Discover Precision

Application Note AN-DAQ3

HYDROELECTRIC POWER PLANT

Governor Testing

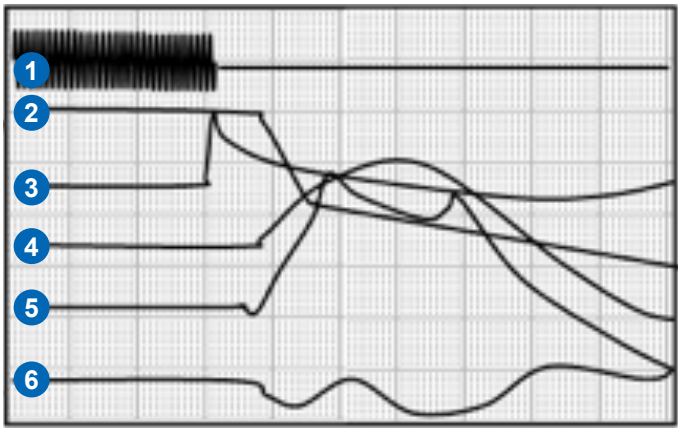
Digital oscillographic recorders are used for power efficiency tests in hydroelectric power plants.

Hydropower generates electricity by rotating a generator from the pressure of water from a dam. Changing the opening (stroke) of the guide vane will change the rotation speed of the generator, which affects the amount of power generated and frequency. Governor tests (load cut off) are performed to confirm the correct functioning of no-load operation in the event that the load is cut off due to an accident during power generation. During this time turbine rotation speed, generator voltage, iron pipe water pressure, and other factors must not exceed a specified range.

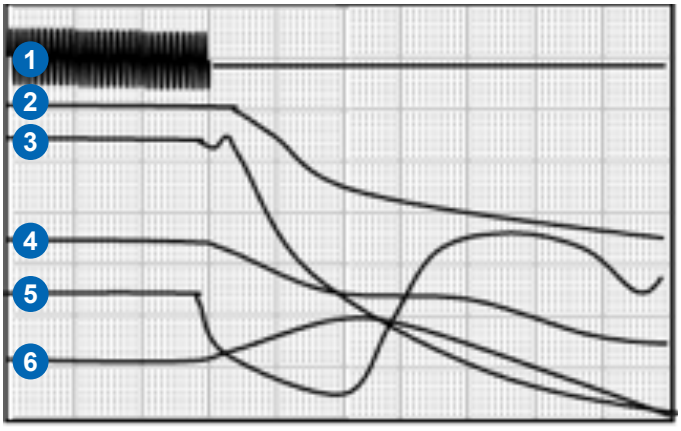
The RA2300MKII is equipped with a strain amplifier and can also fit a pressure sensor and displacement sensor.

Relay Count Test Record Example- ACV and Relay Operation Simultaneous Recording

Testing Load Cut Off of Generator

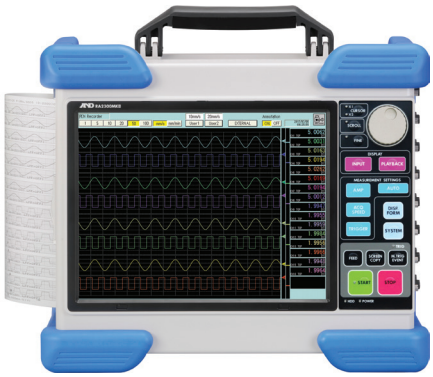


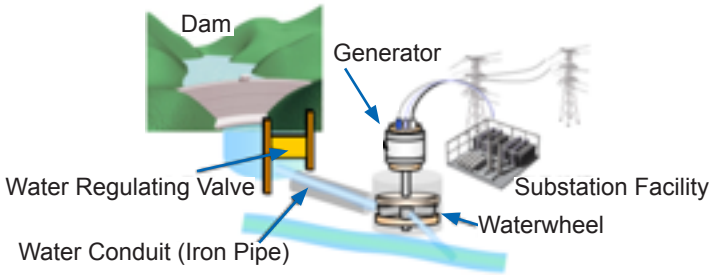
Testing Cut Off of Pump Turbine Input



Key			
1	Generator Current	4	Rotation Speed
2	Guide Vane Servo Stroke	5	Pipe Water Pressure
3	Generator Voltage	6	Draft Tube Water Pressure

RA2000A Series Omniace III Digital Oscilloscope Recorder





Item	Model	Specifications
2CH High Resolution Amp	AP11-101	±100mV ~ ±500V, A/D res 16bit 10µs
2CH High Speed Amp	AP11-103	±100mV ~ ±500V, A/D res 12bit 1µs
Event Amp	AP11-105	Input: 8 logic (Voltge/Contact)
2CH TC-DC Amp	AP11-106A	Input: R • T • J • K • W (±100mV ~ ±50V)
2CH AC Strain Amp	AP11-104A	Response Frequency: 2KHz
2CH DC Strain Amp	AP11-110	Response Frequency: 50KHz
2CH Vibration/RMS Amp	AP11-109	±100mV ~ ±500V
F/V Converter	AP11-108	Input: 1KHz ~ 10KHz

Hydroelectric Power Plant Governor Test

Naturally falling water rotates turbines (generators) and generates electricity in dams. Water is led to the turbine with a water conduit (iron pipe). It is possible to change the rotation speed by adjusting the amount of water with a regulating valve (guide vane). In hydroelectric power generation governor tests the degree of opening/closing, water pressure of each part, number of rotations and amount of power generated are measured. If the water conduit is too long, cavitations may cause “beats” or abnormal vibration which may result in equipment failure and noise.

Did You Know?

The RA Series simultaneously measures voltage, current, control timing, vibration, rotation, pressure and more directly from sensors. The RA2300MKII (shown above left) includes 8 physical slots with 16 channels and use plug-in modules including those listed in the table on the left.

A&D Weighing

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