

EVP Durability Testing System

The EVP durability testing system is for the vacuum durability test of the EVP (Electric Vacuum Pump) by measuring relationship between time and pressure in the specific volume. Totally, 12 specimens will be tested at the same time. The system is composed by a chamber, power supply, and control system. The measuring signals are pressure, voltage, current, and etc. and system will be operated by the prebuilt profile. The user can make the general test profile and modify saved profile from the software.



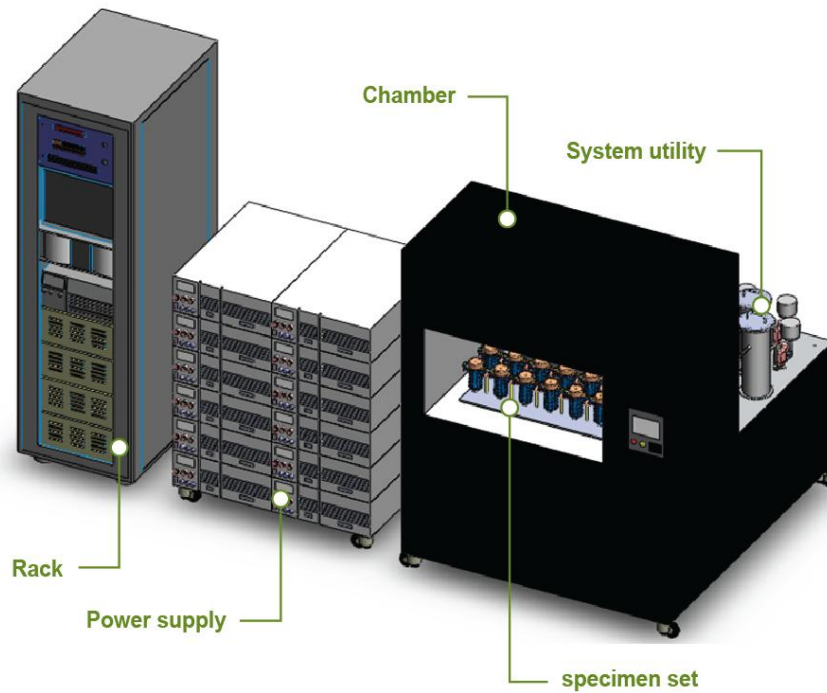


Fig. 1 EVP durability Test System Overview

Fig 1 is the system's overview. The system is composed by the rack which contains the controller and user interface PC, the power supply which supplies appropriate power to the specimen, and the environmental chamber which supports environmental condition to the specimen. The chamber is a main frame and the test utilities will be set up at the chamber.

Basically, the system has real time measuring function of the vacuum pressure, voltage, current signals from the specimen.

The system's specification is shown at the Table 1. The each specimen has an independent reservoir for measuring the vacuum pressure characteristics.

The reservoir has maximum 5 liter capacity and can be changed its internal volume by necessity. The vacuum pressure sensor can measure fluctuation in vacuum pressure and can be monitored by controller.

In addition, the power supply meets a number of specimen preparations for supplying power to each specimen. A V-sense in the power supply is for stabilizing voltage during the test.

Table. 1 EVP durability Test System Specifications

Component	Specifications	
Vacuum Reservoir	Capacity	5 Liter
	Material	SUS 304
Sensor	Pressure Sensor	0 ~ 1200mbar
	Inner Size (WDXH)	1000 X 500 X 500mm
Environmental Chamber	Temperature Range	-40°C ~ +150°C
	Rate of cooling	1°C / min in empty chamber
	Rate of heating	1°C / min in empty chamber
	Cooling type	Air Cooling
Power Supply	Capacity	30 V / 30 A

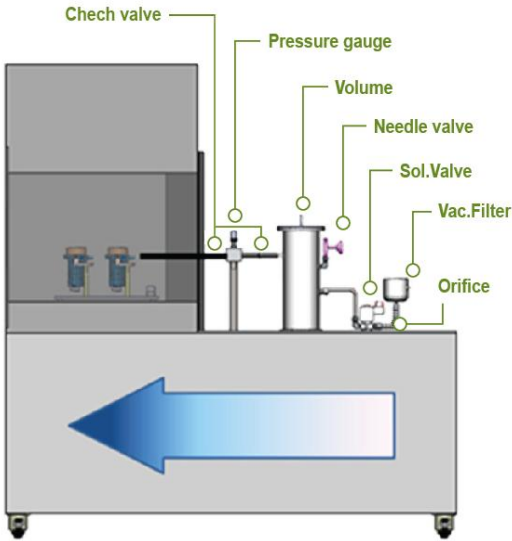


Fig. 2 EVP durability Test System utility layout and picture

Fig 2 and 3 explain the vacuum system. Solenoid for destroying the internal vacuum is equipped for each channel for the repeating durability test. Also, each channel has vacuum filter for filtering the air from outside. To control the intake air flow, an orifice is equipped between the filter and reservoir. Monitoring signals during the test are specimen's

voltage, current, vacuum pressure, and the chamber temperature and can be monitored at the control system by real time. The communication between chamber and controller uses RS-232 protocol. The operating and controlling temperature are possible from the user interface PC.

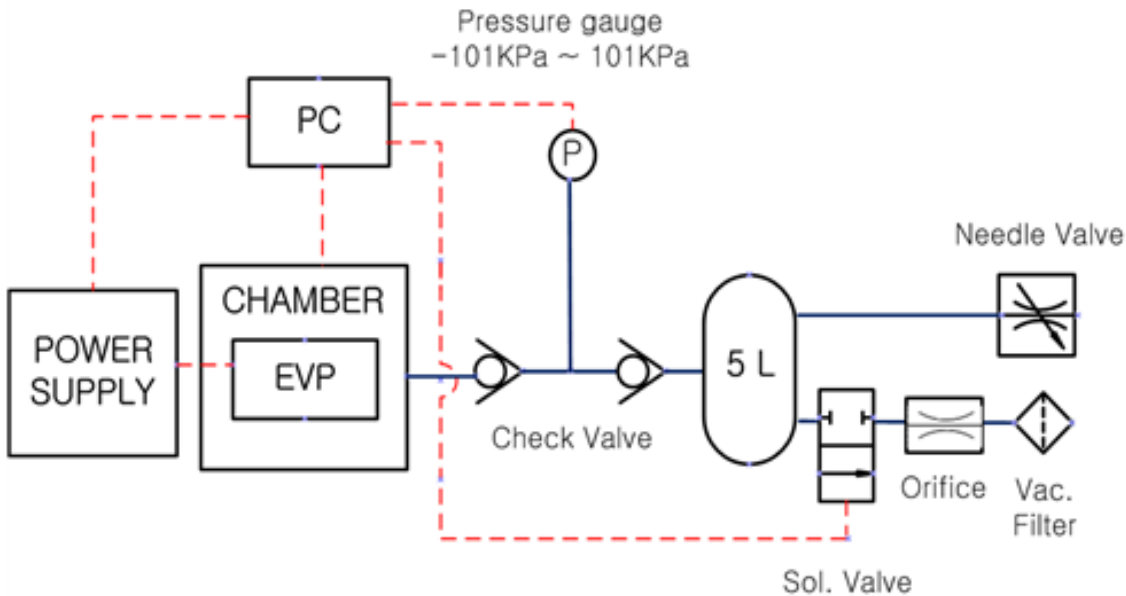


Fig. 3 EVP durability Test System schematic diagram

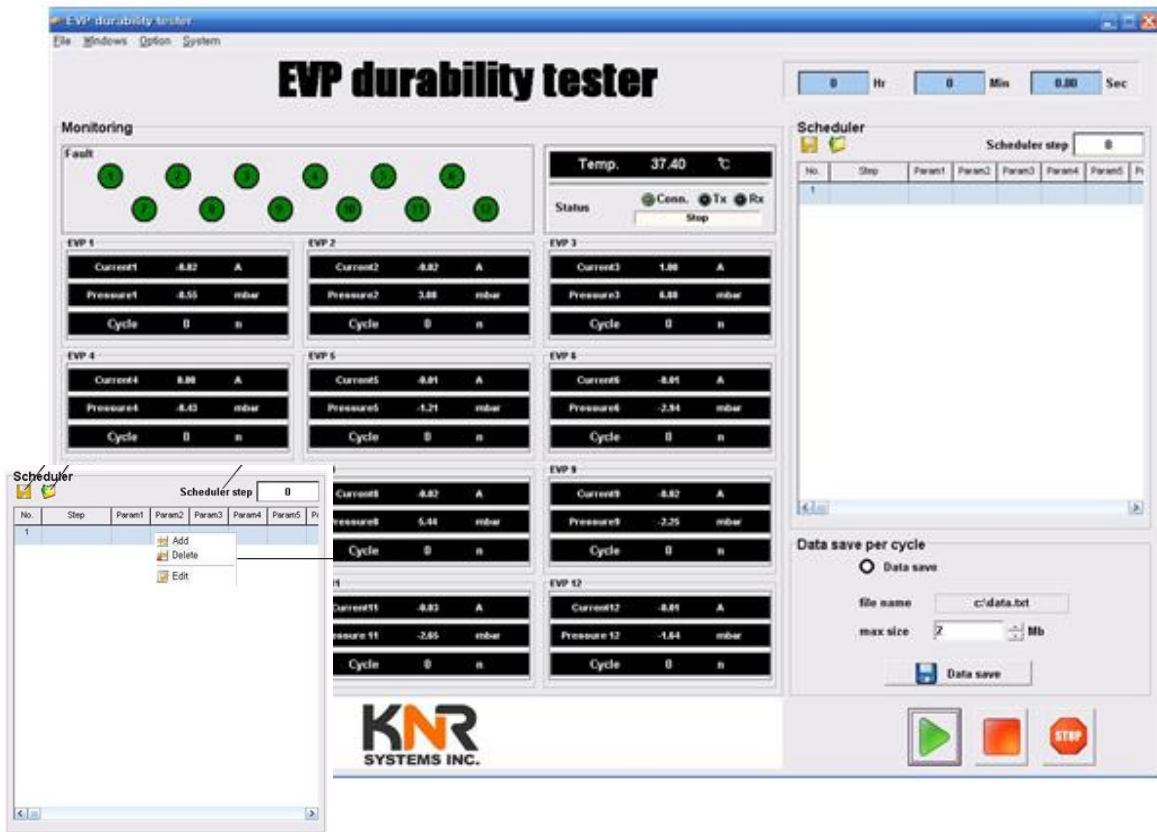


Fig. 4 EVP durability Test System Software

Fig 4 is software's screen capture. Independent and Integration test are possible by the software. In the middle of screen, the user can monitor all 12 specimens' real time performance which contains current value, vacuum pressure, and the test cycle count. The durability test is linked with temperature change and the user can control with a scheduler at the software.

The scheduler is a table for test operating process and user can create and modify the test condition such as repeat count, chamber temperature, and etc.

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During the test, the test data can be saved. If the user set a cycle of saving, the software saves the data by setting cycle. For a long period test, this function helps the user to get quality test data.