
Filter Hot Performance Test Rig

The Filter Hot Performance Test Rig is designed to evaluate filter performance under elevated-temperature operating conditions up to 150°C. The system provides controlled variation of process flow rate while continuously monitoring test temperature, applied pressure at the unit under test, and differential pressure across the test article.

The rig is configured as a freestanding assembly with a polished stainless steel horizontal work surface positioned in front of a vertical instrument panel. The panel is used to mount quick-connect fittings, pressure gauges, and operator displays for convenient access during setup and testing.

A rectangular process tank with an approximate capacity of 10 gallons is located on the left side of the work surface. The tank includes a fixture that allows the operator to immerse the unit under test without direct contact with the heated bath. An insulated removable cover is provided over the tank during test operation. All external surfaces subject to elevated temperature are insulated to improve thermal efficiency and protect operating personnel. The base of the structure incorporates a drip pan with a leak-detection switch, and access doors are provided for service and maintenance.

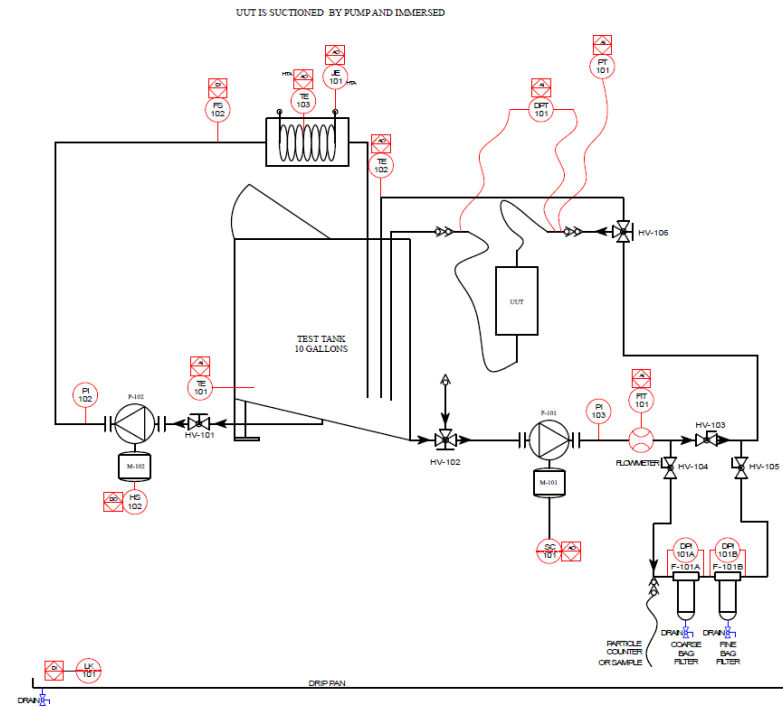
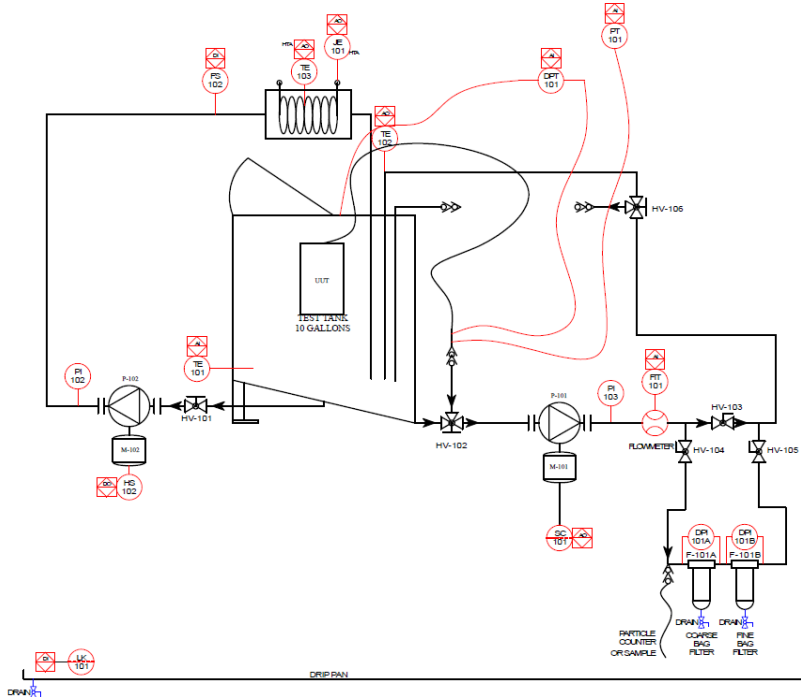
As shown on the referenced drawings on Pages 2 and 3, the system can be configured for submerged, non-submerged suction, and pressure-feed test arrangements. Process connections for each configuration are made using quick-connect fittings. Two three-way valves are used to establish the required flow path through the test article. Once the desired configuration has been set, the positive displacement pump operates in accordance with the programmed PLC sequence, and the system measures flow rate and pressure while recording differential pressure and flow data.

Ball valves are provided to divert flow through cleanup filters, and an additional quick-connect fitting is included to allow either manual sample collection or connection of a particle counter.

Oil heating is accomplished by means of a secondary pump that circulates fluid at a constant flow rate through a recirculation heater. A flow switch in the heater loop is interlocked with the heater to ensure safe operation. In addition to the primary test temperature measurement, a third temperature element is installed within the heater assembly to provide independent overtemperature protection.

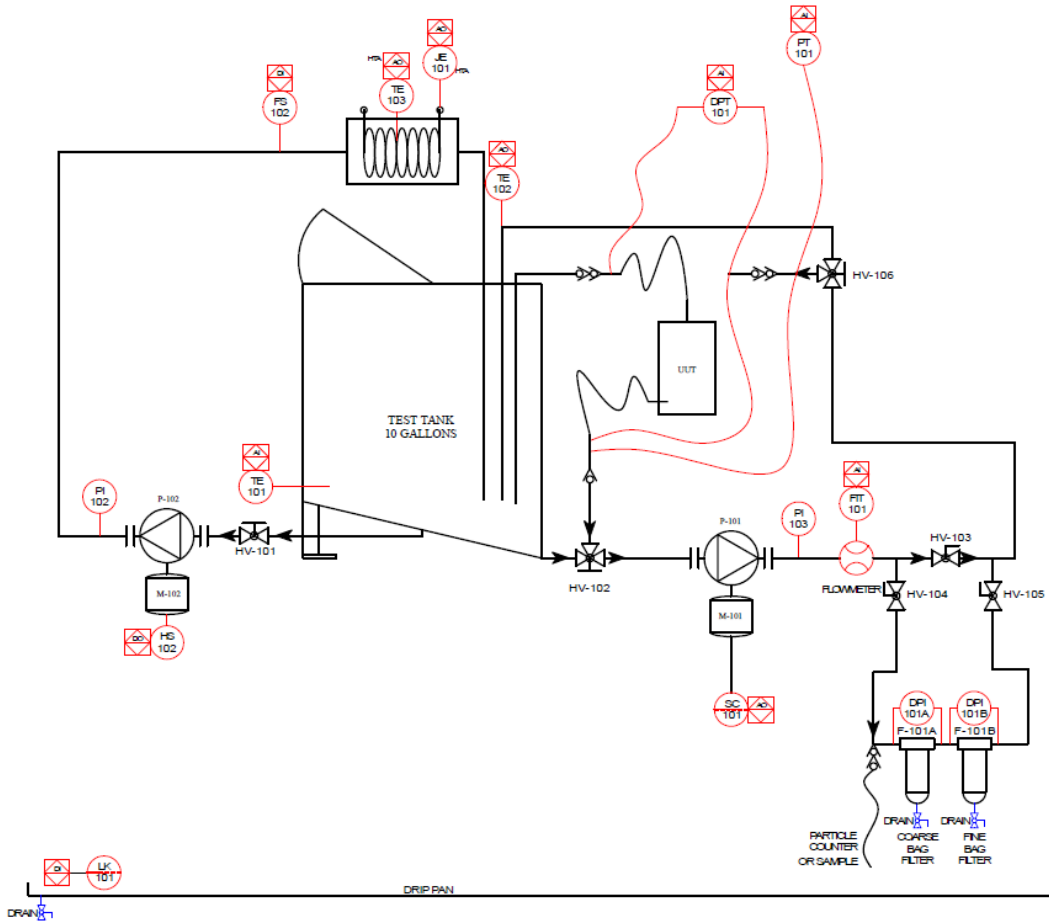
The control system consists of an Allen-Bradley Micro800 Series PLC and a 10-inch Maple Systems HMI. Test parameters are entered through the HMI, and all instrument signals are monitored by the controller. Test data are displayed graphically, recorded during operation, and stored by the HMI in histogram and CSV formats. CSV data files can be exported from the machine using a USB drive.

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