Retrofit Switchgear Interface Module with ADVC Controller
Installation Manual
Scope of this document

This document describes the features and operation of the Retrofit Switchgear Interface Module with ADVC Controller.

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## Revision Record

<table>
<thead>
<tr>
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<th>Comment</th>
</tr>
</thead>
<tbody>
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</table>

**Module:** Retrofit Switchgear Interface Module (RSIM1)

**Controller:** ADVC (Ultra Cubicle)

**Switch:** V/C-Series

**Firmware:** A45-11.01+

**Configuration:** WSOS5.13.15+

<table>
<thead>
<tr>
<th>Document Part Number:</th>
<th>ADVC2-0036</th>
</tr>
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<tbody>
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<td>Document Revision:</td>
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</tr>
</tbody>
</table>
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Introduction</td>
<td>6</td>
</tr>
<tr>
<td>1.1</td>
<td>Scope</td>
<td>6</td>
</tr>
<tr>
<td>1.2</td>
<td>Purpose</td>
<td>6</td>
</tr>
<tr>
<td>1.3</td>
<td>Supported Reclosers</td>
<td>6</td>
</tr>
<tr>
<td>2.0</td>
<td>Terminology</td>
<td>7</td>
</tr>
<tr>
<td>3.0</td>
<td>Overview</td>
<td>8</td>
</tr>
<tr>
<td>3.1</td>
<td>Without voltage measurement (C-Series)</td>
<td>8</td>
</tr>
<tr>
<td>3.2</td>
<td>With voltage measurement (V-Series)</td>
<td>8</td>
</tr>
<tr>
<td>4.0</td>
<td>Mechanical</td>
<td>9</td>
</tr>
<tr>
<td>4.1</td>
<td>RSIM1 Ultra Cubicle</td>
<td>9</td>
</tr>
<tr>
<td>4.2</td>
<td>C-Series Cable Connection Protector</td>
<td>10</td>
</tr>
<tr>
<td>4.3</td>
<td>V-Series Cable Connection Protectors</td>
<td>10</td>
</tr>
<tr>
<td>5.0</td>
<td>Electrical</td>
<td>11</td>
</tr>
<tr>
<td>5.1</td>
<td>RSIM1 Interconnection Overview (V-Series)</td>
<td>11</td>
</tr>
<tr>
<td>5.2</td>
<td>C-Series Cubicle Cabling</td>
<td>12</td>
</tr>
<tr>
<td>5.3</td>
<td>V-Series Cubicle Cabling</td>
<td>13</td>
</tr>
<tr>
<td>6.0</td>
<td>Retrofit Switchgear Interface Module</td>
<td>14</td>
</tr>
<tr>
<td>6.1</td>
<td>Voltage Input – LED - OFF/ON</td>
<td>14</td>
</tr>
<tr>
<td>6.2</td>
<td>Auxiliary-Supply</td>
<td>14</td>
</tr>
<tr>
<td>6.2.1</td>
<td>VT Selectors</td>
<td>14</td>
</tr>
<tr>
<td>6.2.2</td>
<td>Fuses</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Part: BUSSMAN FWH-016A6F</td>
<td>15</td>
</tr>
<tr>
<td>6.2.3</td>
<td>Automatic Change-Over</td>
<td>15</td>
</tr>
<tr>
<td>7.0</td>
<td>Requirements</td>
<td>15</td>
</tr>
<tr>
<td>8.0</td>
<td>Installation</td>
<td>15</td>
</tr>
<tr>
<td>8.1</td>
<td>Mechanical</td>
<td>16</td>
</tr>
<tr>
<td>8.2</td>
<td>Electrical</td>
<td>16</td>
</tr>
<tr>
<td>8.3</td>
<td>Software/Firmware</td>
<td>16</td>
</tr>
<tr>
<td>8.4</td>
<td>Select Auxiliary Supply</td>
<td>17</td>
</tr>
</tbody>
</table>
9.0  Configuration 18
9.1  Setting Preservation 18
9.2  V and C Series 19
9.3  V-Series Only 20
9.3.1 Required Settings 22
9.3.2 Enable RSIM1 Voltage-Inputs 22
9.3.3 Configure Voltage-Inputs 22
9.3.4 Zero Voltage 24
9.3.5 Voltage-Input Calibration 24
9.4  Verify Measurements 25
9.4.1 C-Series 26
9.4.2 V-Series 26
10.0  Operation 27
10.1  Application Feature Availability 27
10.1.1 Voltage-Input Requirements 27
10.1.2 Application Feature Change 28
10.2  V/C-Series ‘Phasing’ 28
10.2.1 Names 28
10.2.2 Configuration 29
10.2.3 Source/Load 29
10.2.4 Operator Interface Text 29
10.2.4.1 Operator Interface and WSOS5 29
10.2.4.2 WSOS5 Only 29
10.3  Unavailable Information 30
11.0  Appendix A 31
11.1  ADVC RSIM1 Recloser Interconnection Diagram 31
11.2  C-Series RSIM1 Control Cable 32
11.3  V-Series RSIM1 VT/Control/Auxiliary Cable 34
11.4  V-Series Coil Supply Cable 36
1.0 Introduction

1.1 Scope
Supplementary controller, installation, firmware configuration, and information applicable to a Retrofit Switchgear Interface Module (RSIM1) installed within an ADVC Ultra cubicle connected with one of the Supported Reclosers.

1.2 Purpose
The manual provides specific technical information on and about the operation and interconnection of the RSIM1, used in conjunction with an ADVC control cubicle, to operate one of the Supported Reclosers.

This manual also includes information about configuration of ADVC controller firmware specific to RSIM1 connected Supported Reclosers, and voltage transformer installations.

This manual would normally be used for retrofitting ADVC Ultra controllers to V/C-Series switches, prior to configuration of the switchgear’s operator and protection firmware.

1.3 Supported Reclosers
An ADVC Ultra controller fitted with an interposing RSIM1 and correctly configured should be able to monitor and control the following W-Group Recloser models.

- WE
- WVE27
- WVE38X
- VWE
- VWVE27
- VWVE38X
- KFE
- KFVE

**NOTE:** As the range of Supported Reclosers has a variety of wiring and actuator permutations, and/or bespoke configurations, it is mandatory that an operator be satisfied that controller, RSIM1 and recloser operate together.
## 2.0 Terminology

<table>
<thead>
<tr>
<th>TERM</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACR</td>
<td>Automatic Circuit Recloser</td>
</tr>
<tr>
<td>ADVC</td>
<td>Advanced Controller (2) Ultra</td>
</tr>
<tr>
<td>CAPE</td>
<td>Control and Protection Enclosure (3) – subassembly of an ADVC</td>
</tr>
</tbody>
</table>
| Connected | • The switch is detected as ‘connected’ to the controller  
• the switch type is supported  
• AND the switch data is valid                                                                                                             |
| Controller | The switchgear’s control cubicle and enclosed equipment (CAPE, power supply, etc.) that provides switchgear control and communications functionality |
| LED     | Light Emitting Diode                                                                                                                                                                            |
| MV      | Medium Voltage                                                                                                                                                                                  |
| PSU     | Power Supply Unit - subassembly of ADVC                                                                                                                                                           |
| C       | Retrofit Switchgear Interface Module (RSIM1) – an interposing electrical/electronic module that integrates one of the Supported Reclosers, with an ADVC Ultra controller |
| SCEM    | Switch Cable Entry Module – a logical part of the RSIM1 that has a non-volatile data-store of V/C-Series switch and voltage-input calibration information                                                 |
| Switch  | The actual electrical switchgear (tank) that provides the network circuit make/break capability                                                                                                   |
| Switchgear | A collective reference to the connected combination of an MV electricity distribution network ‘switch’ connected to a ‘controller’                                                              |
| C       | A collection of switchgear - parameter and configuration data, pertaining to a specific switchgear installation, created, configured with, and managed by WSOS5                                           |
| Terminals | V/C-Series switch terminals are identified as 1, 3, and 5 on the source side, and 2, 4, and 6 on the load side                                                                                   |
| Ultra   | An ADVC, (Ultra option) controller cubicle                                                                                                                                                        |
| V/C-Series | A Schneider Electric switch series designation, pertaining to one of the Supported Reclosers combined with an RSIM1  
Refer sections: 3.1 Without Voltage Measurement (C-Series) and 3.2 With Voltage Measurement (V-Series).                                             |
| VT      | Voltage Transformer                                                                                                                                                                             |
| WSOS5   | Windows Switchgear Operating System – PC software application for V/C-Series installation configuration.                                                                                         |

**NOTE:** A ‘V/C-Series’ switch, refers to one of the Supported Reclosers combined with an RSIM1. It is intended that once an RSIM1 has been commissioned for an installation for one of specific Supported Reclosers, it would remain ‘paired’ with that recloser. The RSIM1 however, can be used with a different recloser once the RSIM1 has been re-configured for ‘another’ recloser installation. The ADVC controller considers the RSIM1 and the retrofitted recloser as a single unit connected to an ADVC, i.e. a V-Series or C-Series switch.
3.0 Overview

The Retrofit Switchgear Interface Module (RSIM1) extends the range of reclosers that may be connected to the ADVC controller.

The RSIM1 provides electronic/electrical interposing adaptation circuits between the CAPE control module and one of the Supported Reclosers.

By setting up the interposing RSIM1 and configuring the ADVC controller’s firmware with the WSOS5 configuration application, the V/C-Series controller can be used to monitor and control two main types of network-switchgear installations in a similar manner to other Schneider Electric ‘X’-Series Pole-Mounted ACRs.

3.1 Without Voltage Measurement (C-Series)

Retrofit recloser applications without voltage measurement using an ADVC controller. Although voltage dependent features are not available for this application, upgrading will bring with it the latest technology, better protection accuracy and flexibility, and powerful communication capabilities.

![Figure 1. Retrofit installation without voltage measurement.](image)

3.2 With Voltage Measurement (V-Series)

In existing recloser installations where Voltage Transformers (VTs) are used for measurement and auxiliary power, the controller utilises the existing military style connectors to connect both the switchgear and VTs. It is possible to nominate the “Source” and/or “Load” side VT(s) used to contribute to the Auxiliary AC supply.

![Figure 2. Retrofit installation with voltage measurement.](image)
4.0 Mechanical

4.1 RSIM1 Ultra Cubicle

Figure 3. RSIM1 fitted to Customer Side Tray.

Vandal Resistance

Figure 4. V/C-Series - Cable Connection Protectors.
4.2 C-Series Cable Connection Protector

The ‘C-Series Mechanical Kit’ contains an anti-vandal Connection Protector that is fitted over the C-Series Control Cable (not shown) before it is attached to the controller via the 14-pin millspec connector during commissioning.

Located on the right hand under-side of the controller (front-view), the connection protector will be held in place with the same fasteners that secure the connector mounting plate to the bottom of the control cubicle.

4.3 V-Series Cable Connection Protectors

The ‘V-Series Mechanical Kit’ contains two connection protectors.

The first anti-vandal Connection Protector is fitted over the V-Series Close Power Out cable (not shown), before it is attached to the controller via a 2-pin millspec connector during commissioning.

Located on the right hand under-side of the controller (front-view), the connection protector will be held in place with the same fasteners that secure the connector mounting plate to the bottom of the control cubicle.
The second anti-vandal Connection Protector is fitted over the V-Series Voltage Transformer Cable (not shown) and the reclosers Control Cable (not shown), before they are attached to the controller via the 8-pin millspec connector (towards the front) and the 14-pin millspec connector (towards rear respectively) during commissioning.

Located on the left hand under-side of the controller (front-view), the connection protector will be held in place with the same fasteners that secure the corners of the connector mounting plate to the bottom of the control cubicle.

5.0 Electrical

5.1 RSIM1 Interconnection Overview (V-Series)

Figure 5. ADVC RSIM1 Interconnect Overview Diagram.
5.2 C-Series Cubicle Cabling

The RSIM1 connects to the Advanced Controller via a ‘fly-lead’ plugged into the CAPE socket marked ‘SWITCHGEAR’.

C-Series controllers have one control cable between the RSIM1 and the recloser connector fitted to the bottom of the control cubicle.

Refer:
11.1 ADVC RSIM1 Recloser Interconnection, for electrical details.

Refer:
11.2 C-Series RSIM1 Control Cable, for mechanical details.

Figure 6. ADVC C-Series Cubicle Cabling.
5.3 V-Series Cubicle Cabling

The RSIM1 connects to the Advanced Controller via a ‘fly-lead’ plugged into the CAPE socket marked ‘SWITCHGEAR’.

V-Series controllers only have a three-tailed VT/Control/Auxiliary Cable between the RSIM1, two tails to connectors fitted to the bottom of the control cubicle and one tail to the PSU.

Refer:
11.1 ADVC RSIM1 Recloser Interconnection Diagram, for connection details.

Refer:
11.3 V-Series RSIM1 VT/Control/Auxiliary Cable, for mechanical details.

Refer:
11.4 V-Series Coil Supply Cable, for mechanical details.

Figure 7. ADVC V-Series Cubicle Cabling.
6.0 Retrofit Switchgear Interface Module

6.1 Voltage Input – LED - OFF/ON

The RSIM1 takes six voltage-transformer inputs (U1, V1, W1, U2, V2, W2,) from the 24-way Burndy male-socket, and routes them through enable-switches with LED indicators, the ‘source’, (Side 1) phases are designated U1, V1, W1, and the ‘load’, (Side 2) phases are designated U2, V2, and W2.

The U1 LED-indicator will ‘light’ when an energised VT is connected across the U1 VT input and common, and the associated U1 enable-switch is placed in the ‘1’ (ON) position. This is also true for all the other (V1, W1, U2, V2, W2) enable-switches and LED indicators.

The six voltage-measurement channels are then routed via the RSIM1 fly-lead (CVT-U1, CVT-V1, CVT-W1, CVT-U2, CVT-V2, CVT-W2,) to the CAPE for voltage-measurement processing by the ADVC.

(Refer section: 11.1 ADVC RSIM1 Recloser Interconnection Diagram)

6.2 Auxiliary-Supply

6.2.1 VT Selectors

The RSIM1 takes six voltage-inputs (U1, V1, W1, U2, V2, W2,) from the 24-way Burndy male-connector, and supplies:
- voltage-inputs U1, V1, and W1, to the three-position Master-Auxiliary Selector switch
- voltage-inputs U2, V2, and W2, to the three-position Slave-Auxiliary Selector switch.

The operator can select the individual phase voltage-input (U, V or W), from either side (Master, and/or Slave), to be used as the controllers Auxiliary Supply source.
6.2.2 Fuses

- Part: BUSSMAN FWH-016A6F

The Master and Slave Auxiliary selected input-voltage sources are fed through to the Master and Slave - Auxiliary Fuses’ respectively and then on to the Automatic Change-Over circuit.

6.2.3 Automatic Change-Over

The Auxiliary-Supply Automatic Change-Over uses either the voltage-input selected by the Master-Auxiliary Selector or the Slave-Auxiliary Selector, as alternate sources for the Auxiliary-Supply voltage.

If the Master-Auxiliary selected voltage-input deviates from an operational voltage-range of 88 < VAC RMS < 138, and if the Slave-Auxiliary Selector selected voltage-input is in the range of 93 < VAC RMS < 133, then the automatic change-over circuit switches the Auxiliary Supply to be sourced from the Slave-Auxiliary selected voltage-input.

If the Master and the Slave voltage-inputs are both outside of their respective ranges (88 < VAC RMS < 138, and 93 < VAC RMS < 133,) then the controller will lose Auxiliary Supply power.

The Master-Auxiliary voltage-input takes precedence in that, if the Slave-Auxiliary voltage-input is presently selected and the Master-Auxiliary voltage-input is restored to its operational voltage-range, then the automatic change-over circuit reverts the Auxiliary Supply source ‘back’ to the Master-Auxiliary selected voltage-input.

Automatic Change-Over takes approximately 30ms and will not affect the operation of the ADVC controller.

The Auxiliary-Supply is fed from the RSIM1 through the 24-way Burndy male-connector to the PSU via the third-tail of the (Refer) 11.3 V-Series RSIM1 VT/Control/Auxiliary Cable.

(Also refer: 11.1 ADVC RSIM1 Recloser Interconnection Diagram)

7.0 Requirements

ADVC control cubicles are factory optioned to be either a V-Series or a C-Series controller. Refer to information in this manual to ensure the control cubicle is suitable for the intended retrofit installation and the following requirements are met.

<table>
<thead>
<tr>
<th>PLATFORM</th>
<th>VERSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Controller Cubicle</td>
<td>ADVC-Ultra</td>
</tr>
<tr>
<td></td>
<td>V-Series or C-Series option.</td>
</tr>
<tr>
<td>ADVC Firmware</td>
<td>A45-11.01+</td>
</tr>
<tr>
<td>PC -Configuration Application</td>
<td>WSOS5.13.15+</td>
</tr>
<tr>
<td>V/C-Series</td>
<td>RSIM1 and one of the Supported Reclosers.</td>
</tr>
</tbody>
</table>

WSOS5 is required for configuration of V-Series installations to provide calibration of voltage-inputs for derivation of voltage measurement.

8.0 Installation

Consult and utilise the “Medium Voltage Distribution Installation Manual N-Series with ADVC Controller” for information regarding the ADVC cubicle’s mechanical and electrical installation instructions. Supplement that information with this manual as required for V/C-series information.
8.1 Mechanical
- MOUNTED: The control cubicle is in position at the installation site, ensuring all cables and conductors can be connected and have sufficient ‘length’ to be secured in an appropriate manner.
- THREADED: The recloser Control (and if applicable, VT and Close Power) Cable(s) are passed through the applicable anti-vandal connection protectors. (Refer section: 4.2 C-Series Cable Connection Protector or section 4.3 V-Series Cable Connection Protectors).

8.2 Electrical
- POWERED DOWN: Ensure ADVC Ultra controller is de-energised, i.e. all the auxiliary and battery supply breakers are in the OFF position.
- COMPLETED: Ensure all cables and connections have been made correctly, and that the installation is free and clear of all tools and other unnecessary equipment.
- ISOLATED: Ensure the controllers TRIP and CLOSE isolators on the CAPE enclosure are in the DISABLE position.
- VOLTAGE-INPUTS: Set all the RSIM1 voltage-inputs enable-switches (U1, V1, W1, U2, V2, W2) to the ‘OFF’ position (refer section: 6.1 Voltage Input – LED).
- CONNECTED: The recloser Control (and if applicable, VT and Close Power) Cable(s) are connected to the connectors at the bottom of the control cubicle (refer section: 5.1 C-Series Cubicle Cabling or 5.2 V-Series Cubicle Cabling).
- STARTUP: Set the battery breaker to the ON position and allow the controller to initialise its application firmware.

8.3 Software/Firmware
Use WSOS5 to:
- select the appropriate WSOS5 to controller communications settings
- go ‘On-line’ to the retrofitted controller
- check the controller’s ISOLATE switches are in the DISABLE position and use the WSOS5 Status dialogue to ensure the controller indicates:
  1. Trip Solenoid – Isolated
  2. Close Solenoid - Isolated.
• CONFIRM: Controller has initialised and indicates ADVC firmware version of A45-11.01+ us the WSOS5 Configuration dialogue.

Firmware version A45-11.01+ is required for correct V/C-Series operation.

• CONFIRM: with WSOS5 Status dialogue that the controller indicates:
  3. Switchgear – Connected
  4. Switchgear Data – Valid

If the dialogue displays “Switchgear Connected” and “Switchgear Data – Invalid”, the RSIM1 SCEM/calibration switch data is invalid. Use the WSOS5 Re-Calibration dialogue to write valid V/C-Series SCEM switchgear data to the RSIM1 non-volatile data storage (Refer: ADVC Operations Manual).

If “Switchgear Not Connected”, check that the CAPE, RSIM1, and recloser cable and electrical connections have been established and are correct.

Refer: 11.1 ADVC RSIM1 Recloser Interconnection Diagram.

### 8.4 Select Auxiliary Supply

If the auxiliary supply is being sourced from a voltage-input connected to the RSIM1, refer to section 6.2 Auxiliary-Supply and change the Master and/or Slave-Auxiliary selector(s) and use the WSOS5 Status dialogue to ensure the controller indicates Auxiliary Supply - Normal.
9.0 Configuration

Supplement the information and procedures contained within the “ADVC Controller Range OPERATIONS MANUAL” with the information from this technical manual.

- V-Series configuration voltage-input configuration requires WSOS5. The two C-Series configuration parameters can be configured via the Operator Interface, namely the switchgear serial-number and the switchgear operations-count.
- For V-Series retrofit installation, VT configuration/calibration for voltage measurement requires energised VT inputs.
- All the Installation sections steps must be completed successfully before the controller’s firmware and WSOS5 configuration application can be used to complete the V/C-Series installation.

9.1 Setting Preservation

If varying, or servicing an existing V/C-Series installation use WSOS5 - ‘Read Switchgear Settings’ to preserve controller settings. Also preserve RSIM1/SCEM data by completing a Re-Calibration dialogue “Save Data To File” to provide a (*cal) file for the installation.

Certain application-feature ‘Availability’ may change during the V/C-Series configuration. Use a WSOS5 - ‘Write Switchgear Settings’ to restore settings to the controller after the V/C-Series configuration set out in this manual.

If the voltage-input configurations have changed, some application features may be constrained – use WSOS5 – ‘Compare Switchgear Settings’ and the controllers event-log to determine if any changes have taken place.
9.2 V and C Series

For configuration of a C-Series, or the first part of a V-Series installation configuration.

Use the WSOS5 Status Dialogue [On-line] to amend the:

- Operations Counter: (0–65535)
- Switchgear Serial No: (0–99999999), for V/C-Series installations.

A change to either setting will result in the ADVC updating the switch attributes in the non-volatile SCEM data storage on the RSIM1, (up to 50 seconds delay).

**NOTE:** Once a change to either the Operations Counter or Serial Number has been initiated, further changes cannot be made until the RSIM1/SCEM-data write has been completed (the SCEM-data write is indicated with an ‘Alert’ message upon controllers operator interface).

Use the WSOS5 Re-Calibration dialogue to:
Either – reset voltage-input calibration values:


2. On the Reset CVT Calibration pop-up select - ‘Reset All’.
3. Select - ‘OK’.
4. On the Re-Calibration dialogue, select ‘Write Data’ to SCEM to complete the SCEM-data write.

Or - import an existing V/C-Series SCEM/calibration-data file:
2. Navigate to and select an applicable calibration (*.cal) file, and select ‘Open’.
3. Ensure the selected Re-Calibration parameters are correct.
4. On the Re-Calibration dialogue, select Write Data to SCEM to complete the SCEM-data write.

“Write Data to SCEM” will update the switch attributes in the RSIM1 non-volatile SCEM data-store, (up to 50 seconds delay). Successful completion of SCEM-data write is indicated at the foot of the WSOS5 Re-Calibration dialogue with:

The RSIM1 SCEM calibration file (*.cal) data is not stored or associated with the WSOS5 V/C-Series switchgear file maintained by WSOS5, so ensure the (*.cal) files is named to clearly reference a specific installation/switch.

Use the WSOS5 Re-Calibration dialogues “Save Data To File” button to store the installations RSIM1/ SCEM attributes and calibration data to a calibration (*.cal) file for future reference/use.

**NOTE:** For V-Series Only continue to section 9.3, for C-Series skip to section 9.4 Verify Measurements.

### 9.3 V-Series Only

The Voltage Transformer (VT) Configurator software tool forms part of the Windows Switchgear Operating System. The VT Configurator tool has been provided for use during the retrofitting of the ADVC controllers to V-Series Supported Reclosers.
Select WSOS5 menu - Display >> Maintenance >> VT Configurator:

...to access the WSOS5 VT-Configurator Dialogue

...which displays the V-Series voltage-input and associated data fields:

Operator settings:

- Phase: the voltage-input to associate with a physical-phase terminal/side
- Sign: sense of voltage-input signal
- Phase Rotation: network phase order: (ABC, ACB)
- Phase Configuration: logical designation (ABC…CBA) associated to a physical phase
- VT Connection: type (Star, DY1, DY11)
Magnitude display fields for each phase/side:

- Voltage
- Current
- Power
- Phase Angle
- Voltage Angle (derived by WSOS5)
- Current Angle (derived by WSOS5).

VT-Configurator voltage-input attribute refresh ‘Buttons’:

- “Start Test” for source-side
- “Start Test” for load-side.

Use the VT-Configurator dialogue and section: 6 Retrofit Switchgear Interface Module to configure the required voltage-inputs to be enabled, and associated with the applicable switch terminals (1, 3, 5, 2, 4, 6,) by using the following subsections.

**NOTE:** It is advisable to disable the controller’s protection functionality to avoid spurious switch operation until the initial V-Series commissioning is complete.

### 9.3.1 Required Settings

Ensure VT-Configurator dialogue operator settings of:

- Phase Rotation is set to A-B-C
- Phase Designation is set to A-B-C
- Power Direction is set to Source 135 -> Load 246.

**NOTE:** These settings are required during V-Series voltage-input configuration and calibration. They can be changed to suit the distribution-network once the initial V-Series commissioning is complete.

Set VT Connection so that the network line-voltage to voltage-input phase shift is correct:

- STAR voltage-input lags line-voltage by zero (0) degrees
- Dy1 voltage-input lags line-voltage by thirty (30) degrees
- Dy11 voltage-input lags line-voltage by three hundred and thirty (330) degrees.

### 9.3.2 Enable RSIM1 Voltage-Inputs

- Enable the installed voltage-inputs, on the RSIM1, use the LED indicator, and note which voltage-inputs (U1, V1, W1, U2, V2, and/or W2,) are fitted for this installation.

### 9.3.3 Configure Voltage-Inputs

Associate the installed and energised voltage-input sources:

- U1 (Circuit 1-1)
- V1 (Circuit 1-2)
- W1 (Circuit 1-3)
- U2 (Circuit 2-1)
- V2 (Circuit 2-2)
- W2 (Circuit 2-3)

in the VT-Configurator dialogue Phase column drop lists, against the applicable switch terminal (1, 3, 5, 2, 4, or 6).
Use the following numbered steps to validate the association of each voltage-input to its respective switch terminal (1, 3, 5, 2, 4, or 6).

1. Ensure the switch is CLOSED.
2. Ensure the network-system is energised.
3. Use the VT-Configurator dialogue to:
   - ensure that a voltage reading is being obtained for each voltage-input that has a voltage source installed (disregard voltage-input magnitude at this time)
   - if there are phases with voltages appearing on the wrong side, swap them to the phases that are missing voltages on the on the source side by means of the “Phase” field for the applicable ‘switch’ terminal.

**NOTE:** To update the VT-Configurator field readings, the operator must select a “Start Test” button, after any Phase/Sign setting change has been made.

4. Check that a “Current” value is indicated for all six terminal ‘rows’. If not, check the CT wiring.
5. Check the load side terminals to ensure that a “Voltage” reading is being obtained from each terminal that has an energised voltage-input fitted.
6. (Applicable for phases having at least one VT.) Now determine that the “Phase” to terminal (1, 3, 5, 2, 4, 6) relationships are correct by checking each phase “Angle”.
   - Ideally, the angle between the voltage and current would be 0° (zero), but rarely is the network load purely resistive.
   - If the phase angle is approximately ±60° or ±120°, swap the associated voltage-input circuit (e.g. Circuit 1-2) to a different CT terminal (1, 3, 5, 2, 4, 6).
   - In the case of a phase “Angle” of approximately 180° opposite, toggle the “Sign” setting (+/-), to make the ‘least’ phase “Angle”.
7. Repeat Step 6 for the load side voltage-inputs.

**NOTE:** The Voltage Angle and Current Angle fields may individually highlight in red, as a warning when the respective fields’ phasor is deviated ±25° from a theoretical phasor spread of 120 degrees. (The mechanism assumes that a voltage/current angle (i.e. VT input) has been associated with V1 (switch terminal 1) or V2 (switch terminal 2)). The red field highlight is only indicative of possible incorrect VT configuration: it is based upon an arbitrary threshold, which may be of no significance with respect to the installations network environment.
9.3.4 Zero Voltage
If a zero “Voltage” reading is correct for a particular terminal/side (i.e. there is no voltage-input associated with it), then set its “Phase” selection to “None”.

NOTE: A Phase/terminal setting of NONE will display zero (0) volts, even if an energised voltage-input is present.

9.3.5 Voltage-Input Calibration
Voltage-inputs are now logically enabled and associated with the correct terminal/sides (1–6). Next: calibrate the voltage-inputs to give the correct voltage magnitudes.
• Close VT-Configurator dialogue, (it cannot be open at the same time as the Re-Calibration dialogue)
• Navigate via the WSOS5 menu

...to the Re-Calibration Dialogue.
• Verify the Phase-to-Earth Voltage magnitudes in the Voltage Measurement Re-Calibration fields agree with the expected voltage-input value.

• If the Phase-to-Earth Voltage doesn’t agree with the expected voltage-input value:
  1. select the incorrect Phase-to-Earth Voltage-magnitude field.
  2. in the pop-up dialogue, amend the Phase-to-Earth Voltage to the correct value for the corresponding RSIM1 voltage-input.
  3. select ‘OK’ to carry out calibration for that voltage-input, (calibration takes approximately 15 seconds).
  4. repeat for any other Voltage Measurement Re-Calibration fields where the voltage-magnitude doesn’t concur with the expected voltage-input value.

• Once all Voltage Measurement Re-Calibration values concur with the expected voltage-input values:
  5. confirm the Re-Calibration dialogue details are correct.
  6. select ‘Write Data’ to SCEM and complete the RSIM1/SCEM-data write.

“Write Data to SCEM” will update the switch attributes in the RSIM1 non-volatile SCEM data-store, (up to 50 seconds delay). Successful completion of SCEM-data write is indicated at the foot of the WSOS5 Re-Calibration dialogue with:

The RSIM1 SCEM calibration file (*.cal) data is not stored or associated - with the V/C-Series switchgear file maintained by WSOS5, so ensure that the (*.cal) file is named to specifically reference the installation to which it pertains (incorporate the switch serial number within the file name – for example).

Use the WSOS5 Re-Calibration dialogues “Save Data To File” button to store the installations RSIM1/ SCEM attributes and calibration data to a (*.cal) file for future reference/use.

9.4 Verify Measurements

• Close the Re-Calibration Dialogue

• Navigate to the WSOS5 Measurement Dialogue
9.4.1 C-Series

Ensure that all WSOS5 voltage and power Measurement fields indicate ‘Unavailable’ for C-Series installations. Any phase-angle related fields display a ‘-‘, (hyphen) to indicate unavailability of angle data, and frequency measurement field indicates 0.0Hz.

9.4.2 V-Series

Set the Measurement Voltage to Phase-to-Earth and ensure that all WSOS5 data fields that display, or are derived from voltage-inputs that are disabled/not-fitted, show ‘Unavailable’ for voltage and power magnitude fields, and a ‘-‘ (hyphen) for phase-angle fields.

- Ensure all other Measurement fields that display data values contain the correct data-values for the system-network, including the Power Measurement dialogue.

NOTE: During V-Series voltage-input configuration and sampling, a number of event-log entries will occur pertaining to ‘Bushing Live/Dead’, ‘Frequency Measurement Bushing’, and ‘Source Supply On’. These events occur as the controller resolves the physical to logical voltage-input mapping, theses events may be ignored.
10.0 Operation

10.1 Application Feature Availability

The V-Series application feature voltage-input requirements are tabulated in Voltage-Input Requirements.

10.1.1 Voltage-Input Requirements

<table>
<thead>
<tr>
<th>Application Feature</th>
<th>Source Side-VT(s) required</th>
<th>Load Side-VT(s) required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic Protection Group Selection</td>
<td>At least one VT on every phase.</td>
<td></td>
</tr>
<tr>
<td>Directional blocking</td>
<td>At least one VT on every phase.</td>
<td></td>
</tr>
<tr>
<td>Directional protection</td>
<td>At least one VT on every phase.</td>
<td></td>
</tr>
<tr>
<td>Sequence components</td>
<td>At least one VT on every phase.</td>
<td></td>
</tr>
<tr>
<td>Under/Over Voltage protection</td>
<td>3</td>
<td>0–3</td>
</tr>
<tr>
<td>Frequency protection</td>
<td></td>
<td>1–6</td>
</tr>
<tr>
<td>Dead Lockout</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Live Load blocking</td>
<td>0–3</td>
<td>1–3</td>
</tr>
<tr>
<td>Loss of Phase protection</td>
<td>At least one VT on every phase.</td>
<td></td>
</tr>
<tr>
<td>Loop Automation: Feeder</td>
<td>At least one VT on every phase.</td>
<td></td>
</tr>
<tr>
<td>Loop Automation: Tie</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Loop Automation: Midpoint</td>
<td>At least one VT on every phase.</td>
<td></td>
</tr>
<tr>
<td>Loop Automation: Auto-Restore</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Supply Outage - Source</td>
<td>1–3</td>
<td>N/A</td>
</tr>
<tr>
<td>Supply Outage – Load</td>
<td>N/A</td>
<td>1–3</td>
</tr>
<tr>
<td>Auto-Changeover</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Events</td>
<td>1–3</td>
<td>N/A</td>
</tr>
<tr>
<td>Load Supply ON/OFF events</td>
<td>N/A</td>
<td>1–3</td>
</tr>
<tr>
<td>Measurement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Voltage Measurement</td>
<td>1–6 (average taken of available CVTs, biased to source side. If switch open, and load side de-energised, a phase with only a load-side CVT will contribute a zero-value magnitude to the average summation)</td>
<td></td>
</tr>
<tr>
<td>A-Phase Voltage Measurement</td>
<td>1 (A-Phase)</td>
<td>0–3</td>
</tr>
<tr>
<td>B-Phase Voltage Measurement</td>
<td>1 (B-Phase)</td>
<td>0–3</td>
</tr>
<tr>
<td>C-Phase Voltage Measurement</td>
<td>1 (C-Phase)</td>
<td>0–3</td>
</tr>
<tr>
<td>Total/Average Power Measurement</td>
<td>At least one VT on every phase.</td>
<td></td>
</tr>
<tr>
<td>A-Phase Power Measurement</td>
<td>At least one VT on A-Phase.</td>
<td></td>
</tr>
<tr>
<td>B-Phase Power Measurement</td>
<td>At least one VT on B-Phase.</td>
<td></td>
</tr>
<tr>
<td>C-Phase Power Measurement</td>
<td>At least one VT on C-Phase.</td>
<td></td>
</tr>
<tr>
<td>Angle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earth Current Angle</td>
<td>At least one VT on every phase.</td>
<td></td>
</tr>
<tr>
<td>A-Phase Angle</td>
<td>At least one VT on A-Phase.</td>
<td></td>
</tr>
<tr>
<td>B-Phase Angle</td>
<td>At least one VT on B-Phase.</td>
<td></td>
</tr>
<tr>
<td>C-Phase Angle</td>
<td>At least one VT on C-Phase.</td>
<td></td>
</tr>
<tr>
<td>History</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harmonic Analysis</td>
<td>1–6</td>
<td></td>
</tr>
<tr>
<td>Sag/Swell Monitoring.</td>
<td>1–6</td>
<td></td>
</tr>
<tr>
<td>Demand</td>
<td>At least one VT on every phase.</td>
<td></td>
</tr>
</tbody>
</table>
10.1.2 Application Feature Change

A variation of a V-Series voltage-input configuration via the VT-Configurator dialogue, Re-Calibration dialogue, and/or RSIM1 replacement, may affect the ‘Availability’ of the application-features. All feature ‘Availability’ changes are event-logged.

If an operator selects ‘Available’ for an application-feature that is unsupported by a switchgear installation, then an application-feature assertion and an operation-denied are recorded as a dual event-log entry.

WSOS5 will indicate rejection of the attempted ‘Available’ setting change with a pop-up message.

The ADVC Operator Interface will indicate rejection with a ‘beep’ and the setting will revert to the original setting.

10.2 V/C-Series ‘Phasing’

The phase-designations on the switchgear must be set (either explicitly by an operator, or by WSOS5 switchgear-file-write) after the initial V-Series installation has been completed satisfactorily. This process is referred to as “setting the phasing”.

10.2.1 Names

A V/C-Series switch has bushing designations that are a combination of physical terminal numbers from the nominally source or load sides of the switch combined with the logical phase designation, resulting in the following set of bushing-names:

- A135, B135, C135
- A246, B246, C246.
10.2.2 Configuration

Phase Configuration settings, ("A-B-C" to "C-B-A") associate the bushing with terminals:

- A135, B135, C135 with physical terminals (1, 3, or 5)
- A246, B246, C246 with physical terminals (2, 4, or 6).

Example 1: Phase Configuration A-B-C associates bushing-designate B135 with terminal 3 (three) of the switch.
Example 2: Phase Configuration C-A-B associates phase-designate C246 with terminal 2 (two) of the switch.

10.2.3 Source/Load

When the Power Direction is set to Source 135 -> Load 246:

- A135, B135, C135, are ‘Source’ side bushings
- A246, B246, C246, are ‘Load’ side bushings.

When Power Direction is set to Source 246 -> Load 135, then the opposite applies:

- A246, B246, C246, are ‘Source’ side bushings
- A135, B135, C135, are ‘Load’ side bushings.

10.2.4 Operator Interface Text

The phase configuration affects all operator interface displays, event and historical logging entries related to voltage measurements, live/dead terminal displays, maximum current events, frequency measurement, etc.

V/C-Series variants for these Operator Interface and WSOS5 messages are listed in paragraph 10.2.4.1 for Operator Interface and WSOS5 and paragraph 10.2.4.2 for WSOS5 only.

10.2.4.1 Operator Interface and WSOS5

Live/Dead Indication:  A135 Live, C246 Live,
A135 Dead, C246 Dead,
A135 Unavailable, C246 Unavailable.


Source/Load:  Source 135, Load 246, Source 246, Load 135.

10.2.4.2 WSOS5 Only

If different to the ‘Operator Interface’ or only appear within WSOS5.

Frequency Bushing:  Measuring Frequency On Bushing A135,
Measuring Frequency On Bushing C246.

Data-values (measured or derived) that are unavailable because of a V/C-Series voltage-input configuration will display as:

- “Unavailable” for voltage, power, frequency, or power factor
- ‘-’ (hyphen) for angle data, (e.g. “A Ph       0A         -°”).
10.3 Unavailable Information
The following switch attributes have no data values and are not displayed for V/C-Series installations:

- Interruption Rating
- Voltage Rating
- Current Rating
- Contact Wear and
- Gas Pressure.
11.0 Appendix A

11.1 ADVC RSIM1 Recloser Interconnection Diagram

NOTE: V-Series Recloser installation shown, C-Series Recloser installations use only the fourteen (14) way control cable.
11.2 C-Series RSIM1 Control Cable
NOTES:
1. ALL CRIMPS MUST WITHSTAND A MIN PULL-OUT FORCE OF 150N.
2. CABLE MUST PASS A CONTINUITY TEST ON ALL WIRES PIN TO PIN.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>SUPPLIER</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ADV2-1241</td>
<td>CABLE PLATE ASST, DOUBLE</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>MS31080-22-18P</td>
<td>MIL-C-5015 14-PIN MALE PANEL MOUNT RECEPTACLE</td>
<td>ALLIED</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>MS31080-22-23P</td>
<td>MIL-C-5015 8-PIN MALE PANEL MOUNT RECEPTACLE</td>
<td>ALLIED</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>-</td>
<td>SCREW, C'W, M3 x 12, A2-70</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>-</td>
<td>WASHER, PLAIN, M3, A2-70</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>-</td>
<td>NYLOC, M3, A2-70</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>7</td>
<td>1899/10C</td>
<td>18 CORE 18 AWG CONN &amp; CTRL MULTICONDUCTOR UNSHIELDED CABLE, 24mm LONG</td>
<td>ALPHA WIRE COMPANY</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>1119309</td>
<td>8 CORE 1.5mm² DOUBLE INSULATED CABLE GREY PVC, 29mm LONG</td>
<td>LAPP</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>1119304</td>
<td>2 CORE 1.5mm² BROWN / BLUE, 32mm LONG</td>
<td>DLEY</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>MS3240-8</td>
<td>BUSHING REDUCER</td>
<td>ALLIED</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>MS3240-10</td>
<td>BUSHING REDUCER</td>
<td>ALLIED</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>MS3240-12</td>
<td>BUSHING REDUCER</td>
<td>ALLIED</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>WP54</td>
<td>LUG INSULATED RED Ø2mm PIN</td>
<td>CARROLL</td>
<td>2</td>
</tr>
<tr>
<td>14</td>
<td>SC16ML11D78</td>
<td>GOLD PLATED OKNAITE PIN SOCKET SIZE 16AWG</td>
<td>FCT FRAMATONE</td>
<td>2</td>
</tr>
<tr>
<td>15</td>
<td>SMSZ24PD01</td>
<td>WAY PLUG WITH HOOD</td>
<td>SOURIAU</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>TIE154002</td>
<td>CABLE TIE 148mm X 3.6mm</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td>FPS-090-1950-B.K</td>
<td>HEAT SHRINK, 58mm LONG</td>
<td>PRO POWER</td>
<td>1</td>
</tr>
</tbody>
</table>

GENERAL TOLERANCES
- LINEAR: ±0.8mm
- ANGULAR: ±1°
- UNMARKED: ±0.4 MAX
- DO NOT SCALE

DETAIL A SCALE 2.000
- STRIP 5.5 (20 PLACES)
- PART NUMBER AND REVISION LABEL
- FONT SIZE: 12

DETAIL B SCALE 2.000
- STRIP 7.5 (20 PLACES)
- BACK SHELL (ITEM 3)
- BACK SHELL (ITEM 2)
- SEPARATOR (ITEM 2)

CRIMP I.A.W CONNECTION DIAGRAM 3 (2 PLACES)
- CRIMP I.A.W CONNECTION DIAGRAM 1
- SOLDER I.A.W CONNECTION DIAGRAM 2
- SOLDER I.A.W CONNECTION DIAGRAM 4
- TORQUE 1.0mm
- KEY
- KEY
- CAP (ITEM 3)
- CAP (ITEM 2)
- CAP (ITEM 1)

COOPER VT/CONTROL CABLE ADV2-1237
11.4 V-Series Coil Supply Cable
Notes
Notes
Notes