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Printworks - Manchester LV Switchgear

Technical Submission of Equipment

Purpose of Issue: Construction Approval

Revision	Date	Comments
R00	24/04/2026	First Issue

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1. About ESS

Founded in 2004, Electrical Switchgear Services Ltd provide specialist engineering solutions to the LV Distribution & MCC Industry in the Retail, Commercial and Industrial sectors. With both Directors and a number of employees being from the Motor Control Background we can offer the full project solution from Distribution through to end User Control Systems Motor Control, being either Fixed or Drawout Types

With over 40 years' experience in the Manufacturing, Installation, Testing, Commissioning and Servicing of L.V. Switchgear & Motor Control Centres, we offer comprehensive service committed to quality craftsmanship, value and customer care We are recognised as a highly competitive and effective business within this industry that work nationwide.

Since trading commenced in 2004, we have acquired and maintained very reputable client contracts as a result of our continued commitment, dedication, value and customer focus.

We Manufacture LV Switchgear & Motor Control Centres from **Form 1** up to **Form 4 type 7 Front & Rear Access**, all out of our Rotherham Based Factory, from where we cover the UK, Ireland and Europe.

ESS Design Verification Document
ESS Design Verification Report DOC 41 V7.pdf

2. LV Switchboard List

Panel Reference	Form and Type	Busbar Rating	KA Rating
Main LV Switchpanel	Form 4 Type 2	1600A	50KA

3. Switchboard Details

Mains LV Switchboard

Mains Incoming

Frame/Trip
1 x 1600/1600A TP&N Fixed ACB (ML5.0 Trip @ 1600A) Type MTZ1 50KA
1 x Local EPO & 230VAC Shunt Trip
1 x Incoming Multifunction Meter with RS485 Output
1 x Neutral/Earth Link
Supported Copper work to Accept Cables as per Schedule

Controls

1 x Marshall Section - All RS485 Outputs wired back to Marshalling section.
1 x PFC Reference CT

Surge Protection

1 x 125A GL TP&N Cartridge Fuse c/w Type 1&2 Surge Arrester with visual display

Outgoing Devices

Frame/Trip
1 x 100/100A SP&N MCCB (TMD Trip @ 100A) Type NSX F
3 x 160/160A TP&N MCCB (TMD Trip @ 160A) Type NSX F
4 x 250/250A TP&N MCCB (TMD Trip @ 250A) Type NSX F
2 x 400/400A TP&N MCCB (ML2.3 Trip @ 400A) Type NSX N
2 x 630/630A TP&N MCCB (ML2.3 Trip @ 630A) Type NSX N

Outgoing Metering

11 x Multifunction Meter with RS485 Output

Spares

9 x Plugin Base TP&N 250A
1 x Plugin Base TP&N 250A Future PFC

Technical Details

All Devices are Fixed
Labels black on White Engraved Gravoply
Switch Board will be - **Front Access, floor standing, Top Entry/ Exit.**
Form 4A Type 2 segregation Rotary compartmentalized.
Switchboard Measurements - **2895mmW x 2020mmH x 641mmD**
Switchboard Calculated Weight - **1000KG**
Switchboard Colour - **RAL 7035 Light Grey**
IP Rating - **IP31**
Busbar Rating - **1600A 4P ASTA Certified 50/1KA Busbars.**
Temperature Rise Tested, IP Certified, Certified to BS EN 61439:2021 - 1 & 2

2.1 Switchboard Certification

We manufacture Our Switchgear at our Registered office in Accordance with the BS61439-1 & 2 2011, Our Switchboards are ASTA Certified Systems, along with Temperature Rise &Type Testing Certification.

Our Metal work is manufactured in house using our CNC Metalwork system, the Switchboard comprises of a fully welded outer casing with modular Internal components and Busbar System, on Glass fibre Insulated Busbar Supports.

2.2 Metalwork

All doors and covers shall be manufactured from 1.5mm sheet. Frames shall be 2.0mm. Steelwork shall be pre-treated with iron phosphate and painted with an epoxy powder paint of minimum thickness 50-80 Microns.
Standard colour shall be RAL 7035, light grey (another colour please specify). The switchboard shall be built with in ingress protection of IP31 unless otherwise specified (up to IP65 possible). All doors and raised covers shall be fitted with gaskets as standard. All screws, nuts and bolts shall be zinc plated.

2.3 Modular Design

The switchboard has been constructed from modular panel sections to form one composite panel. Any combination of height width or depth is constructed to meet client's requirements from the modular units. Floor standing switchboards are fitted with a minimum 65mm high plinth. The switchboard is constructed such that it can be extended from one or both ends.

2.4 Forms of segregation

Forms of segregation

We have allowed for the above switchboard to be **Form 4A Type 2**.
The Definition of **Form 4A Type 2** that we have used is that each functional unit has its own bolted neutral link within its own cubicle that is mechanically separated from each other cubicle and the busbar system, using metal or non-metallic separation barriers.
Each device is supplied with Live side Terminal Shields and Door Interlocked Handle, with A PVC shrouds segregating the cubicle from the cableway
The cables are glanded into a common gland plate, and the tails pass down into the cableway through the PVC cover & terminate directly on to the Terminals of the device. In this instance where these boards are being made LIVE, We feel this will be the safest way for the Contractor to work on, as all live parts are full shrouded away behind doors/covers, eliminating any Risk of Shock.
The Pulse outputs of each meter are wired to terminals within each individual section
The cables are glanded into a common steel glandplate, and the tails pass down into the cableway, through a PVC plate into the individual cubicle and terminate directly onto the device.
Typical Form 4A Type 2 of this arrangement below:-



2.5 Busbars

Busbars are manufactured from Hard Drawn High Conductivity copper with 1mm rounded edge.
Main horizontal and vertical bars 4-pole air insulated with fully rated neutral. Busbars are mounted on a type tested Glass Fiber busbar support system mounted to achieve a fault withstand of 50kA min up to max of 100kA for 1sec determined by project specification and listed within this document. Busbars are fully rated to match design load current (Ratings available 630A up to 6300A). All earth bars have been connected directly to the panel steelwork. A main earth bar runs the full length of the switchboard. All phase, neutral and earth busbars are identified at suitable intervals by means of letter coded square stickers showing L1, L2, L3, N, E as appropriate.

Typical Internal Busbar Layout as below using Solid Copperbar: -



Typical Free Issue Busbar Flange



2.7 Labelling

All front panel sections have been identified by using 75mm wide x 25mm high laminate labels with black text on a white background, text is 4mm high. Labels are fixed using Steel Screws.
The switchboard technical details have been identified by using a 202mm wide x 103mm high aluminium label. The labels are fixed using 3mm zinc plated screws. The following details have bene inscribed as follows:

- Serial number
- Standard
- Insulation level
- Rated Voltage
- Phases & Frequency
- Rated Current
- Short Time Current
- IP Rating

Any additional external and internal labelling also consists of laminate white background with black text, suitably sized to meet application.
All electrical danger/warning labels are self-adhesive type with yellow background and black text.

2.8 Type Tests

The switchboard designs have been verified by test in accordance with BSEN61439-1 Annex D, 'Design verification. Certification from independent test stations are available for review at our manufacturing facility.

2.9 Standard Factory Tests

Upon completion of assembly of the switchboard the following tests have been carried out:
1000V Insulation Resistance Test, Internal & External Visual Inspection, 1890V High Voltage Pressure Test, Functional Test on all devices (where applicable).
Primary Injection testing of discrete relays and meters. The switchboard has been supplied with a copy of the factory test results. Site testing duplicates the factory tests with 1000V Insulation Resistance Test and pressure testing of re-assembled splits

4. ACBs

Manufacturer	Rating	Poles	Pattern	Trip Unit	KA Rating
Schneider	1600A	TP&N	Fixed	ML5.0	50KA

Technical Details on Schneider Electric ACB MTZ

We have allowed to use the MTZ Range ACB:-

- Current ratings 800A – 6300A
- Type H1, H2, H3 & L1
- Micrologic Control Units 5.0 – 7.0H
- Integral Restricted Earth Fault Protection
- Fixed/Drawout
- 3P/4Poles
- BSEN 60947-2



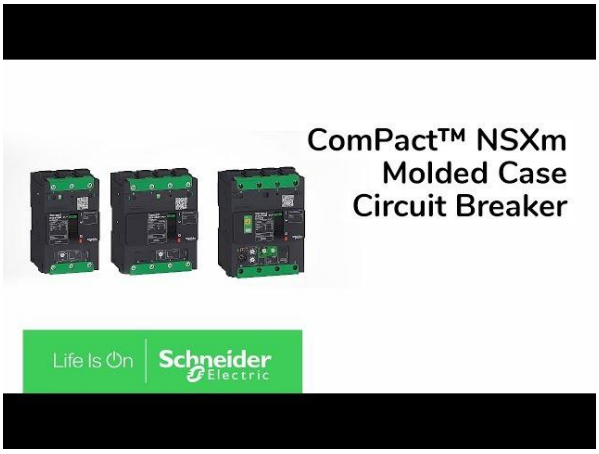
5. MCCBs

Manufacturer	Rating	Poles	Pattern	Trip Unit	KA Rating
Schneider	100A	SP	Plug-In	TMD	50KA
Schneider	160A	TP	Plug-In	TMD	50KA
Schneider	250A	TP	Plug-In	TMD	50KA
Schneider	400A	TP	Plug-In	ML2.3	50KA
Schneider	630A	TP	Plug-In	ML2.3	50KA

Technical Details on Schneider Electric MCCB NSX

We have allowed to use the NSX Range MCCB:-

- Current ratings 16A – 250A
- Current Ratings 400A to 630A
- Type F, N, H, S & L
- TMD Trip Units
- Micrologic Control Units 2.2 - 5.2
- Fixed/Plugin
- 3P/4Poles
- BSEN 60947-2



6. Meters

Manufacturer	Model
Rayleigh Instruments	RI-F220-G-C RS485 & Pulse

Data Sheets
RI_Data_Sheet_RI-F220_W.pdf

Technical Details on RI F220 Metering

We have allowed to use the RI F 220 Multi-Function Meter with Pulse & RS485 Modular Output, this meter allows for the following functions:-

- Current per Phase & Neutral Instantly
- Phase to Neutral & Phase to Phase Voltages
- Frequency
- Active Positive Power Total & Max demand over a programmable period
- Reactive Positive Power Instantly
- Power Factor with Inductive or Capacitive Indication
- Harmonic Distortion on Phase to Neutral, Phase to Phase Voltages & Currents



7. CT's

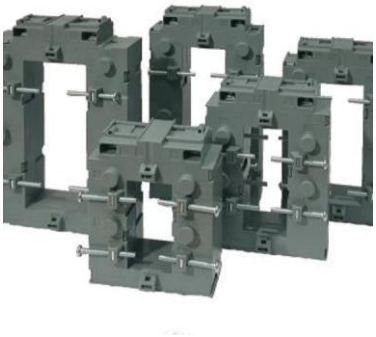
Manufacturer	Rating	Poles	Class
Rayleigh	1600A	1P	Class 1
Rayleigh	630A	3P	Class 1
Rayleigh	400A	3P	Class 1
Rayleigh	250A	3P	Class 1
Rayleigh	160A	3P	Class 1
Rayleigh	100A	3P	Class 1

Data Sheets
RI_Data_Sheet_RI-CT120_W.pdf
RI_Data_Sheet_RI-CT242_W.pdf
RI_Data_Sheet_RI-CT248_W.pdf

Technical Details on Measurement CT's

- Accuracy : Class 1
- VA Rating: 2.5VA
- Input 100-6300A
- Output 5A





8. Surge Protection

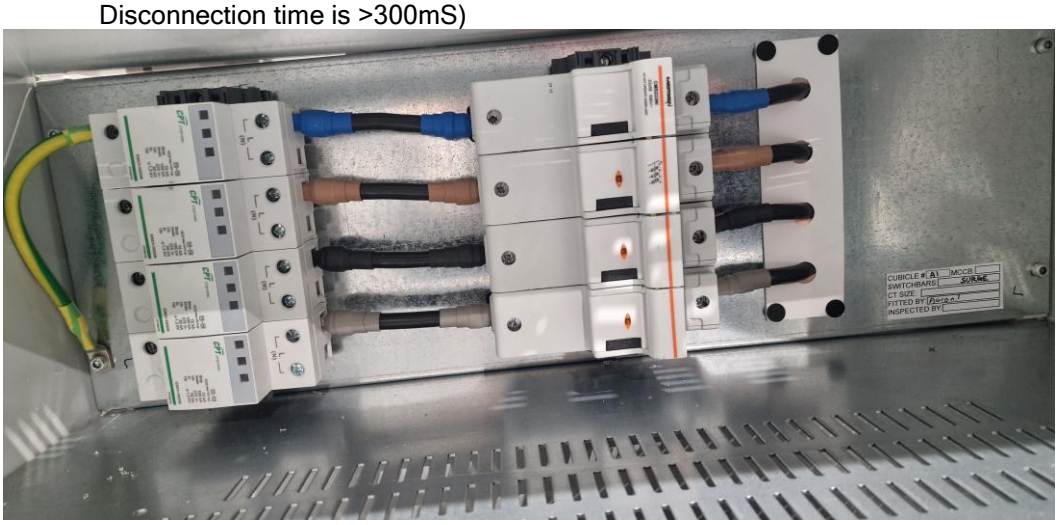
Manufacturer	Make	Model	KA Rating
First Power Surge Protection	CPT	CS1-100	100KA

Data Sheets
125 AMP 1000V FUSE CARRIER DATASHEET .pdf
77738712 - CSC1 - 15kA_1 + TPN.pdf

CS4P-15-400 IR - 77705429.pdf

Technical Details on Surge Protection
We have allowed to use CPT (cirprotec) Type 1&2 Combined Lightning & Surge Protection device, this offers the protection against transient overvoltages in SP & TP electrical power networks:-

- Maximum discharge Current 100KA
- Impulse Current 15KA
- Nominal discharge current 30KA
- Short circuit protection per pole 25KA
- Response time <25ns
- Visual Indication Status
- Recommended back up fuse 125A GL to protect against an impulse current of <300mS (MCCB Disconnection time is >300mS)

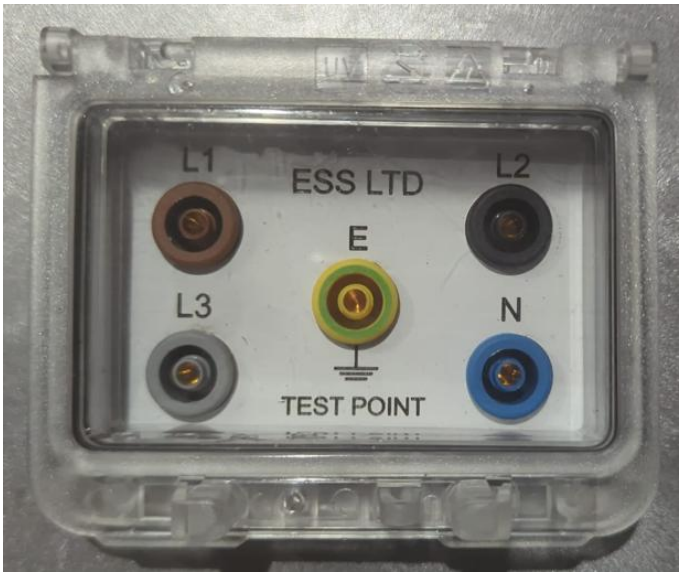


9. Control and Testing Equipment

Manufacturer	Model
ESS	Test Point
TMA	EPO
TMA	Indication Lamp 24v & 240v

Data Sheets
TEST CONNECTOR.pdf
TMA Pushbutton Technical Data.pdf
TMA AD22 (AD26) LED DATA SHEET.JPG

Incoming Test Point



Phase Indicator Lamps & Local EPO



10. ESS Product Range



LV Switchboards



MSDB's



Package Substations



PDU's



LV Panel Boards



PFC's



Distribution Boards



CT Chamber



ATyS Units



Control Panels



Generator Connection Panels