OPUS C POWER SYSTEMS 24VDC – 220VDC

WORK INSTRUCTION

MRC RECTIFIER UPGRADE TO MHE RECTIFIER AND VIDI CONTROLLER CHANGE TO THE EXISTING OPUS C SYSTEM

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1 Introduction

This document guides actions to change VIDI controller and replace MRC rectifier with MHE rectifier in the OPUS C power system. Follow work instructions in the order described in this document to ensure safety in working.

1.1 Revision history

Revision	Date	Revision history	Author
A	2021-05-12	This is the first revision of the document.	V.Haarahiltunen
B	2021-08-25	Component numbers changed to cover also 110VDC systems	O.Rahkonen
C	2023-10-30	Instruction changed to generic for all voltage versions and for all standard OPUS C cabinets	T. Räsänen

1.2 Conventions used in this document

Acronyms	Term
PC	Personal computer
MIB	Management information base

1.3 Reference Documents

Document	Rev. and date	Description
DOC078611	A.02, 2020-10-27	OPUS Power System User Manual
DOC005128	B, 2023-10-30	Work instruction to upgrade MRC rectifier with MHE rectifier

2 Work Instructions Step by Step

Follow instructions in the order described in the following chapters.



For the connection or disconnection of electrical circuits, use only the proper tools.

When working on parts bearing a hazardous voltage, use only tools intended for the work in question.

When measuring parts with a voltage, use the proper measuring instruments.

When the battery is connected, beware that the unit may contain a hazardous energy level. Follow the directives on electrical safety and other, official requirements.

2.1 Saving information of the current system

Before shutting down the system information of the current system can be downloaded from VIDI controller. Part of this information (inventory and parameter settings) can be restored to a new VIDI controller. System data can be downloaded from VIDI controller only via remote interface using Ethernet or RS-232 port. In the OPUS Power System User Manual DOC078611 is described actions and settings for remote connections.

Downloading information from VIDI

Inventory database

Download the inventory database file “inventory.xml” from the Inventory menu.

Parameters

Download the parameter file “params.xml” from the Parameters menu.

Event log

Download the event log from the Event Log page by selecting wanted file type (csv or xml) and format (with or without headers) and then exporting the file.

Alarm log

Download the alarm log from the Alarm Log page. Select first what alarms are wanted to export, “All / Active / Unacknowledged” and press Apply. Then export the file with wanted type and format.

Battery test log

Download the battery test logs from the Battery Test Log page. Select first a wanted battery test log by pressing “Download” button on the raw and then export the file with wanted type and format.

System logs

Download the system logs from the System Logs page. Select log type “Battery discharge log / Battery temperature log / System power log” and export the file with wanted type and format.

Configuration Logic

Download the configuration logic file “pcl.xml” from the Administration\Configuration Logic menu.

MIB file

Download the MIB file “MIB.txt” from the Administration menu by pressing “Download MIB File”.

2.2 Shutting down the system

The system needs to be shut down to ensure safety work conditions.

1. Switch off all load fuses F2.1-F5.5
2. Switch off all battery fuses F1, F2, F3 and F4
3. Switch off mains input supply by the mains switch Q1.
4. Switch off the parallel DC supply MCB/switch.
5. Ensure by measuring there is no AC voltage on the rectifier’s AC fuses.
6. Ensure by measuring there is no DC voltage on any DC bus bars.

2.3 Removing MRC rectifier modules

Removing of MRC rectifier modules is presented by pictures in the document DOC005128B. In this instruction is referred to that document.

1. Switch off all AC fuses of the rectifiers FG1-FG12.
2. Switch off all DC fuses of the rectifiers FG1.1-FG12.1
3. Detach AC and DC cables and the system data bus from the MRC rectifiers.
4. Remove MRC rectifiers from the system.
5. Remove the touch protection cover, which covers the AC and DC fuses of rectifiers and the mains switch Q1.

   Note: there is mains voltage present on the mains input side of the mains switch Q1. To prevent accidental touching of live parts of the mains switch Q1 cover it temporarily with a non-conductive material for a time until changing work of rectifier modules and VIDI controller is finished.
6. Disconnect rectifier’s AC and DC cables from the fuses in the system, see step 1 in the document DOC005128B.

   Note: Before continuing actions in this instruction, make sure an accidental touching of battery poles or other live parts of battery circuits is prevented. It may be helpful to remove batteries from the upper battery self before changing mechanical parts of rectifiers to the system.
7. Remove upper side sliding rails of rectifiers in the system, see step 2 in the document DOC005128B.
8. Remove DC MCB’s and copper connection bars of the rectifiers, see step 3 in the document DOC005128B.

2.4 Installing MHE rectifier modules

Installing of MHE rectifier modules is presented by pictures in the document DOC005128B. In this instruction is referred to that document.

1. Install and connect AC cables of MHE rectifiers to rectifier's AC MCB's, see step 4 in the document DOC005128B.
2. Install upper sliding rail of all rectifiers to the system, see step 5 in the document DOC005128B.
3. Install MHE rectifier DC MCB's and DC cables to the system, see steps 6 and 7 in the document DOC005128B.
4. Install MHE rectifiers to the system.
5. Connect rectifier's AC and DC cables to all MHE rectifiers.
6. Connect the system data bus cable (RJ45 connector) leading from the VIDI controller to the rectifier furthest to the left in position G1 (one of two RJ45 connectors in front of the rectifier)
7. Daisy chain the system data bus to all rectifiers installed in the system.
8. Terminate the system data bus by the termination connector at the last rectifier of the daisy chain bus.

2.5 Changing VIDI controller

1. Detach all cables from the VIDI controller.
2. Disconnect the VIDI module from the system mechanics.
3. Install a new VIDI controller to the system mechanics.
4. Reconnect all cables to the new VIDI controller to same connectors as in the earlier unit.
5. Connect the system data bus termination connector to the other system data bus connector in VIDI controller module.

2.6 Starting up the system

Before starting up the power system

1. Remove additional temporary protection covers if they were used (the battery circuits and the mains switch) from the system.
2. Connect the batteries on the upper battery shelf to the system if they were disconnected earlier during MRC rectifier removing.
3. Install the removed touch protection cover to the system to cover the rectifier's AC and DC fuses and the mains switch Q1.
4. Make sure all other touch protection covers are installed to the system and live parts are not touchable in the system.

Power up the System

1. Switch on the main switch Q1.
2. Switch on the 1st rectifier AC input fuse FG1.
3. Switch on the rectifier output fuse FG1.1. Powering the DC rail by rectifier G1 will start now the system VIDI controller as well. Rectifier's LED will be blinking green until controller is started-up and communication between MHE and VIDI works.
4. Wait until the indication LED of the MHE rectifier turns to steady green.
5. The VIDI controller should be configured to the correct DC voltage version and having correct settings for MHE rectifiers. Check from the system controller's display that the rectifier is detected, is placed in the corresponding slots (G1-G6) and the mains phase (L1, L2 and L3) is correct. If the rectifier location and proposed slot do not match, update accordingly through the VIDI system controller user interface. Approve the changes.
6. The procedure for next rectifiers is slightly different as the controller is already in operation and there is no need to wait for controller start-up:
7. Switch on the 2nd rectifier AC input fuse FG2
8. Wait until the LED turns to solid green.
9. Switch on the rectifier output fuse FG2.1
10. Repeat the above actions for all rectifiers installed in the system.
11. Check from the system controller that the system DC voltage is correct.
12. Check that the battery polarity is correct.
13. Connect the batteries to the system by switching on the corresponding battery fuse.
14. Connect the loads by switching on the corresponding load MCB.
15. Configure correct inventory and system parameter settings to the new VIDI controller.
16. Detailed system controller functionality, system configuration and parameter setting are described in the OPUS Power System User Manual DOC078611.