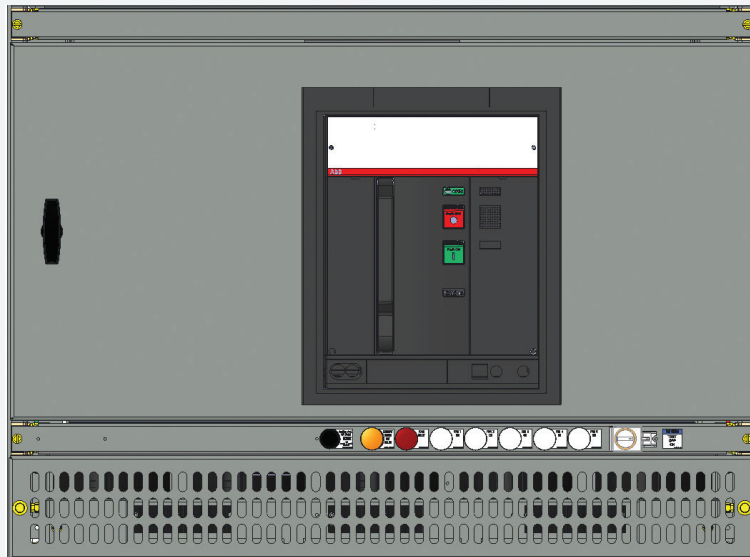




INSTALLATION, OPERATIONS AND MAINTENANCE MANUAL

# 5000 A Fan installation and trip unit programming





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# Introduction

This document details the installation and maintenance pertaining to the cooling fan kit within a front-mounted auxiliary ventilation compartment for ReliaGear LV SG low voltage switchgear.

Front-mounted auxiliary ventilation compartments may be provided, from the factory, with one or more cooling fans installed.

Only a limited number of applications will require a cooling fan kit. Refer to 1VAL106901-MB for further information.

## Contents per kit

### 5000 A Cooling fan installation kit

| Part number    | Description          | QTY |
|----------------|----------------------|-----|
| 3100363550P001 | Cooling fan assembly | 1   |

## NOTICE

**NOTICE:** These instructions do not purport to cover all details or variations in equipment or to provide for every possible contingency to be met in connection with the installation, operation or maintenance. Should further information be desired, or should problems arise which are not covered sufficiently for the Purchaser's purposes, the matter should be referred to an ABB sales representative. These instructions are intended for use by qualified personnel only

### Hazard classifications

The following important highlighted information appears throughout this document to warn of potential hazards or to call attention to information that clarifies a procedure.

Carefully read all instructions and become familiar with the devices before trying to install, operate, service or maintain this equipment.

**DANGER**

**DANGER:** indicates a hazardous situation which, if not avoided, will result in death or serious injury.

**WARNING**

**WARNING:** indicates a hazardous situation which, if not avoided, could result in death or serious injury.

**CAUTION**

**CAUTION:** Indicates that if the hazard is not avoided could result in minor or moderate injury

**NOTICE**

**NOTICE:** Is used to notify of practices not related to personal injury.

### Warranty

This document is based on information available at the time of its publication. While efforts have been made to ensure accuracy, the information contained herein does not cover all details or variations in hardware and software, nor does it provide for every possible contingency in connection with installation, operation, and maintenance. Features may be described herein that are not present in all hardware and software systems. ABB assumes no obligation of notice to holders of this document with respect to changes subsequently made. ABB makes no representation or warranty, expressed, implied, or statutory, with respect to, and assumes no responsibility for the accuracy, completeness, sufficiency, or usefulness of the information contained herein. No warranties of merchantability or fitness for purpose shall apply.

Contact the local sales office if further information is required concerning any aspect of the cooling fan kit.



# Cooling fan replacement

- 01  
Cooling fan kit
- 02  
Front-mounted auxiliary ventilation compartment
- 03  
Fan control instrument panel

These installation instructions cover the installation of a cooling fan kit in a front-mounted auxiliary ventilation compartment, as well as programming of the EKIP Touch Trip Unit. Cooling fan kits for each front-mounted auxiliary ventilation compartment are installed in the same manner and sequence.

Tools required for the installation of the cooling fans are as follows:

1. 3/8 inch wrench or equivalent ratcheting tool
2. 5/16-inch wrench or equivalent ratcheting tool
3. #2 Phillips Screwdriver

Figure 1 depicts the components and parts included in the cooling fan kit.

A typical location of a front-mounted auxiliary ventilation compartment with a fan cooling kit is shown in Figure 2.

When a front-mounted auxiliary ventilation compartment is provided with a fan cooling kit, the instrument tray panel directly above the ventilation compartment is provided with the components shown in Figure 3.



**DANGER**

**DANGER:** Electrical arc flash hazard. Personal protection equipment required. Turn off power to the equipment before working inside.



**WARNING**

**WARNING:** The front-mounted auxiliary ventilated panel and associated components must be installed to maintain the integrity of the enclosure.



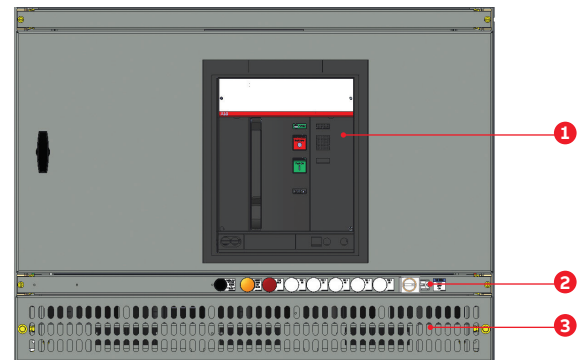
**NOTICE**

**NOTICE:** The fan cooling kit is an integrated system that is activated from the current alarm function on the EMAX 2 circuit breaker. Refer to the section EKIP Touch - Trip Unit Programming of this document for more information.

Turn the illuminated fan control switch to the “OFF” position (Figure 3).

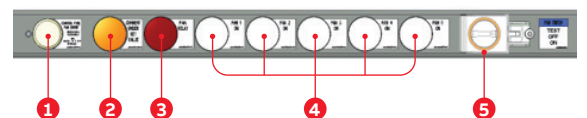


— 01



1. SACE EMAX2 E6.2 circuit breaker
2. Instrument tray panel
3. Front-mounted auxiliary ventilation compartment

— 02



1. Fan control power fuse
2. Current under set value indicating light
3. Fan relay “On” indicating light
4. Fan on indicating light(s)
5. Illuminating fan control switch

— 03

**NOTICE**

**NOTICE:** An individual fan “On” indicating light is provided for each individual fan cooling kit installed in the front-mounted auxiliary vented compartment.

Remove the ¼ hex inch bolts and associated mounting hardware attaching the ventilated cover from the equipment assembly (Figure 4). Be sure to retain the ventilated cover and mounting hardware for re-installation later.

Disconnect the control wiring from the front side of the terminal block shown in Figure 5. Be sure to mark the wire termination positions prior to removal as this information will be needed for re-installation later.

Disconnect the control wiring from the solid-state relays connecting the relays to the load shedding contacts shown in Figure 5. Be sure to mark the wire termination positions prior to removal as this information will be needed for re-installation later. Remove the four ¼-20 inch hex bolts, lock washers and flat washers attaching the cooling fan bracket assembly from the equipment assembly (Figure 5). Be sure to retain the mounting hardware for re-installation later.

The cooling fan bracket assembly can be removed from the compartment by pulling the assembly toward the front of the equipment.

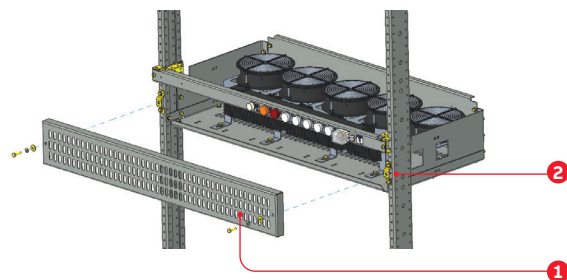
**NOTICE**

**NOTICE:** Care should be taken while removing and installing the cooling fan bracket assembly to not damage the control wire harness within the front-mounted ventilated compartment

Locate the cooling fan that requires replacement. Remove the four wires running from the cooling fan to the terminal blocks.

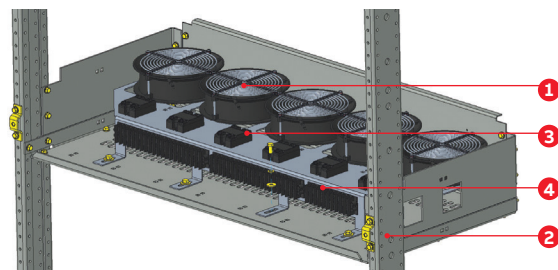
Remove the four M4 machine screws attaching the cooling fan to the mounting bracket (Figure 6) and discard damaged fan.

Attach the new cooling fan to the cooling fan mounting bracket using the four M4 x 70 machine screws and hardware, retained previously, as shown in Figure 6. Ensure the nuts are placed on the underside of the cooling fan bracket assembly. Torque the hardware 10-17 in-lbs. Reconnect the four wires from the cooling fan to their respective terminals. Be sure that the air flow indication arrow on the cooling fan is facing toward the top of the auxiliary vented compartment (Figure 7).



1. Ventilated cover
2. ¼-20 hex bolts, lock-washers and flat-washers

—  
04



1. Cooling fan bracket assembly
2. ¼-20 inch hex bolts, lock washers and flat washers
3. Solid state relay
4. Terminal blocks (wires not shown)

—  
05

**NOTICE**

**NOTICE:** Failure to properly position the air flow marking, as shown in Figure 7, will result in insufficient air flow to ensure internal equipment temperatures will not exceed regulatory limits at maximum continuous current rating. The air flow indication arrow marking on the cooling.

Repeat this for each cooling fan that requires replacement.

—

06

Cooling fan mounting

—

07

Cooling fan air flow orientation

—

08

Fan bracket and rear wall slots

NOTICE

The cooling fan bracket assembly can be reinstalled into the compartment. When re-assembling the fan bracket, align the tabs on the bracket to the slots on the rear panel of the ventilation compartment. The tabs shown in Figure 8 should be fully seated within the slots. The front of the bracket assembly is then secured using the four ¼-20 hex bolts, lock washers and flat washers retained earlier (Figure 5). Torque the hardware to 25-30 inch-lbs.

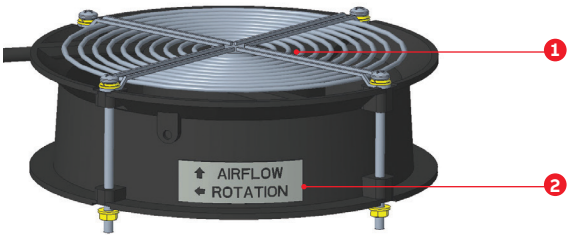
**NOTICE:** Care should be taken while removing and installing the cooling fan bracket assembly to not damage the control wire harness within the front-mounted ventilated compartment.

Reconnect the control wiring to the terminal block (Figure 5).

Using the ¼ inch hex head bolts and associated mounting hardware retained earlier, attach the ventilated cover to the equipment assembly (Figure 4). Tighten the hardware to 25-30 inch-lbs.

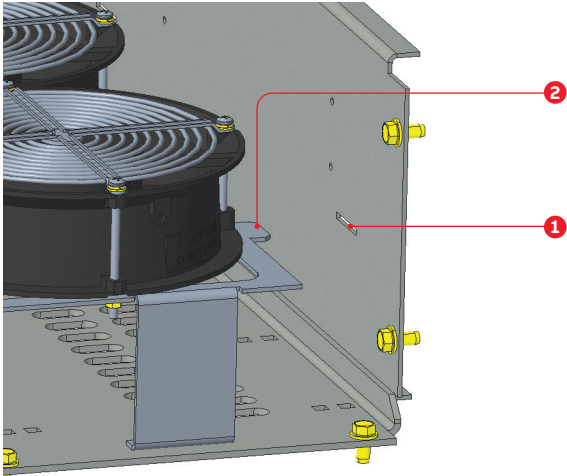
Verify the functional operation of the cooling fans by turning the illuminating fan control switch to the “Test” position. While the switch is held in the “Test” position, each “Fan On” indicating light should illuminate (Figure 3).

After successful testing, the illuminated fan control switch should be returned to the “On” position for normal operation.



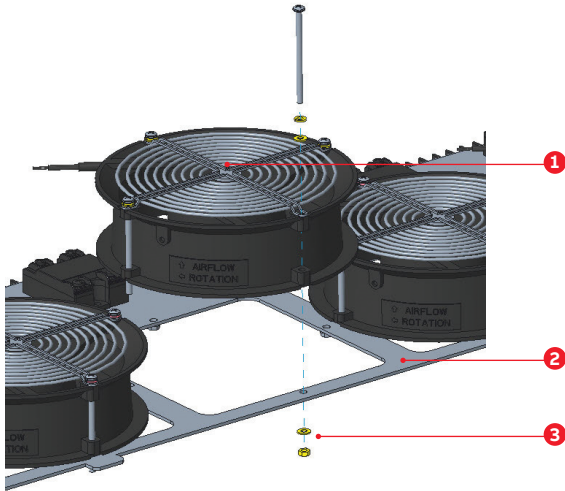
1. Cooling fan  
2. Air flow indication marks

—  
07



1. Slots on rear panel  
2. Tabs on fan bracket

—  
08



1. Cooling fan  
2. Cooling fan bracket assembly  
3. M4 x 70mm machine screw and hardware

—  
06

# Indicating lights and fan troubleshooting

The instrument tray panel directly above the ventilation compartment is provided with components and indicating lights to aid in the process of troubleshooting and diagnosing if a cooling fan fails (Figure 3).

In normal operation, the fan control switch remains in the On-position. Providing power to the fan circuit and allowing the Indicating Lights to illuminate based upon set conditions.

Conditions (1) and (2) in Table 1 depict which lights should be illuminated if the fan switch is in the On-position based upon the continuous current through the breaker.

To test the fan system, hold the fan switch in the Test mode as indicated in Condition (3). With the switch held in the Test mode, the fan relay, along with each of the Fan On indicating lights, should illuminate indicating a functional system. If these lights are not illuminated, refer to Conditions (4) through (6).

**Table 1: Normal operation – fan indicating light status**

| Condition | Current Under Set Value | Fan relay | Fan 1 | Fan 2 | Fan 3 | Fan 4 | Fan 5 | Fan switch | Outcome  |
|-----------|-------------------------|-----------|-------|-------|-------|-------|-------|------------|--|
| 1         | On                      | -         | -     | -     | -     | -     | -     | On         | System On – Current Under Set Value                      |
| 2         | -                       | On        | On    | On    | On    | On    | On    | On         | System On – Current Above Set Value, All Fans Functional |
| 3         | -                       | On        | On    | On    | On    | On    | On    | Test       | System Test – All Fans Functional                        |

If the fan relay is illuminated while one or more Fan On indicating lights are not illuminated, the respective fans require maintenance. Conditions (4) and (5) shown in Table 2 depict the indicating lights illuminated if Fans 1 or 2 require maintenance respectively.

Other combinations of lights for Fans 1 through 5 may be illuminated to indicate respective fan status.

**Table 2: Fan maintenance – fan indicating light status**

| Condition | Current Under Set Value | Fan relay | Fan 1 | Fan 2 | Fan 3 | Fan 4 | Fan 5 | Fan switch | Outcome                                 |
|-----------|-------------------------|-----------|-------|-------|-------|-------|-------|------------|---|
| 4         | -                       | On        | -     | On    | On    | On    | On    | On         | System On – Fan 1 requires maintenance. |
| 5         | -                       | On        | On    | -     | On    | On    | On    | On         | System On – Fan 2 requires maintenance. |



If the Fan Relay light is illuminated but all the Fan Indicating lights are not, a failure may have occurred with the DC power supply.

To check the condition of the DC power supply, review the status of the “Output OK” Indicator Light on the front face of the power supply. If not illuminated, replace the DC power supply.

Table 3: Fan maintenance – DC power supply failure

| Condition | Current Under Set Value | Fan relay | Fan 1 | Fan 2 | Fan 3 | Fan 4 | Fan 5 | Fan switch | Outcome   |
|-----------|-------------------------|-----------|-------|-------|-------|-------|-------|------------|---|
| 6         | -                       | On        | -     | -     | -     | -     | -     | On         | System On – All fans require maintenance or DC Power Supply requires maintenance. |

EKIP Touch - Trip Unit Programming

In ReliaGear LV SG 5000 A applications, the fan control is initiated by the Alarm Warning lw1 feature of the trip unit which signals a fan control circuit to turn the fans on or off. Table 4 provides the current threshold values that EKIP Touch or Hi-Touch trip unit's "Alarm Warning lw1" function should be programmed to initiate the fan cooling system.

Note that the RELT function must be programmed prior to programming the second relay output of the EKIP 2K-3 module for fan control.

Table 4: Current alarm settings for cooling fan function

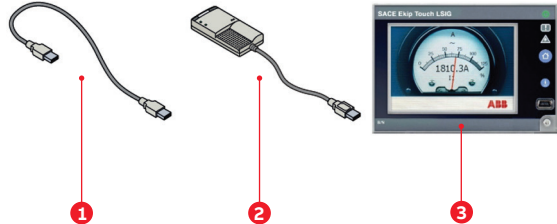
| Circuit breaker | Section width (inches) | Current threshold (A) | Alarm warning lw1 |
|-----------------|------------------------|-----------------------|-------------------|
|                 |                        |                       | Up set point      |
| E6.2            | 38                     | 4400                  | 0.88              |

EKIP Touch programming using EKIP Connect

Using a customer supplied laptop launch the EKIP Connect software. Connect one side of the micro USB cable (1) to the EKIP TandP Module (2) and the other side to the EKIP Touch or Hi-Touch trip unit (3) (Figure 9). Proper connection is confirmed when the green power LED is on as indicated on the front of the EKIP TandP module (2). Active communication is indicated via the blinking orange transmission indicator on the EKIP TandP module (2).

NOTICE

Notice: It may be necessary to scan for the trip unit via the ABB Key Icon in EKIP Connect before the device will be available.

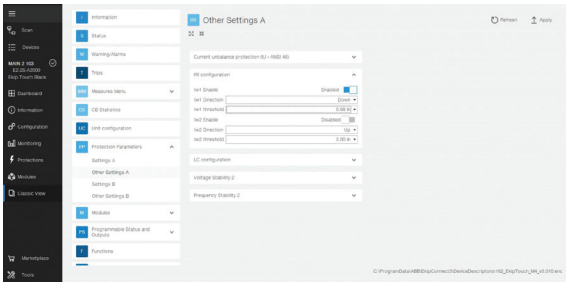


- 
- 10  
EKIP Connect - Login
- 
- 11  
EKIP Connect – IW  
Configuration
- 
- 12  
EKIP Connect –  
signaling modules
- 
- 13  
EKIP Connect – Source  
Trigger Selection
- 
- 14  
EKIP Connect –  
Contact Type and  
Delay Specification

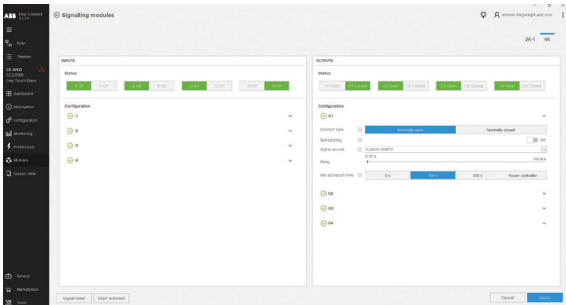
Login to EKIP Connect and select Advanced User as shown in Figure 10, this allows all options to be available for programming.



Once logged in select Classic View via (1) in Figure 11. Expand Protection Parameters and select Other Settings A to reveal the IW Configuration panel (2). Within IW configuration, enable Iw1 and configure the direction and threshold per Table 4 and apply changes per (4).



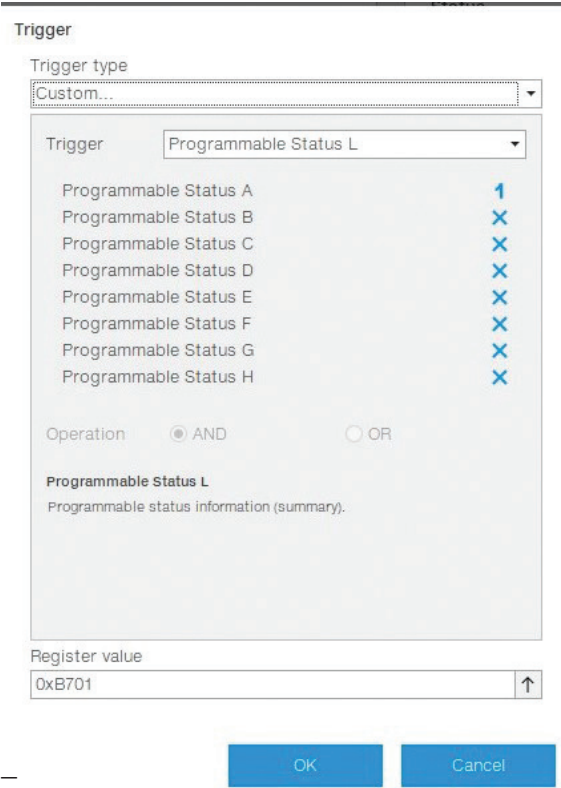
With the EKIP 2K-3 signaling module installed, select Modules (5), Signaling Modules and EKIP Signaling Module 2K-3 (Figure 12). When cooling fans are required, the second output of the 2K-3 module is reserved for fan control and is not available for customer use. To Configure the secondary output, select the drop for O2 and define the signal source by selecting the ellipsis (6).



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12

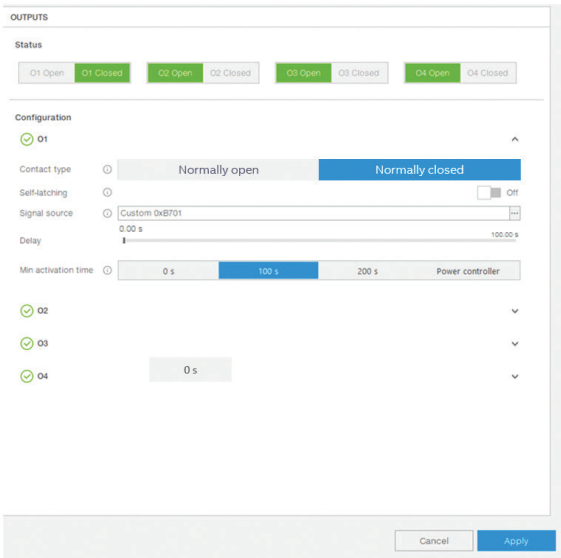
Change the trigger type to Custom and trigger value to “Programmable Status L”. To confirm the correct selection, a “1” rather than an “X” should be shown next to Programmable Status A as depicted by (7).



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13

Select the Normally Closed contact type and confirm that the Signal Source is Custom 0x9B04. Change the Min Activation time to 100 s (Figure 14).



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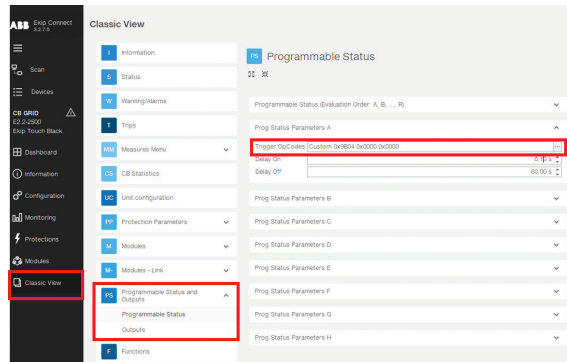
14

15  
EKIP Connect –  
Programmable Status  
and Outputs

16  
EKIP Connect –  
Trigger OpCodes

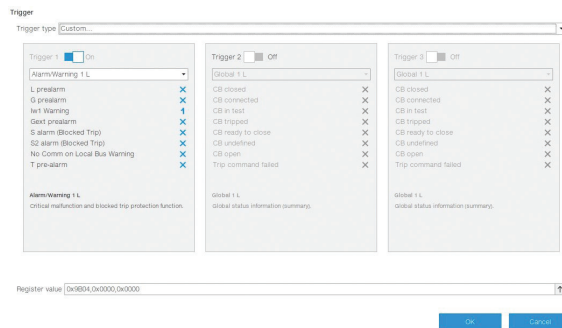
17  
EKIP Connect –  
Trigger OpCodes

Once the Programmable Status A has been activated the time delay can be set to ensure the fans remain operational for 60s after the current has dropped below 4400 A. To do so navigate to “Programmable Status and Outputs” within the classic view shown below (Figure 15).



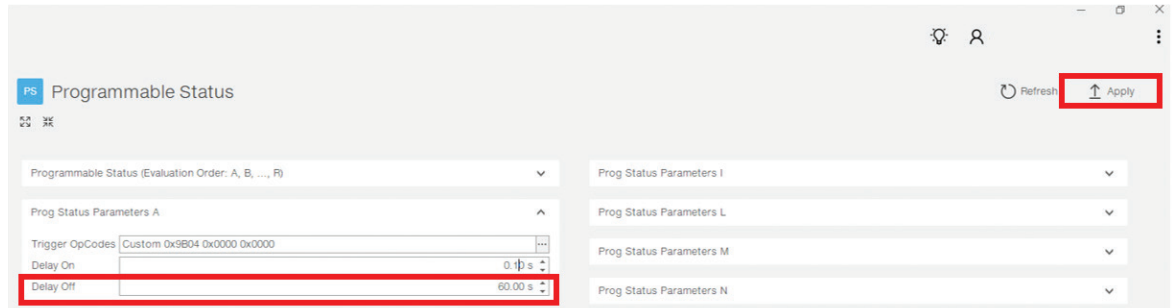
15

Navigate to “Prog Status Parameters A” Trigger OpCodes and expand the selection. Select the Trigger 1 and turn this to “On”. Change the trigger to “Alarm/Warning 1 L”



16

Apply the new Trigger selection to close the pop-out window. Select the Delay Time of 60s and apply the Delay Off value.



17

### EKIP Touch programming verification

To verify if the 2K-3 is properly programmed for the Fan Control, utilize the Test Menu on the EKIP Touch Trip Unit. The test menu is available if the EKIP 2K-3 signaling module is detected correctly.

The Auto-Test command is available within each sub-menu; it activates Automatic Output Test (Contacts and LEDs), Input Test (LEDs) and provides the following operations:

1. Resetting of output contacts (= Open) and LEDs (= Off)
2. Illuminating all LEDs in sequence (Output and Input)
3. Closing and Switch-Off in sequence of the two output contacts while respective LEDs illuminate
4. Resetting to Initial Conditions.

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