

# Turbine Mechanical Equipment - Filter Assembly

## Major Components

- Filter housing
- Filter elements
- Differential pressure indication



## Introduction

Contamination control is of the utmost importance for today's high-pressure hydraulic control systems. Although a great deal is known about reduction and prevention of contamination ingress into hydraulic systems, it has been estimated as much as 70% of hydraulic system failures are due to poor fluid condition. In addition to the filtration provided by the hydraulic power unit, in-line filters are located in the fluid flow path, just prior to the actuator assemblies, to protect the contamination sensitive hydraulic valves housed in the actuator manifolds. This "redundant" filtration system greatly reduces the likelihood of unplanned outages caused by hydraulic system failures and increases the life of the hydraulic control valves, by removing contamination throughout the system.

## Filter Housing

The filter housing is a solid cast design with a built-in changeover valve, screw-in filter bowls and a differential pressure switch.

Four mounting holes are located on top of the housing. The process connections for fluid inlet and outlet are both straight thread o-ring ports, typically SAE-20 in size. These connections are located at opposite ends of the filter housing to simplify in-line mounting. Each filter element has a "clean side" and "dirty side" vent plug. All four vent plugs are accessible on top of the housing. During element changes the vent plugs are removed to allow air to escape from the bowl as hydraulic fluid enters. The differential pressure switch is also located on the housing top surface. The changeover handle, with built in pressure compensation, is located on the front face of the housing. Labels affixed to the front face of the housing indicate which element is in service based on the position of the changeover handle. Maintenance personnel must fully understand the changeover handle operation before servicing the filter assembly.

## Filter Elements

The filter elements supplied by Emerson are high quality, very efficient, high collapse pressure filter elements with maximum contamination retention. Only Emerson filter elements should be used in this turbine hydraulic control system.

Emerson filter elements are tested to the following ISO test standards:

- ISO 3724 – Verification of flow fatigue characteristics
- ISO 4572 – Contamination retention capacity
- ISO 4572 – Multi-pass method for evaluating filtration performance
- ISO 3968 – Evaluation of pressure drop versus flow characteristics
- ISO 2942 – Bubble point test
- ISO 2941 – Verification of collapse/burst resistance

Replacement element part numbers can be found on the metal tag affixed to the filter housing. The element number is the first number that appears on the tag. The element part numbers will be provided upon request.

## Differential Pressure Indication

Each filter assembly includes a differential pressure indicator. The HPU filter assemblies use a combined gage and switch to provide both local and remote (via DCS alarms) indication. The valve actuator filter assemblies use remote indication of excessive differential pressure via switches and local indication via small lamps on the switch housing.

Because the pressure drop across the filter element is dependent on flow, and flow varies during valve position changes, the differential pressure across the element changes. As the filter elements collect contamination, the differential pressure switches will momentarily indicate during high flow demands. As these momentary indications become more frequent, consider replacing the filter elements. Do not wait for a continuous indication from the DP switches before

replacing the elements; this could adversely affect the system performance.

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