Power Study

Objectives

The objective of the study is to monitor key points in the power system under real running conditions in order to perform an analysis of the efficiency and running condition of the equipment.

Completing the Data Sheets

As many data sheets can be returned as necessary, but certain essential conditions must be covered:

a) Generators No Load

A single data sheet should be prepared containing running information for each generator under no-load conditions (i.e. off-line). This does not mean that all generators have to be off-line at the same time; simply that data is recorded for each generator at full speed, no load, off-line and warmed up.

b) Generators Full Load

Ideally, we would like the system to be fully loaded with all generators on line. However this may not be practically possible but the data sheets should include combinations of generators loaded to around 80% of full load, and data should be recorded for all generators.

c) Continuous Running

Where the possibility is available of running under reasonably steady conditions over a period of time is available, data should be recorded at hourly intervals over (for example) a 4 hour period.

Data sheets may be completed by printing copies of the attached spreadsheet and filling in by hand, or entering data directly into copies of the spreadsheet.

The shaded areas do not have to be completed.

Module Details

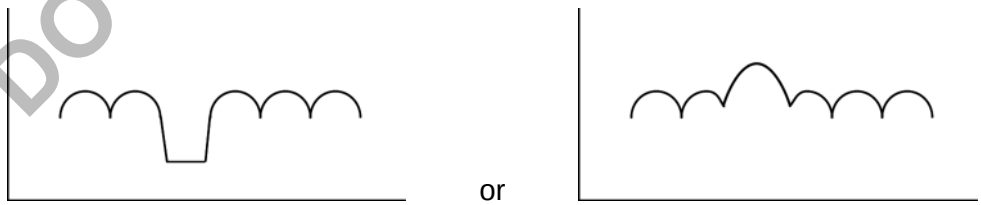
Please complete the module details form with information from the AC and DC module nameplate labels.

SCR Current Feedback Measurement

If possible, a recording of the SCR current feedback at the DC module should be taken for each SCR under high load. Connect the ground of the oscilloscope probe to pin 155 of the DC module and the probe tip to pin 131. A waveform similar to this should be visible:

Good SCR Waveform

If the waveform looks like either of these, there is a problem which may cause noisy operation and overheating in the motors:



or

Bad SCR Waveforms

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If it is not possible to record these waveforms they should be observed anyway and a note made of any unevenness.

What Do These Measurements Tell Us?

By looking at the engine and generator parameters we are able to determine whether or not the equipment is working at optimum level, and estimate where a problem (if any) may lie, either in individual engine/generator performance or system load sharing.

By looking at the SCR and DC module measurements we can analyse the DC loads on the system and operation of the Power Limit.

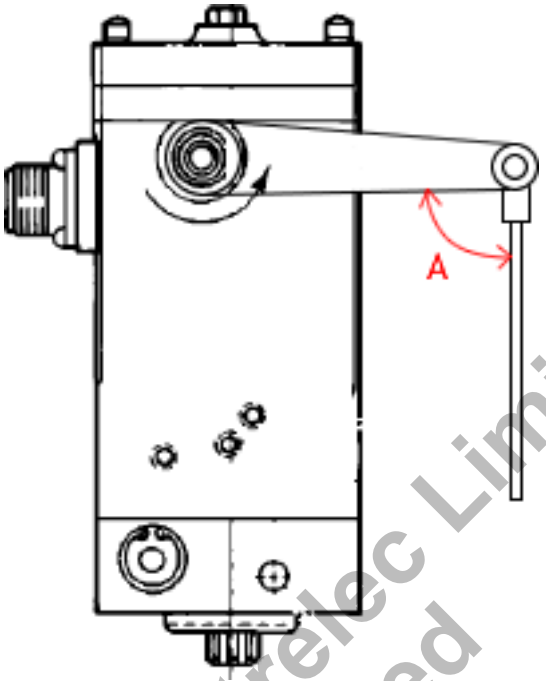
The data sheets also form an important benchmark which, if another series of measurements are taken at some time in the future, would allow us to spot trends and possible deterioration in performance.

The SCR waveform tells us whether or not the DC module is firing the SCRs correctly, or if there is a problem with the SCR device and firing circuit.

Notes on Measurements

The following are referenced on the data sheets:

1. Measure volts, amps, KW, KVAR from door meters.
2. Throttle mA measured by inserting a DC multimeter (set to measure mA) in series with pin 533 of the AC module.
3. Throttle voltage measured using a multimeter (set to measure DC volts) connected across pins 533 and 545 of the AC module.
4. Exciter volts measured using a multimeter (set to measure DC volts) across pins 1 and 10 of the Exciter PCB.
5. Measure KWPL signal using a multimeter (set to measure DC volts) at TP1 on the Power Limit Mk2 (HGC) PCB, 0V on pin 9 of the Power Limit PCB. Refer to Zeefax if other Power Limit PCBs are fitted.
6. Measure Itot signal using multimeter (set to measure DC volts) at TP2 on the Power Limit Mk2 (HGC) PCB, 0V on pin 9 of the Power Limit PCB. Refer to Zeefax if other Power Limit PCBs are fitted.
7. If winding temperatures are available record the highest value. If one particular phase is hot, make a note.
8. If more than one engine exhaust temperatures are available record the highest value and note significant discrepancies.
9. Using a protractor or similar device measure the angle between the actuator lever and connecting rod as shown in the diagram below:



Actuator Angle Measurement

10. Record SCR assignment (MP1, MP2, MP3, DW, RT, etc).
11. Measure TP8 in the DC Module using multimeter (set to measure DC volts) across pin 155 (0V) and TP8 of the DC Module
12. Measure TP7 in the DC Module using multimeter (set to measure DC volts) across pin 155 (0V) and TP7 of the DC Module
13. Measure Power Limit in the DC Module using multimeter (set to measure DC volts) across pin 155 (0V) and pin 115 of the DC Module

WARNING

Take great care in ensuring your multimeter is set correctly before connecting, especially when switching from monitoring voltage to current and vide-versa. We recommend using two multimeters: one set to measure just the generator throttle milliamps (note 2). This greatly reduces the possibility of inadvertently shutting down the engine when inserting the meter, or causing damage to the meter when switching from measuring milliamps to volts.

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