

■ GAS TURBINE LUBRICATION OIL SKIDS

After completing an extensive study to define the performance and capability requirements for an RB211 gas turbine lube oil skid, Dawson and Associates has brought an advanced, easily customized, new design offering to the market.

This product has been specifically designed to serve as a direct replacement for the existing legacy Rolls Royce Mark 1, Mark 2 or Mark 3 lube oil consoles at numerous pipeline and offshore installations.

In addition to competently supporting the full range of industrial RB211 gas turbines, the skid design was kept simple, yet robust and reliable. It is very maintenance friendly and yet has retained the small skid footprint required for retrofit into the restrictive space envelope typically occupied by the existing Mark 1 or Mark 2 installations.

Throughout the design process of this new lube oil skid, a sharp focus was maintained on the safe operation and protection of the RB211 gas turbine. This was achieved by meeting and exceeding all required performance parameters along with the implementation of extensive pressure and temperature monitoring points to ensure the correct and safe functioning of the skid.

Flow and pressure capabilities from this unit readily supports both the pneumatically controlled, open loop VIGV system (employed on the RB211-22/24A/24C gas generator), as well as, the closed loop, higher pressure, electronically controlled N1/ $\sqrt{T1}$ systems of VIGV control (currently employed on the RB211-24G/GT gas generators).

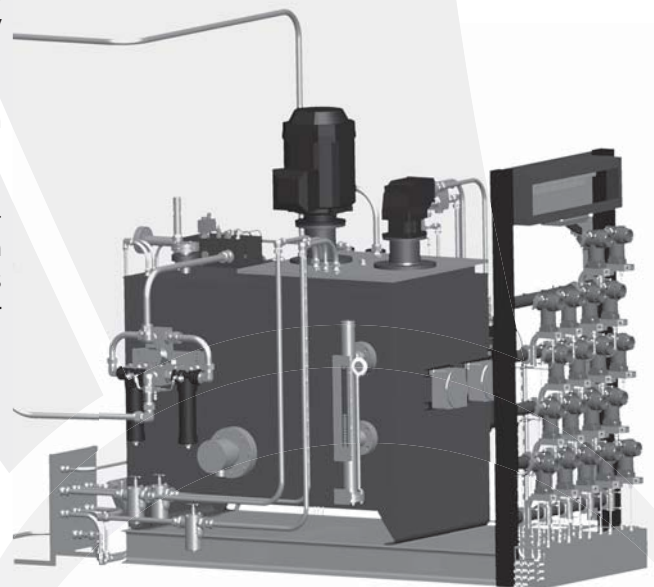
Only the best in class, industry proven components were chosen from recognized leading suppliers with global support networks.

This new lube oil skid design comprises a lube oil reservoir and two multi-stage pump assemblies with associated piping, valves and control system as required to supply filtered, low pressure, lubrication oil to the RB211 gas generator bearing chambers and filtered, high pressure oil to gas generator related hydraulic actuators.

In addition, the skid provides for oil / air scavenge from the gas generator bearing chambers and oil return from the hydraulic actuators.

The reservoir oil is heated by an AC electric, thermostatically regulated, PAC (Programmable Automation Controller) monitored, immersion heater and the reservoir fluid level is electronically monitored continuously by the skid PAC.

The skid design employs the same philosophy of AC electric motor standby / hydraulic motor main pump drives as the typical Mark 1 / Mark 2 design, but will also provide for very straight forward and cost effective, future upgrades to an AC / AC drive system. This was in consideration of an Operators potential future upgrade from an RB211-22/24A gas generator to an RB211-24G/GT gas generator. It is anticipated that the corresponding power turbine would no longer be supplied with a facility to drive a high pressure hydraulic pump. As such, the design of the new lube oil skid allows for an easy retrofit from an initial hydraulic / AC drive system to an AC / AC drive system on the main and standby pump drives.



■ GAS TURBINE LUBRICATION OIL SKIDS

The skid control system is based upon the robust Allen-Bradley ControlLogix PAC configured using the latest generation Rockwell RSLogix5000 software. Network communication is via ControlNet or Ethernet/IP (to the package CPU) in addition to HART communication with the sensors and transmitters.

The entire control system has been built with intrinsic safety in mind. This allows Allen-Bradley FlexEx intrinsically safe power supplies, ControlNet and I/O to be mounted adjacent to the skid in the hazardous area using a standard NEMA enclosure. The use of Allen-Bradley FlexEx distributed I/O allows for single cable connection between the control room based PLC and the skid mounted I/O, greatly simplifying installation and commissioning.

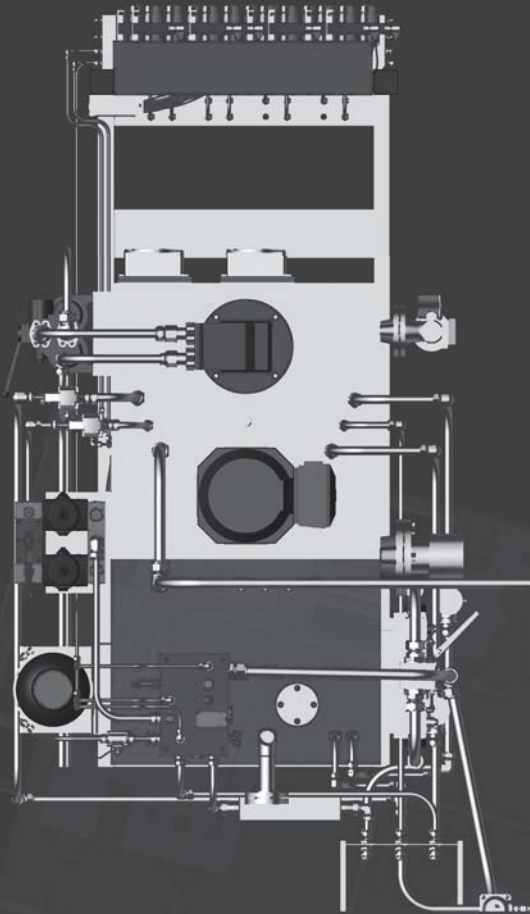
All electrical sensors and transmitters provide intrinsically safe outputs and are rated for operation in NEC/CSA Class 1, Division 1, groups C and D areas. A rack of pressure / temperature transducers with LCD displays is included to provide local data readouts in addition to the control room based PLC / HMI screens.

A directly operated, pressure compensated, proportional flow control valve accurately meters the supply of oil to the engine. As an added level of confidence, to ensure flow control valve integrity and calibration, a coriolis flow meter is fitted downstream in the supply line and verifies flow settings. Feedback from the coriolis flow meter to the PAC initiates fine adjustments of the flow control valve if required.

Filter assemblies for lube oil, high pressure oil and hydraulic motor supply oil are supplied in duplexed configuration to allow filter changes without shutdowns and interruption to operations.

All valves and piping are sized and fabricated to meet the appropriate ANSI pressure – temperature ratings. As this skid was designed to be customizable, the final routing of pipe work and placement of valves will be agreed with client before finalization of skid design.

To ensure long life and reliable operation all components are made from corrosion resistant materials and / or coated with industry leading corrosion prevention coatings.



www.dawsonandassociates.ca | 6937 Lake Forest Walk
3191320 Canada Inc. Greely, ON, Canada
K4P 0A3