

# **Energisation Process**

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## Document control

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## Contents

Document control.....	2
Introduction.....	4
Substation Energisation .....	4
Before substation energisation .....	4
Energisation .....	5
After substation energisation .....	5
High Voltage and Low Voltage ACBs (Air Circuit Breakers) Energisation .....	5
Three-phase LV Energisation Process.....	6
Before energisation .....	6
After energisation .....	6
11kV Networks .....	6
Appendix 1 – Substation energisation checklist .....	7
Appendix 2 – HV Switching Schedule.....	10
Appendix 3 – Three-phase LV energisation checklist .....	11
Appendix 4 Plant Record Form.....	13

## Introduction

This document outlines the process and the documentation required before and after Energisation of HV substations and three-phase LV circuits. Substation and three-phase energisation checklist(s) and a template substation switching schedule can be found at the end of this document.

## Substation Energisation

### Before substation energisation

As soon as practically possible before the substation delivery date, complete a substation locks and signs request form. Send the completed form to [netadmin@muagroup.co.uk](mailto:netadmin@muagroup.co.uk).

Once the proposed energisation date is determined, email mua at [energisation@muagroup.co.uk](mailto:energisation@muagroup.co.uk), ensure any changes are advised promptly.

Substations and HV networks may be audited by mua before energisation, or we may request photographs/videos to cover the following:

- Confirmation the substation has been constructed as per the approved design
- Inspection/audit checklist
- Quality check
- Witness testing of substation earthing
- Witness testing of HV cables - 5kV sheath test, 5kV insulation resistance and continuity
- All covers and fixing in place
- Power and lighting installed and tested

An energisation request must be submitted, no later than 10 days before the connection date, to [energisation@muagroup.co.uk](mailto:energisation@muagroup.co.uk) with the following information:

- mua network reference number
- DNO/mua substation name and number
- Project address / energisation date
- Confirmation of legal completion

5 Days before energisation, the following pre-energisation paperwork should be sent to [energisation@muagroup.co.uk](mailto:energisation@muagroup.co.uk):

- HV switching schedule for mua HV networks
- HV metering CT and VT factory test and commissioning certificates
- RMU commissioning certificate
- HV cable sheath test certificate
- HV cable insulation resistance certificate
- Installed HV and/or LV protection settings
- As-laid drawing for all HV and/or LV cables
- Transformer factory test and commissioning certificates
- Substation earthing certificate
- Factory test LV CT metering certificates
- Small power and lighting certificate
- Mains cable test certificate, if applicable.
- Countersigned signed and complete BCA/BTS
- Substation energisation checklist

Once the pre-energisation paperwork has been submitted and approved you will receive permission to energise, you must not energise without permission.

## Energisation

On the day of energisation, attend site with the host I/DNO, to witness testing. Following energisation test voltage, phase rotation, EFLI of the LV supply to confirm acceptable. If voltage is too high or low, request that the supply is isolated, to allow the transformer tap to be changed to an acceptable output.

The output voltage should be within the following range: of **230-245V; 400-425V**

Phase rotation should always be Standard, if Non-Standard consult [operations@muagroup.co.uk](mailto:operations@muagroup.co.uk) for guidance.

## After substation energisation

After the substation has been energised, please send confirmation of this with the date, time of energisation and include all post-energisation paperwork listed below to [energisation@muagroup.co.uk](mailto:energisation@muagroup.co.uk)

- Substation Plant Record
- Substation LV cabinet/ACB energisation certificate.
- HDCCO, ACB and MCCB energisation certificate.
- Small power and lighting standard live testing results.

## High Voltage and Low Voltage ACBs (Air Circuit Breakers) Energisation

When carrying out High Voltage connection and switching activity, live, dead, or first energisation of a mua Electricity supply, the mua DSR's require that the ICP SAP (Senior Authorised Person) shall provide all relevant information and submit a switching schedule log 1 week prior to the connection date, to: [energisation@muagroup.co.uk](mailto:energisation@muagroup.co.uk). The switching schedule will be checked and approved by the mua Network Management Team, then returned to the ICP

Failure to advise/submit a switching schedule is a non-compliance with the DSR's and may trigger the involvement of the HSE and lead to an investigation if deemed a Dangerous Occurrence.

It is important that the SAP take photographs of the applied High Voltage and ACB Low Voltage protection settings and that all correct information is recorded on the Energisation job card, (Commissioning job card). These should be submitted to mua promptly upon the completion of the energisation.

As part of this requirement; the High Voltage and Low Voltage protection settings must be accurate. You should be aware that incomplete or incorrect information will be rejected, and a rectification visit may be required, which will cause a delay to the Completion process.

If you are unsure about the High Voltage or Low Voltage protection settings, these can be requested from MUA Network Management Team at [energisation@muagroup.co.uk](mailto:energisation@muagroup.co.uk)

Once energisation is complete, the project energisation completion pack should be submitted in full and sent to [energisation@muagroup.co.uk](mailto:energisation@muagroup.co.uk), as soon as reasonably practicable and **No later than 48 hours** after the energisation and connection.

A substation template example of mua High Voltage switching schedule can be found in [Appendix 2](#) of this document, which provides full guidance to help ensure the energisation and connection are completed safely.

## Three-phase LV Energisation Process

### Before energisation

For LV cabinets, link boxes, ACBs, MCCBs, MSDs and HDCOs, place a locks and signs order using the mua request form to [netadmin@muagroup.co.uk](mailto:netadmin@muagroup.co.uk). Your order must be placed 20 working days before the installation day.

Once the energisation date is determined, submit by email to: [energisation@muagroup.co.uk](mailto:energisation@muagroup.co.uk). mua must be notified of any changes to the agreed date.

You must submit a request to energise at least 10 days before your proposed date. Send your request to [energisation@muagroup.co.uk](mailto:energisation@muagroup.co.uk), with the following details:

- mua project reference number
- Project address
- Energisation date
- Confirmation of legal completion

[energisation@muagroup.co.uk](mailto:energisation@muagroup.co.uk) also need to receive the following pre-energisation paperwork:

- As laid cable routes, with reference points and depth
- Mains job card or test certificate, including cable type, size and dead test results
- Installation photos
- Metering CT certificates
- ACB and MCCB protection settings
- Energisation checklist

### After energisation

After the supply is energised, please send all live test results on the appropriate test certificate to: [energisation@muagroup.co.uk](mailto:energisation@muagroup.co.uk)

## 11kV Networks

Where the project involves construction of an 11kV network/s, in addition to the standard documentation, a SLD (single line diagram) must be submitted with the completion pack, the location of Network Open Points must be clearly shown.

For networks being constructed in phases, an updated SLD must be submitted following completion of each phase.

Substation numbers must be shown on the as-laid drawing/s.

## Appendix 1 – Substation energisation checklist

Substation energisation checklist				
Project title				
Mua Network reference				
Form completed by				
Company "ICP"				
Position/job title				
Signature		Date		
General Requirements	Yes	No	n/a	Refer to notes/photos
Legals completed				
Countersigned BCA or BTS received				
MPAN issued				
Substation locks and signage received and installed				
Pre-energisation commissioning completed and results submitted				
Protection settings installed and recorded				
Switching schedule submitted and approved by mua				
Photos of completed installation				
Meter installation date				
Access Arrangement	Yes	No	n/a	Refer to notes/photos
Access road has been constructed				
24-hour access arrangements are in place				
Substation	Yes	No	n/a	Refer to notes/photos
Substation has been located to the approved design				
Substation has been orientated to approved design				
Foundations have been cast to the approved design				
All formwork has been fully removed				
Substation is free from all builder's debris				
Substation is fully sealed watertight				

Substation is securable post energisation				
Substation ventilation is to the approved design				
Substation	Yes	No	n/a	Refer to notes/photos
Substation door type and size is to the approved design				
Sufficient space around the packaged substation for access and ventilation				
Integral substations – anti-vibration pads under transformer/s				
All outgoing circuits terminated and pot ended outside the substation until required				
Cable entry ducts have been sealed as per the approved design				
Substation cable pit is fully sanded to required level				
HV/LV Cables are terminated as per the approved design				
Cables are installed to the correct depth, backfilled and with correct warning and marker tapes				
Ducting system	Yes	No	n/a	Refer to notes/photos
All ducting systems are sealed and properly secured				
Quantity, location, and type of ducting have been installed to the approved design				
GRP/Brick Build enclosure	Yes	No	n/a	Refer to notes/photos
GRP/Brick Build enclosure size and specifications to the approved design				
Finish colour/Brick type and texture is to the approved design				
GRP enclosure has been secured to the plinth via the fixing brackets and sealed				
Small power and lighting	Yes	No	n/a	Refer to notes/photos
Small power and lighting have been installed to the approved design				
All conduit is self-extinguishing heavy-duty PVC				



Test certificate is present (copy retained)				
Earth system	Yes	No	n/a	Refer to notes/photos
Earth system, rods, clamps, conductors has been installed to the approved design				
Earth test certificate submitted to mua and readings satisfactory				
Substation doors, door frames, vents and other exposed metalwork are all earthed and connected to the marshalling bar, as required				
Completed form and supporting information to be returned to: <a href="mailto:energisation@muagroup.co.uk">energisation@muagroup.co.uk</a>				
Notes				
Attached photo number	Photo description			
1	Substation signage & locks			
2	Substation earth bar and rebar connections			
3	Substation plinth			
4	Substation doors			
5	Substation internal			
6	Substation external			
7	Transformer anti-vibration pads fitted – integral substations			
8	HV sheath test result			
9	HV cable insulation resistance result			
10	Substation access			
11	LV and HV earth link			
12	Metering terminations			
13	GRP grating			
14	Labelled distribution board			
15	Isolation transformer (if applicable)			
16	Cable installation (sand, installed cable, tape)			

## Appendix 2 – HV Switching Schedule

HV Switching and Control Log						
Project Name				Schedule No.		
Location						
ICP Project Ref:			mua Network Ref:			
Prepared By			Date		For ICP/IDNO	
Approved By			Date		For IDNO	mua
Schedule of Operations						
Operation Number	Time			Location	Detail	Operator
	Instruct	Action	Report			
1						
2						
3						
4						
4						
5						
6						
7						
8						
9						
10						
11						
12						
Completed By			Signed		Date /Time	

### Appendix 3 – Three-phase LV energisation checklist

Three-phase LV energisation checklist				
Project title				
Project Ref:		mua Network Ref:		
Form completed by				
Company				
Position/job title				
Signature		Date		
Completed form to be returned, with supporting information to <a href="mailto:energisation@muagroup.co.uk">energisation@muagroup.co.uk</a>				
General	Yes	No	n/a	Refer to notes/photos
Legals completed				
Countersigned BCA or BTS received				
MPAN issued				
Locks and labels ordered and received				
Pre-energisation paperwork complete and submitted				
Protection settings installed and recorded				
Locks and labels fitted				
Meter installation arranged				
Photos of completed installation submitted				
Installation	Yes	No	n/a	Refer to notes/photos
All services (e.g. HDCO, MSDB, ACB, MCCB, cutout, link box) have been located as per the approved design				
CT certificates available and sent to mua				
Enclosure size and specifications are to the approved design				
Enclosure has been secured to the plinth via the fixing brackets and sealed				
Enclosure is watertight				

Installation		Yes	No	n/a	Refer to notes/photos
Cables are routed as per the approved design, as laid drawing submitted					
Cables are installed to the correct depth, backfilled and taped					
All exit points and pot ends have been inspected and completed					
All cable test results are satisfactory and recorded					
Notes					
Attached photo number	Photo description				
1	Location				
2	Completed installation				
3	Enclosure				
4	Terminations				
5	Locks and labels				
6	Cable installation (sand, installed cable, tape)				
7	Metering terminations (if applicable)				
8	Earth connection (if applicable)				

## Appendix 4 Plant Record Form

Electrical Plant Record			Packaged Substation								
Project Ref						Project Title					
Client Name & Site Address											
Substation Details: Shared Access											
DNO Substation Name						DNO Substation Number					
mua Substation Name						mua Network Ref:					
ICP						Coordinates					
Housing *Delete		*GRP	*Brick Built	*Internal	GPS						
Ring Main Unit (RMU)											
Manufacturer						Type					
Serial Number						Year of Manufacture					
Service Voltage		kV				Ratings		Busbars	Switch	CB	
Insulating Medium		SF <sub>6</sub>	Vacuum	Other*	Nominal Current (A)						
Protection CT Ratio Setting * Delete		100A*	50A*	5A	Short Time Current 3s (kA)						
CB Protection * Delete		Relay*		5A TLF*	Peak Withstand (kA)						
Protection Settings O/C											
E/F											
Transformer											
Manufacturer						Type					
Serial Number						Year of Manufacture					
Voltage Ratio (kV/V)						Rating		kVA	A		
Frequency						Impedance					
Vector Group						Winding Connection					
Type of Cooling						Volume/Weight of Coolant					
No. of Taps						Selected Tap Setting					
Fittings * Delete		Breather*				Drain Tap*		Other*(state)			
ACB / MCCB											
Manufacturer						Type					
Serial Number						Rating		A			
Protection Unit Type											

<b>Protection Settings</b>						
<b>LV Distribution Cabinet</b>						
<b>Manufacturer</b>				<b>Type</b>		
<b>Serial Number</b>				<b>Year of Manufacture</b>		
<b>Busbar Rating</b>		A		<b>Number of Ways</b>		
<b>Energisation</b>						
<b>L1 – L2</b>	<b>L1 – L3</b>	<b>L2 – L3</b>	<b>L1 – N/E</b>	<b>L2 – N/E</b>	<b>L3 – N/E</b>	<b>EFLI</b>
V	V	V	V	V	V	Ω
					<b>Phase Rotation</b>	<b>S*</b> <b>NS*</b>
<b>Item</b> (tick)	RMU		Transformer		LV Circuits	
<b>Additional Information</b>						
<b>Signed on Behalf of the ICP</b>						
<b>Name</b>						
<b>Signature</b>					<b>Date</b>	