DAWSON and ASSOCIATES
ENGINEERING SOLUTIONS

# GAS **TURBINE HYDRAULIC** STARTER SKIDS

Does your operation suffer from the poor start reliability of your gas turbines? Have you suffered hot starts? Crash engagements?

In addition to high gas turbine repair costs which can result, the production revenue losses can be enormous.

In many cases, the root causes are often that the original hydraulic or pneumatic starter skids were grossly underpowered or not well controlled to avoid these costly events.

Added to the mix, the support for many of these ageing skids has diminished to the point that they are a reliability risk to the ongoing plant or pipeline operation.

For those Operators utilizing natural gas as the driving fluid for their gas starters, the release of large amounts of methane gas with each start cycle has also become an environmental concern.

In light of these issues, Dawson and Associates has designed a high powered, hydraulic starter skid, sized to provide safe, reliable, soft starts for gas turbines up to 50,000 EGHP.

The skid design is simple yet robust, easy to maintain and retains a small skid footprint required for retrofit into such applications as offshore platform berths.

The skid is compatible with existing Parker F11 / F12 series hydraulic starter motors but can be custom designed to meet your specific needs.

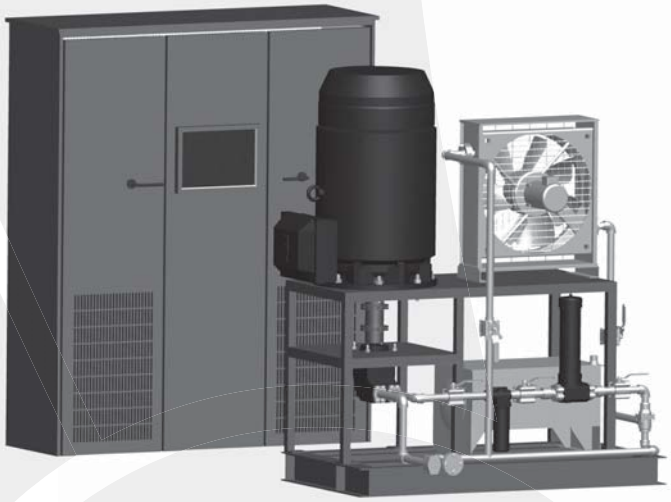
In addition, we have designed our skid to be capable of prolonged purge cycles plus multiple consecutive start duty, without overheating the fluid or components. All skid components were carefully chosen from industry leading suppliers to provide the best quality and reliability available, along with global support.

The start cycle for a typical package consists of a gentle start to take up the play in the gas turbine internal or externally mounted gearbox gear train, followed by a brisk ramp to purge speed, maintaining the compressor rotor/s at purge speed for a predetermined time and then, after combustion ignition is detected, assist the unit as it accelerates to idle.

The gentle start provided by this skid design also greatly reduces the initial in-rush current draw and loading on electrical supply systems and generators.

Safety is of paramount concern and the skid contains a number of features with this objective in mind, including high quality, industry proven instrumentation to ensure correct operation and rapid shut down in the event of a component failure, malfunction, human error, or starter over speed.

The principal elements of this skid are a Class 1, Division 1 rated AC motor driving a high pressure positive displacement pump to supply a gas turbine mounted hydraulic starter with appropriate flows and pressures to achieve a successful start cycle.



## GAS **TURBINE HYDRAULIC** STARTER SKIDS

The AC motor is driven by an industry leading Variable Frequency Drive and controlled by a robust Allen-Bradley ControlLogix Programmable Automation Controller configured with 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 adaptor, and I/O to be mounted adjacent to the skid in the hazardous area using a standard NEMA enclosure.

The use of Flex Ex distributed I/O allows for single coax cable connection between the control room based PLC and the skid mounted I/O. This eliminates the need for large numbers of wiring runs and greatly simplifies 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.

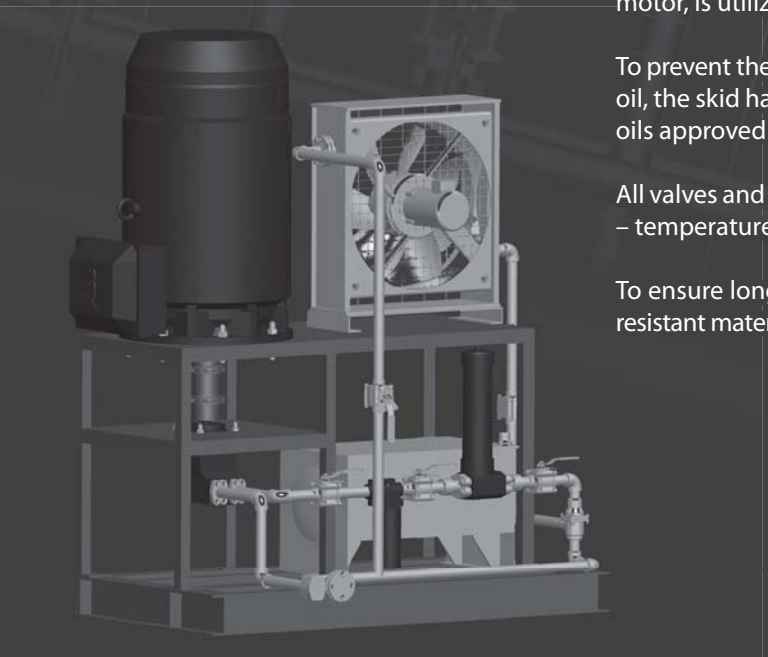
A stainless steel skid mounted oil reservoir is fitted with an immersed, thermostatically controlled heater to maintain adequate oil temperature. Oil drawn from the reservoir is filtered to 5 microns absolute to ensure protection of the pumps and hydraulic starter motor.

An ejector pump boosts the inlet pressure into the high pressure, positive displacement pump and a skid mounted, forced air oil cooler, driven by a Class1, Division 1 AC motor, is utilized to control working fluid temperatures.

To prevent the accidental mixing of hydraulic fluid and gas turbine engine lubricating oil, the skid has been designed to operate with the same synthetic turbo lubricating oils approved for use in the gas turbines.

All valves and piping are sized and fabricated to meet the appropriate ANSI pressure – temperature ratings.

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



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