

# ASD

*Integrated System Design & Development*

## **Automated Arrestor Test System**



## Overview

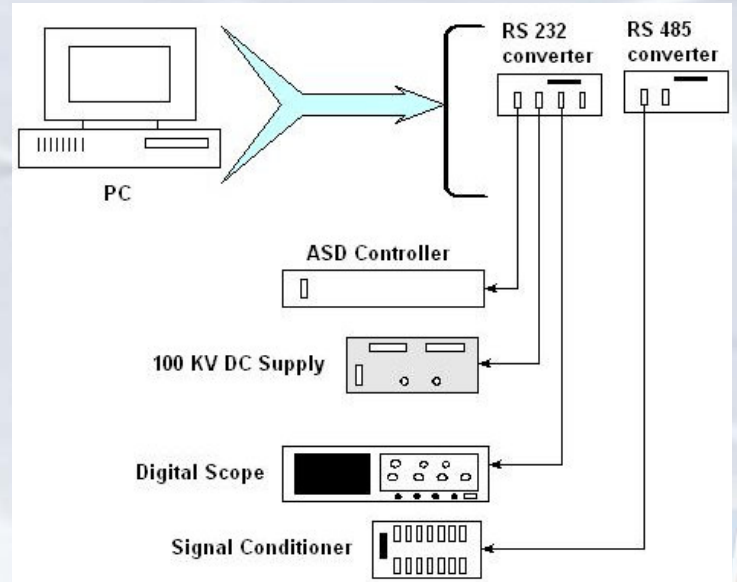
Impulse generator is an electrical apparatus which produces very short high-voltage or high-current surges. Such devices can be classified into two types: impulse voltage generators and impulse current generators. High impulse voltages are used to test the strength of electric power equipment against lightning and switching surges. Also, steep-front impulse voltages are sometimes used in nuclear physics experiments. High impulse currents are needed not only for tests on equipment such as lightning arresters and fuses but also for several other technical applications such as lasers, thermonuclear fusion, and plasma devices.

ASD's Automated Arrestor Test System (AATS) is designed to perform the following:

- Impulse test on arresters at production line level including synchronization and high current testing up to 10 KA to generate an 8/20 $\mu$ s pluse.
- Low current DC test at production line level.

## System Functionality & Hardware

Automated Arrestor Test System is a compound integration between hardware and software. Consistent communication between hardware and PC, with the software on, is insured to achieve a successful impulse test.



## Impulse Test

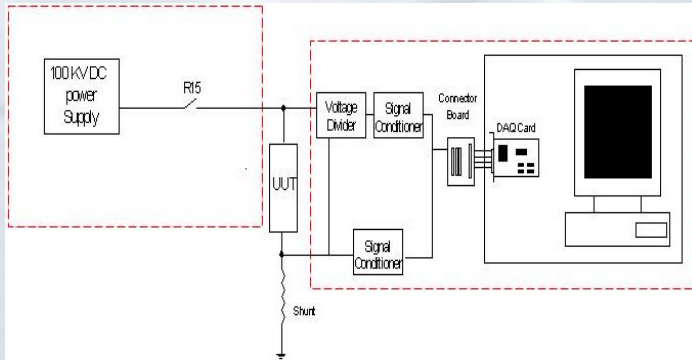
### • Production Level

Units under test (UUT) are placed on turn table and tested individually at 10 KA and required DC testing voltage. As required voltage is reached, appropriate switches open and close so that charged power is dissipated in the UUT between two clamps where output voltage and current measurements are taken and waveform is captured. Note that the whole system is controlled through software, controllers, control cabinets, sensors, PLCs, all working in harmony to perform the right job at right time. Switches are placed on switching panel due to specific design considering safety margins.

### • Low Current DC Test

This test is initiated by software after the impulse test. As the piston clamps the UUT, DC power supply is activated and voltage ramped up to the required level.

Voltage and current measurements are taken via voltage divider and shunt connected to the UUT. These measurements are fed to the PC via DAQ card. The software draws a graph of detected currents and voltages.



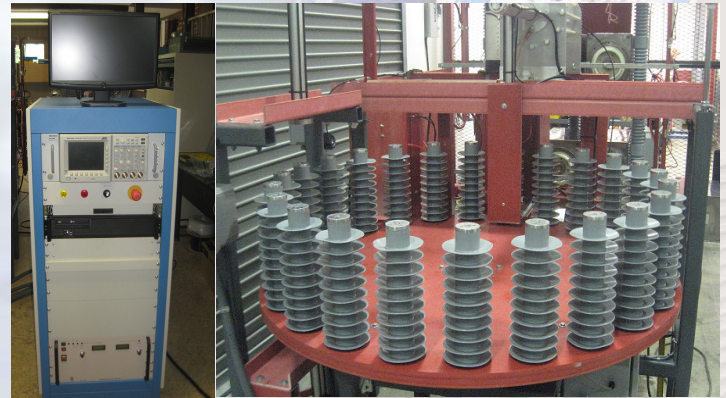
## Hardware

The whole system involves various number of hardware components. Some of the major are described below. The main control cabinet encompasses the following:

- Indexer turn table
- Motor drive
- Neumatic switches
- Capacitor bank
- Voltage divider
- High frequency current transformer
- Control cabinet
- **Control Cabinet**
  - Oscilloscope
  - Protection circuit
  - 100KV DC Power Supply
  - ASD Controller
  - ASD Phase Detector
  - Trigger Generator
  - Industrial PC
  - 17 inch monitor

## Turn Table

Twenty four UUT can be placed on turn table at a time. Two pistons are available, one for impulse test and the other for Low Current DC test. So at one turn both tests are conducted on UUT. When test is initiated, capacitor banks are charged. Then the DCs switch or the 8/20 switch closes simultaneously as the upper and lower pistons clamp the UUT, depending on which test is being conducted. The pistons are supplied with air and controlled by valves cabinet. When UUT is held by the piston, voltage and current measurements are taken.



## Software Features

The software package allows conducting fully automated tests with minimum user interference. An attractive, user-friendly interface with various options giving the system additional power and versatility.

- Performing hardware diagnostics to insure proper communication with devices
- Setting configurable parameters
- Defining the UUT serial / lot numbers as positioned on turn table
- Performing complete automated tests

- Showing the turn table and switching board status as tests proceed
- Performing manual tests and providing debug mode
- Showing real-time graph and value displays of readings
- Storing results in Microsoft Access™ database format
- Allowing retrieve of test history records of one or several units
- Generating Excel format test reports

10/350  $\mu$ s capacitor bank and two spark gaps are involved in the Synchronous test. AC and DC test involve 120V and 10KV power supplies. The system is equipped with powerful software as well.



## Customized AATS

All ASD products can be customized to meet customer's needs. ASD has generated a customized AATS for a client that can perform:

- Impulse test on MOV at production line level and at research level, including synchronization and high current testing.
- Low current AC and DC test at production line level and at research level.

The production line is done at 8/20 $\mu$ s, 2msec levels while at R&D tests involve 8/20 $\mu$ s, 2msec, 10/350  $\mu$ s capacitor banks and high current 200KA switch. On the other hand, the 8/20 $\mu$ s and



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