MUSTANG POWER SYSTEMS

Functional Test Report

Customer:	HongHua		
Project:	TBD		
Site:	TBD		
Purchase Order:	0023318-00	**Date**	March 3, 2016
Work Order	MK-F1064		
Revision:	0		
Unit Number:	2 of 3		
Salesman:	Gregg Bare		
Coordinator:	Derek Torres		
Tested By:	Michael Elliott	**Date**	5·23·16
Witness:	N/A	**Date**	
Company:		**Title**	

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Test Location: Manufacturing Test Facility, Tomball, Texas

Test Attendees

Name *Please Print*	Company	Date
Michael Elliott	Mustang Cat Power Systems	5·23·16
	Mustang Cat Power Systems	
	Mustang Cat Power Systems	
	Mustang Cat Power Systems	

MUSTANG POWER SYSTEMS CAT

Test Location: Manufacturing Test Facility, Tomball, Texas

Test Equipment Used for Testing

Make/Model	Description	Serial Number	Calibration Due Date
Balmac 200	Vibration meter	0801021	7.21.16
Shark 100	meter	141-145385834	2.24.17

Engine/Generator Functional Test Report

Project:

Customer:	HongHua	S.O. No.:	MK-F1064
Project:	TBD	Location:	TBD
Equipment ID:	Drilling Rig Genset	Unit No.:	2 of 3

Equipment tested:

Engine:

Make:	Caterpillar	Model:	3512C	Serial No.	LLA05193
Arrangement Number:	250-7623	ECM Software	435-8655	Caterpillar Pkg. ID No.:	N/A

Generator:

Make:	Kato	Model:	AA27673014	Serial No.	41244-02
Arrangement Number:	6P6-3150	Voltage Regulator	*	Caterpillar Control Panel	125-7089
Voltage	346/600	Connection	Wye	No. of Leads	6
Amps	1684	kW	1225	kVA	1750
Frequency	60 Hz	P.F.	0.7	RPM	1200

* Caterpillar CDVR used for testing

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Scope:

This report covers the test of a generator set for the assurance of proper operation. This report will provide a record of functional test data for future reference. All blanks on this Test Report will be filled in by the Test Technician.

1.) The test will be witnessed by the customer. N/A

2.) Due to the limits of the test pad equipment, the test will be conducted at 480 VAC. ✓

3.) The load test will be at rated load, 480 V, 60 Hz, 1203 A, 1000 kW, 1.0 PF, for 1 hour at 100% load. ✓

4.) The engine safeties will be simulated for proper function. ✓

5.) During the load test, when the genset has reached operating temperature and while the genset is operating at full load, record the vibration levels. ✓

6.) Record the final service meter reading (SMR) at the end of all testing ✓

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Test Record:

1.0 GENSET CONTROLS:

1.1 Engine Safeties

A. Test the emergency shutdown by pressing the emergency stop (E-Stop) pushbutton while the engine is operating at rated speed. Observe the following:

1. Verify the engine stops: ✓
2. Verify the air inlet shut-offs trip: ✓
3. Reset the E-Stop pushbutton : ✓
4. Reset the air inlet shut-offs: ✓
5. Reset the ECM by placing the engine control switch (ECS) in the Off-Reset position. Follow reset procedures: ✓
6. Re-start the engine: ✓

B. "Check Mark" for GOOD "X" FOR FAILS "N/A" for NOT APPLICABLE

Safety	Alarm Design Setting	Shutdown Design Setting	Alarm	Shut-down	CB Trip	Visual Indic.	Audible Indic.
Low Oil Pressure	32 PSI	26 PSI	✓	✓	N/A	✓	✓
High Water Temperature	216 °F	225 °F	✓	✓	N/A	✓	✓
Overspeed	N/A	1416 RPM	N/A	✓	N/A	✓	✓
Emergency Stop	N/A	Button Pushed In	N/A	✓	N/A	N/A	N/A

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2.0 Load Test:

Apply load to the genset at 1.0 PF using resistive load banks.

Use the attached test sheet to record load test results. Record test data every15 minutes. The first and last readings will be taken at no load, 5 minutes before the load test and 5 minutes after the load test.

The load test will be at rated load, 1000 kW, 1.0 PF, for 1 hour;

1 hour at 100% load ✓

3.0 Vibration Test:

See attached sheets. ✓

5.0 Test Completion:

At the completion of all tests, record the final service meter reading.

Verify that all documents are completed, all blanks are filled in, and any required signatures have been obtained.

Make copies of the completed test report. Distribute the original and copies as required. ✓

COMMENTS: _____

Vibration Test

PROCEDURE

SCOPE:

This test procedure covers the functional testing for vibration of the engine, generator, and radiator on Mustang's test stand for assurance of reliable operation of the generator package.

PROCEDURE:

The engine/generator will be started and running under the proper percentage of load. Check the appropriate load condition block on the vibration report. If required, test at each different level of load percentage.

Double BEARING GENERATOR

Measure and record the vibration meter reading for horizontal, vertical, and axial directions for each of the following 4 monitoring points.

1. At the front of the engine, perpendicular to the front main bearing, in line with the crankshaft.
2. The rear end of the engine, perpendicular to the rear main bearing, in line with the crankshaft.
3. The front of the generator, perpendicular to the front generator bearing, in line with the rotor.
4. The rear of the generator, perpendicular to the rear generator bearing, in line with the rotor.

The vibration levels recorded are in thousandths of an inch (mils) displacement. The meter is unfiltered. Vibrations of all orders are represented in the measurement. The maximum reading allowed is 8 mils displacement (0.008") in any axis.

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Vibration Record

Customer **HongHua** Work Order **MK-F1064** Unit Number 2 of 3

Driver Make: Caterpillar Model 3512C Serial Number LLA05193

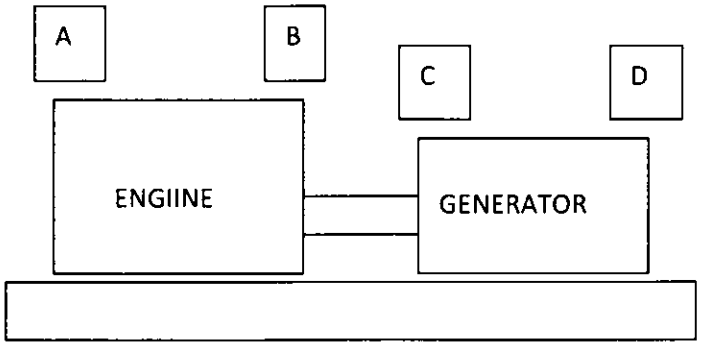
Driven Make: Kato Model AA27673014 Serial Number 41244-02

Coupling Make: Caterpillar Part Number 5N-3765 Type Viscous

LEGEND

RECORDING POINT
PLAIN BEARING
BALL BEARING
RIDGID COUPLING
FLEX COUPLING
PILLOW BLOCK
Dr. out, DRIVER
T out, TRANS. or GEAR
Dn. in, DRIVEN

EQUIPMENT SKETCH



H=Horizontal V=Vertical A=Axial

	[ ] 0% Load		[ ] 25% Load		[ ] 50% Load		[ ] 75% Load		[X] 100% Load	
Record Point	Mils Displ	In./ Sec.	Mils Displ	In./ Sec.	Mils Displ	In./ Sec.	Mils Displ	In./ Sec.	Mils Displ	In./ Sec.
A H									2.15	N/A
V									3.33	N/A
A									2.03	N/A
B H									1.99	N/A
V									1.97	N/A
A									2.61	N/A
C H									2.60	N/A
V									1.28	N/A
A									2.59	N/A
D H									2.60	N/A
V									1.70	N/A
A									2.64	N/A

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LOAD TEST REPORT

Customer:	HongHua	Project:	TBD	S.O.	MK-F1064

Engine: Make/Model	Caterpillar 3512C Petroleum	Generator: Make/Model	Kato AA27673014		Control Panel: Make/Model	Caterpillar 125-7089
Serial Number	LLA05193	Serial Number	41244-02			
Rating:	1103 kW @ 1200 RPM	Rating:	600 Volts	1225 kW	Unit Number	2 of 3

TEST CONDITIONS: TEST LOCATION Mustang CAT Tomball Test Facility TYPE OF TEST Standard 1 Hour Load Test

Time	Volts	Amps Ø1	Amps Ø2	Amps Ø3	kW	PF	Hz	RPM	Boost Press PSI	Fuel Press PSI	Jw Temp °F	Oil Press PSI	After Cooler °F	Left Exh °F	Right Exh °F	Amb Temp °F
9:30	480	0	0	0	0	1	60	1200	1	68	149	81	82	320	322	80
9:35	480	1212	1219	1215	1003	1	60	1200	32	64	180	72	91	995	1029	81
9:50	480	1212	1219	1215	1003	1	60	1200	34	63	181	67	104	1029	1062	81
10:05	480	1213	1220	1216	1003	1	60	1200	34	64	180	67	106	1045	1076	81
10:20	480	1213	1220	1217	1003	1	60	1200	35	64	180	67	104	1027	1060	81
10:35	480	1213	1220	1217	1003	1	60	1200	35	64	181	66	104	1033	1066	81
10:40	480	0	0	0	0	1	60	1200	2	67	176	71	91	455	453	81

Final Service Meter Reading 3,2500 Hours

Tested By: Michael Elliott **Witness:** N/A **Date:** 5-23-15