Reslab Summary Test Report for Compliance to AS4777

Report of Tests Performed For:

Fronius International GmbH
A 4600 Wels – Thalheim
Gunter Fronius Strasse 1

TEST ITEM DESCRIPTION

Type: Fronius IG30,
Serial no: 15201871/30,
Part no: 4,200,003,
Job: 743149,
44,0240,1001 Indoor Standard with display
44,0240,2003 SETUP AUS
44,0240,3000 Screw Terminal

Software Version: 2.1.0
Nominal Operating Voltage: 230 V_{AC}
Nominal Operating Frequency: 50 Hz
Nominal Output Power Rating: 2500 W
Single Phase

Abstract

This summary test report provides the compliance results for the Fronius IG 30 as tested at Reslab between 10/6/2004 to 18/6/2004 for Fronius International GmbH to AS4777. The full test results are reported in the ResLab REP-RL11-T-0001-0. The testing described in this report was done according to the Reslab Test Procedures based on AS4777 (Grid connection of energy systems via inverters).

Test Date

10/6/2004 to 18/6/2004

Issued By: Hari Sharma, ResLab

Authorised by: Nigel Wilmot, ResLab
Authorise Signature:

ResLab
C/o Murdoch University
South St
Murdoch Western Australia 6150

Reslab Document Number:REP-RL11-T-0002 rev 1

Revision Number	Issue Date	Revision Comment
0	22/6/2004	Issued Document
1	23/6/2004	Revised Manufacture date and corrected text

1 INTRODUCTION

This summary test report provides the compliance results for the 2500W single phase Fronius IG 30 as tested at Reslab between 10/6/2004 to 18/6/2004 for Fronius International GmbH to AS4777. The full test results are reported in the ResLab REP-RL11-T-0001-0. The testing described in this report was done according to the Reslab Test Procedures based on AS4777 (Grid connection of energy systems via inverters).

The details of the Equipment Under Test (EUT) are as follows:

Serial. Number	15201871/30
Model Number	FRONIUS IG 30
Year of Production	2004
Nominal Operating Voltage	230 V
Nominal Operating Frequency	50 Hz
Nominal AC Output Power	2500 W
Hardware – Version	Type: Fronius IG30, Serial no: 15201871/30, Part no: 4,200,003, Job: 743149, 44,0240,1001 Indoor Standard with display 44,0240,2003 SETUP AUS 44,0240,3000 Screw Terminal
Software – Version	2.1.0

Table 1: Details of Test Inverter

Figure 1: Test Inverter Pictures

2 SUMMARY

- The EUT complies with the requirements of AS4777.2 and AS4777.3 as per section 3.1 and 3.2 of this report.
- The EUT was not tested to clause 4.1, 4.6 and 4.11 of AS4777.2 by ResLab. The EUT should be tested for these requirements by an appropriate laboratory/authority.

3 COMPLIANCE TEST REPORT

3.1 Compliance to AS4777.2 clause 4

The 2500 W single phase FRONIUS IG30 grid connected inverter was tested for compliance to AS4777.2 (2002): "Grid connection of energy systems via inverters" Part2: inverter requirements.

Clause 4.1. General: (Not tested)

All the tests as required by AS3100 were not performed by Reslab. The insulation resistance and earthing tests were performed by ResLab. The EUT complies with the requirements of AS3100: 2002 for insulation resistance (clause 8.3.1) and testing of earthing connection (clause 8.5) requirements. The other relevant AS3100 tests were not performed and should be performed by an appropriate laboratory.

Clause 4.2. Compatibility with electrical installations: (Complies)

The inverter output a.c. voltage and frequency comply with AS60038.

Clause 4.3. Power flow direction: (Noted)

The power flow during the test was from inverter to the grid.

Clause 4.4. Power factor: (Complies)

The inverter maintained a power factor in the range of 0.962 (leading) to 0.997 (lagging) over the operating range from 20% to 100% of output. It does comply with the requirements of AS4777.2.

Clause 4.5. Harmonic currents: (Complies)

The inverter current THD of 4.36% is less than the required limit of 5%. The individual harmonic current components up to the 33rd were within the limits and complied with the Australian Standard 4777.2, clause 4.5.

Clause 4.6. EMC: (Not tested)

The inverter was not tested for EMC by Reslab. The inverter must conform to the requirements of Radio-communications Act and it should be examined for the relevant requirements.

Clause 4.7. Voltage fluctuations and flicker: (Complies)

The flicker level is within the required limits under normal operation.

Clause 4.8. Impulse protection: (Complies)

The equipment operated normally after the lightning impulse test.

Clause 4.9. Transient voltage limits: (Complies)

During the trip tests with light electronic load, the worst-case over-voltage observed was with 100% inverter input and this was 454.1 V peak with a base duration of 0.1 msec, which is within the required envelope specified in the AS4777.2.

Clause 4.10. DC current injection: (Complies)

The EUT does not have a mains frequency transformer. As per clause 4.10 of AS4777.2, a type test for DC current injection is required. The EUT uses a high frequency transformer to isolate the DC from AC. The EUT was type tested at 100% rated output power. The average DC current value

measured at 100% rated power output was 27.9mA, which is below the limit of 0.5% of rated output current (54.5mA).

Clause 4.11. Data logging and communication devices: (Not tested)

The data logging and communication equipment of the inverter were not tested. The data communication devices must conform to the appropriate requirements of AS/NZS 60950.

3.2 Compliance to AS4777.3 clause 6

The 2500 W single phase FRONIUS IG30 grid connected inverter was tested for compliance to AS4777.3 (2002): "Grid connection of energy systems via inverters" Part 3: Grid protection requirements.

Clause 6.3. (Passive Islanding Protection)

Under/over voltage limits: (Complies)

The test inverter tripped at V_{min} 203.8 Volts and V_{max} 269.5 Volts with under and over voltage trip set points of 202 V and 268 V respectively. The ac voltages at which disconnection occurred were equal to the under/over voltage set points ± 5 V as per the requirements of AS 4777.3. The disconnection times were less than 2 seconds.

Under/over frequency limits: (Complies)

The test inverter tripped at f_{min} 49.04 Hz and f_{max} 50.97 Hz with under and over frequency trip set points of 49.01 Hz and 50.99 Hz respectively. The frequencies at which disconnection occurred were equal to the under/over frequency set points ± 0.1 Hz as per the requirements of AS 4777.3. The disconnection times were less than 2 seconds.

Clause 6.5. (Active Islanding Protection)

Grid trip test: (Complies)

The test inverter was tested under a range of local load conditions as required i.e. light electronic load, load match and load match plus 10%. The inverter tripped within the required time (less than 2 seconds) under all local load conditions.

Clause 6.6. Reconnection procedure: (Complies)

After the test inverter was tripped on under/over voltage and under/over frequency, it reconnected after 60 seconds when voltage and frequency were returned to the nominal value.

Clause 6.7. Security of protection settings: (Complies)

The inverter protection settings are password protected.