Contents

1 Scope/Application 5
2 Safety Information 5
3 Approved Equipment 5
4 Risk Assessment 5
5 Authorisation 6
6 Safety 6
6.1 Personal Protective Equipment (PPE) 6
6.2 Plant Tools and Equipment 6
6.3 Entry to Substations 6
6.4 Vandalism and Trespass 6
6.5 Emergency Contact Details 7
7 Prior to the Commencement of Work on Site 7
8 Installation of LV Supply to ACC-1250 Reflex Power Supply 7
8.1 Indoor Substations 8
8.2 Outdoor Substations 9
8.3 Mounting ACC-1250 9
Figure 8-1 ACC-1250 Reflex Power Supply 10
9 Installation of RX10 Actuator 10
9.1 Parts Required 10
9.2 Parts Required Specific to Switchgear Types 11
9.3 Alignment Tools 11
9.4 Tools Needed (Will Cover Installation to all the Switchgear types) 11
10 Power up the RX10 12
10.1 Method 12
Figure 10-1 Location of ACC-1250 AC Fuse 12
Figure 10-2 24v DC Terminals 12
Figure 10-3 DC and SMA GSM Antenna Connection 13
Figure 10-4 Connecting to a Device 14
Figure 10-5 Pairing to Device 14
Figure 10-6 Entering Password for Device 15
Figure 10-7 Assistant App Home Screen 15
11 Record Details of Substation and Switch 16
Figure 11-1 Setup and Commission – Details Tab 16

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11.1 Method 16
12 Check/Edit Communication Settings 17
Figure 12-1 DNP3 Settings 17
12.1 Method 17
13 Test Communication Links to Control Room 18
Figure 13-1 Communications Testing 18
13.1 Method 18
14 Select Switchgear and Switch 19
Figure 14-1 Selecting Switchgear Type 19
14.1 Method 19
15 Move RX10 Unit to Correct Position 20
Figure 15-1 Actuator Configuration 20
15.1 Preparation 20
Figure 15-2 Confirming Operation 21
Figure 15-3 Actuator Configuration 21
16 Completing the 'Set up and Commission' Process 22
Figure 16-1 Switch Tab 22
16.1 Method 22
Figure 16-2 Running Health Check 22
Figure 16-3 Completed Health Check 23
Figure 16-4 Commissioning Summary 23
Figure 16-5 Committing Commissioning Record 24
17 Communications Testing 24
17.1 Preparation 24
17.2 Items to Test 24
Figure 17-1 Selecting Additional Option Menu 24
Figure 17-2 Selecting 'Change to Remote' 25
Figure 17-3 Confirming Change to Remote 25
Figure 17-4 Locating Diagnostics Button 26
Figure 17-5 Enabling Remote Mode and Viewing Dummy Status 26
Figure 17-6 Locating Diagnostics Button 27
Figure 17-7 Actuator Tab with no Loaded Values 27
Figure 17-8 Loading Configuration Values 28
Figure 17-9 Actuator Tab with Configuration Loaded from Device 28

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Figure 17-10 Confirming Operation 29
Figure 17-11 Location of 4-amp Fuse 30
Figure 17-12 Lost Bluetooth Connection 30
18 Configuring a Password 31
18.1 Method 31
Figure 18-1 Selecting Additional Option Menu 31
Figure 18-2 Selecting Change Password 31
Figure 18-3 Change Password 32
19 Installation of RX10 Actuator 32
19.1 Preparation 32
Figure 19-1 Locating 'Change to Remote' Option 33
20 Installation of RX10 Actuator – Type and Long & Crawford T3(T4)GF3 34
Figure 20-1 T3(T4)GF3 Bracket Alignment Tool 34
Figure 20-2 T3(T4)GF3 Boss Alignment Tool 35
Figure 20-3 T3(T4)GF3 Mounting 36
21 Installation of RX10 Actuator – Lucy VRN2a 38
Figure 21-1 VRN2a Exploded Diagram 38
Figure 21-2 VRN2a Cable Routing 39
Figure 21-3 VRN2a Door Hinge Bolt Removal 39
Figure 21-4 Installation of Cable Guides 40
Figure 21-5 Location of Stuffing Glands in VRN2a Door 40
22 Installation of RX10 Actuator – RN2C(D) 41
Figure 22-1 RX10 Installation to RN2c 41
Figure 22-2 Cut Out for RN2c Cable Routing 42
23 Installation of RX10 Actuator – Lucy FRMU MK2A 43
Figure 23-1 FRMU Fitment of the Anti-Tamper Hardware 43
Figure 23-2 FRMU Fitment of the Anti-Tamper Hardware 44
Figure 23-3 Location of FRMU Rating Plate 45
Figure 23-4 Install RX10 Bracket 46
Figure 23-5 Install RX10 47
24 Installation of RX10 Actuator – Lucy VRN/VRN2 48
Figure 24-1 VRN2 Installation 48
Figure 24-2 Removal and Replacement of Door 49
Figure 24-3 Cable Glands 50

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	Figure 24-4 Cable routing	50
	Figure 24-5 Completed VRN2 Installation	51
25	Labelling of RX10 Unit	52
	Figure 25-1 RX10 with Label	52
26	Completion	52

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1 Scope/Application

This procedure outlines the principles and methods required for the safe installation of RX10 actuators to ground mounted High Voltage (HV) switchgear. It includes the principles that shall be adhered to when carrying out modifications to the operating handle as well as the installation of the actuator.

2 Safety Information

	WARNING: Live Electrical Systems – Use Live Work Techniques/Procedures/PPE for those activities carried out or near equipment that could be live.
	MANDATORY: Work shall be carried out in accordance with General Requirements in CP306 Section 1. Approved mandatory PPE and work wear shall be in accordance with General Requirements in CP306 Section 1. Always refer to EPD903 for current requirements.

The task covered by this procedure has significant hazards associated with it identified by the symbol and text **WARNING:**

This procedure details the risk control measures that Shall be applied when carrying out the task. If the risk control measures in this procedure are implemented the risks will be controlled. This procedure also forms the method statement for the task.

3 Approved Equipment

Refer to Section 10 of this Manual for Approved tools and equipment.

4 Risk Assessment

	The Point Of Work Risk Assessment (POWRA) shall be carried out for this work and shall detail what mitigation has being put in place regarding the hazards as detailed in Section 8 of this document. A copy of POWRA can be found on the Electricity North West Limited website (Volt) within the HSE Section.

Risk:	• Work in confined spaces. • Approach to live exposed conductors • External metal work being alive • Working at heights
Risk Level:	Moderate.
Control Measure:	CP306 Section 1 General Requirements Training / Authorisation Levels as Section 5 Shrouding of LV Boards

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5 Authorisation

This work shall only be undertaken by personnel holding Electricity North West authorisation codes relevant to the tasks outlined in this document. The details of all authorisations are described in CP614.

Dec 23

6 Safety

6.1 Personal Protective Equipment (PPE)

- Appropriate PPE shall be used at all times. Personnel are trained in its use and shall ensure it is in good condition.

6.2 Plant Tools and Equipment

- All plant, tools and equipment used during the work shall be maintained and used in accordance with manufacturer's instructions, or Electricity North West's / Contractor's own policy.

6.3 Entry to Substations

- Entry to substations shall be carried out in accordance with CP606 procedures S28 and S50.

6.4 Vandalism and Trespass

- The requirements of CP606 procedures S28 and S50. shall be observed.

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6.5 Emergency Contact Details

In an emergency should there be a requirement to contact the Network Hub Control Engineer, then use the telephone list below.

AREA DESK	PLANT FILE REF.	PLANNED SWITCHING - INTERNAL (FROM ENWL LANDLINE OR MOBEX)	PLANNED SWITCHING - EXTERNAL	FAULT SWITCHING - INTERNAL (FROM ENWL LANDLINE OR MOBEX)	FAULT SWITCHING - EXTERNAL
Peak	31; 32; 33	33441	0843 3113441	33461	0843 3113461
South Lancs	21; 23	33442	0843 3113442	33462	0843 3113462
North Lakes	62; 63; 66	33443	0843 3113443	33463	0843 3113463
South Lakes	61; 64; 65	33444	0843 3113444	33464	0843 3113464
Manchester	16; 17	33445	0843 3113445	33465	0843 3113465
Lancashire	41; 42; 45	33446	0843 3113446	33466	0843 3113466
33kV		33487	0843 3113487	33487	0843 3113487
132kV		33488	0843 3113488	33488	0843 3113488

7 Prior to the Commencement of Work on Site

Prior to undertaking any installation works, Telemetry Support at Frederick Road Tel: 24700 / 0843 3114700 shall be informed of the work location and requested to flag on the Network Management System (NMS) “staff onsite”.

The status of the Fault Location Isolation and Service Restoration (FLISR) on the circuit shall be confirmed prior to undertaking any installation works. FLISR shall be disabled by the appropriate Network Hub Control Engineer if still in service before completing the installation works.

NOTE: Where the work cannot be completed within the same working day the status of FLISR shall be confirmed with the Network Hub Control Engineer at the start and end of each subsequent day until the work is completed.

8 Installation of LV Supply to ACC-1250 Reflex Power Supply

- Extreme care must be taken if working in or around the LV board or pillar.
- The source of the ACC-1250 LV supply shall be determined by a suitably trained person and recorded on the commisioning document or in the notes field of the commisioning application.
- At indoor substations a fused spur supply can generally be provided from a 13-amp socket, which can be safely isolated. If this 13-amp socket is the only socket in the substation then an additional 13-amp socket **MUST** be installed adjacent to the fused spur. This is the preferred source.

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8.1 Indoor Substations

At indoor substation sites where the 13-amp plug socket is on the exposed LV board, then the following method will be used:

(a) Ensure that the LV board is fully shrouded and remains shrouded for the duration of the installation;

(b) Mount a new fused spur and socket to the wall adjacent to the LV board, external to the LV shrouding and remove the fuse;

(c) Fully complete the remainder of the LV installation, use 1.5mm 3 core steel wired armed cable from the fused spur to the ACC-1250 using appropriate glands and fixings;

(d) Prepare a suitable length of blue artic flexible cable, terminated from the fuse spur with a 13 amp plug top terminated at the opposite end, apply the identification label stating that this is LV supply for ACC-1250 RX10;

(e) Wearing your LV rubber gloves, with leather gauntlet and a full-face visor; Carefully lift the LV shroud to the side and plug the 13-plug into the socket on the LV board;

(f) Replace the 4-amp fuse into the fused spur to power the ACC-1250.

At indoor substation sites where there are LV test points on the exposed LV board but NO LV socket is available, then the following method may be used: -

(a) Ensure that the LV board is fully shrouded and remains shrouded for the duration of the installation;

(b) Mount a new fused spur and socket to the wall adjacent to the LV board, external to the LV shrouding and remove the fuse;

(c) Fully complete the remainder of the LV installation, use 1.5mm 3 core steel wired armed cable from the fused spur to the ACC-1250 using appropriate glands and fixings;

(d) Prepare a suitable length of blue artic flexible cable, terminated from the fuse spur with fork crimps on the conductors (the earth and the neutral will use a single crimp) at the opposite end, apply the identification label stating that this is LV supply for the ACC-1250 RX10;

(e) With your LV gloves and full-face visor now fitted;

(f) Carefully lift the LV shroud to the side to expose the LV test point auxiliary fuses;

(g) Remove the RED phase auxiliary fuse;

(h) Confirm the RED phase to Neutral and Earth, LV test point is dead;

(i) Loosen the test points clamps and connect the fork crimps, ensure that none of the fork crimp is exposed for touch by hand;

(j) Replace the RED phase auxiliary fuse and test to confirm polarity;

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(k) Carefully refit the LV shroud to as originally fitted;

(l) Replace the fuse into the fused spur to power the RTU.

8.2 Outdoor Substations

At outdoor substations the LV supply shall generally be sourced from an LV cabinet or outdoor LV pillar. The specific source for this supply shall be from the following list and shall adopt the lowest numbered option which is possible, if none of the options below are available or you feel that the LV pillar is NOT SAFE to work on, then please contact your Project Manager to inform him the site requires an LV supply and cut out installing.

(a) 13-amp socket with 3 way plug adaptor inserted to ensure a socket is available for test devices.

(b) Auxiliary terminals (ensuring the supply is isolated);

- Where Auxiliary terminals are used as a source then, in accordance with the Distribution Safety Rules, the supply to them shall be isolated prior to working on them.
- All LV cabling shall be adequately protected by an appropriate fuse.
- Apply an identification label stating that this is LV supply for the ACC-1250 RX10

8.2.1 No LV Supply

- Where no LV supply is available a Stainless Steel LV cut-out box shall be mounted on the Free Standing Frame or wall to allow a new service to be provided by others in accordance with Electricity North West standards.

8.3 Mounting ACC-1250

The ACC-1250 is to be mounted on the RMU leg using the method instructed during the EO1170 training course. Any leg can be used however care should be taken not to obstruct any opening maintenance panels.

The ACC_1250 should always be mounted so the electrical connections are at the bottom as shown in Fig 8.1.

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Figure 8-1 ACC-1250 Reflex Power Supply

9 Installation of RX10 Actuator

The RX10 actuator is packaged with a power cable in addition to the device itself. Switchgear specific mounts are required and are ordered separately from the unit.

9.1 Parts Required

Nortech PN	Commodity Code	Description
ACC-1250	330710	RX10 Twin power supply unit (PSU)
RX10-0100	330701	RX10 actuator complete with DC power cable and antenna
FSK-0400	N/A	Assistant app
n/a	N/A	Bluetooth enabled Android tablet with FSK-0400 installed

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9.2 Parts Required Specific to Switchgear Types

Nortech PN	Commodity Code	Description
ACC-1270	330702	Switchgear mounting kit for Long & Crawford T3(T4)GF3
ACC-1310	330707	Anti Vandal Guard for externally mounted T3(T4)GF3
		X56 padlock for T3(T4)GF3 Anti Vandal Guard
ACC-1280	330704	Switchgear mounting kit for LUCY RMU VRN2A
ENW-CC1	N/A	Cable mounting clip for VRN2A
ACC-1291	330705	Switchgear mounting kit for Schneider Electric RN2C LEFT HAND SWITCH
ACC-1292	330706	Switchgear mounting kit for Schneider Electric RN2C RIGHT HAND SWITCH
ACC-1360	330711	Switchgear mounting kit for Lucy FRMU

9.3 Alignment Tools

Dec 23

Nortech PN	Description
ACC-1320	Installation alignment jig kit for Long & Crawford T3(T4)GF3.
ACC-1420	Installation alignment jig for Lucy FRMU

9.4 Tools Needed (Will Cover Installation to all the Switchgear types)

Switchgear type	Description
Long & Crawford T3(T4)GF3	Spanners: 15mm, 17mm Hex spanners with handle: 2.5mm, 5mm
LUCY FRMU Mk2A	Spanners: 17mm Sockets: 17mm socket – deep socket is recommended Hex spanners with handle: 2.5mm, 5mm
LUCY VRN/VRN2/VRN2A	Spanners: 10mm Hex spanners with handle: 2.5mm, 5mm
Schneider Electric RN2C (D)	

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10 Power up the RX10

10.1 Method

- Remove the fuse inside the ACC-1250, as shown in Fig 10.1 circled in red. Test the AC supply to PSU is dead.

Figure 10-1 Location of ACC-1250 AC Fuse

- The power cable is provided in the RX10 kit, cut the cable to length and fit boot lace crimps to the Brown and Blue cores. Wire the boot lace crimps into the correct DC output terminal (-V and +V) of the ACC-1250 PSU (Figure 10-1).

Figure 10-2 24v DC Terminals

- Replace the fuse on the ACC-1250 PSU, test the AC supply by proving voltage is present.
- Replace the lid of the ACC-1250 PSU.

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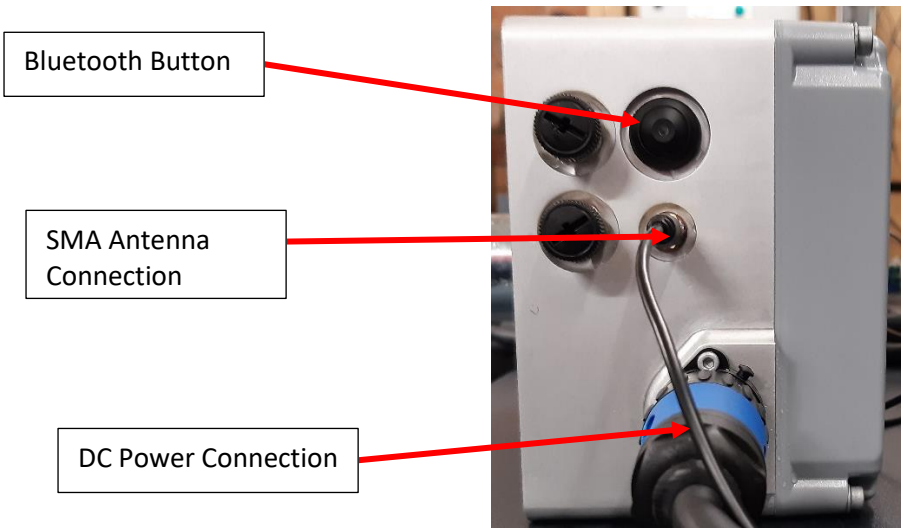
- Unpack the RX10 unit. **DO NOT** install on the switchgear yet!
- Connect the DC power cable blue connector to the RX10 unit as shown in Figure 10-3.
- Connect the Antenna to the SMA connector as shown in Figure 10-2.
- Press the Bluetooth button on the RX10 unit as shown in Figure 10-3, check the blue LED starts and continues to flash.
- Note the Serial Number of the RX10 unit (yellow label on side of unit) as this is used to identify the device when initially connecting via Bluetooth and is recorded by Telemetry support after commissioning.

Figure 10-3 DC and SMA GSM Antenna Connection



- Start the REFLEX Assistant app on the tablet.
- Click CONNECT TO A DEVICE icon as shown in Figure 10-4.

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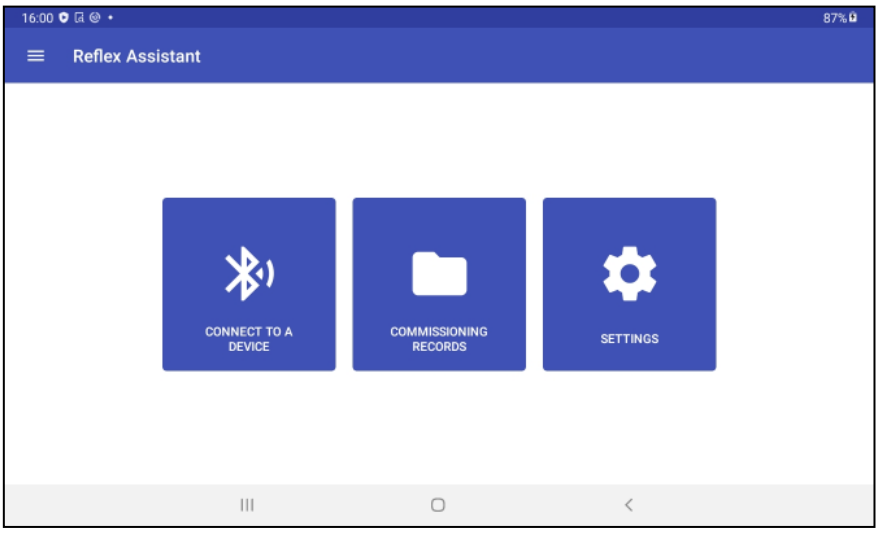
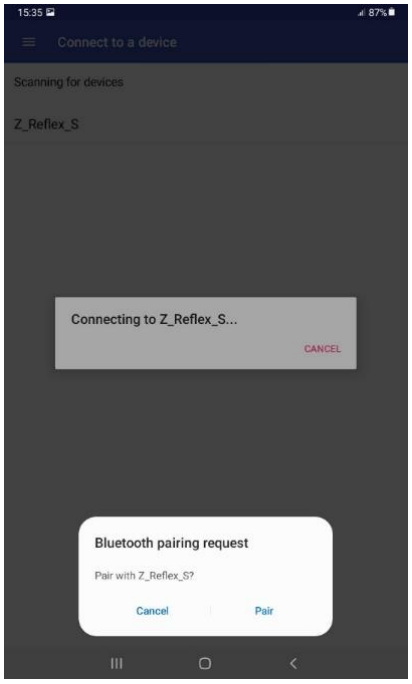
Figure 10-4 Connecting to a Device



- Click the Serial Number of your RX10 unit.
- **If more than one RX10 Unit is already installed care should be taken that the correct device has been connected to. This can be confirmed by ensuring the name (or serial number if not yet configured) of the device matches the device being operated and that the Bluetooth indication is solid blue.**
- If this is the first time you have connected to the unit it will ask you to pair with the device, click pair as shown in Figure 10-5.

Figure 10-5 Pairing to Device



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- Enter the RX10 local password as shown in Figure 10-6 – the default password is password (you will only be asked this once).

Figure 10-6 Entering Password for Device

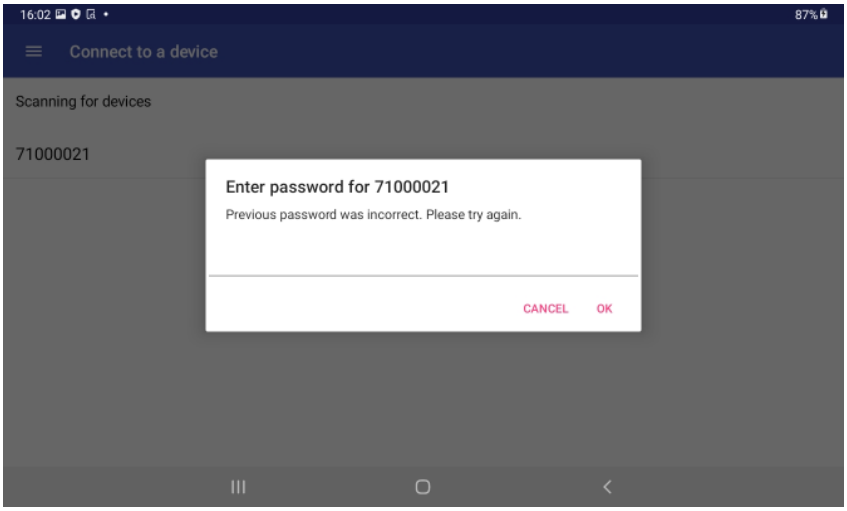
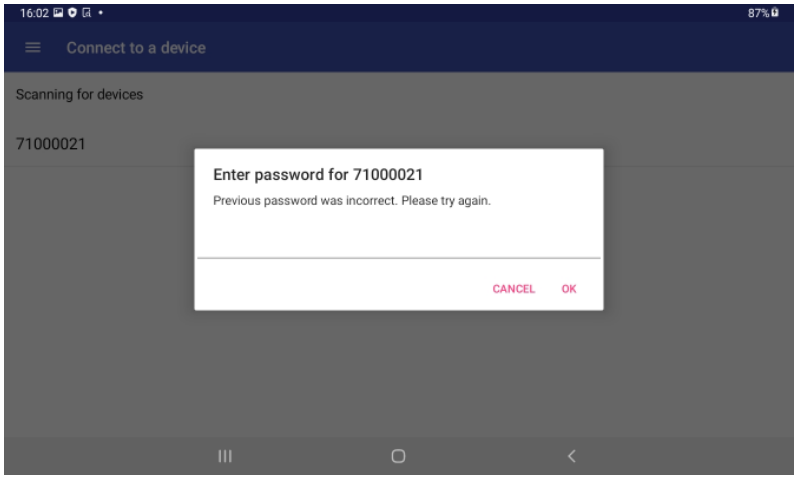


Figure 10-7 Assistant App Home Screen



- Click SETUP AND COMMISION icon as shown in Figure 10-7.

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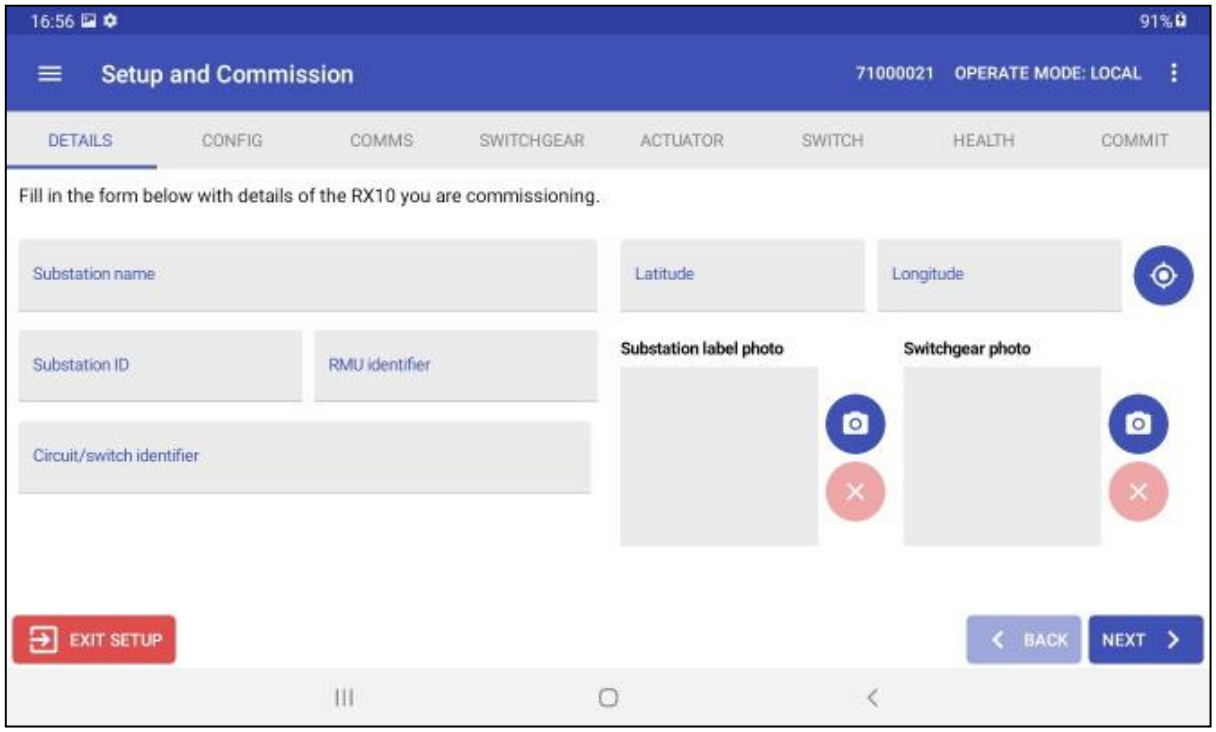
11 Record Details of Substation and Switch

Figure 11-1 Setup and Commission – Details Tab



11.1 Method

- As shown in Figure 11-1, fill in the DETAILS tab. – note that Substation ID refers to the Substation number and RMU identifier refers to the switchgear's serial number.
- The Latitude and Longitude can be discovered by the tablet if it has GPS built in and can see the satellites. If this is not the case enter 0 and 0 in each of the fields.
- Take a photo of the Substation nameplate and the switchgear you will be installing the RX10 unit on later.
- Click NEXT.

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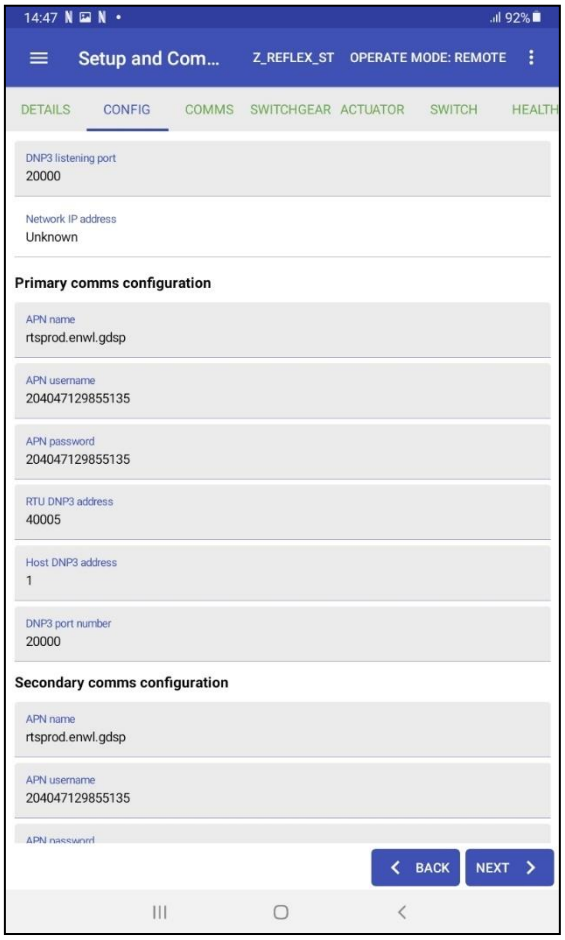
12 Check/Edit Communication Settings

Figure 12-1 DNP3 Settings



12.1 Method

- Check the settings have downloaded from the device as shown in Figure 12-1, the APN name, DNP3 listening port and DNP3 port number will be as in the image, all other fields will vary depending on site.
- RTU DNP3 Addresses (Primary and Secondary) will need to be changed. Contact Telemetry Support for the values to use. The host DNP3 address will always be 1.
- Provide Telemetry support with the Network IP address shown.
- The following settings are factory set; they should therefore be correct:
  - DNP3 listening port and port number
  - APN settings
- Click NEXT.

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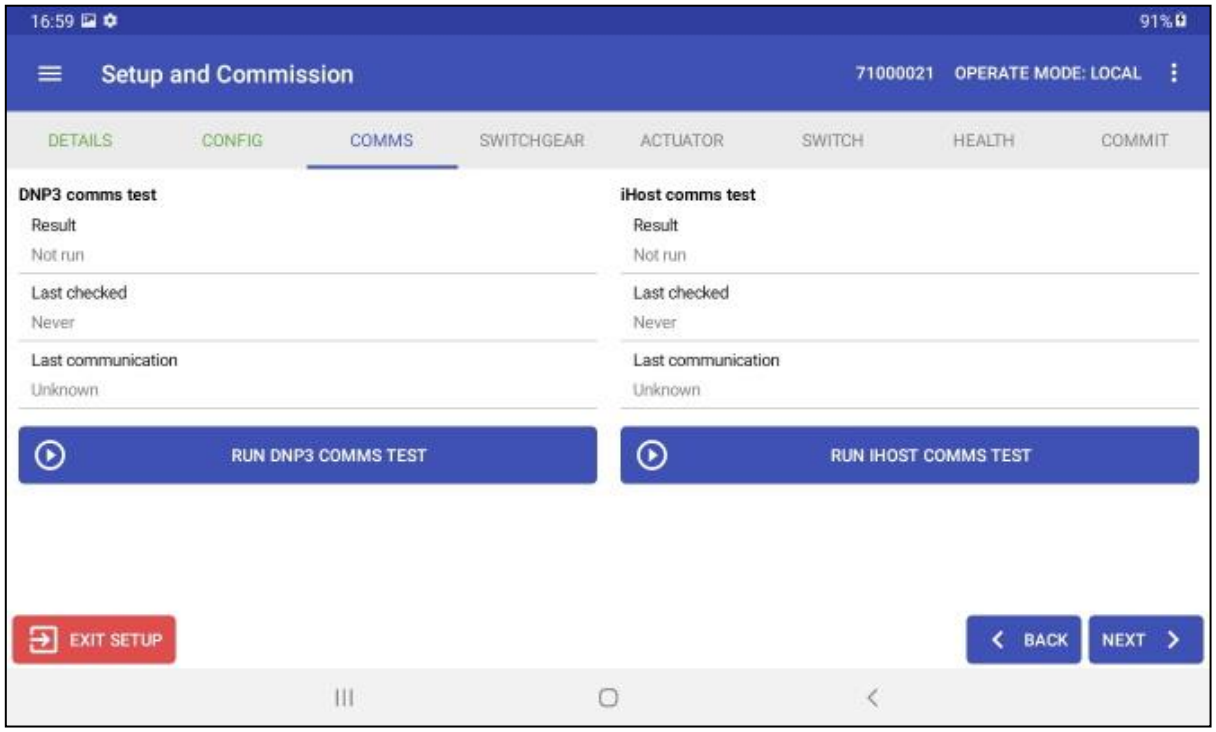
13 Test Communication Links to Control Room

Figure 13-1 Communications Testing



13.1 Method

- Contact Telemetry support who will 'On Scan' the device
- When they have confirmed the device is connected Click RUN DNP3 COMMS TEST as shown in Figure 13-1.
- Wait for the result, if successful it will show as passed.
- Click RUN IHOST COMMS TEST as shown in Figure 13-1.
- Wait for the result, if successful it will show as passed.
- If either test Fails: Inform Telemetry support for advice before proceeding.
- When both tests Pass: Click NEXT.

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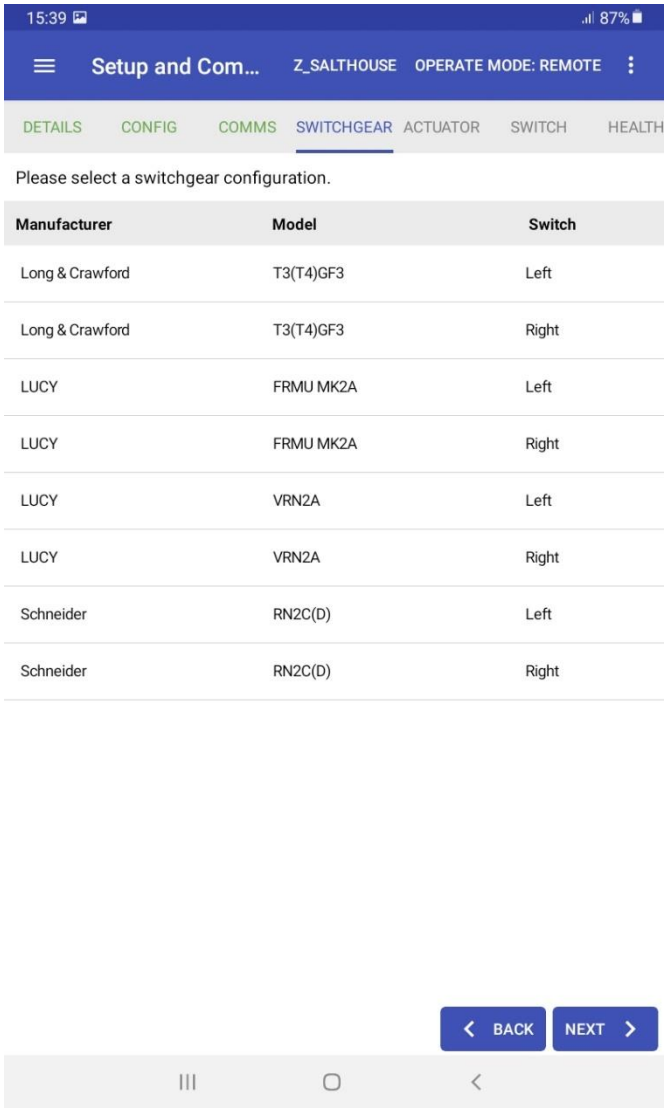
14 Select Switchgear and Switch

Figure 14-1 Selecting Switchgear Type



NOTE For the Lucy VRN/VRN2 the Lucy VRN2A configuration should be used from the list shown above.

Dec 23

14.1 Method

- As shown in Figure 14-1, select the switchgear you are going to install the RX10 unit on.
- **TAKE CARE** to select the correct switchgear type and orientation on the switchgear, Left or Right. Click NEXT.

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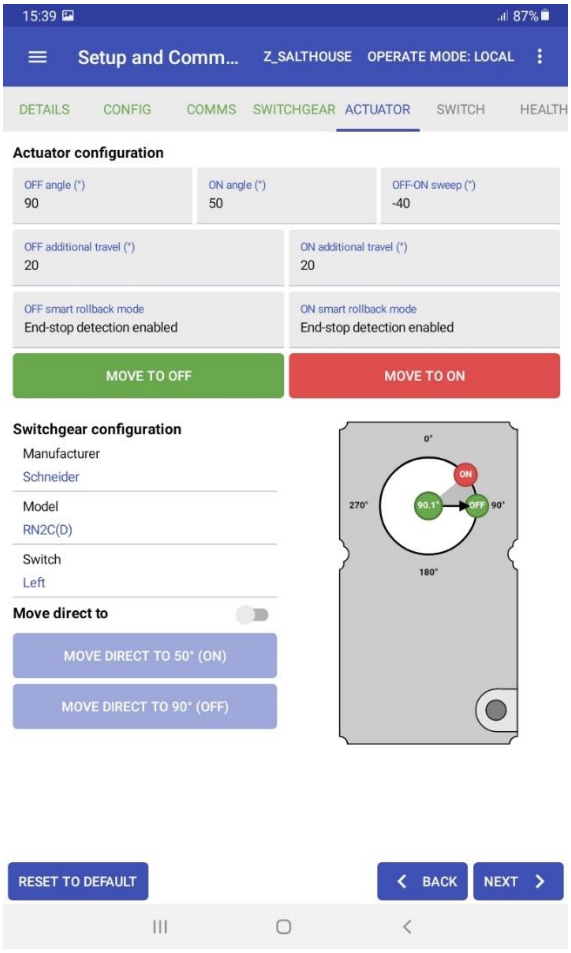
15 Move RX10 Unit to Correct Position

Figure 15-1 Actuator Configuration



NOTE: the screenshot shows operation angles which may not match the switchgear switch you are installing.

15.1 Preparation

- The RX10 unit **MUST NOT** be installed on the switchgear yet.
- **You should not need to edit any of the values on the screen**. If you do, inform Telemetry Support to ensure this is recorded.
- Move the RX10 unit output position (shown by the angle arrow on the screen as illustrated in Figure 15-1) to match the current switch position OFF or ON. **NOTE THAT THIS OPERATION WILL BE VISIBLE ON THE CONTROL SYSTEM.** Do this by clicking on the 'MOVE DIRECTLY TO' switch then 'MOVE DIRECTLY TO OFF' or 'MOVE DIRECTLY TO ON' and then confirming the action at the prompt as shown in Figure 15-2:

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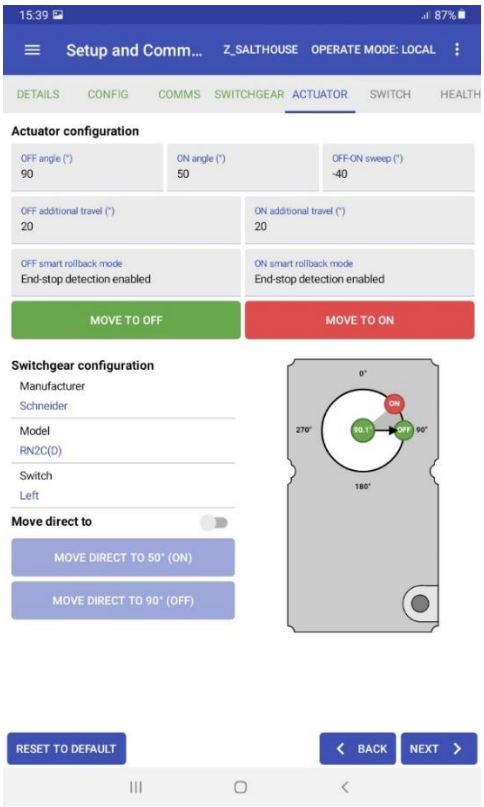
Figure 15-2 Confirming Operation

- The RX10 will now move to the position selected and the screen will update as shown in Figure 15-3:

Figure 15-3 Actuator Configuration



- Before continuing confirm the following:
  - Screen shows the RX10 in either the ON or OFF position.
  - The RX10 position is the same as the position of the switch you are going to install on.
  - Confirm with Telemetry support the device is showing the correct position on the control system

- Click 'NEXT'

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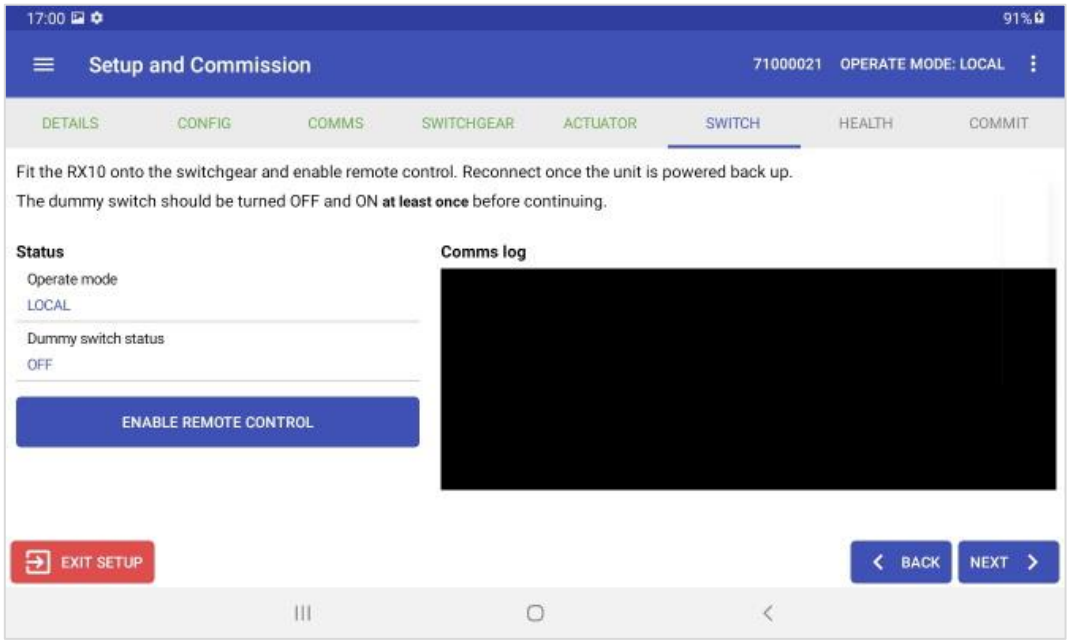
16 Completing the 'Set up and Commission' Process

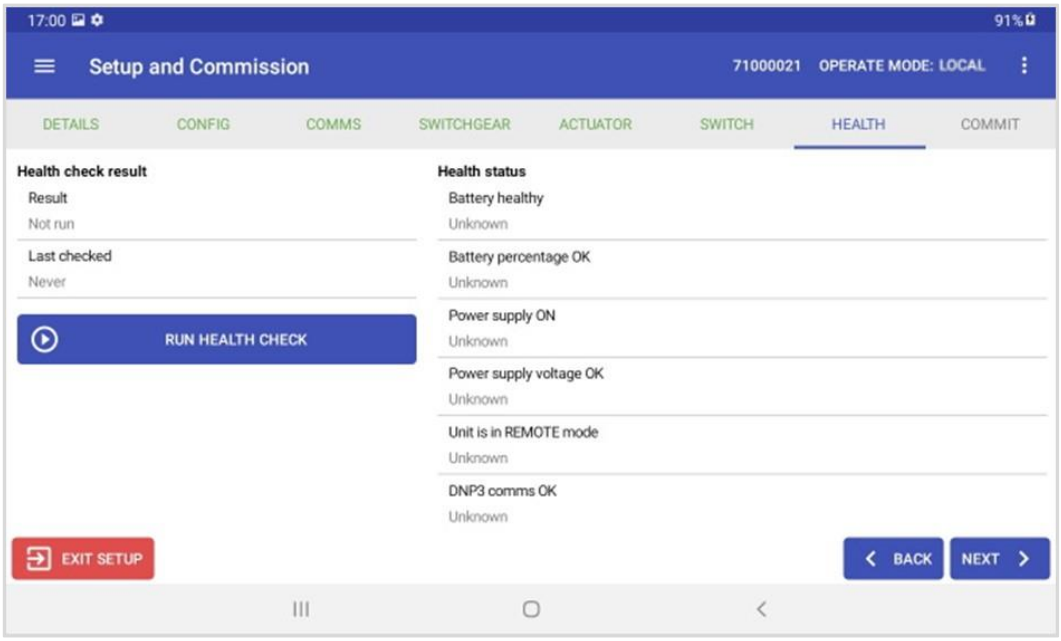
Figure 16-1 Switch Tab



16.1 Method

- As shown in Figure 16-1, the devices 'Operate Mode' by default is in 'Local'. Leave it in this state and click 'NEXT'. If it is in 'Remote' refer to the '17.2.1 Local and Remote operation' section.

Figure 16-2 Running Health Check



- Click 'RUN HEALTH CHECK' as shown in Figure 16-2.

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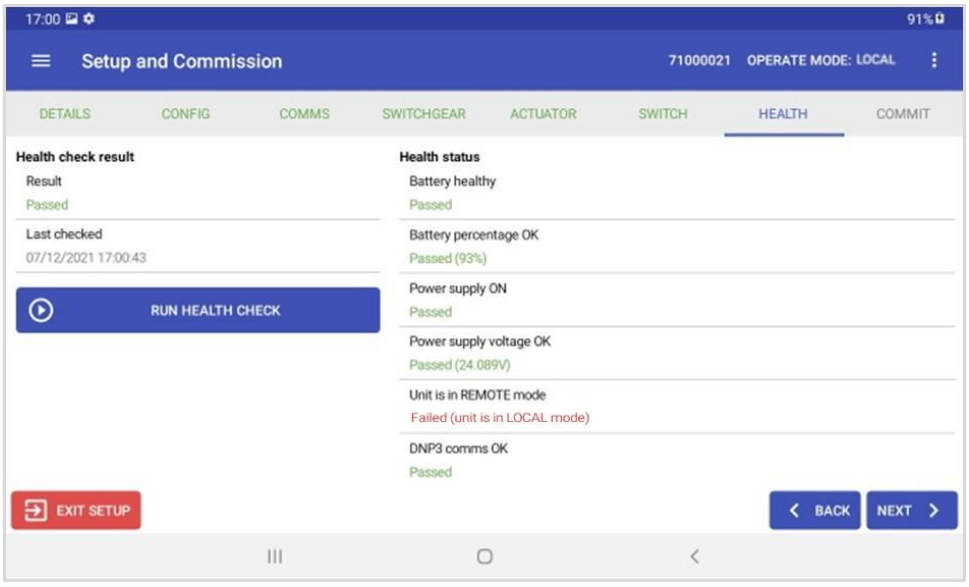
- If any items fail or are highlighted in Red, as shown in Figure 16-3, (Excluding the 'Unit is in Remote' field), check with Telemetry support before continuing.

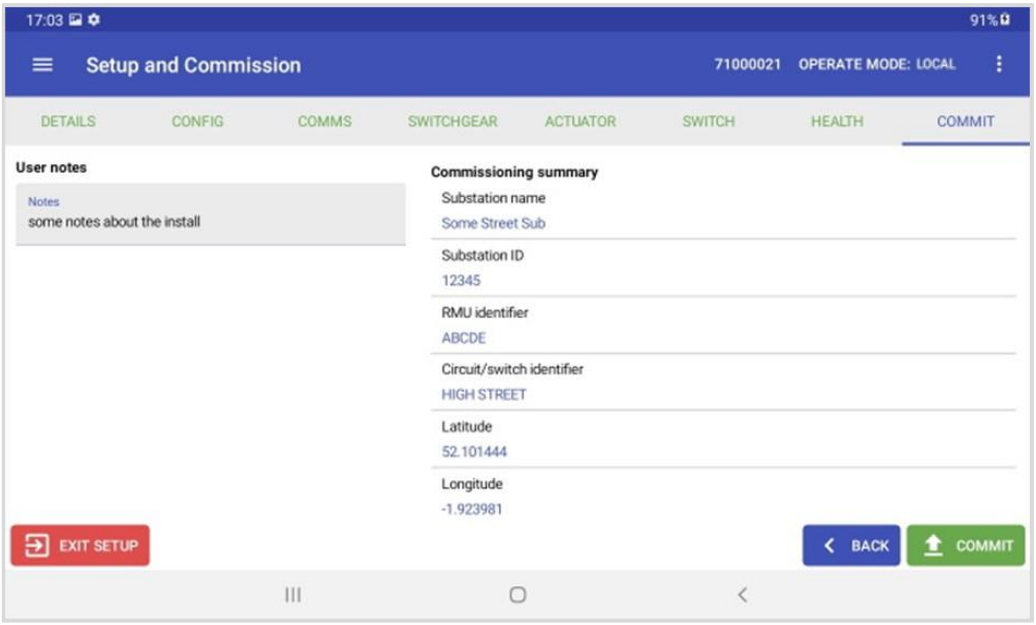
- Click 'NEXT'

Figure 16-3 Completed Health Check



- You will be presented a 'Commissioning Summary', as shown in Figure 16-4, confirm all the details are recorded correctly.

Figure 16-4 Commissioning Summary



- Click 'COMMIT'.

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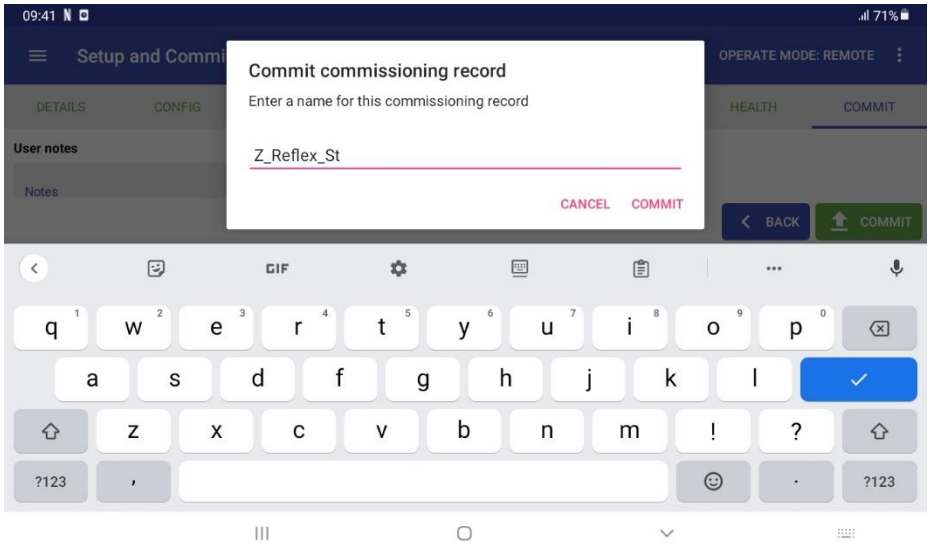
- A filename will be created by the App as shown in Figure 16-5, append the substation number to the end of the filename and click 'COMMIT' to save the Commissioning record.

Figure 16-5 Committing Commissioning Record



17 Communications Testing

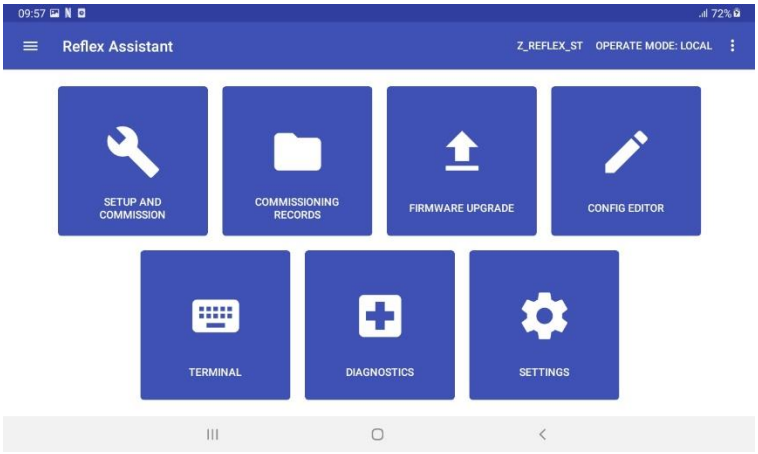
17.1 Preparation

- The RX10 unit **MUST NOT** be installed on the switchgear yet.
- All tests must be undertaken in conjunction with the Telemetry Support team.

17.2 Items to Test

17.2.1 Local and Remote Operation

Figure 17-1 Selecting Additional Option Menu



- Click the 3 dots at the top right next to the Operate Mode, as shown by the arrow in Figure 17-1.

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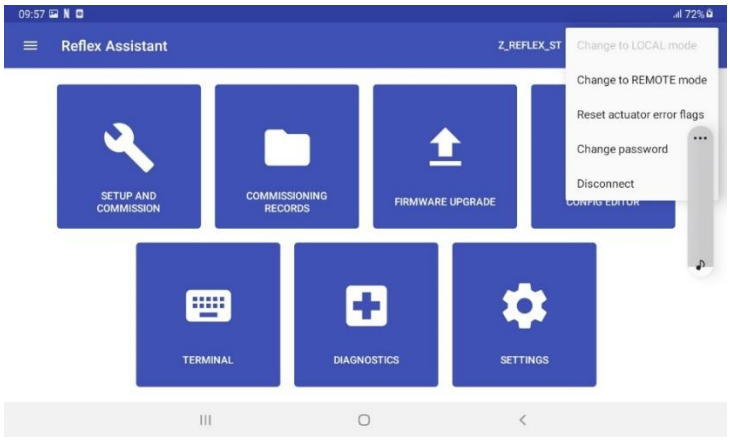
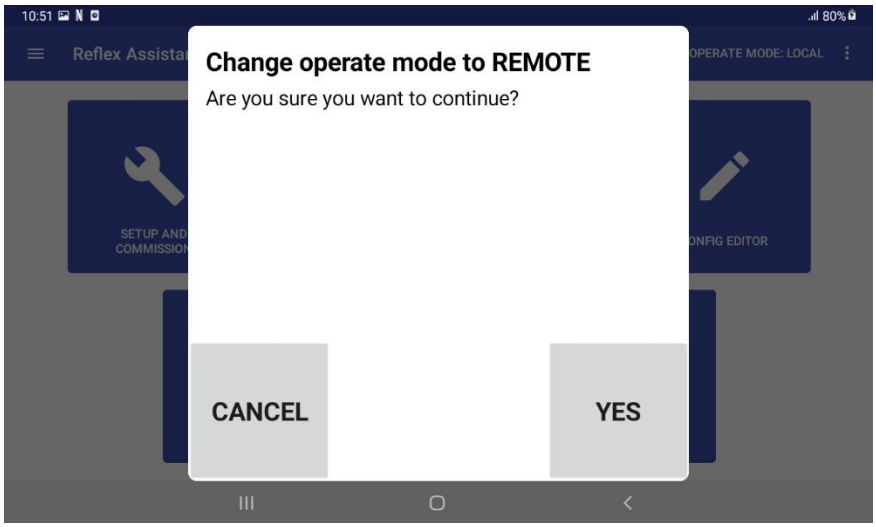
Figure 17-2 Selecting 'Change to Remote'



- Click 'CHANGE TO REMOTE' as shown in Figure 17-2.

Figure 17-3 Confirming Change to Remote



- Click 'YES' as shown in Figure 17-3 and confirm with Telemetry Support the change in state has been received.

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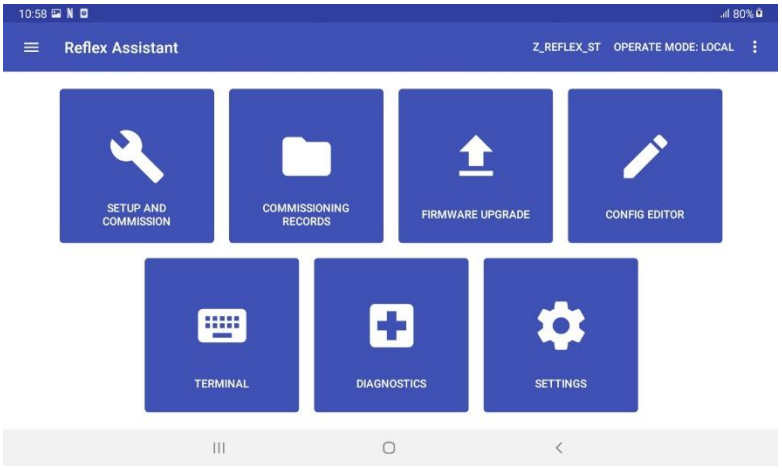
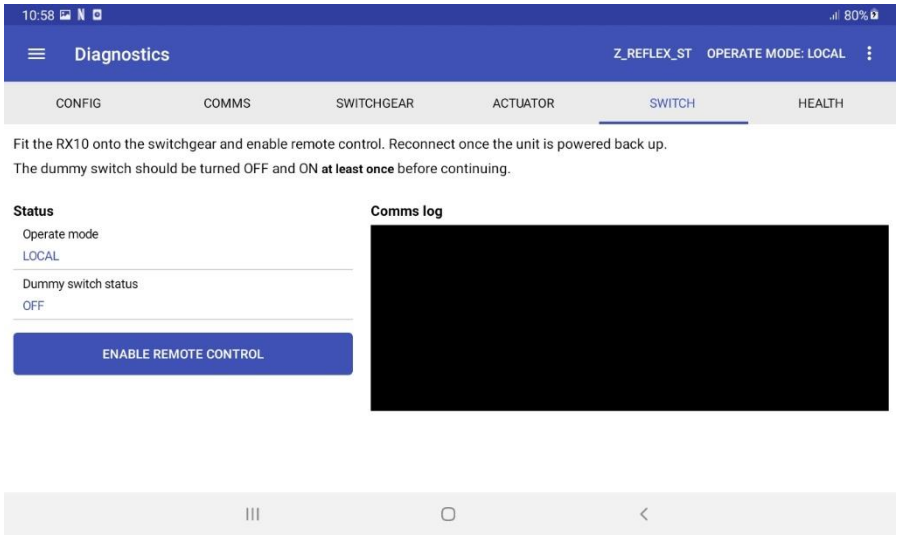
17.2.2 Dummy Remote Operation

Figure 17-4 Locating Diagnostics Button



- Click the 'DIAGNOSTICS' button shown in Figure 17-4.

Figure 17-5 Enabling Remote Mode and Viewing Dummy Status



- Click the 'SWITCH' tab as shown in Figure 17-5.
- If the device is not already in remote mode, click the 'ENABLE REMOTE CONTROL' button to place the device into remote mode.
- Ask Telemetry Support to operate the Dummy – the 'DUMMY SWITCH STATUS' should change from OFF to ON in both the application and NMS.

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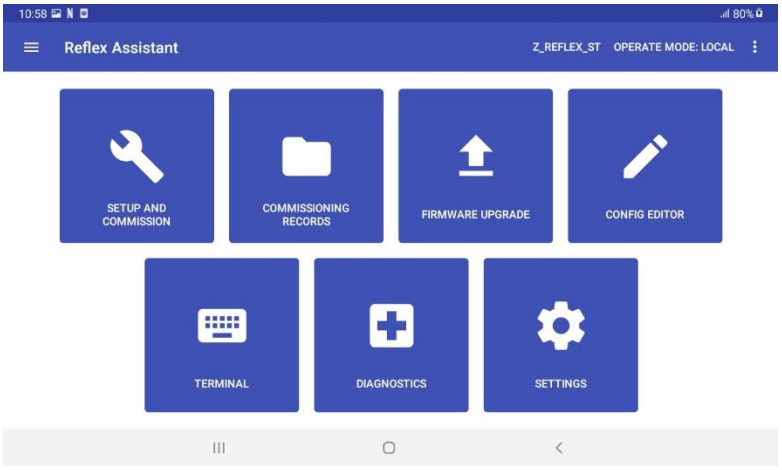
17.2.3 Open and Close Switch Indications and Remote Operation

NOTE the RX10 unit **MUST NOT** be installed on the switchgear yet.

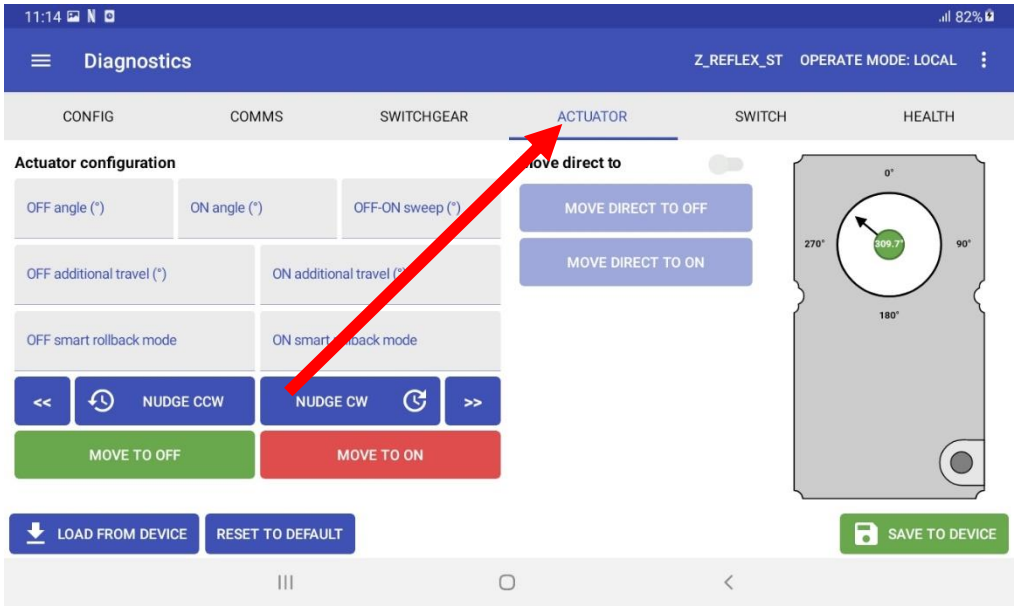
- **As mentioned in section 10, care should be taken that the correct device has been connected to. This can be confirmed by ensuring the name of the device matches the device being operated and that the Bluetooth indication is solid blue.**

Figure 17-6 Locating Diagnostics Button



- Click the 'DIAGNOSTICS' button as shown in Figure 17-6.

Figure 17-7 Actuator Tab with no Loaded Values



- Click the 'ACTUATOR' tab as shown by the arrow in Figure 17-7– **NOTE** the fields will not currently be populated

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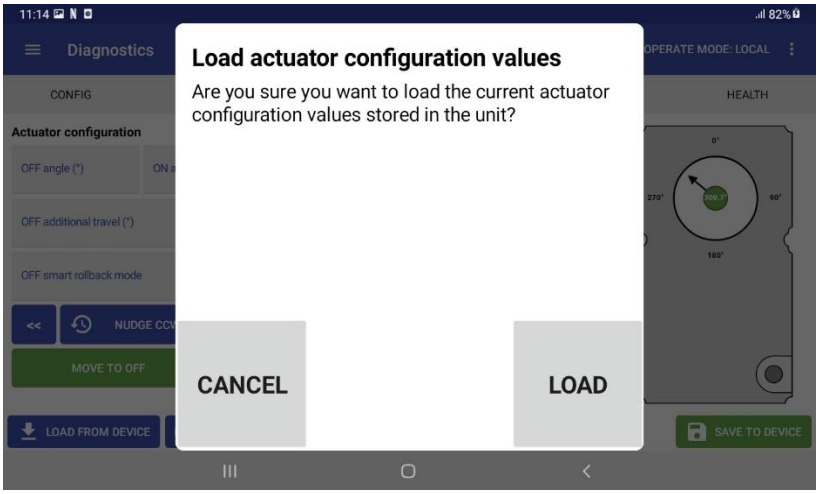
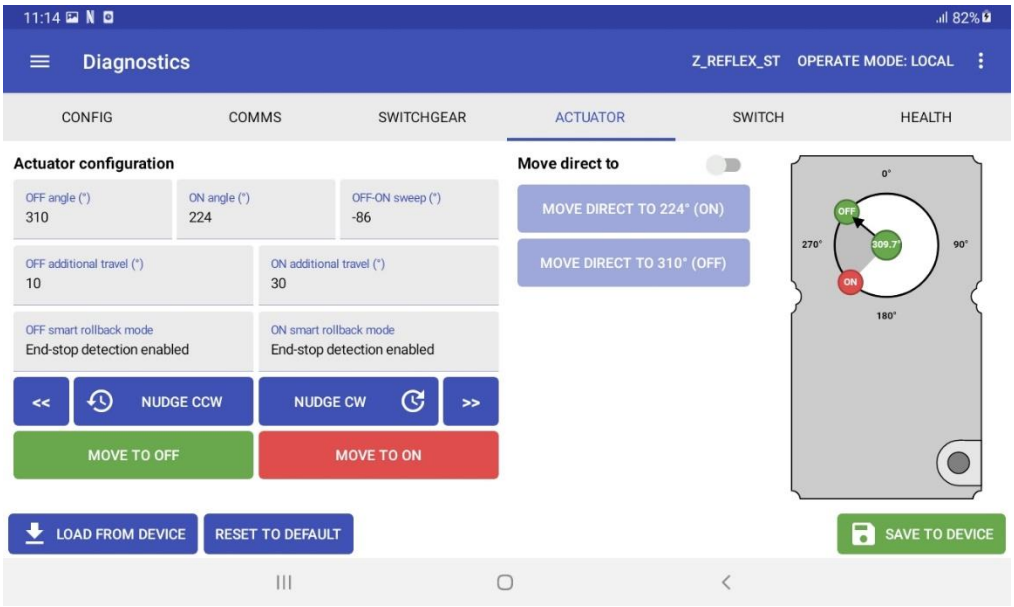
- Click 'LOAD FROM DEVICE' – this will load the actuator type and values stored in the RX10 from the set up and commissioning process.

Figure 17-8 Loading Configuration Values



- Click 'LOAD' as shown in Figure 17-8.

Figure 17-9 Actuator Tab with Configuration Loaded from Device



- The fields will now be populated with the actuator information as shown in Figure 17-9.
- **DO NOT** edit any of the values on the screen as these are set by the manufacturer.
- Put the device is in LOCAL mode following procedure described under '17.2.1 Local and Remote operation'

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NOTE before operating the device ensure it is **NOT** mounted to the switchgear and you are connected to the correct device.

- Move the RX10 unit output position (shown by the angle arrow on the screen) to the opposite position confirmed in section 6. Do this by clicking on the 'MOVE DIRECTLY TO' switch then 'MOVE DIRECTLY TO OFF' or 'MOVE DIRECTLY TO ON' and then confirming the action at the prompt as shown in Figure 17-10:

Figure 17-10 Confirming Operation

- The RX10 will now move to the position selected, confirm this change with Telemetry Support.
- Repeat these steps moving the actuator back to its original position as completed in section 6.
- Put the device into 'REMOTE' mode as described under '17.2.1 Local and Remote operation'
- Confirm this mode change with Telemetry support.
- Ask Telemetry Support to operate the device – confirm each operation and ensure the device is returned to the same state as the switch it is to be mounted on.
- Put the device back into 'LOCAL' mode as described in '17.2.1 Local and Remote operation'

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17.2.4 Power Supply Fail/Bluetooth Enable/Remote Reboot

Figure 17-11 Location of 4-amp Fuse

- Remove the ACC-1250 Cover.
- Remove the 4-amp fuse from the ACC-1250 PSU as shown highlighted in red in Figure 17-11.

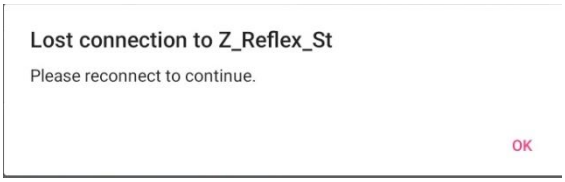
NOTE do not disconnect the supply plug from the RX10 unit as this will cause the device to shut down.

- Confirm with Telemetry Support that a 'Power Supply Fail' alarm has been received.

NOTE if another RX10 unit is currently fitted and commissioned it will also show an alarm, in this event inform Telemetry support of the devices Circuit name so the alarm can be cleared.

- Refit the fuse and confirm the Alarm resets
- Refit the cover of the ACC-1250 PSU
- Ask Telemetry Support to perform a Remote Reboot.

Figure 17-12 Lost Bluetooth Connection



- Once this has been operated the Bluetooth LED will go out and the tablet will lose connection showing the message in Figure 17-12.

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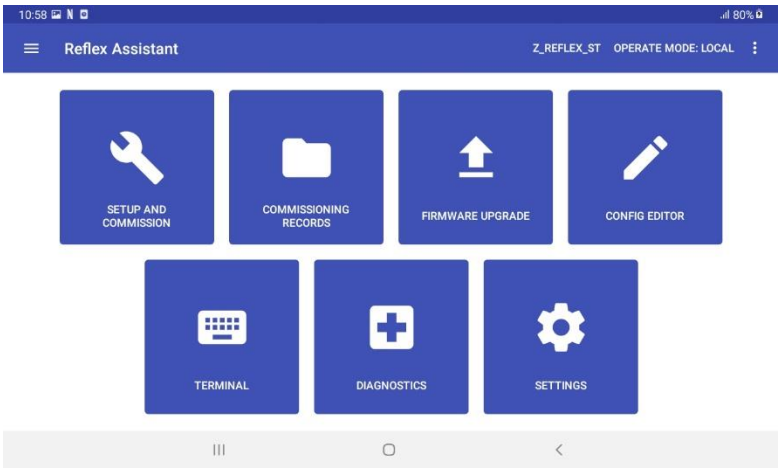
- Confirm with Telemetry Support that the RX10 has restarted and is communicating normally.
- When the device is back online request Telemetry Support to perform a ‘remote Bluetooth enable’
- Once this control has been sent the Bluetooth LED should start to flash and the device can be connected to as described in Section 10, Powering up the RX10.

18 Configuring a Password

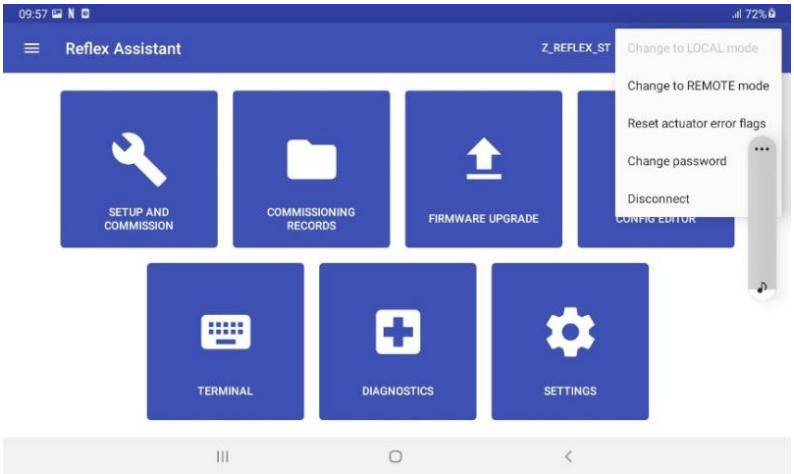
18.1 Method

Figure 18-1 Selecting Additional Option Menu



- Click the three dots on the top right of the display as shown in Figure 18-1.

Figure 18-2 Selecting Change Password



- Select ‘CHANGE PASSWORD’ as shown in Figure 18-2.

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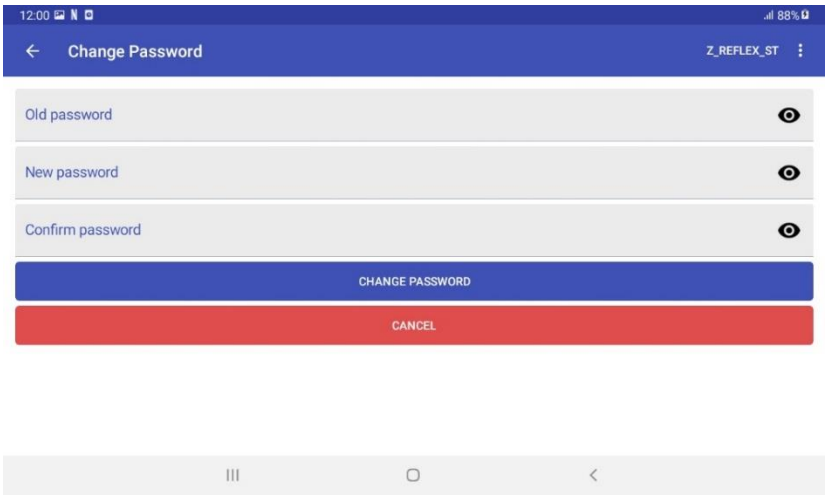
Figure 18-3 Change Password



- Input the existing password (default is 'password') as shown in Figure 18-3.
- Input the new password in both fields, this will be a 4 digit number provided by System Operations.

NOTE: touch the 'eye' icon to view the password as you type it.

NOTE: do not copy and paste the new password into the confirm password field as this can result in the password not matching the agreed format.

- Click 'CHANGE PASSWORD' to save the new password.

19 Installation of RX10 Actuator

The installation procedure is different for each type of switchgear. Follow the section below for the switchgear you are installing on.

19.1 Preparation

- Ensure the device is in 'LOCAL' mode as described under 17.2.1and shown in Figure 19-1.

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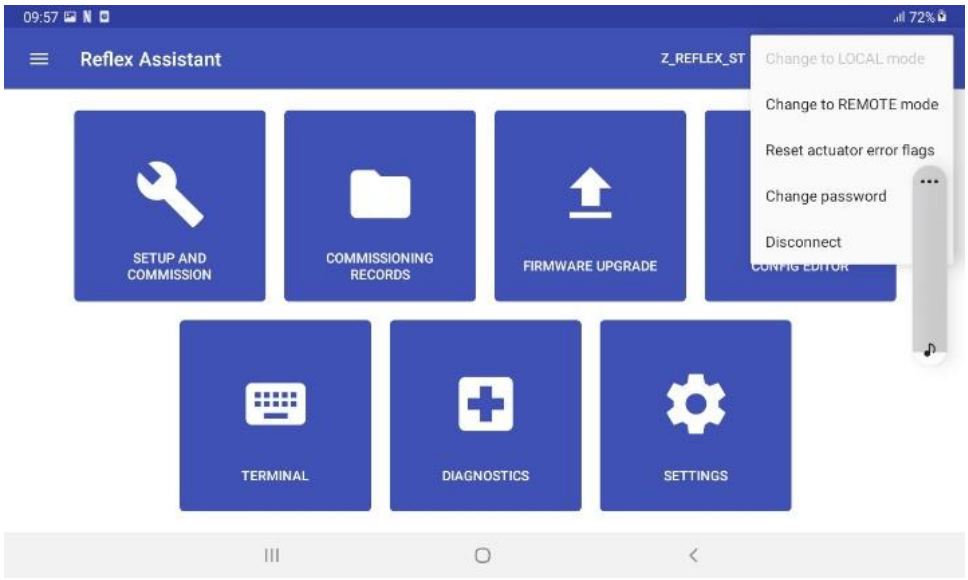
Figure 19-1 Locating 'Change to Remote' Option



- Disconnect from the device by clicking the three dots and the top right of the Assistant App and 'DISCONNECT' The Bluetooth LED will return to a flashing state.

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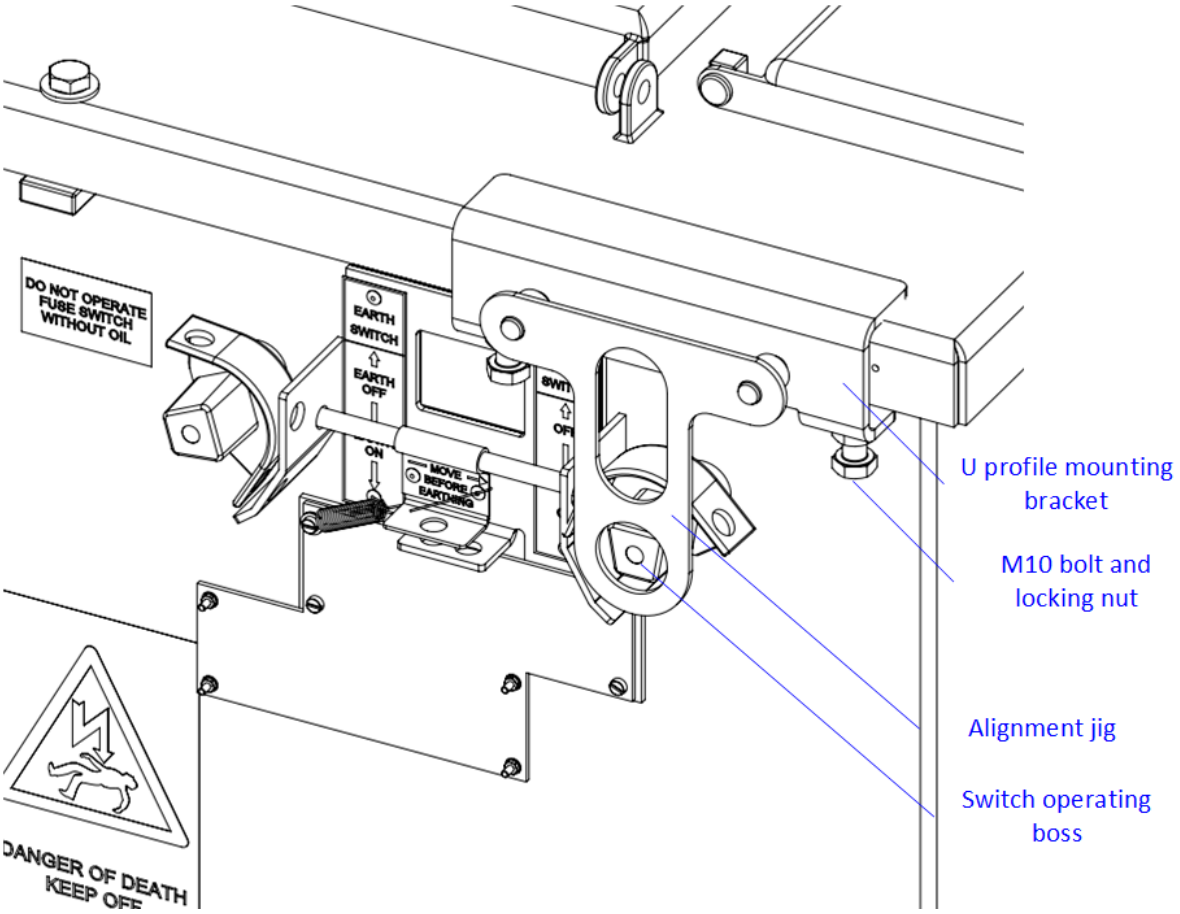
20 Installation of RX10 Actuator – Type and Long & Crawford T3(T4)GF3

The drawings below are for the right-hand switch. The procedure is the same for installation on the left-hand switch, referring to Plant Modification Instruction 726 for the transformer handle modification procedure.

Figure 20-1 T3(T4)GF3 Bracket Alignment Tool



Open the switchgear fixing kit packaging. The kit is installed on the switchgear using the following procedure:

- Loosely fit the U profile mounting bracket to the switchgear as shown in fig 20.1 using two M10 bolts (‘A) and locking nuts. Note the bolts go under the lip of the switchgear.
- Use the alignment jig to get the bracket in the correct left-right position above the switch operating boss. Tighten the M10 (as labelled ‘A’ in Fig 20-1) bolts and lock in place with the M10 nuts to 40Nm. Remove the alignment jig – keep it safe for future use.

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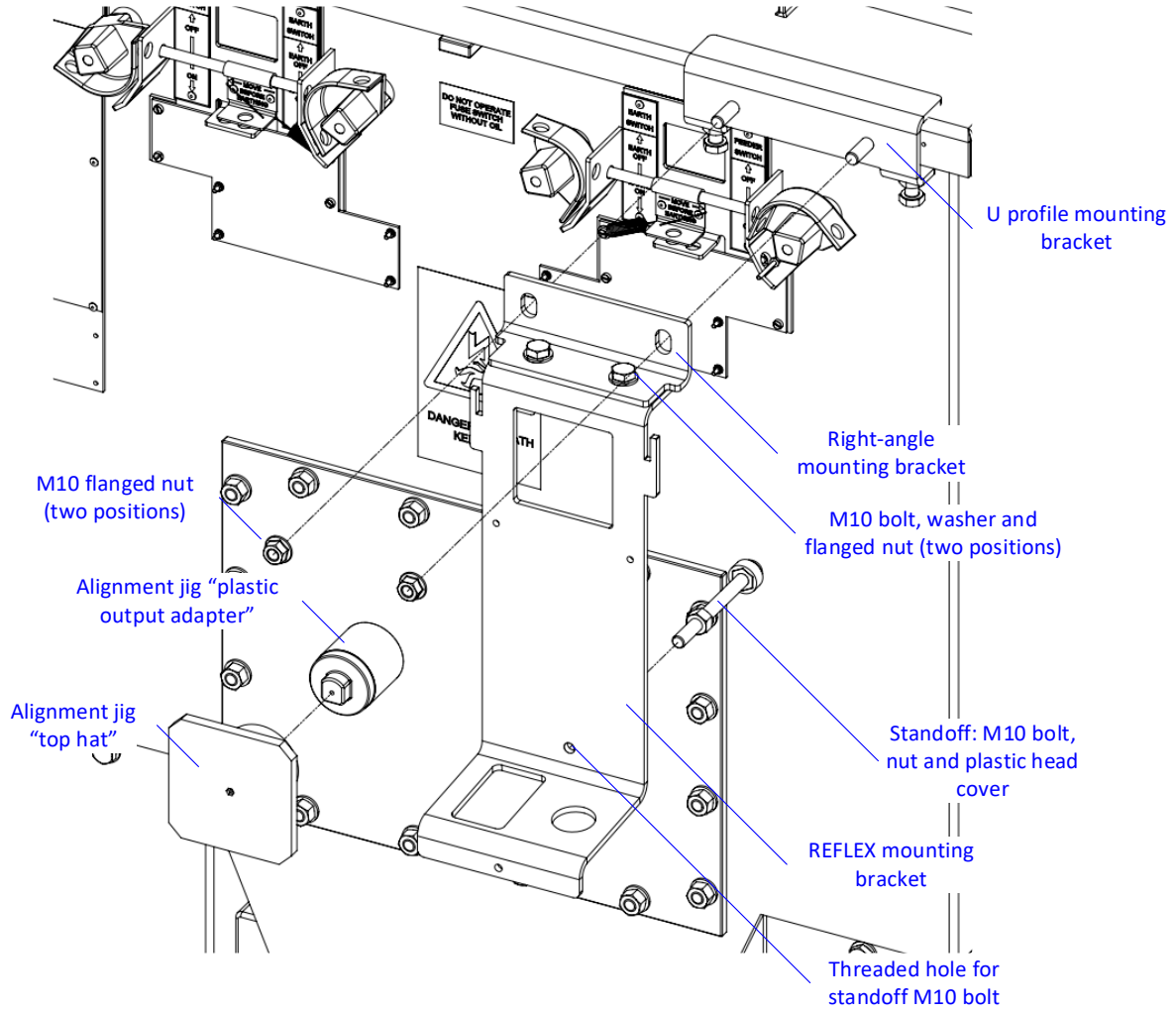
Figure 20-2 T3(T4)GF3 Boss Alignment Tool



- Hand-tighten the right-angled bracket onto the U profile bracket studs using two M10 flanged nuts.
- Hand-tighten the RX10 mounting bracket to the right-angled bracket using the two M10 bolts and flanged nuts.
- Screw the M10 standoff into the back of the RX10 mounting. The standoff should not push the RX10 bracket away from the vertical. If it does then thread more of the bolt into the threaded hole.
- Push fit plastic output adapter into the top hat jig.
- Offer up the top hat and plastic output adapter to the RX10 mounting bracket and switchgear operating boss.
- Make sure the jig is pushed onto the switch output adapter and the RX10 mounting bracket is square to the surface of the switchgear. This provides the correct vertical alignment for the RX10 bracket. Tighten the two M10 flanged nuts securing the right-angle bracket to the U profile bracket.to 40Nm.

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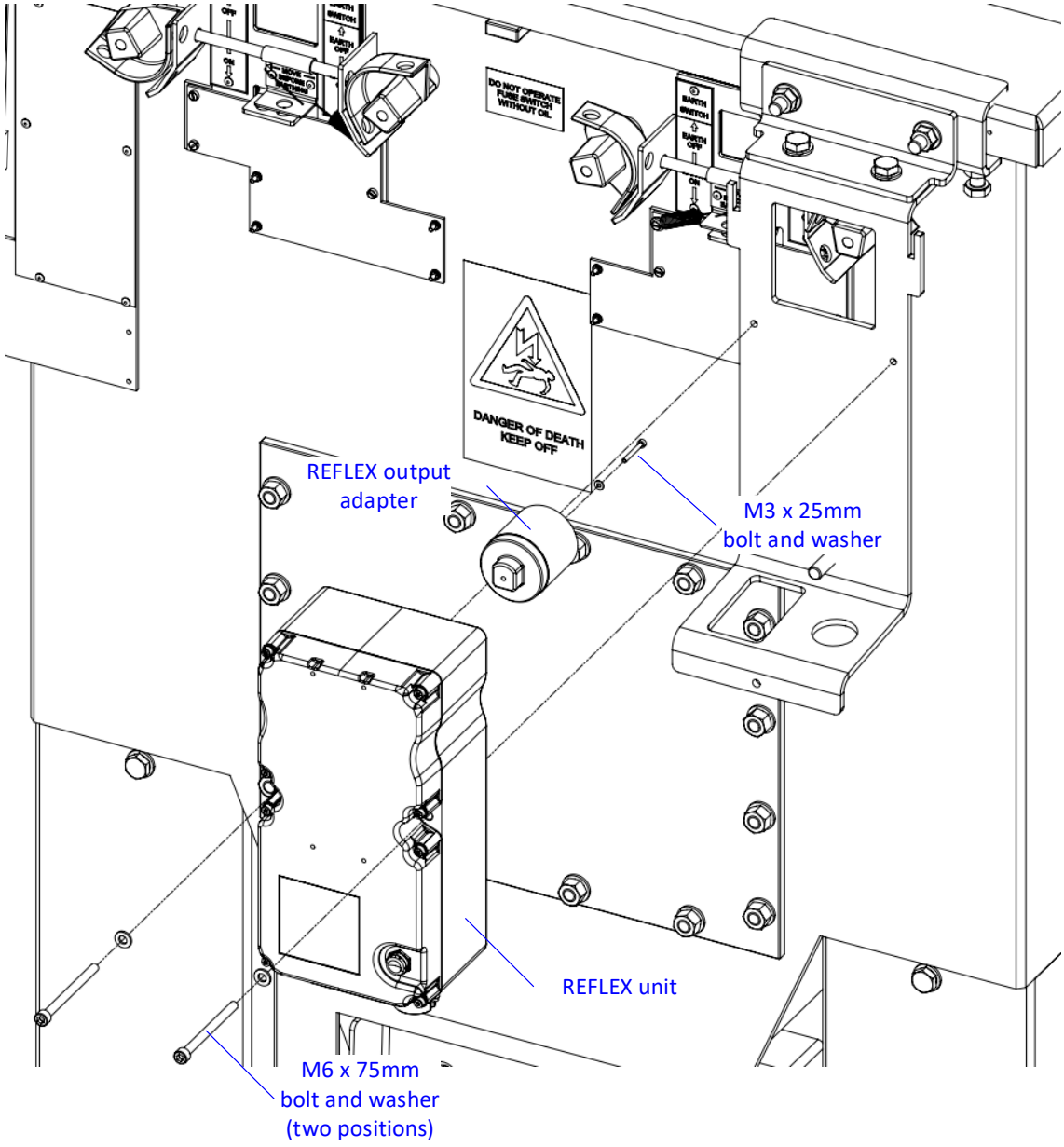
- With the top-hat and plastic output adapter still in place, use the parallel edges jig to make sure the RX10 mounting bracket is parallel to the surface of the switchgear. Use the standoff bolt to help support the bottom of the RX10 bracket so that it is at the same distance from the switchgear as the top of the bracket. Equally the distance from the left-hand side of the RX10 bracket to the switchgear must be the same as the right-hand side of the bracket to the switchgear. Once the RX10 bracket is completely parallel to the surface of the switchgear tighten the two M10 bolts and flanged nuts holding the right-angle bracket to the RX10 bracket. Tighten to 40Nm.

- Remove the top hat and plastic output adapter.

Figure 20-3 T3(T4)GF3 Mounting



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- Fit the RX10 output adapter to the RX10 unit using the M3 x 25mm bolt and washer, tighten to 1.5Nm.

- Offer the RX10 unit up to the switch. The RX10 unit should fit onto the switch and mounting bracket without forcing. Use the two M6 x 75mm and bolts washers, tighten to 10Nm.

- Fit the spring to the earthing tab, using the longer screw with a washer, holding the tab in the opposite direction of the arrow shown.

- Route the DC cabling up the leg of the switchgear, ensuring access panels can still be opened and connect through the circular hole in the plate.

- If two RX10 units are present ensure the GSM antennas are placed on opposite sides on the ring main unit to avoid interference.

- If the substation is located outside fit the anti vandal guard and secure with X56 lock.

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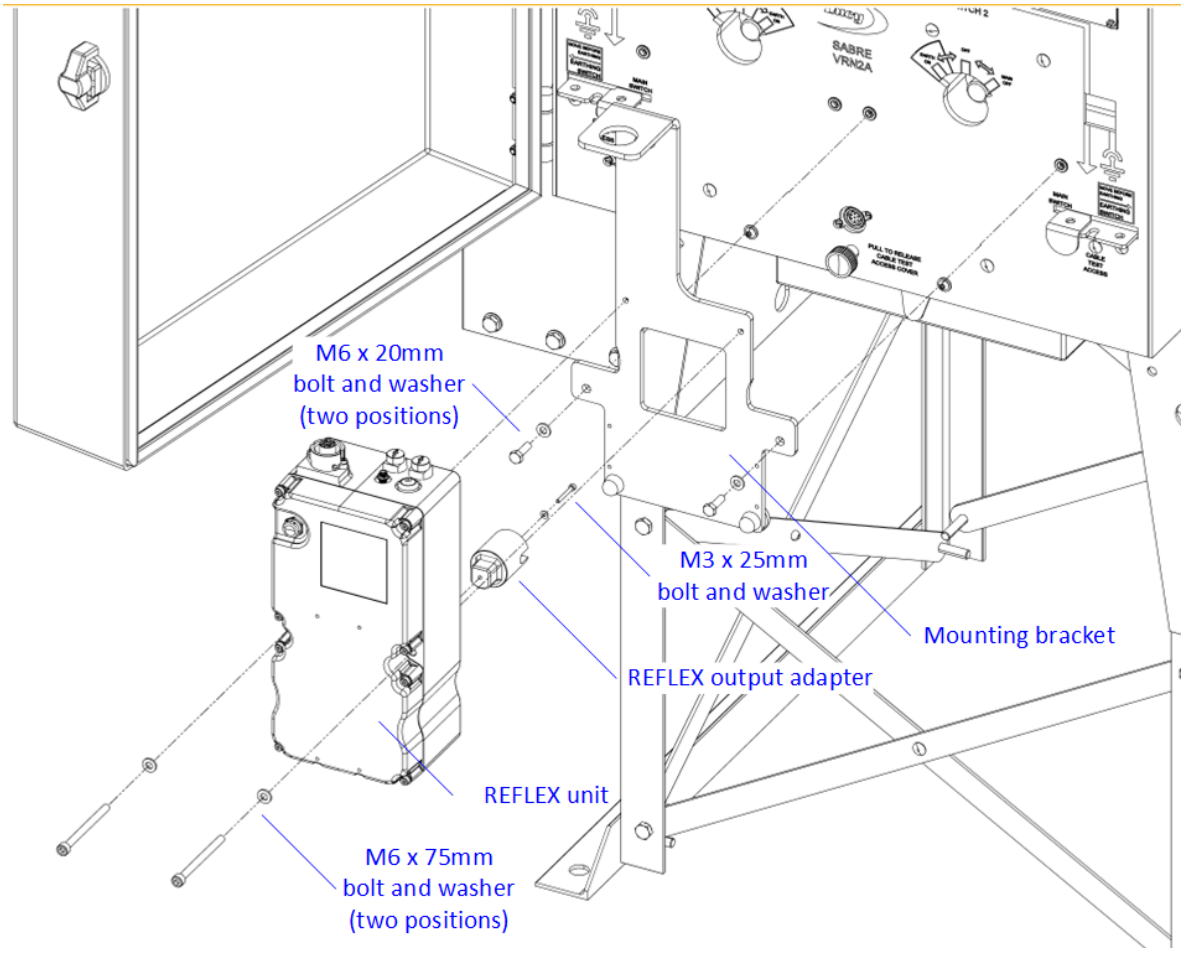
21 Installation of RX10 Actuator – Lucy VRN2a

The instructions below are for the right-hand switch. The procedure is the same for installation on the left-hand switch.

Figure 21-1 VRN2a Exploded Diagram



Open the switchgear fixing kit packaging. The kit is installed on the switchgear using the following procedure:

- Loosely fit the mounting bracket to the switchgear using two M6 x 20mm bolts and washers.
- Fit the RX10 output adapter to the RX10 unit using the M3 x 25mm bolt and washer, tighten to 1.5Nm.
- Offer the RX10 unit up to the switch. The RX10 unit should fit onto the switch and mounting bracket without forcing. Use the two M6 x 75mm and bolts washers, tighten to 10Nm.
- Tighten the M6 bolts fixing the mounting bracket onto the switchgear to 10Nm.
- Route the cabling using the magnetic cleats as shown in Figure 21-2, tie the Antenna cable with the power using cable ties.

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Figure 21-2 VRN2a Cable Routing

- Remove the upper of the two bolts holding the door hinge.

Figure 21-3 VRN2a Door Hinge Bolt Removal

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Figure 21-4 Installation of Cable Guides

- Use the longer 80mm cable guide and replace the original bolt as removed previously as shown in Figure 21-4 and secure cable to the guide with a cable tie.

- Repeat process with the lower bolt on the upper hinge and shorter 70mm cable guide if two RX10 units are installed.

- Using a bi metal hole saw, cut a 20mm hole in the bottom of the door to route the cables through, using a 20mm cable gland. One hole per RX10 power cable and one for both GSM antennas will be required. A finished example is shown in Figure 21-5.

Figure 21-5 Location of Stuffing Glands in VRN2a Door

- Secure the cable up the side of the door using magnetic cable cleats.

- Ensure any cabling outside of the door does not block any access panels.

- If two RX10 units are present, ensure the GSM antennas are placed on opposite sides at the top of the ring main unit to avoid interference.

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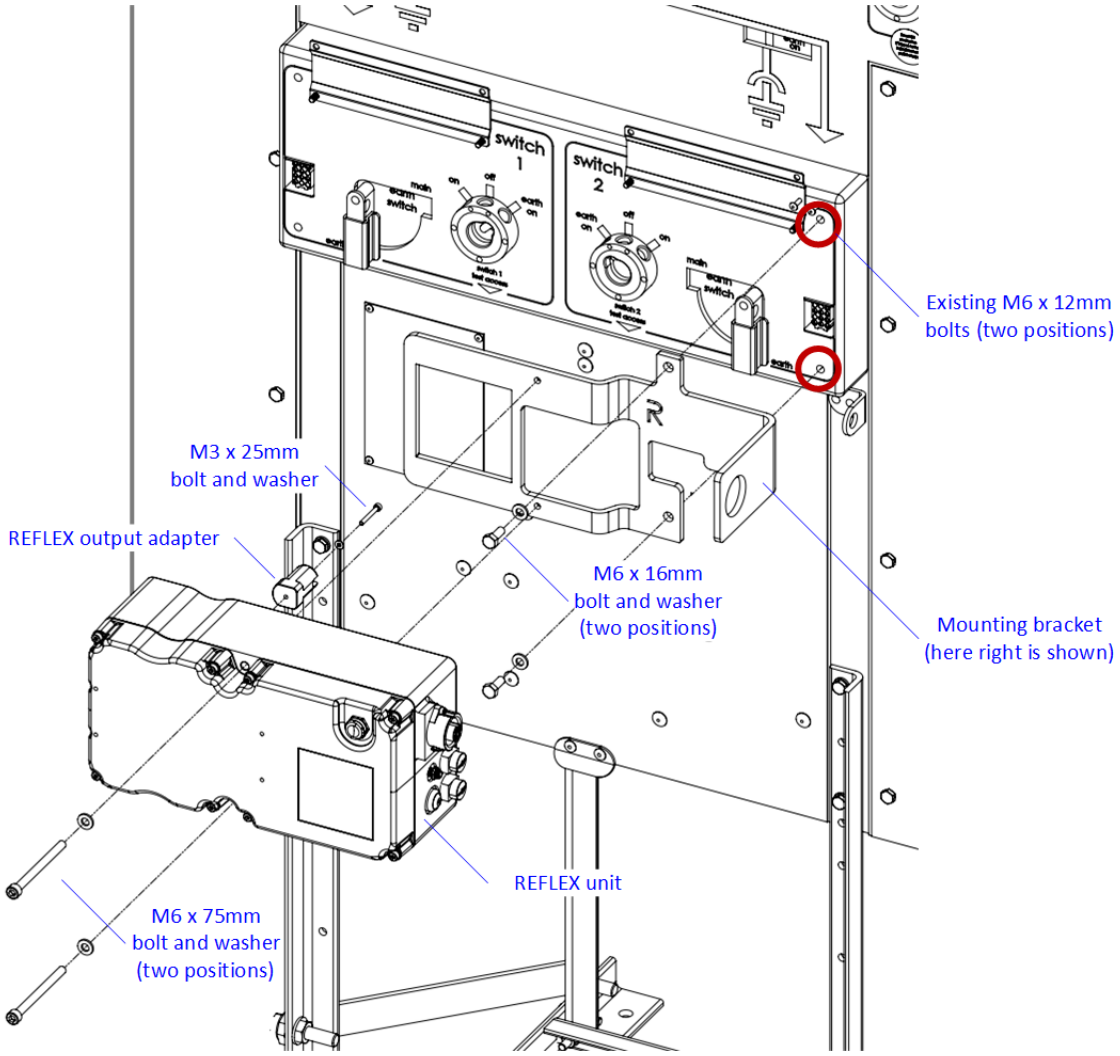
22 Installation of RX10 Actuator – RN2C(D)

These instructions and drawing are for the right-hand switch. The procedure is equivalent for the left-hand switch.

Figure 22-1 RX10 Installation to RN2c



Make sure you have the correct side (left or right) mounting kit for the switch you are fitting to. Open the switchgear fixing kit packaging. The kit is installed on the switchgear using the following procedure:

- Remove the existing M6 x 12mm bolts as shown in Fig 22-1(two locations)
- Loosely fit the mounting bracket to the switchgear using two M6 x 16mm bolts and washers.
- Fit the RX10 output adapter to the RX10 unit using the M3 x 25mm bolt and washer, tighten to 1.5Nm.
- Offer the RX10 unit up to the switch. The RX10 unit should fit onto the switch and mounting bracket without forcing. Use the two M6 x 75mm and bolts washers, tighten to 10Nm.

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- Tighten the M6 bolts fixing the mounting bracket onto the switchgear to 10Nm.
- Route cabling to the left hand side of the switchgear, securing using magnetic cleats.
- A 25mm slot will be required 100mm from the left hand edge of the access panel, using appropriate PPE cut a 25mm hole in the lower part of the door, then using appropriate cutting tool create a slot as shown in Figure 22-2.

Figure 22-2 Cut Out for RN2c Cable Routing

- Fit Grommet strip on exposed edge.
- Ensure any cabling outside of the door does not block any access panels.
- If two RX10 units are present, ensure the GSM antennas are placed on opposite sides at the top of the ring main unit to avoid interference.

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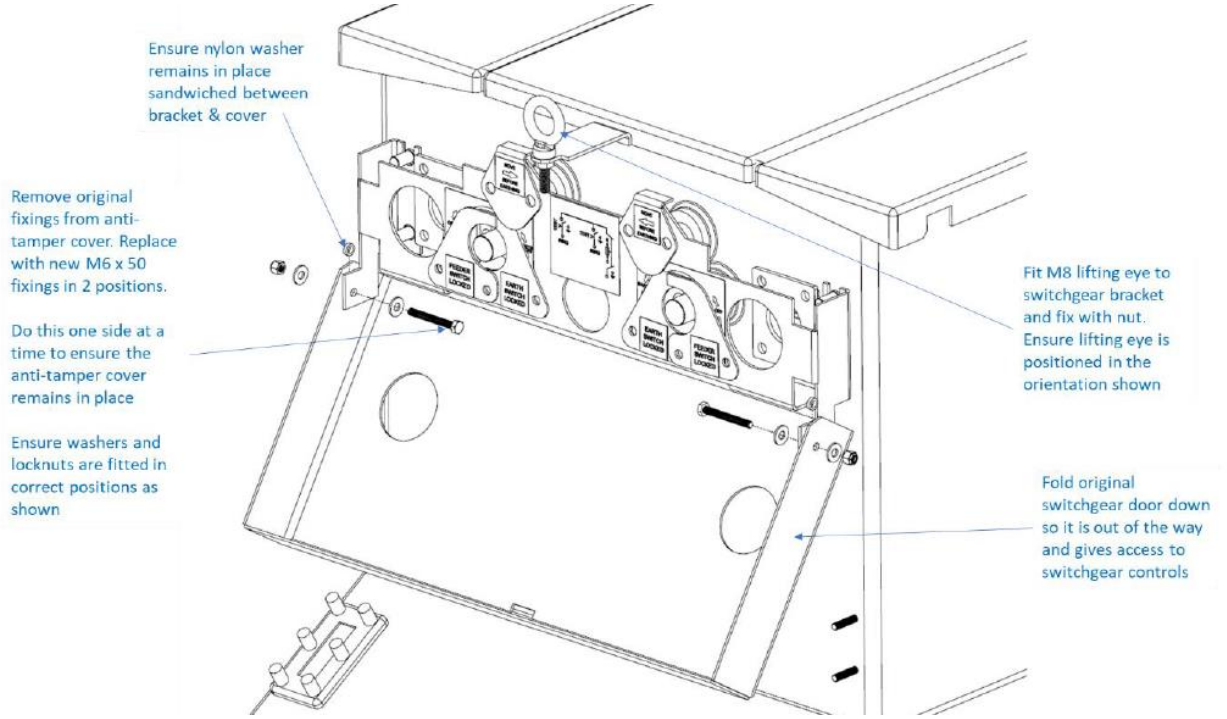
23 Installation of RX10 Actuator – Lucy FRMU MK2A

These instructions cover the fitment of the RX10 to Lucy FRMU switchgear, including the optional anti-tamper guard. The fitting kit is not handed and can be used for both left and right placements.

Figure 23-1 FRMU Fitment of the Anti-Tamper Hardware



Dec 23

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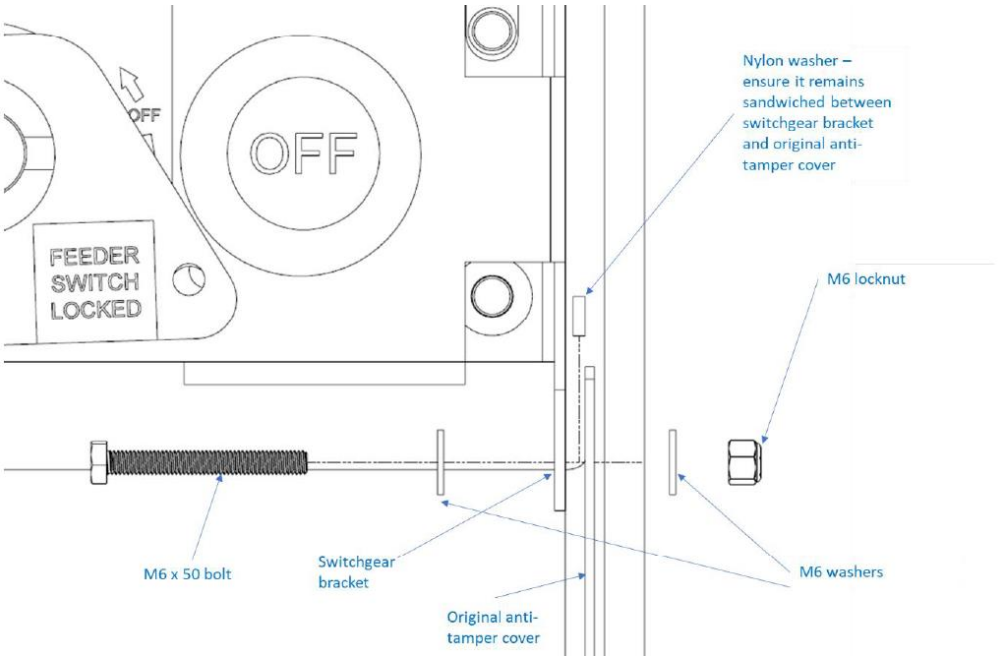
Figure 23-2 FRMU Fitment of the Anti-Tamper Hardware



Dec 23

Open the anti-tamper cover packaging and extract the mounting hardware/fixing pack. The mounting hardware is installed on the switchgear as follows (shown in Fig 23-1 and 23-2):

- Replace original M6 fixings that hold original switchgear door/cover to the switchgear, with new M6 x 50 fixings. Ensure the nylon washer remains in place, sandwiched between the bracket and front cover (Fig 23-2). Fit washers and tighten locknut in correct positions shown in Fig 23-2. It is recommended that one side is replaced entirely first, before moving to the next side, to ensure the cover never leaves the switchgear.

- Fold original door / cover down so it is out of the way and allows access to the switchgear controls

- Ensure that the switchgear rating plate and circuit labels are then fitted to the inside edge of the cover as shown in Fig 23-3

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Figure 23-3 Location of FRMU Rating Plate

Dec 23

- Fit M8 lifting eye to bracket on switchgear. Ensure the lifting eye is positioned in the orientation shown in Fig 23-1.

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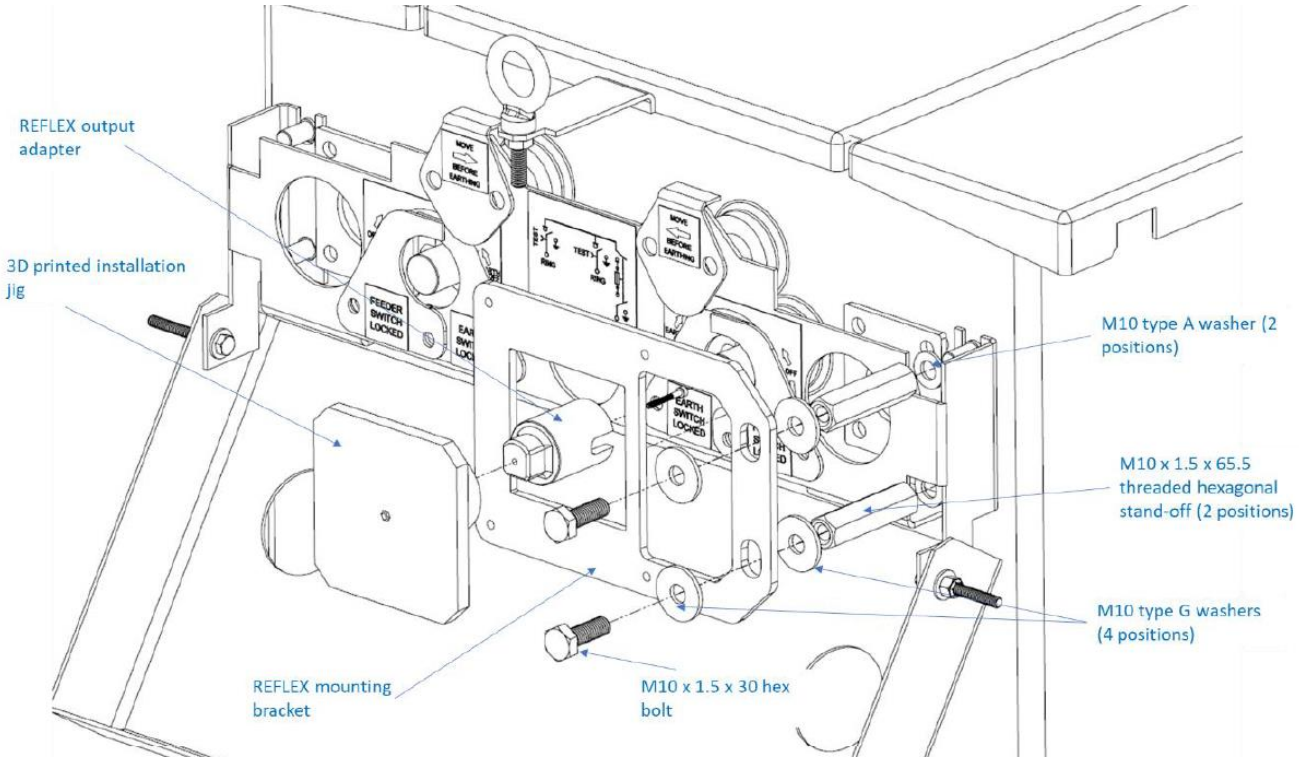
Figure 23-4 Install RX10 Bracket



Next, open the switchgear fixing kit packaging and install the mounting bracket as shown in Fig 23-4 using the steps below: Dec 23

- Remove the 2 M10 nuts and washers from the switchgear that hold the front panel bracket in place, on the side that the REFLEX will be installed. A deep 17 mm socket may be needed to access these. This will reveal 2 off M10 studs coming out of the switchgear body.
- Fit a M10 type A (the smaller type) washer on to the M10 studs on the switchgear, then screw on the M10 hexagonal standoffs into the same studs, tightening to 40 Nm.
- Loosely fit the mounting bracket to the switchgear using two M10 x 30 bolts and oversized M10 washers on both sides of the bracket (i.e. the washers “sandwich” the bracket).
- Fit the REFLEX output adapter to the 3D printed installation jig. Fit installation jig to the REFLEX mounting bracket. Ensure output adapter fits correctly on switchgear shaft and alignment jig fits in square hole in bracket.
- Adjust the bracket so it sits roughly parallel to the top of the switchgear and the M10 bolts are in similar positions in both mounting slots on the bracket.

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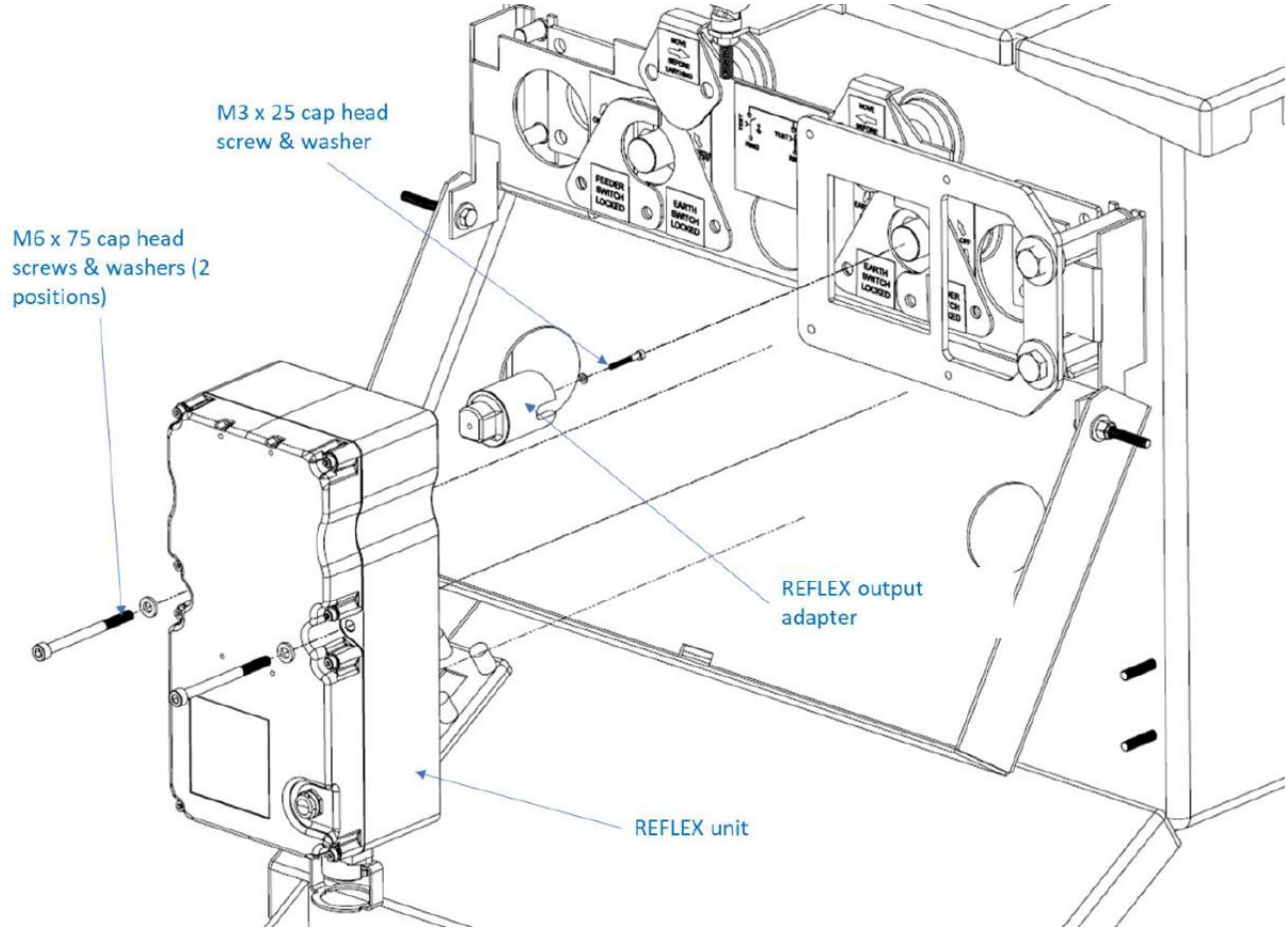
- Tighten the M10 bolts fixing the mounting bracket onto the switchgear, torquing to 40 Nm.
- Remove 3D printed alignment jig.

Figure 23-5 Install RX10



Dec 23

Now, install the REFLEX into the bracket, as shown in Fig 23-5 above using the procedure below:

- Fit the REFLEX output adapter to the REFLEX unit using the M3 x 25 mm bolt and washer, tighten to 1.5 Nm.
- Offer the REFLEX unit up to the switch. The REFLEX unit should fit onto the switch and mounting bracket without forcing. Use the two M6 x 75 mm bolts and washers, tighten to 10 Nm.

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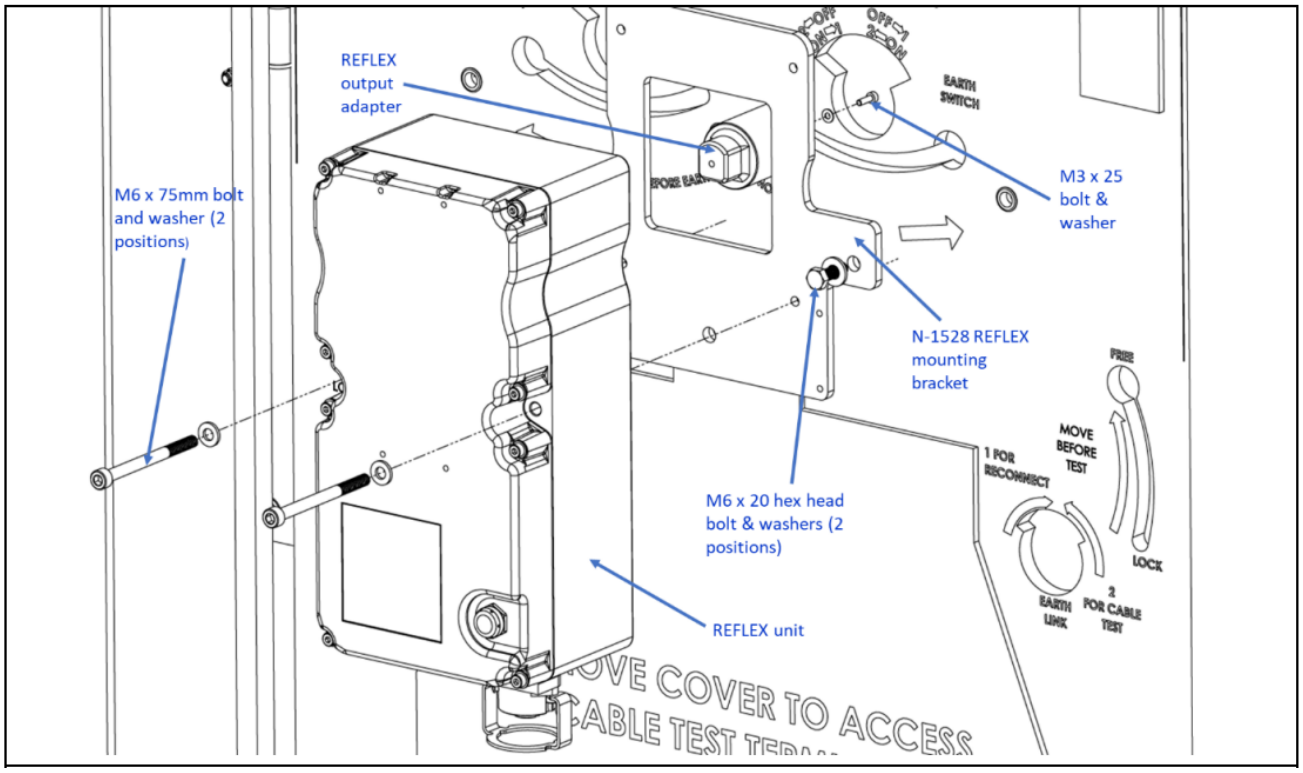
24 Installation of RX10 Actuator – Lucy VRN/VRN2

The installation drawings below are for the right-hand switch; however, the procedure is the same for installation on the left-hand switch.

Figure 24-1 VRN2 Installation



The kit is installed on the switchgear using the following procedure:

- Loosely fit the mounting bracket to the switchgear using two M6 x 20 mm bolts and loose M6 washers. Ensure the bracket is installed with the weld-on washers sandwiched between switchgear and bracket.

- Fit the REFLEX output adapter to the REFLEX unit using the M3 x 25 mm bolt and washer, tighten to 1.5 Nm. 3. Offer the REFLEX unit up to the bracket on the switch, with the connectors of the REFLEX unit facing downwards. The REFLEX unit should fit in without forcing. Use the two M6 x 75 mm bolts and M6 washers to fasten the REFLEX unit to the bracket, tighten to 10 Nm.

- Whilst applying upwards pressure to the RX10, tighten the M6 bolts fixing the mounting bracket onto the switchgear to 10Nm.

Dec 23

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Figure 24-2 Removal and Replacement of Door

Dec 23

If the switchgear has not been previously automated a replacement door will need to be fitted as follows:

- Remove the door stay by removing the 10mm bolt circled in Figure 24-2.
- Lift the door upwards to remove it from its hinges as shown by the arrow in Figure 24-2.
- Refit the new door using existing hinges and Refit the door stay
- The modified door will be pre-drilled with two holes suitable for 20mm glands to feed both power cables and GSM antennas through, as shown in Figure 24-3

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Figure 24-3 Cable Glands

- Secure the cable up the side of the door using magnetic cable cleats.
- Ensure any cabling outside of the door does not block any access panels. A guide to cable routing is shown in Figure 24-4. Dec 23

Figure 24-4 Cable routing

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- If two RX10 units are present, ensure the GSM antennas are placed on opposite sides at the top of the ring main unit to avoid interference. Figure 24-5 shows a completed installation with door closed and power supply location.

Figure 24-5 Completed VRN2 Installation

Dec 23

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25 Labelling of RX10 Unit

Using the appropriate circuit label secure to the device using M3.5x8mm self-tapping screws as shown in Figure 25-1.

Figure 25-1 RX10 with Label

26 Completion

On completion of the installation:

- Connect to the device via Bluetooth, as described earlier.
- Put the device into ‘REMOTE’ mode.
- Disconnect from the device as described earlier.
- Contact the Network Hub Control Engineer and request the Control Engineer restore FLISR.
- Ensure all LV board shrouds are removed.

Leave site and secure.

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