1 Scope/Application

This work is to be carried out in accordance with the requirements of CP306 procedures of work. If the manufacturer's maintenance instructions are available, they should be referred to.

It is also important that any type-specific potential defects are checked for and if necessary put right during maintenance where possible. Defect reporting and recording is described in detail in CP305, it is also important that any mods assoicated with the switchgear be completed in line with plant modifcation requirments

This work is to be carried out in compliance with the requirements of the Distribution Switchgear, General Procedure FM6/001

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 Section 1. Approved mandatory PPE and work wear shall be in accordance with General Requirements in Section 1. Additional Approved PPE and work wear required to complete this task are specified below.**			
		LV Insulated Gloves		Hard Hat
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 5 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. Work adjacent to dead/live systems. Use of hand tools, use COSHH regulated substances.
Risk Level:	Low
Control Measure:	• Training and autherisation for electrical fitting works. • Issue of safety doumentation. • Correct PPE used (i.e) safety glasses, gloves, Arc resistant coveralls & steel toe boot.

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5 Method

Maintenance shall be carried out when equipment is installed onto the network and maintenance should follow normal switchgear practice and follow manufacturers' recommendations where applicable.

5.1 Recloser Bushings

Visually inspect the bushings from ground level and report any defects on the CDC system.

5.2 Recloser Tank Maintenance (Exterior Condition)

- Visually inspect for defects in paint work, missing or broken studs. Report any issues or damage via the CDC device.
- Visually inspect the main tank for any signs of deterioration, damage, cracks or any other issues. Report any issues or damage via the CDC device.
- Visually inspect arc horn gaps for damage or potentially incorrect setting. Report any issues or damage via the CDC device.
- Visually inspect surge arrestors are correctly installed and for any damage where fitted. Report any issues or damage via the CDC device.

5.3 Operating Mechanism

- The operation of the mechanism shall be confirmed via a Function Test as detailed within EPD301. Where Remote Control (RC) is not fitted the local function test shall be completed at the time of maintenance. For all sites where RC is fitted it shall be confirmed with the Network Management Hub when the Auto Recloser was last operated. Where it is outside the 2 year frequency for RC function testing it shall be function tested at the time of maintenance. When any batteries are replaced a function test shall be completed to prove correct operation of the Auto Recloser. 18/12/23

5.4 Testing

- All testing shall be carried out by a suitably authorised person.

- As part of the inspection and maintenance regime the level of SF_6 shall be tested. The gas test point is within the control box and may require climbing equipment to test where it is situated above the anti climbing device.

- For all Whipp & Bourne/Hawker Siddeley GVR's the manufacturers' gas tester shall be used to confirm the minimum level of SF_6 within the main tank normally 0.3 bar gauge for 12kV and 0.5 bar gauge for 33kV. In the factory the GVRs are filled to 1.4 bar (absolute) at 20 degrees centigrade (at 2 bar the bursting disc fails). .

  Pressure Definitions: -
  - Gauge Pressure - Pressure above atmospheric pressure.
  - Absolute Pressure - Pressure above zero

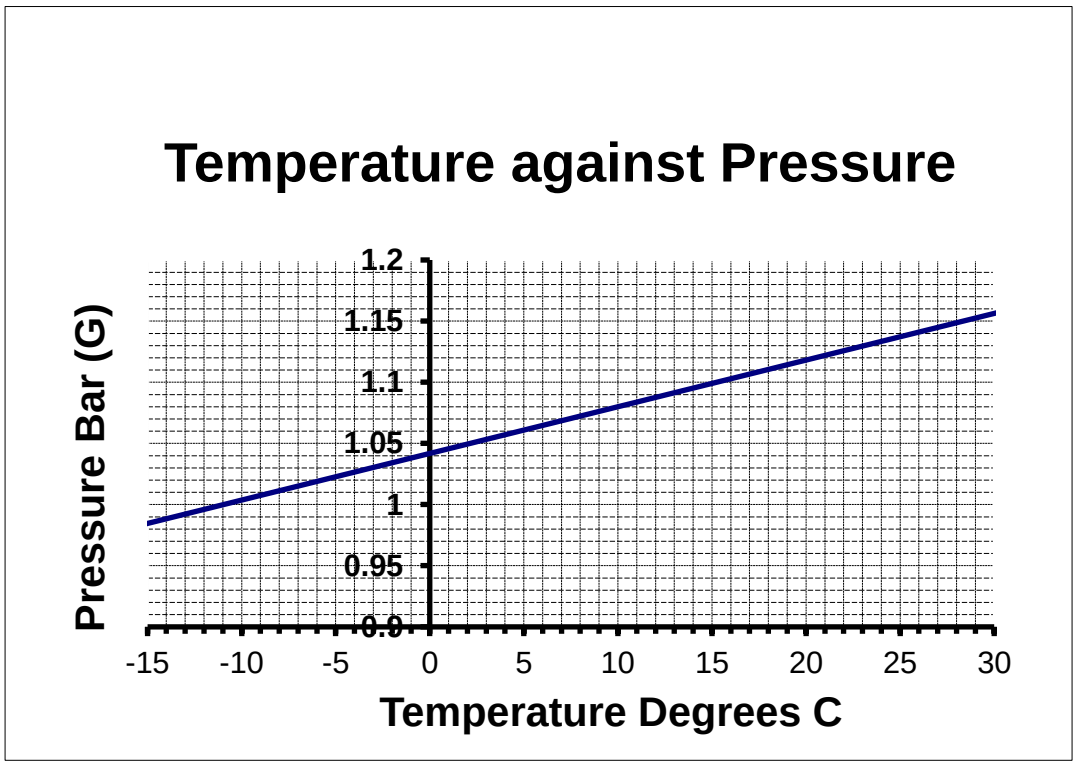
  Hence:-

  Absolute Pressure = Gauge Pressure + 1.0Bar
  (Assuming nominal pressure over UK as 1000mB)

  NOTE: The Gas test must be completed when the temperature is 10 degrees C or higher. The manufacturer states that anything lower than 10 degrees C can affect the readings.

  The GVR Gas Test device measures in bar and is temperature dependant. The temperature at the time of reading shall be noted. The manufacturer states a GO / NO GO value of 1.08 bar (absolute) and above at 10 degrees C. A variation of 0.1bar can occur at normal ambient temperatures.

The manufacturer uses the graph below to cover other temparatures at the time of reading. They state that any temperature above 10 degrees C the 1.08 bar criteria (absoulte) shall still be concidered as a pass.



Where the SF_6 levels start to fall there is a risk that moisture ingress can occur. At 100% air the BIL of the device reduces to 55kV (rated value in ENWL specifications is 75kV). The manufacture has confirmed that 30% moisture ingress making a 70/30 SF_6/Air split can occur without detriment. Whilst the unit has been tested for lightning impulse at 0 bar gauge it does not concider moisture ingress over time. The molecular seive inside the tank will absorb some moisture but will become saturated over time. Therefore any GVRs that are leaking will need to be replaced.

When testing the GVR gas level, the temperature must be noted and entered into CHIME with the SF_6 pressure reading.

Actions Required.

- Where the Brush Tester indicates a value lower than 1.08 bar (absolute) at 10 degrees C the GVR shall be replaced in a planned manner (maximum 3 months) and preferably sent away for refurbishment for re-use.

- Any at 1 bar (absolute) or 0 bar gauge shall be replaced as soon as possible as the quality of the small remaining SF_6 will degrade over time and mix with air as detailed above therefore affecting the BIL.

- Where CDC has been completed via the use of drones and the bursting disk has been noted as failed or has signs of degredation such as cracking, the GVR shall be replaced urgently as the SF_6 to air mix will likely be pure air therefore the BIL would be reduced to below ENWL specifications.

- All protection and automation can remain enabled until the GVR is replaced.

- All batteries within the GVR control box shall be voltage tested using a voltmeter. Any batteries which are 8 years old or older shall be replaced on Maintenance. Any 96V batteries which have less than 60V when tested shall also be replaced. Any 60V batteries which have less than 55V when tested shall be replaced. All 16V Polar Relay batteries shall be tested and any with a result 12V or lower shall be replaced. All Batteries will be replaced by Telecoms & Telemetry Support. The fault shall be reported via Voyager and by emailing Telecomservices@enwl.co.uk. The Network Hub Control Engineer shall take the appropriate actions where flat batteries are reported.