Embedded Generator G59/1 Protection Commissioning Record for LV Connection

Location :- Imperial Tobacco, Winterstoke Rd, Bristol

Owner/Operator Details

Name	Jon Baker		
Address	Imperial Tobacco Winterstoke Road Ashton Bristol BS99 1UP		
Telephone(daytime)	0117 9530000	Fax	0117 9636403
Telephone (24 hour for Emergency Contact)			0117 9530000

Generating Plant Details

Make	Dale Electric	Type/Frame Size	TypeB B904F
Serial No	63495	Voltage	240/415V
KW Rating	757.6	Frequency	50 Hz
Operating Power Factor	0.8	Full Load Current	1319A
Energy Source and Prime Mover	Diesel Engine		

Synchronous

Type of Scheme: Peak lopping-NGC Support

Certification

On behalf of PowerGen Energy Solutions I certify this generator has been installed in accordance with the requirements of EA Engineering Recommendation G59/1 and the commissioning tests recorded on pages 2 to 5 attached have been carried out.

Test Engineer	John Gordon	Signed	
Address	Howland Grange Close Minchinhampton Glos. GL6 9DF	Date	12/10/01
WPD Witness	Pat Lewis	Signed	
Address	Western Power Distribution Avonbank Feeder Road BRISTOL BS2 0TB	Date	12/10/01

Western Power Distribution

Embedded Generator Commissioning Tests
LV generator

Location :- Imperial Tobacco, Winterstoke Rd, Bristol

1. Over/Under Voltage Protection

OVERVOLTAGE Settings 435.8 V 0.5secs	Red - Yellow		Yellow – Blue		Blue - Red	
	Volts	Time	Volts	Time	Volts	Time
Overvolts Test 1	434V	282ms	436V	262ms	435V	235ms
Overvolts Test 2	434V	-	437V	-	435V	-
Overvolts Test 3	434V	-	436V	-	435V	-
UNDERVOLTAGE Settings 390 V 0.5secs	Red - Yellow		Yellow – Blue		Blue - Red	
	Volts	Time	Volts	Time	Volts	Time
Undervolts Test 1	391V	294ms	392V	315ms	392V	335ms
Undervolts Test 2	391V	-	392V	-	393V	-
Undervolts Test 3	391V	-	392V	-	393V	-

Relay Make & Type

DEIF Generator Paralleling Controller (GPU2)
Serial 700265-10

Method of Test

T&R DVS3. Serial 13TE0484. Cal to 10/11/02.
Fluke 41. Cal to 1/2002

Remarks / Additional Protection (e.g. Unbalance)

Relay nominal volts 415V.
Relay set to 0.2s Delay.
Relay is NOT self reset.
Note – Times are relay trip times. It was not possible to secondary inject the relay with the breaker closed (The genny had to be running to closé the breaker)
The trip circuit was proved after the testing by running the generator and altering 'Setting 2' overvoltage to cause a trip.

Signed
Date: 12/10/01

Western Power Distribution

Embedded Generator Commissioning Tests
LV generator

Location **Imperial Tobacco, Winterstoke Rd, Bristol**
:-

2. Over/Under Frequency Protection

OVERFREQUENCY		Test 1		Test 2		Test 3	
Settings	Hz 0.5secs	Hz	Secs	Hz	Secs	Hz	Secs
Test Results		50.50Hz	347ms	50.50Hz	-	50.50Hz	-
UNDERFREQUENCY		Test 1		Test 2		Test 3	
Settings	Hz 0.5secs	Hz	Secs	Hz	Secs	Hz	Secs
Test Results		46.99Hz	357ms	46.99Hz	-	46.99Hz	-

Phases connected to Relay
All Phases

Relay Make & Type
DEIF Generator Paralleling Controller (GPU2)
Serial 700265-10

Method of Test
T&R DVS3. Serial 13TE0484. Cal to 10/11/02.

Remarks
Relay set to 0.2s Delay.
Relay is NOT self reset

Signed
Date: 12/10/01

Embedded Generator Commissioning Tests
LV generator

Location :- Imperial Tobacco, Winterstoke Rd, Bristol

3. Loss of Mains Protection

Generators capable of self-sustained operation must be provided with additional protection to ensure disconnection of the generator for faults on the WPD system which would not necessarily cause voltage or frequency protection to operate. The type of "Loss of Mains" relay and suitable commissioning tests must be agreed with WPD and recorded below:-

Relay Make, Type & Phases Connected to Relay

DEIF Generator Paralleling Controller (GPU2)
Serial 700265-10

Method of Test

T&R DVS3. Serial 13TE0484. Cal to 10/11/02.

Test Results / Remarks

Vector Shift set to 6 degrees. Operates at 6.2 degrees in 24ms.

ROCOF set at 0.4Hz/s. Stable at 0.4Hz/s.
Operates at 0.45Hz/s in 316ms.

4. Generator Neutral Earthing

This generator may be operated in Island Mode for Standby Purposes.
The customer is advised the generator neutral point should be isolated from earth whilst running in parallel with the WPD system.

Remarks

The generator neutral is connected to the LV neutral bar.
The customer has carried out harmonic testing and are happy with the results.

Signed 
Date 12/10/01

Western Power Distribution

Embedded Generator Commissioning Tests
LV generator

Location :- Imperial Tobacco, Winterstoke Rd, Bristol

5. Synchronising After all G59/1 tests are completed and **before** the generator is first synchronised with the WPD system:-

a) the wiring which supplies voltage to the synchroniser from the generator and the WPD system must be proved to be correctly in-phase.

b) with the generator circuit breaker racked out and connected to the synchroniser, the generator and the WPD system voltages must be checked and proved to be in-phase at the generator circuit breaker when the close signal is received.

c) the consent of the WPD Control Engineer **must** be obtained before first synchronising.

Recorded Date & Time of First Synchronising :- 12/10/01 14:15Hrs

6. Voltage Control System

After the generator has been successfully synchronised with the WPD system, the voltage must be recorded with maximum agreed generation to verify that Statutory Voltage on the WPD network will not be exceeded due to export power flow. The Power Factor of the generator must be recorded during this test.

System Voltage	Date & Time	Red/Yellow V	Yellow/Blue V	Blue/Red V
With no generation	12/10/01 14:15Hrs	398V	396V	400V
With generation of 625 kVA at a lagging PF of 0.96 p.u.	12/10/01 14:30Hrs	420V	418V	421V

Remarks

Signed
Date 12/10/01