Single Pole ATS Backfeed

DCE have devised a method of installing Dual fed ATSs to In-Rack PDUs without the requirement for a power outage to the in-service racks. Life Safety and the maintained operation of existing critical loads shall be the top priority during all of this process. All work shall be controlled under a relevant CM. The CM should cover both "sides" of the rack (A&B).

**NOTE:** All information on this form should be filled out in ink.

|  |  |  |
| --- | --- | --- |
| procedural detail | | |
| Site/Pod: | CM#: | |
| Technician: | Date: | |
|  | <topic breadcrumb> | |
| <DCGS Energized Electrical Work Permit # if required> Reviewers… if not needed I’ll delete row from doc. | | |
| Equipment Information | | |
| Manufacturer: | | Model #: |
| Serial #: | Assed ID: | |

IMPORTANT METHODS FOR SUCCESS ; Control your work area with appropriate barriers and signs. Do not let anyone not directly involved in the CM into your workspace. Secure backfeed cables to prevent them from being inadvertently yanked out by tripping over them, relocation of the backfeed cart, etc. There will be open floor tiles, make sure that the backfeed cart or yourself does not fall into open floors. Place safety caps (female L6-30 cord cap) on ALL male L6-30 cords once they have been unplugged to prevent possible short circuits and shock hazards. When unplugging male cord caps have a safety cap close at hand and immediately cap it. Keep your eyes on the cord cap until it has a safety cap on it. When handling the energized cord caps utilize gloves, rubber mats, and maintain constant awareness of your surroundings. You will be under the floor and surrounded by grounded metal on all sides. When plugging in cords give them one full counter clockwise twist (with a safety cap installed) before you insert the plug and twist it clockwise to lock it in. This will give it the natural tendency to stay locked by exerting constant clockwise force. If a rack needs to be moved out into an aisle to access the rPDU make sure that you have sufficient slack on the power cords and the networking cables at the op of the rack. You should also make sure that the floor grommets through which the cables pass are in place so that the sharp edges of the floor tiles do not damage the cables or short out. Also, be aware that the side panels (upper and lower) do not fall off as they might hit network cables, or other parts of the adjacent racks. Before moving the rack out replace any vent tiles that the rack will rest on with a regular floor tile. The vent tiles are often not rated for the weight of the rack. When done, relocate any tiles to their proper location and make sure that the vent tiles are open to ensure proper cooling to the racks. MAINTAIN CLEAR COMMUNICATION throughout the execution of the CM. Do not use yeah, uh huh, yep, thumbs ups, etc.. Call-out exactly what you do and have the other team member/members repeat it back to you. Any direction you are given should be repeated back and verified as well. This will help to eliminate miscommunication. "I thought you said............." is sometimes too late and there is no way to undo a dropped rack. The most important thing to remember is that before the rPDU is unplugged or the paralleling switch is opened, you are sharing load between the backfeed cart and the normal source through the ATS. Follow the procedure carefully and do not skip any step. Do not let ANYONE rush you during this process. If you or any member of your team are unsure about any step of the process STOP, discuss the situation, verify at what step you are on and proceed only if all are comfortable, on the same "page"and in agreement.

# References

## Authorization

## Training/Certification

## Equipment/Information

## Policies

## Related Procedures

# Security Considerations

# Procedure(s)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ITEM** | **DESCRIPTION** | **VALUE** | **STATUS** | **COMMENTS** |
| 1 | READ AND UNDERSTAND THE ABOVE INTRODUCTION. There are several things listed that will assist in your success. |  |  |  |
|  | Signature 1 - Signature 3- | | | |
|  | Signature 2 - Signature 4- | | | |
| 2 | Make sure the SO cord extensions for the "Load Pre-Return Check Socket" and the "Supply Pre- Return Check Inlet” are in place and connected on the backfeed cart. |  |  |  |
| 3 | Document the current status of the rack with DCO tech. Check for any downed servers, switch status, loose C-13 or C-19 cords at the rPDU. (Attach separate sheet if required) |  |  |  |
|  | DCO Tech signature- | | | |
| **ITEM** | **DESCRIPTION** | **VALUE** | **STATUS** | **COMMENTS** |
| 4 | Confirm which UPS the PDU is fed from. | UPS |  |  |
| 5 | Confirm intended Donor supply is from same UPS/PDU. (Same Panel Y / N ) | **YES / NO** |  |  |
| 6 | Inspect the rack to determine if an ATS is installed already |  |  |  |
| 7 | Using the colored and tagged velcro, identify each power cable end from the **power source** to the **ATS. Start from one end with two tags on each cable and slide one tag to the other end. This will prevent cable misidentification.** |  |  | **Important to avoid unplugging and possibly dropping the wrong rack!** DO NOT REMOVE VELCRO/LABELS. IF YOU HIT A POINT WHERE YOU CANNOT SLIDE THE VELCRO, ADD ANOTHER IMMEDIATELY ADJACENT TO THE PREVIOUS' STOP POINT |
| 8 | Using the colored and tagged velcro, identify the power cable from the **ATS** to the **RPDU** in the rack in question. **Start from one end with two tags on each cable and slide one tag to the other end. This will prevent cable misidentification.** |  |  | You will be provided with tags labeled in **YOUR** name. Old velcro or tywraps may be present from earlier work. |
| 9 | **Does all the information match what is on the CM?** | YES/NO |  | Initial\_\_\_\_\_\_\_ Initial\_\_\_\_\_\_\_ |
| 10 | **Confirm that Paralleling switch and all other switches on the Rack Backfeed Control Unit (RBCU) are open and locked out and there is a safety cap on the RBCU input power cord cap.** |  |  | Important to avoid energizing the RBCU male L6-30P input cord cap. |
| 11 | Inspect the in-rack PDU power strip and find the two matching back feed cords that correspond with the outlets on the in-rack PDU power strip (C14 or C20). |  |  |  |
| 12 | Connect back feed cord Output 1 to in rack PDU power strip. |  |  |  |
|  | **NOTE: If there are no spaces available get your DCO tech involved to see what can be altered.** |  |  | **You MUST have a connection to the TOP of the RPDU to prevent possible rPDU failure** |
| 13 | **IS THE RACK STABLE?** | YES/NO |  | **If not begin back out plan as noted on the CM** |
| 14 | Confirm voltages at TP-1 L1 & TP-1 L2 | Volts |  |  |
|  |  |  |  |  |
| **ITEM** | **DESCRIPTION** | **VALUE** | **STATUS** | **COMMENTS** |
| 15 | Connect back feed cord Output 2 to in rack PDU power strip. |  |  |  |
|  | **NOTE: If there are no spaces available get your DCO tech involved to see what can be altered.** |  |  | **You MUST have a connection to the BOTTOM of the RPDU to prevent possible rPDU failure** |
| 16 | **IS THE RACK STABLE?** | YES/NO |  | **If not begin back out plan as noted on the CM** |
| 17 | Confirm voltages at TP-2 L1 & TP-2 L2 | Volts |  |  |
| 18 | Measure voltage between TP-1 L1 & TP-2 L1 | Volts |  | **EXPECT Between 0 –7 Volts** |
| 19 | Measure voltage between TP-1 L2 & TP-2 L2 | Volts |  | **EXPECT Between 0 –7 Volts** |
|  | **STOP DO NOT PROCEED IF VOLTAGE DIFFERENCE IS GREATER THAN 7 VOLTS** |  |  |  |
| 20 | Remove lock from Output 1 switch and close switch |  |  |  |
| 21 | **IS THE RACK STABLE?** | YES/NO |  | **If not begin back out plan as noted on the CM** |
| 22 | Remove lock from Output 2 switch and close switch |  |  |  |
| 23 | **IS THE RACK STABLE?** | YES/NO |  | **If not begin back out plan as noted on the CM** |
| 24 | Verify voltages at TP-1- L1 & TP-1 L2 and TP-2 L1 7 TP-2 L2 | TPI=\_\_\_\_\_\_V TP2=\_\_\_\_\_ V |  |  |
| 25 | Verify the parelling switch on the **RCBU** panel is **LOCKED** in **OFF** position to prevent closing out of phase |  |  | **VERY IMPORTANT** |
| 26 | **Confirm Back-feed phase by inspecting the Utility Power panel and check which phase the single pole breakers is on feeding the ½ rack being worked on.Once phase is established then attempt to find an available spare. !!!BE SURE PHASE IS CORRECT!!!** | Back feed phase is: |  | ***Remember to record the back feed phase.*** |
| 27 | When the back feed phase is verified, plug Verify voltage at TP-5 L1 and TP-5 L2 in the L6-30p from the Rack Backfeed Control Unit (RBCU) into the matching L6-30R from the backfeed receptacles for the correct UPS. (Refer to UPS identified in step 4) | \_\_\_\_Volts |  |  |
| 28 | Measure the voltage between **TP-5 L1** and **TP-1 L1** and verify that the value is between **0 – 7 volts** | \_\_\_\_Volts |  | **EXPECT Between 0 – 7 Volts** |
| **ITEM** | **DESCRIPTION** | **VALUE** | **STATUS** | **COMMENTS** |
| 29 | Measure the voltage between **TP-5 L2** and **TP-1 L2** and verify that the value is between **0 – 7 volts** | \_\_\_\_Volts |  | **EXPECT Between 0 – 7 Volts** |
|  | **STOP DO NOT PROCEED IF VOLTAGE DIFFERENCE IS GREATER THAN 7 VOLTS** |  |  |  |
| 30 | Close Paralleling switch on Rack Backfeed Control Unit (RBCU). |  |  |  |
| 31 | **IS THE RACK STABLE?** | YES/NO |  | **If not begin back out plan as noted on the CM** |
| 32 | Climb under floor and find the **VERIFIED** "CATCHER FEED" to the ATS. Unplug it from the PINK "CATCHER" receptacle. **PLACE A CORD CAP ON THIS CABLE TO PREVENT POSSIBLE SHORT.** |  |  | **IMPORTANT TO PREVENT A SHORT DUE TO AN ATS MALFUNCTION.** |
| 33 | Record load amps sharing on supply line of RBCU (L1 & L2) | L1 =              A L2 =              A |  |  |
|  | **You are now sharing the load of the rack. DO NOT LEAVE THE RACK UNATTENDED FROM HERE TO COMPLETION!** |  |  |  |
|  | **NOTE: The following is easiest done in a comfortable, hands in front (T-REX short arm style) position. Use cord caps as needed** |  |  |  |
| 34 | **Remove Normal supply L6-30P rPDU input power cord and insert into “Load Pre-Return Check Socket” SO cord extensions from the RBCU panel.** |  |  | **EXTREME CAUTION: EXPOSED PRONGS ARE ENERGIZED! 209-232 Volts.** |
| 35 | If there is an existing ATS; Unplug ( Source 2 then Source 1)and remove old ATS and obtain a tested / rewired new ATS. |  |  | ONLY UNPLUG CORDS THAT WERE IDENTIFIED IN STEP 7 |
| 36 | **Power up the new ATS on source 1 from the same receptacle that fed the old ATS unit.** |  |  | Catcher (source 2 ) should not be powered up at this time. |
| 37 | Confirm in rack PDU normal L6-30P is inserted “Load Pre- Return Check Socket” on RBCU panel. |  |  |  |
| 38 | Verify and record voltage across test points TP-7 L1 and TP-7 L2 on “Load Pre-Return Check Socket” | Volts |  |  |
| 39 | Insert “source 1” (yellow shrink wrap) of ATS into the original power outlet receptacle for the rack which is being back-fed. |  |  |  |
| 40 | Insert load side cord from new tested / rewired ATS into “Supply Pre-Return Check Inlet” on RBCU panel. |  |  | **There should be a cap on the secondary plug.** |
|  |  |  |  |  |
| **ITEM** | **DESCRIPTION** | **VALUE** | **STATUS** | **COMMENTS** |
| 41 | With ATS on preferred source 1 verify and record voltage across Test points TP-6 L1 and TP-6 L2 on “Supply Pre- Return Check Inlet” | Volts |  |  |
| 42 | Measure voltage across TP-7 L1 and TP-6 L1 and confirm between 0-7 volts | Volts |  | **EXPECT Between 0 – 7Volts** |
| 43 | Measure voltage across TP-7 L2 and TP-6 L2 and confirm between 0-7 volts | Volts |  | **EXPECT Between 0 – 7Volts** |
|  | **IF VOLTAGE IS GREATER THAN 7 VOLTS** – WORK BACKWARDS FROM **STEP 39** TO **STEP 32** AND REMOVE ATS. RECONFIGURE(SWAP ‘X’ AND ‘Y’) PHASES ON THE LOAD FEMALE CONNECTOR OF THE ATS AND THEN REPEAT **STEPS 32** THROUGH **39** |  |  |  |
| 44 | Remove the “Supply Pre-Return Check Inlet” SO cord extension cable from the ATS output. |  |  |  |
| 45 | Remove Rpdu input cable from the “Load Pre-Return Check Socket” SO extension cord and insert into the output of the tested / rewired ATS. |  |  | **EXTREME CAUTION: EXPOSED PRONGS ARE ENERGIZED! 209-232 Volts.** |
| 46 | **IS THE RACK STABLE?** | YES/NO |  | **If not begin back out plan as noted on the CM** |
| 47 | **Ensure all L6-30 connections are securely twist-locked and firmly plugged in to avoid plug becoming loose. Check the L6-30 connection is firm by pulling on it to ensure plug does not come out.** |  |  | **IMPORTANT - DO NOT SKIP THIS STEP** Initial -                          Date - |
| 48 | **IS THE RACK STABLE? Is the ATS sharing the load. (Within an amp or less of the recorded values in step 33.)** | YES/NO |  | **If not begin back out plan as noted on the CM** |
| 49 | Test for voltage on the Secondary( CATCHER) source (L6-30P) cable coming out of the new ATS using your supply pre return check cable and test point on the RBCU. If voltage is found, STOP!!! CLOSE THE PARALLELING SWITCH ON THE RCBU AND ISOLATE (CAP OFF WITH A FEMALE CORSD CAP) the Secondary( CATCHER) source (L6-30P) cable coming out of the new ATS.. Verify load sharing and if you are again sharing load with the backfeed cart, replace ATS unit with new one from stock. and go back to **step 39** and continue from there. |  |  | There Should be a cap on the secondary side. |
|  |  |  |  |  |
| **ITEM** | **DESCRIPTION** | **VALUE** | **STATUS** | **COMMENTS** |
| 50 | **Open Paralleling switch on Rack Backfeed Control Unit (RBCU).** |  |  |  |
| 51 | **IS THE RACK STABLE?** | YES/NO |  | **If not begin back out plan as noted on the CM** |
| 52 | Isolate and remove back feed panel components |  |  |  |
| 53 | **IS THE RACK STABLE?** | YES/NO |  | **If not begin back out plan as noted on the CM** |
| 53 | De mobilize all paralleling equipment safely and store in secure location |  |  |  |
| 54 | Once all back feed components have been removed then the secondary source can be plugged in if it is available. ***Plug secondary plug into the “pink” catcher back-plate receptacle.*** |  |  | **There should be a cap on the secondary plug.** |
| 55 | If transferring rack to secondary source to off load PDU: A) Confirm all back feed components are removed. B) Verify secondary source is plugged in and available C) Open the correct breaker feeding primary source. |  |  | **Please note this is a chance that the Rack may be dropped if the ATS does not transfer as it should and was confirmed to do during testing.** |

## Document Properties

|  |  |
| --- | --- |
| **Property** | **Value** |
| Site Code | DCA |
| Filename | dca\_dceo\_sop\_backfeed |
| Title | Single Pole ATS Backfeed |
| Version number/Date version published | Draft |
| Doc Type | SOP |
| Zone | Region |
| Technical Owner | swilleye@ |
| Technical Writer | beelliot@ |
| Affected Equipment | ATS |
| Sensitivity rating | Amazon Confidential |
| Origin | Mailed from Jeff Burkhammer who got it from Josh Dubnansky. |
| URL | TBD |
| Physical location | TBD |
| Audience | EOT |
| Renewal date | 1/1/15 |

## Status

|  |  |  |
| --- | --- | --- |
| **Status** | **Date mm/dd/yy** | **Approver/Reviewer Name** |
| Original filed | 5/25/14 | NA |
| Writer sent to SME for review | 5/25/14 | NA |
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