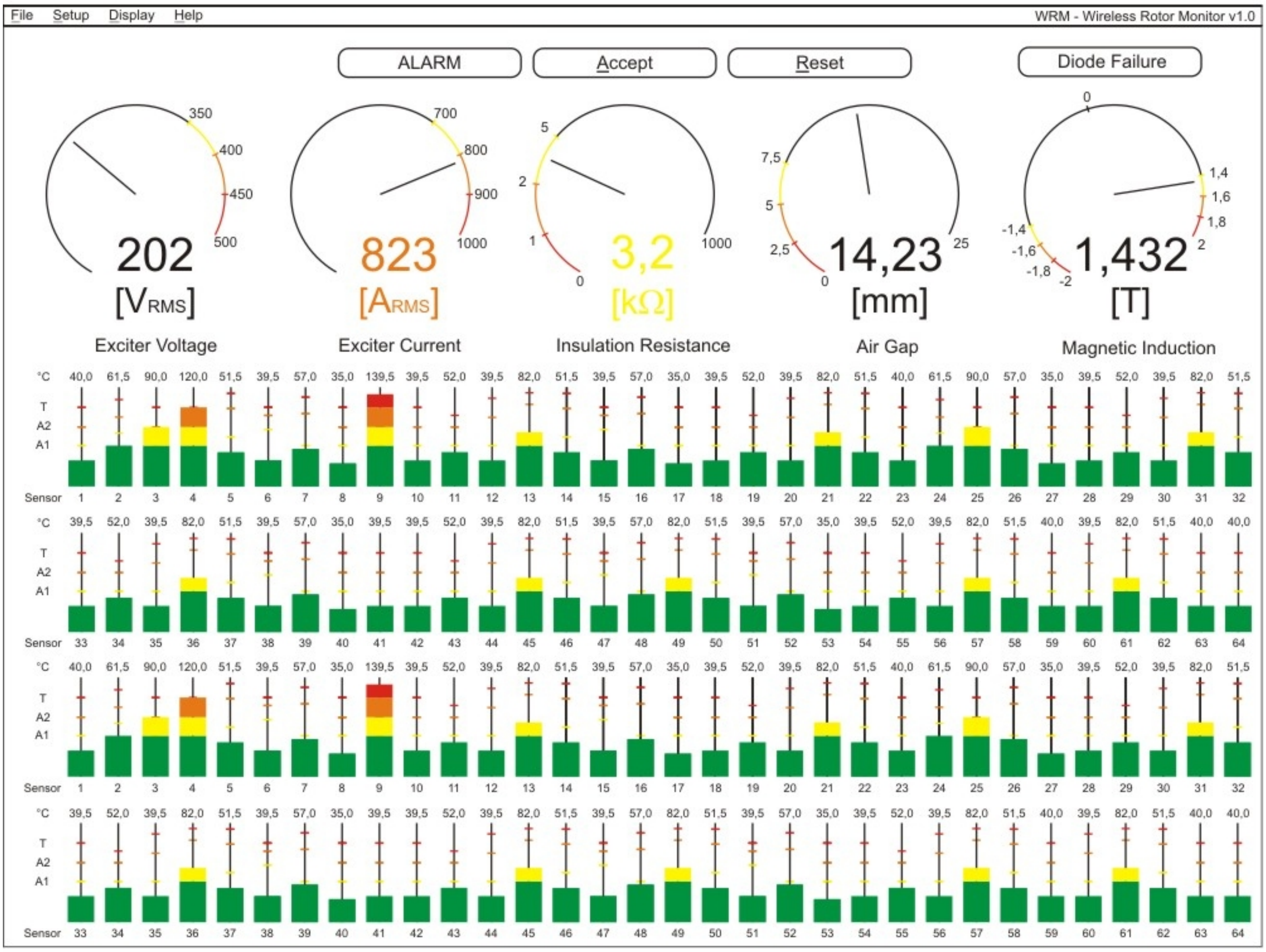
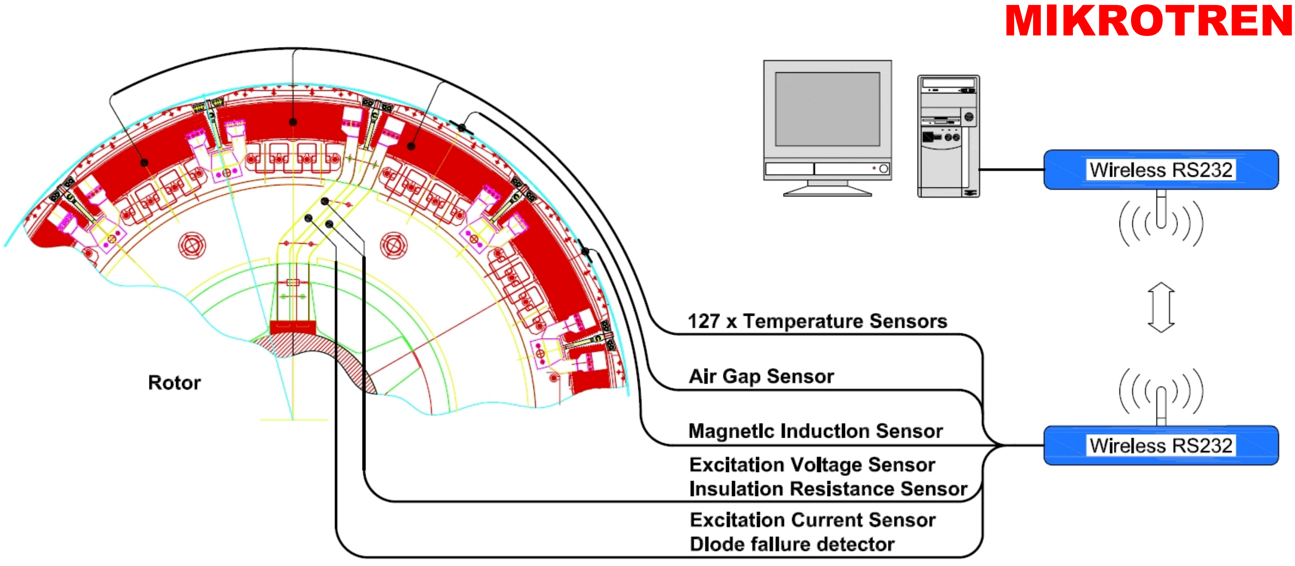
WRM
Wireless Rotor Monitor



WRM – Software "Rotor View" v1.0 display layout



Wireless Rotor Monitoring System for generators with brush-less exciter
Powered from excitation current (patent pending),
Tested up to 500G (pending further testing),
Easy installation of sensors with Self-adhesive silicone clamps (patent pending).
Dynamic measurements of electric and mechanical parameters significantly contribute to overall reliability of hydro-generators.
Overstressing of rotor/stator in many different ways may cause deforming of rotor/stator shape/geometry, making the whole generator system prone to failure.
Thanks to rotor Air Gap Sensor this is the first method to allow real time measurements of stator geometry under dynamic conditions. Rotor Magnetic Induction Sensor makes possible monitoring of the generator system functionalities and may crucially contribute to the overall reliability. Fault prevention is now possible and saves cost of major overhauls.

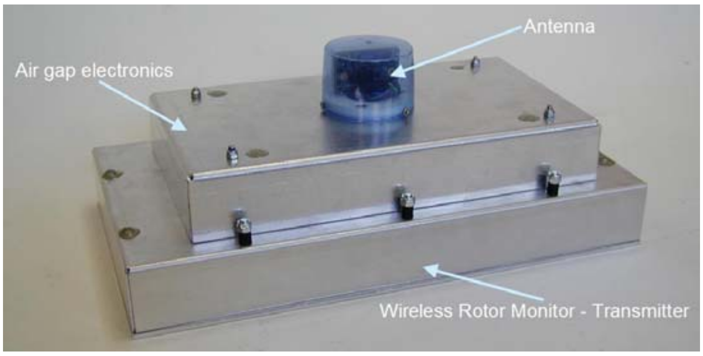


Figure 1: Wireless Rotor Monitor with Air Gap Sensor electronics

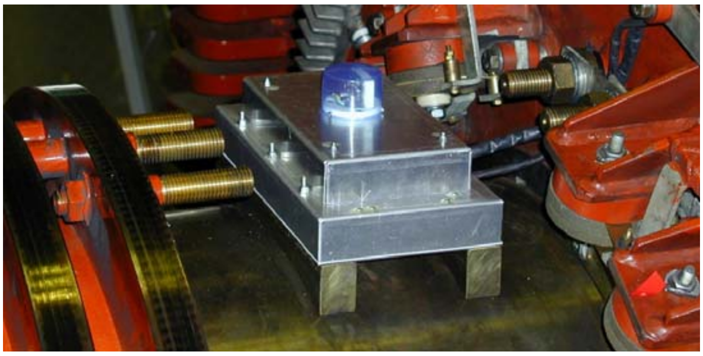


Figure 2: Wireless Rotor Monitor with Air Gap Sensor installed

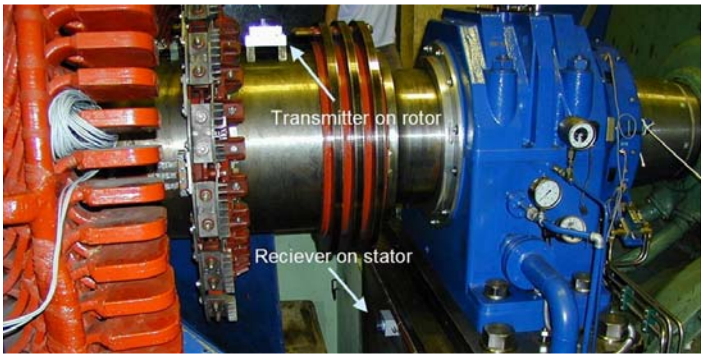


Figure 3: Wireless Rotor Monitor mounted

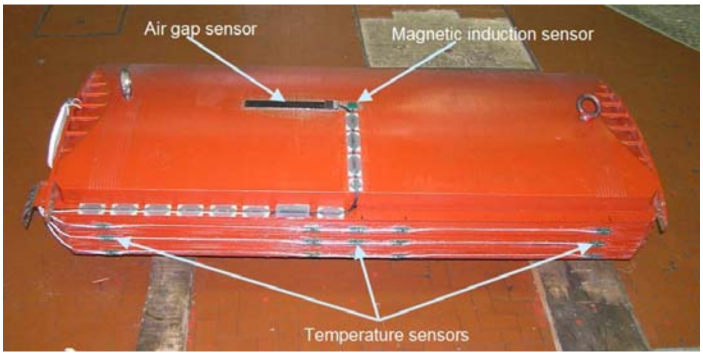


Figure 4: Wireless Rotor Monitor – Sensors installed on pole

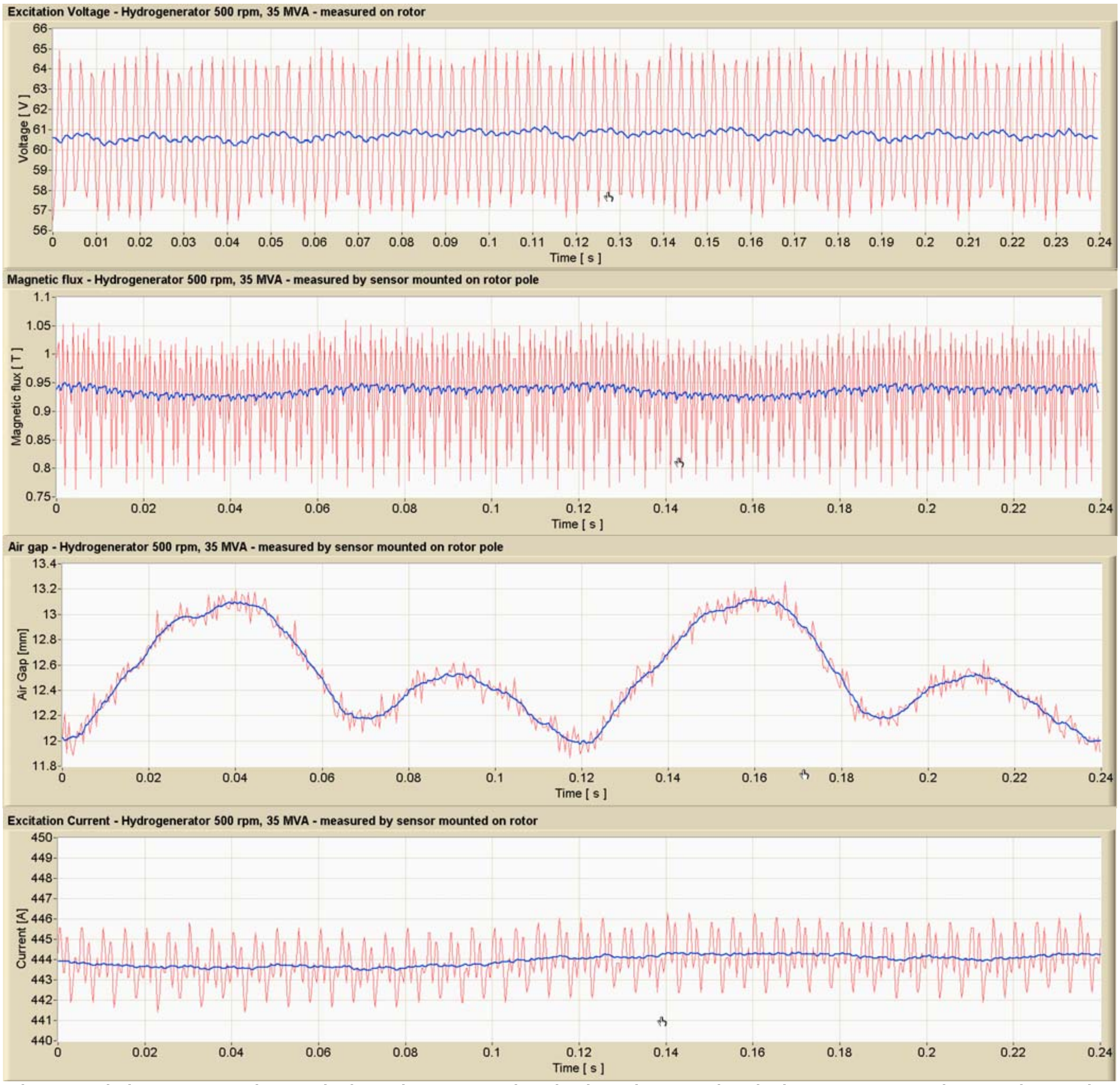


Figure 5: Wireless Rotor Monitor- excitation voltage, Magnetic Induction, Air Gap and excitation current measuring sample at Hydro Electric Power Plant "HE Vinodol"

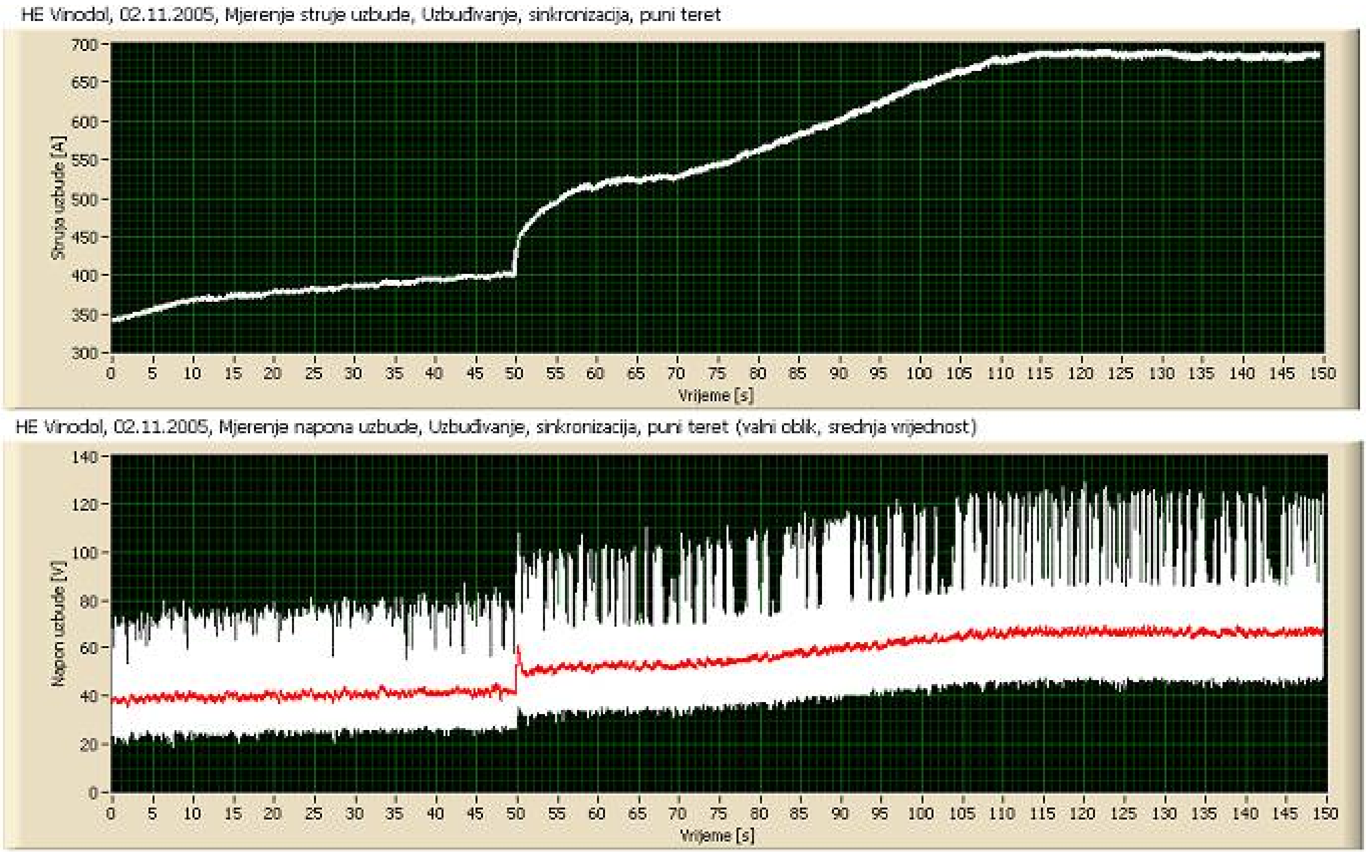


Figure 6: Wireless Rotor Monitor- excitation voltage and current measuring sample: excitation, synchronisation and full load

MIKROTREND

WIRELESS ROTOR MONITOR SPECIFICATIONS

EXCITATION VOLTAGE SENSOR:

Measuring range: 0...±500 VDC
Max. input voltage: ±600 VDC
Overload: 1500 VDC max., 1 sec.
Repeat accuracy: 1%

EXCITATION CURRENT SENSOR:

Transducer type: LEM HAX 500 to 2500-S, or any other by request
Measuring range: by request
R.m.s. voltage for AC isolation test, 60 Hz, 1mn: 5kV
R.m.s. rated voltage, safe separation: 500 V
Isolation resistance @ 500 VDC: >1000 MΩ
Accuracy @ I_{PN}, T_A = 25°C (without offset): <±1%
Linearity (0...±I_{PN}): <±1% of I_{PN}
Thermal drift of the gain (% of reading): <±0,1%/K
Frequency bandwidth (-3dB): DC 25 kHz
Operating temperature range: -25...+85°C
Weight: approx. 450 g
Min. internal creep age distance/clearance: ≥8,5 mm
Isolation material group: IIIa
Standards: EN 50178

INSULATION RESISTANCE SENSOR

Measuring aux. voltage: U_H = 30 VDC
Measuring frequency: f_H = 0,5 Hz
Measuring resistance range: 1kΩ to 1MΩ
Max. input voltage: 600 VDC
Minimum initialisation time after supply voltage has applied: 20 sec
Minimum response time when supply voltage is available: 2 sec
Repeat accuracy: 5%

MAGNETIC INDUCTION SENSOR:

Measuring range: ±2T
Max. linearity error, (0 to 10 kG) with R_{lin}: ±3% of RDG
Mean temperature coefficient of V_H (-20°C to +80°C): -0.2%/°C
Operating temperature range: -40...+100°C

AIR GAP SENSOR:

SENSOR:

Probe dimensions: 236×32×2 mm, 3,5 mm cable fitting
Cable: 1 m triax + 0…8 m multicore shielded cable
Linear measuring range: 5…25 mm with AGSC-5/25
Conditioner unit, sensitivity: 0,8 mA/mm
Magnetic flux density: 1,8 T max.
Operating temperature range: -20…125°C
Operating humidity: 95% non condensing
Immunity: dust and oil contamination

CONDITIONER:

Linear measuring range: 5…25 mm
Repeatability: better than ±0,3%
Linearity: <5%
Sensitivity: 0,8 mA/mm
Typical frequency resp.: 1 kHz (-3 dB)
Operating temperature range: -20…85°C
Operating humidity: standard 80% relative, max.
extended 95% relative, max.
Mech. dimensions: 220×120×35 mm w/o cable inlets

DIODE FAILURE DETECTOR:

Software implemented: open circuit failure and short circuit failure detection

TEMPERATURE SENSOR:

Up to 127 temperature sensors DS18S20
Measuring range: –55...+125°C (–67°F to +257°F)
Accuracy: ± 0,5°C from –10°C to +85°C
Thermometer resolution: 9-bit, 0,5°C
Response time: 750ms (max.)

COMMON DATA WIRELESS ROTOR MONITOR:

Resolution: 12 bit
Sampling rates: 2 samples/hour... 2048 samples/sec
Data throughput: 16 Kb/sec max
Input channels: 8 (5 used, 3 spare)
Power supply (Excitation Voltage): 40...400 VAC (50...400 Hz), 15...600 VDC
Power consumption: 8VA max.
Output: RS-232, RS 485, ETHERNET 10MB, NE2000 compatible
Voltage test: not allowed
Surge voltage test: not allowed
Withstand G-force: standard: 500G,
extended: by request
Operating temperature range: -10...+85 °C
Operating humidity: standard 80% relative, max.
extended 95% relative, max.
Weight: 0,8...1,5 kg, varies with enclosure type
Environment protection: from IP50 to IP66
Mech. dimensions: 280×150×40 mm w/o cable inlets

SOFTWARE:

Rotor View v1.0
- user friendly operation
- numeric view of all sensors
- alarm1 function
- alarm2 function
- trip function
- trending and login function

Rotor Graphics v1.0
- online oscilloscope function
- four channel simultaneous view
- free scale and window
- trending and login function (optional)
- free alarm set-up (optional)

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