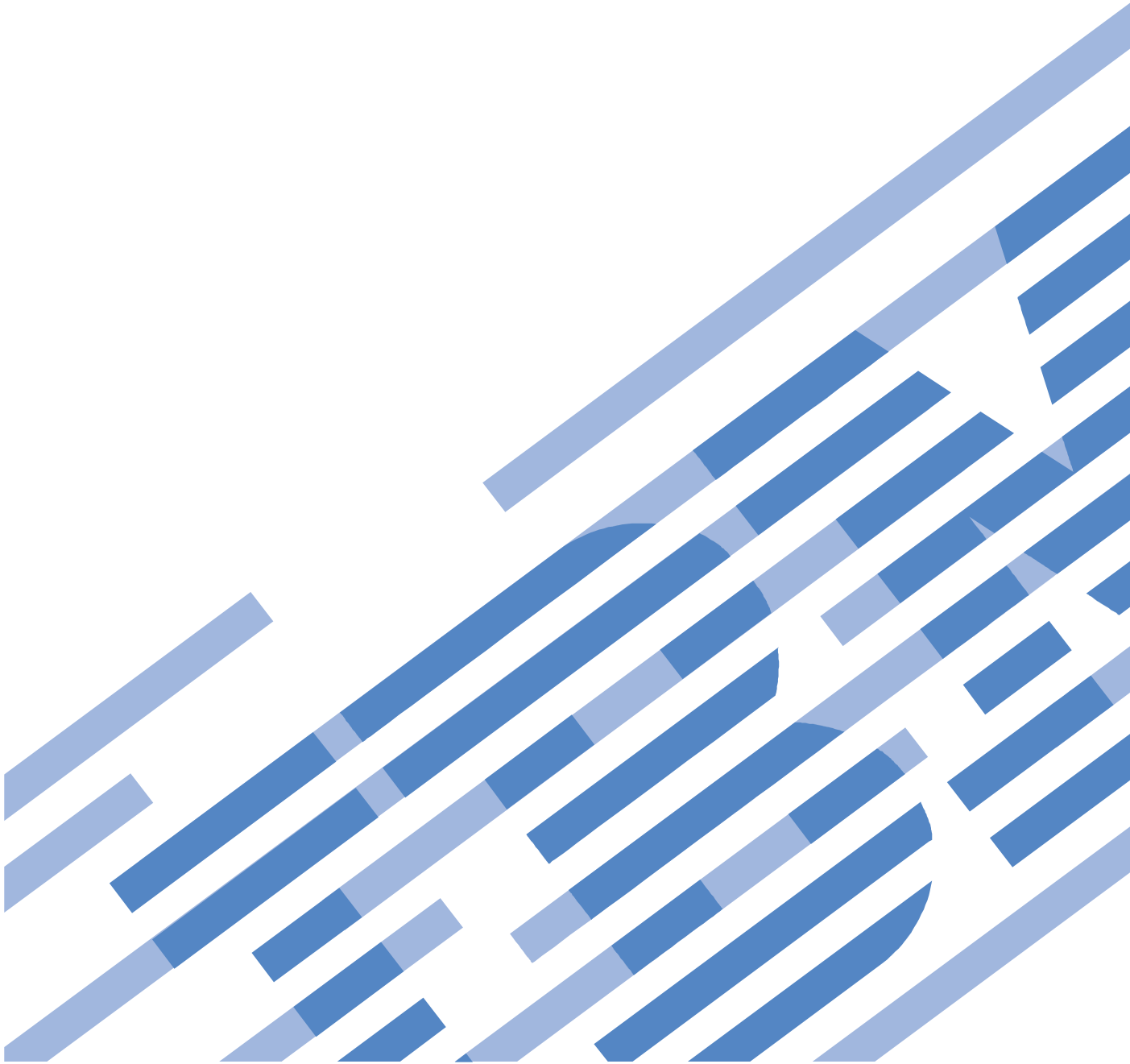


Power775 System Fill, Top Off, and Pressure Test Procedures

Last Modified 3/6/2012 3:54 PM



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1 GENERAL

1.1 Release / Revision History

Document Name	Date	PDF name	Description
Power775 System Fill, Top Off, and Pressure Test Procedures	Error! Reference source not found.	"p775_sys_fill_top_off_pres_tst.pdf"	Initial Release

Table 1 Release / Revision History

1.2 Where to find this document, and contents of the parent PDF

The current "Power775 System Fill, Top Off, and Pressure Test Procedures" document is "p775_sys_fdt.pdf" which is to be downloaded from:

InfoCenter Website: <http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7ee2/p7ee2kickoff.htm>

Click "PDF files for the IBM Power 775 (9125-F2C) removing and replacing parts"

Under "Fill and Drain Tool (FDT) procedures to support R&V FRUs", click "System" to download PDF "p775_sys_fill_top_off_pres_tst.pdf"

This is the only valid source for the latest "Power775 System Fill, Top Off, and Pressure Test Procedures" document.

1.3 Required Documents

Document	Doc Number	Location
Safety Notices http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7hdx/G229-9054.pdf	G229-9054	InfoCenter

Table 2 Required Documents

1.4 Abbreviations

Abbreviation	Definition	Details
BPA	Bulk Power Assembly	
BPD	Bulk Power Distributor	
CEC	Central Electronic Complex	Also referred to as the “node”.
DCCA	Distributed Conversion and Control Assembly	The power supplies for the CEC and DE are called the CEC DCCA and DE DCCA respectively.
DE	Disk Enclosure	
FRU	Field Replaceable Unit	
HPIC	High Power Interface Cable	DCCA power cable
LED	Light Emitting Diode	
LIC	Licensed Internal Code	
SAS	Serial Attached SCSI	Protocol used for direct attached storage
SSR	Systems Services Representative	IBM Service personnel
UEPO	Unit Emergency Power Off	
UPIC	Universal Power Interface Cable	Cable used for power and communication to the Power 775 Fill and Drain Tool (FDT).

Table 3 Abbreviations

2 POWER775 SYSTEM FILL PROCEDURE

2.1 Safety Notices

Read “Safety Notices“ available from InfoCenter:

<http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7hdx/G229-9054.pdf>

The following cautions apply to all Power775 service procedures:

CAUTION:

Energy hazard present and Shorting might result in system outage and possible physical injury. Remove all metallic jewelry before servicing. (C001)

CAUTION:

The doors and covers to the product are to be closed at all times except for service by trained service personnel. All covers must be replaced and doors locked at the conclusion of the service operation. (C013)

CAUTION:

Servicing of this product or unit is to be performed by trained service personnel only. (C032)

The following notices specifically pertain to this Power775 service procedure.

CAUTION: The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations involving the coolant or which may potentially expose you to the coolant. Refer to the MSDS for more information. (C037)

CAUTION: This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)



DANGER: Hazardous voltage present. Voltages present constitute a shock hazard, which can cause severe injury or death. (L004)



CAUTION: Protective eyewear is needed for the procedure. (L011)

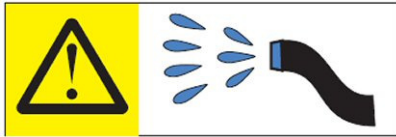
Power775 System Fill, Top Off, and Pressure Test Procedures
---- System Fill Procedure ----



DANGER: Heavy equipment—personal injury or equipment damage might result if mishandled. (L013)



CAUTION: Chemical resistant gloves are needed for this procedure. (L014)



DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

2.2 Background:

This document contains the procedure for filling an empty **IBM Power 775** system with conditioned water using an **IBM Power 775** Fill and Drain Tool (FDT). The successful execution of a **Power 775 System Pressure Test** procedure is required for this procedure to be performed.

Due to high packaging density and heat load, many components within the **Power 775** system are water cooled. The system and water cooled sub-components contain internal plumbing to route cooling water towards and carry heat away from these critical power components. In the event that a new **Power 775** system is to be installed and powered-on, the system must be filled with conditioned water prior to enabling full system operation. Until the system is filled with conditioned water, the **Power 775** cooling system is insufficient and will not be able to support normal system operation.

The system fill procedure should be the first service action that is completed on a **Power 775** frame after proper system installation and initial power-on. The system, with all sub-components installed, is shipped empty to the client location from IBM to eliminate the risk of damage from water leakage due to freeze expansion. To enable the system to regulate internal temperatures and provide adequate cooling to all components, a **Power 775 System Fill Procedure** must be executed.

When the **IBM Power775** system is powered-on (EPO-On), the system will come up in **Rack Standby** mode, in which the frame limited power and cooling functionality. The Bulk Power Controller (BPC) will be activated in an air-cooled mode, and the Bulk Power Regulators (BPR's) will be activated in a limited-power configuration; power will not be normally present on any other system components.

While the frame is in **Rack Standby** mode, the FDT may be activated and operated for pressure testing the system. To ensure that no system water is inadvertently leaked from the **Power 775** system after installation, the system must pass a system-level pressure test (**Power 775 System Pressure Test**) before the system can be filled. In the event that the system-level pressure test fails, each water-cooled component must be pressure tested individually to isolate and identify the failing component.

During the system fill procedure (**Power 775 System Fill Procedure**), WCU function will be manually controlled, and care must be taken to follow all instructions accurately to return the system to a normal cooling state at the conclusion of the procedure.

Near the termination of the system fill procedure, the system must be taken out of **Rack Standby** mode to initialize full-system cooling operation. Once the system has been filled during **Rack Standby** mode (approximately 95% full), the system is transferred into **BPA Standby** mode; the BPR's are enabled to provide more power to the system, and power is activated to all present Central Electronics Complexes (CEC's), Disk Enclosures (DE's), and WCU's. While in **BPA Standby** mode the BPC takes control of

WCU pumping function, and turns two (2) of the WCU pumps on to 1800 RPM. System filling is completed in **BPA Standby** mode.

Due to the large system volume on a fully configured **Power 775** system, up to six (6) system water containers may be used for a system fill procedure. The FDT internal volume is approximately 9 gallons; when water is being transferred from the FDT into the system during a system fill procedure, the FDT may be emptied up to three (3) times. This will require up to three (3) **IBM Power 775 Fill and Drain Tool (FDT) Tank Fill Procedures**, depending on system configuration, at some point in the system fill procedure. While the FDT is pumping water into the system, status will indicate the water level state within the FDT, and this procedure will identify when the FDT requires re-filling based on that status.

Reference Information:

IBM Power 775 FDT P/N:	45D6928
Hose assemblies/adapters required:	HA1 (45D8561) HA2 (45D8562) A2 (45D8566)

Approximate system water volume (minimum configuration): 46.8 L (12.4 U.S. gal)
Approximate system water volume (maximum configuration): 88.8 L (23.5 U.S. gal)

Estimated time to fully fill **IBM Power 775** system with FDT: 1 to 2 hours

NOTE: *Some steps in this procedure may be redundant due to other service operations being completed prior to this procedure. If a step has already been completed, verify that the step has been completed properly and proceed to the next step.*

2.3 Procedure:

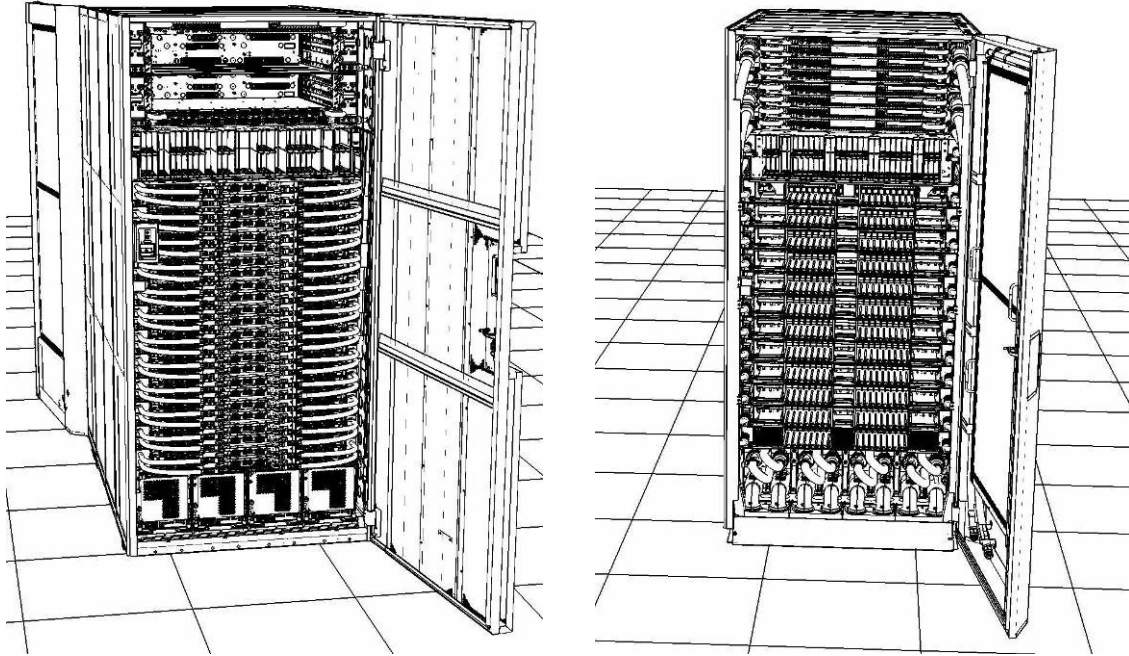
NOTE: If you already have the FDT powered on, proceed to **Step 14**. Otherwise, start procedure at **Step 1**.

Power775 System Fill, Top Off, and Pressure Test Procedures
---- System Fill Procedure ----

1. Identify the **Power 775** frame that requires service.

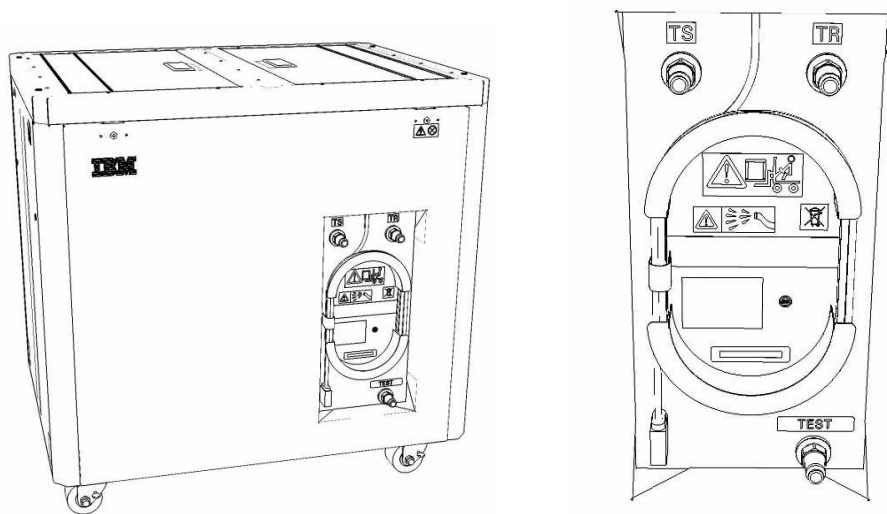
Verify that the system UEPO is set to **ON**, and the managing consoles (HMC and XCat) are powered on and communicating with the frame.

2. Open front and rear doors of the **Power 775** frame that requires service.



3. Bring the FDT to the front side of the **Power 775** frame that requires service.
4. Locate the panel of the FDT that contains the Universal Power and Information Cable (UPIC), as well as the **TS**, **TR**, and **TEST** water connections.

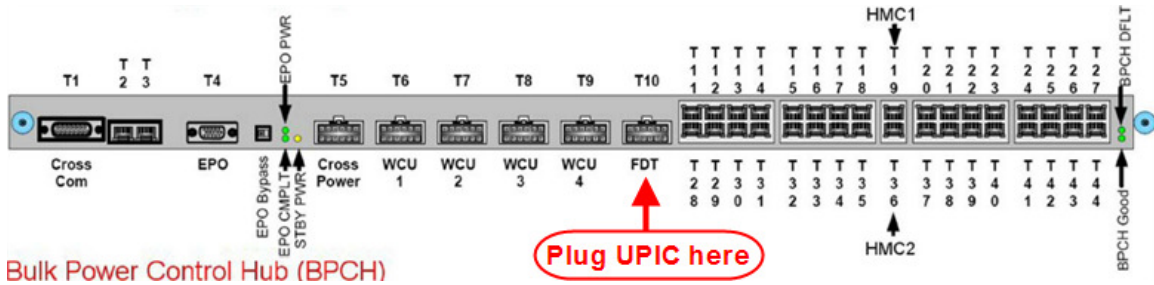
This side of the tool should be facing the front of the frame.



5. Un-wrap the FDT UPIC cable from the storage loop on the FDT.

6. Select BPC port for FDT

- If the lower BPA is not targeted for service, and is functional:
Plug the FDT UPIC cable into **port T10 of the lower BPC**.
- If the lower BPA is targeted for service, or is not functional:
Plug the FDT UPIC cable into **port T10 of the upper BPC**.



7. Login to the HMC with the User ID `hscroot`.

Use the HMC that is connected to the BPA where the FDT is plugged.

8. From the HMC left Navigation menu, expand **Systems Management** then select **Frames**.

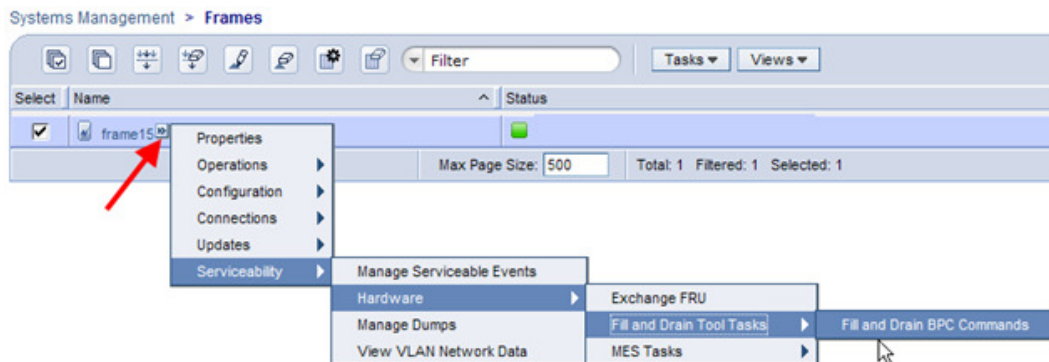
Verify frame serial number for the frame to be serviced.

9. In the **Frames** view on the HMC, place a checkmark in the **Select** column for the frame to be serviced.

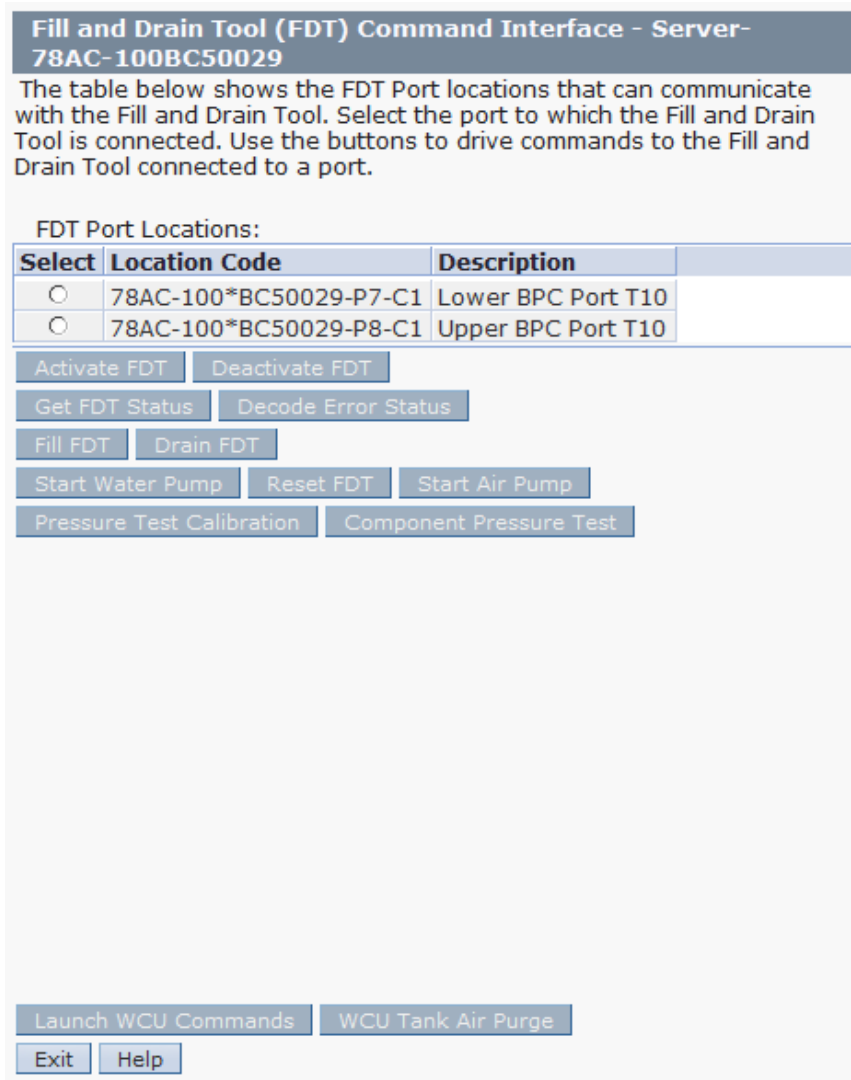
10. Verify that the frame **Status** is **Rack Standby/Rack Standby**.

- If frame **Status** reads **Rack Standby/Rack Standby** – continue to next step.
- If frame **Status** does not read **Rack Standby/Rack Standby** – action required. Contact your next level of support.

11. From the **Task** menu on the HMC, *select* **Serviceability** > **Hardware** > **Fill and Drain Tool Tasks** > **Fill and Drain Command Interface**



Fill and Drain Tool Command Interface will display. See below for a sample image of the interface (FDT deactivated).



12. Select the BPC port that the FDT was plugged into in **Step 6** from the **FDT Port Locations:** list.

13. *Click* the **Activate FDT** button.

- If the Activate FDT command is successful – OK. **Wait 30 seconds and continue to next step.**
- If the **Activate FDT** command fails – action required.

Click the **Deactivate FDT** button.

Wait 2 minutes and repeat **Step 13**. If the **Activate** command fails again, contact your next level of support.

14. Click the **Get FDT Status** button.

- If the **Get FDT Status** command is successful – OK.
See below for a sample status (does not reflect expected state)
- If the **Get FDT Status** command fails – action required.

Repeat **Step 14**. If the **Get FDT Status** command fails again, contact your next level of support.

Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

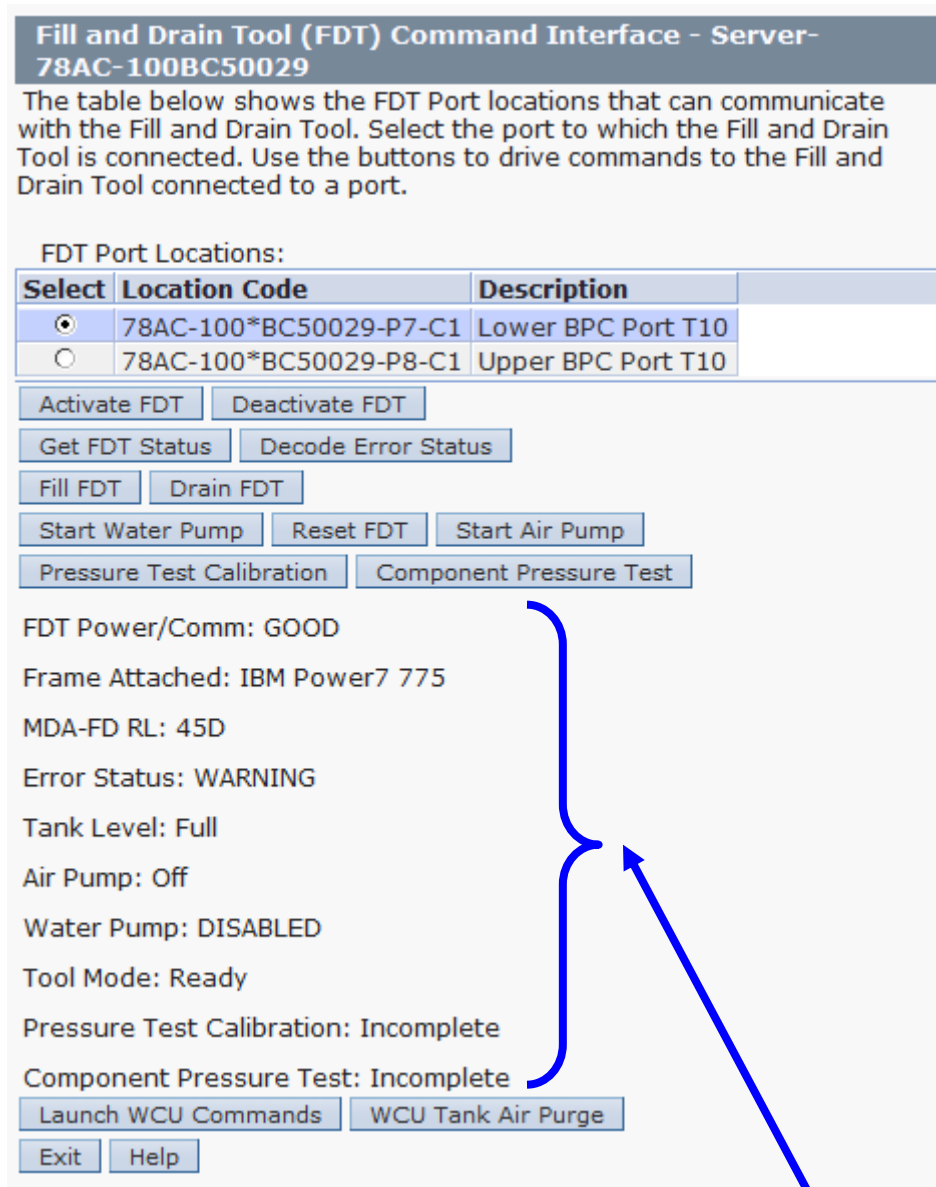
FDT Port Locations:

Select	Location Code	Description
<input checked="" type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10

Activate FDT Deactivate FDT
Get FDT Status Decode Error Status
Fill FDT Drain FDT
Start Water Pump Reset FDT Start Air Pump
Pressure Test Calibration Component Pressure Test

FDT Power/Comm: GOOD
Frame Attached: IBM Power7 775
MDA-FD RL: 45D
Error Status: WARNING
Tank Level: Full
Air Pump: Off
Water Pump: DISABLED
Tool Mode: Ready
Pressure Test Calibration: Incomplete
Component Pressure Test: Incomplete

Launch WCU Commands WCU Tank Air Purge
Exit Help



Sample FDT Status

15. Review the FDT status screen and ensure that the following status items are OK:

<u>Status Item</u>	<u>State</u>	<u>Action</u>
• Tool Mode:	Ready	– OK. Check next Status item.
• Error Status:	NONE	– OK. Check next Status item. WARNING – <i>click</i> the Decode Error Status button, record the information returned and check Tank Level. CRITICAL – <i>click</i> the Decode Error Status button, record the information returned and contact your next level of support.
• Tank Level:	Full or Upper Half	– OK. Check next Status item. Lower Half or Empty – action required. Exit this procedure and perform the Power 775 Fill and Drain Tool (FDT) Tank Fill Procedure . (in Section 7 of this document) Once FDT tank level is Full or Upper Half , return to this step and continue with procedure.
• Component Pressure Test:	Pass	– OK. Proceed to next step. This procedure should not be continued if the system pressure test did not Pass . Incomplete or Fail – action required. Exit this procedure and complete the Power775 System Pressure Test Procedure (in Section 3 of this document) Once a passing result is confirmed, return to this step and continue with procedure.

16. Verify that all system water connections are connected.

Verify that all WCU system water connections (upper 2 connections) are connected, with all valves open.

Power775 System Fill, Top Off, and Pressure Test Procedures
---- System Fill Procedure ----

17. Click the **Launch WCU Commands** button:

Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

FDT Port Locations:

Select	Location Code	Description
<input checked="" type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10

Activate FDT Deactivate FDT
Get FDT Status Decode Error Status
Fill FDT Drain FDT
Start Water Pump Reset FDT Start Air Pump
Pressure Test Calibration Component Pressure Test

FDT Power/Comm: GOOD
Frame Attached: IBM Power7 775
MDA-FD RL: 45D
Error Status: WARNING
Tank Level: Full
Air Pump: Off
Water Pump: DISABLED
Tool Mode: Ready
Pressure Test Calibration: Incomplete
Component Pressure Test: Incomplete

Launch WCU Commands WCU Tank Air Purge
Exit Help

18. In the **WCU Command Interface** window, select **WCU-1**, from the WCU locations:

hmc17: Fill and Drain Tool Command Interface - Mozilla Firefox: IBM Edi...
ibm.com https://hmc17.austin.ibm.com/hmc/wcl/T16fd#tableTop_2acc2acc

WCU Command Interface - Server-78AC-100BPC0227

The table below shows the available WCU (Water Conditioning Units) locations. Select the correct WCU location. Use the buttons to drive commands to the selected WCU.

WCU Locations:

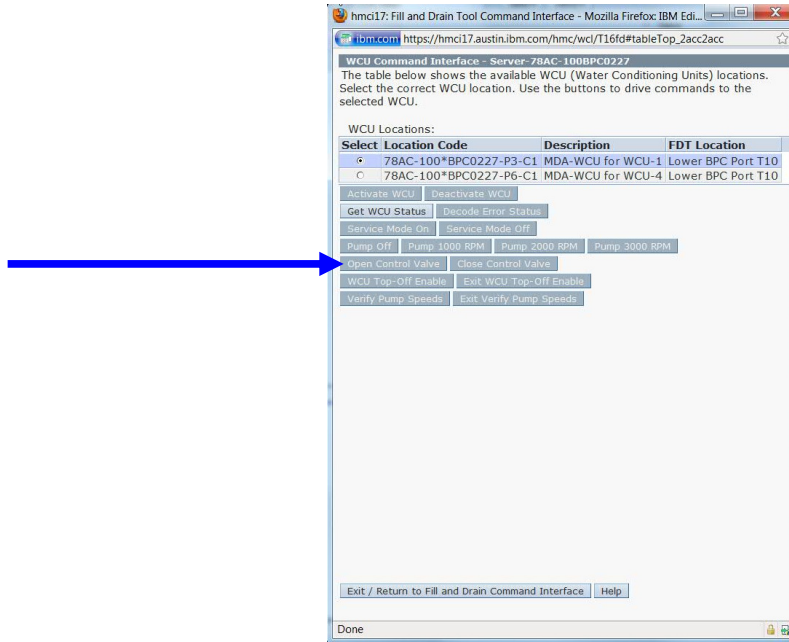
Select	Location Code	Description	FDT Location
<input checked="" type="radio"/>	78AC-100*BPC0227-P3-C1	MDA-WCU for WCU-1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BPC0227-P6-C1	MDA-WCU for WCU-4	Lower BPC Port T10

Activate WCU Deactivate WCU
Get WCU Status Decode Error Status
Service Mode On Service Mode Off
Pump Off Pump 1000 RPM Pump 2000 RPM Pump 3000 RPM
Open Control Valve Close Control Valve
WCU Top-Off Enable Exit WCU Top-Off Enable
Verify Pump Speeds Exit Verify Pump Speeds

Exit / Return to Fill and Drain Command Interface Help

Power775 System Fill, Top Off, and Pressure Test Procedures
---- System Fill Procedure ----

19. Click the **Open Control Valve** button, and wait 30 seconds before proceeding to **Step 20**.



Power775 System Fill, Top Off, and Pressure Test Procedures
 ---- System Fill Procedure ----

20. Click the **Get WCU Status** button and evaluate the status per below starting with Pump Speed:

Status	Value	Action Required	Comments
"Pump Speed"	0	Check "Control Valve Position".	The WCU pump should be off as part of initial system fill.
	> 0	Contact your next level of support.	

Status	Value	Action Required	Comments
"Customer Water Flow"	between 25 and 30	OK. Check "Control Valve Position"	The volumetric flow must be a positive number and should be 25 to 30 gallons per minute.
	less than 25	Contact your next level of support.	Flow rate is insufficient.
	less than 0	Contact your next level of support.	A negative flow rate indicates incorrect customer water hook up.

Status	Value	Action Required	Comments
"Control Valve Position"	between 90 and 100	OK. Check "WCU Service Mode".	The valve is at least 90% open.
	< 90	Wait 30 seconds and repeat Step 19 and Step 20 . If it is still less than 90 on 2 nd try, contact your next level of support.	This valve is less than 90% open.

Status	Value	Action Required	Comments
"Control Valve Position"	between 90 and 100	OK. Check "WCU Service Mode".	The valve is at least 90% open.
	< 90	Wait 30 seconds and repeat Step 19 and Step 20 . If it is still less than 90 on 2 nd try, contact your next level of support.	This valve is less than 90% open.

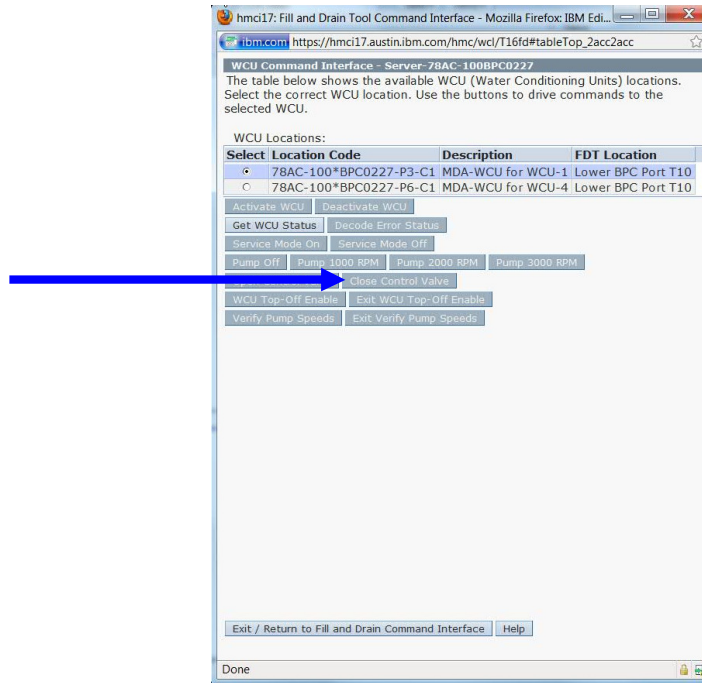
Status	Value	Action Required	Comments
"WCU Service Mode"	"OFF"	OK. Check "Error Status"	
	any other value	Contact your next level of support.	

Status	Value	Action Required	Comments
"Error Status"	"NONE"	OK. Check "Customer Supply Temperature" and "Customer Return Temperature"	
	any other value	Contact your next level of support.	

Status	Value	Action Required	Comments
"Customer Supply Temperature"	On an active system, should be colder than Return Temp.	This procedure assumes an initial system fill, so the return temperature is not expected to be much higher than the supply at this point. Proceed to Step 21 . Later on, after the frame is powered on, if the return temperature is observed to be colder than the supply temperature, contact your next level of support.	
"Customer Return Temperature"	On an active system, should be warmer than Supply Temp		

Power775 System Fill, Top Off, and Pressure Test Procedures
 ---- System Fill Procedure ----

21. Click the **Close Control Valve** button, and wait 30 seconds before proceeding to **Step 22**.



22. Click the **Get WCU Status** button and confirm the “Control Valve Position” is less than 5.

Status	Value	Action Required	Comments
“Control Valve Position”	between 0 and 5	OK. Proceed to next step.	The valve is closed (less than 5% open).
	> 5	Wait 30 seconds and repeat Step 21 and Step 22 . If it is still less than 90 on 2 nd try, contact your next level of support.	This valve is greater than 5% open.

23. If **WCU-2** is installed in the system:

Repeat **Step 18** through **Step 22** (selecting **WCU-2** in **Step 18**).

24. If **WCU-3** is installed in the system:

Repeat **Step 18** through **Step 22** (selecting **WCU-3** in **Step 18**).

25. If **WCU-4** is installed in the system:

Repeat **Step 18** through **Step 22** (selecting **WCU-4** in **Step 18**).

26. Exit the **WCU Command Interface** window.

27. Before proceeding, read required safety information:

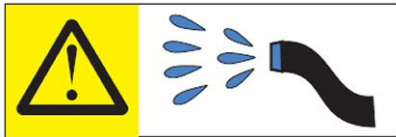
CAUTION: The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations involving the coolant or which may potentially expose you to the coolant. Refer to the MSDS for more information. (C037)



CAUTION: Protective eyewear is needed for the procedure. (L011)



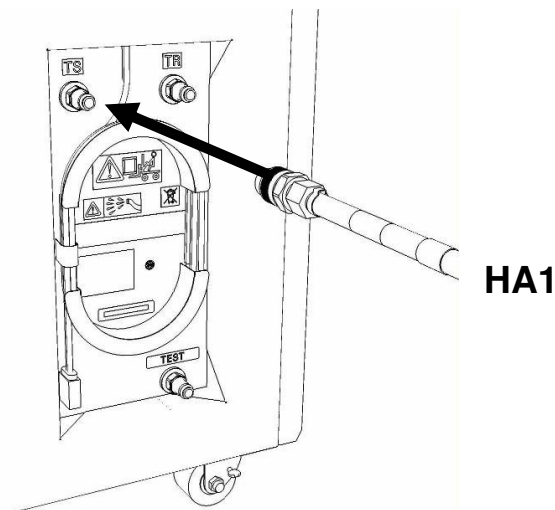
CAUTION: Chemical resistant gloves are needed for this procedure. (L014)



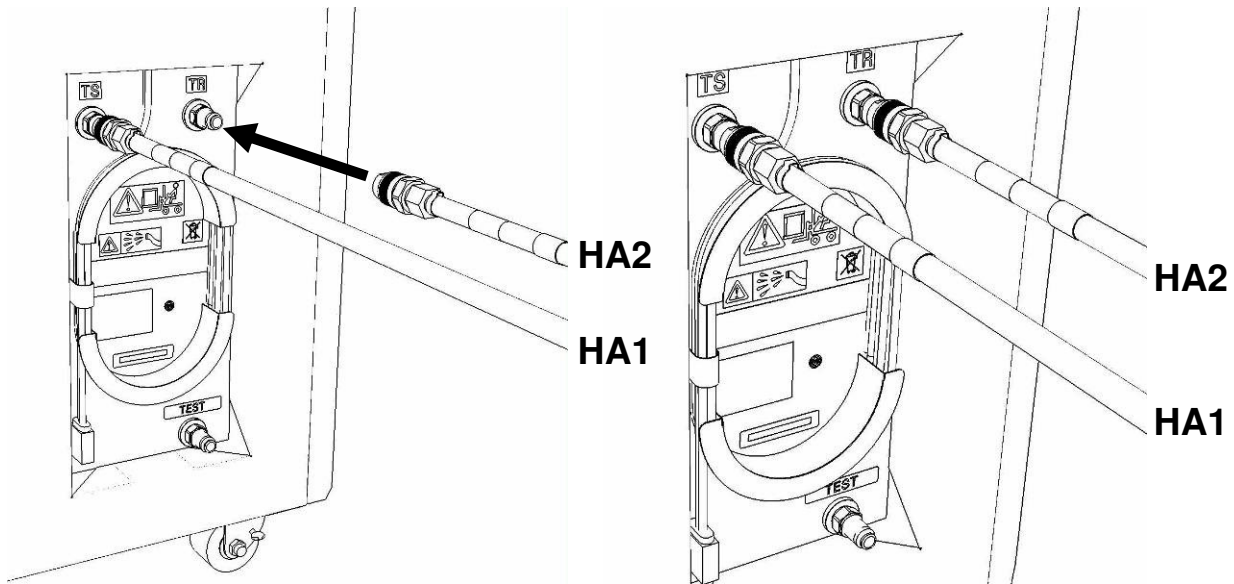
DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

28. Remove hose assembly **HA1** from the upper tool storage compartment.

Connect either end of hose assembly **HA1** to the **TS** connection on the front panel of the FDT.



29. Remove hose assembly **HA2** from the upper tool storage compartment.
Connect the end *without sight glass* to the **TR** connection on the FDT.

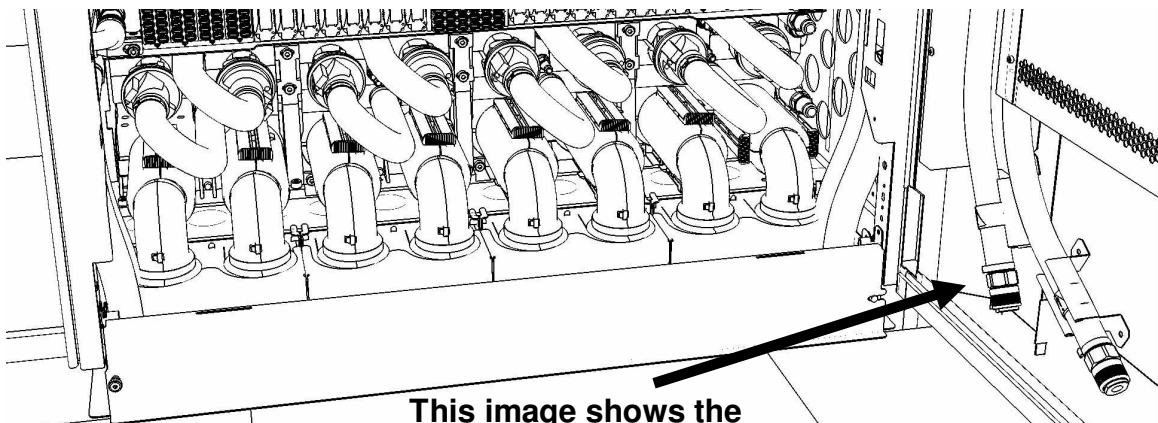


30. Pass the system (unattached) ends of **HA1** and **HA2** to the rear of the frame.

NOTE: *HA1 and HA2 can be passed **around** the frame or **over** the frame for service actions at the rear of the frame.*

31. Disconnect both RDHX hoses from system manifolds (if connected)

NOTE: *The initial system fill will be completed without the RDHX installed. The RDHX will be pressure tested and filled separately and installed at a later time (see WCII install document).*

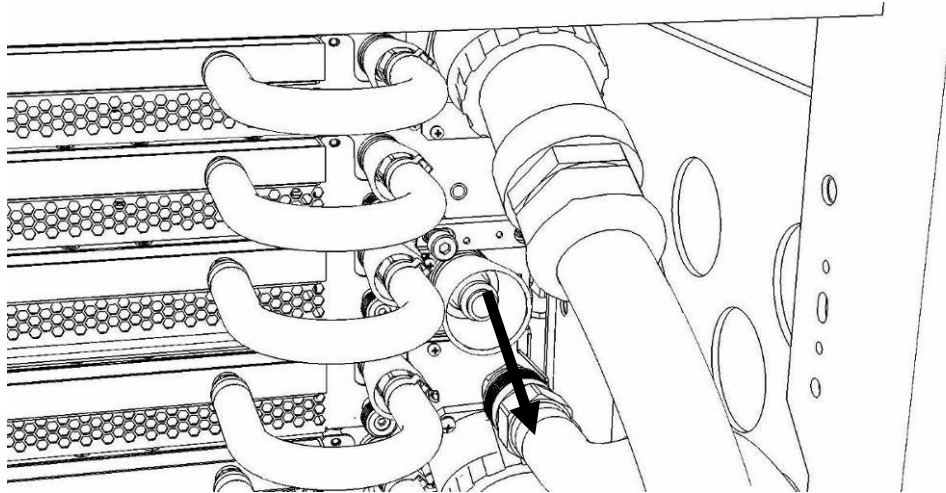


**This image shows the
RDHX not connected.**

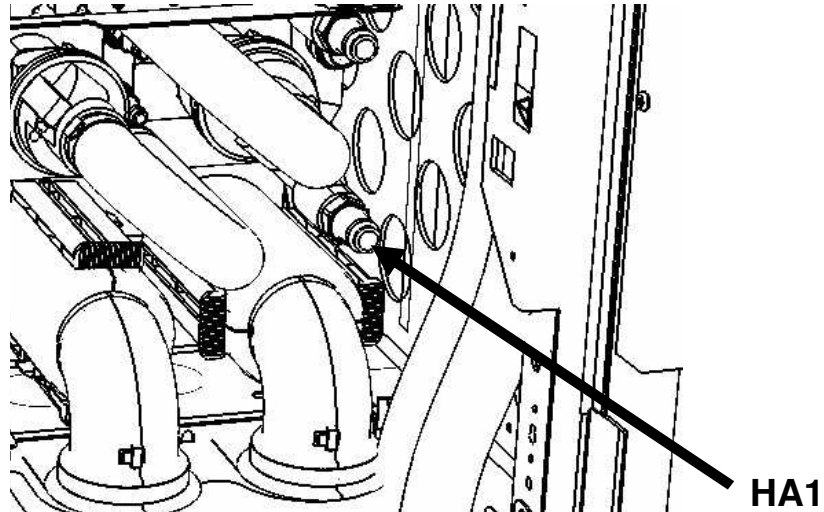
Power775 System Fill, Top Off, and Pressure Test Procedures
---- System Fill Procedure ----

32. Disconnect the water connection on the right side of the upper BPE (hose connection to return manifold).

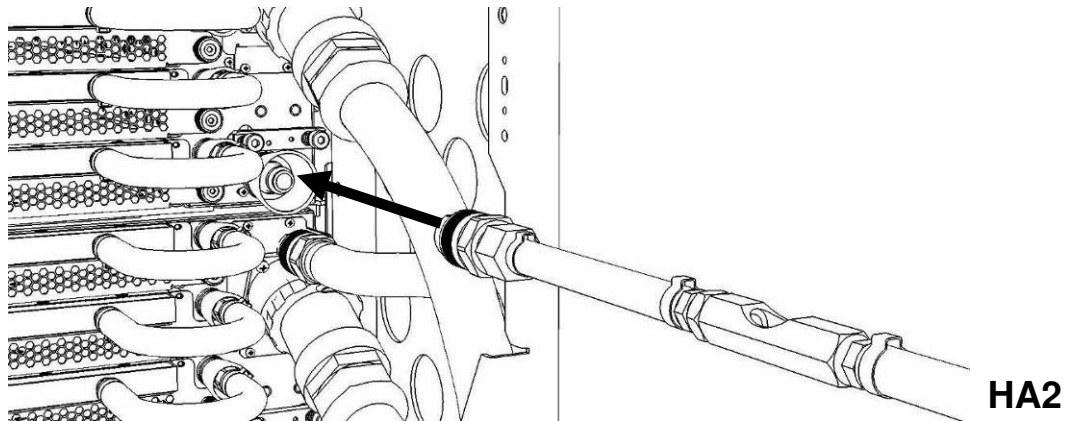
All other hoses on the upper and lower BPE should remain connected.



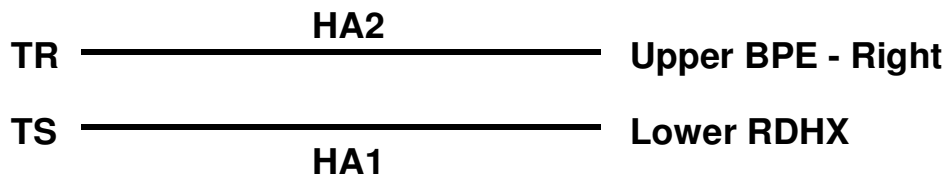
33. Connect hose assembly **HA1** to the lower RDHX manifold connection.



34. Connect the unattached end of hose assembly **HA2** with *sight glass* to the right side water connection of the upper BPE.



35. Ensure all hose connections are made properly and securely.



36. On the FDT panel, *click* the **Start Water Pump** button.

The **Get FDT Status** button may be *clicked* to examine FDT status.

NOTE: *The water pump will shut off after 30 minutes of run time.*

NOTE: *This step will transfer a large amount of water into the system. The FDT will likely go empty and require refilling.*

CAUTION: **This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)**

37. Inspect the sight glass in hose assembly **HA2**.

NOTE: *For a system fill, a full sight glass in this step **does not** indicate a full system.*

This step will fill the system enough so that the WCU pumps can be turned on.

Expected sight glass behavior

- Sight glass will start out full of air while the component is being purged of air.
- After some period of time, water will start passing through the sight glass in an air/water mixture.
- Eventually the sight glass will become full of water, with intermittent small air bubbles.

Full sight glass definition

- The sight glass is considered full of water **when** water flow is obvious (white ball pinned in direction of FDT) **and** no large bubbles of air are observed.
- If the above description is observed and the water appears cloudy, this is also considered full.

38. If the water pump has stopped unexpectedly without *clicking* the **Reset FDT** button:

Click Get Status and ensure that the following status items are OK:

<u>Status Item</u>	<u>State</u>	<u>Action</u>
• Tool mode:	Ready – OK. Check next Status item.	
	Tool mode: System/Component Fill Mode – water pump still running. Proceed to Step 39 .	
• Tank Level:	Full, Upper Half, or Lower Half – OK. Check next Status Item.	
	Empty – action required. FDT must be re-filled.	
	Exit this procedure and complete a Power 775 Fill and Drain Tool (FDT) Tank Fill Procedure .	

Once FDT tank level is **Full** or **Upper Half** return to **Step 18** and continue with procedure.

- **Error Status:** **NONE** – OK. Proceed to next step.

WARNING – *click* the **Decode Error Status** button, record information returned and proceed to next step.

CRITICAL – *click* the **Decode Error Status** button, record information returned and contact your next level of support.

39. If the sight glass in **HA2** never becomes full of water:

Ensure all hose connections in **Step 28** through **Step 35** are made properly.

Complete the diagnostics in **Step 38**.

- If the sight glass in **HA2** becomes full of water, continue with procedure.
- If the sight glass in **HA2** does not become full of water, contact your next level of support.

40. When the sight glass in **HA2** has been mostly solid water for 60 seconds:

Click the **Reset FDT** button (on the FDT Panel).

41. *Click* the **Get FDT Status** button and review the following:

- **Tool mode:** **Ready** – OK. Check Error Status.

System/Component Fill Mode – water pump still running. Repeat **Step 40**.

- **Error Status:** **NONE** – OK. Proceed to next step.

WARNING – *click* the **Decode Error Status** button, record information returned and proceed to next step.

CRITICAL – *click* the **Decode Error Status** button, record information returned and contact your next level of support.

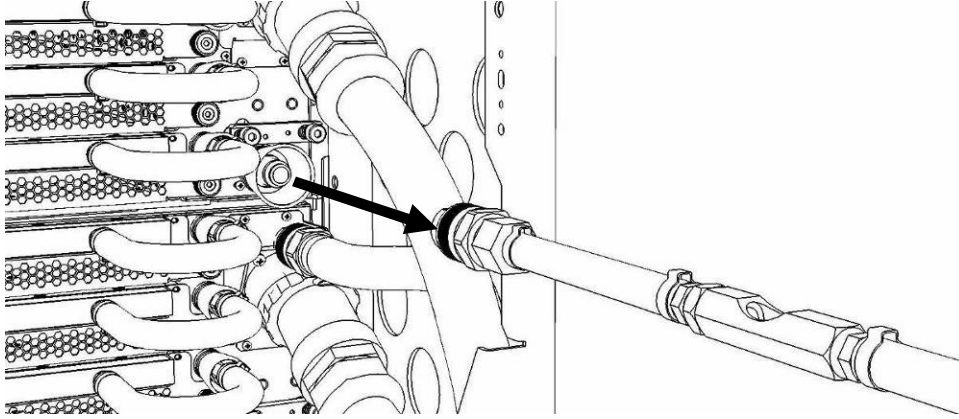
42. The first section of the system fill procedure has completed successfully.

The system has been filled to approximately 60% full.

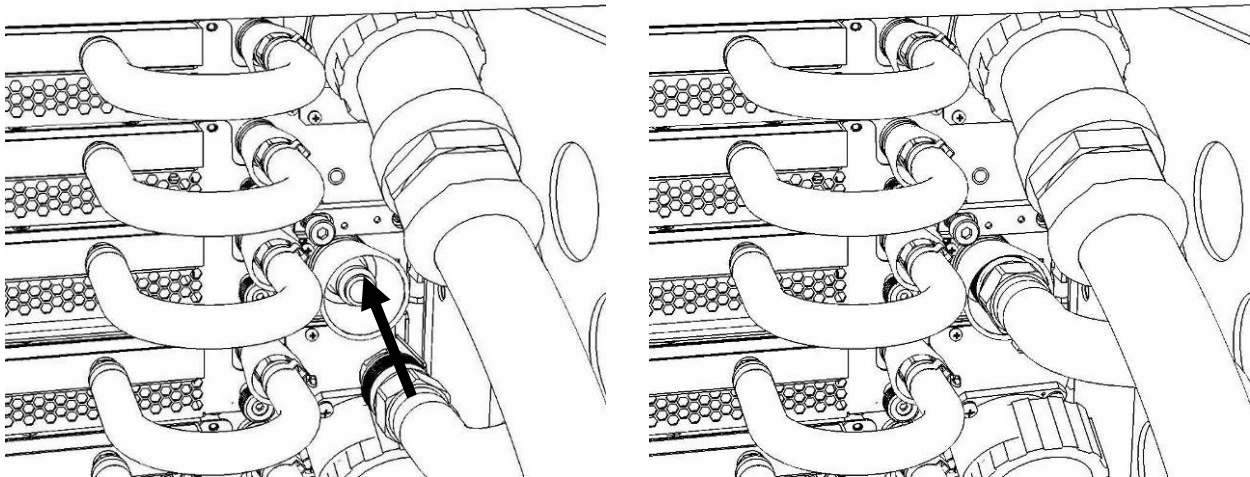
Proceed to **Step 43**.

43. Disconnect hose assembly **HA2** (sight glass end) from the right side water connection of the upper BPE.

Leave **HA2** at the rear side of the frame.



44. Re-connect system water connection to the right side water connection of the upper BPE.



45. On the FDT Commands panel, *click* the **Launch WCU Commands** button.

This will launch a separate command window for WCU operations. Below is a representative image of the WCU Commands interface.

WCU Command Interface - Server-78AC-100BPC0227

The table below shows the available WCU (Water Conditioning Units) locations. Select the correct WCU location. Use the buttons to drive commands to the selected WCU.

WCU Locations:

Select	Location Code	Description	FDT Location
<input type="radio"/>	78AC-100*BPC0227-P3-C1	MDA-WCU for WCU-1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BPC0227-P6-C1	MDA-WCU for WCU-4	Lower BPC Port T10

Activate WCU Deactivate WCU

Get WCU Status Decode Error Status

Service Mode On Service Mode Off

Pump Off Pump 1000 RPM Pump 2000 RPM Pump 3000 RPM

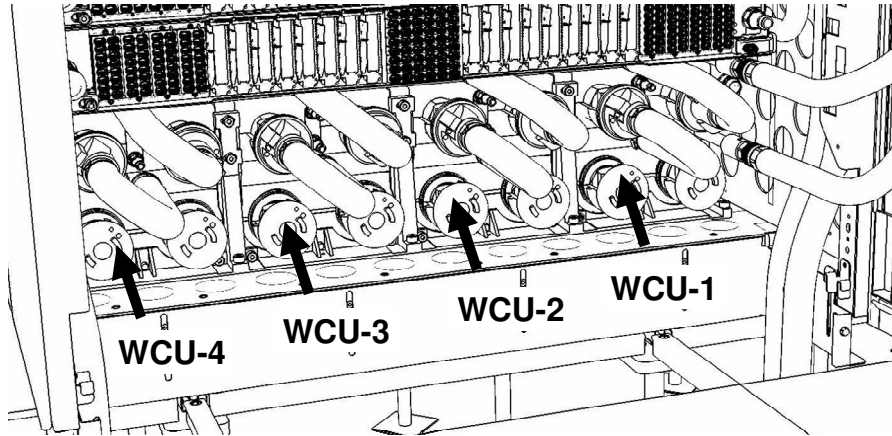
Open Control Valve Close Control Valve

WCU Top-Off Enable Exit WCU Top-Off Enable

Verify Pump Speeds Exit Verify Pump Speeds

Exit / Return to Fill and Drain Command Interface Help

46. Identify all WCU's installed in the system using image and location code information listed below.



WCU-1 Location Code: **-P3-C1**

WCU-2 Location Code: **-P4-C1**

WCU-3 Location Code: **-P5-C1**

WCU-4 Location Code: **-P6-C1**

47. For **WCU-1**, select WCU location code **-P3-C1** (**MDA-WCU** for **WCU-1**).

48. *Click* the **Activate WCU** button (for **WCU-1**, location code **-P3-C1**)

Verify the **MDA PWR** LED has been lit on **WCU-1** (located on front of WCU - MDA).

- If the **Activate WCU** command is successful – OK. Proceed to next step.
- If the **Activate WCU** command fails or **MDA PWR** LED not lit – action required.

Click the **Deactivate WCU** button (for **WCU-1**, location code **-P3-C1**)

Repeat **Step 48**. If the **Activate** command fails again, contact your next level of support.

49. *Click* the **Get WCU Status** button (for **WCU-1**, location code **-P3-C1**)

- If the **Get WCU Status** command is successful – OK. Proceed to next step.
See below for a sample status (does not reflect expected state)

- If the **Get WCU Status** command fails – action required.

Repeat **Step 49**. If the **Get WCU Status** command fails again, contact your next level of support.

WCU Command Interface - Server-78AC-100BPC0227

The table below shows the available WCU (Water Conditioning Units) locations. Select the correct WCU location. Use the buttons to drive commands to the selected WCU.

WCU Locations:

Select	Location Code	Description	FDT Location
<input checked="" type="radio"/>	78AC-100*BPC0227-P3-C1	MDA-WCU for WCU-1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BPC0227-P6-C1	MDA-WCU for WCU-4	Lower BPC Port T10

Activate WCU Deactivate WCU

Get WCU Status Decode Error Status

Service Mode On Service Mode Off

Pump Off Pump 1000 RPM Pump 2000 RPM Pump 3000 RPM

Open Control Valve Close Control Valve

WCU Top-Off Enable Exit WCU Top-Off Enable

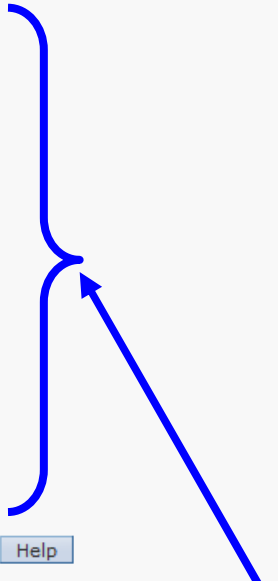
Verify Pump Speeds Exit Verify Pump Speeds

Pump Speed (RPM): 2067
Control Valve Position (percent open): 32
Control Valve Calibration: Off

WCU Tank Level: Full
WCU Service Mode: Off
Error Status: NONE

System Supply Temperature (C): 16.55
System Return Temperature (C): 20.13
Customer Supply Temperature (C): 7.15
Customer Return Temperature (C): 19.39
Customer Water Flow (GPM): 2.83

Exit / Return to Fill and Drain Command Interface Help



Sample WCU Status

Above status is a **sample status**, and does not reflect the target WCU state.

When the WCU is first activated, errors will likely be present.

Disregard the following errors:

WARNING/CRITICAL: *click* Decode Error Status:

Reservoir 0 or **Reservoir 1:** Due to WCU low water or empty – OK.

If any other errors are present, contact your next level of support.

50. Wait up to three (3) minutes for **Control Valve Calibration** to complete.

- **Control Valve Calibration:** **On** or not visible – wait 3 minutes.
Off – proceed to next step.

Wait 3 minutes before proceeding to **Step 51**.

51. Click the **Service Mode On** button (for **WCU-1**, location code **–P3-C1**)

- If the **Service Mode On** command is successful – OK. Continue to next step.
- If the **Service Mode On** command fails – action required: repeat **Step 51**. If the **Service Mode On** command fails again, contact your next level of support.

52. Click the **Get WCU Status** button. Review the following for OK:

<u>Status Item</u>	<u>State</u>	<u>Action</u>
• WCU Service Mode:	Yes – OK. Check next Status item. No – action required.	Repeat Step 51 . If action fails again, contact your next level of support.
• Error Status:	NONE – OK. Proceed to next step. WARNING – <i>click</i> the Decode Error Status button, record information returned and proceed to next step. CRITICAL – <i>click</i> the Decode Error Status button, record information returned and contact your next level of support.	

53. Click the **Close Control Valve** button (for **WCU-1**, location code **–P3-C1**)

54. Connect the unattached end of hose assembly **HA2** with *sight glass* to adapter **A2**.

55. Click the **Exit / Return to Fill and Drain Command Interface** button.

56. Click the **Start Water Pump** button.

The **Get FDT Status** button may be *clicked* to examine FDT status.

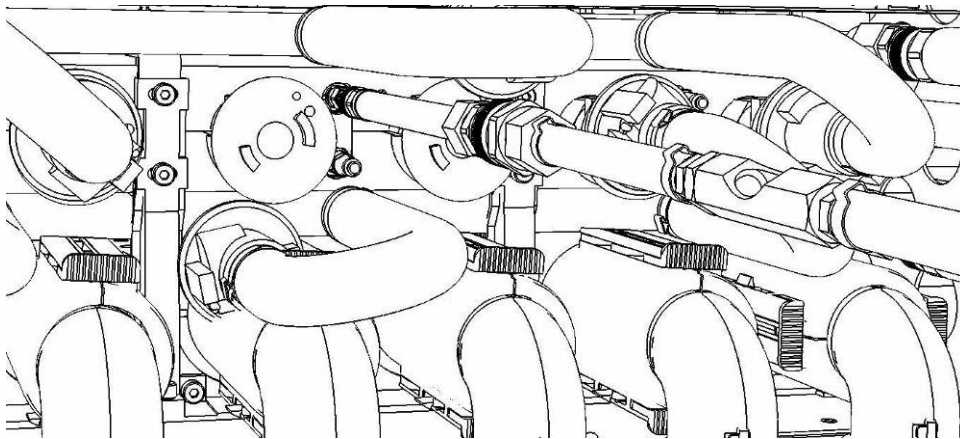
NOTE: The water pump will shut off after 30 minutes of run time.

NOTE: This step will transfer a large amount of water into the system. The FDT will likely go empty and require refilling.

CAUTION: This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)

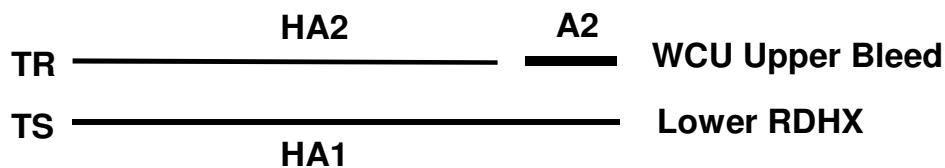
57. Connect the **HA2/A2** assembly the **upper** bleed connection of **WCU-1**.

Disregard WCU position in below image – generic image for reference only



58. **HA1** will remain on lower RDHX manifold connection (**Step 32**).

59. Ensure all hose connections are made properly and securely.



60. Inspect the sight glass in hose assembly **HA2**.

Expected sight glass behavior

- Sight glass will start out full of air while the component is being purged of air.
- After some period of time, water will start passing through the sight glass in an air/water mixture.
- Eventually the sight glass will become full of water, with intermittent small air bubbles.

Full sight glass definition

- The sight glass is considered full of water **when** water flow is obvious (white ball pinned in direction of FDT) **and** no large bubbles of air are observed.
- If the above description is observed and the water appears cloudy, this is also considered full.

61. If the water pump has stopped unexpectedly without *clicking* the **Reset FDT** button:

Click the **Get FDT Status** button and review the following for OKI:

<u>Status Item</u>	<u>State</u>	<u>Action</u>
• Tool mode:	Ready – OK. Check next Status item.	
		Tool mode: System/Component Fill Mode – water pump still running. Proceed to Step 5 .
• Tank Level:	Upper Half or Lower Half – OK. Check next Status item.	
	Empty – action required.	On the WCU Panel, <i>click</i> the Pump Off button. Complete a Fill and Drain Tool (FDT) Tank Fill Procedure until the FDT tank level is Upper Half . Return to Step 56 (also Step 28 and 29), continue with procedure at most recent WCU pump speed .
• Error Status:	NONE – OK. Proceed to next step.	
		WARNING – <i>click</i> the Decode Error Status button, record information returned and proceed to next step. CRITICAL – <i>click</i> the Decode Error Status button, record information returned and contact your next level of support.

62. When the sight glass in **HA2** has been mostly solid water for 60 seconds, proceed to the next step.

63. Click the **Launch WCU Commands** button (if necessary).

64. For **WCU-1**, select WCU location code **-P3-C1 (MDA-WCU for WCU-1)**.

65. Click the **Pump 1000 RPM** button (for **WCU-1**, location code **-P3-C1**)

66. Click the **Get WCU Status** button. Review the following for OK:

<u>Status Item</u>	<u>State</u>	<u>Action</u>
• Pump Speed (RPM):	1000 +/- 20 - OK. Check next Status item.	
	0 – action required (except on Step 69– Pump Off)	
	Repeat Step 66 . If unsuccessful again, contact your next level of support.	
• Error Status:	NONE – OK. Proceed to next step.	
	WARNING – click the Decode Error Status button, record information returned and proceed to next step.	
	CRITICAL – click the Decode Error Status button, record information returned and contact your next level of support.	

NOTE: The FDT will likely go empty during this part of the procedure. Refer to **Step 51**.

67. When sight glass is full with **Pump Speed (RPM): 1000**:

Repeat **Step 60** through **Step 66**, WITH THE FOLLOWING CHANGE:

At **Step 65**, *click* the **Pump 2000 RPM** button.

(expected pump speed in status = 2000).

68. When sight glass is full with **Pump Speed (RPM): 2000**:

Repeat **Step 60** through **Step 66**, WITH THE FOLLOWING CHANGE:

At **Step 65**, *click* the **Pump 3000 RPM** button.

(expected pump speed in status = 3000).

69. When sight glass is full with **Pump Speed (RPM): 3000**:

Repeat **Step 60** through **Step 66**, WITH THE FOLLOWING CHANGE:

At **Step 65**, *click* the **Pump Off** button.

(expected pump speed in status = 0).

70. *Click* the **Deactivate WCU** button (for **WCU-1**, location code **-P3-C1**)

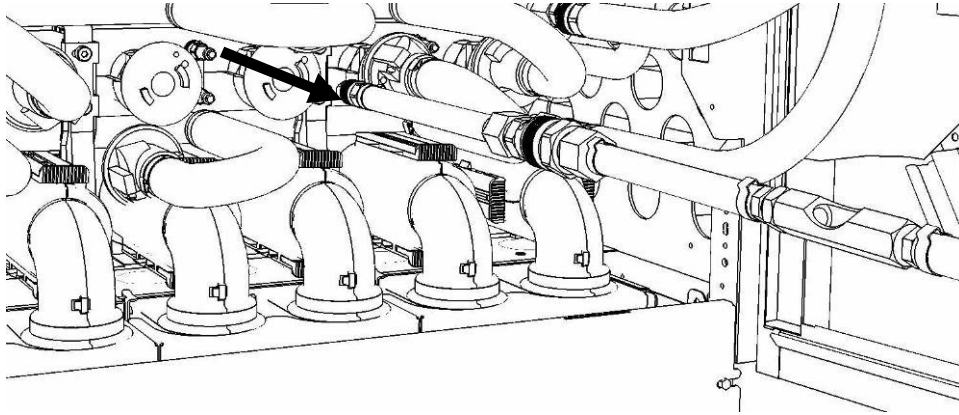
- If the **Deactivate WCU** command is successful – OK. Continue to next step.
- If the **Deactivate WCU** command fails or **MDA PWR** lit – action required.

Repeat **Step 70**. If the **Deactivate WCU** command fails again, contact your next level of support.

71. Disconnect the system end of the **HA2/A2** assembly the upper bleed connection of **WCU-1**.

FDT water pump will continue running after this step.

Disregard WCU position in below image – generic image for reference only



72. If **WCU-2** is installed in the system (see **Step 45** identification):

Repeat **Step 47** through **Step 71** for **WCU-2**.

All **WCU-1** references should be changed to **WCU-2**.

73. If **WCU-3** is installed in the system (see **Step 35** identification):

Repeat **Step 47** through **Step 71** for **WCU-3**.

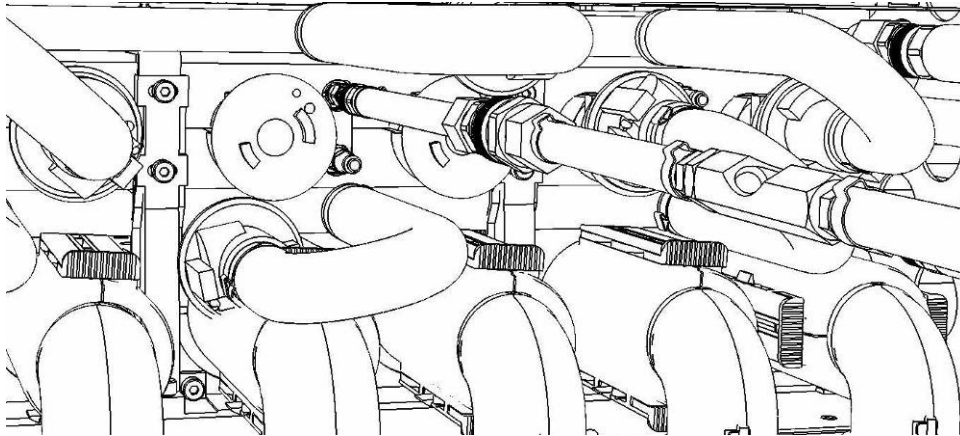
All **WCU-1** references should be changed to **WCU-3**.

74. If **WCU-4** is installed in the system (see **Step 35** identification):

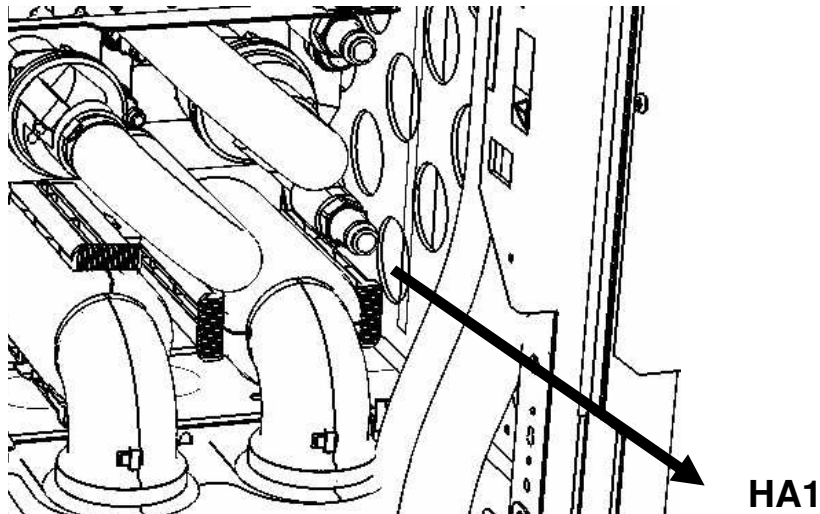
Repeat **Step 47** through **Step 71** for **WCU-4**.

All **WCU-1** references should be changed to **WCU-4**.

75. Reconnect the **HA2/A2** assembly the **upper** bleed connection of **WCU-1**.
FDT water pump will continue running during **Step 75** through **Step 78**.
Disregard WCU position in below image – generic image for reference only



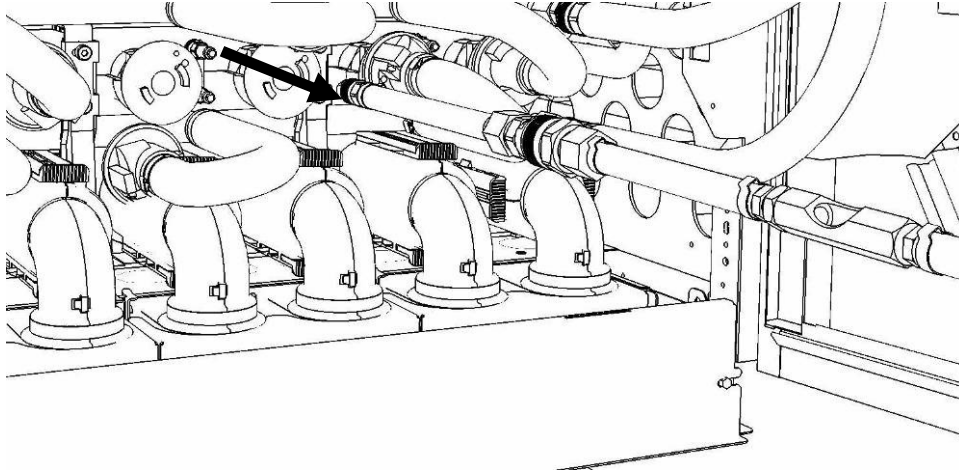
76. Disconnect hose assembly **HA1** from the lower RDHX manifold connection.



77. When the ball in the **HA2** sight glass is free to move, proceed to **Step 78**.
Hold sight glass vertically for best indication.

78. Disconnect the system end of the **HA2/A2** assembly the upper bleed connection of **WCU-1**.

Disregard WCU position in below image – generic image for reference only



79. Click the **Exit / Return to Fill and Drain Command Interface** button.

80. Click the **Reset FDT** button.

81. Click the **Get FDT Status** button and review the following for OK:

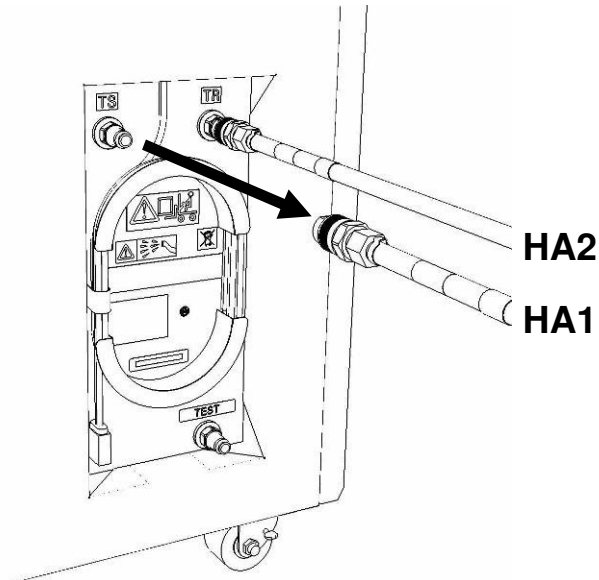
<u>Status Item</u>	<u>State</u>	<u>Action</u>
• Tool mode:	Ready – OK. Check next Status item.	
		Tool mode: System/Component Fill Mode – water pump still running. Repeat Step 79 .
• Error Status:	NONE – OK. Proceed to next step.	
		WARNING – <i>click</i> the Decode Error Status button, record information returned and proceed to next step.
		CRITICAL – <i>click</i> the Decode Error Status button, record information returned and contact your next level of support.

At this point, all WCU's have been filled by the FDT, and the WCU's have provided additional system filling as their pumps were run. The system now contains enough water to support CEC turn-on function.

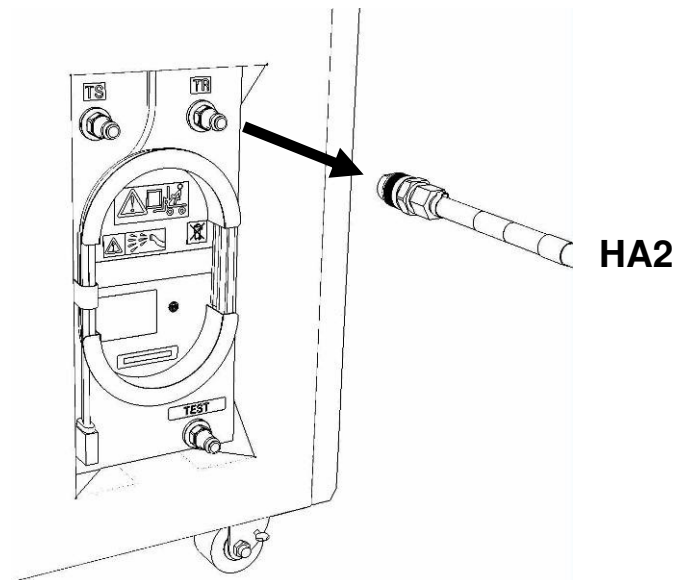
NOTE: Once BPA standby has been achieved (as seen in the **Frame Status** on the HMC as **Standby/Standby**), complete a **System Top-Off Procedure**.

82. Disconnect adapter **A2** from hose assembly **HA2**.

83. Disconnect the FDT end of **HA1** from **TS** on the FDT.



84. Disconnect the FDT end of **HA2** from **TR** on the FDT.



85. Place all hose assemblies and adapters in their appropriate locations within the FDT storage enclosure.

86. Determine whether the FDT will be used for another procedure:

- If the FDT will be used for another procedure, leave tool activated and go to that procedure now; skip the remaining steps of this procedure.
- If the FDT requires no further use - proceed to the next step.

87. Click the **Deactivate FDT** button.

- If the **Deactivate FDT** command is successful – OK. Proceed to next step.
- If the **Deactivate FDT** command fails– action required.

Repeat **Deactivate FDT**. If the **Deactivate FDT** command fails again, contact your next level of support.

88. Disconnect FDT UPIC power cable from port T10 of BPC used.

Wrap the UPIC cable in appropriate cable storage location on FDT.

89. If this procedure was referenced from another procedure, return to parent procedure.

2.4 End of Power775 System Fill Procedure

3 POWER775 SYSTEM PRESSURE TEST PROCEDURE

3.1 Safety Notices

Read “Safety Notices“ available from InfoCenter:

<http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7hdx/G229-9054.pdf>

The following cautions apply to all Power775 service procedures:

CAUTION:

Energy hazard present and Shorting might result in system outage and possible physical injury. Remove all metallic jewelry before servicing. (C001)

CAUTION:

The doors and covers to the product are to be closed at all times except for service by trained service personnel. All covers must be replaced and doors locked at the conclusion of the service operation. (C013)

CAUTION:

Servicing of this product or unit is to be performed by trained service personnel only. (C032)

The following notices specifically pertain to this Power775 service procedure.

CAUTION: The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations involving the coolant or which may potentially expose you to the coolant. Refer to the MSDS for more information. (C037)

CAUTION: This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)



DANGER: Hazardous voltage present. Voltages present constitute a shock hazard, which can cause severe injury or death. (L004)



CAUTION: Protective eyewear is needed for the procedure. (L011)

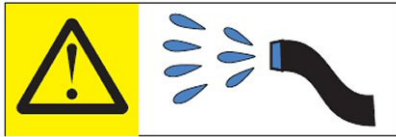
Power775 System Fill, Top Off, and Pressure Test Procedures
---- System Pressure Test Procedure ----



DANGER: Heavy equipment—personal injury or equipment damage might result if mishandled. (L013)



CAUTION: Chemical resistant gloves are needed for this procedure. (L014)



DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

3.2 Background:

This document contains the procedure for performing a pressure test an **IBM Power 775** system, using an **IBM Power 775** Fill and Drain Tool (FDT). The successful execution of an **Pressure Test Calibration** procedure is required for this procedure to be performed.

To ensure that all **IBM Power 775** water cooling systems are leak-free, the **IBM Power 775** Fill and Drain Tool (FDT) is equipped with pressure testing capability. The system pressure test is designed to identify leaks in the system internal plumbing, and must be completed before a system fill procedure is executed so that any potential for water leakage in the system can be avoided.

The results of the system pressure test are recorded within the FDT; if the test passes, a system fill procedure can be completed. If this test fails, there is a functional defect in the system, and the fill operation cannot be completed. Upon a system-level pressure test failure, each system component must be pressure tested individually to identify the source of the leak.

A system fill procedure cannot be executed unless both the **Pressure Test Calibration** and system pressure test have passed since FDT activation. The FDT water pump will otherwise be disabled in software until these conditions are met.

Normally, a system will ship without water to the customer location, and no additional drainage is required prior to pressure testing. If the FDT senses that the system is not empty when the pressure test begins, the pressure test will stop. The pressure test status will be set as incomplete, and a system drain operation will be required.

Reference Information:

IBM Power 775 FDT P/N:	45D6928
Hose assemblies/adapters required:	HA1 (45D8561) HA2 (45D8562)

Expected maximum time to complete system pressure test: 4 min

NOTE: *Some hose connection steps may be redundant due to other FDT service operations being completed prior to this procedure. If a hose connection has already been completed, ensure connection and proceed to the next step.*

NOTE: *To safely complete a system or component fill procedure without any leaks, component pressure test **and** pressure test calibration routines both must pass. Test results will be present in the FDT status.*

3.3 Procedure:

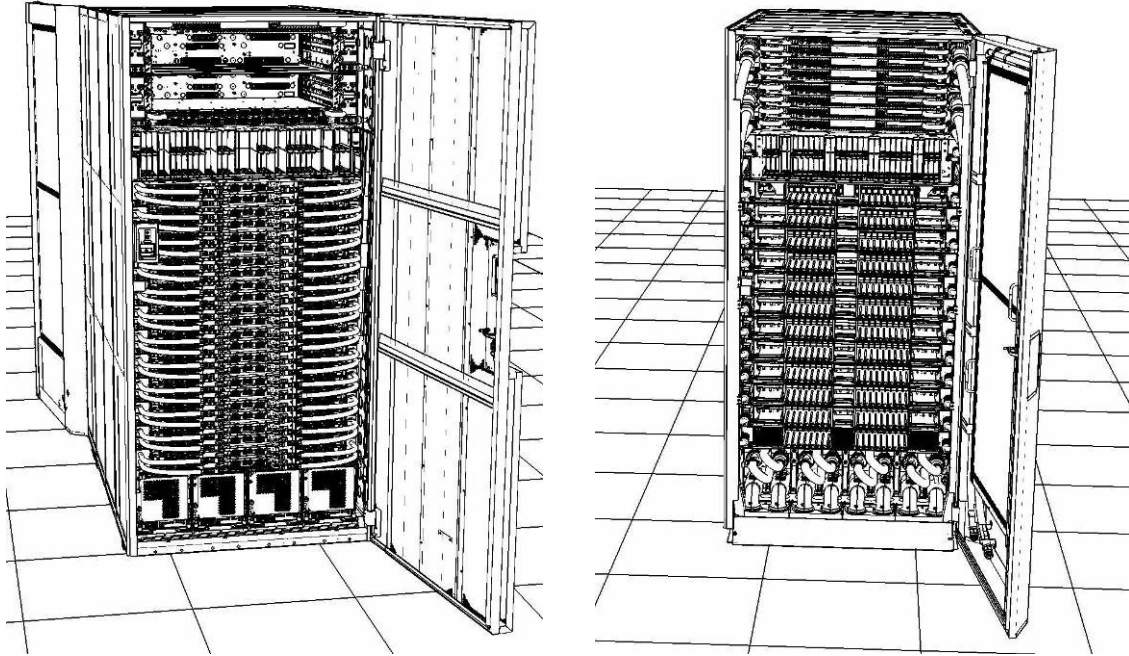
NOTE: If you already have the FDT powered on, proceed to **Step 14**. Otherwise, start procedure at **Step 1**.

Power775 System Fill, Top Off, and Pressure Test Procedures
---- System Pressure Test Procedure ----

1. Identify the **Power 775** frame that requires service.

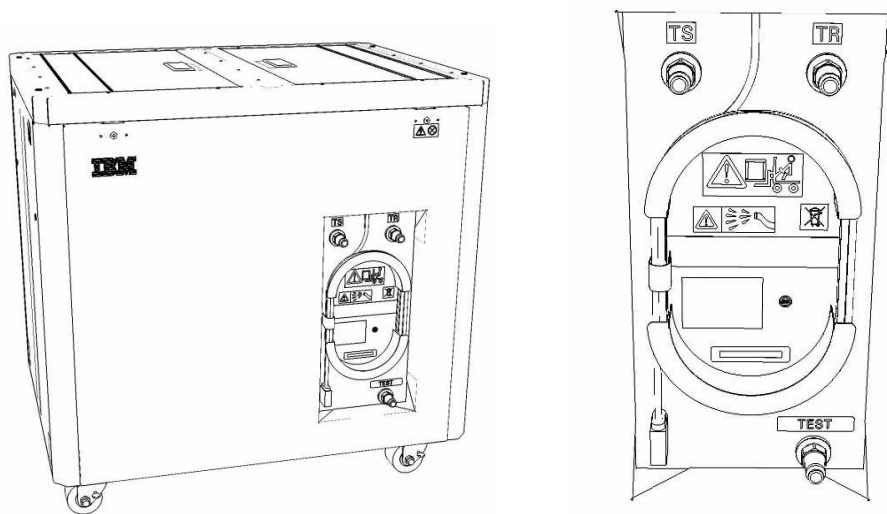
Verify that the system UEPO is set to **ON**, and the managing consoles (HMC and XCat) are powered on and communicating with the frame.

2. Open front and rear doors of the **Power 775** frame that requires service.



3. Bring the FDT to the front side of the **Power 775** frame that requires service.
4. Locate the panel of the FDT that contains the Universal Power and Information Cable (UPIC), as well as the **TS**, **TR**, and **TEST** water connections.

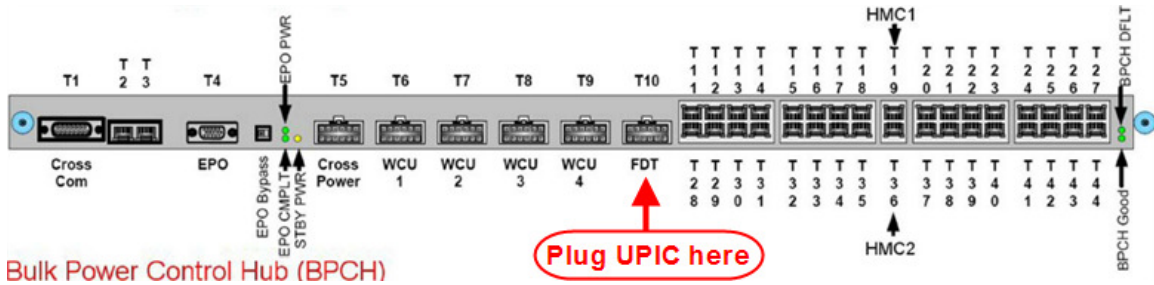
This side of the tool should be facing the front of the frame.



5. Unwrap the FDT UPIC cable from the storage loop on the FDT.

6. Select BPC port for FDT

- If the lower BPA is not targeted for service, and is functional:
Plug the FDT UPIC cable into **port T10 of the lower BPC.**
- If the lower BPA is targeted for service, or is not functional:
Plug the FDT UPIC cable into **port T10 of the upper BPC.**



7. Login to the HMC with the User ID `hscroot`.

Use the HMC that is connected to the BPA where the FDT is plugged.

8. From the HMC left Navigation menu, expand **Systems Management** then select **Frames**.

Verify frame serial number for the frame to be serviced.

9. In the **Frames** view on the HMC, place a checkmark in the **Select** column for the frame to be serviced.

10. Verify that the frame **Status** is **Rack Standby/Rack Standby** or **Standby/Standby**.

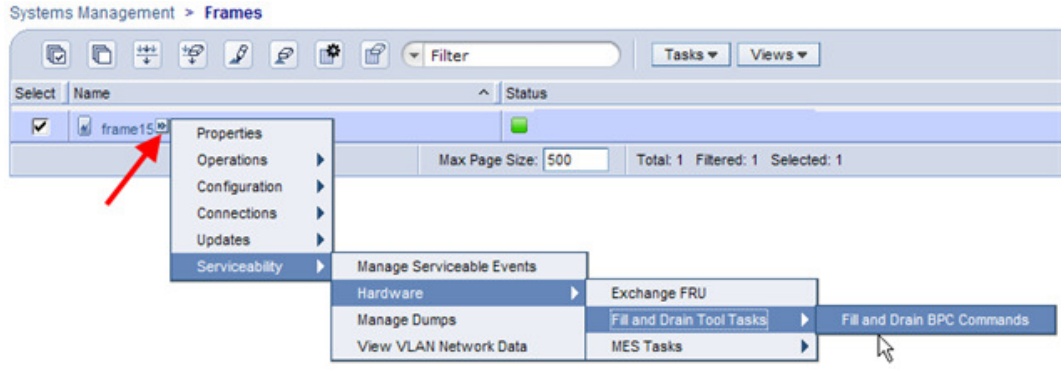
- If frame **Status** reads **Rack Standby/Rack Standby** or **Standby/Standby** – OK.

Continue to next step.

- If frame **Status** does not read **Rack Standby/Rack Standby** or **Standby/Standby** – action required. Contact your next level of support.

11. From the **Task** menu on the HMC, *select* **Serviceability** > **Hardware** > **Fill and Drain Tool Tasks** > **Fill and Drain Command Interface**

Power775 System Fill, Top Off, and Pressure Test Procedures
 ---- System Pressure Test Procedure ----



Fill and Drain Tool Command Interface will display. See below for a sample image of the interface (FDT deactivated).

Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

FDT Port Locations:

Select	Location Code	Description
<input type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10

12. Select the BPC port that the FDT was plugged into in **Step 6** from the **FDT Port Locations:** list.

13. *Click* the **Activate FDT** button.

- If the Activate FDT command is successful – OK. **Wait 30 seconds and continue to next step.**
- If the **Activate FDT** command fails – action required.

Click the **Deactivate FDT** button.

Wait 2 minutes and repeat **Step 13**. If the **Activate** command fails again, contact your next level of support.

14. *Click* the **Get FDT Status** button.

- If the **Get FDT Status** command is successful – OK.
See below for a sample status (does not reflect expected state)
- If the **Get FDT Status** command fails – action required.

Repeat **Step 14**. If the **Get FDT Status** command fails again, contact your next level of support.

Power775 System Fill, Top Off, and Pressure Test Procedures
 ---- System Pressure Test Procedure ----

Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

FDT Port Locations:

Select	Location Code	Description
<input checked="" type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10

FDT Power/Comm: GOOD
 Frame Attached: IBM Power7 775
 MDA-FD RL: 45D
 Error Status: WARNING
 Tank Level: Full
 Air Pump: Off
 Water Pump: DISABLED
 Tool Mode: Ready
 Pressure Test Calibration: Incomplete
 Component Pressure Test: Incomplete

Sample FDT Status

15. Review the FDT status screen and ensure that the following status items are OK:

Status Item	State	Action
-------------	-------	--------

- **Tool Mode:** **Ready** – OK. Check next Status item.
- **Error Status:** **NONE** – OK. Check next Status item.

WARNING – *click* the **Decode Error Status** button, record the information returned and check Tank Level.

CRITICAL – *click* the **Decode Error Status** button, record the information returned and contact your next level of support.

- **Tank Level:** **Upper Half, Lower Half** or **Empty** – OK. Check next Status item.

Full – action required.

Exit this procedure and perform the **Section 5: Power 775 Fill and Drain Tool (FDT) Tank Drain Procedure**.

Once FDT tank level is **Upper Half, Lower Half** or **Empty**, return to this step and continue with procedure.

- **Pressure Test Calibration:** **Pass** - OK. Check next Status item.
Incomplete or **Fail** – action required.
Exit this procedure and complete the **Pressure Test Calibration** procedure.
Verify a **Pass** result and return to this step and continue with this procedure.
- **Component Pressure Test:** **Incomplete** – OK. Check Tank Level.
Pass or **Fail** – action required.
Click the **Reset FDT** button and proceed to next step.

16. Before proceeding, read required safety information:

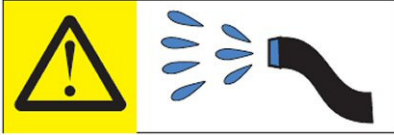
CAUTION: The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations involving the coolant or which may potentially expose you to the coolant. Refer to the MSDS for more information. (C037)



CAUTION: Protective eyewear is needed for the procedure. (L011)



CAUTION: Chemical resistant gloves are needed for this procedure. (L014)



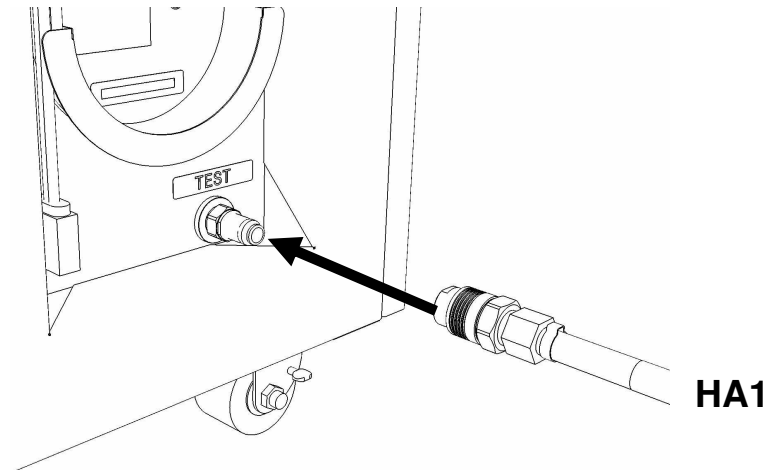
DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

17. Verify that all system water connections in the system are connected.

Verify that all WCU system water connections (upper 2 connections) are connected, with all valves open.

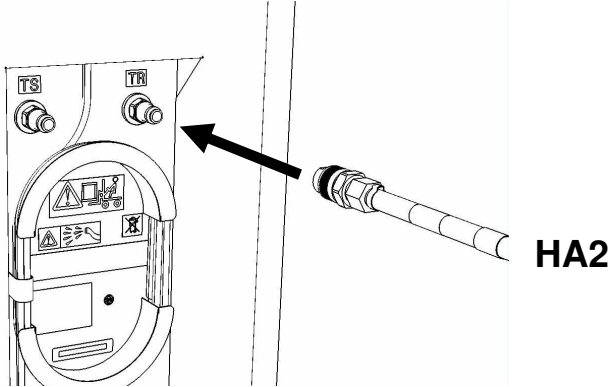
18. Remove hose assembly **HA1** from the upper tool storage compartment.

Connect either end of hose assembly **HA1** to the **TEST** connection on the front panel of the FDT.



19. Remove hose assembly **HA2** from the upper tool storage compartment.

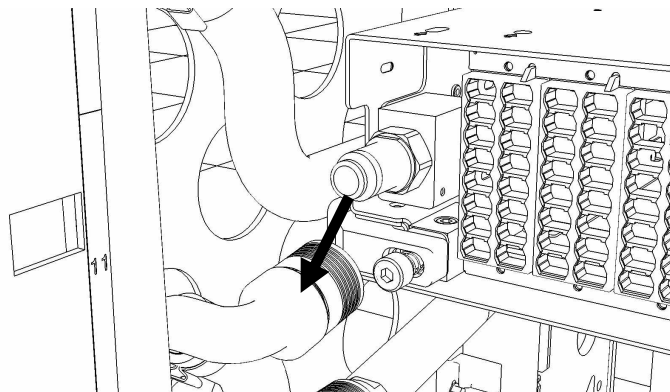
Connect the end of hose assembly **HA2** *without sight glass* to the **TR** connection on the FDT.



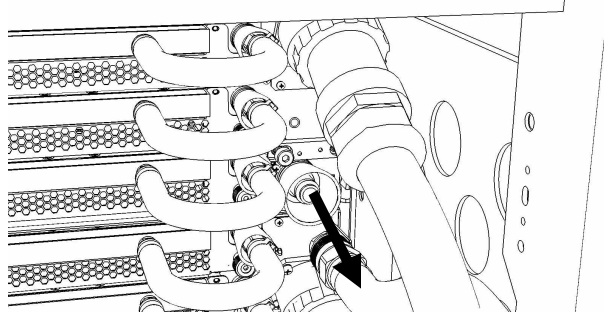
20. Pass the system (unattached) ends of **HA1** and **HA2** to the rear of the frame.

NOTE: *Hose assemblies **HA1** and **HA2** can be passed **around** the frame or **over** the frame, depending on frame position. These hoses are long enough to complete all FDT service actions on the rear of the frame.*

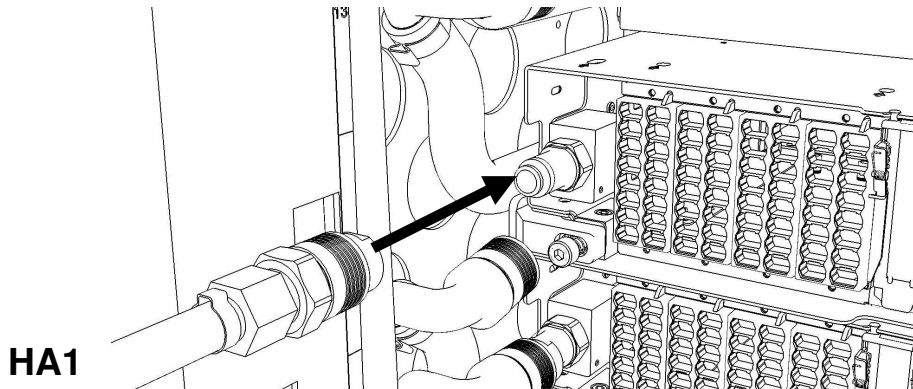
21. Disconnect the left side water connection of the **lowest CEC installed in the system.**



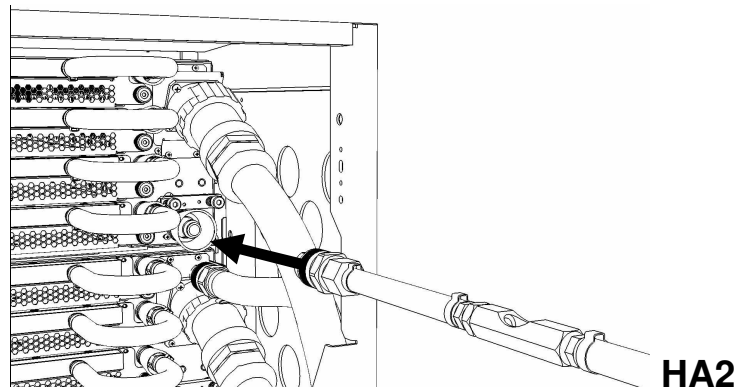
22. Disconnect the right side BPE main water connection of the **upper BPE**.



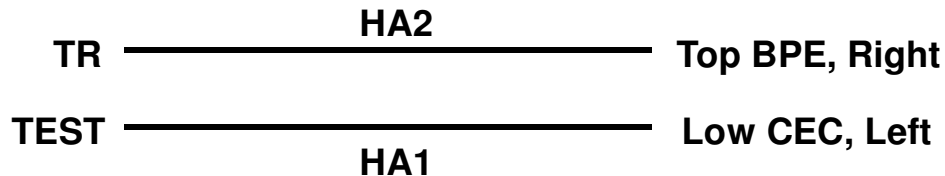
23. Connect the system end of hose assembly **HA1** to the left side CEC water connection of the **lowest CEC installed in the system**.



24. Connect unattached end of hose assembly **HA2 with sight glass** to the right side BPE main water connection of the **upper BPE**.



25. Ensure all hose connections are made properly and securely.
Verify hoses are connected as outlined in the schematic below.



26. On the FDT Panel, *click* the **Component Pressure Test** button.

The **Get FDT Status** button may be *clicked* to examine FDT status.

NOTE: *The pressure testing will last for 4 minutes (2 minutes with air pump on)*

CAUTION: **This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)**

27. *Click* the **Get FDT Status** button and ensure the following status items are OK:

<u>Status Item</u>	<u>State</u>	<u>Action</u>
• Tool mode:	Ready – OK.	Check next Status item. System/Component Pressure Test Mode – pressure test still running. Wait 30 seconds and repeat Step 25 .
• Error Status:	NONE – OK.	Check next Status item. WARNING – <i>click</i> the Decode Error Status button, record information returned and proceed to next step. CRITICAL – <i>click</i> the Decode Error Status button, record information returned and contact your next level of support.
• Component Pressure Test:	Pass – OK.	Proceed to next step.

Fail or Incomplete – action required.

Click the **Reset FDT** button.

Repeat **Step 17** through **Step 24** and continue with procedure.

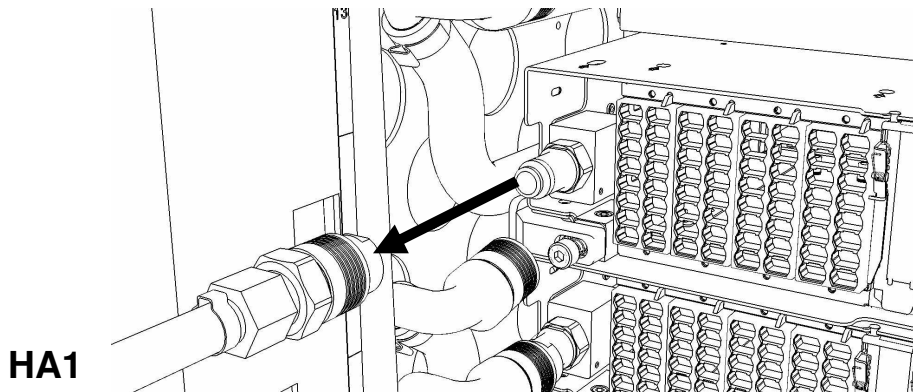
If the test read **Fail** twice, hardware is defective. Contact your next level of support.

28. The system pressure test has passed successfully.

A system fill procedure can now be completed.

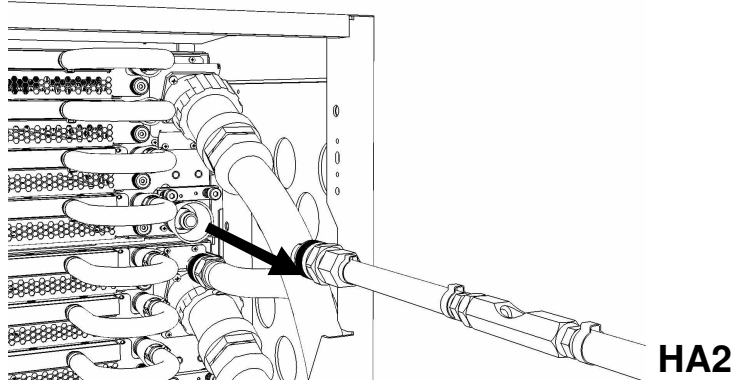
NOTE: *If a **System Fill Procedure** will be completed following this test, disregard **Step 29, 31, and 33.** These hose connections will be the same in the system fill procedure.*

29. Disconnect the **HA1** hose assembly from the left side CEC water connection on the **lowest CEC** installed in the frame.

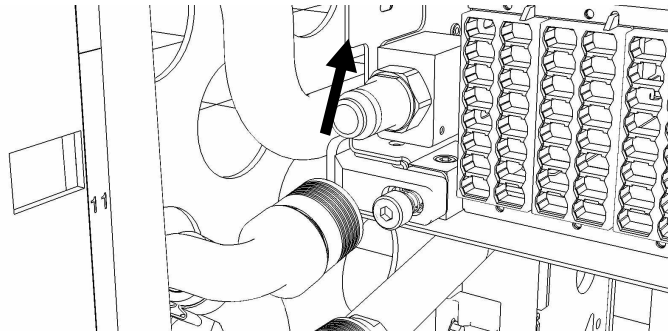


30. Disconnect the hose assembly **HA2** with *sight glass* from the right side BPE main water connection of the **upper BPE**.

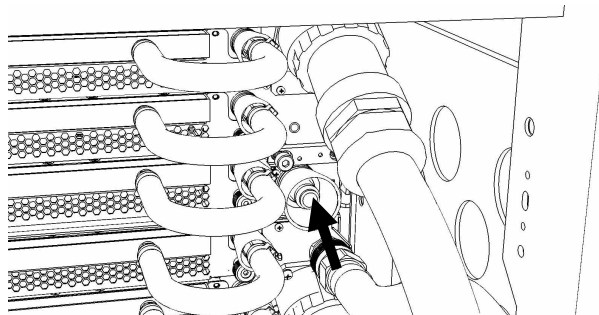
Power775 System Fill, Top Off, and Pressure Test Procedures
---- System Pressure Test Procedure ----



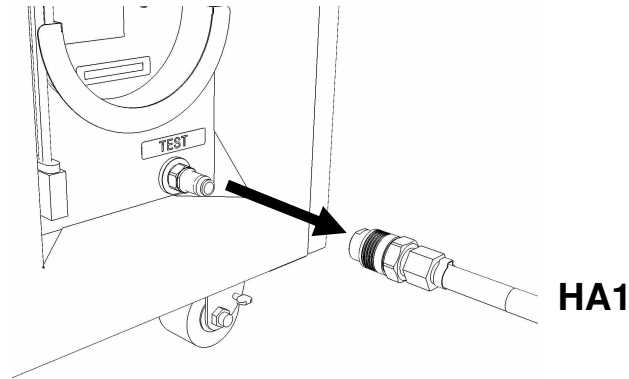
31. Reconnect the left side CEC water connection of the **lowest CEC** installed in the system.



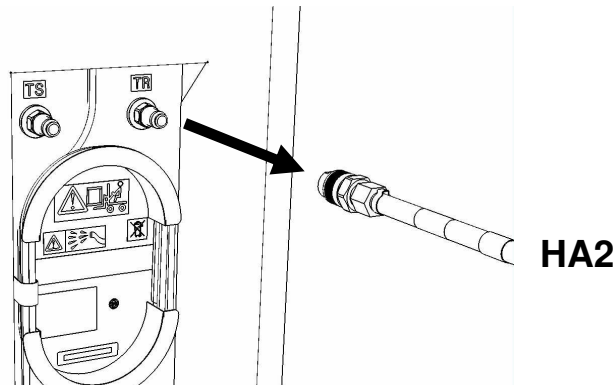
32. Reconnect the right side BPE main water connection of the **upper BPE**.



33. Disconnect the FDT end of **HA1** from **TEST** on the FDT.



34. Disconnect the FDT end of **HA2** from **TR** on the FDT.



35. Place all hose assemblies and adapters in their appropriate locations within the FDT storage enclosure.

36. Determine whether the FDT will be used for another procedure:

- If the FDT will be used for another procedure, leave tool activated and go to that procedure now; skip the remaining steps of this procedure.
- If the FDT requires no further use - proceed to the next step.

37. Click the **Deactivate FDT** button.

- If the **Deactivate FDT** command is successful – OK. Proceed to next step.
- If the **Deactivate FDT** command fails– action required.

Repeat **Deactivate FDT**. If the **Deactivate FDT** command fails again, contact your next level of support.

38. Disconnect FDT UPIC power cable from port T10 of BPC used.

Wrap the UPIC cable in appropriate cable storage location on FDT.

39. If this procedure was referenced from another procedure, return to parent procedure.

3.4 End of Power775 System Pressure Test Procedure

4 POWER775 SYSTEM TOP-OFF PROCEDURE

4.1 Safety Notices

Read “Safety Notices“ available from InfoCenter:

<http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7hdx/G229-9054.pdf>

The following cautions apply to all Power775 service procedures:

CAUTION:

Energy hazard present and Shorting might result in system outage and possible physical injury. Remove all metallic jewelry before servicing. (C001)

CAUTION:

The doors and covers to the product are to be closed at all times except for service by trained service personnel. All covers must be replaced and doors locked at the conclusion of the service operation. (C013)

CAUTION:

Servicing of this product or unit is to be performed by trained service personnel only. (C032)

The following notices specifically pertain to this Power775 service procedure.

CAUTION: The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations involving the coolant or which may potentially expose you to the coolant. Refer to the MSDS for more information. (C037)

CAUTION: This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)



DANGER: Hazardous voltage present. Voltages present constitute a shock hazard, which can cause severe injury or death. (L004)



CAUTION: Protective eyewear is needed for the procedure. (L011)

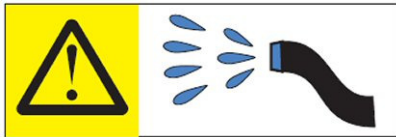
Power775 System Fill, Top Off, and Pressure Test Procedures
---- System Top-Off Procedure ----



DANGER: Heavy equipment—personal injury or equipment damage might result if mishandled. (L013)



CAUTION: Chemical resistant gloves are needed for this procedure. (L014)



DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

4.2 Background:

This procedure is used when adding conditioned water to an **IBM Power 775** system with an **IBM Power 775** Fill and Drain Tool (FDT). This procedure should be executed when one or more **IBM Power 775** Water Conditioning Units (WCU's) show a low-water condition. The procedure may be performed concurrently (with CEC logic power on in one or more CEC drawers), or non-concurrently (with no CEC having logic power turned on).

When performed concurrently, the System Top-Off is non-interruptive and is designed to transfer conditioned water into the system while all WCU's are running normally with at least one processor (CEC) drawer having logic power on. During system operation it is normal for the WCU's to periodically post a low-water condition and to require additional water, mainly due to evaporative losses through hoses and entrained air settling in the WCU's. A low water level System Ref Code (SRC) on one or more WCU's will indicate if and when a System Top-Off procedure needs to be completed to protect against thermal failure.

The System Top-Off procedure is executed concurrently when:

1. The frame is in BPA Standby and CEC logic power is on.
2. There is at least one WCU indicating a low water condition.
3. The WCU with the low water is running with the same pump speed as the other operating WCUs.

When performed non-concurrently, the System Top-Off will interrupt normal system control and is designed to transfer conditioned water into the system while the system and all WCU's are NOT running normally or the system is in BPA standby and **NO CEC logic power is on**.

There are two circumstances when a **Power 775** system will require the execution of a System Top-Off procedure non-concurrently:

1. After the completion of an **IBM Power 775 System Fill Procedure**. This is to ensure the system is full after installation, and is referenced directly in the system fill procedure.
2. After the completion of a water-cooled field replaceable unit (FRU) replacement procedure. Although each component will be filled prior to insertion into the system, small amounts of air may still be introduced during the connection of the component into system plumbing.

Due to the high output pressures of the WCU's, system pressures can exist that are greater than what the FDT can supply. This presents the risk of draining 40% of the system water into the FDT if operated and connected improperly. During a System Top-Off procedure, the FDT must only pump into a system where **all WCU's installed are running at the same speed (RPM)**. This eliminates pressure differentials within

the WCU that could drain the system, and result in massive leakage and system shut-down.

Reference Information:

IBM Power 775 FDT P/N: 45D6928
Hose assemblies/adapters required: HA1 (45D8561)
HA2 (45D8562)
A2 – 2X (45D8566)

Estimated time to complete an **IBM Power 775 WCU Top-Off Procedure** with 4 WCU's installed in the system: 15 min

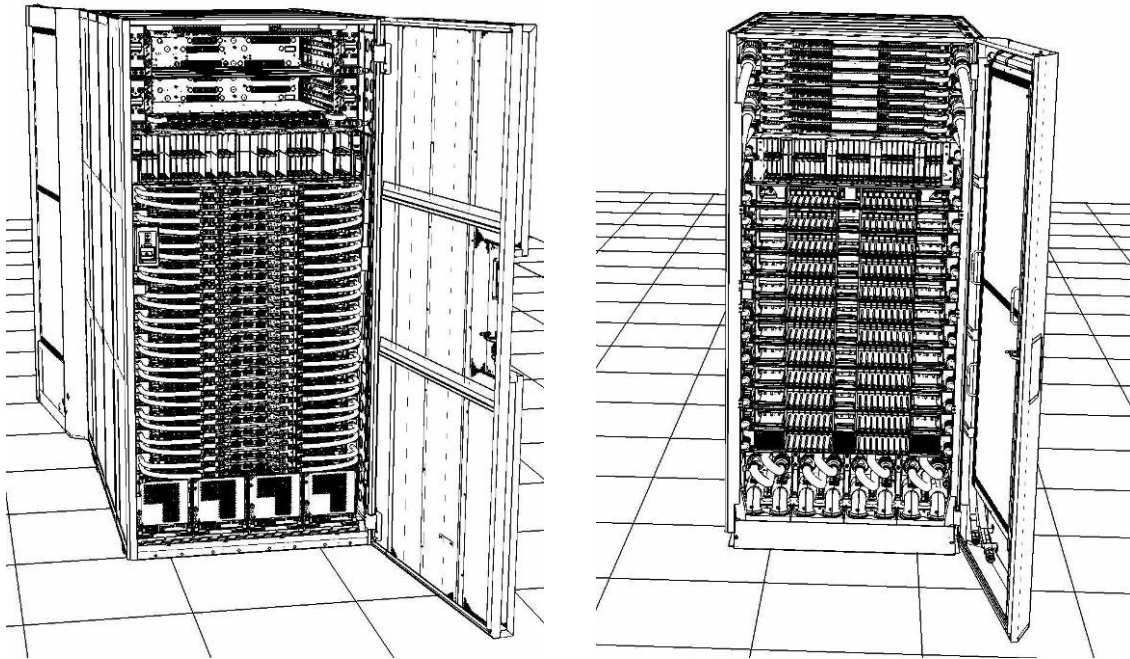
4.3 Procedure:

NOTE: If you already have the FDT powered on, proceed to **Step 14**. Otherwise, start procedure at **Step 1**.

1. Identify the **Power 775** frame that requires service.

Verify that the system UEPO is set to **ON**, and the managing consoles (HMC and XCAT) are powered on and communicating with the frame.

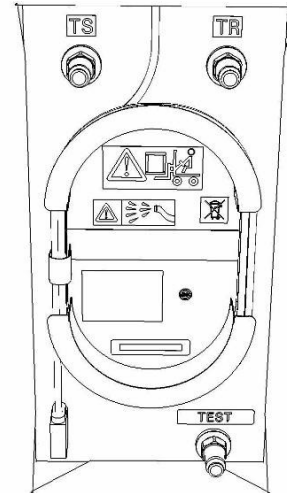
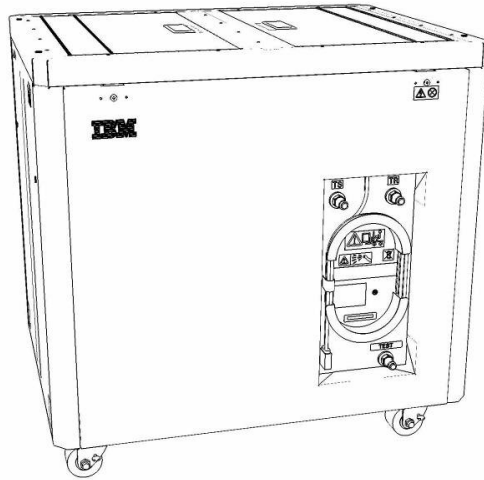
2. Open front and rear doors of the **Power 775** frame that requires service.



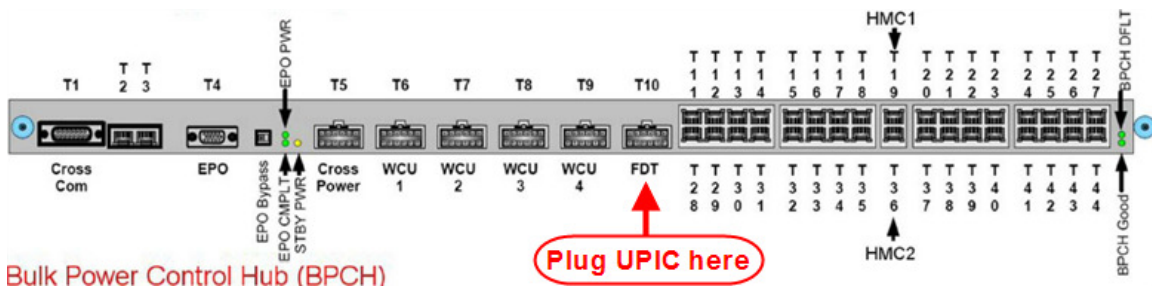
3. Bring the FDT to the front side of the **Power 775** frame that requires service.
4. Locate the panel of the FDT that contains the Universal Power and Information Cable (UPIC), as well as the **TS**, **TR**, and **TEST** water connections.

This side of the tool should be facing the front of the frame.

Power775 System Fill, Top Off, and Pressure Test Procedures
 ---- System Top-Off Procedure ----



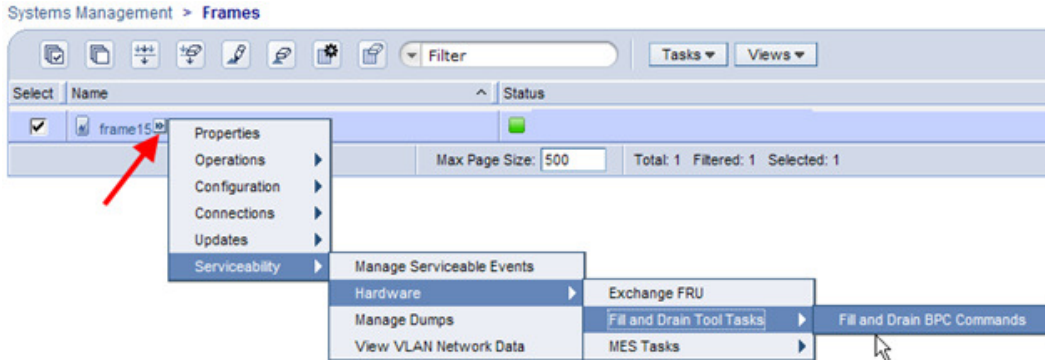
5. Un-wrap the FDT UPIC cable from the storage loop on the FDT.
6. Select BPC port for FDT
 - If the lower BPA is not targeted for service, and is functional:
Plug the FDT UPIC cable into **port T10 of the lower BPC.**
 - If the lower BPA is targeted for service, or is not functional:
Plug the FDT UPIC cable into **port T10 of the upper BPC.**



7. Login to the HMC with the User ID **hscroot**.
Use the HMC that is connected to the BPA where the FDT is plugged.
8. From the HMC left Navigation menu, expand **Systems Management** then select **Frames**.
Verify frame serial number for the frame to be serviced.
9. In the **Frames** view on the HMC, place a checkmark in the **Select** column for the frame to be serviced.
40. Verify that the frame **Status** is **Rack Standby/Rack Standby** or **Standby/Standby**.

- If frame **Status** reads **Rack Standby/Rack Standby** or **Standby/Standby** – OK.
Continue to next step.
- If frame **Status** does not read **Rack Standby/Rack Standby** or **Standby/Standby** – action required. Contact your next level of support.

10. From the **Task** menu on the HMC, *select* **Serviceability** > **Hardware** > **Fill and Drain Tool Tasks** > **Fill and Drain Command Interface**



Fill and Drain Tool Command Interface will display. See below for a sample image of the interface (FDT deactivated).

Power775 System Fill, Top Off, and Pressure Test Procedures
---- System Top-Off Procedure ----

Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

FDT Port Locations:

Select	Location Code	Description
<input type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10

Activate FDT Deactivate FDT

Get FDT Status Decode Error Status

Fill FDT Drain FDT

Start Water Pump Reset FDT Start Air Pump

Pressure Test Calibration Component Pressure Test

Launch WCU Commands WCU Tank Air Purge

Exit Help

11. Select the BPC port that the FDT was plugged into in **Step 6** from the **FDT Port Locations:** list.

12. *Click* the **Activate FDT** button.

- If the **Activate FDT** command is successful – OK. **Wait 30 seconds and continue to next step.**
- If the **Activate FDT** command fails – action required.

Click the **Deactivate FDT** button.

Wait 2 minutes and repeat **Step 12**. If the **Activate** command fails again, contact your next level of support.

13. Click the **Get FDT Status** button.

- If the **Get FDT Status** command is successful – OK.

See below for a sample status (does not reflect expected state)

- If the **Get FDT Status** command fails – action required.

Repeat **Step 13**. If the **Get FDT Status** command fails again, contact your next level of support.

Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

FDT Port Locations:

Select	Location Code	Description
<input checked="" type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10

FDT Power/Comm: GOOD
 Frame Attached: IBM Power7 775
 MDA-FD RL: 45D
 Error Status: WARNING
 Tank Level: Full
 Air Pump: Off
 Water Pump: DISABLED
 Tool Mode: Ready
 Pressure Test Calibration: Incomplete
 Component Pressure Test: Incomplete

Sample FDT Status

14. Review the FDT status screen and ensure that the following status items are OK:

Status Item	State	Action
-------------	-------	--------

- **Tool Mode:** **Ready** – OK. Check next Status item.
- **Error Status:** **NONE** – OK. Check next Status item.

WARNING – *click* the **Decode Error Status** button, record the information returned and check Tank Level.

CRITICAL – *click* the **Decode Error Status** button, record the information returned and contact your next level of support.

- **Tank Level:** **Full** or **Upper Half** – OK. Continue with procedure.
Lower Half or **Empty** – action required.

Exit this procedure and perform the **Power 775 Fill and Drain Tool (FDT) Tank Fill Procedure**.

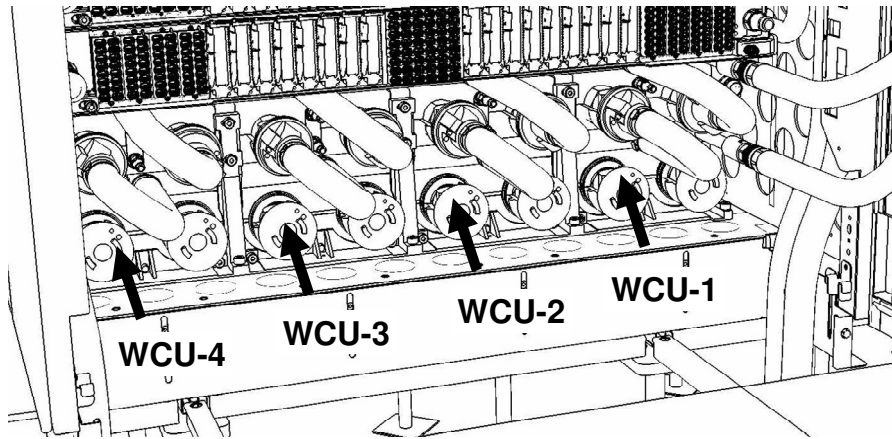
Once FDT tank level is **Full** or **Upper Half**, return to this step and continue with procedure.

15. On the FDT Commands panel, *click* the **Launch WCU Commands** button.

This will launch a separate command window for WCU operations. Below is a representative image of the WCU Commands interface.



16. Identify all WCU's installed in the system using image and location code information listed below.



WCU-1 Location Code: **-P3-C1**

WCU-2 Location Code: **-P4-C1**

WCU-3 Location Code: **-P5-C1**

WCU-4 Location Code: **-P6-C1**

17. For every WCU installed in the system:

a. Select the WCU

WCU Locations:			
Select	Location Code	Description	FDT Location
<input type="radio"/>	78AC-100*BPC0227-P3-C1	MDA-WCU for WCU-1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BPC0227-P6-C1	MDA-WCU for WCU-4	Lower BPC Port T10

b. Click the **Get WCU Status** button.

- If the **Get WCU Status** command is successful – OK.

See below for a sample status (does not reflect expected state)

- If the **Get WCU Status** command fails – action required.

Repeat **Step 17**. If the **Get WCU Status** command fails again, contact your next level of support.

Power775 System Fill, Top Off, and Pressure Test Procedures
 ---- System Top-Off Procedure ----

WCU Command Interface - Server-78AC-100BPC0227

The table below shows the available WCU (Water Conditioning Units) locations. Select the correct WCU location. Use the buttons to drive commands to the selected WCU.

WCU Locations:

Select	Location Code	Description	FDT Location
<input checked="" type="radio"/>	78AC-100*BPC0227-P3-C1	MDA-WCU for WCU-1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BPC0227-P6-C1	MDA-WCU for WCU-4	Lower BPC Port T10

Pump Speed (RPM): 2067
 Control Valve Position (percent open): 32
 Control Valve Calibration: Off

 WCU Tank Level: Full
 WCU Service Mode: Off
 Error Status: NONE

 System Supply Temperature (C): 16.55
 System Return Temperature (C): 20.13
 Customer Supply Temperature (C): 7.15
 Customer Return Temperature (C): 19.39
 Customer Water Flow (GPM): 2.83

Sample WCU Status

Above status is a **sample status**, and does not reflect the target WCU state.

The following WCU conditions may be present:

Error Status: WARNING or CRITICAL - click Decode Error Status

Decoded Error Status values:

- **Reservoir 0 or Reservoir 1:** OK - Due to WCU low water or empty.
- **Shutdown for Fault:** OK - Due to WCU empty.

If any other errors are present, contact your next level of support.

Note which WCUs have a low water condition as this will be used later.

18. If you are performing this procedure concurrently, (CEC logic power is on in at least one drawer), skip this step and proceed to **Step 19.**

If you are performing this procedure non-concurrently, (CEC logic power is off on all processor (CEC) drawers),

Click the **WCU Top-Off Enable** button.

Wait 1 minute before proceeding to next step.

- If the **WCU Top-Off Enable** command is successful – Continue to **Step 19.**
- If the **WCU Top-Off Enable** command fails – action required.
 - **NOTE: If you receive error code 75,** this most likely means at least one CEC drawer is turned on still. Confirm that you want to proceed non-concurrently and if so, ensure all CEC drawer(s) are turned off. Repeat **Step 18.** If the command fails again, contact your next level of support.
 - If the command failed with error code other than 75, Repeat **Step 18.** If the command fails again, contact your next level of support.

19. Click the **Verify Pump Speeds** button. **Note: Click this once only.**

Wait 1 minute before proceeding to next step.

- If the **Verify Pump Speeds** command is successful – OK.
- If the **Verify Pump Speeds** command fails – action required.
Repeat **Step 19.** If the command fails again, contact your next level of support.

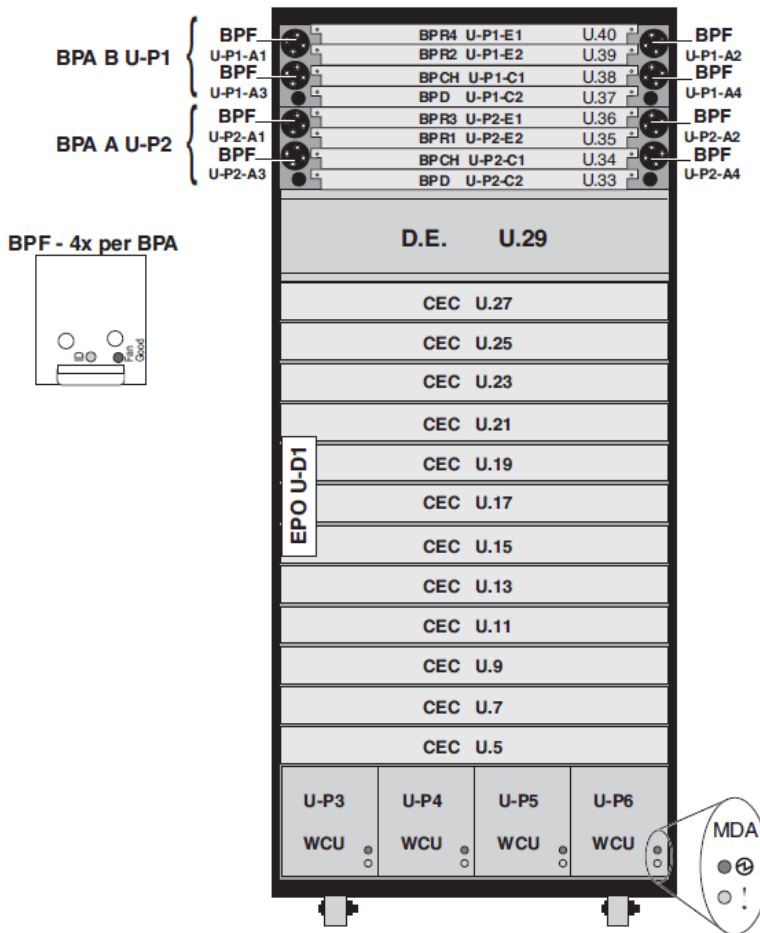
NOTE: Step 18 and Step 19 will spin all WCU pumps to the same speed and blink the indentify leds on the wcu control cards to indicate which WCUs can be topped.

20. Inspect the MDA-WCU for each WCU installed in the system.

Note which WCUs have the MDA **IDENTIFY** (!) LED blinking.

ONLY WCU's with the MDA **IDENTIFY** (!) LED blinking may be topped off.

Front View



21. Ensure that the WCUs with the low water condition noted earlier have the **Identify** LED blinking. If there is a WCU with a low water condition, and the **Identify** LED is NOT blinking, **DO NOT** top off that WCU and contact your next level of support.

Note: Only WCUs with the Identify LED blinking can be topped off.

22. Before proceeding, read required safety information:

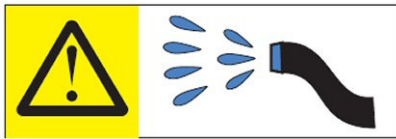
CAUTION: The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations involving the coolant or which may potentially expose you to the coolant. Refer to the MSDS for more information. (C037)



CAUTION: Protective eyewear is needed for the procedure. (L011)



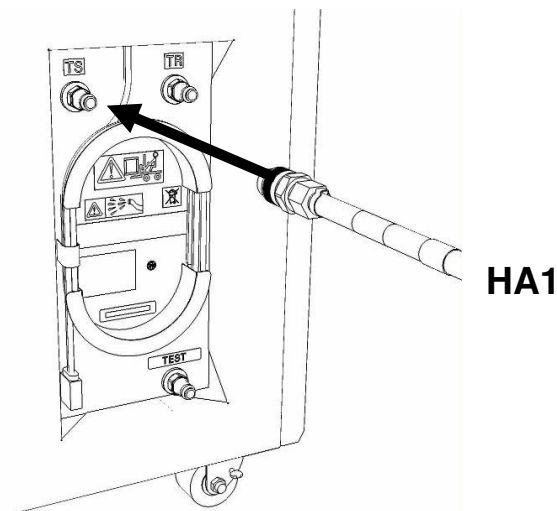
CAUTION: Chemical resistant gloves are needed for this procedure. (L014)



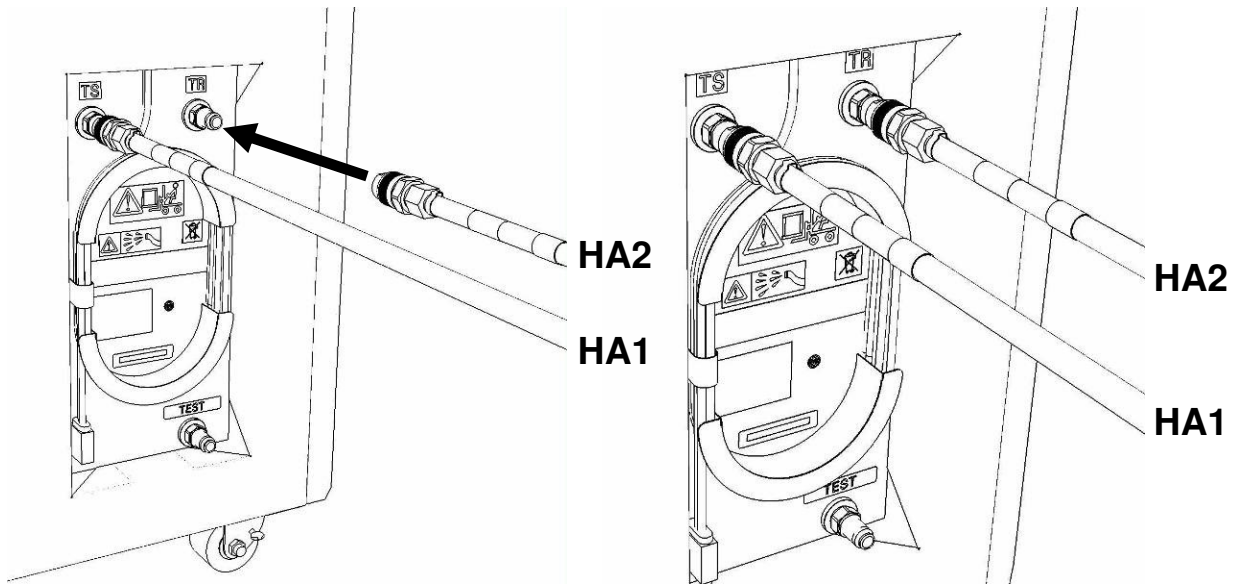
DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

23. Remove hose assembly **HA1** from the upper tool storage compartment.

Connect either end of hose assembly **HA1** to the **TS** connection on the front panel of the FDT.



24. Remove hose assembly **HA2** from the upper tool storage compartment.
Connect the end *without sight glass* to the **TR** connection on the FDT.



25. Pass the system (unattached) ends of **HA1** and **HA2** to the rear of the frame.

NOTE: *HA1 and HA2 can be passed **around** the frame or **over** the frame for service actions at the rear of the frame.*

26. Click the **Exit / Return to Fill and Drain Command Interface** button.

27. On the FDT panel, click the **Start Water Pump** button.

The **Get FDT Status** button may be *clicked* to examine FDT status.

NOTE: *The water pump will shut off after 30 minutes of run time.*

Approximate time to top-off a WCU: 2 minutes.

CAUTION: This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)

28. Verify the following:

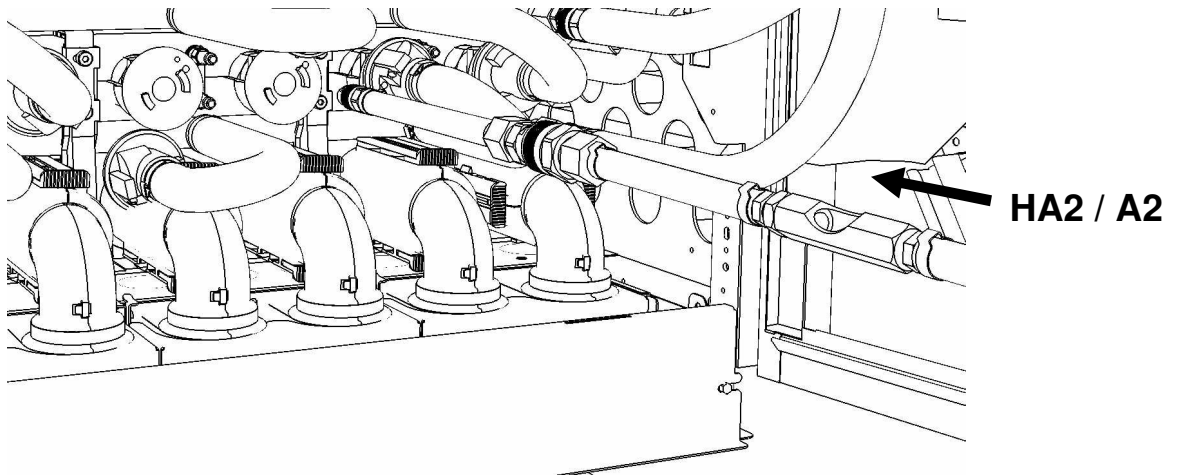
- WCU's with **IDENTIFY** LED's blinking are identified (**Step 20**).
- All WCU's with **IDENTIFY** LED blinking have the same pump speed (**Step 21**).

29. When **Step 28** is verified:

Proceed to **Step 30** with a WCU that has the **IDENTIFY** LED blinking.

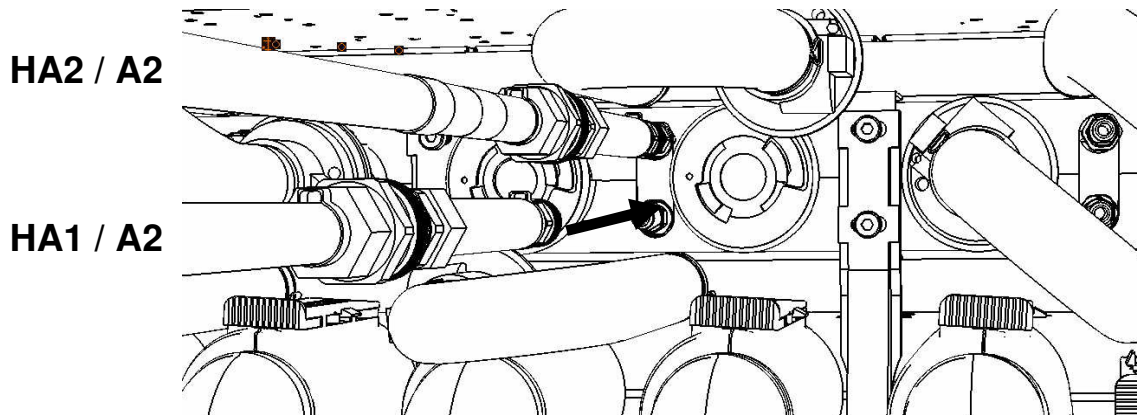
30. Connect the unattached end *with sight glass* of hose assembly **HA2** to adapter **A2**.

Connect the **HA2/A2** assembly to the **upper** WCU bleed port connection.



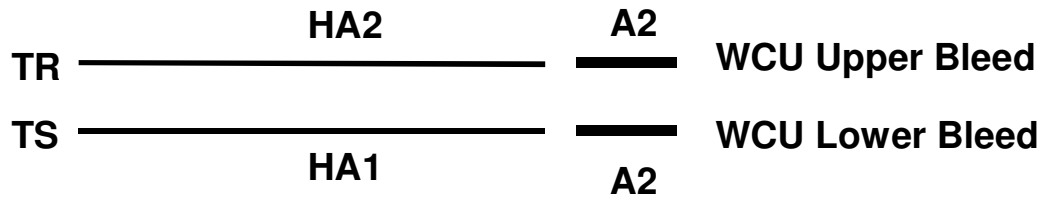
31. Connect the unattached end of hose assembly **HA1** to adapter **A2**.

Connect the **HA1/A2** assembly to the **lower** WCU bleed port connection.



32. Ensure all hose connections are made properly and securely.

Verify hoses are connected as outlined in the schematic below.



33. Inspect the sight glass in hose assembly **HA2**.

Expected sight glass behavior

- Sight glass will start out full of air while the component is being purged of air.
- After some period of time, water will start passing through the sight glass in an air/water mixture.
- Eventually the sight glass will become full of water, with intermittent small air bubbles.

Full sight glass definition

- The sight glass is considered full of water **when** water flow is obvious (white ball pinned in direction of FDT) **and** no large bubbles of air are observed.
- If the above description is observed and the water appears cloudy, this is also considered full.

34. If the water pump has stopped unexpectedly without *clicking* the **Reset FDT** button:

Click the **Get FDT Status** button and ensure the following items are OK:

<u>Status Item</u>	<u>State</u>	<u>Action</u>
• Tool mode:	Ready – OK. Check next Status item.	
	Tool mode: System/Component Fill Mode – water pump still running. Proceed to Step 35 .	
• Tank Level:	Upper Half or Lower Half – OK. Check next Status item.	
	Full or Empty – action required.	

If **Full** - complete a **Fill and Drain Tool (FDT) Tank Drain Procedure** until the FDT tank level is **Upper Half**.

Return to **Step 18** and repeat procedure.

ONLY WCU's with the **IDENTIFY** LED blinking may be topped off.

If **Empty** - complete a **Fill and Drain Tool (FDT) Tank Fill Procedure** until the FDT tank level is **Upper Half**.

Return to **Step 22** and continue with procedure.

- **Error Status:** **NONE** – OK. Proceed to next step.

WARNING – *click* the **Decode Error Status** button, record information returned and proceed to next step.

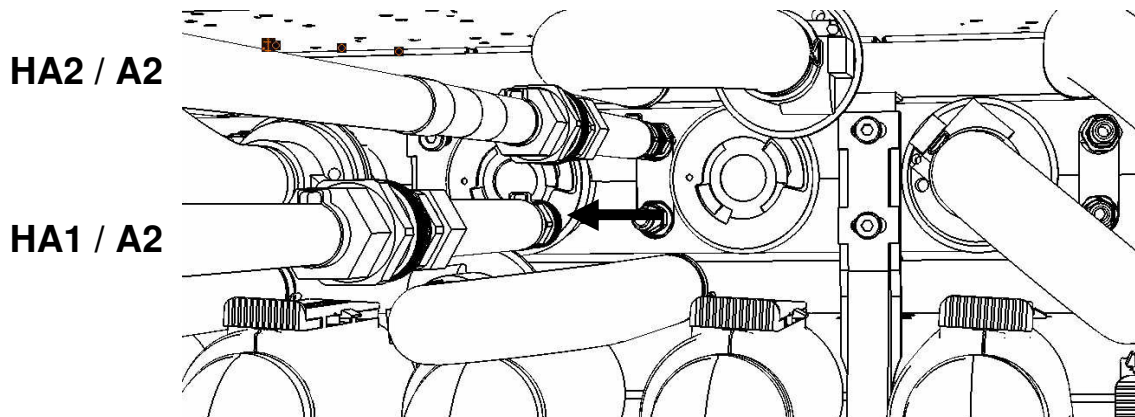
CRITICAL – *click* the **Decode Error Status** button, record information returned and contact your next level of support.

35. When the sight glass in **HA2** has been mostly solid water for 60 seconds:
Proceed to **Step 36**.

36. Disconnect the system end of the **HA1/A2** assembly from the lower bleed connection of WCU.

FDT water pump will continue running after this step.

Disregard WCU position in below image – generic image for reference only



37. When the ball in the **HA2** sight glass is free to move, proceed to **Step 38**.

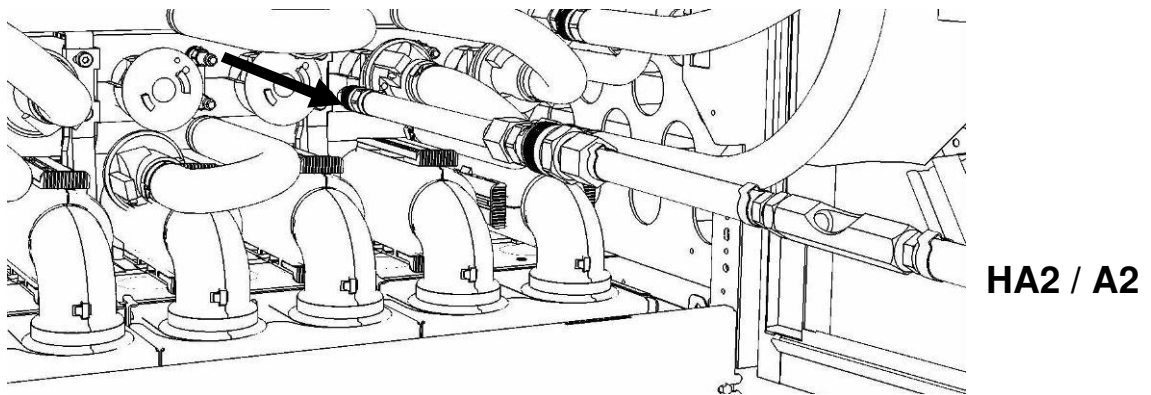
Hold sight glass vertically for best indication.

If ball in sight glass does not become free to move after **30 seconds**:

- Complete **Step 38**.
- Return to **Step 19** and repeat procedure.
ONLY WCU's with the **IDENTIFY** LED blinking may be topped off.
- Contact your next level of support.

38. Disconnect the system end of the **HA2/A2** assembly from the upper bleed connection of WCU.

Disregard WCU position in below image – generic image for reference only



39. For every WCU installed in the system:

- Re-verify **Step 20** and **Step 21**.
- Repeat **Step 28** through **Step 38**.

When all WCU's have been topped-off, proceed to next step.

40. Click the **Exit WCU Top-Off Enable** button for both concurrent and NON-concurrent top off. This is clicked once as all WCUs will get the command to exit Top Off and Service mode.

41. Click the **Exit Verify Pump Speeds** button for both concurrent and NON-concurrent top off. This is clicked once as all WCUs will get the command to exit Verify Pump Speed mode.

42. Click the **Exit / Return to Fill and Drain Command Interface** button.

43. *Click* the **Reset FDT** button.

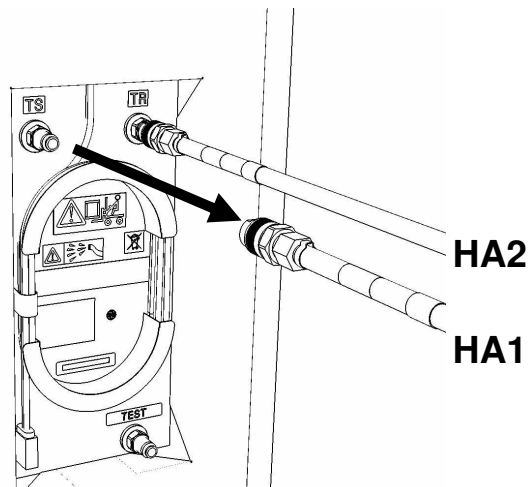
44. Click the **Get FDT Status** button and ensure the following are OK:

Status Item	State	Action
• Tool mode:	Ready – OK. Check next Status item. Tool mode: System/Component Fill Mode – water pump still running, Repeat Step 43 .	
• Error Status:	NONE – OK. Proceed to next step. WARNING – <i>click</i> the Decode Error Status button, record information returned and proceed to next step. CRITICAL – <i>click</i> the Decode Error Status button, record information returned and contact your next level of support.	

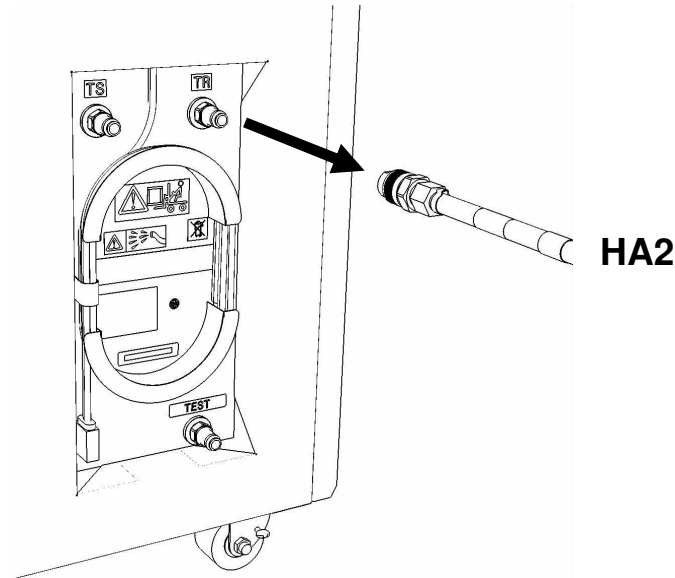
45. Disconnect adapter **A2** from hose assembly **HA1**.

46. Disconnect adapter **A2** from hose assembly **HA2**.

47. Disconnect FDT end of **HA1** from **TS** on the FDT.



48. Disconnect the FDT end of **HA2** from **TR** on the FDT.



49. Place all hose assemblies and adapters in their appropriate locations within the FDT storage enclosure.

50. Determine whether the FDT will be used for another procedure:

- If the FDT will be used for another procedure, leave tool activated and go to that procedure now; skip the remaining steps of this procedure.
- If the FDT requires no further use - proceed to the next step.

51. *Click* the **Deactivate FDT** button.

- If the **Deactivate FDT** command is successful – OK. Proceed to next step.
- If the **Deactivate FDT** command fails– action required.

Repeat **Deactivate FDT**. If the **Deactivate FDT** command fails again, contact your next level of support.

52. Disconnect FDT UPIC power cable from port T10 of BPC used.

Wrap the UPIC cable in appropriate cable storage location on FDT.

53. If this procedure was referenced from another procedure, return to parent procedure.

4.4 End of Power775 System Top-Off Procedure

5 POWER775 FILL AND DRAIN TOOL (FDT) TANK DRAIN PROCEDURE

5.1 Safety Notices

Read "Safety Notices" available from InfoCenter:

<http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7hdx/G229-9054.pdf>

The following cautions apply to all Power775 service procedures:

CAUTION:

Energy hazard present and Shorting might result in system outage and possible physical injury. Remove all metallic jewelry before servicing. (C001)

CAUTION:

The doors and covers to the product are to be closed at all times except for service by trained service personnel. All covers must be replaced and doors locked at the conclusion of the service operation. (C013)

CAUTION:

Servicing of this product or unit is to be performed by trained service personnel only. (C032)

The following notices specifically pertain to this Power775 service procedure.

CAUTION: The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations involving the coolant or which may potentially expose you to the coolant. Refer to the MSDS for more information. (C037)

CAUTION: This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)



DANGER: Hazardous voltage present. Voltages present constitute a shock hazard, which can cause severe injury or death. (L004)



CAUTION: Protective eyewear is needed for the procedure. (L011)

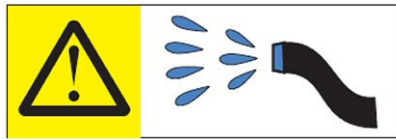
Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Tank Drain Procedure ----



DANGER: Heavy equipment—personal injury or equipment damage might result if mishandled.
(L013)



CAUTION: Chemical resistant gloves are needed for this procedure. (L014)



DANGER: Risk of electric shock due to water or a water solution which is present in this product.
Avoid working on or near energized equipment with wet hands or when spilled water is present.
(L016)

5.2 Background:

This document contains the procedure for draining the water out of the internal reservoir of an **IBM Power 775** Fill and Drain Tool (FDT).

The FDT is used to transfer water into and out of various components of the **IBM Power 775** system. When a system component or the entire system is drained, the water will be transferred into the tank (internal reservoir) within the FDT. During drain operations, the FDT tank may become full, and if so, will need to be periodically emptied into the supplied system water containers. The FDT Tank Drain Procedure instructs the user to properly transfer water out of the FDT Tank and into an empty system water container.

During system or component drain operations, if the FDT senses that the internal reservoir has become full, it will terminate any running drain routine, as well as prevent any further drain routines from being executed. This may occur during a system or component drain procedure; if so, the system or component drain procedure must be paused, and this FDT Tank Drain Procedure must be completed before system/component draining can resume. Individual system water containers treated with a corrosion inhibitor are shipped with the system and after the initial system fill, the empty containers must be stored to be available for the FDT Tank Drain operation.

The system water is treated and must not be poured down a sink or on the ground.

Reference Information:

IBM Power 775 FDT P/N: **45D6928**
IBM System Water Container P/N: **45D2124** (U.S.), **45D2129** (non-U.S.)
Hose assemblies/adapters required: **THA** (45D8563)

Approximate FDT internal water volume: 32 L

Expected drainage time for one (1) system water container: 1 min, 40 s

NOTE: *Some steps in this procedure may be redundant due to other service operations being completed prior to this procedure. If a step has already been completed, verify that the step has been completed properly and proceed to the next step.*

5.3 Procedure:

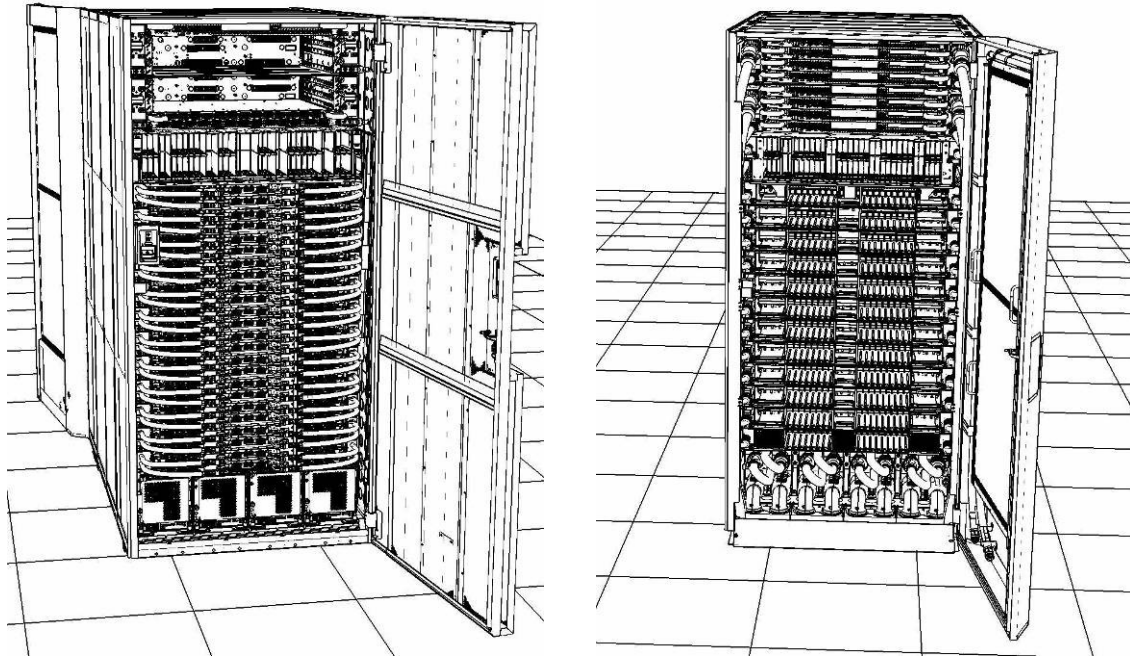
NOTE: If you already have the FDT powered on, proceed to **Step 14**. Otherwise, start procedure at **Step 1**.

Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Tank Drain Procedure ----

1. Identify the **Power 775** frame that requires service.

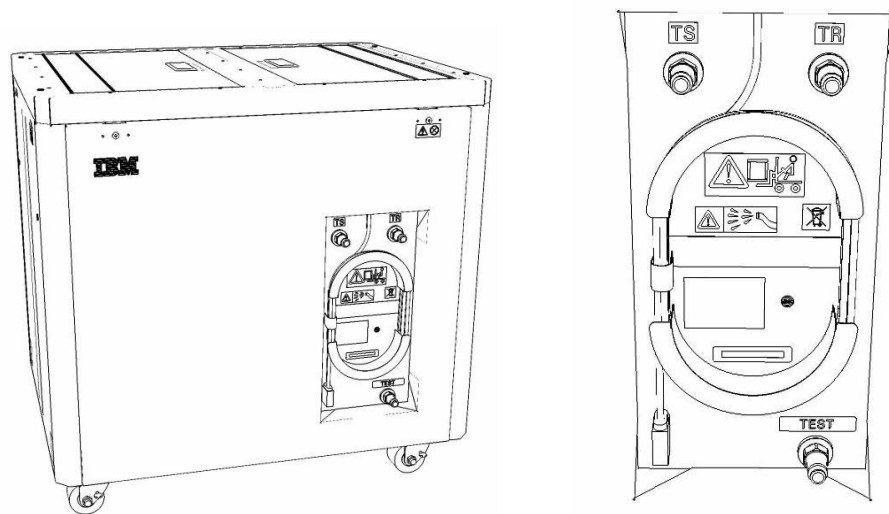
Verify that the system UEPO is set to **ON**, and the managing consoles (HMC and XCat) are powered on and communicating with the frame.

2. Open front and rear doors of the **Power 775** frame that requires service.



3. Bring the FDT to the front side of the **Power 775** frame that requires service.
4. Locate the panel of the FDT that contains the Universal Power and Information Cable (UPIC), as well as the **TS**, **TR**, and **TEST** water connections.

This side of the tool should be facing the front of the frame.

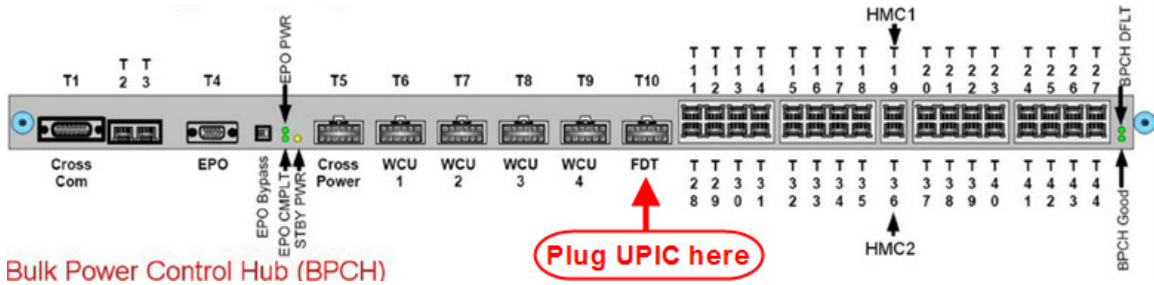


5. Unwrap the FDT UPIC cable from the storage loop on the FDT.

Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
 ---- FDT Tank Drain Procedure ----

6. Select BPC port for FDT

- If the lower BPA is not targeted for service, and is functional:
 Plug the FDT UPIC cable into **port T10 of the lower BPC.**
- If the lower BPA is targeted for service, or is not functional:
 Plug the FDT UPIC cable into **port T10 of the upper BPC.**



7. Login to the HMC with the User ID `hscroot`.

Use the HMC that is connected to the BPA where the FDT is plugged.

8. From the HMC left Navigation menu, expand **Systems Management** then select **Frames**.

Verify frame serial number for the frame to be serviced.

9. In the **Frames** view on the HMC, place a checkmark in the **Select** column for the frame to be serviced.

10. Verify that the frame **Status** is **Rack Standby/Rack Standby** or **Standby/Standby**.

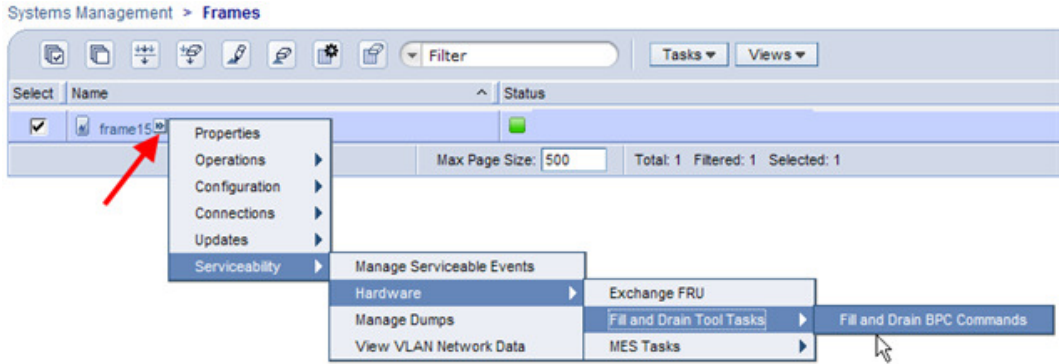
- If frame **Status** reads **Rack Standby/Rack Standby** or **Standby/Standby** – OK.

Continue to next step.

- If frame **Status** does not read **Rack Standby/Rack Standby** or **Standby/Standby** – action required. Contact next level of support.

11. From the **Task** menu on the HMC, *select* **Serviceability** > **Hardware** > **Fill and Drain Tool Tasks** > **Fill and Drain Command Interface**

**Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Tank Drain Procedure ----**



Fill and Drain Tool Command Interface will display. See below for a sample image of the interface (FDT deactivated).

Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

FDT Port Locations:

Select	Location Code	Description
<input type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10

Activate FDT Deactivate FDT
Get FDT Status Decode Error Status
Fill FDT Drain FDT
Start Water Pump Reset FDT Start Air Pump
Pressure Test Calibration Component Pressure Test

Launch WCU Commands
WCU Tank Air Purge

Exit Help

12. Select the BPC port that the FDT was plugged into in **Step 6** from the **FDT Port Locations:** list.

13. *Click* the **Activate FDT** button.

- If the Activate FDT command is successful – OK. **Wait 30 seconds and continue to next step.**
- If the **Activate FDT** command fails – action required.

Click the **Deactivate FDT** button.

Wait 2 minutes and repeat **Step 13**. If the **Activate** command fails again, contact next level of support.

14. *Click* the **Get FDT Status** button.

- If the **Get FDT Status** command is successful – OK.

See below for a sample status (does not reflect expected state)

- If the **Get FDT Status** command fails – action required.

Repeat **Step 14**. If the **Get FDT Status** command fails again, contact next level of support.

Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
 ---- FDT Tank Drain Procedure ----

Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

FDT Port Locations:

Select	Location Code	Description
<input checked="" type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10

FDT Power/Comm: GOOD
 Frame Attached: IBM Power7 775
 MDA-FD RL: 45D
 Error Status: WARNING
 Tank Level: Full
 Air Pump: Off
 Water Pump: DISABLED
 Tool Mode: Ready
 Pressure Test Calibration: Incomplete
 Component Pressure Test: Incomplete

Sample FDT Status

15. Review the FDT status screen and ensure the following status items are OK:

Status Item	State	Action
-------------	-------	--------

- **Tool Mode:** **Ready** – OK. Check next Status item.
- **Error Status:** **NONE** – OK. Check next Status item.

WARNING – *click* the **Decode Error Status** button, record the information returned and check Tank Level.

CRITICAL – *click* the **Decode Error Status** button, record the information returned and contact next level of support.

Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Tank Drain Procedure ----

- **Tank Level:** **Full, Upper Half, or Lower Half** – OK.
Note tank level, and proceed to next step.
Empty – FDT cannot be drained.
Exit procedure.

16. Locate an empty system water container.

Transport the container to the location of the FDT.

Do not place the container between the FDT and the open frame.

NOTE: Use an empty system water container **only**. If a non-empty system water container is used, water will overflow out of the container.

IBM PN **45D2124** (U.S.), **45D2129** (non-U.S.).

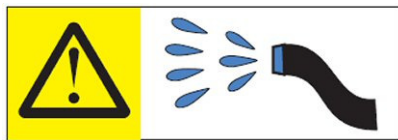
CAUTION: The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations involving the coolant or which may potentially expose you to the coolant. Refer to the MSDS for more information. (C037)



CAUTION: Protective eyewear is needed for the procedure. (L011)



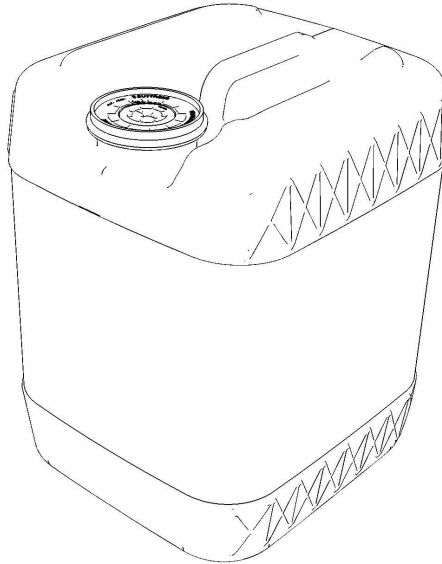
CAUTION: Chemical resistant gloves are needed for this procedure. (L014)



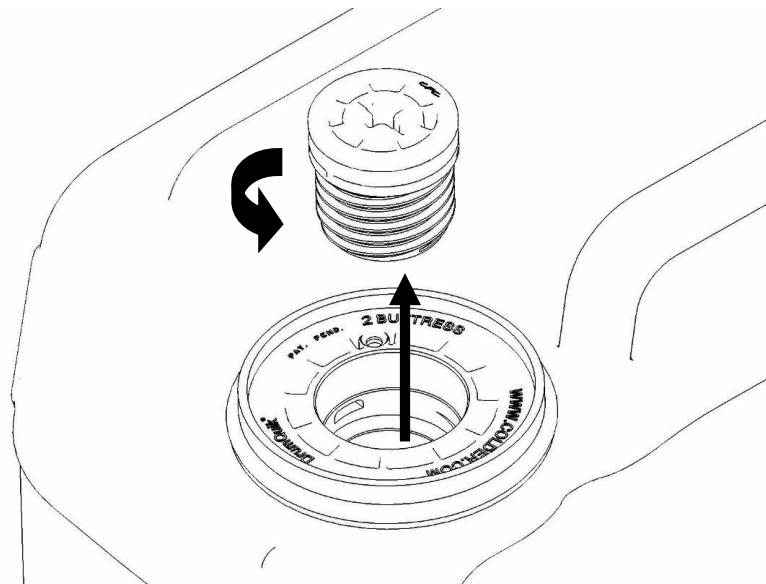
DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

The system water is treated and must not be poured down a sink or on the ground.

Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Tank Drain Procedure ----

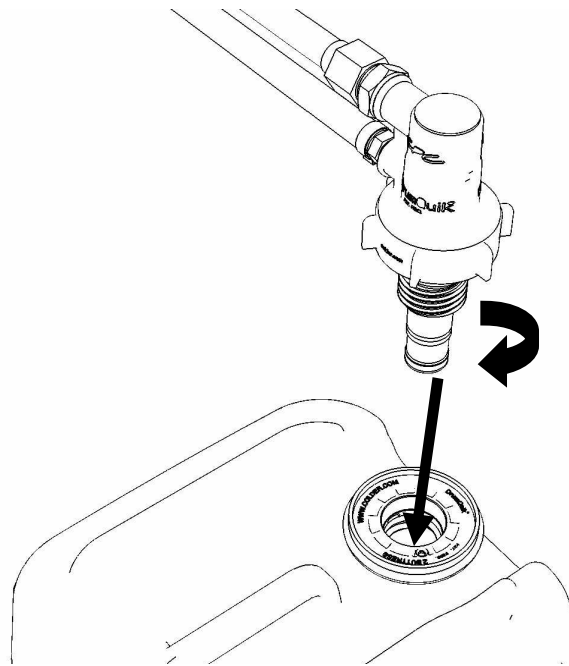


17. Remove the inner cap from the white system water container insert.
Unthread inner cap counter-clockwise with a large screwdriver.

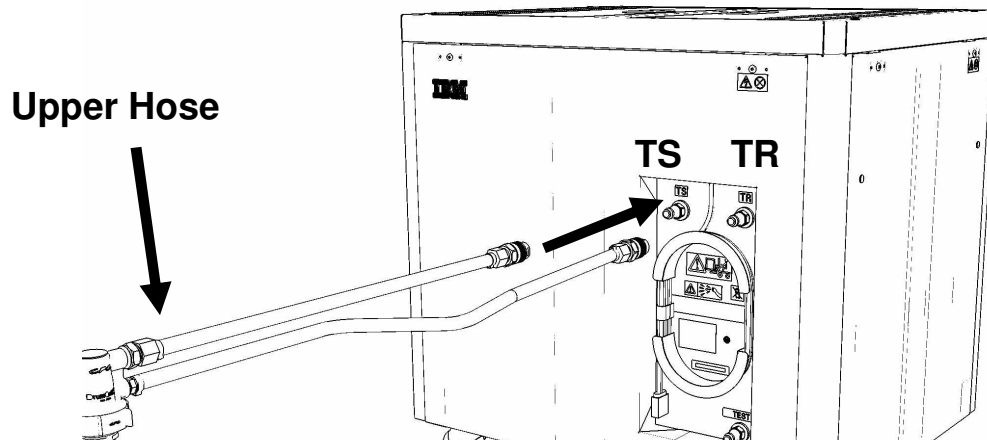


18. Remove transfer hose assembly **THA** from the upper tool storage compartment.
19. Insert large white threaded insert of **THA** into the system water container.
Turn clockwise until hand tight.

Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Tank Drain Procedure ----

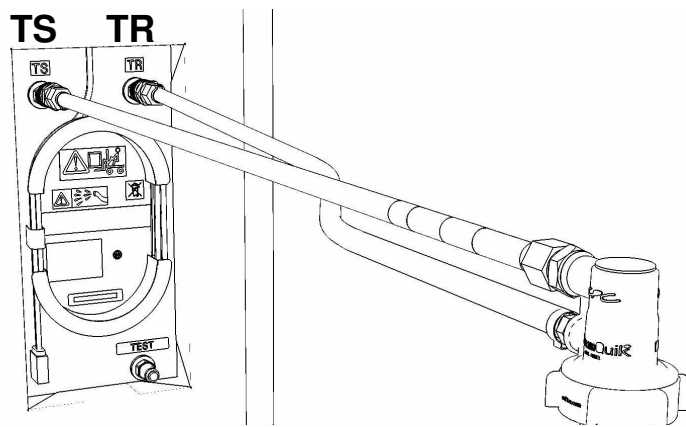
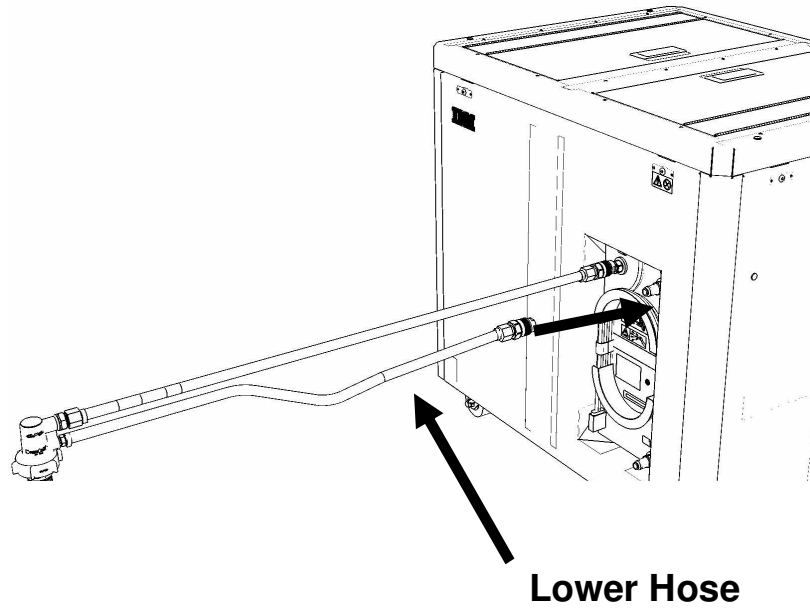


20. Connect the **Upper THA Hose** to the **TS** connection on the front panel of the FDT.



21. Connect the **Lower THA Hose** to the **TR** connection on the front panel of the FDT.

Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Tank Drain Procedure ----



22. Ensure all water connections are made properly and securely.



23. On the FDT panel, *click* the **Drain FDT** button.

The **Get FDT Status** button may be *clicked* to examine FDT status.

NOTE: *The water pump will shut off after 1 minute, 40 seconds of run time.*

CAUTION: **This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)**

24. Verify that the container feels full of water after FDT drain.

Container will weigh approximately 35 lbs. (16 kg) when full.

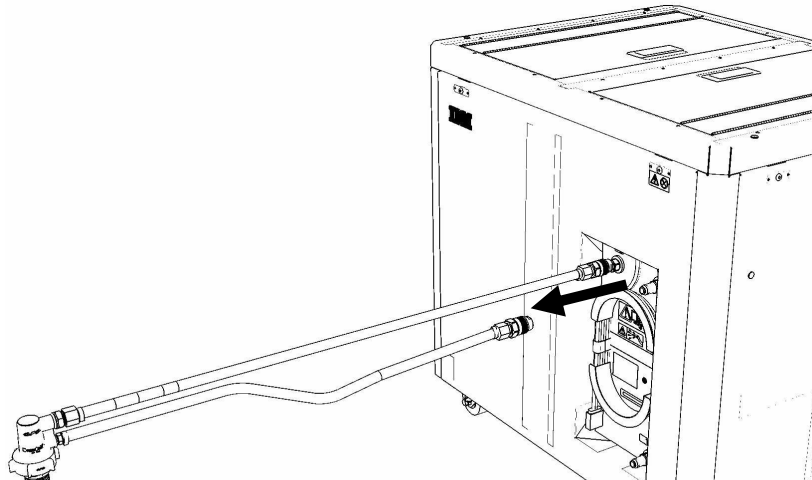
- If container feels full, proceed to **Step 25**.
- If container feels empty, repeat **Step 20** and continue with procedure.
To prevent overflow, only repeat if the system water container is **still empty**.

25. Click the Get FDT Status button and ensure the following status items are OK:

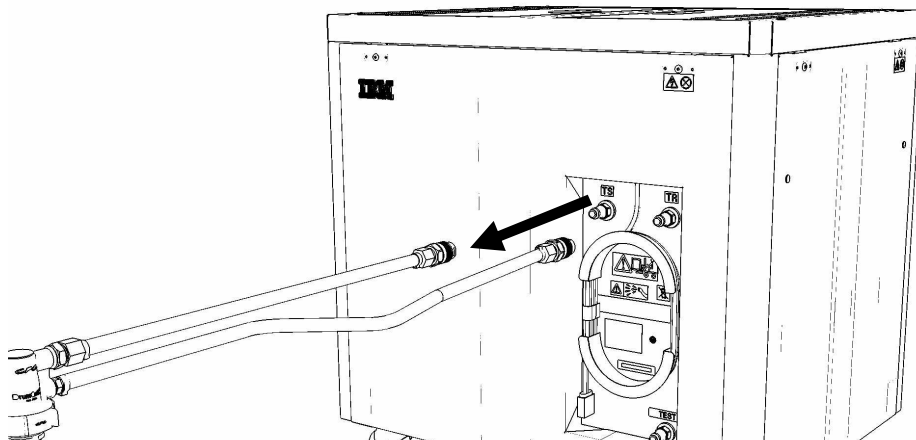
<u>Status Item</u>	<u>State</u>	<u>Action</u>
• Tool mode:	Ready – OK. Check next Status item. FDT Drain Mode – water pump still running. Wait 30 seconds and repeat Step 25 .	
• Error Status:	NONE – OK. Check next Status item. WARNING – <i>click</i> the Decode Error Status button, record information returned and proceed to next step. CRITICAL – <i>click</i> the Decode Error Status button, record information returned and contact next level of support.	
• Tank Level:	Repeat Step 16 to Step 25 (with additional empty container) until desired level is reached. If tank level does not fall, repeat Step 16 through Step 25 . If tank level does not decrease after repeat, contact next level of support. To prevent overflow, only repeat if the system water container is still empty .	

Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Tank Drain Procedure ----

26. Disconnect the **Lower THA Hose** from the **TR** connection on the front panel of the FDT.

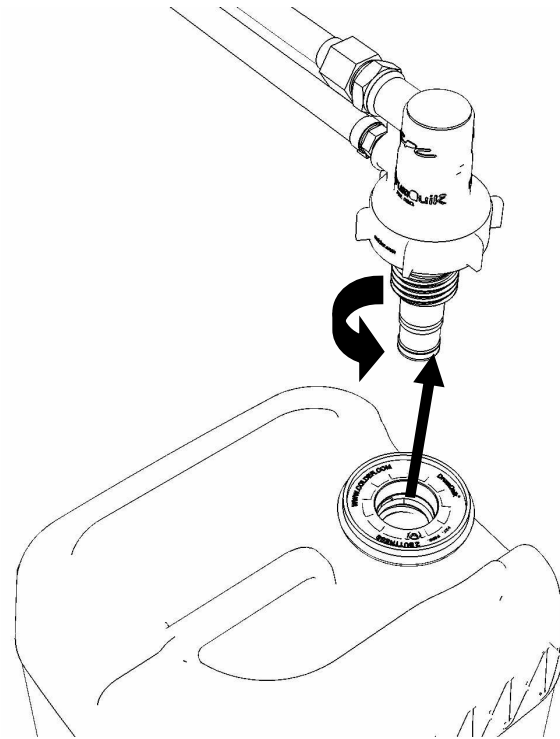


27. Disconnect the **Upper THA Hose** from the **TS** connection on the front panel of the FDT.



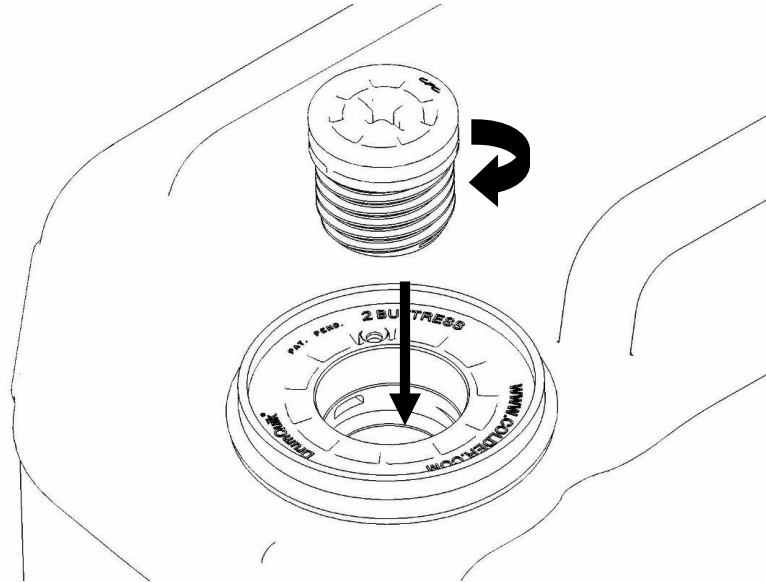
Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Tank Drain Procedure ----

28. Remove large white threaded insert of **THA** from the system water container.
Turn **slowly** counterclockwise until removed.
Some residual pressure may remain on the system water container



29. Replace the inner cap into the white system water container insert.
Turn inner cap clockwise with a large screwdriver.

Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Tank Drain Procedure ----



30. Place all hose assemblies and adapters in their appropriate locations within the FDT storage enclosure.

31. Determine whether the FDT will be used for another procedure:

- If the FDT will be used for another procedure, leave tool activated and go to that procedure now; skip the remaining steps of this procedure.
- If the FDT requires no further use - proceed to the next step.

32. Click the **Deactivate FDT** button.

- If the **Deactivate FDT** command is successful – OK. Proceed to next step.
- If the **Deactivate FDT** command fails– action required.

Repeat **Deactivate FDT**. If the **Deactivate FDT** command fails again, contact next level of support.

33. Disconnect FDT UPIC power cable from port T10 of BPC used.

Wrap the UPIC cable in appropriate cable storage location on FDT.

34. If this procedure was referenced from another procedure, return to parent procedure.

5.4 End of Power775 FDT Tank Drain Procedure

6 POWER775 FILL AND DRAIN TOOL (FDT) TANK FILL PROCEDURE

6.1 Safety Notices

Read "Safety Notices" available from InfoCenter:

<http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7hdx/G229-9054.pdf>

The following cautions apply to all Power775 service procedures:

CAUTION:

Energy hazard present and Shorting might result in system outage and possible physical injury. Remove all metallic jewelry before servicing. (C001)

CAUTION:

The doors and covers to the product are to be closed at all times except for service by trained service personnel. All covers must be replaced and doors locked at the conclusion of the service operation. (C013)

CAUTION:

Servicing of this product or unit is to be performed by trained service personnel only. (C032)

The following notices specifically pertain to this Power775 service procedure.

CAUTION: The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations involving the coolant or which may potentially expose you to the coolant. Refer to the MSDS for more information. (C037)

CAUTION: This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)



DANGER: Hazardous voltage present. Voltages present constitute a shock hazard, which can cause severe injury or death. (L004)



CAUTION: Protective eyewear is needed for the procedure. (L011)

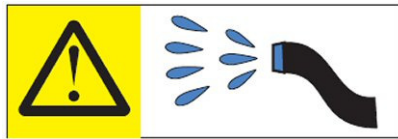
Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Tank Fill Procedure ----



DANGER: Heavy equipment—personal injury or equipment damage might result if mishandled.
(L013)



CAUTION: Chemical resistant gloves are needed for this procedure. (L014)



DANGER: Risk of electric shock due to water or a water solution which is present in this product.
Avoid working on or near energized equipment with wet hands or when spilled water is present.
(L016)

6.2 Background:

This document contains the procedure for filling an **IBM Power 775** Fill and Drain Tool (FDT) tank (internal reservoir).

The FDT is used to transfer water into and out of various components of the **IBM Power 775** system. When a system component or the entire system is filled, the water will be transferred from the tank (internal reservoir) within the FDT to the component or system. During fill operations, the FDT tank may become empty, and if so, will need to be periodically filled using the supplied system water containers. Individual system water containers treated with a corrosion inhibitor are shipped with the system. The FDT Tank Fill Procedure instructs the user to properly transfer water out of a full system water container into the FDT Tank.

During system or component filling operations, if the FDT senses that the internal reservoir has become empty, it will terminate any running fill routine, as well as prevent any further fill routines from being executed. This may occur during a system or component fill procedure; if so, the system or component fill procedure must be paused, and this FDT Tank Fill Procedure must be completed before system/component filling can resume.

The system water is treated and must not be poured down a sink or on the ground.

Reference Information:

IBM Power 775 FDT P/N:	45D6928
IBM System Water Container P/N:	45D2124 (U.S.), 45D2129 (non-U.S.)
Hose assemblies/adapters required:	THA (45D8563)

Approximate FDT internal water volume: 32 L

Expected filling time for one (1) system water container: 1 min, 30 s

NOTE: *Some steps in this procedure may be redundant due to other service operations being completed prior to this procedure. If a step has already been completed, verify that the step has been completed properly and proceed to the next step.*

6.3 Procedure:

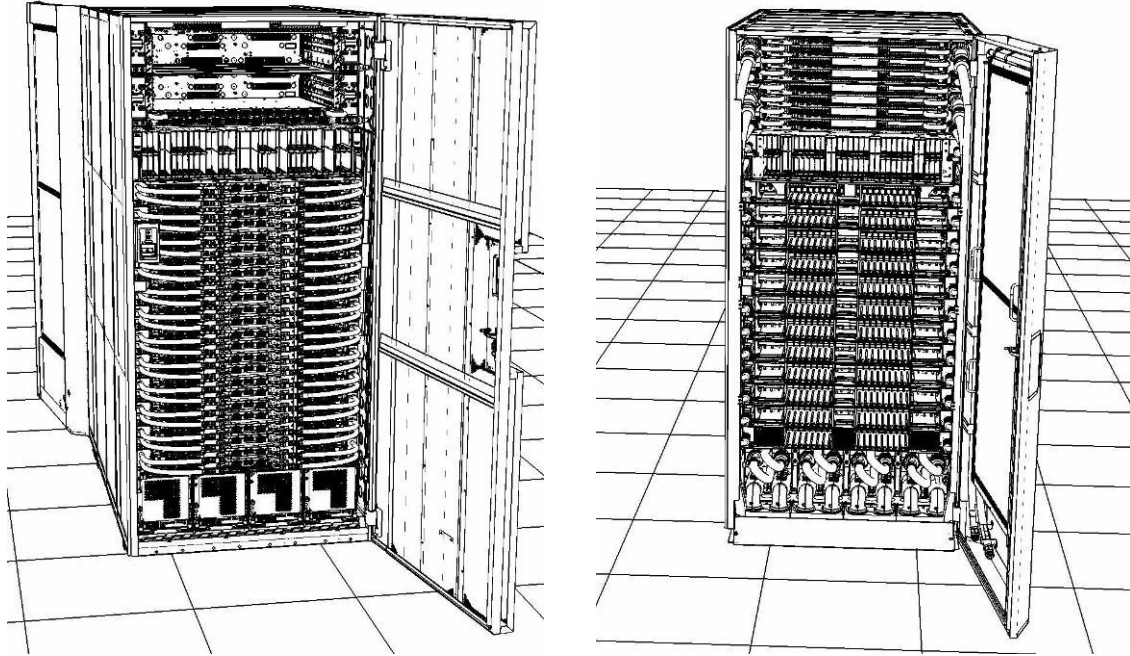
NOTE: If you already have the FDT powered on, proceed to **Step 14**. Otherwise, start procedure at **Step 1**.

Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Tank Fill Procedure ----

1. Identify the **Power 775** frame that requires service.

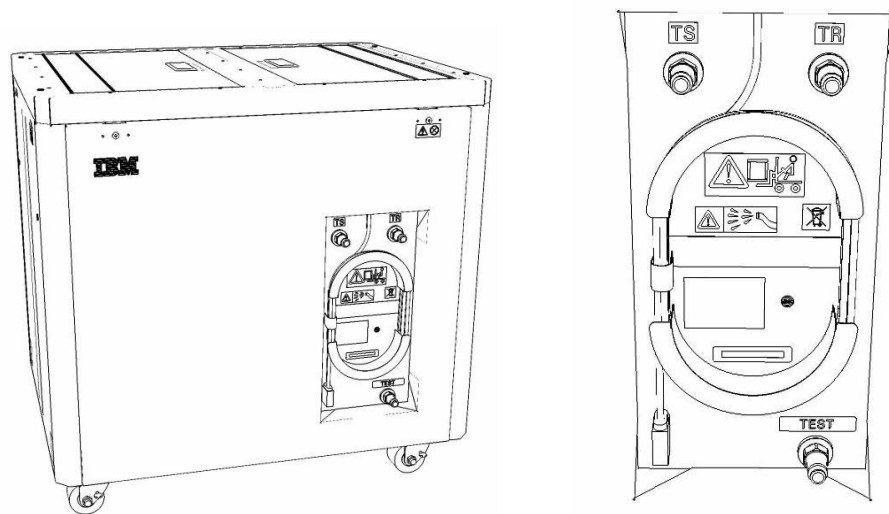
Verify that the system UEPO is set to **ON**, and the managing consoles (HMC and XCat) are powered on and communicating with the frame.

2. Open front and rear doors of the **Power 775** frame that requires service.



3. Bring the FDT to the front side of the **Power 775** frame that requires service.
4. Locate the panel of the FDT that contains the Universal Power and Information Cable (UPIC), as well as the **TS**, **TR**, and **TEST** water connections.

This side of the tool should be facing the front of the frame.

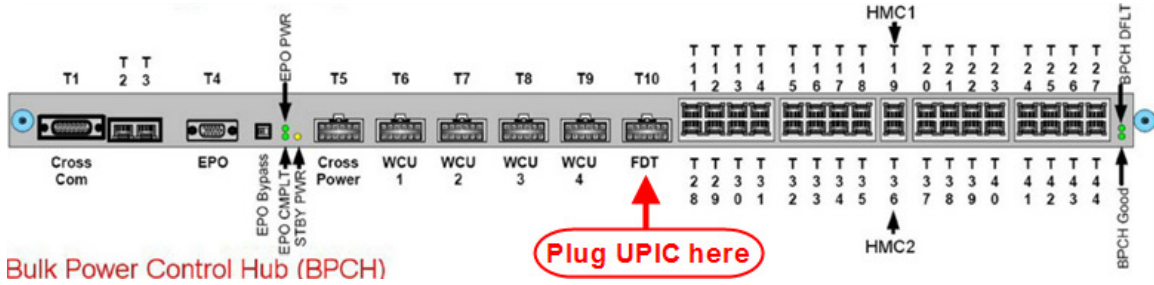


5. Unwrap the FDT UPIC cable from the storage loop on the FDT.

**Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Tank Fill Procedure ----**

6. Select BPC port for FDT

- If the lower BPA is not targeted for service, and is functional:
Plug the FDT UPIC cable into **port T10 of the lower BPC.**
- If the lower BPA is targeted for service, or is not functional:
Plug the FDT UPIC cable into **port T10 of the upper BPC.**



7. Login to the HMC with the User ID **hscroot**.

Use the HMC that is connected to the BPA where the FDT is plugged.

8. From the HMC left Navigation menu, expand **Systems Management** then select **Frames**.

Verify frame serial number for the frame to be serviced.

9. In the **Frames** view on the HMC, place a checkmark in the **Select** column for the frame to be serviced.

10. Verify that the frame **Status** is **Rack Standby/Rack Standby** or **Standby/Standby**.

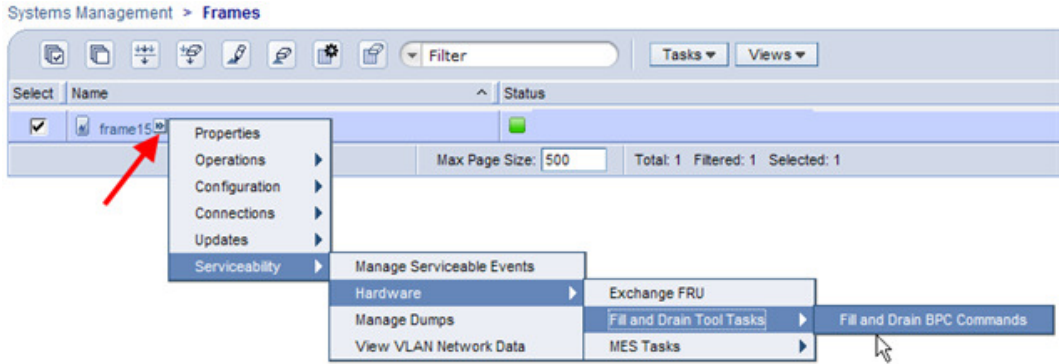
- If frame **Status** reads **Rack Standby/Rack Standby** or **Standby/Standby** – OK.

Continue to next step.

- If frame **Status** does not read **Rack Standby/Rack Standby** or **Standby/Standby** – action required. Contact next level of support.

11. From the **Task** menu on the HMC, *select* **Serviceability** > **Hardware** > **Fill and Drain Tool Tasks** > **Fill and Drain Command Interface**

**Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Tank Fill Procedure ----**



Fill and Drain Tool Command Interface will display. See below for a sample image of the interface (FDT deactivated).

Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

FDT Port Locations:

Select	Location Code	Description
<input type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10

Activate FDT Deactivate FDT
Get FDT Status Decode Error Status
Fill FDT Drain FDT
Start Water Pump Reset FDT Start Air Pump
Pressure Test Calibration Component Pressure Test

Launch WCU Commands
WCU Tank Air Purge

Exit Help

12. Select the BPC port that the FDT was plugged into in **Step 6** from the **FDT Port Locations:** list.

13. *Click* the **Activate FDT** button.

- If the Activate FDT command is successful – OK. **Wait 30 seconds and continue to next step.**
- If the **Activate FDT** command fails – action required.

Click the **Deactivate FDT** button.

Wait 2 minutes and repeat **Step 13**. If the **Activate** command fails again, contact next level of support.

14. *Click* the **Get FDT Status** button.

- If the **Get FDT Status** command is successful – OK.
See below for a sample status (does not reflect expected state)
- If the **Get FDT Status** command fails – action required.

Repeat **Step 14**. If the **Get FDT Status** command fails again, contact next level of support.

Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
 ---- FDT Tank Fill Procedure ----

Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

FDT Port Locations:

Select	Location Code	Description
<input checked="" type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10

FDT Power/Comm: GOOD
 Frame Attached: IBM Power7 775
 MDA-FD RL: 45D
 Error Status: WARNING
 Tank Level: Full
 Air Pump: Off
 Water Pump: DISABLED
 Tool Mode: Ready
 Pressure Test Calibration: Incomplete
 Component Pressure Test: Incomplete

Sample FDT Status

15. Review the FDT status screen and ensure the following status items are OK:

Status Item	State	Action
-------------	-------	--------

- **Tool Mode:** **Ready** – OK. Check next Status item.
- **Error Status:** **NONE** – OK. Check next Status item.

WARNING – *click* the **Decode Error Status** button, record the information returned and check Tank Level.

Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Tank Fill Procedure ----

CRITICAL – *click* the **Decode Error Status** button, record the information returned and contact next level of support.

- **Tank Level: Lower Half or Empty** – OK.

Note tank level, and proceed to next step.

Upper Half or Full – FDT should not be filled.

Exit procedure.

16. Locate a full system water container.

Transport the container to the location of the FDT.

Do not place the container between the FDT and the open frame.

NOTE: *Use of a non-full system water container will result in repeated FDT filling operations.*

IBM PN **45D2124** (U.S.), **45D2129** (non-U.S.).

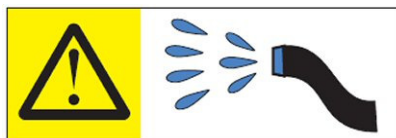
CAUTION: The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations involving the coolant or which may potentially expose you to the coolant. Refer to the MSDS for more information. (C037)



CAUTION: Protective eyewear is needed for the procedure. (L011)



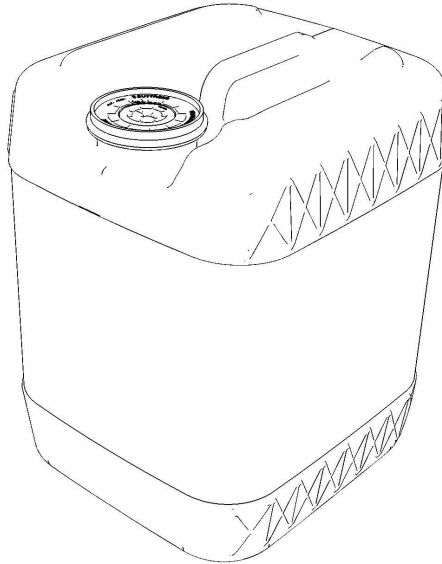
CAUTION: Chemical resistant gloves are needed for this procedure. (L014)



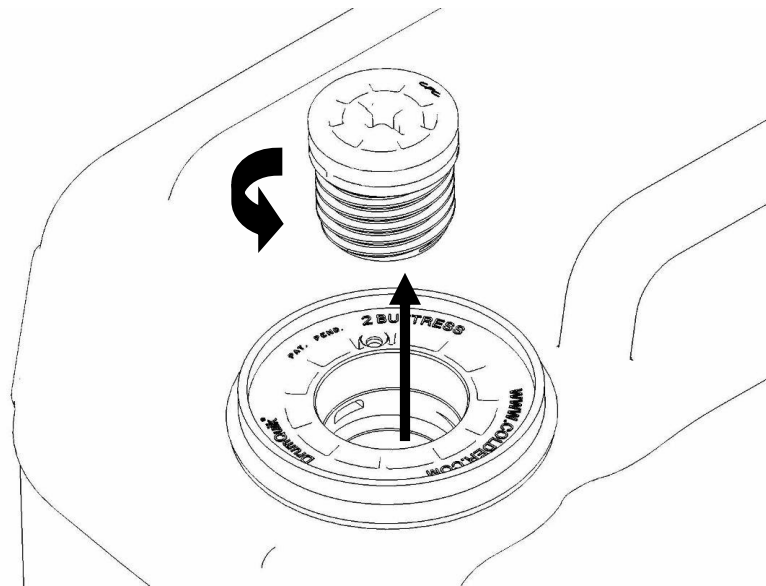
DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

The system water is treated and must not be poured down a sink or on the ground.

Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Tank Fill Procedure ----



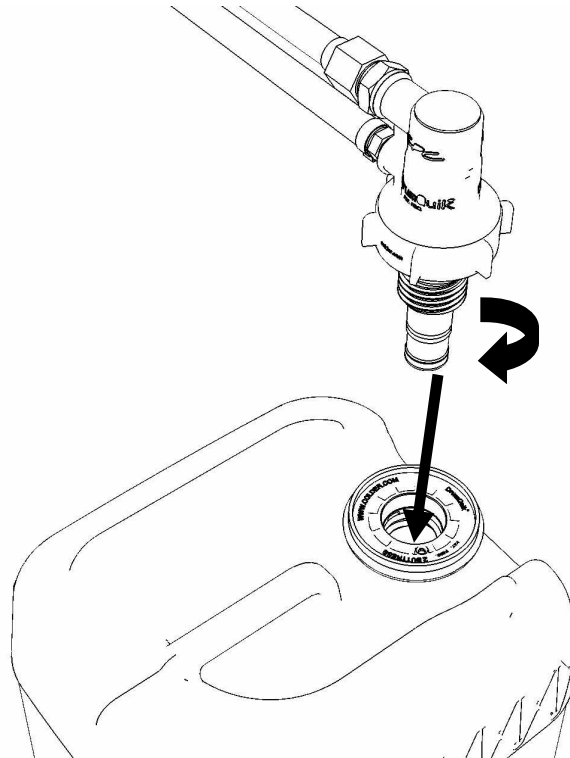
17. Remove the inner cap from the white system water container insert.
Unthread inner cap counter-clockwise with a large screwdriver.



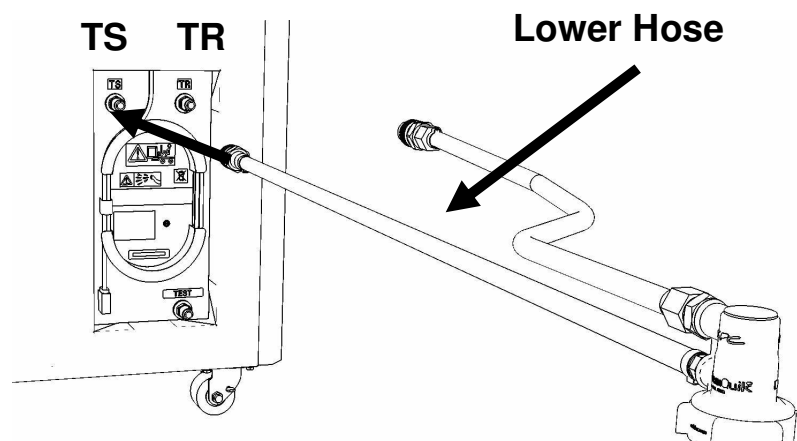
18. Remove transfer hose assembly **THA** from the upper tool storage compartment.

Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Tank Fill Procedure ----

19. Insert large white threaded insert of **THA** into the system water container.
Turn clockwise until hand tight.

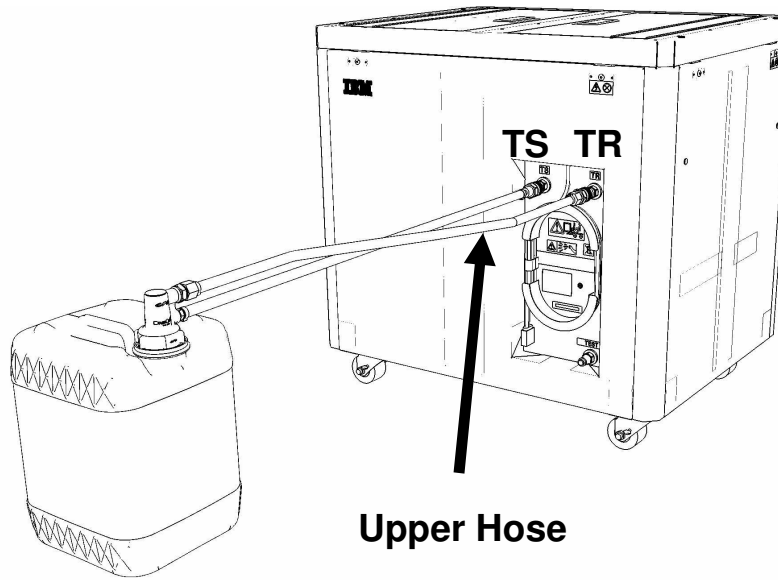


20. Connect the **Lower THA Hose** to the **TS** connection on the front panel of the FDT.

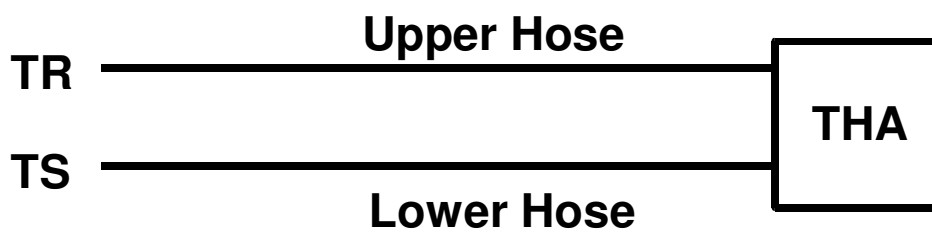


Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Tank Fill Procedure ----

21. Connect the **Upper THA Hose** to the **TR** connection on the front panel of the FDT.



22. Ensure all water connections are made properly and securely.



23. On the FDT panel, *click* the **Fill FDT** button.

The **Get FDT Status** button may be *clicked* to examine FDT status.

NOTE: *The air pump will shut off after 1 minute, 40 seconds of run time.*

CAUTION: **This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)**

24. Verify that the container feels empty after FDT fill.

Container will weigh approximately 5 lbs. (2 kg) when empty.

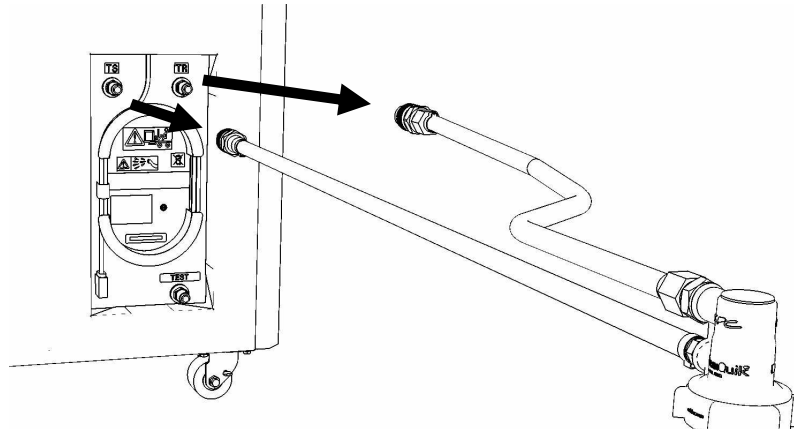
- If container feels empty, proceed to **Step 25**.
- If container does not feel empty, repeat **Step 20** and continue with procedure.

25. Click the **Get FDT Status** button and ensure the following status items are OK:

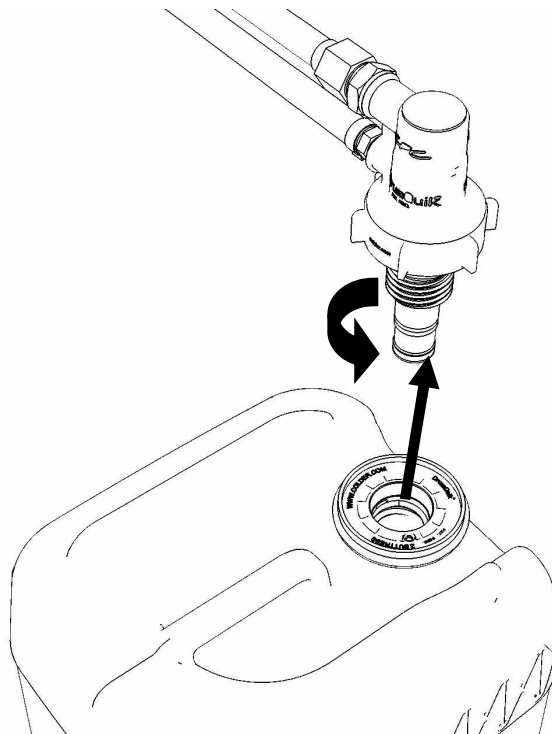
<u>Status Item</u>	<u>State</u>	<u>Action</u>
• Tool mode:	Ready – OK. Check next Status item. FDT Fill Mode – air pump still running. Wait 30 seconds and repeat Step 25 .	
• Error Status:	NONE – OK. Check next Status item. WARNING – <i>click</i> the Decode Error Status button, record information returned and proceed to next step. CRITICAL – <i>click</i> the Decode Error Status button, record information returned and contact next level of support.	
• Tank Level:	Repeat Step 16 to Step 25 (with additional full container) until desired level is reached. If tank level does not rise, repeat Step 16 through Step 25 . If tank level does not increase after repeat, contact next level of support.	

Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Tank Fill Procedure ----

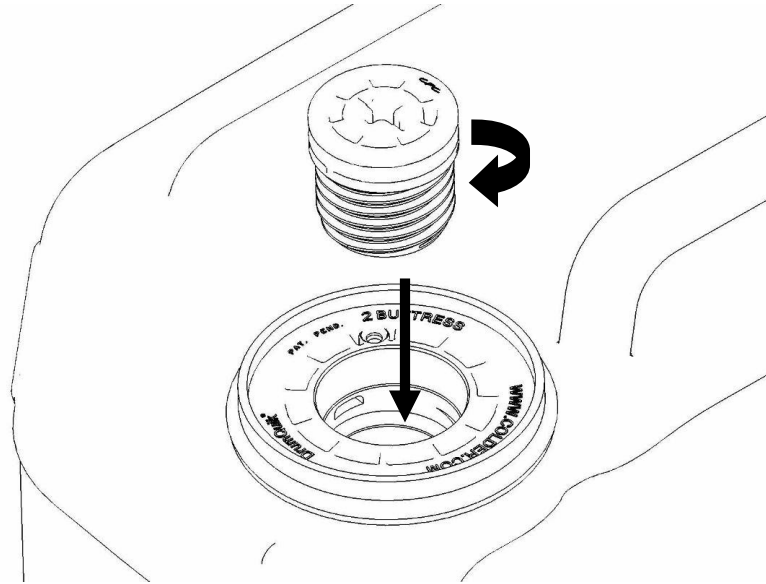
26. Disconnect the **Lower THA Hose** from the **TS** connection on the front panel of the FDT.
27. Disconnect the **Upper THA Hose** from the **TR** connection on the front panel of the FDT.



28. Remove large white threaded insert of **THA** from the system water container.
Turn **slowly** counterclockwise until removed.
Some residual pressure may remain on the system water container



29. Replace the inner cap into the white system water container insert.
Turn inner cap clockwise with a large screwdriver.



30. Place all hose assemblies and adapters in their appropriate locations within the FDT storage enclosure.
31. Determine whether the FDT will be used for another procedure:
- If the FDT will be used for another procedure, leave tool activated and go to that procedure now; skip the remaining steps of this procedure.
 - If the FDT requires no further use - proceed to the next step.
32. *Click* the **Deactivate FDT** button.
- If the **Deactivate FDT** command is successful – OK. Proceed to next step.
 - If the **Deactivate FDT** command fails– action required.
Repeat **Deactivate FDT**. If the **Deactivate FDT** command fails again, contact next level of support.
33. Disconnect FDT UPIC power cable from port T10 of BPC used.
Wrap the UPIC cable in appropriate cable storage location on FDT.
34. If this procedure was referenced from another procedure, return to parent procedure.

6.4 End of Power775 FDT Tank Fill Procedure

7 POWER775 FILL AND DRAIN TOOL (FDT) PRESSURE TEST CALIBRATION PROCEDURE

7.1 Safety Notices

Read "Safety Notices" available from InfoCenter:

<http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7hdx/G229-9054.pdf>

The following cautions apply to all Power775 service procedures:

CAUTION:

Energy hazard present and Shorting might result in system outage and possible physical injury. Remove all metallic jewelry before servicing. (C001)

CAUTION:

The doors and covers to the product are to be closed at all times except for service by trained service personnel. All covers must be replaced and doors locked at the conclusion of the service operation. (C013)

CAUTION:

Servicing of this product or unit is to be performed by trained service personnel only. (C032)

The following notices specifically pertain to this Power775 service procedure.

CAUTION: The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations involving the coolant or which may potentially expose you to the coolant. Refer to the MSDS for more information. (C037)

CAUTION: This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)



DANGER: Hazardous voltage present. Voltages present constitute a shock hazard, which can cause severe injury or death. (L004)



CAUTION: Protective eyewear is needed for the procedure. (L011)

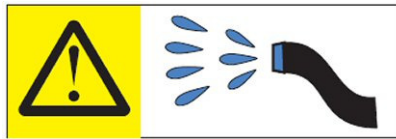
Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Pressure Test Calibration Procedure ----



DANGER: Heavy equipment—personal injury or equipment damage might result if mishandled. (L013)



CAUTION: Chemical resistant gloves are needed for this procedure. (L014)



DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

7.2 Background:

This document contains the procedure for performing an **IBM Power 775** Fill and Drain Tool (FDT) pressure test calibration procedure for an **IBM Power 775** system.

To ensure that all water cooled components in the **IBM Power 775** system are leak-free, the **IBM Power 775** Fill and Drain Tool (FDT) is equipped with air pressure testing capability. The FDT Pressure Test Calibration routine is designed as a diagnostic test to verify the integrity of the FDT air pump, associated plumbing, and hose assemblies. This procedure tests for leaks within the FDT and FDT hose assemblies, and *must* be completed before a component (FRU) pressure test or fill is executed. The results of the calibration routine are recorded within the FDT.

If the calibration passes, system and component pressure tests can be completed.

If the calibration fails, there is a functional defect in the FDT or hose assemblies. System or component pressure tests cannot be completed. System or component fills must not be completed unless pressure tests are done first to ensure there are no leaks. Upon a calibration failure, the next level of support must be contacted for FDT debug and repair.

Once the FDT has been activated, a system or component fill procedure cannot be executed unless both the Pressure Test Calibration and Component Pressure Test have passed. The water pump within the FDT will otherwise be disabled until these conditions are met.

To properly complete a pressure test, the FDT hose assemblies must be purged of water. No specific hose drain procedure is required; the Pressure Test Calibration routine will drain all required hose assemblies if they have been left full of water.

Reference Information:

IBM Power 775 FDT P/N:	45D6928
Hose assemblies/adapters required:	HA1 (45D8561) HA2 (45D8562) A3 (45D8567)

Total Pressure Test Calibration runtime: 1 min (air pump on 30 s)

NOTE: *Some steps in this procedure may be redundant due to other service operations being completed prior to this procedure. If a step has already been completed, verify that the step has been completed properly and proceed to the next step.*

7.3 Procedure:

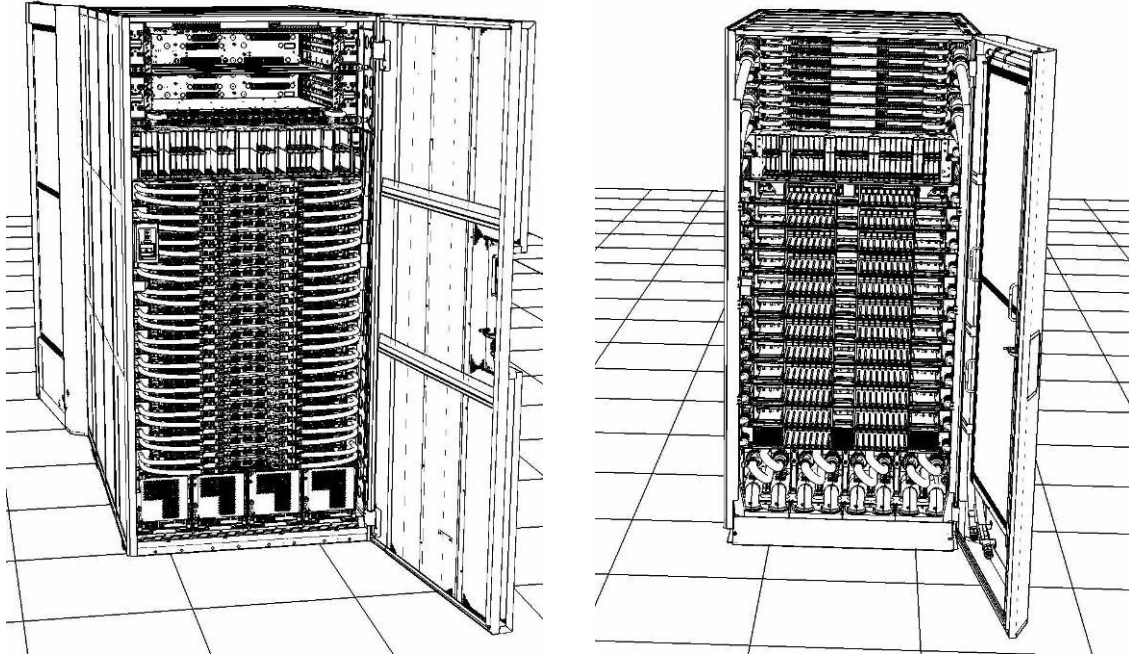
NOTE: If you already have the FDT powered on, proceed to **Step 14**. Otherwise, start procedure at **Step 1**.

Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Pressure Test Calibration Procedure ----

1. Identify the **Power 775** frame that requires service.

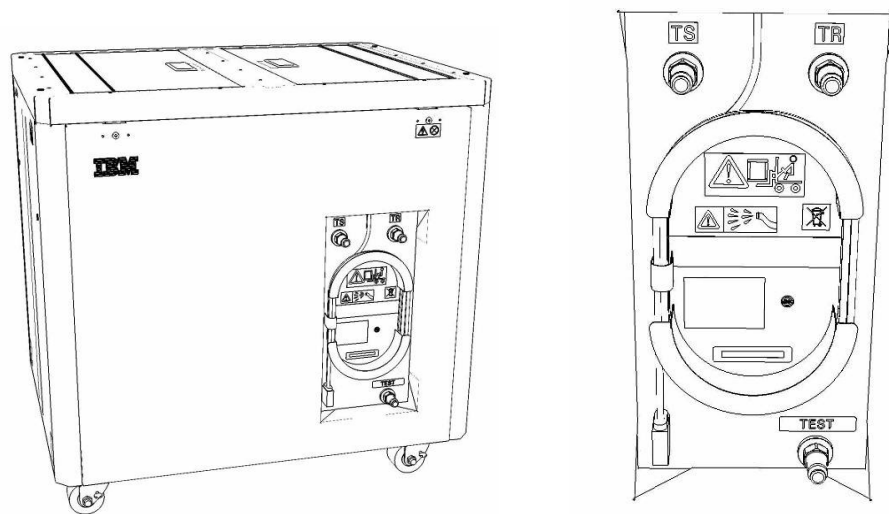
Verify that the system UEPO is set to **ON**, and the managing consoles (HMC and XCat) are powered on and communicating with the frame.

2. Open front and rear doors of the **Power 775** frame that requires service.



3. Bring the FDT to the front side of the **Power 775** frame that requires service.
4. Locate the panel of the FDT that contains the Universal Power and Information Cable (UPIC), as well as the **TS**, **TR**, and **TEST** water connections.

This side of the tool should be facing the front of the frame.

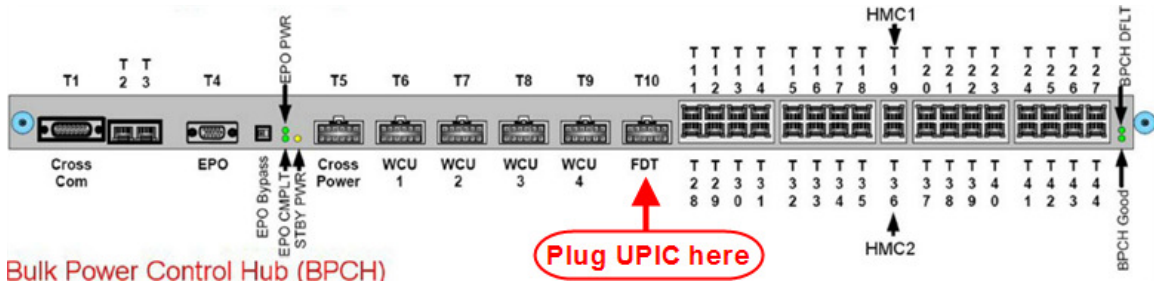


5. Unwrap the FDT UPIC cable from the storage loop on the FDT.

**Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Pressure Test Calibration Procedure ----**

6. Select BPC port for FDT

- If the lower BPA is not targeted for service, and is functional:
Plug the FDT UPIC cable into **port T10 of the lower BPC.**
- If the lower BPA is targeted for service, or is not functional:
Plug the FDT UPIC cable into **port T10 of the upper BPC.**



7. Login to the HMC with the User ID **hscroot**.

Use the HMC that is connected to the BPA where the FDT is plugged.

8. From the HMC left Navigation menu, expand **Systems Management** then select **Frames**.

Verify frame serial number for the frame to be serviced.

9. In the **Frames** view on the HMC, place a checkmark in the **Select** column for the frame to be serviced.

10. Verify that the frame **Status** is **Rack Standby/Rack Standby** or **Standby/Standby**.

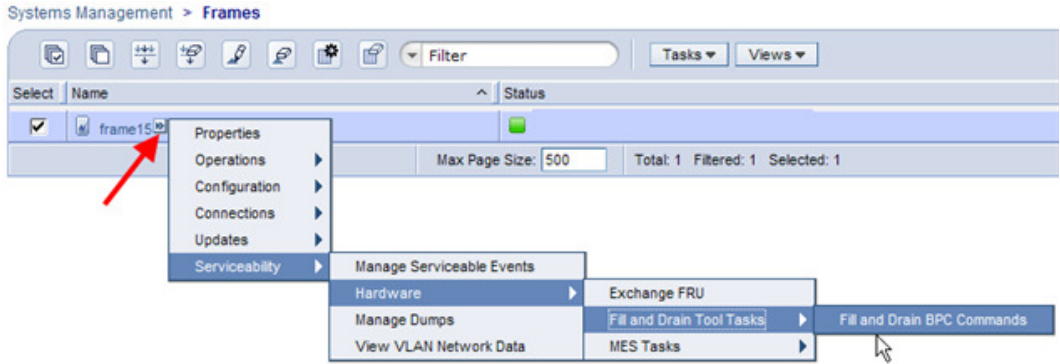
- If frame **Status** reads **Rack Standby/Rack Standby** or **Standby/Standby** – OK.

Continue to next step.

- If frame **Status** does not read **Rack Standby/Rack Standby** or **Standby/Standby** – action required. Contact next level of support.

11. From the **Task** menu on the HMC, *select* **Serviceability** > **Hardware** > **Fill and Drain Tool Tasks** > **Fill and Drain Command Interface**

**Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Pressure Test Calibration Procedure ----**



Fill and Drain Tool Command Interface will display. See below for a sample image of the interface (FDT deactivated).

Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

FDT Port Locations:

Select	Location Code	Description
<input type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10

Activate FDT Deactivate FDT
Get FDT Status Decode Error Status
Fill FDT Drain FDT
Start Water Pump Reset FDT Start Air Pump
Pressure Test Calibration Component Pressure Test

Launch WCU Commands WCU Tank Air Purge
Exit Help

12. Select the BPC port that the FDT was plugged into in **Step 6** from the **FDT Port Locations:** list.

13. *Click* the **Activate FDT** button.

- If the Activate FDT command is successful – OK. **Wait 30 seconds and continue to next step.**
- If the **Activate FDT** command fails – action required.

Click the **Deactivate FDT** button.

Wait 2 minutes and repeat **Step 13**. If the **Activate** command fails again, contact next level of support.

14. *Click* the **Get FDT Status** button.

- If the **Get FDT Status** command is successful – OK.

See below for a sample status (does not reflect expected state)

- If the **Get FDT Status** command fails – action required.

Repeat **Step 14**. If the **Get FDT Status** command fails again, contact next level of support.

Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
 ---- FDT Pressure Test Calibration Procedure ----

Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

FDT Port Locations:

Select	Location Code	Description
<input checked="" type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10

FDT Power/Comm: GOOD
 Frame Attached: IBM Power7 775
 MDA-FD RL: 45D
 Error Status: WARNING
 Tank Level: Full
 Air Pump: Off
 Water Pump: DISABLED
 Tool Mode: Ready
 Pressure Test Calibration: Incomplete
 Component Pressure Test: Incomplete

Sample FDT Status

15. Review the FDT status screen and ensure the following status items are OK:

Status Item	State	Action
-------------	-------	--------

- **Tool Mode:** **Ready** – OK. Check next Status item.
- **Error Status:** **NONE** – OK. Check next Status item.

WARNING – *click* the **Decode Error Status** button, record the information returned and check Tank Level.

CRITICAL – *click* the **Decode Error Status** button, record the information returned and contact next level of support.

Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Pressure Test Calibration Procedure ----

- **Tank Level:** **Upper Half, Lower Half or Empty** – OK. Check next Status item.
Full – action required.
Exit this procedure and perform the **Power 775 Fill and Drain Tool (FDT) Tank Drain Procedure**.
Once FDT tank level is **Upper Half, Lower Half or Empty**, return to this step and continue with procedure.
- **Pressure Test Calibration:** **Incomplete** - OK. Proceed to next step.
Pass or Fail – action required.
*Click the **Deactivate FDT** button.*
Repeat **Step 13** and continue with procedure.

16. Before proceeding, read required safety information:

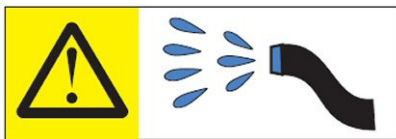
CAUTION: The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations involving the coolant or which may potentially expose you to the coolant. Refer to the MSDS for more information. (C037)



CAUTION: Protective eyewear is needed for the procedure. (L011)



CAUTION: Chemical resistant gloves are needed for this procedure. (L014)

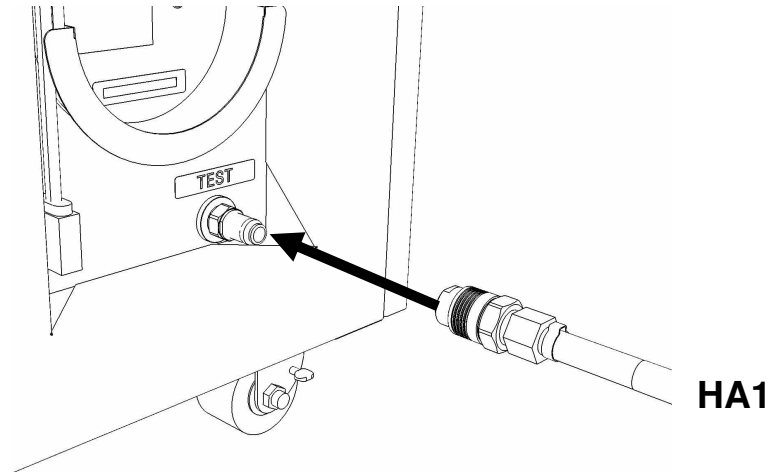


DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

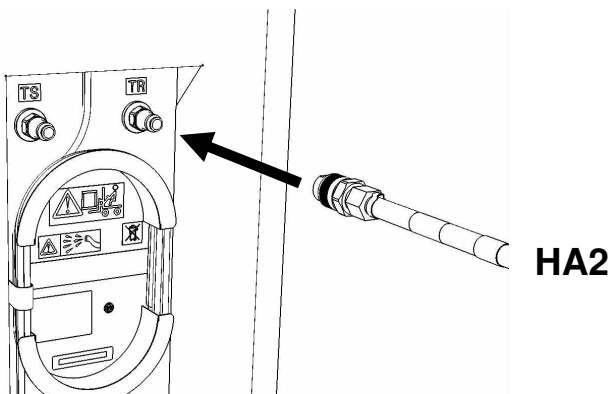
17. Remove hose assembly **HA1** from the upper tool storage compartment.

Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Pressure Test Calibration Procedure ----

Connect either end of hose assembly **HA1** to the **TEST** connection on the front panel of the FDT.



18. Remove hose assembly **HA2** from the upper tool storage compartment. Connect the end *without sight glass* to the TR connection on the FDT.

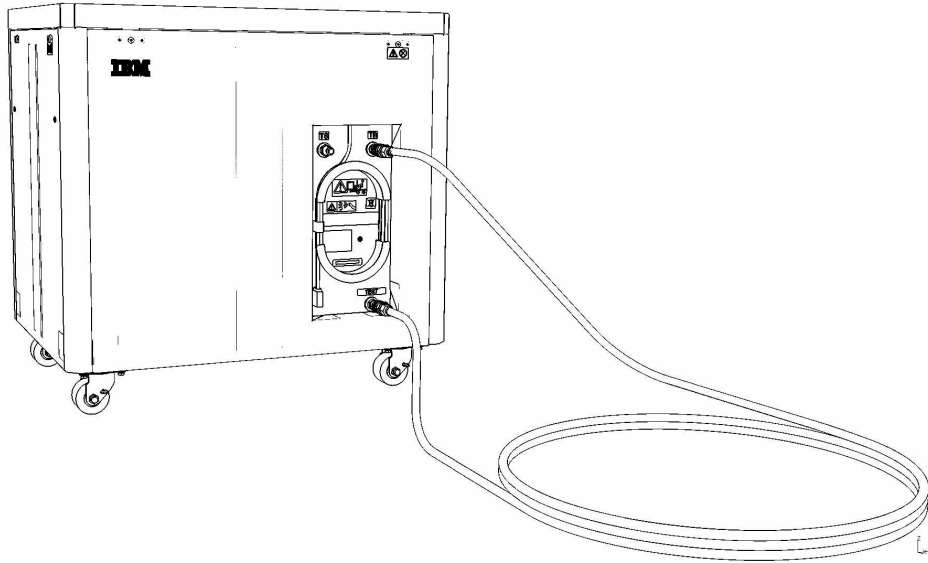


19. Remove adapter **A3** from the FDT.

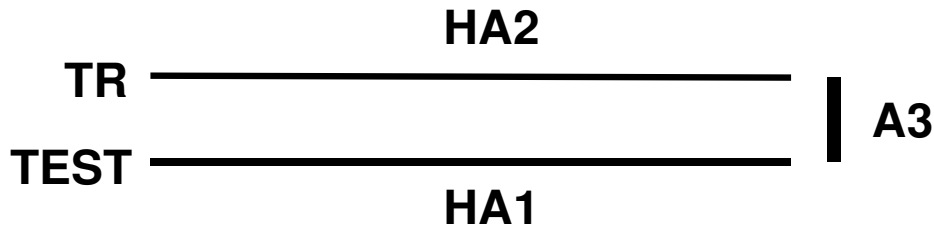
Connect the free ends of **HA1** and **HA2** together via adapter **A3**.

Place excess hose on floor in front of FDT.

Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Pressure Test Calibration Procedure ----



20. Ensure all water connections are made properly and securely.



21. On the FDT panel, *click* the **Pressure Test Calibration** button.

The **Get FDT Status** button may be *clicked* to examine FDT status.

NOTE: *The pressure testing will last for 1 minute (30 seconds with air pump on)*

CAUTION: **This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)**

22. *Click* the **Get FDT Status** button and review the following:

- **Tool mode:** **Ready – OK.** Check Error Status.
 Pressure Test Calibration Mode – pressure test still running.

Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Pressure Test Calibration Procedure ----

Wait 30 seconds and repeat **Step 22**.

- **Error Status:** **NONE** – OK. Check Pressure Test Calibration.
WARNING – *click* the **Decode Error Status** button, record information returned and proceed to next step.
CRITICAL – *click* the **Decode Error Status** button, record information returned and contact next level of support.
- **Pressure Test Calibration:** **Pass** – OK. Proceed to next step.
Fail or Incomplete – action required.
Click the **Reset FDT** button.
Repeat **Step 17** and continue with procedure.
If the test read **Fail** twice, hardware is defective. Contact next level of support.

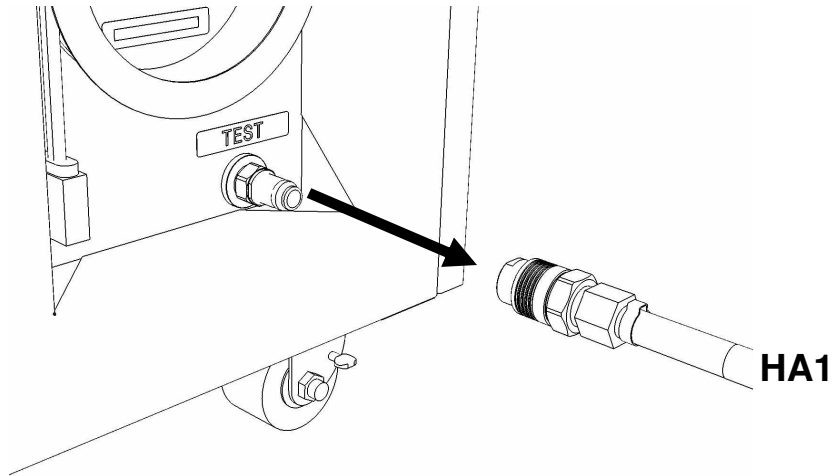
23. The FDT Pressure Test Calibration has passed successfully.

NOTE: *If a Component Pressure Test procedure will be completed following this test, disregard Step 25 – 26. These hose connections will be the same in the component pressure test procedure.*

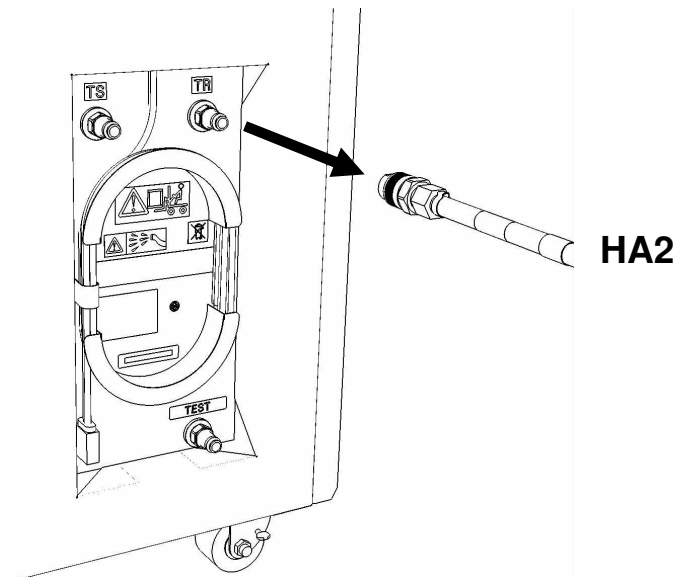
24. Disconnect hose assemblies **HA1** and **HA2** from adapter **A3**.

Power775 Bulk Power Distributor (BPD) Fill and Drain Tool Procedures:
---- FDT Pressure Test Calibration Procedure ----

25. Disconnect the FDT end of **HA1** from **TS** on the FDT.



26. Disconnect the FDT end of **HA2** from **TR** on the FDT.



27. Place all hose assemblies and adapters in their appropriate locations within the FDT storage enclosure.

28. Determine whether the FDT will be used for another procedure:

- If the FDT will be used for another procedure, leave tool activated and go to that procedure now; skip the remaining steps of this procedure.
- If the FDT requires no further use - proceed to the next step.

29. *Click* the **Deactivate FDT** button.

- If the **Deactivate FDT** command is successful – OK. Proceed to next step.
- If the **Deactivate FDT** command fails– action required.

Repeat **Deactivate FDT**. If the **Deactivate FDT** command fails again, contact next level of support.

30. Disconnect FDT UPIC power cable from port T10 of BPC used.

Wrap the UPIC cable in appropriate cable storage location on FDT.

31. If this procedure was referenced from another procedure, return to parent procedure.

7.4 End of Power775 FDT Pressure Test Calibration Procedure

8 APPENDIX A: IBM POWER775 FDT VOLUME TABLES

8.1 IBM Power 775 Component Water Volumes

	Liters	Gallons
WCU	10.75	2.84
Supply Manifold	5.64	1.49
Return Manifold	5.64	1.49
CEC	1.74	0.46
CEC DCCA	0.07	0.02
CEC + 2 DCCAs	1.87	0.49
BPE	0.97	0.26
BPR	0.12	0.03
BPD	0.18	0.05
Disk Enclosure	0.90	0.24
RDHX	7.50	1.98
System Water Container	15.00	3.96
FDT Tank (Internal Reservoir)	32.00	8.45

Table 4 IBM Power 775 Component Water Volumes

8.2 IBM Power 775 System Water Volumes

		Number of CEC Drawers										
		2	3	4	5	6	7	8	9	10	11	12
Number of Disk Enclosures	0	46.8	48.6	50.5	63.6	65.4	67.3	69.2	82.3	84.1	86.0	87.9
	1	47.7	49.5	51.4	64.5	66.3	68.2	70.1	83.2	85.0	86.9	88.8
	2	48.6	50.4	52.3	65.4	67.2	69.1	71.0	84.1	85.9		
	3	49.5	51.3	53.2	66.3	68.1	70.0	71.9				
	4	50.4	52.2	54.1	67.2	69.0						
	5	51.3	53.1	55.0								
	6	52.2										

(Volumes in Liters)

Table 5 IBM Power 775 System Water Volume (Liters)

		Number of CEC Drawers										
		2	3	4	5	6	7	8	9	10	11	12
Number of Disk Enclosures	0	12.4	12.8	13.3	16.8	17.3	17.8	18.3	21.7	22.2	22.7	23.2
	1	12.6	13.1	13.6	17.0	17.5	18.0	18.5	22.0	22.5	23.0	23.5
	2	12.8	13.3	13.8	17.3	17.8	18.3	18.8	22.2	22.7		
	3	13.1	13.6	14.1	17.5	18.0	18.5	19.0				
	4	13.3	13.8	14.3	17.7	18.2						
	5	13.5	14.0	14.5								
	6	13.8										

(Volumes in Gallons)

Table 6 IBM Power 775 System Water Volume (Gallons)

8.3 IBM Power 775 System Water Containers per Frame

		Number of CEC Drawers										
		2	3	4	5	6	7	8	9	10	11	12
Number of Disk Enclosures	0	4	4	4	5	5	5	5	6	6	6	6
	1	4	4	4	5	5	5	5	6	6	6	6
	2	4	4	4	5	5	5	5	6	6		
	3	4	4	4	5	5	5	5				
	4	4	4	4	5	5						
	5	4	4	4								
	6	4										

Table 7 IBM Power 775 Required Number of System Water Containers per Frame

8.4 End of Appendix A: Power775 FDT Volume Tables