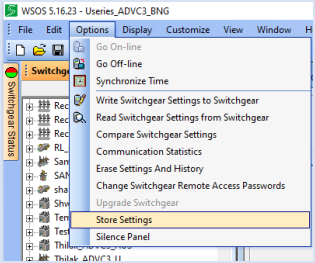
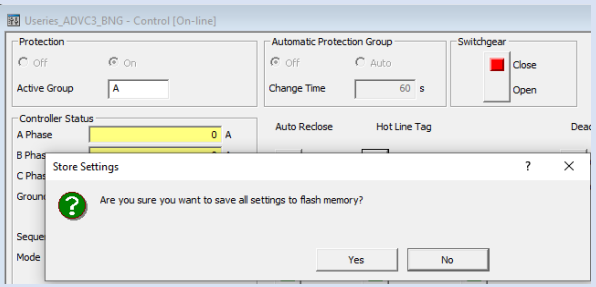
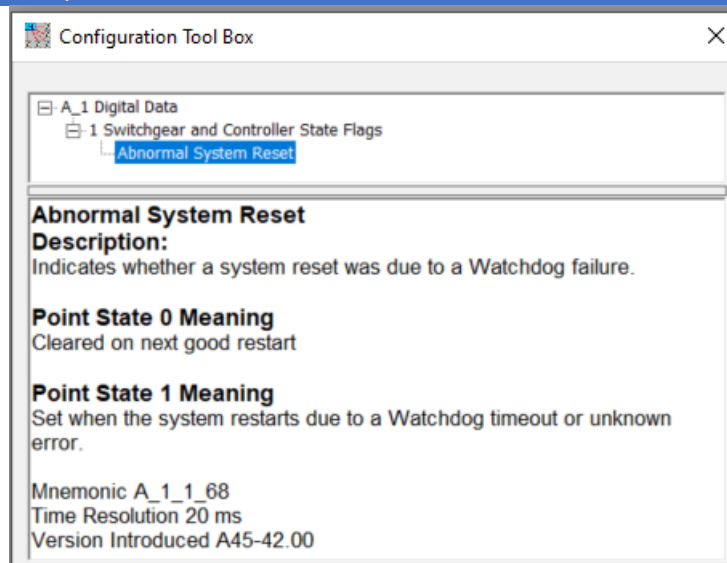


	Question	Response
1	What is the impact to the current installed base?	ADVC2 controllers programmed with firmware version A45-51.02 and lower versions and all ADVC1 controllers and PTCC controllers programmed with firmware version V28.23.02 and lower versions, that are paired with the N-series, U-series or W-series Recloser switchgear are susceptible to the incident described below in Question 2 What occurred which prompted Schneider Electric to contact customers? .
2	What occurred which prompted Schneider Electric to contact customers?	One of our customers applied a Work Tag / Hot Line Tag to an ADVC2 controller via SCADA. This setting was registered in volatile memory within the controller. Shortly after the Work Tag / Hot Line Tag was applied, a hardware watchdog within the controller triggered a processor reset, resulting in an abnormal restart of the controller. This restart resulted in the loss of the Work Tag / Hot Line Tag setting that was applied via SCADA, since this was not committed to the non-volatile storage in the controller.
3	What is the recommended containment action for the reported incident?	<p>1. Power cycling the controller after a critical setting change is made. By design, the controller will commit settings to non-volatile memory when powering down.</p> <p style="text-align: center;">OR</p> <p>2. using WSOS5 (Version 5.16.25) the user can go online to the controller and issue the 'Store Settings' command to the controller irrespective of the firmware version loaded in the ADVC1 or ADVC2 control unit. This option is available in the 'Options' menu</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div>
4	What is meant by an abnormal system reset or abnormal reboot of the control unit?	An abnormal system restart or reboot can occur when a program / application or the underlying operating system encounters an error or exception that it cannot recover from, and hence stops functioning properly. This may manifest in the form of a system crash or an unresponsive system. The hardware watchdog, when enabled, detects this situation and resets the processor after a configured time period expires. All ADVC controller ranges enable that hardware watchdog by default.

Question		Response
		Enabling hardware watchdogs makes the system self-reliant in the event of encountering an unrecoverable exception, eliminating the need for manual intervention to restart the controller to restore normal function.
5	What is a Program fault?	<p>A Program Fault is a failure condition raised by the system within the execution context of a specific application or process, when the process executes code that could violate the operating system's memory protection. Typically, this involves either a misaligned memory access or accessing memory addresses outside the permitted boundaries of the system.</p> <p>A Program fault usually results in the abrupt / abnormal termination of the offending process / application, without affecting the rest of the system.</p> <p>This is akin to an application like Microsoft Word crashing, but the rest of the windows operating system and applications are still up and running.</p>
6	Which of the above faults could lead to a loss of settings in the controller?	<p>The events leading up to the incident described above was caused due to an abrupt controller reset triggered by the hardware watchdog in the controller. This phenomenon has been described in FAQ no.3 "What is meant by an abnormal system reset or abnormal reboot of the control unit?"</p> <p>A Program Fault will not cause a loss of settings.</p>
7	Are settings in volatile memory retained if the controller shuts down due to low battery voltage?	Yes. If the controller shuts down due to low battery, a controlled process is followed and all settings in volatile memory are automatically transferred to non-volatile memory before the controller shuts down.
8	What alarms are raised remotely in the event of an abnormal controller reset?	There is support built into the ADV2 firmware to indicate an abnormal system reset, to the control centre via SCADA once the control unit has restarted. This provision was made available with firmware release A45-43.xx and appears as a Digital data point in the Protocol mapping tool.

Question

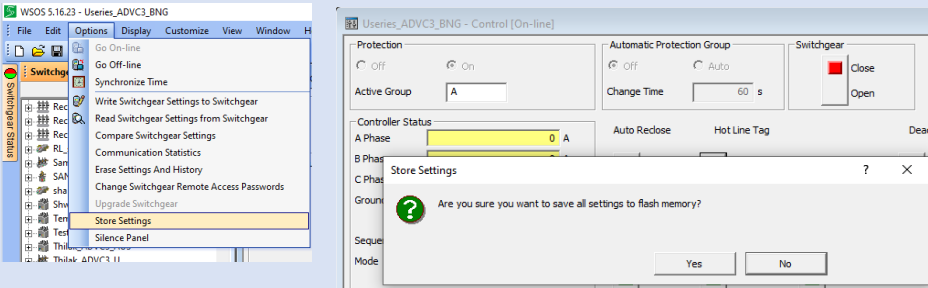
Response



The DNP3 Protocol implementation allows for the sharing of internal status information between the slave RTU and the Master Station using what is referred to as the Internal Indication Bits or IIN Bits for the DNP3 status. These Internal Indication Bits will indicate that the ADVC2 has restarted for any power up event whether caused by a standard power cycle or abnormal system reset.

All controllers raise a maintenance required alarm and a switchgear data invalid alarm upon a restart whether abnormal reset or a normal power up. This is because upon re-start the controller automatically reads relevant data regarding the switchgear from an electronic card in the switchgear tank known as the SCEM card – Switchgear Cubicle Entry Module card, and while this data is being read, the switchgear data is invalid. A switchgear data invalid alarm means that the controller has not yet successfully managed to retrieve the data file from the switchgear memory. A maintenance required alarm is raised for any of the conditions noted below:

1. Battery not normal, this is made up of multiple conditions: Battery OFF, Over Voltage, and Low Voltage.
2. Capacitor charge "status" is Failed.

Question	Response
	<ol style="list-style-type: none"> 3. Low Power Mode. 4. Gas Pressure Low or Invalid (if applicable). 5. Switchgear data not valid (includes connection to an invalid switch type). 6. Any Vacuum/Puffer Interrupter contact life is less than 20%. 7. Mechanism Fail. 8. Switchgear not connected. 9. Firmware mismatch. 10. The PCOM is not calibrated. 11. Power Supply is "Over Voltage". 12. Failed to save settings. 13. Voltages are not calibrated. <p>Upon power up the maintenance required alarm and switchgear data invalid alarm will be active for typically 15-30s and will be reset subsequently.</p>
<p>9</p> <p>Can we force the settings to be saved to permanent non-volatile memory via WSOS?</p>	<p>Yes, using WSOS5 (Version 5.16.25) the user can go online to the controller and issue the 'Store Settings' command to the controller irrespective of the firmware version loaded in the ADV C1 or ADV C2 control unit. This option is available in the 'Options' menu</p> 
<p>10</p> <p>How often are settings committed to non-volatile memory in controllers with firmware variants that may be susceptible to the incident referred to in Q2 above?</p>	<p>Changes to settings that need to be persisted are committed to non-volatile memory once every 24 hours. There are timers programmed in the controller firmware that persist settings every day at 2:00 AM.</p>

	Question	Response
11	Can settings applied in previous days be lost?	No, since the persistent settings would have been committed to non-volatile memory within that period.
12	What setting could be lost?	Any setting change, after 2:00 AM, that needs to be persisted across restarts could be lost when the events leading up to the incident described in Question 2 What occurred which prompted Schneider Electric to contact customers? before 2:00 AM the subsequent day.
13	Is there a difference if a work tag is applied locally or remotely?	No. The change to the setting, when permitted, is agnostic to the mode that the controller is operating in.
14	has this issue been reported before on ADVC2?	No. This is the first instance of any such incident occurring on the ADVC2 that we have on our records.
15	Is there a means to power cycle remotely?	No, there is no consistent method to power cycle the controller remotely.
16	Is there a firmware correction available?	Yes. A new firmware version has been made available, where in any change to settings that need to be persisted across restarts are committed to non-volatile storage after 30 seconds of being made. Additionally, changes to settings like 'Global Auto Reclose', 'Active Protection Group' and 'Work Tag', which are commonly used during maintenance work on the OH lines, are committed to non-volatile storage immediately. These changes are available with version A45-57.05 for the ADVC2
17	How does ADVC3 differ with regards to storing persistent settings in non-volatile memory?	The ADVC3 controller commits persistent settings after 30s of the change being made. Unlike the ADVC2, the ADVC3 does not store settings to fixed sectors within the flash.