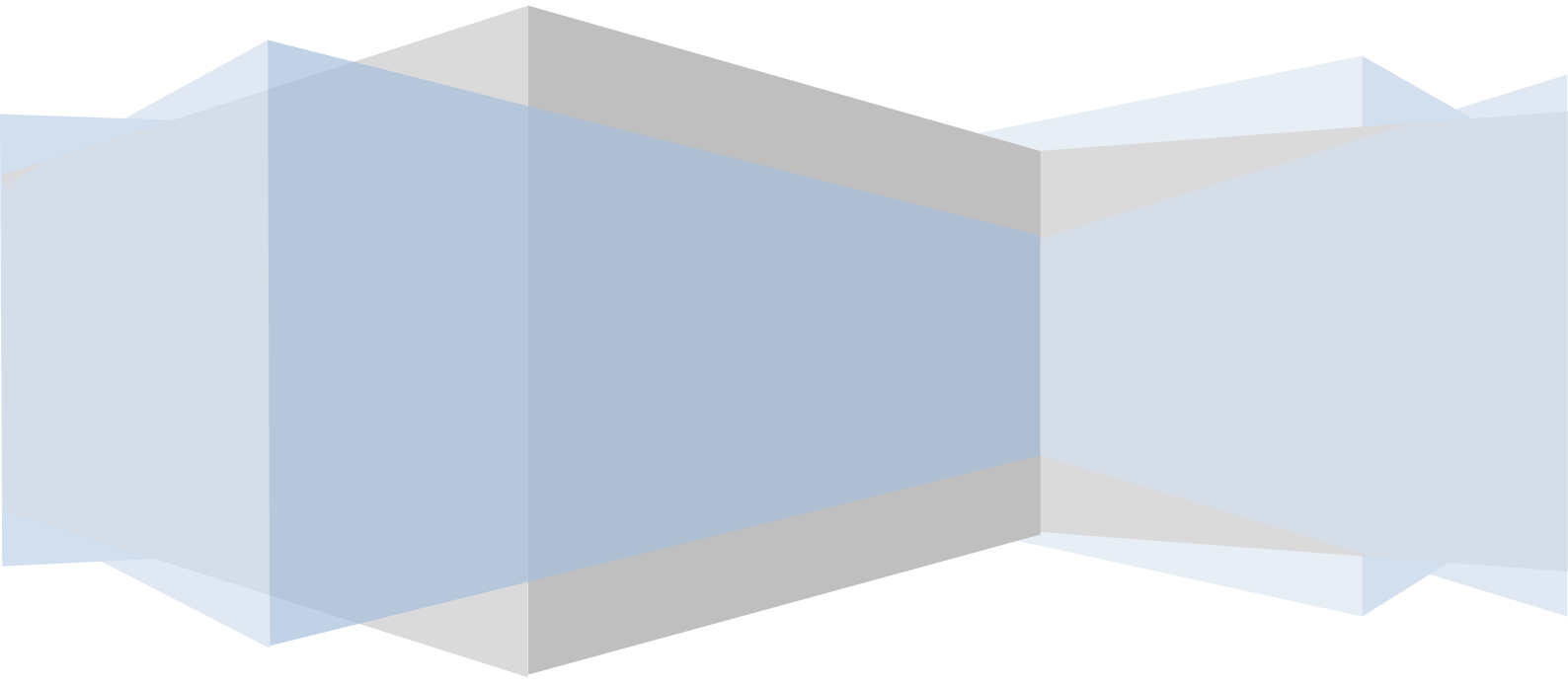
MSB - General Description and Operation Manual



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Main Switch Board

General Description

The Main Switch Board (MSB) receives supply from SESCO.

Earth Fault and Overcurrent protection relays are installed for the Mains Incoming and Generator Incoming. If an earth fault or overcurrent condition occurs, the protection relays will trip the ACBs/MCCBs.

A digital power meter (DPM) is installed to monitor the main incoming supply and outgoing supply. The DPM provides power quality readings for operators.

A surge arrestor is installed at the MSB. The surge arrestor functions to divert lightning surge current to the ground to prevent voltage spikes that may damage equipment. The surge arrestor is protected by 3-phase fuses.

The MSB has several outgoing MCCBs supplying to different equipment/loads. The MCCBs are equiped with thermal magnetic tripping units. Any overload or short at the equipement or load will cause the MCCB to trip.

A capacitor bank is installed at the MSB to prevent low power factor condition. The capacitor bank is controlled by a Power Factor Regulator (PFR). The PFR will determine how many steps of capacitor bank to switch on, depending on the power factor at that time.

Operating Instructions for Main Switch Board

Air Circuit Breaker (ACB)

To turn on the ACB, make sure that the closing spring is charged. To charge the closing spring, pump the spring charging handle until the indication shows that the spring is charged. The press the “ON” button to turn on the ACB.

To turn off the ACB, press the “OFF” button.

To withdraw the ACB from its cradle, remove the ACB handle from its storage position. Position it on the cranking slot, press the unlock button and start turning the handle anti-clockwise. The indicator will show when the ACB has been disconnected. Once disconnected, the ACB can be racked out and removed.

To reinstall the ACB, push the ACB into the cradle and turn the handle clockwise. The indicator will show when the ACB has been connected. A resistance can also be felt at the cranking handle when the ACB has been fully racked in.

Moulded Case Circuit Breaker (MCCB)

To turn on the MCCB, push the operating handle upwards. To turn off the MCCB, pull the operating handle downwards.

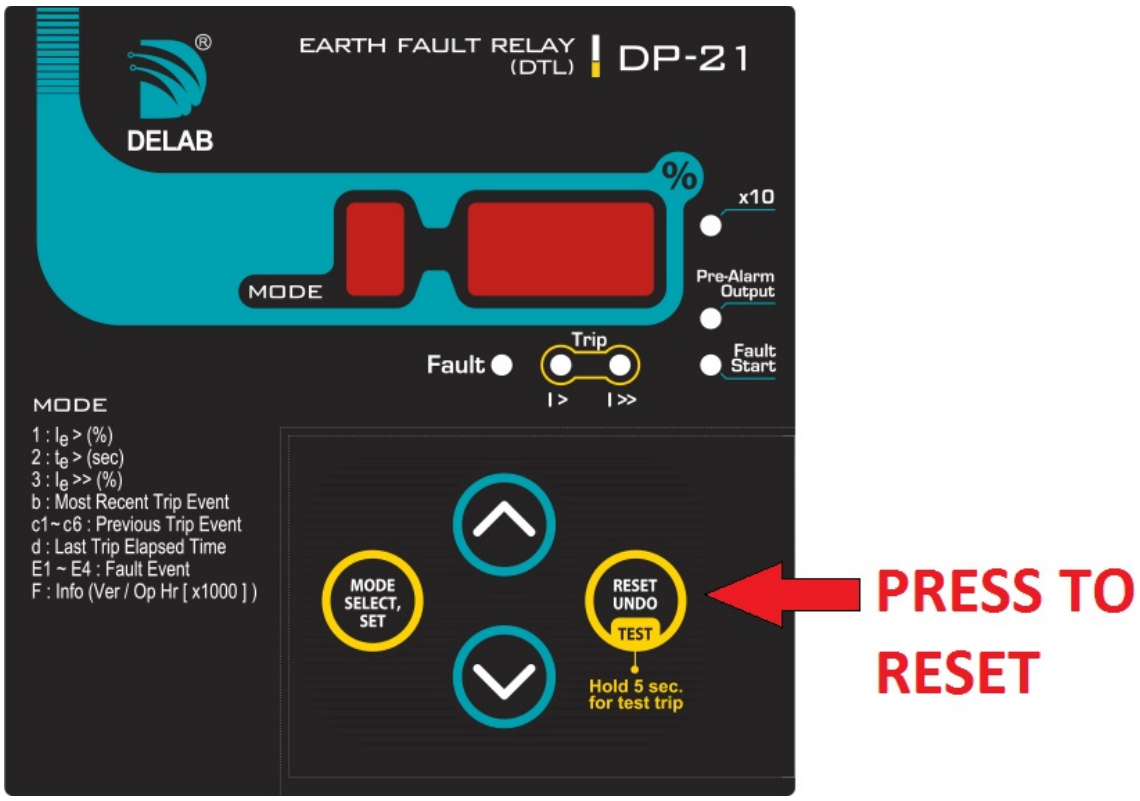
If the MCCB has tripped, the operating handle will be in the middle position. Investigate the cause of the trip before turning it back on.

To turn the MCCB back on, pull the operating handle downwards first, then push it upwards.

Protection Relays

The protection relays will have a red indicator showing that it has tripped. Investigate the cause of the trip before resetting it.

To reset the protection relays, press the “Reset” button on the protection relay.



Capacitor Bank

Ensure that the MCCB to the Capacitor Bank is turned on. Ensure that the Power Factor Regulator is in “Auto” mode. Ensure that the MCCBs for individual capacitors are turned on.

For more information, please refer to the Delab NV-6s Power Factor Regulator User Manual.

Digital Power Meter

Use the arrow keys to view monitored parameters.

For more information, please refer to the DPM User Manual.

Lightning Surge Arrestors

The surge arrestors should be periodically checked to ensure they are in good condition. The surge arrestor is in good condition if the indicators are GREEN. The surge arrestors will need to be replaced when the indicators turn RED.

Troubleshooting Guide

Symptom	Causes	Rectification
No power supply to MSB.	1. Sesco Failure. 2. Incoming ACB/MCCB not turned on.	1. Ensure Sesco supply available. 2. Turn on incoming ACB/MCCB
Unable to turn on ACB.	1. Ensure that the EF or OC has not tripped. 2. Ensure that the ACB spring has been charged.	1. If EF or OC has tripped (Red LED ON), reset the EF or OC and try turning on the ACB again. 2. Use the charging handle to charge the ACB spring and try turning on the ACB again.
Unable to turn on MCCB.	1. Ensure that the EF or OC has not tripped. 2. Outgoing cables or board shorted.	1. If EF or OC has tripped (Red LED ON), reset the EF or OC and try turning on the MCCB again. 2. Check outgoing cables for any shorts.

Power Factor Log Sheet

1. KWH and KVArh Meter is to be checked on every 5th, 12th, 20th & 28th of each month. If it is a Public Holiday, checking will be carried out on the following day.
2. The meter reading should not be less than 0.85 lead/lag.
3. Attached is the checking form for the periodical checks.

POWERTECH ENGINEERING

Periodical Checks on Power Factor Correction Capacitor Bank at Sesco Incoming Main Switchboard

Client : _____ Sesco Incoming Amp : _____

Location : _____ Cap. Bank Size/Make : _____

Date	KWH Meter Reading (S/N :)	KVARH Meter Reading (S/N :)	Average P.F. (Min. 0.85)	Remarks

Average Power Factor Calculation base on KWH & KVARH Meters Reading of the period

$$X\ Factor = \frac{\text{KVARH Units (Current) - (Previous)}}{\text{KWH Units (Current) - (Previous)}}$$

X - Factor	*Average P.F.*
1.3	0.61
1.2	0.64
1.1	0.67
1	0.71
0.9	0.74
0.8	0.78
0.7	0.82
0.6	0.86
0.5	0.89
0.4	0.93
0.3	0.96

Note : To Be Check on Every 5th, 12th, 20th & 28th of each month. If it is a Public Holiday, checking will be carried out the following day.