COMBER
Drying and Filtration Technology

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Peripherals

Heating / Cooling
Condensation
Vacuum

TI 0055 - E - 06/05

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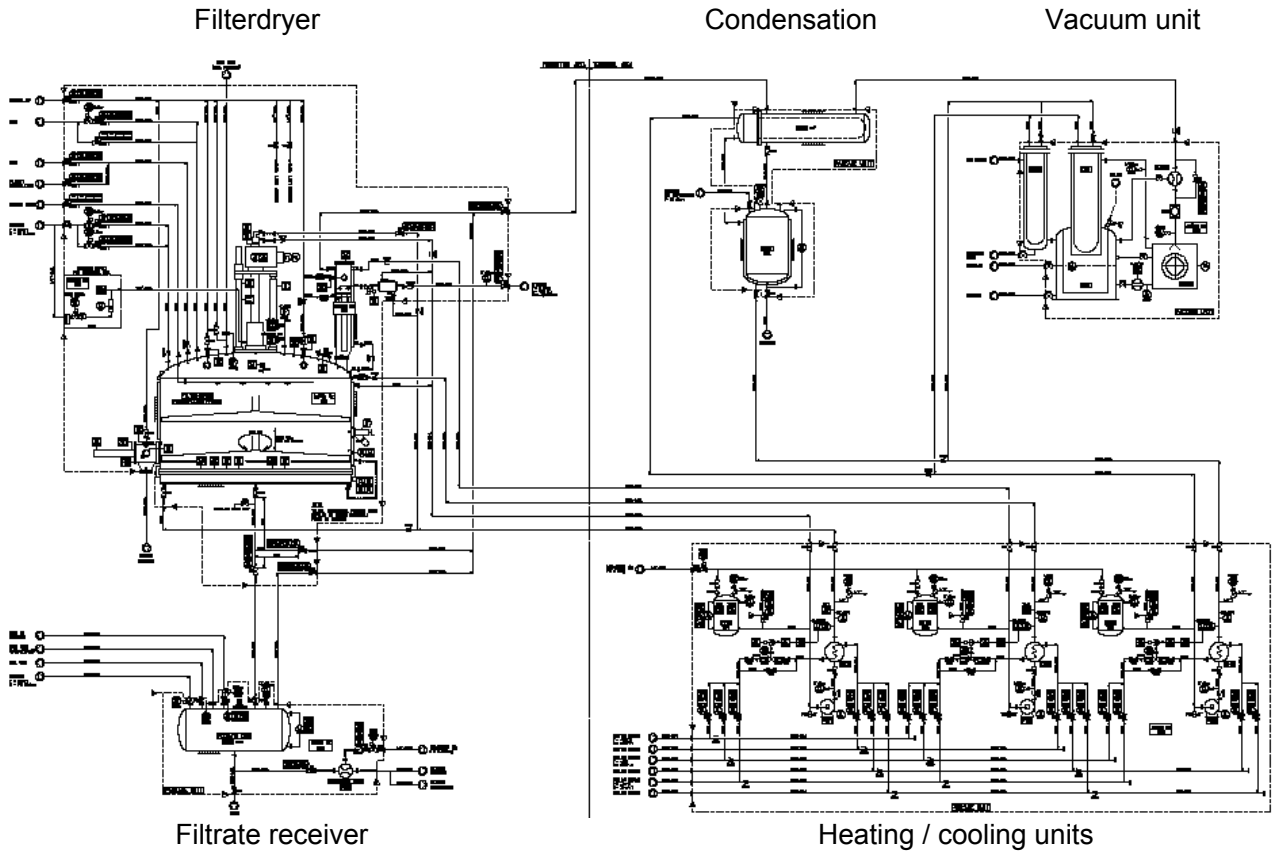
Supplementary Equipment

Supplementary equipment entailing condensation and vacuum systems, heating / cooling units, filtrate receivers, CIP cleaning systems and others, as to the specific requirements.

The example indicated on the P&ID below shows a filter dryer, complete with condensation system, liquid ring vacuum pump, filtrate receiver and three independent pressurized heating cooling units. Two heating / cooling units are used for the heating and cooling of the filterdryer, one unit is used for the filterbottom, the vessel and the agitator, the other for the vessel top and the dust filter. This arrangement permits reflux cleaning of the vessel by evaporating solvent in the vessel which is condensed at the vessel top and the dust filter. The third unit provides temperature control for the condensation unit and vacuum unit jackets.



The individual supplementary equipment units are supplied on skids, complete with all piping, valves and required controls, and are pre-wired to junction boxes.

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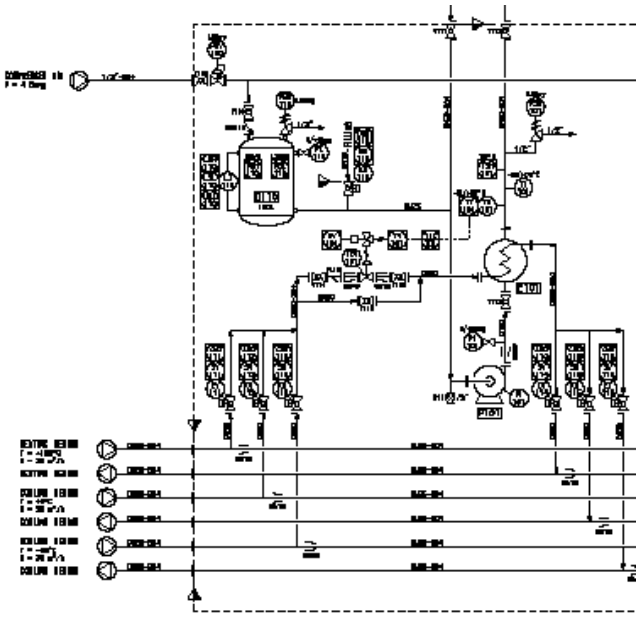
Supplementary Equipment



Heating / cooling unit with a capacity of 3 x 35 kW, for the individual heating and cooling of the vessel bottom and the agitator of the filter dryer, upper vessel and dust filter of the filter dryer as well as for the cooling of the solvent recovery system and ring liquid vessel and post condenser of the vacuum pump. Heating and cooling is with heat transfer fluid. Each circuit is equipped with its own pressurized expansion vessel.

Left:
Heating / cooling unit with 35 kW capacity. Heating is with steam, cooling with cooling brine.

Right:
Condenser with solvent recovery vessel installed on skid.

Peripheral equipment is supplied on skids, complete with all piping, valves and required controls, and is pre-wired to junction boxes.

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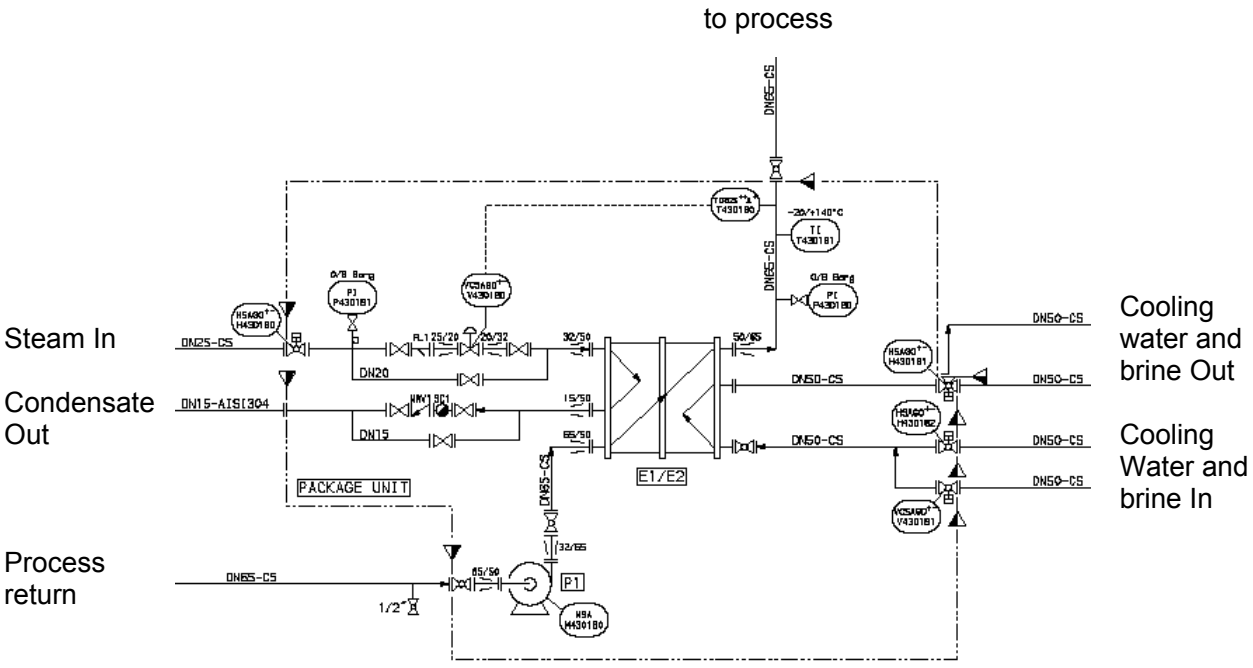
Heating / Cooling Unit



Typical P&ID of a heating / cooling unit

Heating / cooling unit for heating during the drying process and for cooling after completion of the drying as well as for the temperature control during filtration and other process stages. The unit is designed as a closed system, with circulation pump, heat exchangers, expansion vessel (not shown) and all required instrumentation and control systems. Heating is with steam, cooling with cooling water or brine.

In the example shown two individual cooling circuits are shown. Per the process requirements either cooling water or brine is used for cooling.

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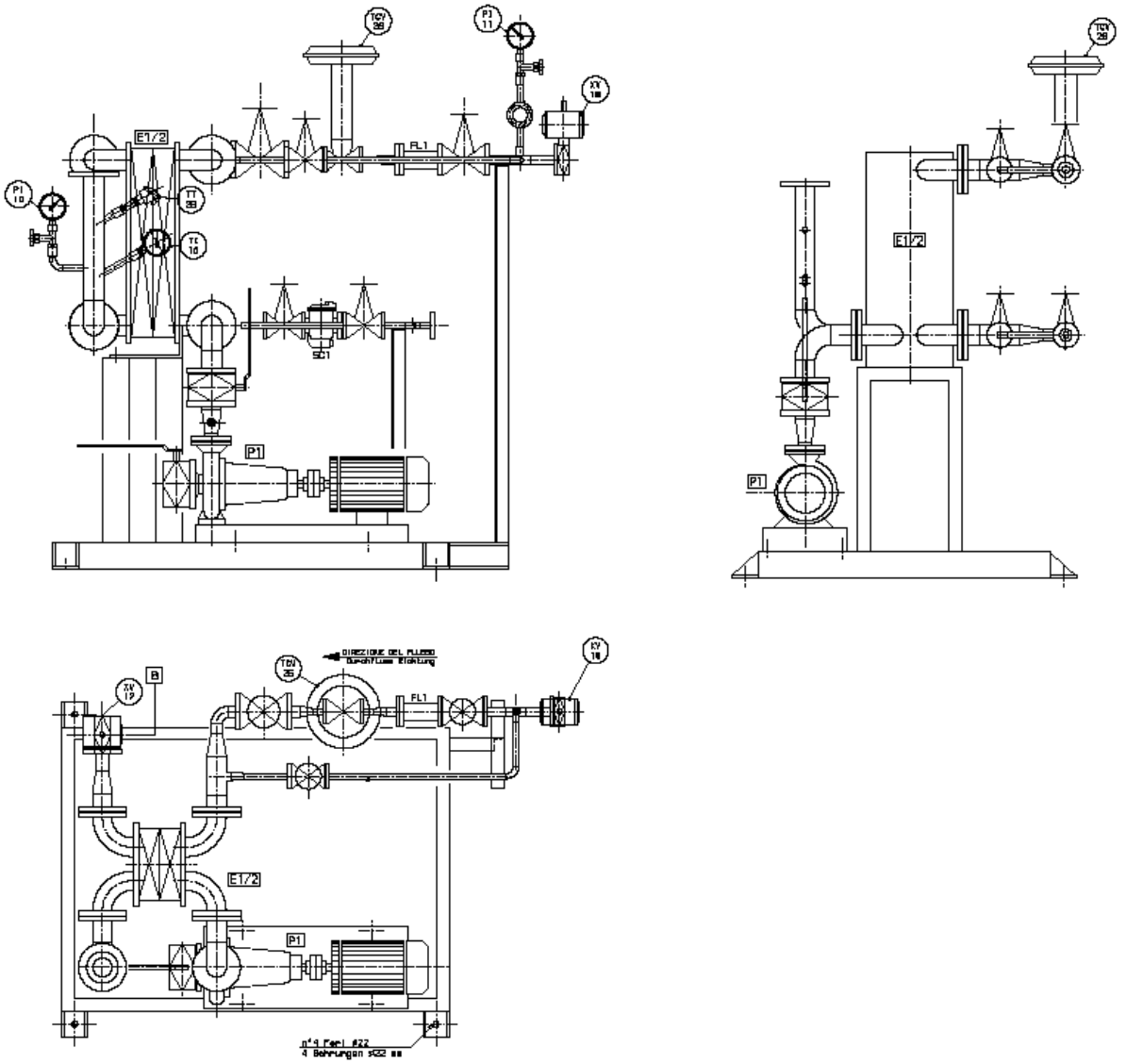
Heating / Cooling Unit



Typical layout of a skid mounted heating / cooling unit

Heating / cooling unit with circulating pump, plate heat exchanger for heating and cooling as well as all required instrumentation and controls.

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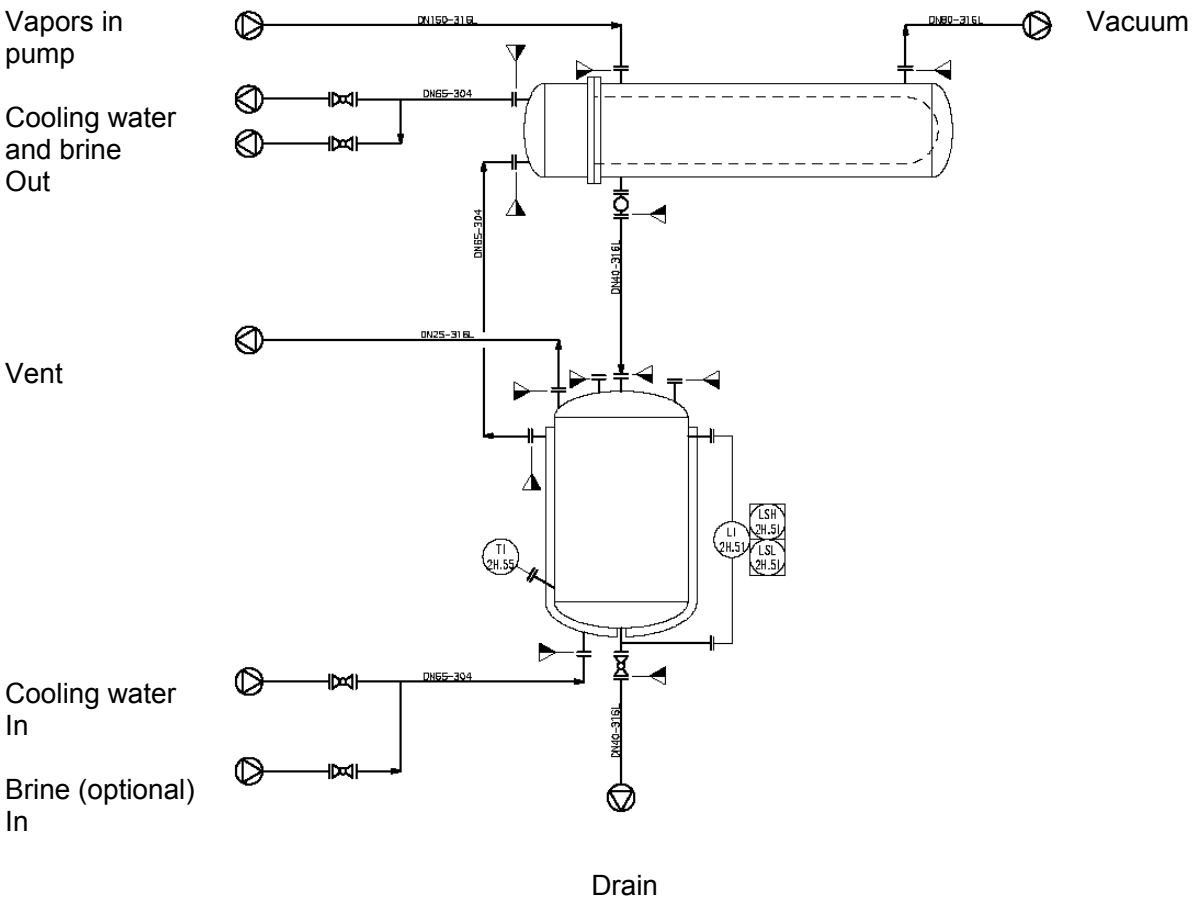
Condensation with Condensate Vessel



Typical P&ID of a condensation wit condensate vessel

Condensers are applied to efficiently recover the solvents evaporating during the drying process. Using condensers substantially increases the capacity of the vacuum system, in particular during the initial phase of the drying process, when large amounts of solvents are being evaporated.

In the example shown two individual cooling circuits are shown. Depending on the requirements brine is used for very volatile solvents whereas cooling water is used for less volatile solvents.

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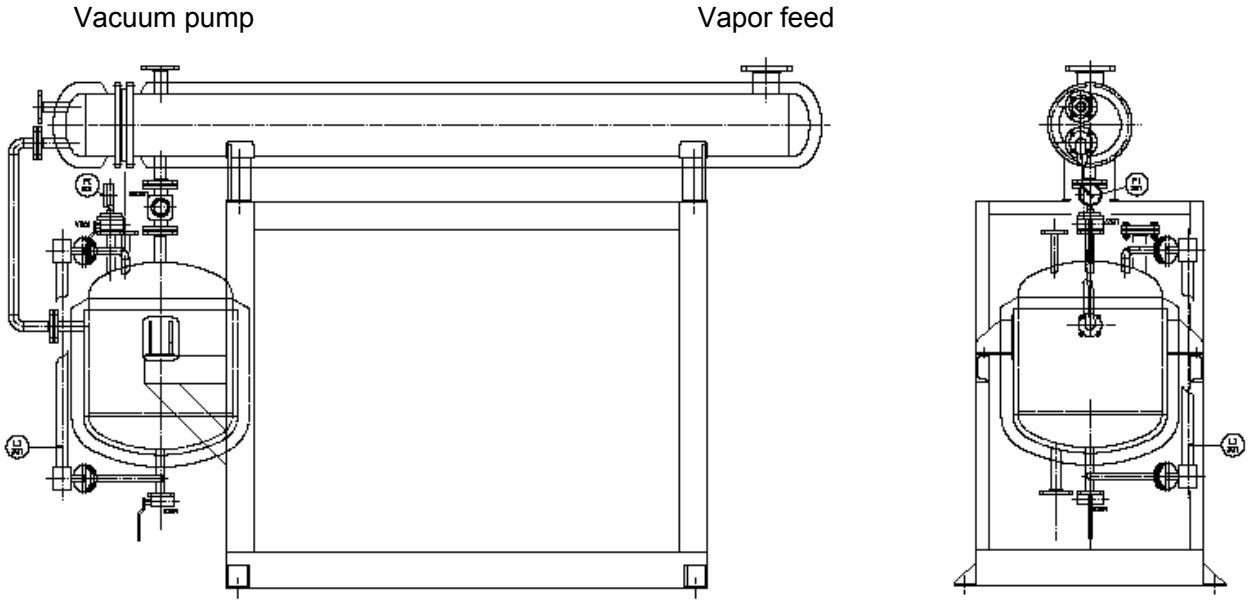
Condensation with Condensate Vessel



Typical layout of a skid mounted condensation unit with condensate vessel

Horizontally arranged condenser. By feeding the vapors to the condenser on one end and installing the condensate vessel at the opposite end of the condenser the vapors are forced along the cooling tube bundles resulting in a high condenser efficiency.

The heat exchange surface of the condenser and the condensate vessel volume are sized to meet the requirements.

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Liquid Ring Vacuum Pump System

From condensation or vapors In respectively

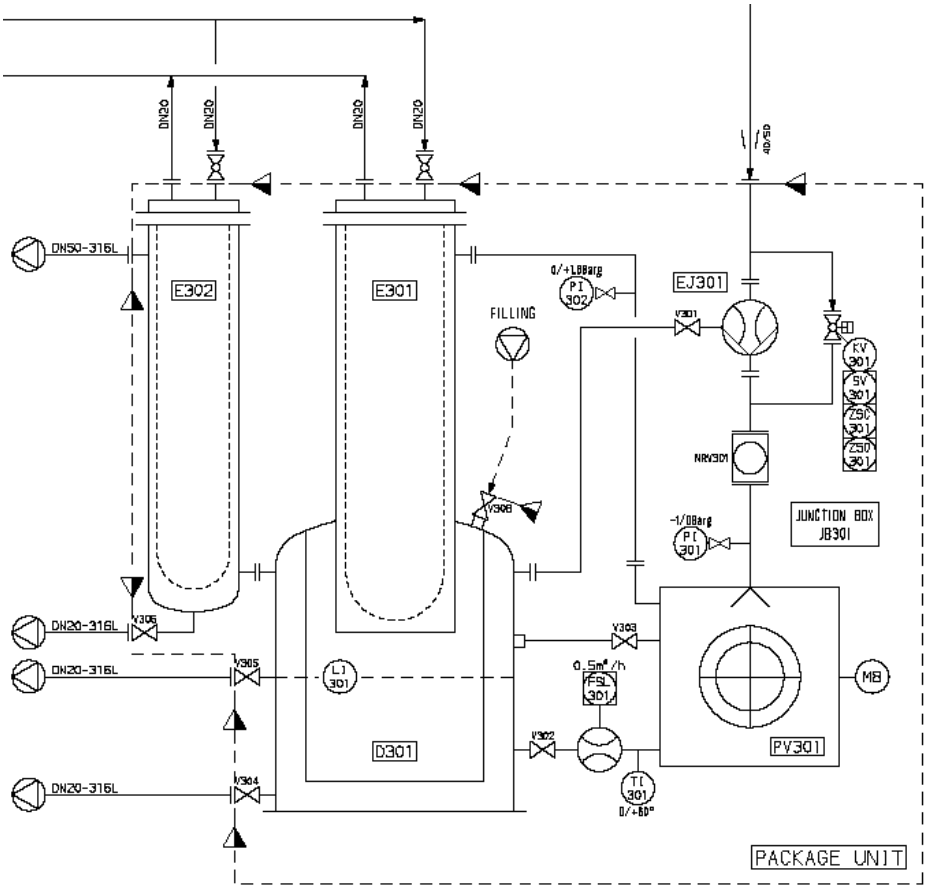
cooling water In / Out

Exhaust gas Out

Post condenser drain

Ring liquid vessel overflow

Ring liquid vessel drain



Typical P&ID of a liquid ring vacuum pump system

Two stage liquid ring vacuum pump (PV301) with ring liquid vessel (D301), post condenser (E302) and ejector (EJ301). The ring liquid vessel is equipped with an integrated heat exchanger (E301) for the cooling of the ring liquid. The post condenser is designed to recover all solvents from the exhaust gas. The ejector with bypass and isolation valve installed in the suction of the vacuum pump is designed to provide for a better final vacuum.

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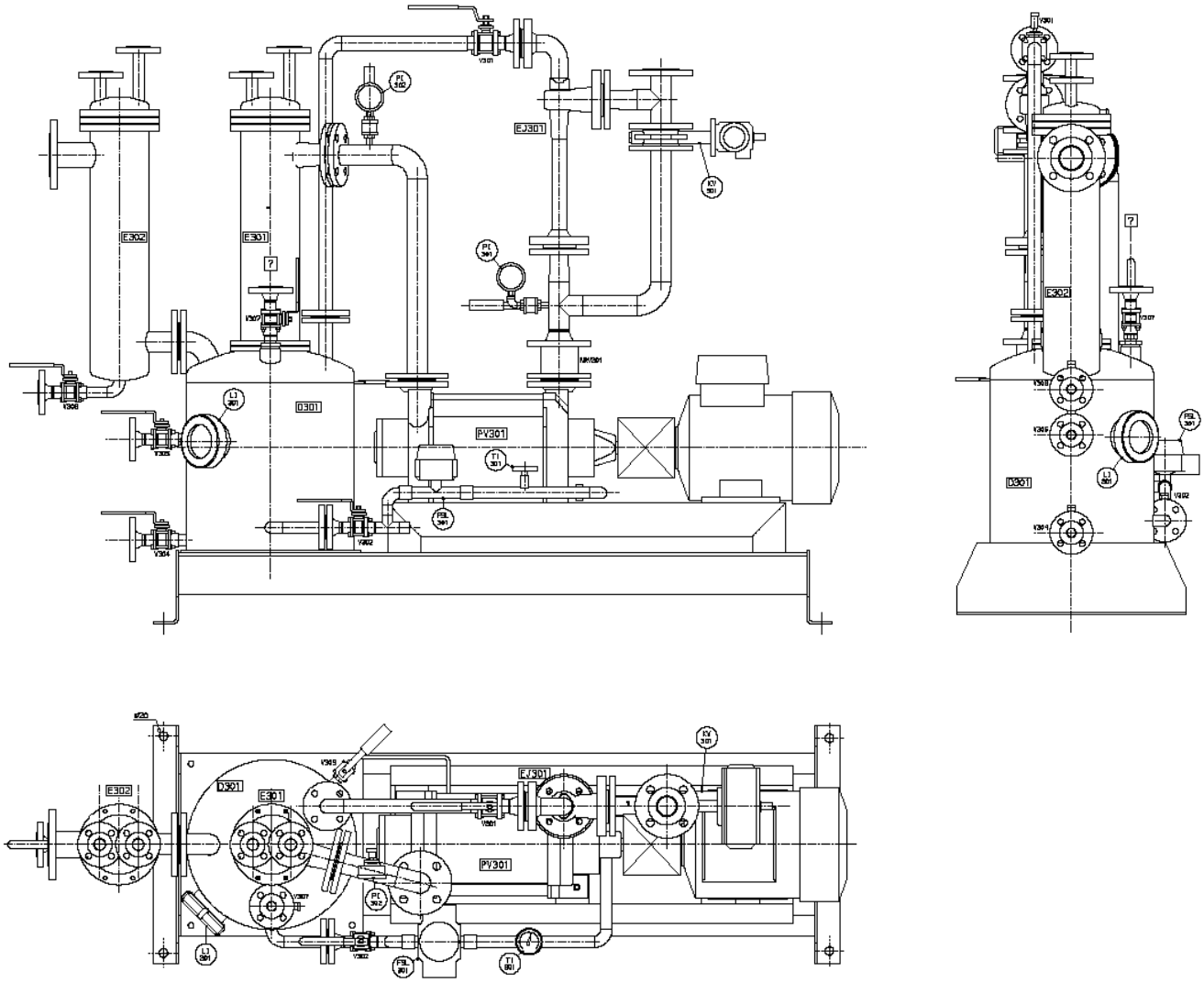
Liquid Ring Vacuum Pump System



Typical layout of a skid mounted liquid ring vacuum pump system

With two stage liquid ring vacuum pump, ring liquid vessel, post condenser and ejector.

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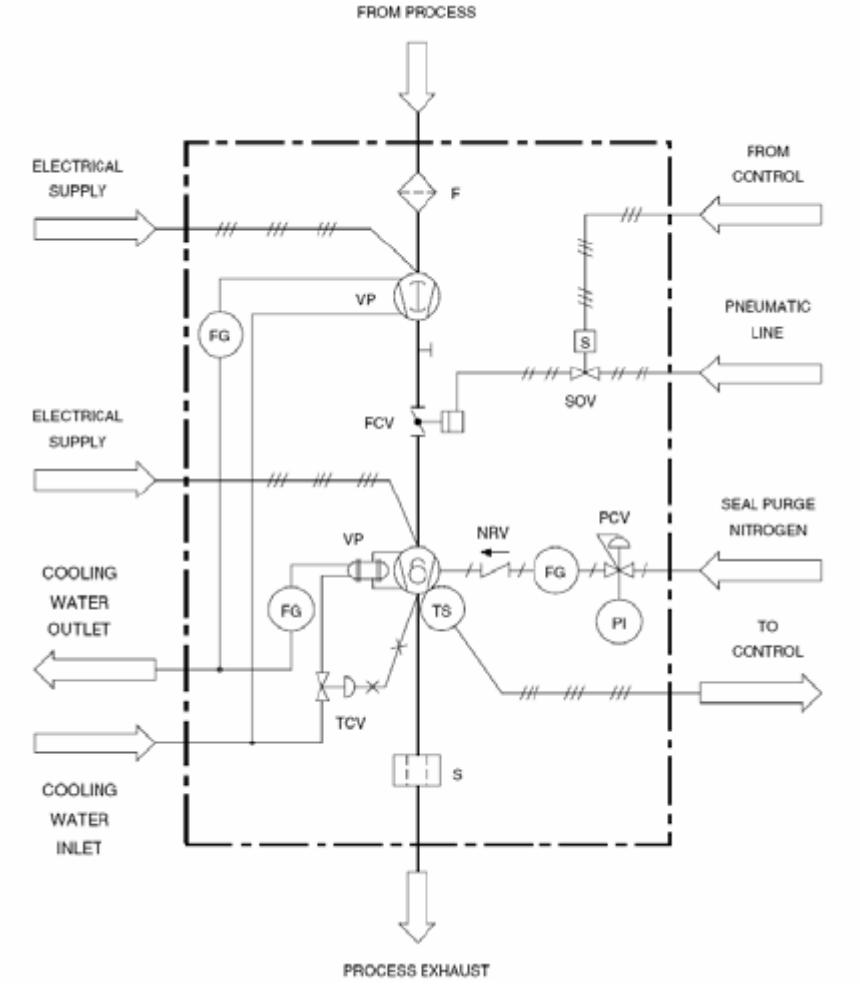
Dry Running Vacuum Pump System



Typical P&ID of a dry running vacuum pump system

Vacuum pump (VP, lower) with booster pump (VP, upper) for increased suction capacity. A post condenser with condensate receiver is available as an option.

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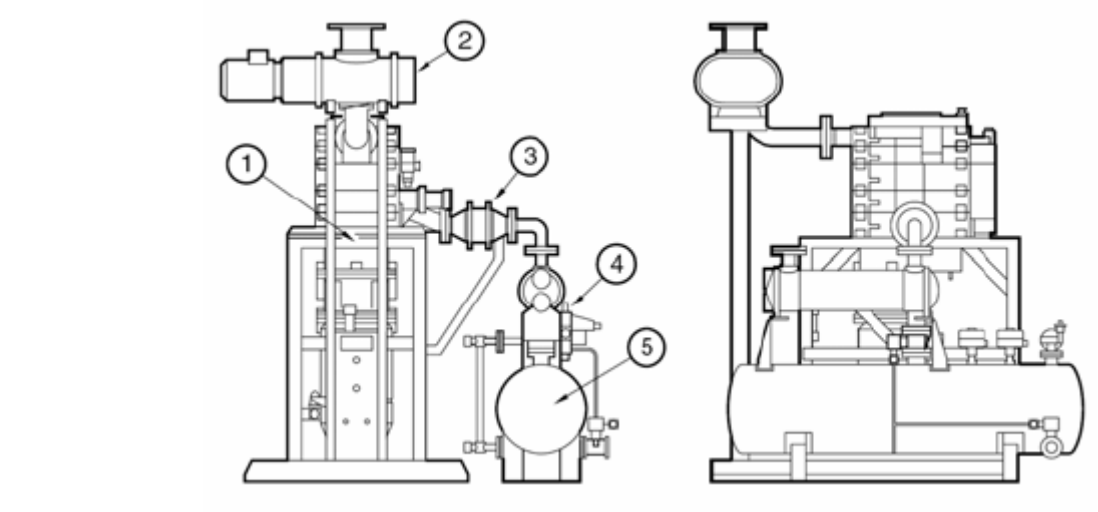
Dry Running Vacuum Pump System



Typical layout of a skid mounted dry running vacuum pump system with booster

Vacuum pump (1) with dual three stage claw mechanism, booster pump (2) for increased suction capacity, flame arrestor (3), post condenser (4) and condensate receiver (5).