse ring.	Repair or replace rinse ring.
		Toilet bowl leaks; faulty or missing O-ring(s).	Replace O-ring(s).
		Toilet bowl leaks; warped or damaged bowl.	Replace bowl.
		Toilet drain elbow leaks; faulty or missing O-ring(s).	Replace O-ring(s).
		Toilet elbow leaks; warped or damaged bowl.	Replace elbow.
		Flush valve leaks; faulty or missing O-ring(s).	Replace O-ring(s).
		Toilet flush control unit leaks; damaged FCU	Replace FCU.
		Toilet outlet leaks; faulty or missing O-ring(s).	Replace O-ring(s).

Table 1004: Revolution™ Toilet Fault Isolation (Continued)

STEP	TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION
		Toilet outlet elbow leaks; damaged outlet.	Replace outlet.
(10)(b)	Unit fails Jammed Flush Valve Test;; fault light never turns on.	Flush valve did not close on the flexible hose.	Repeat the test. Make sure the valve closes on the hose.
		Faulty FCU.	Repair or replace FCU.
(10)(d)	Unit fails Jammed Flush Valve Test; fault light never turnsoff.	Faulty FCU.	Repair or replace FCU.
(11)(e)	Unit fails Water Quantity Test; rinse water collected does not meet test specifications.	Faulty rinse valve (debris in valve).	Clean rinse valve.
		Stuck or jammed rinse valve .	Repair or replace rinse valve.
		Faulty FCU.	Repair or replace FCU.
(12)(e)	Unit fails Rinse Valve Leakage Test; rinse water does not drain back into the measuring cup.	Faulty rinse valve (debris in valve).	Clean rinse valve.
		Faulty rinse valve (debris in valve).	Clean rinse valve.
		Faulty rinse valve (faulty poppet seal).	Repair or replace rinse valve.
		Faulty rinse valve (debris in valve).	Clean rinse valve.
		Faulty rinse valve (faulty poppet seal).	Repair or replace rinse valve.

Table 1004: Revolution™ Toilet Fault Isolation (Continued)

STEP	TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION
	Other Common Faults (Vacuum Toilet)		
	Clogged toilet.	Blockage at bowl elbow or vacuum lines - usually caused by tissues, paper towels, etc.	Remove blockage manually or by using Kinetic Water Ram Tool (PN 14400-995).
	Toilet will not flush.	Lavatory circuit breaker tripped.	Reset Lavatory circuit breaker.
		Aircraft's Flush switch not connected to toilet's timer.	Reconnect aircraft's Flush switch.
		Faulty aircraft's Flush switch.	Repair or replace aircraft's Flush switch.
	Toilet has excessive odor.	Excessive usage. (toilet assembly not serviced for a long time).	Service toilet. Refer to DESCRIPTION AND OPERATION.
		Excessive usage. (bowl overfilled beyond rinse ring's capability to rinse away residual material during flush cycle operation).	Clean toilet. Refer to CLEANING.
	Toilet leaks aboard aircraft, but not in the repair shop.	Faulty or missing connection O-rings at water supply line.	Replace O-rings.
		Faulty or missing connection O-rings at waste drain line.	Replace O-rings.
		Damaged aircraft drain plumbing.	Repair aircraft drain plumbing.
	Lavatory toilet paper / sanitary napkin supply exhausted.	Excessive usage. (lavatory not serviced for a long time).	Restock lavatory toilet paper / sanitary napkins as required.

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SCHEMATICS AND WIRING DIAGRAMS

TASK 38-34-41-760-801-A01

1. General

A. Revolution™ Toilet

Refer to the following figures for information regarding on electrical schematics and wiring diagrams of the Revolution™ Toilet.

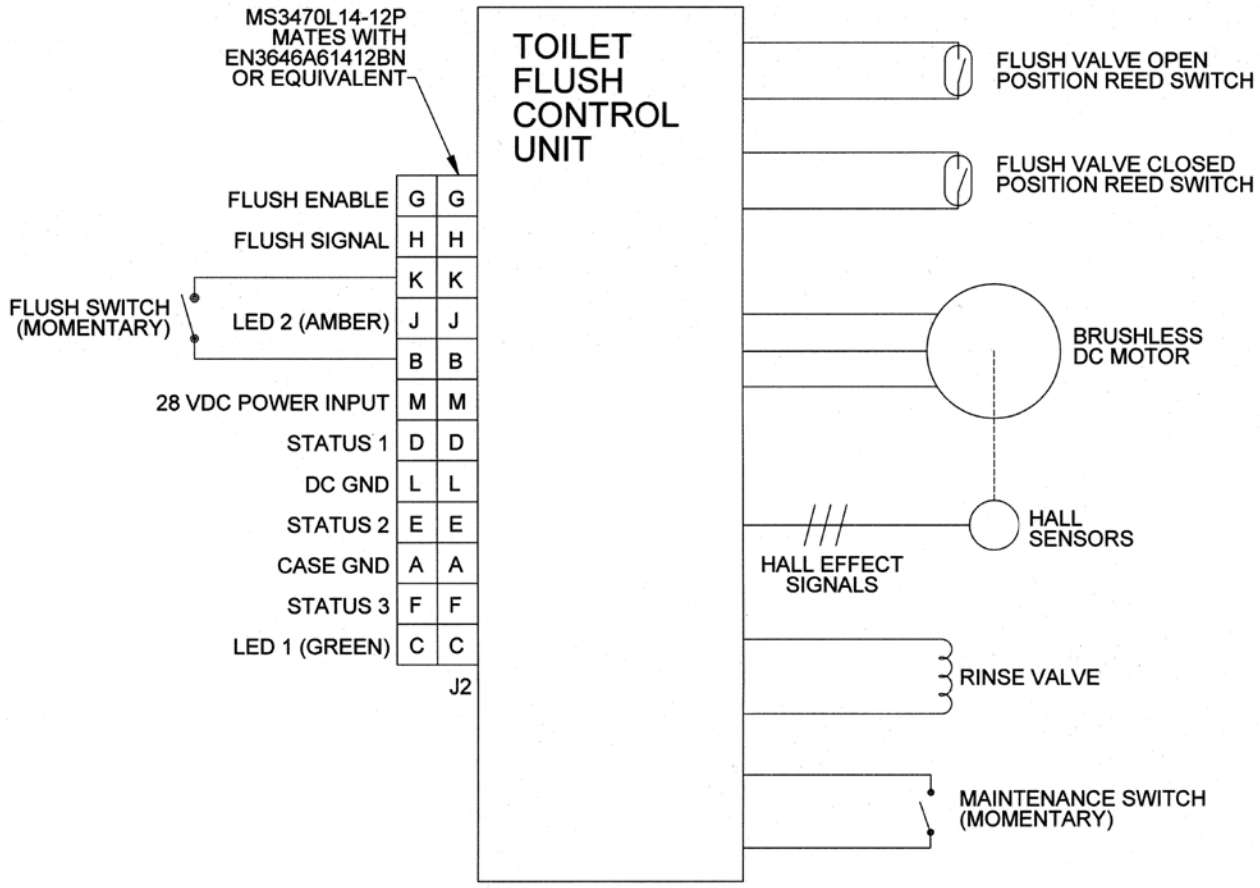

Figure 2001: Wiring Diagram - Revolution™ Toilet

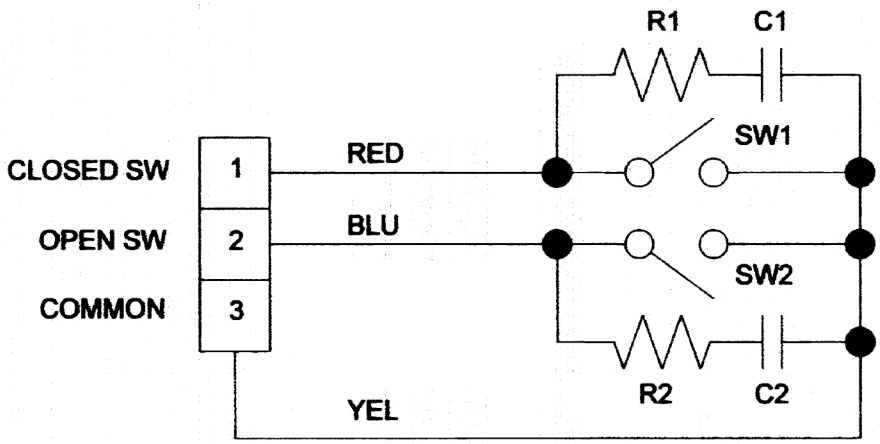

Figure 2002: Wiring Diagram - Flush Valve Reed Switch

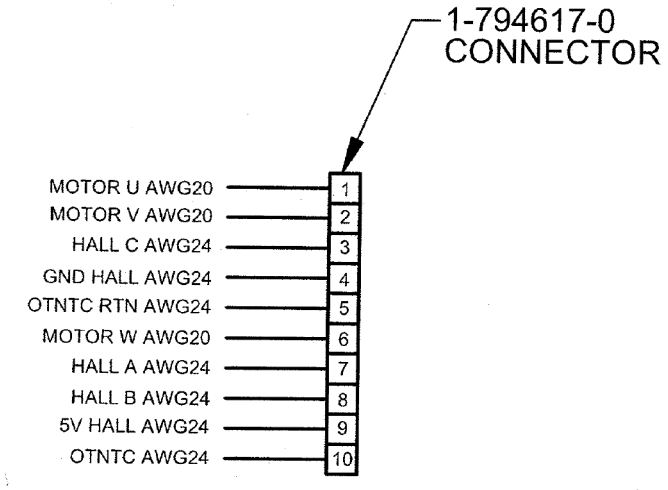

Figure 2003: Wiring Diagram - Motor

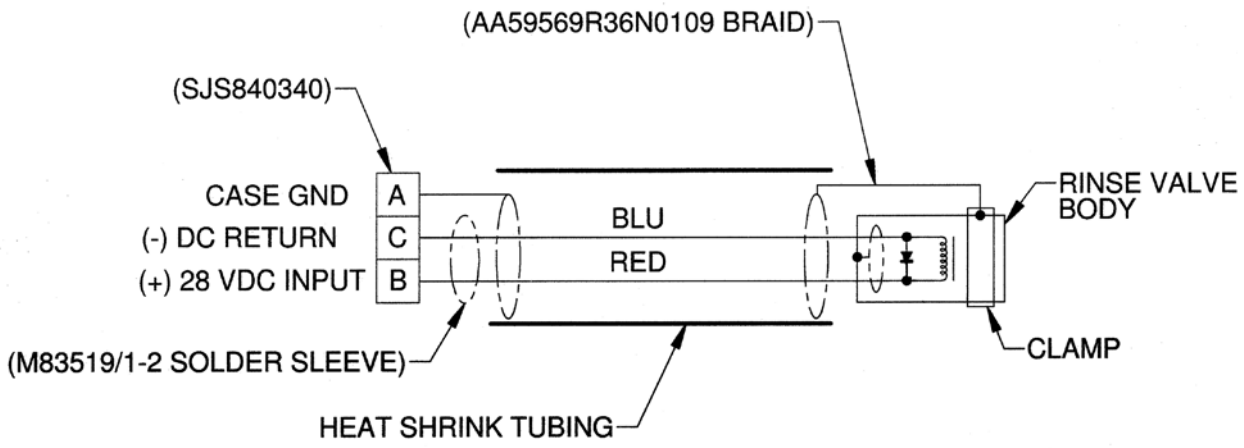

Figure 2004: Schematic - Rinse Valve

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DISASSEMBLY

TASK 38-34-41-000-801-A01

1. General

WARNING: FOR SANITARY REASONS, ALWAYS WEAR RUBBER GLOVES (ELBOW LENGTH) WHEN HANDLING PARTS WHICH HAVE BEEN IN CONTACT WITH WASTE MATERIALS.

A. Overview

(1) Prior to initiating disassembly, personnel shall carefully read all instructions and study illustrations applicable to the Revolution™ Toilet and any components.

(2) Disassembly instructions assume that complete overhaul of the assembly is to be accomplished. Disassembly instructions cover disassembly only as far as practicable; however these instructions enable disassembly to provide access for inspection and cleaning. In some instances, partial equipment overhaul, or overhaul of individual sub assemblies only, can be required. In this event, disassemble only to the extent necessary to accomplish removal of affected assemblies.

(3) Unless the Revolution™ Toilet has been suitably tagged to denote the nature of overhaul requirements, refer to TESTING AND FAULT ISOLATION and perform as much of the fault isolation procedures as necessary to isolate and identify the most probable cause of its malfunction before performing disassembly. This is to determine the extent of disassembly required without completely tearing down and rebuilding the component. Unnecessary disassembly is not recommended.

(4) The procedures that follow are provided to disassemble all major assemblies and components to their detail parts. Use the Illustrated Parts List Figure number listed in the paragraph heading to refer to the Item number listed in parentheses, unless otherwise noted in the following procedures.

NOTE: Prior to initiating disassembly operations, the assembly shall be in a clean condition, free of contamination and residue, before disassembly is begun. Refer to CLEANING if additional cleaning is required.

TASK 38-34-41-000-802-A01

2. Disassembly Equipment and Materials

A. Required Equipment

Standard shop equipment can be used to disassemble the assembly and its components.

B. Required Materials

Standard shop materials can be used to disassemble the assembly and its components.

TASK 38-34-41-010-801-A01

3. Disassembly Procedure

Subtask 38-34-41-010-001-A01

A. Toilet Assembly

Disassemble the toilet assembly as follows (refer to IPL Figure 1 on page 10016):

NOTE: The design of the Revolution™ Toilet is such that the removal of the main components, such as the rinse ring and anti-siphon valve, toilet bowl, rinse valve, and flush valve can be performed while the Revolution™ Toilet is installed in the aircraft.

(1) Remove the rinse ring and anti-siphon valve (IPL Figure 1 / Items 40 & 55).

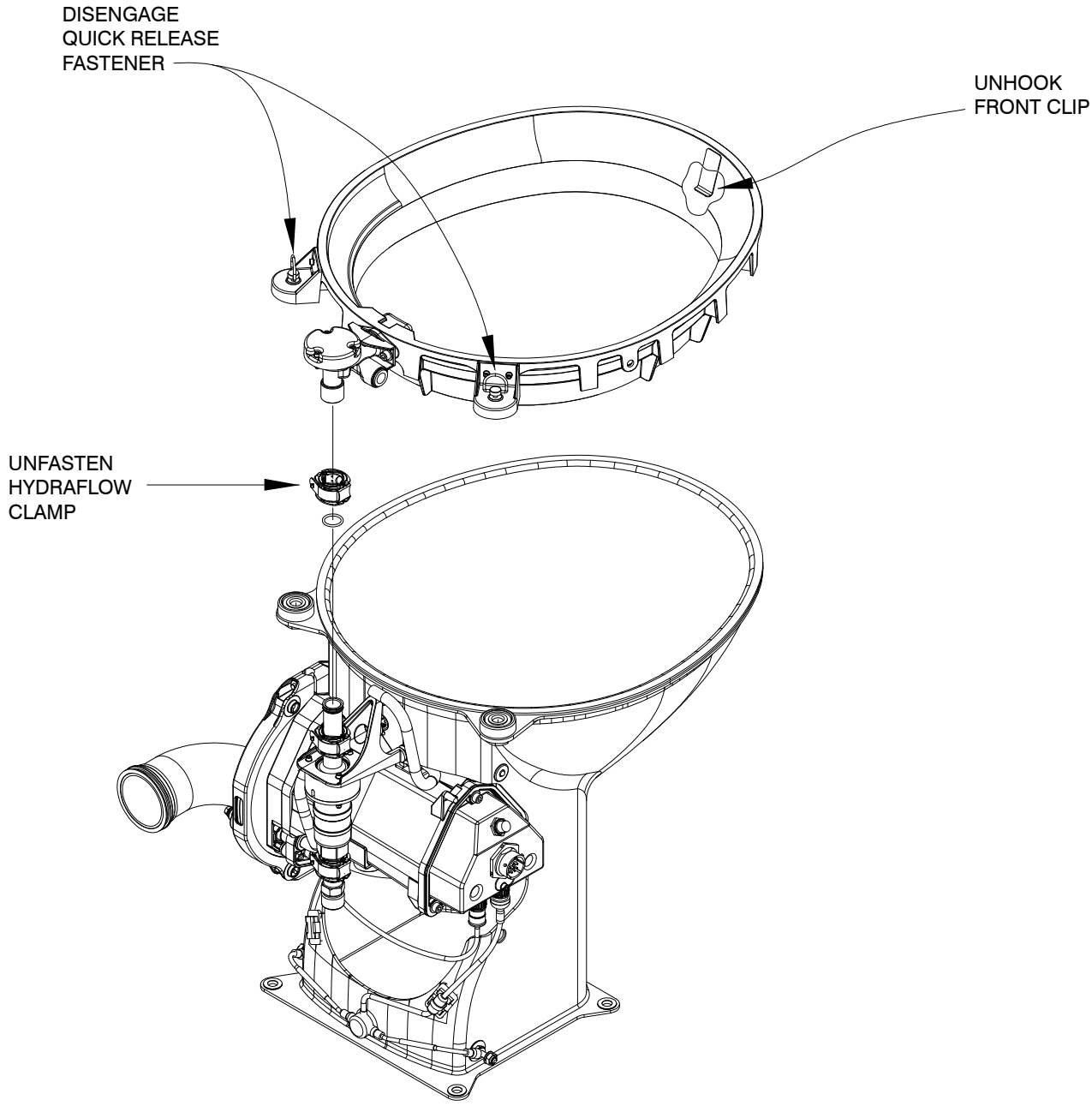

Figure 3001: Rinse Ring Removal

(a) Detach the flush valve's vent tube (IPL Figure 4, item 190) from the anti-siphon valve (55) by pushing on the push-on fitting, then pulling out the vent tube.

(b) Unfasten the upper clamshell clamp (110), releasing the anti-siphon valve (55) from the rinse valve tube (120).

(c) Disengage the rinse ring's two quick-release fasteners (100) by turning the fastener ring one quarter turn, then unhook the front clip (45) from the pedestal (365) freeing the rinse ring (50).

(d) Lift the rinse ring (50) and anti-siphon valve (55) from the pedestal (365).

(e) Remove the O-ring (115) from the base of the anti-siphon valve (55).

(2) Separate the rinse ring (50) from the anti-siphon valve (55) by removing two screws (60), four washers (65), and two nuts (70). Remove the O-ring (75).

NOTE: The rinse ring's brackets (80) are bonded, and should not be removed unless necessary for repair.

(3) Remove the plug (30) from the anti-siphon valve (55) by pushing on the push-on fitting, then pulling out the plug (30).

(4) To disassemble the anti-siphon valve, refer to paragraph A., "Anti-siphon Valve" on page 3011.

(5) Remove the bowl assembly (IPL Figure 1 / Item 135) as follows:

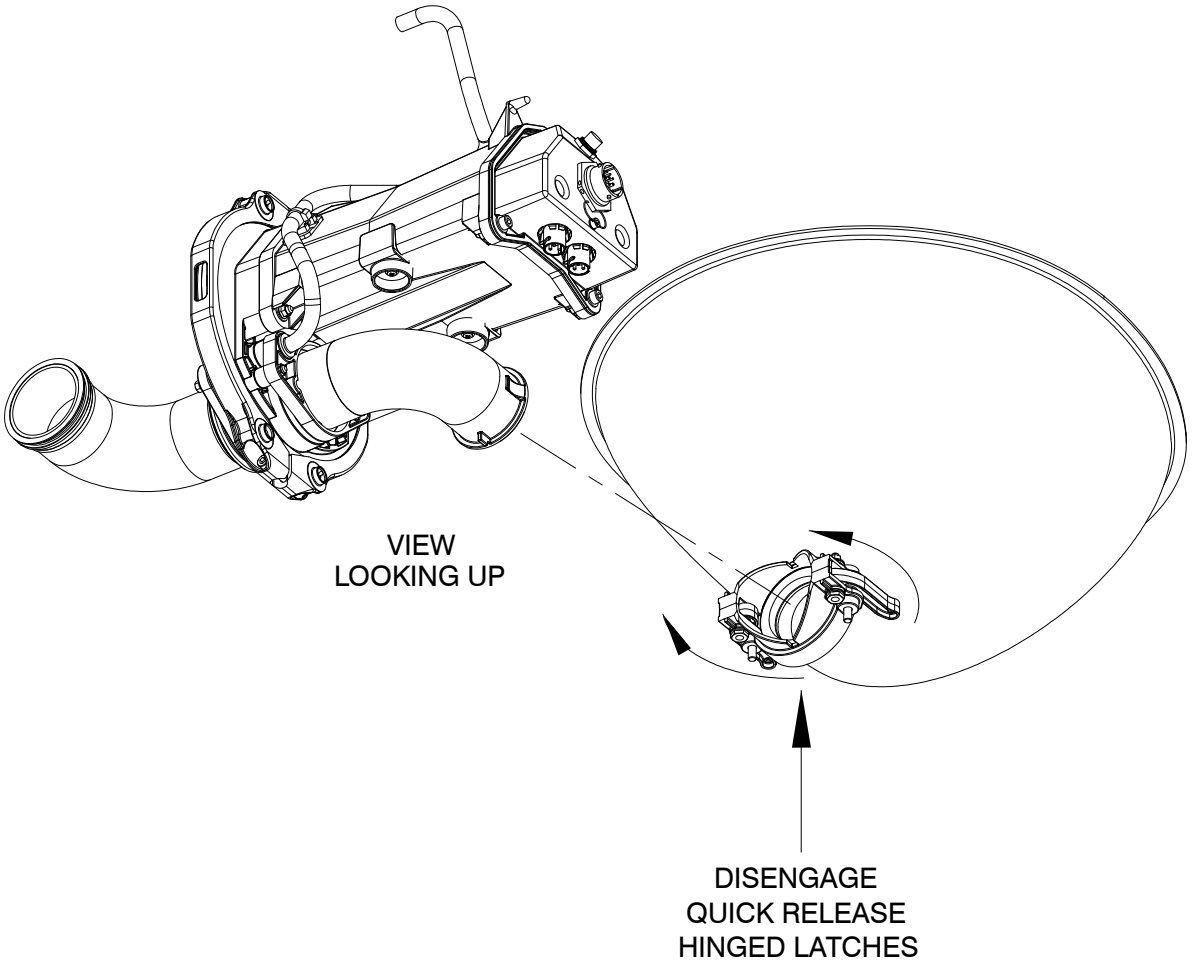

Figure 3002: Bowl Removal

(a) Disengage the bowl assembly (135) from the flush valve (215) as follows:

1 Press up on the locking buttons (170), then pry the two cam levers (160) outward until the cams have disengaged from the flush valve's inlet elbow.

2 Lift the bowl (182) from the pedestal (365).

(6) To disassemble the bowl assembly, refer to paragraph B., "Bowl Assembly" on page 3012.

(7) Remove the rinse valve (IPL Figure 1 / Item 185) as follows:

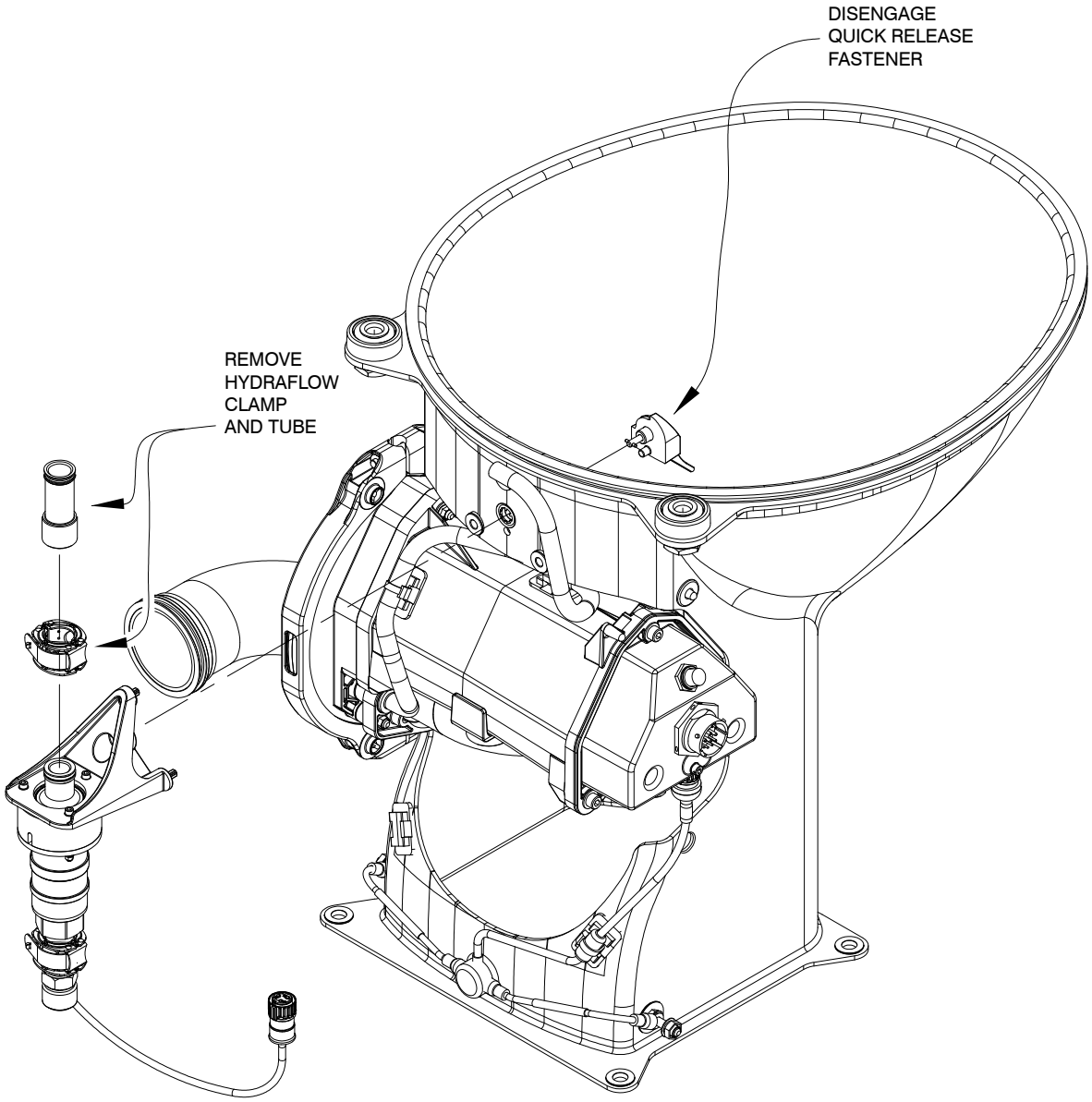

Figure 3003: Rinse Valve Removal

(a) If the unit is being removed on-wing:

CAUTION: MAKE SURE THAT THE AIRCRAFT'S WATER SUPPLY IS TURNED OFF BEFORE DETACHING THE CLAMSHELL CLAMP.

1 Disconnect the aircraft's water supply line from the rinse valve inlet by removing the clamshell connector (205).

(b) Disconnect the rinse valve's (185) connector P2 from the flush valve's (215) connector J2.

(c) Detach the rinse valve (185) from the pedestal (365) by disengaging the quarter turn cam fastener (190) by lifting the cam's lever up, then turning the lever one-quarter turn.

(d) Remove the O-ring (186) from the rinse valve's (185) outlet.

(e) Remove the O-ring (188) and inlet screen (187) from the rinse valve's (185) inlet.

(f) Remove the rinse valve tube (120) from rinse valve (185) by unfastening the mid clamshell clamp (125). Remove the two O-rings (115 and 130) and the rinse valve inlet adapter (200).

(8) Remove the flush valve assembly (IPL Figure 1 / Item 215) as follows:

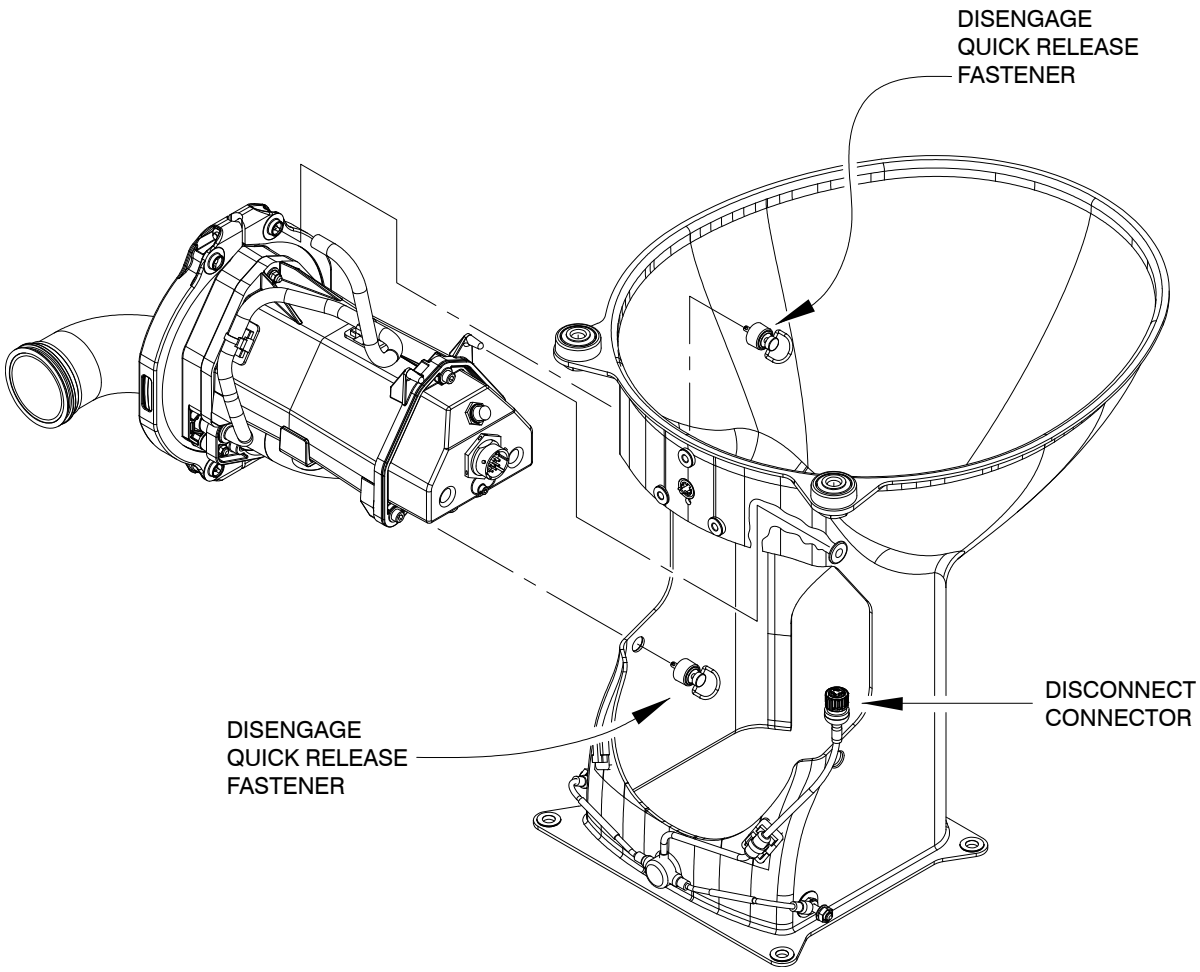

Figure 3004: Flush Valve Removal

(a) Disconnect the grounding cable (285) connector P1 from the flush valve assembly (215) connector J1.

(b) Disengage the two quick-release fasteners (220), then lift the flush valve assembly (215) and outlet (250 or 255) from the pedestal (365). Remove the grommet (225).

(9) Remove the outlet (250 or 255) and swivel plate (230) from the flush valve assembly (215) by removing two nuts (235) and washers (240). Remove the O-ring (245).

(10) To disassemble the flush valve assembly (215), refer to paragraph C., ”Orbital Flush Valve” on page 3013.

(11) Cut the cable tie (295) to remove the ground cable (285) from the cable tie mount (340).

NOTE: If cable tie mount (340) is damaged or loose, refer to Repair Subtask 38-34-41-302-002-A01 for reattachment.

(12) Remove the ground cables (290) from the left and right hand side of the pedestal (365) by removing two nuts (300), lock washers (305), washers (310), and nuts (320).

NOTE: The washers (330) and screws (335) are bonded to the pedestal (365). Removal is not necessary unless they are damaged.

(13) Remove the ground cables (285 and 290) from the center of the pedestal (365) by removing one screw (345), washer (350), washers (355), washer (360), and nut (361).

TASK 38-34-41-020-801-A01

4. Component Disassembly Procedure

Subtask 38-34-41-020-001-A01

A. Anti-siphon Valve

Disassemble anti-siphon valve (refer to IPL Figure 2 on page 10026) as follows:

(1) Remove protective cover (5) from valve body (45) by removing three screws (10), six washers (15), and three nuts (20).

(2) Remove O-ring cover (25) and O-ring (40).

(3) Remove the poppet (30) and poppet valve seal (35).

(4) Remove two half cartridges (50) and O-rings (55).

Subtask 38-34-41-020-002-A01

B. Bowl Assembly

Disassemble bowl assembly (refer to IPL Figure 1, item 135) as follows:

(1) Remove the two flanges (145) by removing two nuts (150), two washers (155), and two bolts (160).

(2) Remove the two cams (165), locking buttons (175), and springs (180) from the flanges (145).

(3) Remove the four flange bearings (170) from the two cams (165).

(4) Remove the seal (140) from the bowl (182).

Subtask 38-34-41-020-004-A01

C. Orbital Flush Valve

Disassemble the orbital flush valve (refer to IPL Figure 4 on page 10031) as follows:

(1) If damaged or illegible, remove identification label (5).

(2) Remove the v-band (10) by removing two screws (15), washers (20), and nuts (25).

(3) Separate the vacuum side assembly (30) from the motor side assembly (60). Remove the O-ring (90).

(4) Remove the retainer (100) and O-ring (105) from the vacuum side assembly (30) drive shaft recess.

(5) Remove the flush plate (130).

(6) Remove the bearing (40) and plain bearing (45) from the vacuum side assembly (30).

(7) Remove the outlet side seal (110), O-ring (115), O-ring (120), and silicone extrusion (125) from the vacuum side assembly (30).

(8) Remove the motor side seal (140), O-ring (145) O-ring (150), and silicone extrusion (155) from the motor side assembly (60).

(9) Cut the cable ties (IPL Figure 1, item 295) from the cable tie mounts (375), then remove the vent tube (190) from the swivel plate (175).

(10) Detach the motor side assembly (60) from the FCU housing by removing three nuts (160) and washers (165), and two hollow dowels (170).

(11) Remove the swivel plate (175) and bowl elbow (215) from the motor side assembly (60) by removing two nuts (185) and washers (180).

(12) Remove the leading edge insert (220) and O-ring (225) from the swivel plate (175).

(13) Remove the two elbow stops (227) from the base of the FCU housing (370) by removing two screws (228) and washers (229).

(14) Remove the O-ring (245), gear (240), and bearing (250) from the mounting plate (265).

(15) Remove the spacer (230), pinion gear (235), and spacer (230) from the mounting plate (265).

CAUTION: ELECTROSTATIC SENSITIVE ASSEMBLY; USE PRECAUTIONARY MEASURES WHEN HANDLING ELECTRONIC COMPONENTS.

(16) Slide the motor plate assembly (260) out of the FCU housing (370). Remove the O-ring (360).

NOTE: The reed switch PC board (285) on the motor plate assembly (260) will disconnect from the main controller PC board (325) as you slide it out.

(17) Cut the cable tie (270) freeing the motor's (275) connector.

(18) Disconnect the motor's (275) connector from the reed switch PC board (285).

(19) Remove the motor (275) from the mounting plate (265) by removing four screws (280).

(20) Remove the reed switch PC board (285) from the motor plate assembly (260) by removing three screws (290), insulators (295), nylon washers (300), washers (305), and nuts (310).

(21) Remove the plain bearing (315) from the mounting plate (265).

CAUTION: ELECTROSTATIC SENSITIVE ASSEMBLY; USE PRECAUTIONARY MEASURES WHEN HANDLING ELECTRONIC COMPONENTS.

(22) Remove the FCU cover (330) from the FCU housing (370) by removing three screws (335), washers (340), and nuts (345). Remove the O-ring (360).

NOTE: The main controller pc board (325) will slide out of the FCU housing.

(23) Remove the main controller PC board (325) from the FCU cover (330) by removing two screws (350) and washers (355).

Further disassembly is neither necessary nor recommended. For repair instructions, refer to REPAIR.

CLEANING

TASK 38-34-41-100-801-A01

1. General

A. Overview

(1) Thorough cleaning is an essential prelude to inspection for determining the existence, extent and exact locations of defects. Cleaning includes the removal of waste build-up and mineral deposits. Cleaning is performed during a complete or partial overhaul and for periodic maintenance.

WARNING: CLEAN PARTS IN A WELL-LIT AREA WITH GOOD AIR CIRCULATION. ENSURE SAFETY AND FIRE EQUIPMENT ARE AVAILABLE AT ALL TIMES.

CAUTION: DO NOT USE HYDROCARBON SOLVENTS; CHEMICAL SOLVENTS OF THE ETHER OR FLUORIDE FAMILY; ACETONE, METHYL-KETONE, OR RELATED SOLVENTS ON PLASTIC OR FIBERGLASS PARTS.
DO NOT USE ABRASIVE OR SCOURING CLEANSER ON ANY METAL, RUBBER, FIBERGLASS, OR PLASTIC PARTS.

(2) Clean all metal parts to remove oil, grease, rust, and dirt. Clean flange areas and sealing surfaces to remove old sealing compounds.

(3) Use a bristle brush to remove loose scale and light surface corrosion.

WARNING: A FACE GUARD AND GLOVES (ELBOW-LENGTH) MUST BE WORN DURING ALL CLEANING OPERATIONS FOR PROTECTION AGAINST SPLASHBACK.

(4) The following procedures must be used for cleaning the assembly or its disassembled components. The subsequent steps are for cleaning a completely disassembled toilet. Refer to DISASSEMBLY to disassemble components or assemblies. For a partial cleaning, follow only those steps applicable. Refer to ASSEMBLY to reassemble components or assemblies. Cleaning materials are specified in Table 4001.

TASK 38-34-41-100-802-A01

2. Cleaning Equipment and Materials

A. Required Equipment

Standard shop equipment, along with equipment listed in Table 4001 can be used to clean the assembly and its components.

NOTE: Equivalent substitutes can be used for listed items.

Table 4001: Cleaning Equipment

Equipment	Equipment's Specification		Source or CAGE Code	Representative Type (Model, Part No)
	Characteristics	Range Accuracy Tolerance		
Brush, non-metallic stiff bristle (scrub)			Commercially available	H-B-1490 -or- A-A-2074 -or- MIL-B-43871

B. Required Materials

Standard shop materials, along with materials listed in Table 4002 can be used to clean the assembly and its components.

NOTE: Equivalent substitutes can be used for listed items.

Table 4002: Cleaning Materials

ITEM	DESCRIPTION	SOURCE
Detergent, general purpose liquid	Ivory® Liquid	Proctor and Gamble (V1XY28)
	-or-	
	P-D-220D	Commercially available
	-or-	
	MIL-D-16791, Type I	Commercially available
Soap, antimicrobial	A-A-279, PH31	Commercially available
	-or-	
	P-S-619C	Commercially available
Vinegar, distilled white	Acetic acid 5% concentration	Commercially available

Table 4002: Cleaning Materials (Continued)

ITEM	DESCRIPTION	SOURCE
Cleaner, industrial	Eldorado ED-333	PRC-DeSoto International (V83574)
	-or-	
	Simple Green All-Purpose Cleaner	Sunshine Makers, Inc. DBA: Simple Green (V1Z575)
	-or-	
	Pine-Sol®	The Clorox Company (V93098)
Disinfectant, general purpose	Lysol ®	Reckitt Benckiser Inc. (V0MWS8)
-or-		
Soap, disinfectant	A-A-1441	Commercially available
	-or-	
	A-A-1438	Commercially available
-or-		
Bleach, chlorine	Ultra Clorox Bleach	The Clorox Co. (V93098)
Alcohol, Isopropyl, 99.9%	TT-I-735A	Commercially available
Cloth, lint-free	MIL-C-85043, Type I or Type II	Commercially available
Abrasive pad, general purpose	Scotch Brite™ 7447	3M Co. (V04963)

C. Cleaning and Disinfectant Solutions

The following suggested mixtures can be used to prepare a solution suitable for cleaning or disinfecting the parts and components of the Revolution™ Toilet.

NOTE: The solution's concentration can be adjusted as required to achieve satisfactory results.

NOTE: The solution can be warmed to approximately 180° F (82° C) for improved performance.

NOTE: For more convenient application, the solution can be placed in a spray bottle.

(1) General Purpose Cleaning Solution

A general purpose cleaning solution can be prepared for use in the following cleaning procedures.

Prepare a general purpose cleaning solution as follows:

(a) Mix 1 to 4 parts antimicrobial soap (Table 4001) to 100 parts water,

-or-

(b) Mix 1 to 4 parts liquid detergent (Table 4001) to 100 parts water,

-or-

(c) Mix 1 to 4 parts industrial cleaner (Table 4001) to 30 parts water,

-or-

(d) Mix 1 part distilled white vinegar (Table 4001) to 1 part water.

NOTE: 10-20 drops of pine oil or lemon oil can be added to each quart (each liter) of the vinegar cleaning solution for a more pleasant scent.

(2) Strong Disinfectant Solution

A strong disinfectant solution can be prepared for use in the following cleaning procedures to neutralize microbes and bacteria.

Prepare a strong disinfectant solution as follows:

(a) Mix 1 part chlorine bleach (Table 4001) to 256 parts water,

NOTE: Approximately 1 tablespoon (14.8 ml) bleach (Table 4001) to 1 gallon (3.8 liter) water.

-or-

(b) Mix 1 part disinfectant soap (Table 4002) to 50 parts water,

-or-

(c) Use a general purpose disinfectant (Table 4002) directly,

-or-

(d) Use isopropyl alcohol (Table 4001) directly.

TASK 38-34-41-140-801-A01

3. Cleaning Procedure

Subtask 38-34-41-140-001-A01

A. Bowl Assembly

(Refer to IPL Figure 1, item 135)

(1) Prepare a cleaning solution as per paragraph C. on page 4004.

(2) Prepare a strong disinfectant solution as per paragraph C. on page 4004.

(3) Support the bowl/pedestal over a suitable waste receptacle or drain.

(4) Clean the exterior and internal surfaces of the bowl and bowl elbow using a non-metallic stiff bristle brush (Table 4001) and the cleaning solution. Remove all waste and mineral buildup.

(5) Wipe all exterior and interior surfaces clean with a lint-free cloth soaked with strong disinfectant solution.

(6) Dry all surfaces with dry, compressed air or wipe dry with a lint-free cloth (Table 4002).

Subtask 38-34-41-140-002-A01

B. Rinse Ring Assembly

(Refer to IPL Figure 1, item 50)

(1) Prepare a cleaning solution as per paragraph C. on page 4004.

(2) Prepare a strong disinfectant solution as per paragraph C. on page 4004.

(3) Clean all parts in the cleaning solution. Remove all scale, calcium, lime and mineral deposits. Use a stiff, non-metallic brush (Table 4001) as required.

(4) Wipe all parts clean with a lint-free cloth soaked with strong disinfectant solution.

(5) Dry all surfaces with dry, compressed air or wipe dry with a lint-free cloth (Table 4002).

Subtask 38-34-41-140-003-A01

C. Anti-Siphon Valve Assembly

(Refer to IPL Figure 1, item 55)

(1) Prepare a cleaning solution as per paragraph C. on page 4004.

(2) Prepare a strong disinfectant solution as per paragraph C. on page 4004.

(3) Clean all parts in the cleaning solution. Remove all scale, calcium, lime and mineral deposits. Use a stiff, non-metallic brush (Table 4001) as required.

(4) Wipe all parts clean with a lint-free cloth soaked with strong disinfectant solution.

(5) Dry all surfaces with dry, compressed air or wipe dry with a lint-free cloth (Table 4002).

Subtask 38-34-41-140-004-A01

D. Rinse Valve Assembly

(Refer to IPL Figure 1, item 185)

(1) Prepare a cleaning solution as per paragraph C. on page 4004.

(2) Prepare a strong disinfectant solution as per paragraph C. on page 4004.

(3) Clean the bore of the rinse valve and the exterior of the armature assembly with the cleaning solution. Use an abrasive pad (Table 4002) or a stiff, non-metallic brush (Table 4001) as necessary to remove corrosion and/or minerals.

(4) Wipe all parts clean with a lint-free cloth soaked with strong disinfectant solution.

(5) Dry all surfaces with dry, compressed air, or wipe dry with a lint-free cloth (Table 4002).

Subtask 38-34-41-140-005-A01

E. Rinse Valve Inlet Screen

(Refer to IPL Figure 1, item 187)

(1) Prepare a cleaning solution as per paragraph C. on page 4004.

(2) Prepare a strong disinfectant solution as per paragraph C. on page 4004.

(3) Clean the rinse valve's water inlet screen with the cleaning solution. Use a stiff, non-metallic brush (Table 4001) as necessary to remove dirt and mineral deposits.

(4) Wipe all parts clean with a lint-free cloth soaked with strong disinfectant solution.

(5) Replace the screen if it is damaged.

(6) Dry all surfaces with dry, compressed air or wipe dry with a lint-free cloth (Table 4002).

Subtask 38-34-41-140-006-A01

F. Orbital Flush Valve Assembly

(Refer to IPL Figure 4, item 1)

(1) Prepare a cleaning solution as per paragraph C. on page 4004.

(2) Prepare a strong disinfectant solution as per paragraph C. on page 4004.

(3) Clean the interior surfaces of the back and motor mount housings and plate with cleaning solution and a stiff non-metallic brush (Table 4001). Remove all waste and mineral buildup.

(4) Clean inside of elbow fitting with cleaning solution and a stiff non-metallic brush (Table 4001). Remove all waste and mineral buildup.

(5) Make sure that the vent tube is clear of any obstructions.

(6) Wipe the parts clean with a lint-free cloth soaked with strong disinfectant solution.

(7) Wipe all electrical parts clean with a lint-free cloth moistened with isopropyl alcohol (Table 4002).

(8) Dry all surfaces with dry, compressed air or wipe dry with a lint-free cloth (Table 4002).

Subtask 38-34-41-140-007-A01

G. Electrical parts

(1) Using a lint-free cloth moistened with isopropyl alcohol (Table 4002), wipe electrical parts clean.

(2) Allow electrical components to air dry.

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CHECK

TASK 38-34-41-200-801-A01

1. General

A. Overview

(1) Visually inspect the complete Revolution™ Toilet and its components (subassemblies) using a strong light and preferably some means of magnification. Use an inspection mirror when inspecting for damage to interior details of an assembly so that all surfaces are made visible.

(2) Visually examine all parts for nicks, cracks, cuts, fraying, dents, distortion, chafing, scoring, excessive wear, loose mounting rings and missing attaching hardware, stripped or crossed threads and other defects that could impair function of the assembly.

NOTE: Parts made of Neoprene, nylon, or rubber are replaced at each overhaul; therefore, inspection of O-rings, seals, and gaskets is unnecessary unless otherwise specified.

B. Inspection of Parts Affected by Mineral Deposits

(1) Accumulated Deposits

Depending on the hardness (concentration of dissolved minerals) of the potable water used in the assembly, the rinse valve (IPL Figure 1, item 185) and the inlet screen (IPL Figure 1, item 187) can accumulate deposits, affecting proper operation.

Water & Waste Systems recommends that the rinse valve's internal parts and screen (IPL Figure 1, item 187) be inspected and cleaned per CLEANING every two years or sooner, depending on the mineral content of the water used.

A clogged screen can result in insufficient water during the flush cycle.

TASK 38-34-41-200-802-A01

2. Check Equipment and Materials

A. Required Equipment and Materials

Standard shop equipment and materials can be used to disassemble the unit.

TASK 38-34-41-210-801-A01

3. Inspection Procedure

Subtask 38-34-41-210-001-A01

A. Electrical Inspection

(1) To conduct an electrical inspection of the rinse valve assembly, refer to Figure 2004.

(2) To conduct an electrical inspection of the motor assembly, refer to Figure 2003.

Subtask 38-34-41-210-002-A01

B. Physical Inspection

(1) Perform a check of the toilet assembly per Table 5001.

Table 5001: Check Requirements

DESCRIPTION	METHOD	CHECK	REQUIREMENTS	REMEDY
Pedestal (Refer to IPL Figure 1)				
General condition	Visual	Scratches, gouges, cracks, de-bonding, or other evidence of structural failure.	No damage permissible.	Replace.
	Visual	Broken or missing attachment points for the rinse ring.	No damage permissible.	Replace.
	Visual	Corrosion or damage to ground connection.	No damage permissible.	Replace.

Table 5001: Check Requirements

DESCRIPTION	METHOD	CHECK	REQUIREMENTS	REMEDY
Bowl (Refer to IPL Figure 1, item 135)				
Identification labels, placards, and ink stamps	Visual	Legibility of label, placard or ink-stamp information	All information must be legible.	Refer to REPAIR for proper replacement procedure.
	Visual	Bubbling, lifting, peeling, cracking, discoloration of label or protective coating	No damage permissible.	Refer to REPAIR for proper replacement procedure.
Attaching and mounting hardware	Visual	Missing, loose, or damaged fasteners.	No missing, loose, or damaged fasteners permissible.	Replace attaching hardware.
General	Visual	Scratches or other damage considered cosmetic.	Cosmetic damage permissible per operator's discretion.	Repair or replace.
	Visual	Scratches or gouges that impair function of the toilet.	Damage impairing function of the toilet not permissible.	Repair or replace.
	Visual	Cracks, de-bonding, or other evidence of structural failure.	No damage permissible.	Replace.
	Visual	Evidence of leaks around the flanged coupling.	No leakage permissible.	Locate source of leak and repair or replace as required.
	Functional	Cam levers for ease of movement.	Cam levers must move freely.	Repair or replace.

Table 5001: Check Requirements

DESCRIPTION	METHOD	CHECK	REQUIREMENTS	REMEDY
	Functional	Locking button for positive locking of cam levers.	Locking buttons must operate smoothly, locking the cam levers when folded to the 'locked' position.	Repair or replace locking button and/ or wave spring.

Table 5001: Check Requirements

DESCRIPTION	METHOD	CHECK	REQUIREMENTS	REMEDY
Rinse Ring (Refer to IPL Figure 1, item 40)				
General condition	Visual	Inadequate rinse water, uneven rinse flow, water sprays above the bowl, no rinsing at all.	Full and even spray of rinse water onto the toilet bowl.	CLEAN rinse ring or replace.
	Visual	Cracks, nicks, deformation, broken or missing attachment points for the pedestal,	No damage permissible.	Replace.
	Visual	Plugged nozzles	Nozzles must deliver a full and even spray of water on the toilet bowl.	CLEAN nozzles or replace.
	Visual	Evidence of leakage around the anti-siphon valve outlet.	No leakage permissible.	Locate source of leak and repair or replace as required.

Table 5001: Check Requirements

DESCRIPTION	METHOD	CHECK	REQUIREMENTS	REMEDY
Anti-Siphon Valve (Refer to IPL Figure 2)				
Identification labels, placards, and ink stamps	Visual	Legibility of label, placard or ink-stamp information	All information must be legible.	Refer to REPAIR for proper replacement procedure.
	Visual	Bubbling, lifting, peeling, cracking, discoloration of label or protective coating	No damage permissible.	Refer to REPAIR for proper replacement procedure.
Attaching and mounting hardware	Visual	Missing, loose, corroded, or damaged fasteners.	No missing, loose, or damaged fasteners permissible.	Replace fasteners.
Cover	Visual	Dents, deformation, or corrosion.	No damage permissible.	Replace component.
Poppet	Visual	Cuts, nicks, scratches.	No damage permissible.	Replace component.
Poppet valve seal	Visual	Condition of the valve seal.	No scratches, nicks, or cuts are permissible.	Replace.
Valve body	Visual	Cracks, gouges, scratches.	No damage permissible.	Repair or replace component.
	Visual	Mineral deposits	No mineral deposits permissible.	Clean or Replace.
Half cartridge	Visual	Dents, deformation, or corrosion.	No damage permissible.	Repair or replace component.

Table 5001: Check Requirements

DESCRIPTION	METHOD	CHECK	REQUIREMENTS	REMEDY
Rinse Valve (Refer to IPL Figure 1, item 185)				
Identification labels, placards, and ink stamps	Visual	Legibility of label, placard or ink-stamp information	All information must be legible.	Refer to REPAIR for proper replacement procedure.
	Visual	Bubbling, lifting, peeling, cracking, discoloration of label or protective coating	No damage permissible.	Refer to REPAIR for proper replacement procedure.
Attaching and mounting hardware	Visual	Missing, loose, corroded, or damaged fasteners.	No missing, loose, or damaged fasteners permissible.	Replace fasteners.
Valve body	Visual	Cracks, gouges, scratches.	No damage permissible.	Replace component.
	Visual	Mineral deposits	No mineral deposits permissible.	Clean or Replace.
Electrical connector	Visual	Connector housing.	No damage permissible.	Replace component.
		Connector fasteners.	No loose or damaged fasteners	Replace component.
		Evidence of arcing or burning.	No damage permissible.	Replace component.
		Loose, bent, or missing pins.	No damage permissible.	Replace component.
Electrical wiring	Visual	Evidence of arcing, charred, chafed, or missing insulation.	No damage permissible.	Repair or replace wiring.

Table 5001: Check Requirements

DESCRIPTION	METHOD	CHECK	REQUIREMENTS	REMEDY
	Visual	Broken or frayed wire strands.	No damage permissible.	Repair or replace wiring.
Inlet screen	Visual	Tears in the inlet screen	No damage permissible.	Replace.
	Visual	Damage to peripheral seal	No damage permissible.	Replace.
	Visual	Corrosion	No corrosion permissible.	Replace.

Table 5001: Check Requirements

DESCRIPTION	METHOD	CHECK	REQUIREMENTS	REMEDY
Orbital™ Flush Valve (Refer to IPL Figure 4)				
Identification labels, placards, and ink stamps	Visual	Legibility of label, placard or ink-stamp information	All information must be legible.	Refer to REPAIR for proper replacement procedure.
	Visual	Bubbling, lifting, peeling, cracking, discoloration of label or protective coating	No damage permissible.	Refer to REPAIR for proper replacement procedure.
Attaching and mounting hardware	Visual	Missing, loose, corroded, or damaged fasteners.	No missing, loose, or damaged fasteners permissible.	Replace fasteners.
	Visual	Damage or deformation to the enclosure or housings.	No damage permissible.	Repair or replace.
	Visual	Worn or damaged seals.	No damage permissible.	Replace.
	Visual	Mising or loose bonded bolts.	No missing or loose fasteners permissible.	Repair or replace.
	Visual	Damage to the vent fitting.	No damage permissible.	Replace.
	Visual	Damaged or corroded flush plate.	No damage permissible.	Replace.
	Visual	Evidence of leaks.	No leakage permissible.	Locate source of leak and repair or replace as required.

Table 5001: Check Requirements

DESCRIPTION	METHOD	CHECK	REQUIREMENTS	REMEDY
	Visual	Worn, damaged, or stripped gears.	No damage permissible.	Replace.
	Visual	Damage to printed circuit wiring board.	No damage permissible.	Repair or replace.
	Visual	Damage to connector or bent connector pins.	No damage permissible.	Repair or replace.
	Visual	Damage to motor or motor drive shaft,	No damage permissible.	Replace.
	Visual	Excessive armature wear.	No damage permissible.	Repair or replace.
	Visual	Damage to wiring.	No damage permissible.	Repair or replace.
	Visual	Damage to connector(s).	No damage permissible.	Repair or replace.
Electrical connector	Visual	Connector housing.	No damage permissible.	Replace connector housing.
		Connector fasteners.	No loose or damaged fasteners	Repair or replace connector.
		Evidence of arcing or burning.	No damage permissible.	Repair or replace connector.
		Loose, bent, or missing pins.	No damage permissible.	Repair or replace connector.

REPAIR

TASK 38-34-41-300-801-A01

1. General

A. Overview

Component repair consists of performing any repair or part replacement necessary to restore the component to a serviceable condition. The instructions contained in the following paragraphs cover complete overhaul of components; however, perform only the procedures necessary to make the required repair or part replacement. The following general procedures and practices should be observed during repair of components.

B. General Permissible Repairs

Certain repair procedures can be undertaken without resorting to replacement of the part:

* Minor Damage
* Studs and Bolts
* Electrical Components
* Placard Replacement
* Other General Repairs

For general repair procedure, refer to paragraph A., ”General Repairs” on page 6006.

C. Test after Repair

Perform the appropriate TESTING procedures after reassembly to verify proper operation.

TASK 38-34-41-300-802-A01

2. Repair Equipment and Materials

A. Required Equipment

Standard shop equipment, along with the equipment listed in Table 6001 can be used to assemble the Revolution™ Toilet.

NOTE: Equivalent substitutes can be used for listed items.

Table 6001: Repair Equipment

Equipment	Equipment's Specification		Source or CAGE Code	Representative Type (Model, Part No)
	Characteristics	Range Accuracy Tolerance		
Cable Tie Installation Tool			Commercially available	MS90387-1
Wire stripping tool	10 - 28 AWG		Tyco Electronics Corp. AMP Products Inc. (V00779)	734185-1
Pin insertion/ extraction tool	22-28 AWG		Tyco Electronics Corp. AMP Products Inc. (V00779)	91067-1 (green/white) -or- M81969/1-01
Pin insertion/ extraction tool	20-24 AWG		Tyco Electronics Corp. AMP Products Inc. (V00779)	91067-2 (red/white) -or- M81969/1-02
Crimping tool	connector pins and sockets	20 - 24 AWG	Tyco Electronics Corp. AMP Products Inc. (V00779) Commercially available	601966-1 -or- M22520
Crimping tool	Wire terminals	10 - 20 AWG	Tyco Electronics Corp. AMP Products Inc. (V00779)	696126-1
Heat gun	115 VAC, 400W / 1000W	790° / 1200°	Weller (V34772)	1095
Putty knife			Commercially Available	

Table 6001: Repair Equipment (Continued)

Equipment	Equipment's Specification		Source or CAGE Code	Representative Type (Model, Part No)
	Characteristics	Range Accuracy Tolerance		
Soldering iron	120 VAC	0 - 40 W 0 - 900°	Weller (V34772)	WLC100
Kinetic water ram			Water & Waste Systems (V29780)	14400-995

B. Required Materials

Standard shop materials, along with materials listed in Table 6002 can be used to assemble the Revolution™ Toilet.

NOTE: Equivalent substitutes can be used for listed items.

Table 6002: Repair Materials

ITEM	DESCRIPTION	SOURCE
Abrasive cloth, various grits as required	P-C-451, Type II -or- A-A-1048A -or- ANSI B74.18	Commercially Available
Wire, various gauges, various colors	M22759/34-GG-XY G-Gauge, X=Color, Y=Stripe Color: 0=Blk 4=Yel 8=Gry 1=Brn 5=Grn 9=Wht 2=Red 6=Blu 3=Org 7=Viol Per MIL-W-22759	Commercially available

Table 6002: Repair Materials (Continued)

ITEM	DESCRIPTION	SOURCE
Heat shrink tubing, thin wall PTFE, various sizes and colors	RNF-100-XXX-C XXX (Diameter) 1/8 = 1/8” 3/8 = 3/8” 3/16 = 3/16” 1/2 = 1/2” 1/4 = 1/4” Color: 0=Blk 4=Yel 8=Grey 1=Brn 5=Grn 9=Wht 2=Red 6=Blu 3=Org 7=Viol	Raychem Corp. (V06090)
Heat shrink tubing, dual wall, various sizes and colors	HTAT-XXX-C XXX (Diameter) 1/8 = 1/8” 3/8 = 3/8” 3/16 = 3/16” 1/2 = 1/2” 1/4 = 1/4” Color: 0=Blk 4=Yel 8=Grey 1=Brn 5=Grn 9=Wht 2=Red 6=Blu 3=Org 7=Viol	Raychem Corp. (V06090)
Solder, Sn60 Pb40	QQ-S-571	Commercially available
Sealant, high strength RTV	3145 (clear) -or- MIL-A-46146	Dow Corning Corp. (V71984) Commercially available
Tape, electrical	Super 88 tape per MIL-I-24391	3M. Co. (V04963)
Adhesive, structural epoxy	DP460	3M. Co. (V04963)
Alcohol, Isopropyl, 99.9%	TT-I-735A	Commercially available
Adhesive, contact	W121201 -or- Fastbond™ 30NF	Resinlab, LLC (V34PB2) 3M. Co. (V04963)

Table 6002: Repair Materials (Continued)

ITEM	DESCRIPTION	SOURCE
Protective coating, clear	DP100 Clear -or- 771 Clear -or- TT-C-535A, Type I (Clear)	3M. Co. (V04963) Revlon, Inc. (V0DL21) Commercially available
Adhesive, structural epoxy	Scotch-Weld™ 2216 B/A -or- Scotch-Weld™ Epoxy DP190 gray -or- Hysol® EA 9394™	3M Co. (V04963) Henkel Loctite Corp. (V12405)

TASK 38-34-41-301-801-A01

3. Repair Procedures

Subtask 38-34-41-301-001-A01

A. General Repairs

CAUTION: CONDUCT ALL WORK IN A WELL VENTILATED AREA AS THESE REPAIR MATERIALS CONTAIN TOXIC AND FLAMMABLE INGREDIENTS. AVOID BREATHING VAPORS. IF FINISHES OR SOLVENTS ARE SPATTERED IN EYES, FLUSH IMMEDIATELY WITH WATER FOR 15 MINUTES AND GET MEDICAL ATTENTION IMMEDIATELY. IF SPATTERED ON SKIN, FLUSH THOROUGHLY WITH WATER.

IMMEDIATELY CLEAN UP ALL SPILLS OF CHEMICALS AND SOLVENTS USED FOR REPAIRS.

THE REQUIREMENTS FOR THE USE OF PROTECTIVE CLOTHING SHOULD BE ESTABLISHED BY THE APPROPRIATE SAFETY ORGANIZATION.

Certain repair procedures can be undertaken without resorting to replacement of the part:

(1) Minor Damage

(a) Minor scratches can be polished out using abrasive cloth (Table 6002) as long as it does not affect the structural integrity of the part.

NOTE: Do not use Federal Specification P-C-458 abrasive cloth on aluminum alloy parts as it contains an iron oxide which causes rapid oxidation of these metals.

(b) Dimpled mounting plate holes can be flattened as long as hole diameter deformation does not occur.

(2) Studs and Bolts

(a) De-burring and chasing stud bolts and threaded fittings is acceptable as long as not more than two consecutive threads are damaged.

(3) Replacement of Threaded Inserts

(a) Install a thread removal tool (Table 6001) on the insert to replace and turn it counterclockwise until it comes out.

(b) Clean the thread hole on the component with an applicable size tap.

NOTE: If necessary, remove fractured pieces from the bore.

(c) Remove sharp edges from the bore.

(d) Put a new threaded insert in the sleeve of a thread insertion tool (Table 6001).

(e) Put the crank handle in the sleeve and install the insert in the thread hole.

(f) Break off the insert tang with a tang removal tool (Table 6001).

(4) Electrical Components

Damage to wiring, connectors, and other associated components can be repaired by referring the paragraphs below, or by referring to AC 43.13-1b, Chapter 11, sections 13 through 19, FAA "Aircraft Wiring Practices," or CASA AC 21-99(0), as a guideline where applicable.

(a) Wiring

To aid in re-installation, note electrical lead routing before removing it for replacement. Refer to the wiring diagrams listed in SCHEMATICS for wiring details.

1 Prepare the end of an electrical lead for installation of a terminal or contact by removing 0.25 in (6 mm) of insulation with a wire stripper (Table 6001).

If more than 0.5 in (13 mm) must be cut from the wire, or if the shortened length of the wiring will not meet the mating connector without strain, splice in a length of wire to make up the difference according to the methods, techniques and practices shown in AC 43.13-1b, Chapter 11, sections 13 through 19, or those shown in CASA AC 21-99(0).

2 Cut 0.5 in (13 mm) long heat shrink tubing (Table 6002) and slip over end of wire. If a new marker sleeve is required, slip a new one over end of wire.

3 Soldered components:

CAUTION: USE HEAT SINKS AS NECESSARY TO PREVENT DAMAGE TO PARTS AND WIRE INSULATION DURING SOLDERING.

a Remove old solder and clean wire end prior to re-soldering.

b Reconnect the electrical connection with a soldering iron (Table 6001) using QQ-S-571 solder (Table 6002).

4 Crimped components:

a Repair or replace crimped electrical connections per paragraph (b) below.

5 Slide heat shrink tubing into place over connection and shrink in place using a heat gun (Table 6001).

6 If the marker sleeve was damaged or is illegible, affix a new marker sleeve to the wiring.

(b) Connectors

NOTE: To aid in re-installation, make note of the electrical lead routing before removing it for replacement. Refer to the wiring diagrams listed in SCHEMATICS for wiring details.

NOTE: Electrical cables with molded connectors are not repairable and must be replaced.

1 Carefully cut away heat shrink tubing from the connector wiring.

2 Cut off the connections as closely as possible to the connector base. Use a wire stripper (Table 6001) to prepare the ends of the wires. If more than 0.5 in (13 mm) must be cut from the wire, or if the shortened length of the wiring will not meet the mating connector without strain, splice in a length of wire to make up the difference according to the methods, techniques and practices shown in AC 43.13-1b, Chapter 11, sections 13 through 19, or those shown in CASA AC 21-99(0).

3 If the connector can be salvaged, remove the old contacts using a pin extraction tool (Table 6001).

4 Heat shrink tubing over wire bundle for strain relief:

If the connector uses heat shrink tubing for a strain relief, cut heat shrink tubing (Table 6002) and slip over the wire bundle. (Do not shrink in place at this time.)

5 Heat shrink tubing over individual wires:

Cut 0.5 in (13 mm) long heat shrink tubing (Table 6002) and slip over ends of wires. (Do not shrink in place at this time.)

6 Use a crimping tool (Table 6001) to crimp new contacts to the ends of the wire leads and insert the contacts into the connector using the pin insertion tool (Table 6001).

CAUTION: ALL SOCKET CONTACT LOCATIONS MUST HAVE A CONTACT OR SEALING PLUG INSTALLED TO PREVENT THE INGRESS OF FOREIGN PARTICLES. FOREIGN PARTICLES IN AN EMPTY CONTACT LOCATION COULD CAUSE AN ELECTRICAL SHORT.

7 Insert sealing plugs as necessary in each unused socket contact location.

8 Heat shrink tubing over Individual wires:

Slide the heat shrink tubing back over the connections and use a heat gun (Table 6001) to shrink the heat shrink tubing in place.

9 Heat shrink tubing over wire bundle for strain relief:

If heat shrink tubing is used for strain relief, slide the heat shrink tubing back over the connections and use a heat gun (Table 6001) to shrink the heat shrink tubing in place.

(For additional moisture and debris protection, 3145 clear sealant (Table 6002) can be applied to the wiring as they exit the rear of the connector to create a moisture barrier and to supplement the strain relief.)

-or-

If heat shrink tubing is not used for strain relief, or if the connector uses a backshell, use Super 88 electrical tape (Table 6002) as necessary to build up the thickness of the wiring bundle so the backshell sufficiently secures the cabling, then attach the backshell to the connector.

10 Make sure that the part number identification is still legible, or, if it was removed during the repair, that the identification is reapplied to the part.

(5) Placard Replacement

Replace bonded placards as follows:

(a) Transfer data from the old placard to replacement placard.

(b) Using a sharp knife, lift a corner of the old placard, then grasp and remove.

NOTE: A heat gun (Table 6001) can be used to help soften stubborn adhesive.

(c) Clean location of placard on assembly using isopropyl alcohol (Table 6002).

(d) If placard is not self-adhesive, apply W121201 contact adhesive (Table 6002) to back of placard.

(e) Affix the replacement placard at same location as the old placard.

(f) To guard against damage, moisture, and debonding, apply a clear protective coating of DP100 (Table 6002) over the placard, sealing all edges. Make sure that the information is legible through the protective coating.

(6) Other General Repairs

Other general repairs to defective or faulty parts are acceptable if the parts are deemed suitable for such repair according to FAA Advisory Circular AC 43.13-1b (or newer), and are repaired according to the methods, techniques and practices listed therein.

TASK 38-34-41-302-801-A01

4. Component Repair Procedure

Subtask 38-34-41-302-001-A01

A. Toilet Bowl

Due to structural considerations, cracks, fractures, and ruptures of the bowl assembly necessitates replacement.

Subtask 38-34-41-302-002-A01

B. Toilet Pedestal Assembly

The pedestal is not considered a repairable part, even though small cracks or broken mounting tabs can be successfully repaired using DP460 epoxy adhesive (Table 6002). Due to structural considerations, breaks, fractures, or ruptures of the pedestal necessitates replacement.

Damaged or loose cable tie mounts (IPL Figure 1, item 340) can be replaced as follows:

(1) Remove the cable tie mount (340). Remove any remaining adhesive from the pedestal (365).

NOTE: A heat gun can be used to apply heat (195° F)(90° C) to soften the epoxy adhesive to the consistency of chewing gum, then use a putty knife to remove the epoxy adhesive. Surface of the pedestal must not be damaged.

(2) Wipe the surface clean with a lint-free cloth moistened with isopropyl alcohol and let area air dry.

(3) Use abrasive cloth (180 grit or finer) to abrade the mating surfaces of the pedestal (365) and the new cable tie mount (340). Wipe the surfaces clean with a lint-free cloth moistened with isopropyl alcohol and let air dry.

(4) Apply 2216 B/A epoxy to the mating surfaces of the pedestal (365) and the new cable tie mount (340), then press the cable tie mount into place on the pedestal. Wipe up any adhesive that has oozed out with a lint-free cloth moistened with isopropyl alcohol. Allow the adhesive to cure per manufacturer's instructions.

Subtask 38-34-41-302-003-A01

C. Rinse Ring Assembly

The rinse ring is not considered a repairable part, even though small cracks or chipped edges can be successfully repaired using DP460 epoxy adhesive (Table 6002). Due to structural considerations, breaks, fractures, or ruptures of the rinse ring necessitates replacement.

Broken rinse ring brackets (IPL Figure 1, item 80) can be replaced as follows:

(1) Remove two screws (85), four washers (90), and two nuts (95).

(2) Remove the broken rinse ring bracket (80). Remove any remaining adhesive from the rinse ring (40).

NOTE: A heat gun (Table 6001) can be used to apply heat (195° F)(90° C) to soften the epoxy adhesive to the consistency of chewing gum, then use a suitably sized and shaped scraper to remove the epoxy adhesive.

(3) Use abrasive cloth to roughen the mating surfaces between the rinse ring (40) and the new rinse ring bracket (80). Wipe the surfaces clean with a lint-free cloth moistened with isopropyl alcohol (Table 6002), and allow to air dry.

(4) Apply 2216 B/A epoxy (Table 6002) to the mating surfaces of the rinse ring (40) and the new rinse ring bracket (80), then attach the two pieces together using two screws (85), two washers (90), (the two parts), two washers (90), and two nuts (95). Wipe up any adhesive that has oozed out with a lint-free cloth moistened with isopropyl alcohol (Table 6002). Allow the adhesive to cure per manufacturer's instructions.

Subtask 38-34-41-302-004-A01

D. Flush Valve Assembly

Repair flush valve assembly (refer to IPL Figure 4) as follows:

NOTE: Refer to schematics and wiring diagrams for electrical lead size, color, and destinations.

(1) Damaged connectors or wiring can be repaired by referring to paragraph 4), "Electrical Components" on page 6007.

(2) If seals or bearings are worn or damaged, refer to DISASSEMBLY and ASSEMBLY for instructions on replacement.

(3) If motor or reed switch assembly are damaged, refer to DISASSEMBLY and ASSEMBLY for instructions on replacement.

(4) Replace all other components of the assembly that do not meet TEST or CHECK requirements.

(5) If the cable tie mount (375) is damaged or loose, it can be reattached to the FCU housing (370) as follows:

(a) Remove the cable tie mount (375). Remove any remaining adhesive from the FCU housing (370).

NOTE: A heat gun can be used to apply heat (195° F)(90° C) to soften the epoxy adhesive to the consistency of chewing gum, then use a putty knife to remove the epoxy adhesive. Surface of the housing must not be damaged.

(b) Wipe the surface clean with a lint-free cloth moistened with isopropyl alcohol and let area air dry.

(c) Use abrasive cloth (180 grit or finer) to abrade the mating surfaces of the FCU housing (370) and the new cable tie mount (375). Wipe the surfaces clean with a lint-free cloth moistened with isopropyl alcohol and let air dry.

(d) Apply 2216 B/A epoxy to the mating surfaces of the FCU housing (370) and the new cable tie mount (375), then press the cable tie mount into place on the housing. Wipe up any adhesive that has oozed out with a lint-free cloth moistened with isopropyl alcohol. Allow the adhesive to cure per manufacturer's instructions.

ASSEMBLY

TASK 38-34-41-400-801-A01

1. General

A. Overview

Assembly instructions assume that the Revolution™ Toilet has been disassembled to the extent covered in DISASSEMBLY. All part number identification removed during cleaning or otherwise illegible, has been replaced during repair. All new parts are identical in fit and function to the parts they replace.

(1) If the assembly has only been subject to a partial overhaul, disregard those instructions that are not applicable.

(2) The procedures that follow are provided to assemble all major assemblies and components from their detail parts. Use the Illustrated Parts List Figure number listed in the paragraph heading to refer to the Item number listed in parentheses, unless otherwise noted.

B. Install New Parts

(1) Install new fasteners and other low-cost items, such as screws, washers, nuts, retaining rings, cotter pins, cable ties, safety wire, etc., when practical to prevent future maintenance requirements due to failure of these items.

NOTE: If there are no specific requirements, an anti-seize compound (such as per MIL-PRF-83483) can be applied to the threads of fasteners at the operator's discretion.

NOTE: If there are no specific requirements, a threadlocking compound (such as per MIL-S-22473) can be applied to the threads of fasteners at the operator's discretion.

NOTE: If a specific torque value is warranted, but not specified, refer to FITS AND CLEARANCES for general torque information.

NOTE: If there are no specific requirements, a torque detection paint can be applied to fasteners at the operator's discretion.

(2) Parts made with materials that deteriorate with age, such as O-rings, gaskets, seals, hoses, etc. removed during disassembly should be replaced with new parts.

NOTE: To facilitate installation, a light coat of lubricant (such as per MIL-S-8660) can be applied to O-rings at the operator’s discretion.

(3) Parts that deteriorate due to wear, such as bushings, bearings, and grommets removed during disassembly should be replaced with new parts.

C. Test After Assembly

Perform the appropriate TESTING procedures after reassembly to verify proper operation.

TASK 38-34-41-400-802-A01

2. Assembly Equipment and Materials

A. Required Equipment

Standard shop equipment, along with equipment listed in Table 7001 can be used to assemble the Revolution™ Toilet.

NOTE: Equivalent substitutes can be used for listed items.

Table 7001: Assembly Equipment

Equipment	Equipment's Specification		Source or CAGE Code	Representative Type (Model, Part No)
	Characteristics	Range Accuracy Tolerance		
Cable Tie Installation Tool	For Nylon cable ties		Commercially available	MS90387-1
Cable Tie Installation Tool	For Stainless steel cable ties		Commercially available	MS90387-3
Retaining Ring Installation Tool			Skybolt Aeromotive Corp. (V435Z0)	SK-T2698

B. Required Materials

Standard shop materials, along with materials listed in Table 7002 can be used to assemble the Revolution™ Toilet.

NOTE: Equivalent substitutes can be used for listed items.

Table 7002: Assembly Materials

ITEM	DESCRIPTION	SOURCE
Alcohol, Isopropyl, 99.9%	TT-I-735A	Commercially available
Cloth, lint-free	MIL-C-85043, Type I or Type II	Commercially available
Lubricant, silicone base	Molykote® 111 -or- Christo-Lube MCG 111 -or- Super O-Lube®	Dow Corning Corp. (V71984) Synthetic Great Lubrication Technology Inc. (V0JRD3) Parker Seals (V02697)
Thread-locker, removable med-strength	242 per MIL-S-46163A Type II, Grade M	Henkel Loctite Corp. (V12405)
Sealant	Pro-Seal P/S 890 Class B -or- CS 3201 per MIL-S-7124 -or- PR1776 -or- PR1776M	PRC-DeSoto International, Inc. (V83574) Chem Seal Products (V14439) PRC Aerospace Sealants (V83574) PRC Aerospace Sealants (V83574)
Lubricant, hi-temp bearing grease	Molykote® 44 -or- MIL-PRF-81322	Dow Corning Corp. (V71984) Commercially available

Table 7002: Assembly Materials (Continued)

ITEM	DESCRIPTION	SOURCE
Twine	0.06 wide Nylon per MIL-T-713	Commercially available
Glycerin	Glycerin 99P	US Glycerin (VZZ109)
Grease, synthetic	AMS-G-4343	Commercially available
Cap, protective for rinse valve inlet	CD-XX= ID size 4 = 0.246 18 = 1.093 5 = 0.308 19 = 1.888 6 = 0.369 20 = 1.231 8 = 0.489 22 = 1.340 9 = 0.551 23 = 1.428 10 = 0.605 24 = 1.463 12 = 0.720 25 = 1.528 14 = 0.850 26 = 1.613 15 = 0.930 28 = 1.715 16 = 0.973	Protective Closures Co., Inc. CAPLUGS Div. (V99017)
Cap, protective for flush valve connector	EC-XX= ID size 4 = 0.246 18 = 1.093 5 = 0.308 19 = 1.888 6 = 0.369 20 = 1.231 8 = 0.489 22 = 1.340 9 = 0.551 23 = 1.428 10 = 0.605 24 = 1.463 12 = 0.720 25 = 1.528 14 = 0.850 26 = 1.613 15 = 0.930 28 = 1.715 16 = 0.973	Protective Closures Co. Inc. CAPLUGS Div. (V99017)
Cap, protective for toilet flush valve outlet	HVC-XX-YY= ID size 125= 0.125 625 = 0.625 250= 0.250 750 = 0.750 375= 0.375 1000 = 1.000 500= 0.500 YY= length 8 = 0.500 16 = 1.000	Protective Closures Co., Inc. CAPLUGS Div. (V99017)
Lubricant, silicone base	Molykote® 111	Dow Corning Corp. (V71984)

Table 7002: Assembly Materials (Continued)

ITEM	DESCRIPTION	SOURCE
Adhesive, epoxy	Scotch-Weld Epoxy 2216 B/A gray -or- Scotch-Weld™ Epoxy DP190 gray -or- Hysol® EA 9394™	3M Co. (V04963) 3M Co. (V04693) Henkel Loctite Corp. (V12405)

TASK 38-34-41-420-801-A01

3. Assembly Procedure

Subtask 38-34-41-420-001-A01

A. Toilet Assembly

Assemble the toilet assembly (refer to IPL Figure 1 on page 10016) as follows:

NOTE: Each of the following steps can be carried out either on-wing or while the toilet is in the shop for overhaul.

NOTE: If cable tie mount (340) is damaged or loose, refer to Repair Subtask 38-34-41-302-002-A01 for reattachment.

(1) Attach the ground cables (285 and 290) to the center of the pedestal (365) using one screw (345), washer (350), washer (355), the ground cables (285 and 290), washer (355), washer (360), and nut (361).

Torque the nut to 30 ± 5 lb-in (3.39 ± 0.56 Nm).

(2) If the screw (335) or washer (330) was previously removed, reaffix as follows:

(a) Use abrasive cloth to roughen the mating surfaces of the pedestal (365) and the washer (330) for a good bond. Clean the surfaces with a lint free cloth moistened with isopropyl alcohol (Table 7002).

(b) Apply a small amount of P/S 890 sealant (Table 7002) to the mating surfaces of the pedestal and the washer (330), then press the washer into place on the pedestal.

(c) While the sealant is still wet, apply a small amount of P/S 890 sealant (Table 7002) to the head of the screw (335), then press the screw into place on the pedestal.

NOTE: Avoid getting sealant on the threads of the screw (335). Wipe off any excess sealant with a lint free cloth moistened with isopropyl alcohol (Table 7002).

(d) Apply a generous amount of sealant to the screw's head, covering it completely, making a continuous bead around the circumference of the screw head, making contact with the pedestal. Wipe up any excess sealant with a lint-free cloth moistened with isopropyl alcohol (Table 7002). Allow the sealant to cure per manufacturer's instructions.

(3) For Left-Hand Toilet assemblies PN 14330-514-205 or 14330-514-207:

(a) On the left side, attach the ground cable (290) to the pedestal's (365) ground stud using one nut (320), washer (310), the ground cable (290), washer (310), lock washer (305), and nut (300).

Torque the nuts to 30 ± 5 lb-in (3.39 ± 0.56 Nm).

(b) On the right side, attach the ground cable (290) to the pedestal's (365) ground stud using one nut (320), washer (310), the ground cable (290), washer (310), lock washer (305), and nut (300).

Torque the nuts to 30 ± 5 lb-in (3.39 ± 0.56 Nm).

(4) For Right-Hand Toilet assemblies PN 14330-514-206 or 14330-514-208:

(a) On the left side, attach the ground cable (290) to the pedestal's (365) ground stud using one nut (320), washer (310), the ground cable (290), washer (310), lock washer (305), and nut (300).

Torque the nuts to 30 ± 5 lb-in (3.39 ± 0.56 Nm).

(b) On the right side, attach the ground cable (290) to the pedestal's (365) ground stud using one nut (320), washer (310), the ground cable (290), washer (310), lock washer (305), and nut (300).

Torque the nuts to 30 ± 5 lb-in (3.39 ± 0.56 Nm).

(5) Fit a cable tie (295) around the ground cable (285) and affix it to the cable tie mount (340).

NOTE: The MS90387-1 cable tie installation tool (Table 7001) should be used with a tension setting of 1-3.

(6) If previously removed, install the quarter turn cam assembly (190) onto the pedestal (365) using the retaining ring (195).

NOTE: The retaining ring is press fit into position using the SK-T2698 retaining ring installation tool (Table 7001).

(7) If previously removed, install the following rinse ring's quick-release components onto the pedestal (365):

(a) At each of the two locations, install the straight flange (260), washer (265), bumper pin (270), washer (275), and sleeve nut (280) onto the pedestal (265).

Torque the nuts to 30 ± 5 lb-in (3.39 ± 0.56 Nm).

(8) Install the grommet (225) onto the pedestal (365).

NOTE: It is permissible to use a dab of 111 lubricant to facilitate installation of the grommet onto the pedestal.

(9) To assemble the flush valve (215), refer to paragraph C., "Orbital Flush Valve" on page 7019.

(10) Apply a light coat of 111 lubricant (Table 7002) onto the O-ring (245), then place the O-ring (245) onto position on the flush valve (215).

(11) Attach the outlet (250 or 255) and swivel plate (230) to the flush valve (215) using two nuts (235) and washers (240).

Torque the nuts to 30 ± 5 lb-in (3.39 ± 0.56 Nm).

(12) Install the flush valve (215), swivel plate (230), and outlet (250 or 255) onto the pedestal as follows:

(a) Fit the flush valve's (215) rear mounting pin into the grommet (225) on the pedestal (365).

(b) Fit the forward portion of the flush valve (215) into position on the pedestal, then engage the two quick-release fasteners (220).

(c) Connect the grounding cable (285) connector P1 to the flush valve (215) connector J1.

(13) Install the flush valve assembly (IPL Figure 1 / Item 215) as follows:

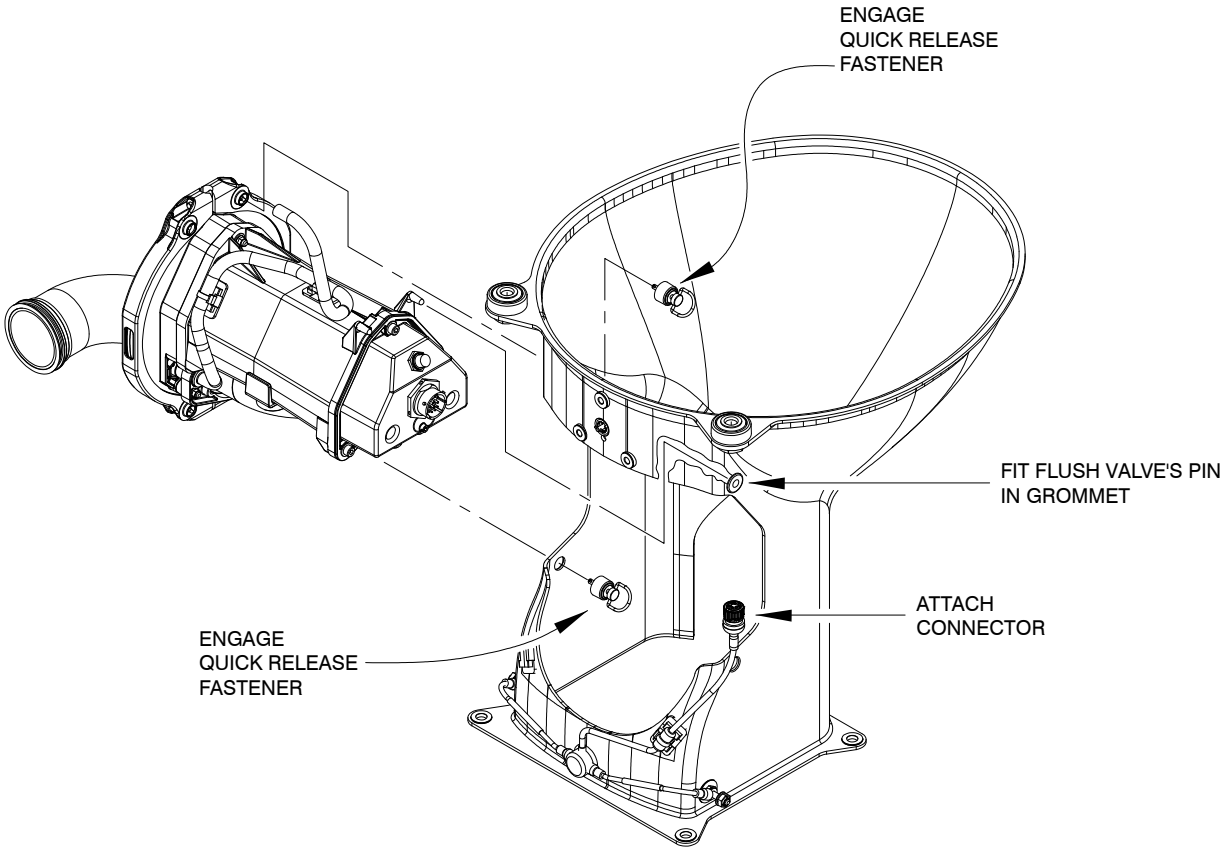

Figure 7001: Flush Valve Installation

(14) To assemble the flush valve assembly (215), refer to paragraph C., "Orbital Flush Valve" on page 7019.

(15) Apply a light coat of 111 lubricant (Table 7002) to the O-ring (245), then place the O-ring (245) onto the flush valve assembly (215). Install the outlet elbow (250) or outlet stub (255) and swivel plate (230) onto the flush valve assembly (215) using two nuts (235) and washers (240).

Torque the nuts to 30 ± 5 lb-in (3.4 ± 0.6 Nm).

NOTE: To prevent a possible loss of parts, the quick-release fasteners (220) can be lashed to the flush valve assembly with a lanyard made from a length of twine or lockwire (Table 7002). Attach the lanyard around the threads of the v-band's screw (IPL Figure 4, item 15) in between the two clamps (IPL Figure 4, item 10), and around the ring of the quick-release fastener (150). Refer to Figure 7002.

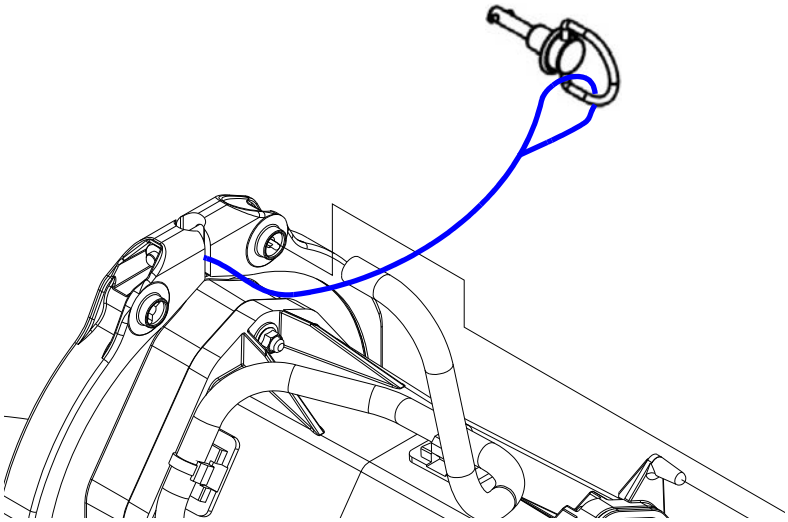

Figure 7002: Lash the Quick-Release Fasteners

(16) Install flush valve assembly (215) and outlet (250 or 255) onto the pedestal (365) as follows:

(a) Fit the flush valve assembly (IPL Figure 1, item 215) into position on the pedestal (365) so that the flush valve's rear mounting pin fits into the pedestal's grommet (225). Rotate the flush valve so that the flush valve's v-band mounting holes line up with the pedestal's quick-release fasteners.

(b) Engage the pedestal's two quick-release fasteners (150) to lock the flush valve in place.

(c) Connect the ground cable connector P1 to the flush valve's (215) connector J1.

NOTE: The flush valve's inlet elbow (IPL Figure 4, item 215) will be attached to the toilet bowl's outlet in a later step.

NOTE: The flush valve's vent tube (IPL Figure 4, item 190) will be attached in a later step.

(17) Install the rinse valve (IPL Figure 1 / Item 185) as follows:

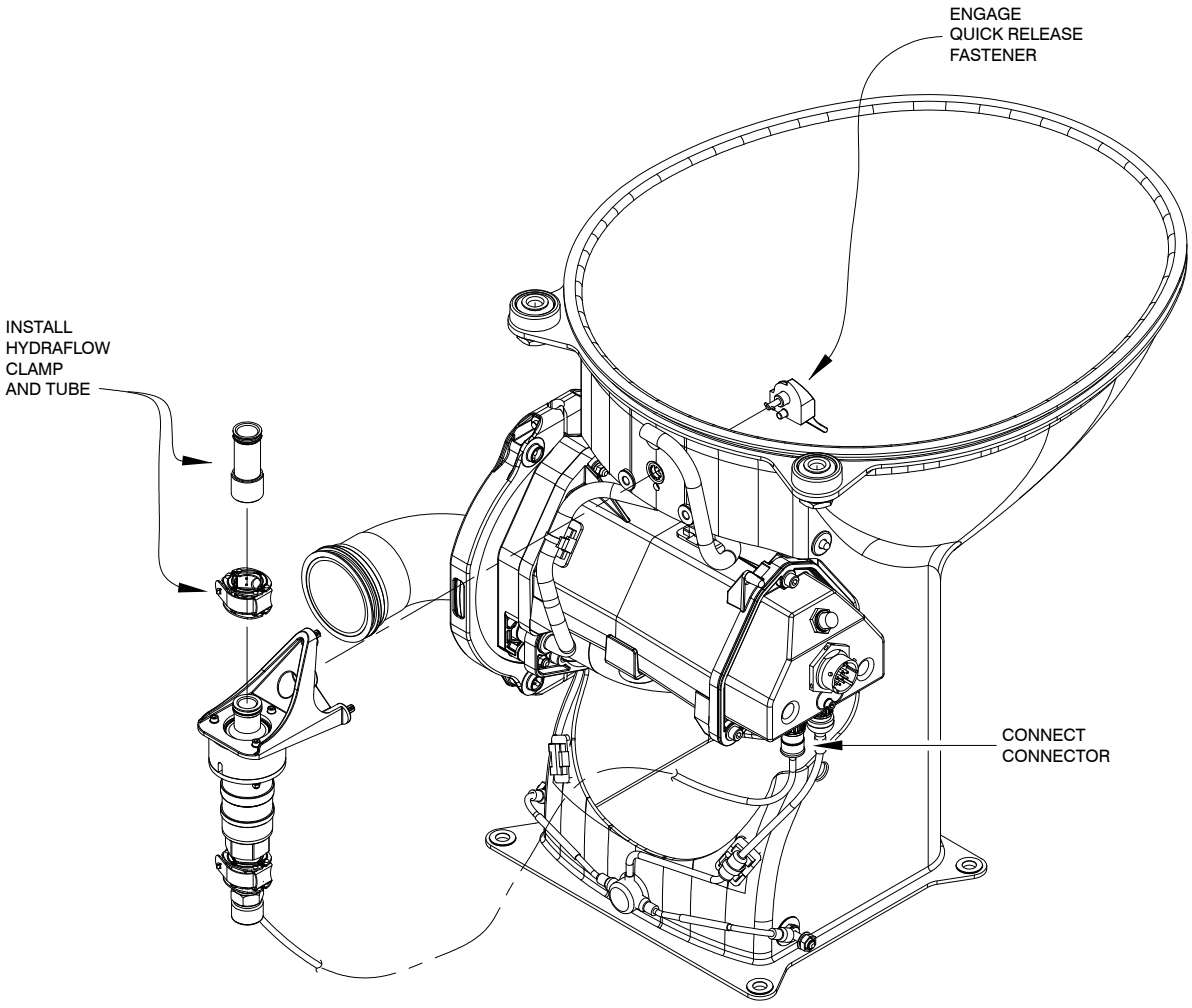

Figure 7003: Rinse Valve Installation

(a) Apply a light coat of 111 lubricant (Table 7002) to the O-ring (115), then place the O-ring (115) into position on the rinse valve tube (120).

(b) Apply a light coat of 111 lubricant (Table 7002) to the O-ring (186), then install the O-ring (186) onto the rinse valve's (185) outlet.

(c) Attach the rinse valve tube (120) to the rinse valve (185) by fastening the mid clamshell clamp (125). Refer to Figure 7003.

(d) Apply a light coat of 111 lubricant (Table 7002) to the O-ring (188), then install the O-ring (188) and rinse valve screen (187) into the rinse valve's (185) inlet. Refer to Figure 7004.

NOTE: It is permissible to pinch the inlet screen slightly to keep it in position.

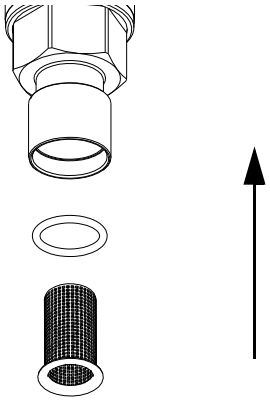

Figure 7004: Rinse Valve Inlet Screen Installation

(18) Apply a light coat of 111 lubricant (Table 7002) onto the O-ring (130), then place the O-ring (130) onto position on the rinse valve adapter (200).

(19) Attach the rinse valve inlet adapter (200) onto the base of the rinse valve (185) using the locking clamshell clamp (205).

(20) Attach the rinse valve (185) to the pedestal (365) by engaging the quarter turn cam fastener (190); insert the fastener onto the rinse valve, then turn the lever one-quarter turn to engage the rinse valve (185), then fold the cam lever down to lock the rinse valve (185) in place. Refer to Figure 7005.

NOTE: Make sure that the quarter-turn fastener's (190) cam lever is folded all the way down or it can interfere with the toilet bowl installation at a later step.

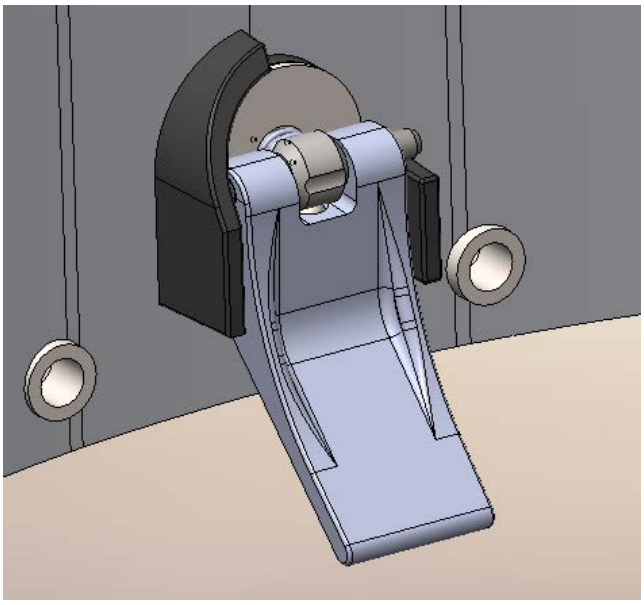

Figure 7005: Rinse Valve Quarter Turn Cam

(21) Connect the rinse valve's (185) connector P2 to the flush valve's (215) connector J2.

CAUTION: MAKE SURE THE BOWL SEAL (140) HAS A LIGHT COAT OF AMS-G-4343 GREASE ON BOTH FACES OF THE SEAL. THE GREASE IS NECESSARY TO INSURE A PROPER SEAL ON THE BOWL ASSEMBLY. (Refer to Subtask 38-34-41-421-002-A01 PARAGRAPH 4.B.)

(22) Install the bowl assembly (IPL Figure 1 / Item 135) as follows:

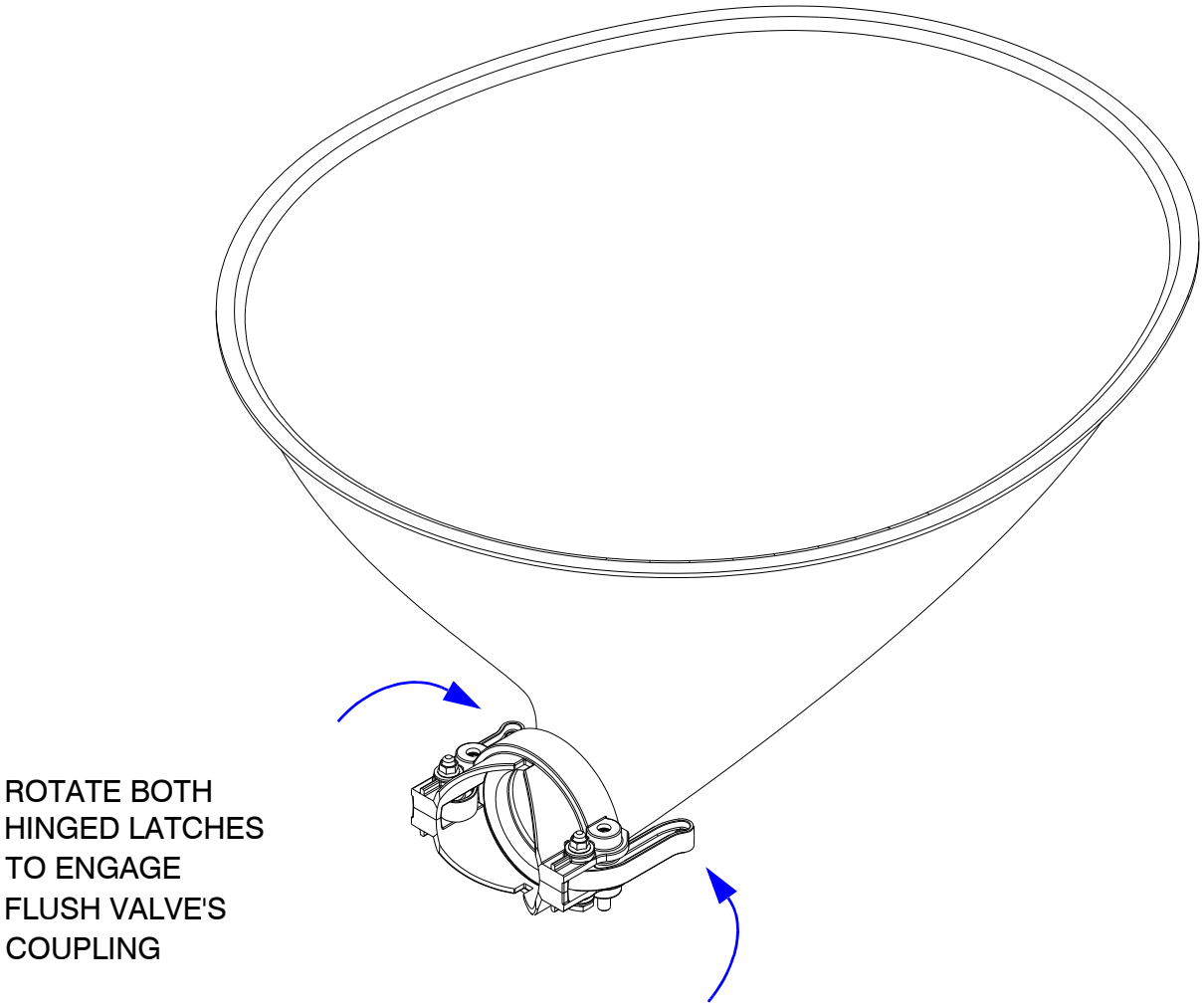

Figure 7006: Bowl Installation

(23) Pry the bowl assembly's cam levers (165) outward to the open position.

(24) Place the bowl (165) into the pedestal (365), making sure that the bowl's outlet lines up with the flush valve's inlet. Make sure that the bowl's rim is fully seated flat against the edge of the pedestal (365). Any gap or space between the bowl and the pedestal will prevent the rinse ring (40) from seating properly on the bowl in step (27) below.

NOTE: If the rinse valve's quarter-turn cam (190) lever is not fully folded down, it can interfere with the toilet bowl's correct position in the pedestal.

(25) Fit the flush valve's inlet into the toilet bowl's outlet. Once the bowl is properly seated, press the bowl assembly's cam levers (165) to the closed position.

NOTE: The bowl's locking buttons (175) will snap down into the LOCKED position when cam levers are fully engaged, and the bowl's outlet and the flush valve's inlet are properly mated.

(26) Assemble the rinse ring and anti-siphon valve as follows:

(a) If previously removed, for each quick release fastener (100), attach the quick release fastener (100) to the rinse ring bracket (80) using the retaining ring (105).

NOTE: The SK-T2698 retaining ring installation tool (Table 7001) can be used to facilitate retaining ring (105) installation.

(b) To assemble the anti-siphon valve (55), refer to paragraph A., "Anti-siphon Valve" on page 7017.

(c) Apply a light coat of 111 lubricant (Table 7002) to the O-ring (75), then place the O-ring (75) in position on the anti-siphon valve's (55) outlet.

(d) Attach the anti-siphon valve (55) to the rinse ring (50) using two screws (60), four washers (65), and two nuts (70).

Torque the screws to 30 ± 5 lb-in. (3.39 ± 0.56 Nm).

(27) Install the rinse ring (IPL Figure 1 / Item 40) and anti-siphon valve (55) as follows:

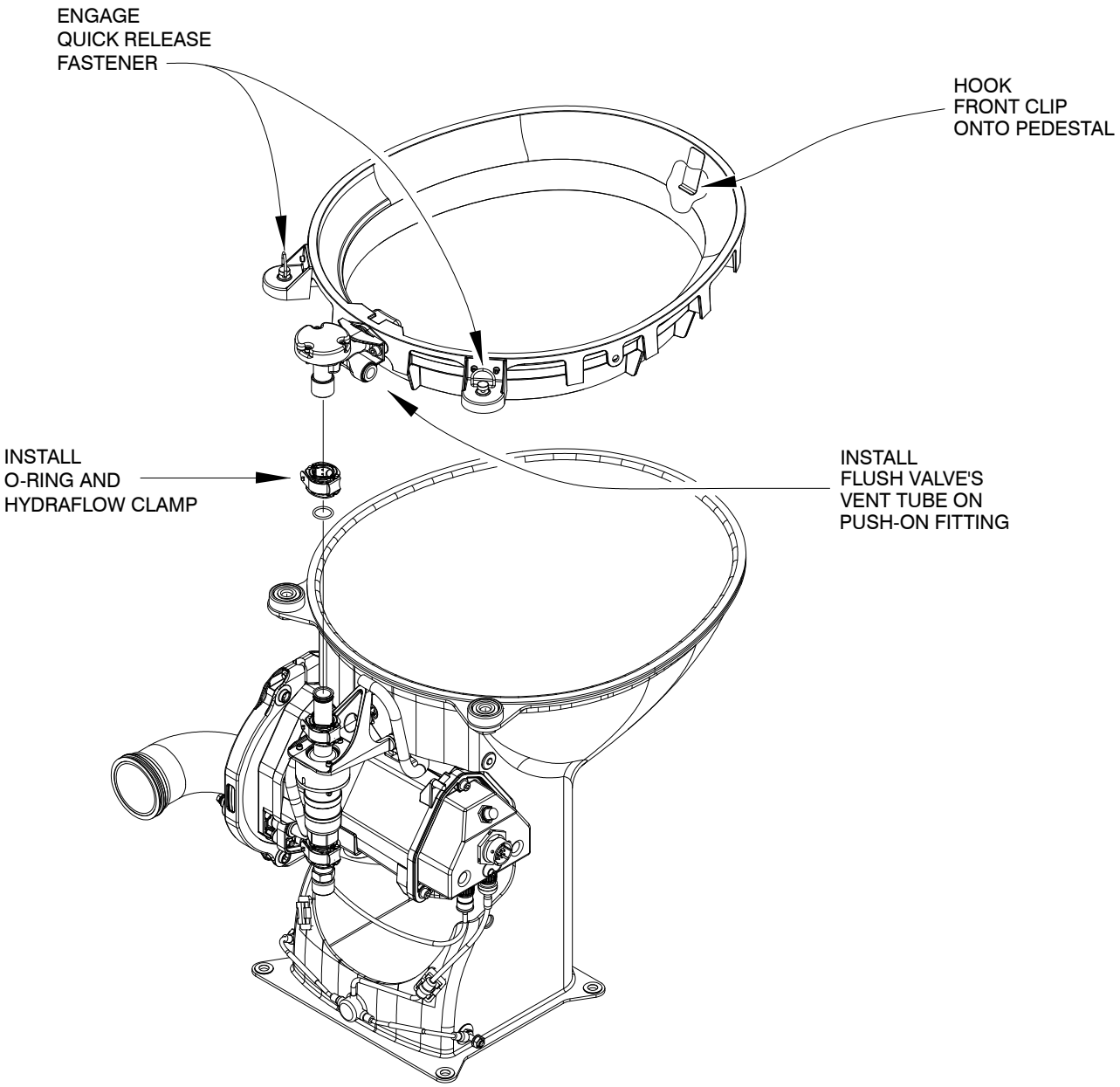

Figure 7007: Rinse Ring Installation

(a) Hook the front clip (45) in the front groove of the pedestal (365) (refer to Figure 7008).

(b) Place the rinse ring (50) and anti-siphon valve (55) onto the pedestal (365).

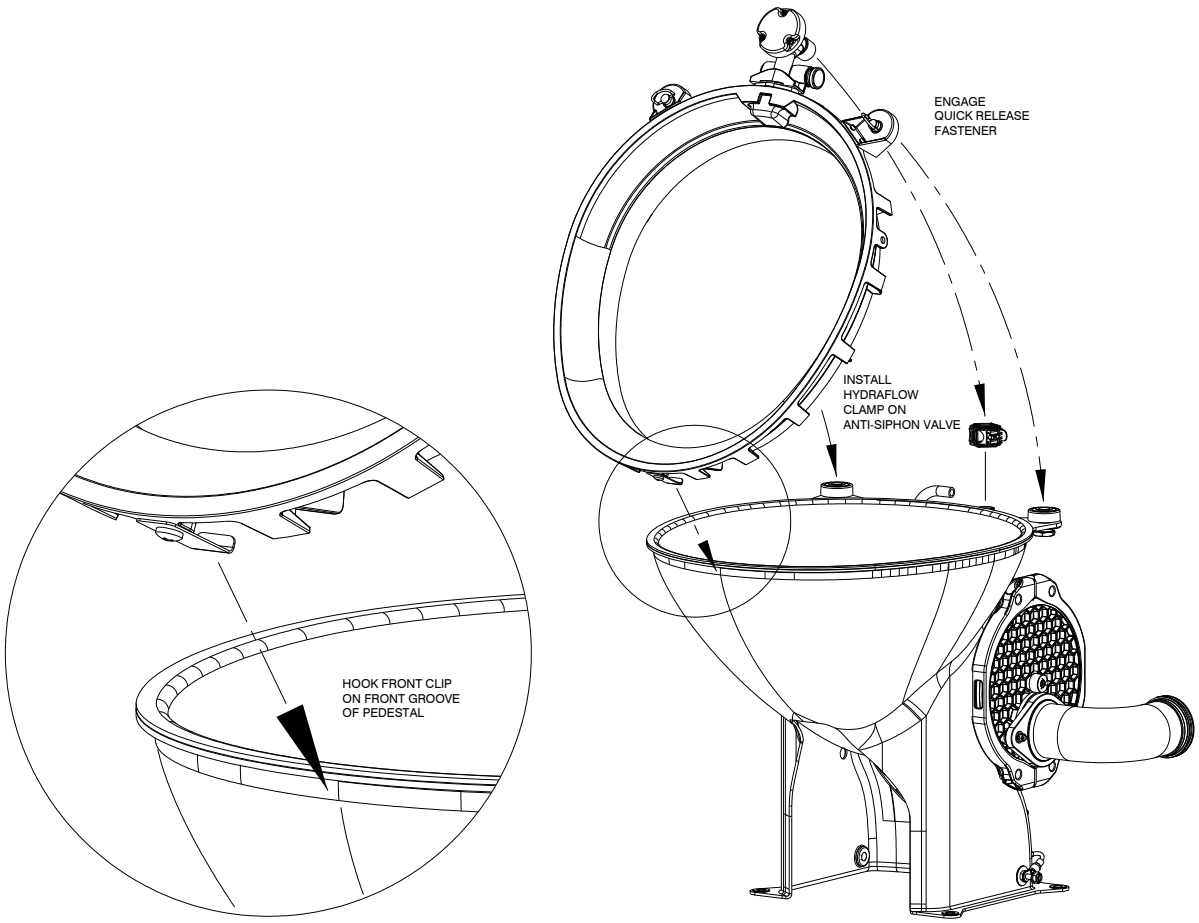

Figure 7008: Rinse Ring - Front Clip Attachment

(c) Engage the rinse ring's two quick-release fasteners (100) by turning the fastener ring one quarter turn, locking the rinse ring (40) in position.

(28) Fasten the upper clamshell clamp (60), attaching the anti-siphon valve (55) to the rinse valve tube (70).

(29) Install the plug (30) onto the anti-siphon valve (33) by pushing on the push-on fitting, then inserting the plug.

(30) Attach the flush valve's vent tube (IPL Figure 4, item 190) to the anti-siphon valve (55) by pushing on the push-on fitting, then inserting the vent tube.

TASK 38-34-41-421-801-A01

4. Component Assembly Procedure

Subtask 38-34-41-421-001-A01

A. Anti-siphon Valve

Assemble Anti-siphon Valve (refer to IPL Figure 2 on page 10026) as follows:

(1) Apply a light coat of 111 lubricant (Table 7002) to the O-rings (55), then install the two O-rings and half cartridges (50) into the valve body (45).

(2) Install the poppet valve seal (35) onto the poppet (30), then install the poppet and seal into the valve body (45).

(3) Apply a light coat of 111 lubricant (Table 7002) to the O-ring (40), then place the O-ring (40) and O-ring cover (25) into the valve body (45).

(4) Install protective cover (5) onto valve body (45) using three screws (10), six washers (15), and three nuts (20).

Torque the nuts to 7 ± 1 lb-in (0.79 ± 0.11 Nm).

Subtask 38-34-41-421-002-A01

B. Bowl Assembly

Assemble bowl assembly (refer to IPL Figure 1, item 135) as follows:

NOTE: Although the two flanges (145) are identical, determine which one will be used as the upper side and which one will be used as the lower side.

(1) Fit the two springs (180) into the upper side flange (145).

(2) Fit the two locking buttons (175) into the lower side flange (145).

(3) Place the two flanges (145) around the bowl (182) outlet, and attach the flanges (145) using two bolts (160), two washers (155), two flange bearings (170), two cams (165), two flange bearings (170), two washers (155), and two nuts (150).

NOTE: The bolts (160) are installed with the head down.

NOTE: As the two flanges (145) come together, make sure that the springs and the locking buttons remain in place.

(4) Alternate torquing the nuts (150), in 10 lb-in (1.13 Nm) increments, to 40 ± 5 lb-in (4.52 ± 0.56 Nm).

CAUTION: MAKE SURE THE BOWL SEAL (140) HAS A LIGHT COAT OF AMS-G-4343 GREASE ON BOTH FACES OF THE SEAL. THE GREASE IS NECESSARY TO INSURE A PROPER SEAL ON THE BOWL ASSEMBLY.

(5) Apply a light coat of AMS-G-4343 grease to both faces of the seal (140) and fit the seal (140) into the flanges (145) of the bowl's (182) outlet. Refer to Figure 7009.

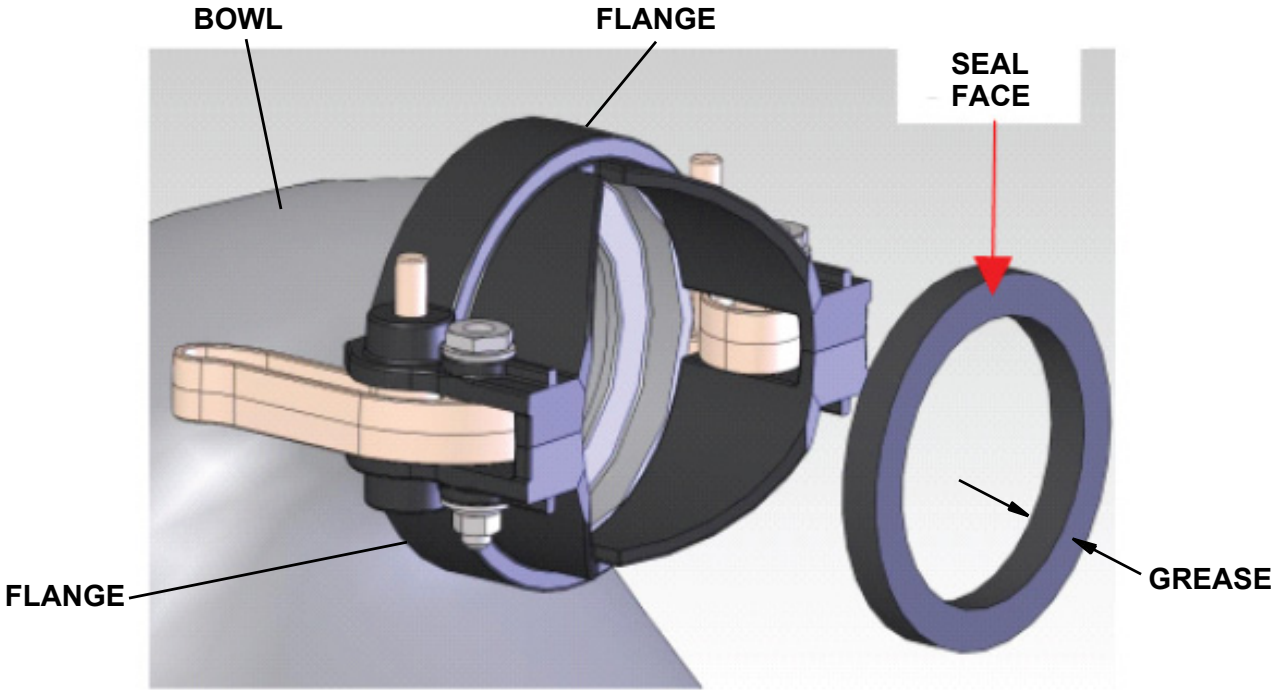

Figure 7009: Seal Installation

Subtask 38-34-41-421-004-A01

C. Orbital Flush Valve

Assemble the orbital flush valve (refer to IPL Figure 4 on page 10031) as follows:

CAUTION: ELECTROSTATIC SENSITIVE ASSEMBLY; USE PRECAUTIONARY MEASURES WHEN HANDLING ELECTRONIC COMPONENTS.

NOTE: If cable tie mount (375) is damaged or loose, refer to Repair Subtask 38-34-41-302-004-A01 for reattachment.

(1) Connect the main controller PC board's (325) card edge connector to the FCU cover's (330) connector, then attach the main controller PC board (325) to the FCU cover (330) using two screws (350) and washers (355).

(2) Apply a light coat of glycerin (Table 7002) to the O-ring (360), then place the O-ring in position on the FCU cover (330).

(3) Slide the main controller PC board (325) into the FCU housing (370), then attach the FCU cover (330) to the FCU housing (370) using three screws (335), washers (340), and nuts (345).

(4) Press the plain bearing (315) into the mounting plate (265) until the face is flush with the mounting plate.

CAUTION: ELECTROSTATIC SENSITIVE ASSEMBLY; USE PRECAUTIONARY MEASURES WHEN HANDLING ELECTRONIC COMPONENTS.

(5) Install the reed switch PC board (285) onto the motor plate assembly (260) using three screws (290), nylon insulators (295), (the reed switch PC assembly), nylon washers (300), (the mounting plate), washers (305), and nuts (310).

Torque the nuts to 8 to 10 lbf-in (0.90 to 1.13 Nm).

(6) Apply 242 threadlocker (Table 7002) to the threads of the screws (280), then install the motor (275) onto the mounting plate (265) using four screws (280).

Torque the screws to 8 to 10 lbf-in (0.90 to 1.13 Nm) in a cross pattern.

(7) Apply P/S 890 sealant (Table 7002) to the outer edges of the screws (280), making a fillet radius of approximately 0.1 in. (2.5 mm). Allow the sealant to cure per manufacturer's instructions.

(8) Connect the motor's (275) connector to the reed switch PC board (285).

(9) Install a cable tie (270) around the motor (275) to bind the motor's connector cabling.

(10) Connect the main controller PC board's (325) card edge connectors to the reed switch PC board's (285) connectors.

(11) Slide the motor plate assembly (260) into the FCU housing (370).

(12) Install the spacer (230), pinion gear (235), and spacer (230) onto the motor's (275) drive shaft.

(13) Apply a light coat of glycerin (Table 7002) to the O-ring (245) and gear (240), then install the O-ring (245) onto the gear (240).

(14) Install the item (250) and gear (240) into the plain bearing (315).

(15) Apply a liberal coat of Molykote 44 grease (Table 7002) to the teeth of the pinion gear (235) and gear (240).

(16) Install the two elbow stops (227) onto the base of the FCU housing (370) using two screws (228) and washers (229).

(17) Apply a light coat of glycerin (Table 7002) to the O-ring (225), then install the O-ring (225) and leading edge insert (220) onto the swivel plate (175).

(18) Install the swivel plate (175) with bowl elbow (215) onto the motor side assembly (60) using two nuts (185) and washers (180).

Torque the nuts to 40 ± 5 lb-in. (4.52 ± 0.56 Nm) in 10 lb-in (1.13 Nm) increments.

(19) Apply a light coat of glycerin (Table 7002) to the O-ring (360), then place the O-ring (360) in position on the FCU housing (370).

(20) Attach the FCU housing (370) to the motor side assembly (60) using two hollow dowels (170), and three nuts (160) and washers (165).

(21) Attach the vent tube (190) to the cable tie mounts (375) using two cable ties (IPL Figure 1, item 295), then fit onto the swivel plate (175).

NOTE: The MS90387-1 cable tie installation tool (Table 7001) should be used with a tension setting of 1-3.

(22) Apply a light coat of glycerin (Table 7002) to the silicone extrusion (155), then install the silicone extrusion (155) into the motor side assembly's (60) drain port.

(23) Apply a light coat of glycerin (Table 7002) to the O-rings (145 and 150), then fit the O-rings into the inner and outer channels of the outlet side seal (140).

(24) Fit the outlet side seal (140) and O-rings (145 and 150) into the motor side assembly's (60) drain port, on top of the silicone extrusion (155).
Refer to Figure 7010.

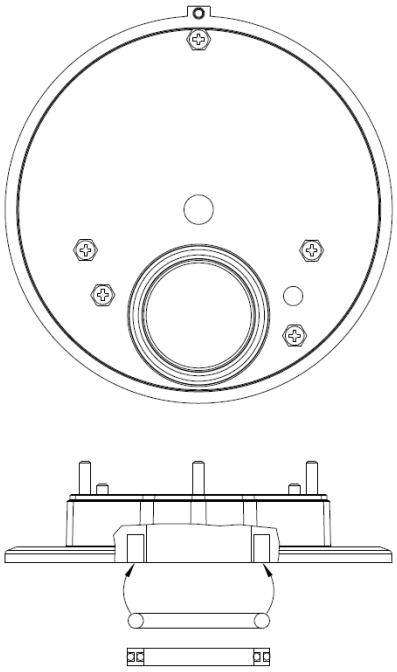

Figure 7010: O-Ring and Seal Installation

(25) Install the flush plate (130) onto the end of the gear (240) sticking out of the center of the motor side assembly (60).

NOTE: Make sure that the flush plate (130) is oriented properly on the shaft, with the rounded edge on the left as the flush plate is viewed installed on the motor side assembly. Refer to Figure 7011.

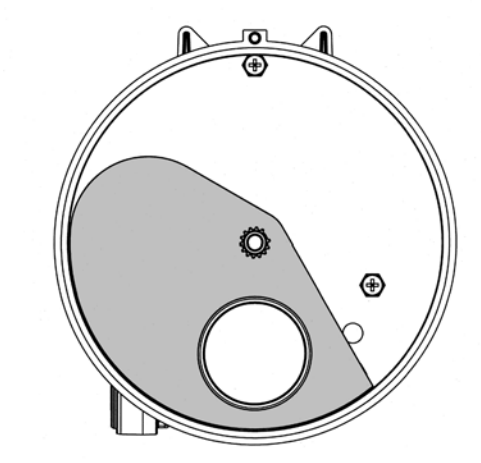

Figure 7011: Flush Plate Orientation

(26) Install the retainer (100) into the end of the gear (240) sticking out of the center of the motor side assembly (60).

(27) Apply a light coat of 111 lubricant (Table 7002) to the O-ring (105), then install the O-ring (105) into the end of the gear (240) sticking out of the center of the motor side assembly (60).

(28) Apply a light coat of 111 lubricant (Table 7002) to the silicone extrusion (125), then install the silicone extrusion (125) into the vacuum side assembly's (30) drain port.

(29) Apply a light coat of 111 lubricant (Table 7002) to the O-rings (115 and 120), then fit the O-rings into the inner and outer channels of the outlet side seal (110).

(30) Fit the outlet side seal (110) and the O-rings (115 and 120) into the vacuum side assembly's (30) drain port, on top of the silicone extrusion (125).

(31) Install the plain bearing (45) and bearing (40) into the vacuum side assembly (30).

(32) Apply a light coat of 111 lubricant (Table 7002) to the O-ring (90), then place the O-ring (90) onto the vacuum side assembly (30).

(33) Fit the vacuum side assembly (30) and the motor side assembly (60) together, then install the v-band (10) using two screws (15), washers (20), and nuts (25).

Torque the screws, upper and lower, in 10 lb-in (1.13 Nm) increments, to 40 ± 5 lb-in (4.52 ± 0.56 Nm).

(34) If previously removed, affix a new identification label (5).

FITS AND CLEARANCES

TASK 38-34-41-900-801-A01

1. General

This section contains applicable fit and clearance information, fastener torque limits and service wear tolerances.

TASK 38-34-41-900-802-A01

2. Fits and Clearances

Not Applicable

TASK 38-34-41-900-803-A01

3. Assembly Torque Limits

A. Recommended Torque Values

Specific fastener torque values are listed in ASSEMBLY section.

If a specific fastener torque value is warranted, but not specified, refer to FAA AC 43.13, Chg 1B, Chapter 7, Section 3 or to H-8083-30, chapter 5, for general torque limits.

TASK 38-34-41-900-804-A01

4. Service Wear Limits

Not Applicable

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SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

TASK 38-34-41-940-801-A01

1. General

A. Overview

This section describes the special tools, fixtures, and equipment required for the Revolution™ Toilet.

TASK 38-34-41-940-802-A01

2. Special Equipment and Materials

A. Required Equipment

Standard shop equipment, along with equipment listed in Figure 9001 can be used in the disassembly, check, repair, assembly and storage of the Revolution™ Toilet.

NOTE: Equivalent substitutes can be used for listed items.

Table 9001: Special Equipment

ITEM	IDENTIFICATION	SOURCE	WHERE USED
A320 Test harness for vac toilet (IPL 1, 1)	- - -	Fabricated by the Operator; refer to Figure 1005	TESTING
Alternate test setup for vac toilet (IPL 1, 1) and flush valve (IPL 1, 215):			TESTING
Vacuum Toilet Test Stand	18000-001 (110VAC) (non-procurable) -or- 18000-003-203 (110 VAC) -or- 18000-003 (220 VAC) (non-procurable) -or- 18000-003-201 (220 VAC)	(V29780)	
-with- A320 Test Harness	PN 18300-011 (included)	(V29780)	TESTING

Table 9001: Special Equipment (Continued)

ITEM	IDENTIFICATION	SOURCE	WHERE USED
Alternate test setup for rinse valve (IPL 1, 185) (VTTS)	18000-001 (110VAC) (non-procurable) -or- 18000-003-203 (110 VAC) -or- 18000-003 (220 VAC) (non-procurable) -or- 18000-003-201 (220 VAC)	(V29780) Refer to Figure 1011, Figure 1012	TESTING
VTTS test harness for rinse valve (IPL 1, 185)	- - -	Fabricated by the Operator; refer to Figure 1013	TESTING
Brush non-metallic stiff bristle	H-B-1490 -or- A-A-2074 -or- MIL-B-43871	Commercially available	CLEANING
Bucket	RSFCW22	Cambro Manufacturing Co. (V21669)	TESTING
Cable Tie Installation Tool	MS90387-1	Commercially available	ASSEMBLY, REPAIR
Cable Tie Installation Tool, heavy duty	MS90387-3	Commercially available	ASSEMBLY
Catch pan	1/2 gal (2 L)	Commercially available	TESTING
Clamp, hose	Size as req'd HXXSS XX= size 6: 0.44 to 0.78 8: 0.44 to 0.91 10: 0.56 to 1.06 12: 0.69 to 1.25 16: 0.75 to 1.50 20: 0.81 to 1.75	Murray Corp. (V76599)	TESTING

Table 9001: Special Equipment (Continued)

ITEM	IDENTIFICATION	SOURCE	WHERE USED
Crimping tool for connector pins & sockets	601966-1 -or- MS22520/2-01	Tyco Electronics Corp. AMP Products Inc. (V0779) Commercially Available	REPAIR
Crimping tool for wire terminals	PN 696126-1 -or- PN 63811-1000	Tyco Electronics Corp. AMP Products Inc. (V00779) Molex (V27264)	REPAIR
Dielectric & Insulation Resistance Tester AC Hipot Tester DC Hipot Tester	2975	Slaughter Co. (V05611)	TESTING
Heat gun, 1000 W	1095	Weller (V34772)	REPAIR
Hose, flexible vinyl	3/4” OD x 12” LG (1.9 cm x 30.5 cm lg)	Commercially available	TESTING
Kinetic water ram	PN 14400-995	(V29780)	REPAIR
Measuring cup, 0 - 16 oz. (0 - 500 ml)	- - -	Commercially available	TESTING
Multimeter, digital	83-III -or- 83 series V -or- 87 series V	Fluke Corporation (V89536)	TESTING
Pin insertion/extraction tool, 20-24 AWG (red/white)	91067-2 -or- M81969/1-02	Tyco Electronics Corp. AMP Products Inc. (V00779)	REPAIR
Pin insertion/extraction tool, 22-28 AWG (green/white)	91067-1 -or- M81969/1-01	Tyco Electronics Corp. AMP Products Inc. (V00779)	REPAIR

Table 9001: Special Equipment (Continued)

ITEM	IDENTIFICATION	SOURCE	WHERE USED
Power Supply, DC 0 - 36 VDC, 0 - 6 Amps	Z36-6-U	TDK-Lambda, Inc. (V89022)	TESTING
Putty knife	- - -	Commercially available	REPAIR
Retaining Ring Installation Tool	SK-T2698	Skybolt Aeromotive Corp. (V435Z0)	ASSEMBLY
Shutoff valve (vacuum line)	Size as req'd		TESTING
Shutoff valve (drain line)	Size as req'd	Commercially available	TESTING
Shutoff valve (2 req'd)	Size as req'd	Commercially available	TESTING
Soldering iron, 0 - 40 W	WLC100	Weller (V34772)	REPAIR
Stopwatch, 0 - 60 min. 0.1 sec accuracy	- - -	Commercially available	TESTING
Test fixture for rinse valve (IPL 1, 185)	- - -	Fabricated by the Operator; refer to Figure 1009	TESTING
Test fixture for Revolution™ vacuum toilet (IPL 1, 1)	- - -	Fabricated by the Operator; refer to Figure 1004	TESTING
Test harness for rinse valve (IPL 1, 185)	- - -	Fabricated by the Operator; refer to Figure 1010	TESTING
Vacuum gauge	451010A02L -100	Ashcroft Inc. (V38056)	TESTING

Table 9001: Special Equipment (Continued)

ITEM	IDENTIFICATION	SOURCE	WHERE USED
Various plumbing & connections	Size as req'd	Commercially available	TESTING
Water pressure regulator	3823T32	McMaster Carr Supply Co. (V39428)	TESTING
Water pressure regulator	9796K19	McMaster Carr Supply Co. (V39428)	TESTING
Water pressure gauge	451010A02L125	Ashcroft Inc. (V38056)	TESTING
Water pressure gauge	451010A02L200	Ashcroft Inc. (V38056)	TESTING
Water tank w/ drain valve & water separator	5 gal (20 L)	Commercially available	TESTING
Wire stripping tool, 10 - 28 AWG	734185-1	Tyco Electronics Corp. AMP Products Inc. (V00779)	REPAIR

B. Required Materials

Standard shop materials, along with materials listed in Figure 9002 can be used in the disassembly, check, repair, assembly and storage of the Revolution™ Toilet.

NOTE: Equivalent substitutes can be used for listed items.

Table 9002: Special Materials

ITEM	IDENTIFICATION	SOURCE	WHERE USED
Abrasive cloth, various grits as required	P-C-451, Type II -or- A-A-1048A -or- ANSI B74.18	Commercially Available	REPAIR
Abrasive pad, general purpose	Scotch Brite™ 7447	3M Co. (V04963)	CLEANING
Adhesive, structural epoxy	DP460	3M Co. (V04963)	REPAIR
Adhesive, contact	W121201 -or- Fastbond™ 30NF	Resinlab, LLC (V34PB2) 3M. Co.(V04963)	REPAIR
Adhesive, structural epoxy	Hysol® EA 9394™	Henkel Loctite Corp. (V12405)	ASSY
Adhesive, structural epoxy	Scotch-Weld™ DP190 gray	3M Co. (V04963)	ASSY
Adhesive, structural epoxy	Scotch-Weld™ 2216 B/A gray -or- Scotch-Weld™ Epoxy DP190 gray -or- Hysol® EA 9394™	3M Co. (V04963) 3M Co. (V04963) Henkel Loctite Corp. (V12405)	ASSY REPAIR
Alcohol, Isopropyl, 99.9%	TT-I-735A	Commercially available	ASSY CLEANING REPAIR

Table 9002: Special Materials (Continued)

ITEM	IDENTIFICATION	SOURCE	WHERE USED
Bag, plastic (clear polyethylene)	Size and thickness as required -or- per MIL-B-117	Uline (V7Z049) Commercially available	STORAGE
Barrier material	MIL-B-121	Commercially available	STORAGE
Cap, protective for rinse valve inlet	CD-XX= ID size 4 = 0.246 18 = 1.093 5 = 0.308 19 = 1.888 6 = 0.369 20 = 1.231 8 = 0.489 22 = 1.340 9 = 0.551 23 = 1.428 10 = 0.605 24 = 1.463 12 = 0.720 25 = 1.528 14 = 0.850 26 = 1.613 15 = 0.930 28 = 1.715 16 = 0.973	Protective Closures Co., Inc. CAPLUGS Div. (V99017)	ASSY
Cap, protective for flush valve connector	EC-XX= ID size 4 = 0.246 18 = 1.093 5 = 0.308 19 = 1.888 6 = 0.369 20 = 1.231 8 = 0.489 22 = 1.340 9 = 0.551 23 = 1.428 10 = 0.605 24 = 1.463 12 = 0.720 25 = 1.528 14 = 0.850 26 = 1.613 15 = 0.930 28 = 1.715 16 = 0.973	Protective Closures Co. Inc. CAPLUGS Div. (V99017)	ASSY
Cap, protective for toilet flush valve outlet	HVC-XX-YY= ID size 125= 0.125 625 = 0.625 250= 0.250 750 = 0.750 375= 0.375 1000 = 1.000 500= 0.500 YY= length 8 = 0.500 16 = 1.000	Protective Closures Co., Inc. CAPLUGS Div. (V99017)	ASSY

Table 9002: Special Materials (Continued)

ITEM	IDENTIFICATION	SOURCE	WHERE USED
Cleaner, industrial	Eldorado ED-333 -or- Simple Green All-Purpose Cleaner -or- Pine-Sol®	PRC-DeSoto International (V83574) Sunshine Makers, Inc. DBA: Simple Green (V1Z575) The Clorox Company (V93098)	CLEANING
Cloth, lint-free	MIL-C-85043, Type I or Type II	Commercially available	CLEANING
Desiccant	MIL-D-3436 -or- MIL-D-3464	Commercially available	STORAGE
Detergent, general purpose liquid	Ivory® Liquid -or- P-D-220D -or- MIL-D-16791, Type I	Proctor and Gamble (V1XY28) Commercially available Commercially available	CLEANING
Disinfectant, general purpose -or- Soap, disinfectant -or- Bleach, chlorine	Lysol ® A-A-1441 -or- A-A-1438 Ultra Clorox Bleach	Reckitt Benckiser Inc. (V0MWS8) Commercially available Commercially available The Clorox Co. (V93098)	CLEANING
Glycerin	Glycerin 99P	US Glycerin (VZZ109)	ASSY
Grease, synthetic	AMS-G-4343	Commercially available	ASSY

Table 9002: Special Materials (Continued)

ITEM	IDENTIFICATION	SOURCE	WHERE USED
Heat shrink tubing, thin wall PTFE, various sizes and colors	RNF-100-XXX-C Diameter 1/8 = 1/8” 3/8 = 3/8” 3/16 = 3/16” 1/2 = 1/2” 1/4 = 1/4” Color: 0=Blk 4=Yel 8=Grey 1=Brn 5=Grn 9=Wht 2=Red 6=Blu 3=Org 7=Viol	Raychem Corp. (V06090)	REPAIR
Heat shrink tubing, dual wall, various sizes and colors	HTAT-XXX-C Diameter 1/8 = 1/8” 3/8 = 3/8” 3/16 = 3/16” 1/2 = 1/2” 1/4 = 1/4” Color: 0=Blk 4=Yel 8=Grey 1=Brn 5=Grn 9=Wht 2=Red 6=Blu 3=Org 7=Viol	Raychem Corp. (V06090)	REPAIR
Ice, crushed	Approx. 1-in (2.5 cm) pieces	Commercially available	SERVICING
Lubricant, hi-temp bearing grease	Molykote® 44 -or- MIL-PRF-81322	Dow Corning Corp. (V71984) Commercially available	ASSEMBLY
Lubricant, silicone base	Molykote® 111 -or- Christo-Lube MCG 111 -or- Super O-Lube®	Dow Corning Corp. (V71984) Synthetic Great Lubrication (V0JRD3) Parker Seals (V02697)	ASSEMBLY

Table 9002: Special Materials (Continued)

ITEM	IDENTIFICATION	SOURCE	WHERE USED
Protective coating, clear	DP100 Clear -or- 771 Clear -or- TT-C-535A, Type I (Clear)	3M. Co. (V04963) Revlon, Inc. (V0DL21) Commercially available	REPAIR
Sealant, high strength RTV	3145 (clear) -or- MIL-A-46146	Dow Corning Corp. (V71984) Commercially available	REPAIR
Sealant, polysulphide	Pro-Seal P/S 890 Class B -or- CS 3201 per MIL-S-7124 -or- PR1776 -or- PR1776M	PRC-DeSoto International, Inc. (V83574) Chem Seal Products (V14439) PRC Aerospace Sealants (V83574) PRC Aerospace Sealants (V83574)	ASSEMBLY
Soap, antimicrobial	A-A-279, PH31 -or- P-S-619C	Commercially available Commercially available	CLEANING
Solder, Sn60 Pb40	QQ-S-571	Commercially available	REPAIR
Tap water	- - -	Commercially available	SERVICING
Tape, adhesive	UU-T-105 -or- PPP-T-60, Type III, Class 2	Commercially available	STORAGE

Table 9002: Special Materials (Continued)

ITEM	IDENTIFICATION	SOURCE	WHERE USED
Tape, electrical	Super 88 tape per MIL-I-24391	3M Co. (V04963)	REPAIR
Thread-locker, removable med-strength	242 per MIL-S-46163A Type II, Grade M	Henkel Loctite Corp. (V12405)	ASSEMBLY
Twine	0.06 wide Nylon per MIL-T-713	Commercially available	ASSEMBLY
Vinegar, distilled white	Acetic acid 5% concentration	Commercially available	CLEANING, SERVICING
Wire, various gauges, various colors	M22759/34-GG-XY G-Gauge, X=Color, Y=Stripe Color: 0=Blk 4=Yel 8=Grey 1=Brn 5=Grn 9=Wht 2=Red 6=Blu 3=Org 7=Viol Per MIL-W-22759	Commercially available	REPAIR

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ILLUSTRATED PARTS LIST

TASK 38-34-41-99F-801-A01

1. Introduction

A. Purpose

This section lists, describes, and illustrates all component assemblies, sub-assemblies, and detail parts. It is comprised of illustration sheets and detailed parts lists (DPLs). Illustration sheets show exploded views and detailed parts lists are arranged in a tabular form providing information about each item. Parts listed are considered to be replaceable for reasons of wear, age, or excessive abuse.

B. How to Use the Illustrated Parts List

Each assembly listed is followed immediately by a breakdown of its detail parts, properly indented (by dot(s)) to show their relationship to the assembly. Parts are listed in general order of disassembly, with the exception of attaching parts which are listed immediately following the item which they attach and which precede the components, if any, of that assembly. Item numbers in the parts list are keyed to corresponding item numbers in the accompanying exploded view illustration.

C. How to Identify a Part

(1) WHEN THE PART NUMBER IS KNOWN:

When a Numerical Parts Index is available, turn to it and locate the part number. The corresponding figure and item numbers of the illustration where the part appears are listed in the column to the right of the part number. The corresponding item number in the accompanying detail parts list will give the part number, description, assembly relationship and quantity required for that particular application.

(2) WHEN THE PART NUMBER IS NOT KNOWN:

Review the illustrations and identify the part by appearance or location. Note the item number in the exploded view. The corresponding item number in the accompanying detail parts list will give the part number, description, assembly relationship and quantity required for that particular application.

TASK 38-34-41-99F-802-A01

2. Explanation of Detail Parts List Entries

A. Overview

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

B. FIG. ITEM Column

This column contains the number referenced in the illustration for each part. The figure number is further specified as follows:

(1) The first number at the top of each FIG. ITEM column is the figure number of the corresponding illustration.

(2) The remaining numbers are item numbers that correspond to the numbers in the referenced illustration, and refer to a particular part that is detailed on the corresponding row.

(3) A dash or hyphen (-) in front of an item number means the part is not illustrated.

(4) Alpha-variant suffixes A through Z (except I and O) are assigned to item numbers when necessary to identify:

* Similar parts differentiated by an effectivity code,
* Added parts,
* Alternate parts, or
* Service bulletin modified parts.

A check of the NOMENCLATURE column and the EFF CODE column will clarify the usage or relationship of that part to the other parts.

C. PART NUMBER Column

This column contains the manufacturer’s part number by which a part can be ordered or procured.

Parts that cannot be purchased are also listed in order to complete a parts breakdown and to show the relationship of these parts to other parts of the assembly. Examples of non-procurable parts would be one part of a matched set, or a part that is permanently bonded to another part.

Part numbers can have been modified to meet the requirements of ATA 200 and ATA 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.

When applicable, the manufacturer’s complete part number is given in the NOMENCLATURE column and can be used when ordering these parts.

(2) Insertion of a reference part number compatible with ATA 200/2000 if the manufacturers part number exceeds 15 characters.

When applicable, the manufacturer’s complete part number is given in the NOMENCLATURE column and can be used when ordering these parts.

D. NOMENCLATURE Column

This column contains descriptive information for each part, and can also list:

* the true part number (if longer than 15 digits or modified per ATA 200/2000),
* the vendor code (if the part was not manufactured by Water & Waste Systems),
* service bulletins affecting the part,
* obsolete part numbers,
* information regarding the interchangeability of parts, and
* other special terms and symbols.

(1) Indented Text

The indenture system is used in the NOMENCLATURE column to indicate the assembly or subassembly relationship of one part to another. An item that is not indented is the highest level of assembly. An indented item will always be a part of a preceding item with one less indent. This system provides rapid determination of the parts comprising an assembly, or the Next Higher Assembly (NHA) for any particular part. In determining item relationship, remember that attaching parts follow the part attached and therefore can precede the breakdown of an assembly.

The terms defined below are used in the NOMENCLATURE column when applicable to aid in the determination of attaching parts for a particular assembly.

Term	Definition
.	(1-7 dots preceding the descriptive information) Designates the part's indenture level of assembly.
ATTACHING PARTS	Designates the beginning of a group of attaching parts for an assembly at the current indenture level.
* * *	Designates the end of a group of attaching parts for an assembly at the current indenture level.

An example of indenture relationship is as follows:

1 2 3 4 5 6 7
END ITEM OR MAJOR ASSEMBLY
Detail Parts for End Item or Major Assembly
. Subassembly
ATTACHING PARTS
. Attaching Parts for Subassembly to End Item or Major Assembly
* * *
. . Detail Parts for Subassembly
ATTACHING PARTS
. . Attaching Parts for Detail Parts to Subassembly
* * *

(2) Vendor Code (Manufacturer's CAGE Code)

Part numbers used in this unit that are not produced or altered by Water & Waste Systems are indicated by a vendor Commercial And Government Entity (CAGE) code. The vendor code is listed as a "V" followed by 5 additional characters in parentheses in the NOMENCLATURE column. The CAGE codes are referenced from the "Federal Supply Code for Manufacturers", Catalog Handbook H4-1, H4-3, and/or the NATO Code. For convenience, a list of these vendors is detailed in paragraph 3., "Vendor Names and Address" on page 10008.

(a) Part numbers with a vendor code in the NOMENCLATURE column can be obtained from that vendor. The part is also obtainable from and supported by Water & Waste Systems.

(b) The absence of a vendor code in the NOMENCLATURE column indicates the part is manufactured or modified by Water & Waste Systems (V29780).

(3) Service Bulletin/Service Advisory Incorporation

Assemblies, subassemblies, and detail parts subject to modification, deletion, addition, or replacement by an issued service bulletin or service advisory are annotated to indicate both pre- and post- service bulletin/advisory configurations.

Term	Definition
PRE SB/SA XXXX	Pre-Service Bulletin / Service Advisory.
POST SB/SA XXXX	Post-Service Bulletin / Service Advisory.
DELETED BY SB XXXX	Deleted By Service Bulletin. Parts deleted by service bulletins show the deleted part number but omit its nomenclature. Only this term is shown in the NOMENCLATURE column.
ADDED BY SB XXXX	Added by Service Bulletin. Parts added by service bulletins include this notation in the NOMENCLATURE column.

(4) Obsolete and Interchangeable Parts Incorporation

The terms defined below are used in the NOMENCLATURE column when applicable to indicate the interchangeability or obsolescence of parts.

Term	Definition
ALT	Alternate part. The given part is alternate to and interchangeable with other parts within the same item number variant group or other item numbers if designated.
PRFD	Preferred part. The given part is interchangeable with other parts within the same item number variant group, and of the available choices, is the preferred part to procure.
REPLD BY	Replaced By. The part is replaced by and is interchangeable with the item number designated in the notation.
REPLS	Replaces. The part replaces and is interchangeable with the item number designated in the notation.
SUPSD BY	Superseded By. The part is replaced by and is not interchangeable with the item number designated in the notation.
SUPSDS	Supersedes. The part replaces and is not interchangeable with the item number designated in the notation.
DELETED	Deleted. Parts that are deleted are identified in the NOMENCLATURE column as “DELETED.” The part number will stay in the PART NUMBER column. Information in other columns will be deleted.

(5) Other Special Terms and Symbols

The special terms defined below are used in the NOMENCLATURE column when applicable to further describe the part.

Term	Definition
TRUE PN	True Part Number. The part in the PART NUMBER column has been modified to conform to ATA 200/2000 standards. Use the True Part Number shown within parentheses in the NOMENCLATURE column to procure the desired part.
NONPROC	Non Procurable. The part in the PART NUMBER column for an assembly or subassembly that is not procurable in its listed form. NONPROC assemblies or subassemblies are not procurable and should not be ordered; however the parts for that assembly or subassembly could be procurable. A NONPROC assembly is created to allow a group of parts to be illustrated and listed as an assembly or subassembly.
ORDER NHA	Order Next Higher Assembly. The part in the PART NUMBER column cannot be ordered. Order the Next Higher Assembly (NHA) shown in the DPL to procure the desired part.
PN CORRECTION	Part Number Correction. The part in the PART NUMBER column was previously in error, and has been corrected to the number listed in the PART NUMBER column.
ITEM SHIPPED LOOSE	Item is shipped detached from its assembly. The detail item is not attached to the assembly during storage or shipment. An example of such items are gaskets, seals, or O-rings.
CUSTOMER SUPPLIED	Item is supplied by the customer. The part in the PART NUMBER column is not part of the assembly, but is used with the assembly. The part is to be obtained separately by the customer, and is listed for clarity.
SEE IPL FIG. XX FOR DETAILS	Refer to the listed figure for more details on this part. The part or assembly is described in more detail in the referenced figure.
SEE IPL FIG. XX FOR NHA	Refer to the listed figure to see this item in relation to the next higher assembly. The part or assembly is listed as a single item at the next higher assembly level.

E. EFF CODE Column

This column contains effectivity codes to indicate alternate models or configurations of the end item to which the given parts apply. When the Detailed Parts List describes more than one assembly part number, each top assembly part number is assigned a code (A, B, etc.). Applicable detail parts will have matching codes in the EFF CODE column to indicate its effectivity to the corresponding top assembly part number.

When a detail part is applicable to a group of top assembly part numbers and listing a series of single part number effectivity codes is impractical, an additional code is assigned to indicate its effectivity to the group of top assembly part numbers.

When necessary, an explanation of the effectivity codes is listed at the end of the figure's Detailed Parts List.

F. UNITS PER ASSY Column

The quantity shown in this column represents the units required for one Next Higher Assembly (NHA) or, when referring to attaching parts, the quantity to attach one such item. The quantities shown are in this column are the quantities required at a particular location and not necessarily the total quantity of parts in one assembly. Other terms used in the UNITS PER ASSY column are defined below.

Term	**Definition**
RF	Reference. The part or assembly is listed here only for reference, and is shown completely assembled in the figure referenced in the NOMENCLATURE column.
AR	As Required. This part is a bulk quantity item, and the quantity used varies upon the discretion of the installer.

TASK 38-34-41-99F-803-A01

3. Vendor Names and Address

The following Table is provided to list the names and addresses of all vendors supplying items not carried under a Water & Waste Systems part number, together with their Commercial And Government Entity (CAGE) codes.

Vendor codes, preceded by the letter “V”, are listed in the NOMENCLATURE column to identify the supplier of non-Water & Waste Systems or non-military standard (AN, MS, or NAS) parts. Refer to the Table below for a listing of vendor codes.

Vendor Code List

CODE	VENDOR’S NAME AND ADDRESS
V0697	Parker Hannifin Corp. Seal group 2360 Palumbo Dr. P.O. Box 11751 Lexington, KY 40512-1751
V29780	MAG Aerospace Industries, LLC 1500 Glenn Curtiss St. Carson, CA 90746-4012
V71984	Dow Corning Corp. P.O. Box 994 Midland, MI 48686-0994
VZZ107	Colema Boards of California 3660 Main St., Ste. C Cottonwood, CA 96022

TASK 38-34-41-99F-804-A01

4. Numerical Parts Index

A Numerical Parts Index is provided to help find parts in the Detail Parts List by part number. The figure number, item number, and total quantity required are given for each entry.

Numerical Parts Index

PART NUMBER	AIRLINE STOCK NUMBER	FIG.	ITEM	TTL REQD
A6TPL		1	30	1
C031L4S17		1	180	2
CB9120V5		1	-340A	2
CB9120V5		4	-375	2
CR2M		4	-272	
CTM00M4		1	340	
FW0126A		4	300	3
JF10304-02		1	170	4
JFM101215-035		4	70	1
JS1-0607-06		4	40	1
JS1-0809-06		4	315	1
JTEM05		4	45	1
JTEM06		4	250	1
MN1-4-12		4	295	3
MS14151-1		1	355	
MS15795-857		1	-350A	1
MS21083C06		1	360	
MS21083C3		1	70	2
MS21083C3		4	25	2
MS21083C3		4	345	
MS27595-012		4	100	1
MS29513-154		1	45	1
MS35338-138		1	305	2
MS35338-138		1	-360B	1
MS35489-35		1	225	1
MS35650-304		1	-320A	2
MS51957-16		4	290	3
MS51957-17		4	228	2
MS51957-30		1	345	
MS51958-61		1	46	1
NA0068A030006		4	280	4
NAS1149C0332R		1	65	4
NAS1149C0332R		1	155	4
NAS1149C0332R		1	240	2
NAS1149C0332R		4	165	3
NAS1149C0332R		4	185	2
NAS1149C0332R		4	340	3
NAS1149C0832R		1	265	2

Numerical Parts Index (Continued)

PART NUMBER	AIRLINE STOCK NUMBER	FIG.	ITEM	TTL REQD
NAS1149C1016R		1	275	2
NAS1149CN432R		4	229	2
NAS1149CN432R		4	305	3
NAS1149D0316J		1	310	4
NAS1149D0316J		1	315	2
NAS1149D0316J		1	325	
NAS1149D0316J		1	-355A	2
NAS1291C04M		1	95	4
NAS1291C04M		2	20	3
NAS1291C04M		4	310	3
NAS1291C3M		1	150	2
NAS1291C3M		1	235	2
NAS1291C3M		4	160	3
NAS1291C3M		4	180	2
NAS1351C3-12		1	60	2
NAS1351C3-12		4	335	3
NAS1351C3-20		4	15	2
NAS1352C04-6		1	85	4
NAS1352C04-8		2	10	3
NAS1352C08-8		4	350	2
NAS1802-3-10		1	-345A	1
NAS1802-3-14		4	-85	2
NAS1802-3-14		4	-50	2
NAS1802-3-16		1	335	2
NAS1802-3-20		4	-80	3
NAS620C10		4	20	2
NAS620C4L		1	90	8
NAS620C4L		2	15	6
NAS620C6L		1	350	
NAS620C8L		4	355	2
NAS6303U14		1	160	2
NAS679C3M		1	47	1
NAS679C3M		1	300	2
NAS679C3M		1	361	1
NASM35338-138		1	-360A	1
NASM35650-304		1	320	2
PS890		1	362	
SK220-2S		1	260	2
SK2600LWS		1	-105	2
SK2600R9S		1	100	2
TX31SS		1	-195	1
14330-212		4	155	1
14330-212-1		4	125	1
14330-514-205		1	-1	RF
14330-514-205A		1	-1D	RF

Numerical Parts Index (Continued)

PART NUMBER	AIRLINE STOCK NUMBER	FIG.	ITEM	TTL REQD
14330-514-206		1	-1A	RF
14330-514-206A		1	-1E	RF
14330-514-207		1	-1B	RF
14330-514-207A		1	-1F	RF
14330-514-208		1	-1C	RF
14330-514-208A		1	-1G	RF
14330-515-5		1	5	1
14330-515-6		1	-5A	1
14330-515-7		1	-5B	1
14330-515-8		1	-5C	1
14C33-08		1	-110A	1
14C33-08		1	-125A	1
14C33-08		1	-205A	1
14C34-08A		1	110	1
14C34-08A		1	125	1
14C34-08A		1	205	1
15800-192		1	187	1
18402-8		4	5	2
18402-9		4	-5A	2
18402-31		4	-5B	2
18415		1	220	2
18430-205		1	50	1
18451		4	230	2
18453		4	140	1
18454		4	110	1
18455		4	10	2
18457-1		4	-35	1
18461		4	170	2
18463		1	250	1
18465		4	235	1
18468		4	265	1
18469		4	-65	1
18471		4	275	
18472		4	260	1
18474		1	230	1
18475		2	50	2
18476-201		4	240	1
18477-201		4	30	1
18478		4	60	1
18479		4	172	
18479		4	360	2
18480		4	220	1
18482		1	255	1
18483		4	190	1
18484		4	175	1

Numerical Parts Index (Continued)

PART NUMBER	AIRLINE STOCK NUMBER	FIG.	ITEM	TTL REQD
18486		4	370	1
18489		4	130	1
18504-203		4	285	1
18510-101		4	325	
18510-301		4	-325A	1
18510-401		4	-325B	1
18541-3		1	120	1
18542		1	55	1
18542		2	-1	RF
18543		2	45	1
18544		2	5	1
18546		2	25	1
18547		2	30	1
18571		1	285	1
18579		4	330	1
18585		1	200	1
18587-201		1	215	1
18587-201		4	-1	RF
18587-205		1	-215A	1
18587-205		4	-1A	RF
18589		1	145	2
18592		1	182	1
18593		4	215	1
18594		1	140	1
18595		1	175	2
18596		4	227	2
18597		1	135	1
18598-205		1	40	1
18601		1	270	2
18602		1	80	2
18603		1	365	1
18604		1	185	1
18608		1	190	1
18614		1	280	2
18615		1	290	1
18618		1	330	2
18619		1	165	2
18642		1	-45A	1
18644		1	-290A	2
18645		1	-285A	1
18646		4	-260A	1
18650-10		1	-20	1
18650-11		1	-20A	1
18650-12		1	-20B	1
18650-13		1	-20C	1

Numerical Parts Index (Continued)

PART NUMBER	AIRLINE STOCK NUMBER	FIG.	ITEM	TTL REQD
18650-201AMDTA		1	-20D	1
18650-202AMDTA		1	-20E	1
18650-203AMDTA		1	-20F	1
18650-204AMDTA		1	-20G	1
18652		4	-275A	1
18831		1	-365A	1
18864		1	-185A	1
18960		4	-325C	1
18977		4	-370A	1
2-012E3609-70		1	188	1
2-012N0602-70		4	105	1
2-012N602-70		4	245	1
2-015E3609-70		1	115	1
2-015E3609-70		1	130	1
2-015E3609-70		1	186	1
2-017E3609-70		1	75	1
2-023E3609-70		2	-40A	1
2-023E0515-80		2	40	1
2-110N0602-70		2	55	1
2-110N0602-70		4	195	1
2-134N0602-70		4	150	1
2-137N0602-70		4	120	1
2-137N0602-70		4	225	1
2-138N0602-70		4	145	1
2-139N0602-70		1	245	1
2-141N0602-70		4	115	1
2-163N0602-70		4	90	1
3-23609AL		1	-110B	1
3-2309AL08V		1	-125B	1
3-23609AL		1	-205B	1
36035-3		1	295	3
36035-3		4	270	
36035-5		4	-270A	2
3765-215-89		1	-8	1
406736		4	365	
446121188		2	35	1
77001-041		1	-7	1

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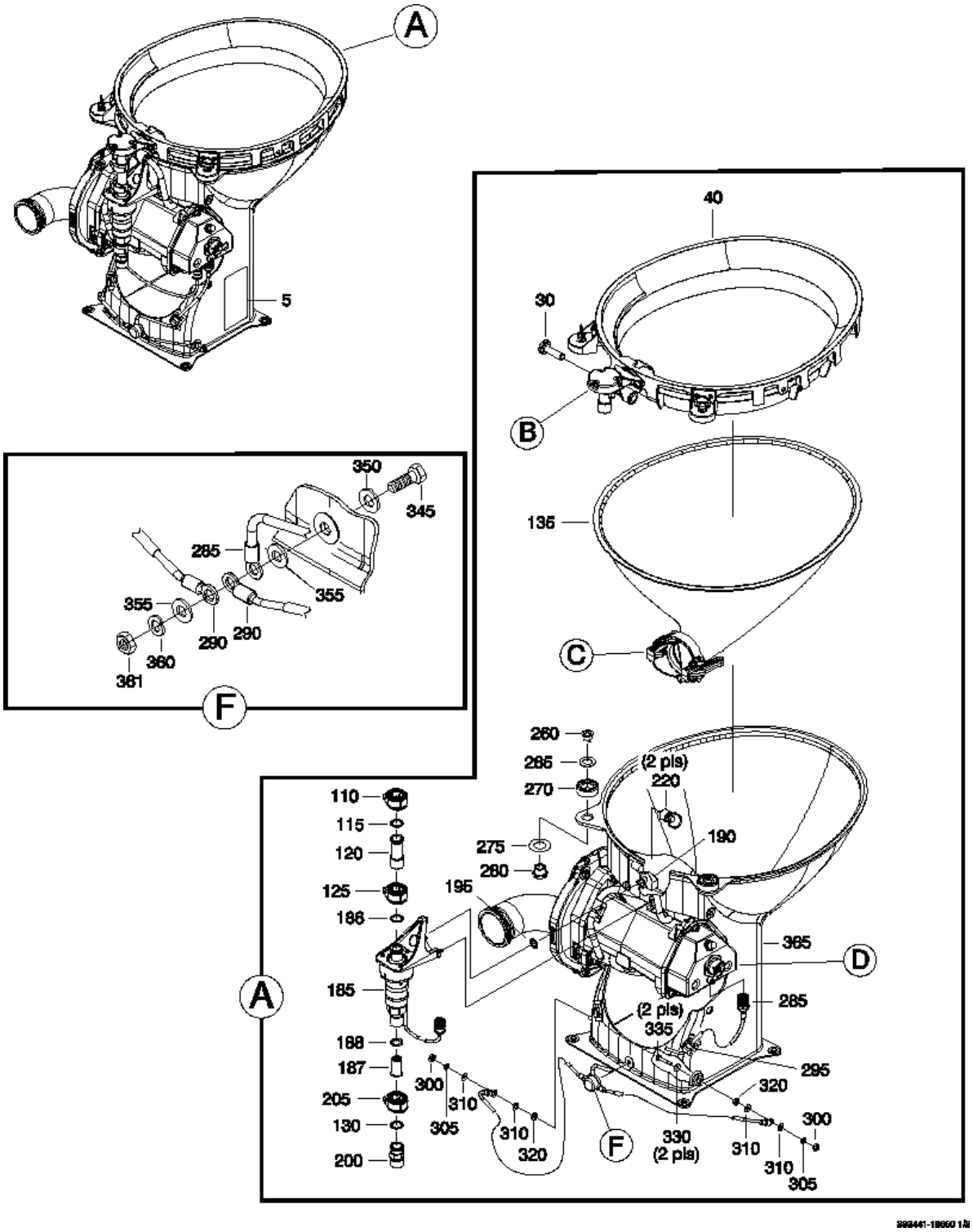
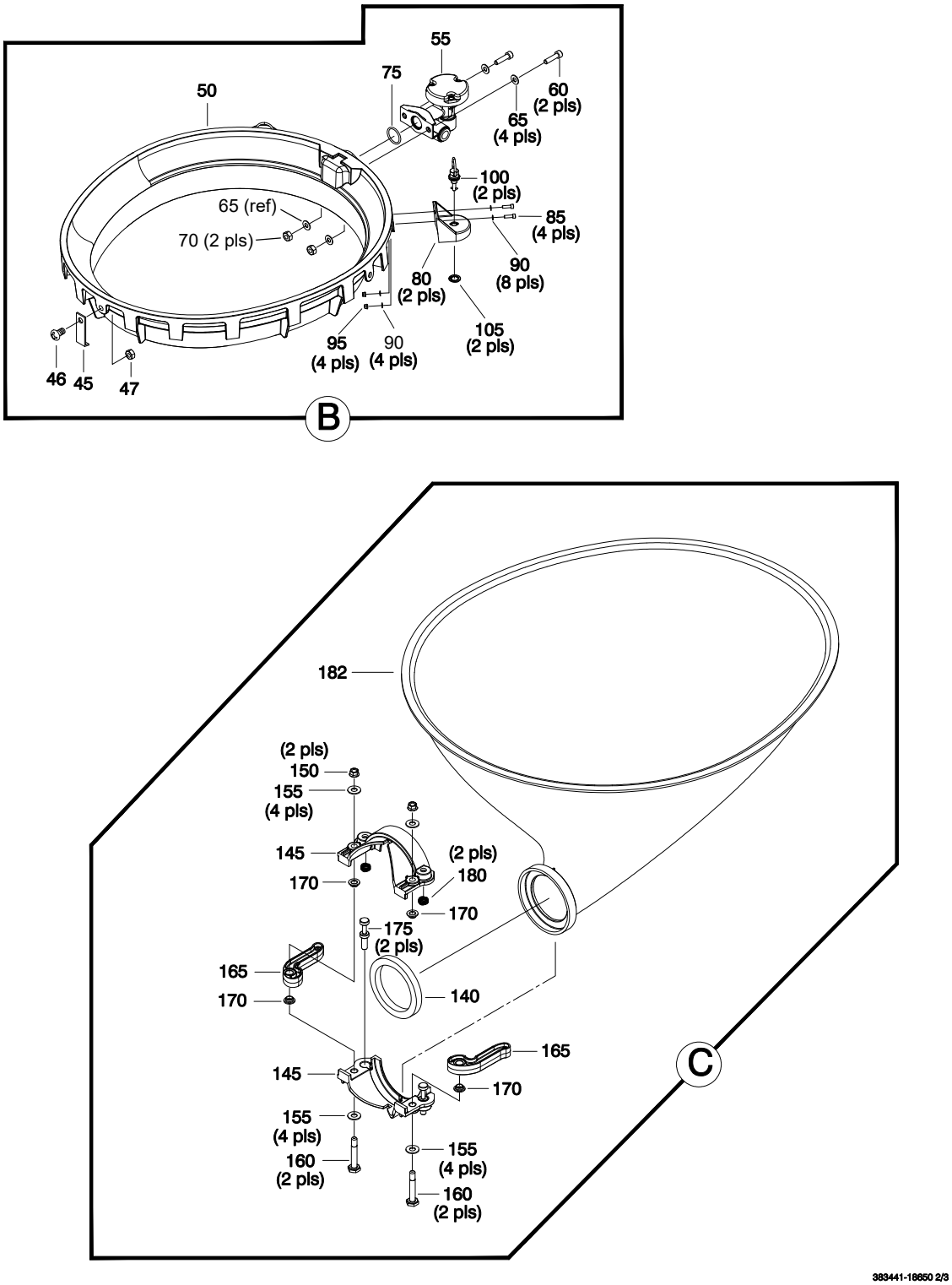
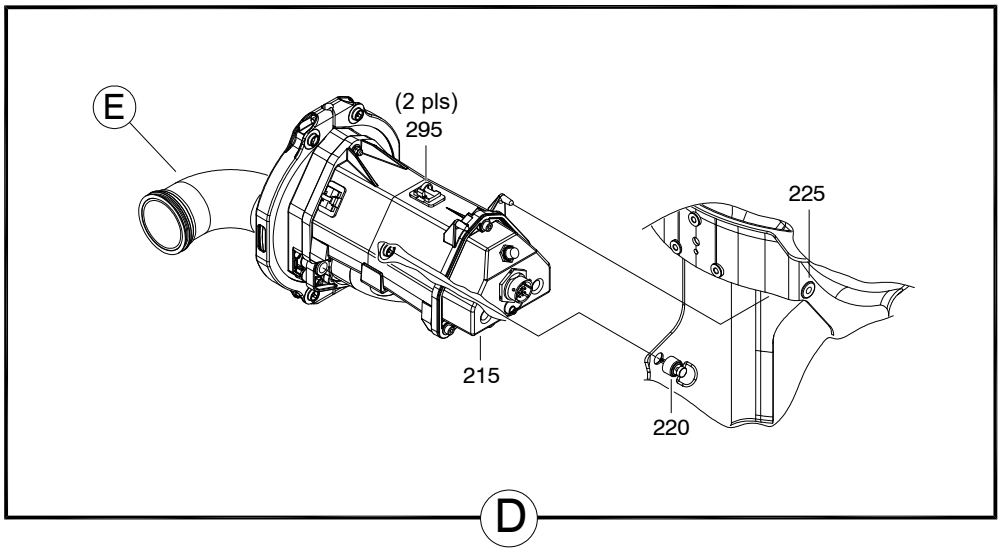
5. Illustrated Parts List

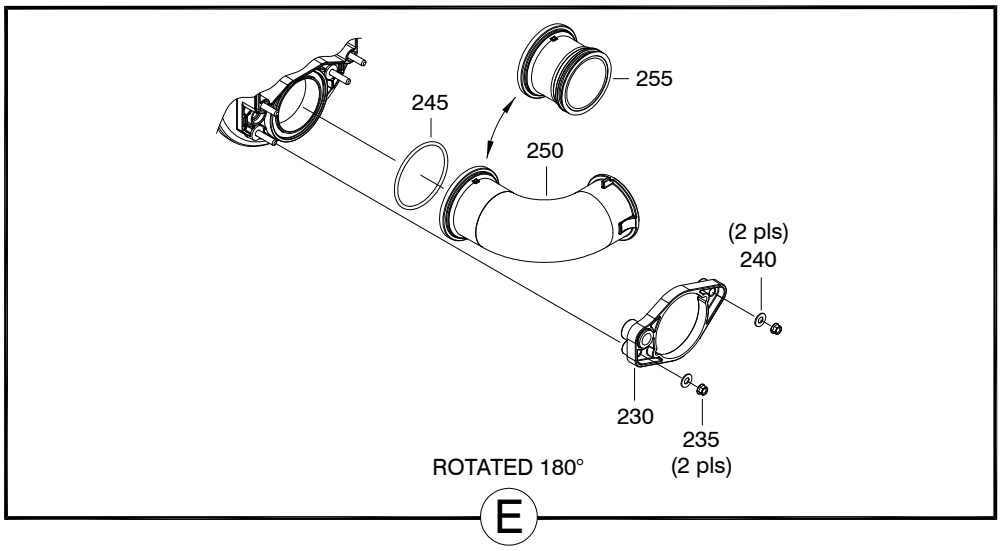


IPL Figure 1: Revolution™ Toilet Assembly (LH Shown) (Sheet 1 of 3)



IPL Figure 1: Revolution™ Toilet Assembly
(LH Shown) (Sheet 2 of 3)





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IPL Figure 1: Revolution™ Toilet Assembly
(LH Shown) (Sheet 3 of 3)

IPL Figure 1: Revolution™ Toilet Assembly - Detail Parts List

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1 2 3 4 5 6 7	EFF CODE	UNITS PER ASSY
1					
-1	14330-514-205		TOILET ASSY, (WITH LH, ELBOW OUTLET) (POST SB 14330-004-38-003) (RWK SB 14330-514-38-001; REPLD BY ITEM 1D)	A	RF
-1A	14330-514-206		TOILET ASSY, (WITH RH, ELBOW OUTLET) (POST SB 14330-004-38-003) (RWK SB 14330-514-38-001; REPLD BY ITEM 1E)	B	RF
-1B	14330-514-207		TOILET ASSY, (WITH LH, STUB OUTLET) (POST SB 14330-004-38-003) (RWK SB 14330-514-38-001; REPLD BY ITEM 1F)	C	RF
-1C	14330-514-208		TOILET ASSY, (WITH RH, STUB OUTLET) (POST SB 14330-004-38-003) (RWK SB 14330-514-38-001; REPLD BY ITEM 1G)	D	RF
-1D	14330-514-205A		TOILET ASSY, (WITH LH, ELBOW OUTLET) (REPLS ITEM 1) (TRUE PN 14330-514-205AMDTA)	E	RF
-1E	14330-514-206A		TOILET ASSY, (WITH RH, ELBOW OUTLET) (REPLS ITEM 1A) (TRUE PN 14330-514-206AMDTA)	F	RF
-1F	14330-514-207A		TOILET ASSY, (WITH LH, STUB OUTLET) (REPLS ITEM 1B) (TRUE PN 14330-514-207AMDTA)	G	RF

- ITEM NOT ILLUSTRATED

IPL Figure 1: Revolution™ Toilet Assembly - Detail Parts List (Continued)

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1 2 3 4 5 6 7	EFF CODE	UNITS PER ASSY
1					
-1G	14330-514-208A		TOILET ASSY, (WITH RH, STUB OUTLET) (REPLS ITEM 1C) (TRUE PN 14330-514-208AMDTA)	H	RF
5	14330-515-5		. LABEL, IDENTIFICATION	A,E	1
-5A	14330-515-6		. LABEL, IDENTIFICATION	B,F	1
-5B	14330-515-7		. LABEL, IDENTIFICATION	C,G	1
-5C	14330-515-8		. LABEL, IDENTIFICATION	D,H	1
-6	77001-041		. LABEL, MODIFICATION RECORD		1
-7	3765-215-89		. DECAL, RETROFIT (POST SB 14330-514-38-001)	A,B,C,D	1
-20	18650-10		. TOILET SUBASSY (NONPROC)	A	1
-20A	18650-11		. TOILET SUBASSY (NONPROC)	B	1
-20B	18650-12		. TOILET SUBASSY (NONPROC)	C	1
-20C	18650-13		. TOILET SUBASSY (NONPROC)	D	1
-20D	18650-201AMDTA		. TOILET SUBASSY (NONPROC)	E	1
-20E	18650-202AMDTA		. TOILET SUBASSY (NONPROC)	F	1
-20F	18650-203AMDTA		. TOILET SUBASSY (NONPROC)	G	1
-20G	18650-204AMDTA		. TOILET SUBASSY (NONPROC)	H	1
30	A6TPL		. . PLUG		1
40	18598-205		. . RINSE RING ASSY		1
			ATTACHING PARTS		
45	MS29513-154		. . . O-RING (REPLD BY ITEM -45A)		1
-45A	18642		. . . CLIP, FRONT (REPLS ITEM 45)		1
46	MS51958-61		. . . SCREW, PAN HD		1
47	NAS679C3M		. . . NUT, SELF LOCKING		1
			* * *		
50	18430-205		. . . RINSE RING		1
55	18542		. . . VALVE, ANTI SIPHON (SEE IPL FIG. 2 FOR DETAILS)		1
			ATTACHING PARTS		
60	NAS1351C3-12		. . . SCREW, SKT HD CAP		2
65	NAS1149C0332R		. . . WASHER		4

- ITEM NOT ILLUSTRATED

IPL Figure 1: Revolution™ Toilet Assembly - Detail Parts List (Continued)

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1 2 3 4 5 6 7	EFF CODE	UNITS PER ASSY
1					
70	MS21083C3		. . . NUT, SELF LOCKING * * *		2
75	2-017E3609-70		. . . O-RING		1
80	18602		. . . BRACKET, RINSE RING		2
			ATTACHING PARTS		
85	NAS1352C04-6		. . . SCREW, SKT HD CAP		4
90	NAS620C4L		. . . WASHER		8
95	NAS1291C04M		. . . NUT, SELF LOCKING * * *		4
100	SK2600R9S		. . . QUICK RELEASE FASTENER		2
-105	SK2600LWS		. . . RETAINING RING, QUICK RELEASE FASTENER (TRUE PN SK2600-LWS)		2
110	14C34-08A		. . CLAMSHELL ASSY, LOCKING		1
-110A	14C33-08		. . CLAMSHELL ASSY, LOCKING (ALT TO ITEM 110)		1
-110B	3-23609AL		. . CLAMSHELL ASSY, LOCKING (ALT TO ITEM 110) (TRUE PN 3-23609AL-08V)		1
115	2-015E3609-70		. . O-RING		1
120	18541-3		. . TUBE, RINSE VALVE TO ANTI-SIPHON VALVE		1
125	14C34-08A		. . CLAMSHELL ASSY, LOCKING		1
-125A	14C33-08		. . CLAMSHELL ASSY, LOCKING (ALT TO ITEM 125)		1
-125B	3-23609AL08V		. . CLAMSHELL ASSY, LOCKING (ALT TO ITEM 125) (TRUE PN 3-23609AL-08V)		1
130	2-015E3609-70		. . O-RING		1
135	18597		. . BOWL ASSY		1
140	18594		. . . SEAL		1
145	18589		. . . HOUSING, FLANGE		2

- ITEM NOT ILLUSTRATED

IPL Figure 1: Revolution™ Toilet Assembly - Detail Parts List (Continued)

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1 2 3 4 5 6 7	EFF CODE	UNITS PER ASSY
1					
			ATTACHING PARTS		
150	NAS1291C3M		. . . NUT, SELF-LOCKING		2
155	NAS1149C0332R		. . . WASHER		4
160	NAS6303U14		. . . BOLT, HEX HD		2
			* * *		
165	18619		. . . CAM		2
170	JF10304-02		. . . BEARING, FLANGE (TRUE PN JFI-0304-02)		4
175	18595		. . . BUTTON, LOCKING		2
180	C031L4S17		. . . SPRING, WAVE (TRUE PN C031-L4-S17)		2
182	18592		. . . BOWL		1
185	18604		. . RINSE VALVE ASSY (P2) (ALT FOR ITEM -185A)		1
-185A	18864		. . RINSE VALVE ASSY (P2) (PRFD)		1
			ATTACHING PARTS		
186	2-015E3609-70		. . . O-RING		1
187	15800-192		. . . SCREEN, RINSE VALVE		1
188	2-012E3609-70		. . . O-RING		1
190	18608		. . QUARTER TURN CAM ASSY		1
-195	TX31SS		. . RING, RETAINING (TRUE PN TX-31SS) * * *		1
200	18585		. . ADAPTER, RINSE VALVE INLET		1
205	14C34-08A		. . CLAMSHELL ASSY, LOCKING		1
-205A	14C33-08		. . CLAMSHELL ASSY, LOCKING (ALT TO ITEM 205)		1
-205B	3-23609AL08V		. . CLAMSHELL ASSY, LOCKING (ALT TO ITEM 205) (TRUE PN 3-23609AL-08V)		1
215	18587-201		. . ORBITAL FLUSH VALVE (J1,J2,SW1) AND FCU (PRE SB 14330-514-38-001; REPLD BY ITEM 215A) (SEE IPL FIG. 4 FOR DETAILS)	ABCD	1

- ITEM NOT ILLUSTRATED

IPL Figure 1: Revolution™ Toilet Assembly - Detail Parts List (Continued)

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1 2 3 4 5 6 7	EFF CODE	UNITS PER ASSY
1					
-215A	18587-205		. . ORBITAL FLUSH VALVE (J1,J2,SW1) AND FCU (POST SB 14330-514-38-001; REPLS ITEM 215) (SEE IPL FIG. 4 FOR DETAILS)	EFGH	1
			ATTACHING PARTS		
220	18415		. . FASTENER, QUICK RELEASE * * *		2
225	MS35489-35		. . GROMMET		1
230	18474		. . PLATE, SWIVEL		1
			ATTACHING PARTS		
235	NAS1291C3M		. . NUT, SELF LOCKING		2
240	NAS1149C0332R		. . WASHER * * *		2
245	2-139N0602-70		. . O-RING		1
250	18463		. . OUTLET, ELBOW	ABEF	1
255	18482		. . OUTLET, STUB	CDGH	1
260	SK220-2S		. . FLANGE, STRAIGHT		2
265	NAS1149C0832R		. . WASHER		2
270	18601		. . PIN, BUMPER		2
275	NAS1149C1016R		. . WASHER		2
280	18614		. . NUT, SLEEVE		2
285	18571		. . CABLE, GROUND (P1) (REPLD BY ITEM -285A)		1
-285A	18645		. . CABLE ASSY, GROUNDING (P1) (REPLS ITEM 285)		1
290	18615		. . CABLE, GROUND (REPLD BY ITEM -290A)		1
-290A	18644		. . CABLE, GROUND CONNECT (REPLS ITEM 290)		2
			ATTACHING PARTS		
295	36035-3		. . CABLE TIE, HEAT STABILIZED		3
300	NAS679C3M		. . NUT, SELF LOCKING		2
305	MS35338-138		. . WASHER, LOCK		2
310	NAS1149D0316J		. . WASHER		4
315	NAS1149D0316J		DELETED		
320	NASM35650-304		. . NUT, PLAIN (REPLD BY ITEM -320A)		2

- ITEM NOT ILLUSTRATED

IPL Figure 1: Revolution™ Toilet Assembly - Detail Parts List (Continued)

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1 2 3 4 5 6 7	EFF CODE	UNITS PER ASSY
1					
-320A	MS35650-304		. . NUT, PLAIN (REPLS ITEM 320)		2
325	NAS1149D0316J		DELETED		
330	18618		. . WASHER		2
335	NAS1802-3-16		. . SCREW, HEX HD * * *		2
340	CTM00M4		DELETED		
-340A	CB9120V5		. . MOUNT, CABLE TIE (BONDED)		2
			ATTACHING PARTS		
345	MS51957-30		DELETED (REPLD BY ITEM -345A)		
-345A	NAS1802-3-10		. . SCREW, HEX HD (REPLS ITEM 345)		1
350	NAS620C6L		DELETED (REPLD BY ITEM -350A)		
-350A	MS15795-857		. . WASHER, FLAT (REPLS ITEM 350)		1
355	MS14151-1		DELETED (REPLD BY ITEM -355A)		
-355A	NAS1149D0316J		. . WASHER, FLAT (REPLS ITEM 355)		2
360	MS21083C06		DELETED (REPLD BY ITEM -360A)		
-360A	NASM35338-138		. . WASHER, LOCK-SPRING (REPLS ITEM 360) (REPLD BY ITEM -360B)		1
-360B	MS35338-138		. . WASHER, LOCK-SPRING (REPLS ITEM 360A)		1
361	NAS679C3M		. . NUT,SELF-LOCKING		1
362	PS890		DELETED * * *		
365	18603		. . PEDESTAL		1
-365A	18831		. . PEDESTAL (ALT TO ITEM 365)		1

- ITEM NOT ILLUSTRATED

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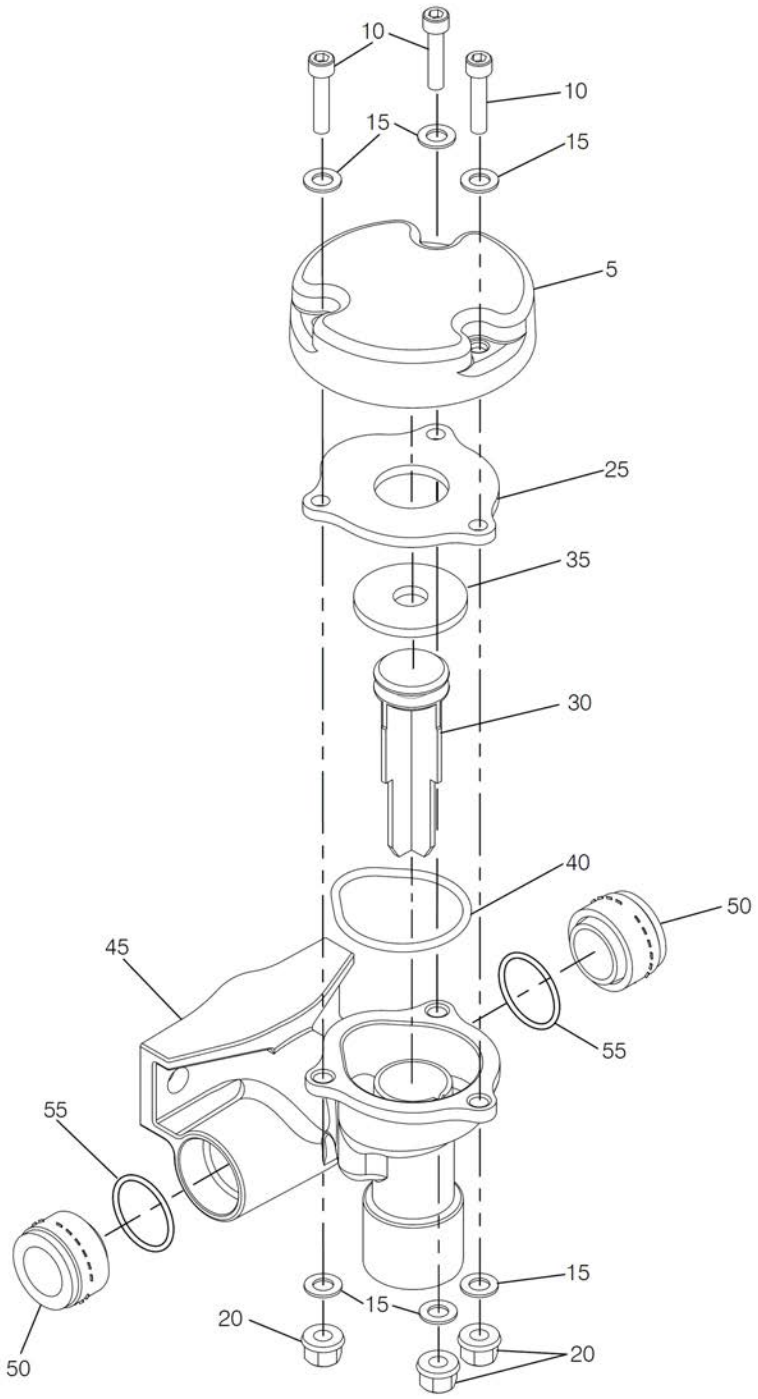

IPL Figure 2: Anti-Siphon Valve

IPL Figure 2: Anti-Siphon Valve - Detail Parts List

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1 2 3 4 5 6 7	EFF CODE	UNITS PER ASSY
2					
-1	18542		ANTI-SIPHON VALVE (SEE IPL FIG. 1 FOR NHA)		RF
5	18544		. COVER, PROTECTIVE		1
			ATTACHING PARTS		
10	NAS1352C04-8		. SCREW, SKT HD CAP		3
15	NAS620C4L		. WASHER		6
20	NAS1291C04M		. NUT, SELF-LOCKING * * *		3
25	18546		. COVER, O-RING		1
30	18547		. POPPET		1
35	446121188		. SEAL, POPPET VALVE		1
40	2-023E0515-80		. O-RING (ALT TO ITEM 40)		1
-40A	2-023E3609-70		. O-RING (PRFD)		1
45	18543		. BODY, VALVE		1
50	18475		. HALF CARTRIDGE		2
55	2-110N0602-70		. O-RING		1

- ITEM NOT ILLUSTRATED

DELETED

IPL Figure 3: Deleted

IPL Figure 3: Deleted

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1 2 3 4 5 6 7	EFF CODE	UNITS PER ASSY
3					
-1	18604		DELETED (REPLACEMENT PARTS ADDED TO IPL FIGURE 1)		

- ITEM NOT ILLUSTRATED

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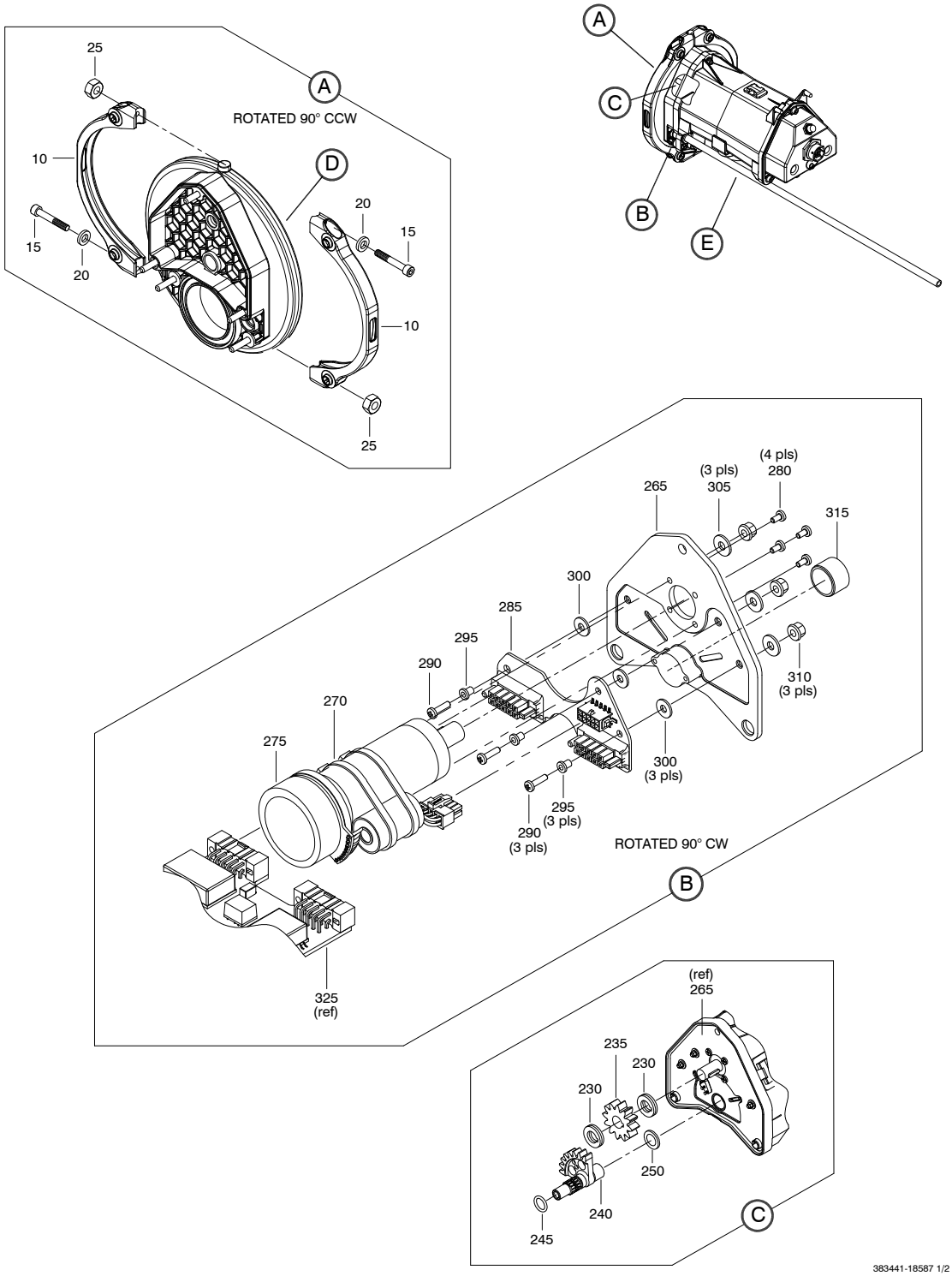
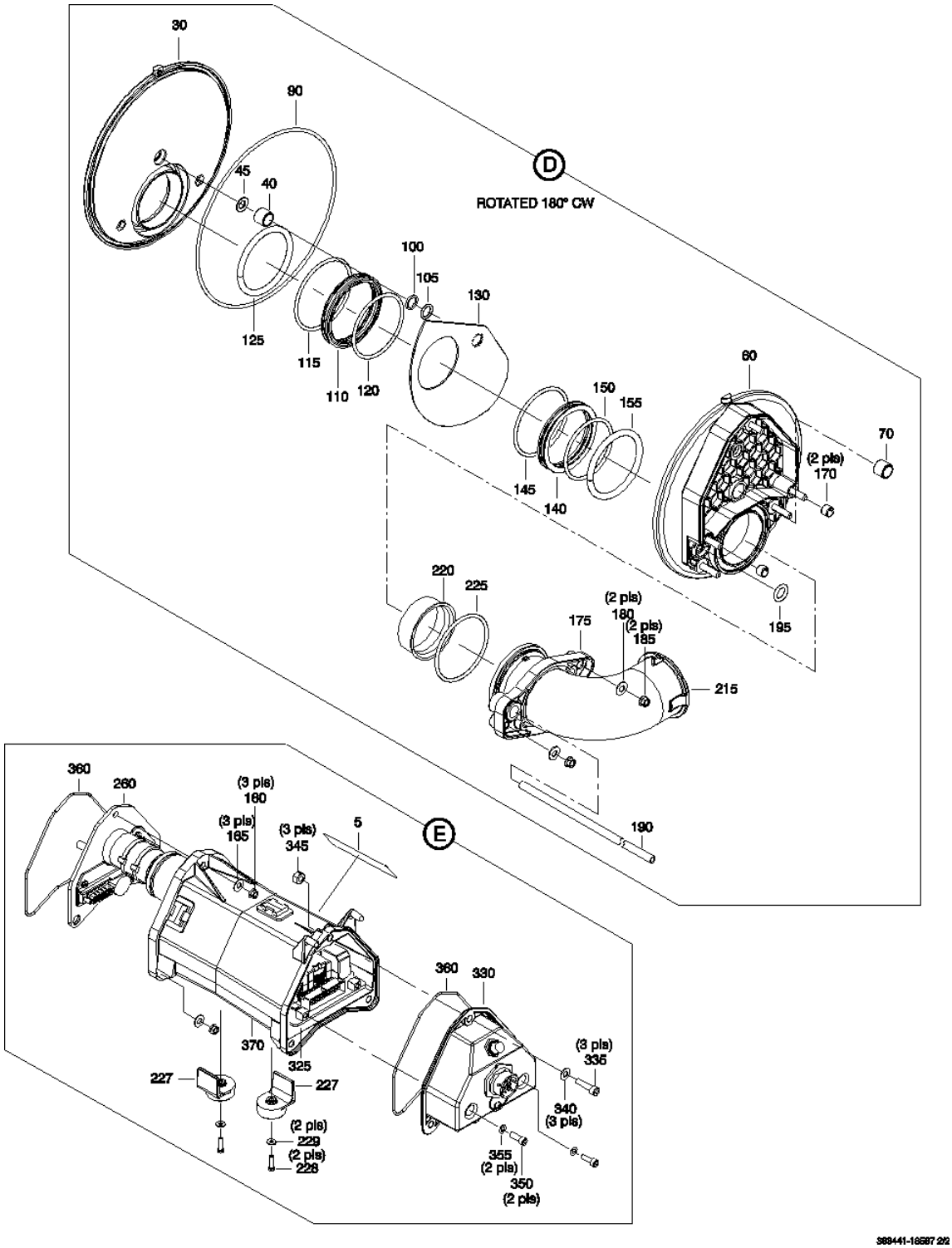


IPL Figure 4: Orbital™ Flush Valve
(Sheet 1 of 2)



IPL Figure 4: Orbital™ Flush Valve
(Sheet 2 of 2)

IPL Figure 4: Orbital™ Flush Valve - Detail Parts List

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1 2 3 4 5 6 7	EFF CODE	UNITS PER ASSY
4					
-1	18587-201		ORBITAL™ FLUSH VALVE / FCU (PRE SB 14330-514-38-001; REPLD BY ITEM -1A) (SEE IPL FIG. 1 FOR NHA)	A	RF
-1A	18587-205		ORBITAL™ FLUSH VALVE / FCU (POST SB 14330-514-38-001; REPLS ITEM -1) (SEE IPL FIG. 1 FOR NHA)	B	RF
5	18402-8		. LABEL, IDENTIFICATION (REPLD BY ITEM -5A)		2
-5A	18402-9		. LABEL, IDENTIFICATION (REPLS ITEM 5) (PRE SB 14330-514-38-001; REPLD BY ITEM 5B)	A	2
-5B	18402-31		. LABEL, FLUSH VALVE ASSY (POST SB 14330-514-38-001; REPLS ITEM 5A)	B	2
-7	77001-041		. LABEL, MODIFICATION - AMDT A (POST SB 14330-514-38-001)	B	1
-8	3765-215-89		. DECAL, RETROFIT (POST SB 14330-514-38-001)	B	1
10	18455		. CLAMP, V-BAND		2
			ATTACHING PARTS		
15	NAS1351C3-20		. SCREW, SKT HD CAP		2
20	NAS620C10		. WASHER		2
25	MS21083C3		. NUT, SELF-LOCKING		2
			* * *		
30	18477-201		. VACUUM SIDE ASSY		1
-35	18457-1		. . HOUSING, VACUUM SIDE		1
40	JS1-0607-06		. . BEARING, PLAIN (TRUE PN JSI-0607-06)		1
45	JTEM05		. . IGLIDE POLYSORB (TRUE PN JTEM-05)		1
-50	NAS1802-3-14		. . SCREW, HEX HD (BONDED)		2

- ITEM NOT ILLUSTRATED

IPL Figure 4: Orbital™ Flush Valve - Detail Parts List (Continued)

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1 2 3 4 5 6 7	EFF CODE	UNITS PER ASSY
4					
60	18478		. MOTOR SIDE ASSY		1
-65	18469		. . HOUSING, MOTOR SIDE		1
70	JFM101215-035		. . BEARING, FLANGED (TRUE PN JFM-101215-035)		1
-80	NAS1802-3-20		. . SCREW, HEX HD (BONDED)		3
-85	NAS1802-3-14		. . SCREW, HEX HD (BONDED)		2
90	2-163N0602-70		. O-RING		1
100	MS27595-012		. RETAINER, PACKING BACKUP		1
105	2-012N0602-70		. O-RING		1
110	18454		. SEAL, OUTLET SIDE		1
115	2-141N0602-70		. O-RING		1
120	2-137N0602-70		. O-RING		1
125	14330-212-1		. EXTRUSION, SILICONE		1
130	18489		. PLATE, FLUSH (TITANIUM)		1
140	18453		. SEAL, MOTOR SIDE		1
145	2-138N0602-70		. O-RING		1
150	2-134N0602-70		. O-RING		1
155	14330-212		. EXTRUSION, SILICONE		1
160	NAS1291C3M		. NUT, SELF LOCKING		3
165	NAS1149C0332R		. WASHER		3
170	18461		. DOWEL, HOLLOW		2
172	18479		DELETED		
175	18484		. SWIVEL PLATE		1
			ATTACHING PARTS		
180	NAS1291C3M		. NUT, SELF LOCKING		2
185	NAS1149C0332R		. WASHER		2
			* * *		
190	18483		. TUBE, VENT		1
195	2-110N0602-70		. O-RING		1
215	18593		. ELBOW, INLET		1
220	18480		. INSERT, LEADING EDGE		1
225	2-137N0602-70		. O-RING		1
227	18596		. STOP, ELBOW		2
			ATTACHING PARTS		
228	MS51957-17		. SCREW, PAN HD		2
229	NAS1149CN432R		. WASHER		2
			* * *		

- ITEM NOT ILLUSTRATED

IPL Figure 4: Orbital™ Flush Valve - Detail Parts List (Continued)

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1 2 3 4 5 6 7	EFF CODE	UNITS PER ASSY
4					
230	18451		. SPACER		2
235	18465		. PINION		1
240	18476-201		. GEAR		1
245	2-012N602-70		. . O-RING		1
250	JTEM06		. BEARING, PLASTIC (TRUE PN JTEM-06)		1
260	18472		. MOTOR PLATE ASSY (REPLD BY ITEM -260A)		1
-260A	18646		. MOTOR PLATE ASSY (REPLS ITEM 260)		1
265	18468		. . PLATE, MOUNTING		1
270	36035-3		DELETED		
-270A	36035-5		. . CABLE TIE		2
-272	CR2M		DELETED		
275	18471		DELETED		
-275A	18652		. . MOTOR		1
			ATTACHING PARTS		
280	NA0068A030006		. . SCREW, PAN HD * * *		4
285	18504-203		. . PCB, REED SWITCH		1
			ATTACHING PARTS		
290	MS51957-16		. . SCREW, PAN HD		3
295	MN1-4-12		. . INSULATOR, MOLDED NYLON (TRUE PN MNI-4-12)		3
300	FW0126A		. . WASHER, NYLON		3
305	NAS1149CN432R		. . WASHER		3
310	NAS1291C04M		. . NUT, SELF-LOCKING * * *		3
315	JS1-0809-06		. . BEARING, PLAIN (TRUE PN JSI-0809-06)		1

- ITEM NOT ILLUSTRATED

IPL Figure 4: Orbital™ Flush Valve - Detail Parts List (Continued)

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1 2 3 4 5 6 7	EFF CODE	UNITS PER ASSY
4					
325	18510-101		DELETED		
-325A	18510-301		. PCB ASSY, MAIN CONTROLLER (PRE SB 14330-514-38-001; REPLD BY ITEM 325C)	A	1
-325B	18510-401		. PCB ASSY, MAIN CONTROLLER (PRE SB 14330-514-38-001; REPLD BY ITEM 325C)	B	1
-325C	18960		. PCB ASSY, MAIN CONTROLLER (POST SB 14330-514-38-001; REPLS ITEM 325B) (INCLUDES SOFTWARE)	B	1
330	18579		. COVER, FCU (SW1,J1,J2)		1
			ATTACHING PARTS		
335	NAS1351C3-12		. SCREW, SKT HD CAP		3
340	NAS1149C0332R		. WASHER		3
345	MS21083C3		DELETED		
350	NAS1352C08-8		. SCREW, SKT HD CAP		2
355	NAS620C8L		. WASHER		2
			* * *		
360	18479		. O-RING		2
365	406736		DELETED		
370	18486		. HOUSING, FCU (ALT FOR ITEM -370A)		1
-370A	18977		. HOUSING, FCU (PRFD)		1
-375	CB9120V5		. MOUNT, CABLE TIE (BONDED)		2

- ITEM NOT ILLUSTRATED

SPECIAL PROCEDURES

Not Applicable

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REMOVAL

Not Applicable

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INSTALLATION

Not Applicable

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SERVICING

1. General

This section describes the periodic servicing to be performed on the Revolution™ Toilet in order to help meet its life expectancy.

Proper training, combined with routine servicing and maintenance, will significantly increase the in-service performance of the Revolution™ Toilet.

Routine visual inspection can be performed without removing the unit from the aircraft. Factors that must be considered when establishing frequency and decision to remove the unit to perform the noted maintenance include:

* Unit operating environment
* Unit current operational performance
* Accumulated flight hours
* Period of time between maintenance actions

Refer to paragraph A. for the Recommended Periodic Servicing Schedule.

A. Recommended Periodic Servicing Schedule

Table 14001 provides a recommended schedule for servicing. It is intended only as a convenient abbreviated guide, and does not pre-exempt or supplant instructions for CLEANING or CHECK section.

Table 14001: Recommended Servicing Schedule

Interval **		Inspection, Cleaning, -or- Maintenance	Action
Flight Hours	-or- Calendar Time		
- - -	2 - 4 weeks	Cleaning	Clean the toilets and waste lines. Refer to paragraph C., "Waste Line Cleaning Procedure" on page 14005.
- - -	2 years	Inspection	Inspect the rinse valve's inlet screen (IPL Figure 1, item 80). Refer to paragraph C., "Rinse Valve Inlet Screen Inspection Procedure" on page 14003.
- - -	3 years (C Check)	Cleaning	Disassemble and clean the toilet per CLEANING section.

** The servicing schedule shows recommended intervals, and can be adjusted as conditions warrant.

2. Recommended Periodic Inspection

A. These recommended periodic inspection procedures listed below will help keep the Revolution™ Toilet operating at its maximum performance.

Refer to Table 14001 on page 14002 for the recommended frequency to perform these procedures.

B. Required Equipment and Materials

(1) Required Equipment

Standard shop equipment and tools can be used to inspect the unit.

(2) Required Materials

Standard shop materials can be used to clean the unit.

Subtask 38-34-41-604-001-A01

C. Rinse Valve Inlet Screen Inspection Procedure

Inspect the rinse valve's inlet screen (IPL Figure 1, item 80) for the following conditions:

Table 14001: Periodic Check Requirements

DESCRIPTION	METHOD	CHECK	REQUIREMENTS	REMEDY
Rinse valve inlet screen	Visual	Tears in the screen	No damage permissible.	Replace.
	Visual	Damage to peripheral seal	No damage permissible.	Replace.
	Visual	Corrosion	No corrosion permissible.	Replace.
	Visual	Debris or foreign material build-up	No debris or build-up.	Refer to CLEANING section. If CLEANING is unsuccessful, replace the unit.
	Visual	Scale or mineral build-up clogging the screen.	No scale or mineral build-up permissible.	Refer to CLEANING section. If CLEANING is unsuccessful, replace the unit.

3. Recommended Periodic Cleaning

A. These recommended cleaning procedures listed below will help keep the Revolution™ Toilet operating at its maximum performance.

Refer to Table 14001 on page 14002 for the recommended frequency to perform these procedures.

B. Required Equipment and Materials

(1) Required Equipment

Standard shop equipment and tools can be used to clean the unit.

(2) Required Materials

Standard shop materials, along with special materials listed in Table 14002 can be used to clean the unit.

NOTE: Equivalent substitutes can be used for listed items.

Table 14002: Periodic Cleaning Materials

ITEM	DESCRIPTION	SOURCE
Vinegar, distilled white	Acetic acid 5% concentration	Commercially available
Tap water	- - -	Commercially available
Ice, crushed	Approx. 1-in (2.5 cm) pieces	Commercially available

C. Waste Line Cleaning Procedure

The following preventative cleaning procedure is recommended to reduce debris buildup in the vacuum system's waste lines.

Perform the following procedure at each toilet aboard the aircraft.

(1) Create a water / vinegar cleaning solution by mixing 1 part vinegar to 8 parts water.

NOTE: Each toilet requires approximately 2-1/2 gallons (9.5 L) of cleaning solution to perform this procedure.

(2) Fill the toilet bowl with approximately 1-1/2 gallons (5.7 L) of water / vinegar cleaning solution and allow to soak for 5 minutes, then flush the toilet.

The above process allows for efficient vinegar saturation in the waste lines while also allowing the toilet bowl and flush valve disk to be soaked.

(3) Wait 3 - 5 minutes to allow the water / vinegar cleaning solution to soak in the waste lines.

(4) Fill the toilet bowl approximately 1/2 full with crushed ice, then flush the toilet.

NOTE: It is very important that crushed ice is used as it will scrape away waste and mineral build-up. The ice should be crushed into approximately 1 inch pieces.

(5) Fill toilet assy with approximately 1 gallon (3.8 L) of water / vinegar cleaning solution and flush the toilet.

NOTE: The last flush of water / vinegar cleaning solution helps to clean any leftover residue in the waste lines.

(6) Optional: Allow the water / vinegar cleaning solution to remain in the waste tank overnight. This will help keep the waste tank surfaces clean.

4. Recommended Periodic Maintenance

Not Applicable

STORAGE AND TRANSPORTATION

TASK 38-34-41-550-801-A01

1. General

A. Overview

This section contains complete packing instructions for shipping and storage of the Revolution™ Toilet.

TASK 38-34-41-550-802-A01

2. Storage Materials

A. Required Equipment and Materials

Standard shop equipment and tools, along with tools and materials listed in Table 15001 can be used to store the assembly and its components.

NOTE: Equivalent substitutes can be used for listed items.

Table 15001: Storage Materials

ITEM	DESCRIPTION	SOURCE
Bag, plastic (clear polyethylene)	Size and thickness as required -or- per MIL-B-117	Uline 12575 Uline Drive Pleasant Prairie, WI 53158 Commercially available
Barrier material	MIL-B-121	Commercially available
Desiccant	MIL-D-3436 -or- MIL-D-3464	Commercially available
Tape, adhesive	UU-T-105 -or- PPP-T-60, Type III, Class 2	Commercially available

TASK 38-34-41-550-803-A01

3. Storage Instructions

A. Storing the Assembly

When an assembly is to be stored after overhaul, observe the following:

(1) Seal all assembly openings.

(2) Place the unit in the original shipping container.

If the original shipping container is not available, a wood framework can be built around the assembly. The complete structure shall be covered and sealed with plastic sheeting.

(3) Clearly mark the outside of the container with the assembly part number, serial number, and date of overhaul.

(4) Seal the container.

NOTE: A desiccant must be included if the assembly or component is not stored in a moisture-free area.

B. Storage Conditions

Do not store assembly exposed to direct sunlight, temperatures below 1°F (-17, 2°C), or over 170°F (76,6°C) for prolonged periods.

C. Long Term Storage

(1) If the toilet assembly is stored for a period of more than six (6) months, a thorough visual inspection is recommended before installation.

(2) If the toilet assembly is stored for a storage period that exceeds ten (10) years, it is also recommended to do an operational test before installation.

REWORK PROCEDURES

Not Applicable

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