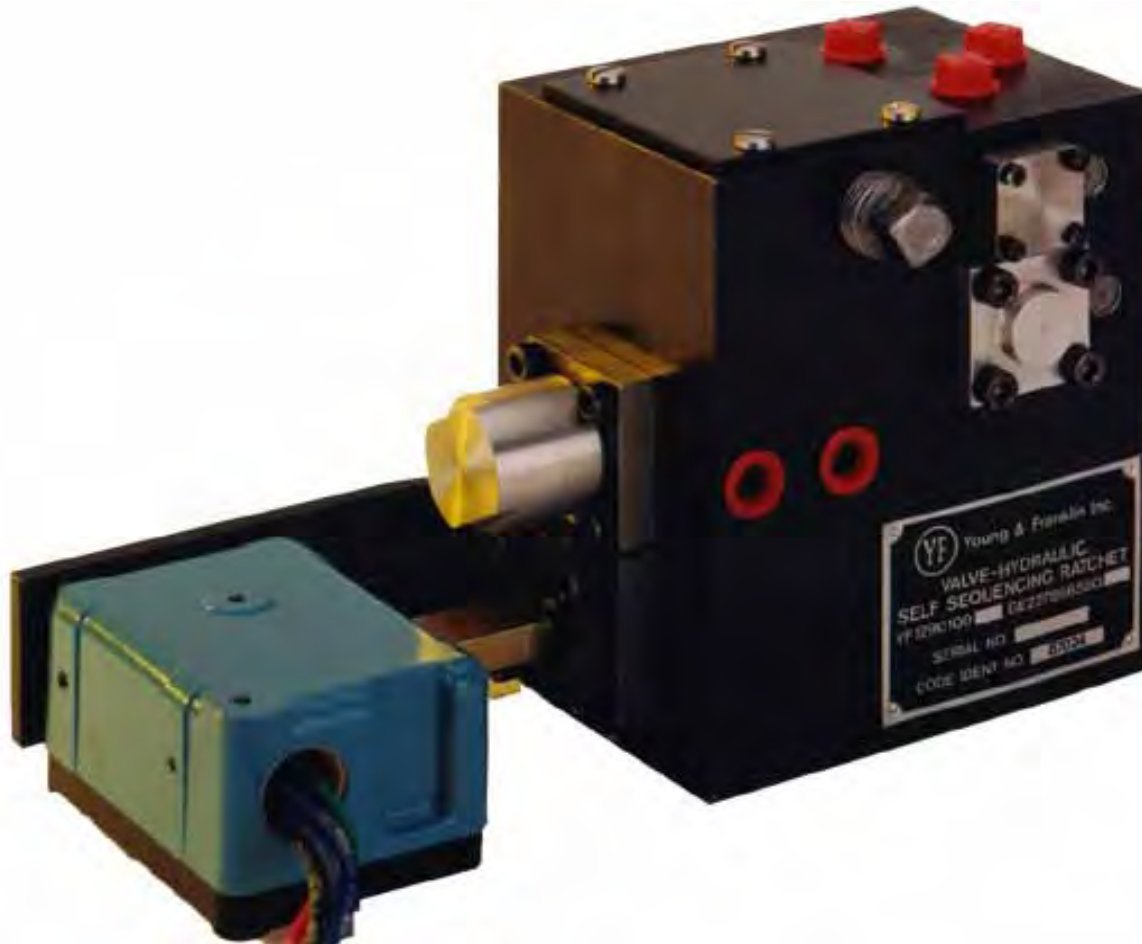


Introduction & Operation of Hydraulic Sequencing Valves for GE Ratchet Gear

Larry Mitter

***Vice President, Engineering Support Services
Young & Franklin Inc.***





Product Introduction / Production History

Late 70s Hydra-Power (H-P) develops Hydraulic Sequencing Valve for ratchet gear applications on General Electric (GE) gas turbines

1970-80s Teledyne acquires H-P, diversifying Industrial/Commercial product lines (WaterPik)

1992 Teledyne H-P sells Aerospace/Industrial product lines to Young & Franklin, Inc (YF)

1992-on YF incorporated H-P sequencing valve into “YF production system” with new part numbers. H-P and YF parts remain interchangeable. Over 1,500 units produced to date.

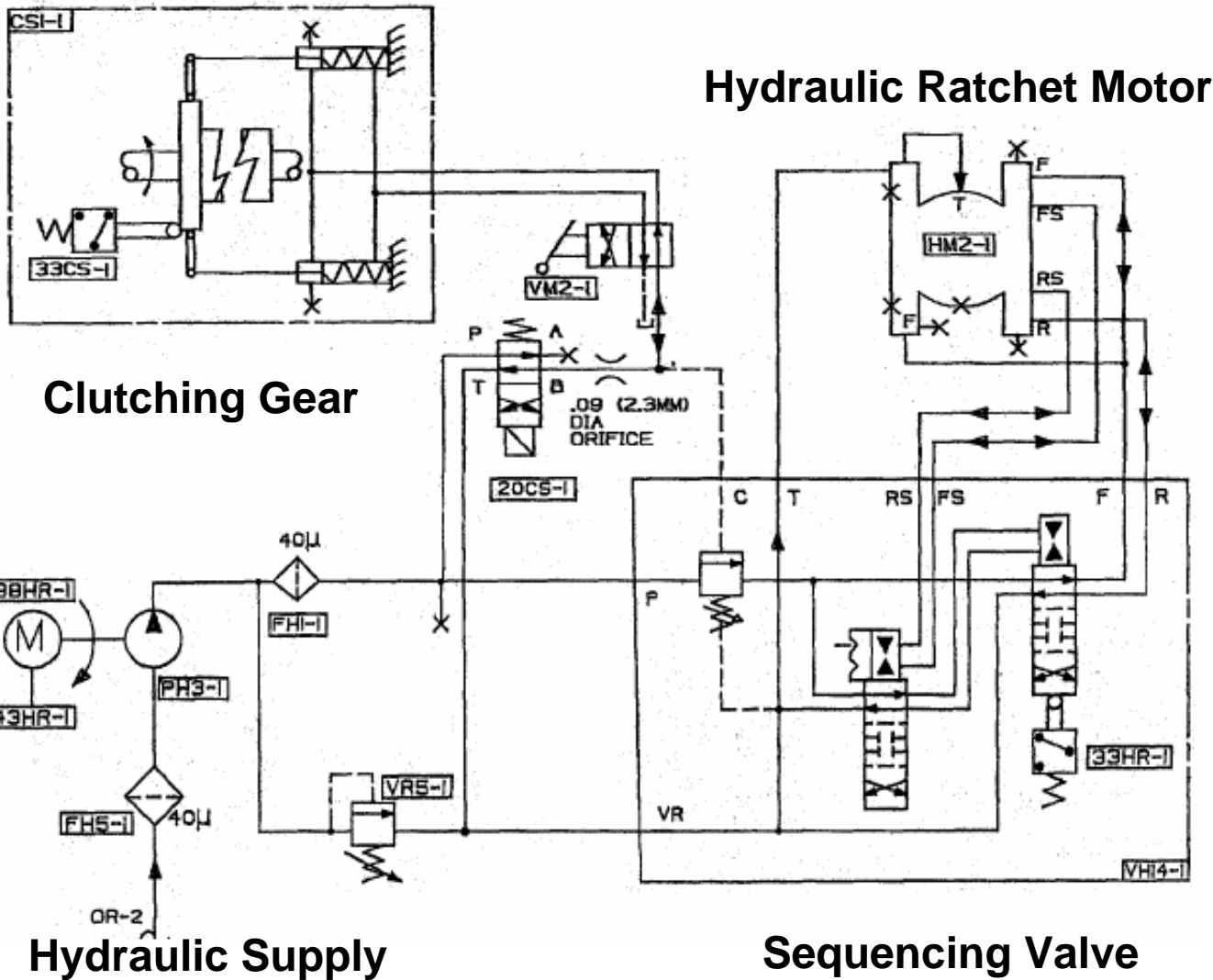


Hydraulic Ratchet Sequencing Valve Part Number Configurations

General Electric	Teledyne Hydra-Power	Young & Franklin	Features	
			Pilot Solenoid Valve	Sequencing Valve Orifice
277A2918-P001	HP1290100-1	YF1290100-1	•	
*277A2918-P002	HP1290100-4	YF1290100-4	•	•
227B6658-G001	HP1290100-2	YF1290100-2		
*227B6658-G002	HP1290100-3	YF1290100-3		•

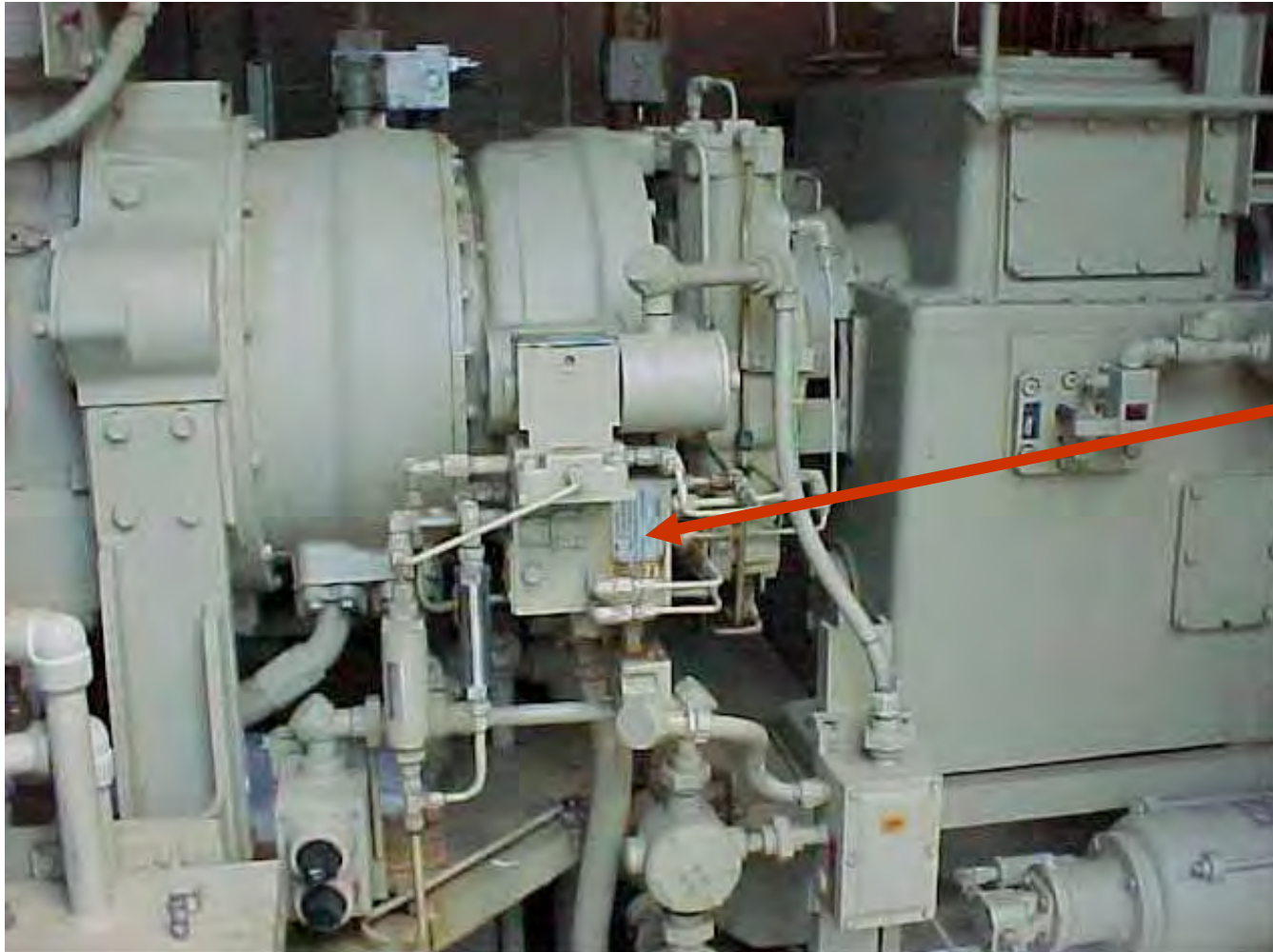
***Latest and generally preferred models.**

General Electric Ratchet Gear System Schematic



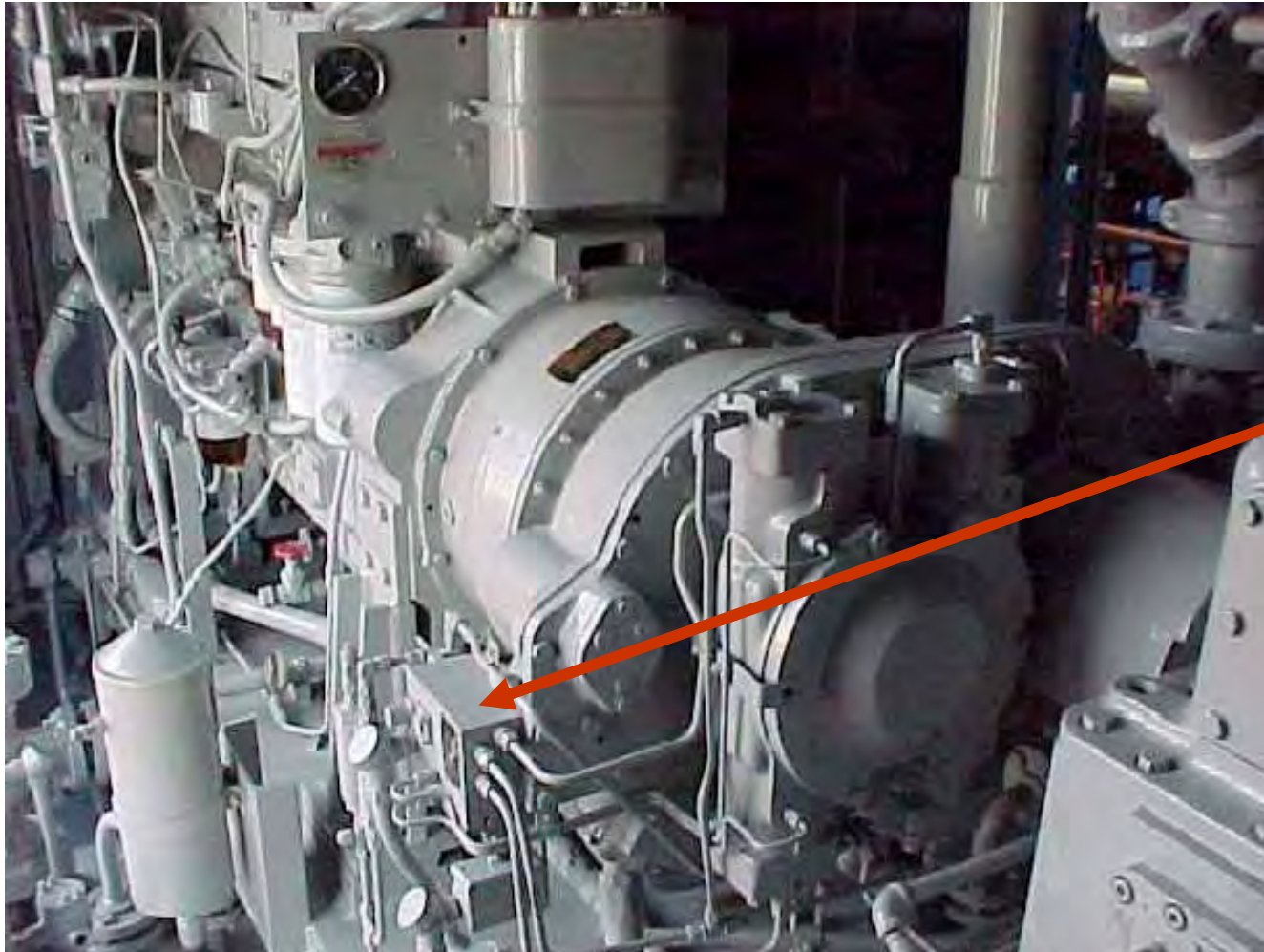


QUESTION: *Where is it located in the accessory module?*



Hydraulic Ratchet Sequencing Valve

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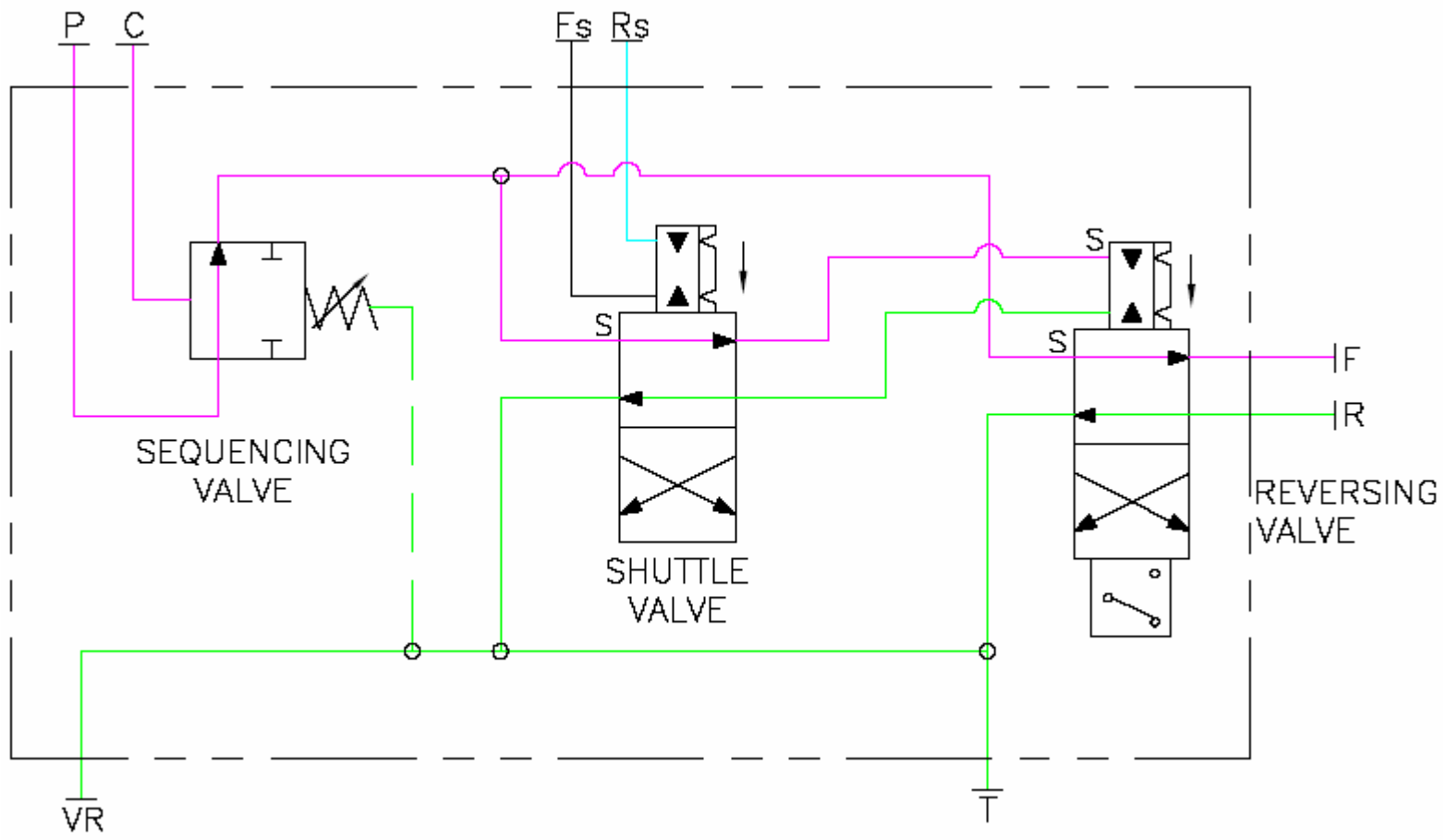
Hydraulic Ratchet Sequencing Valve



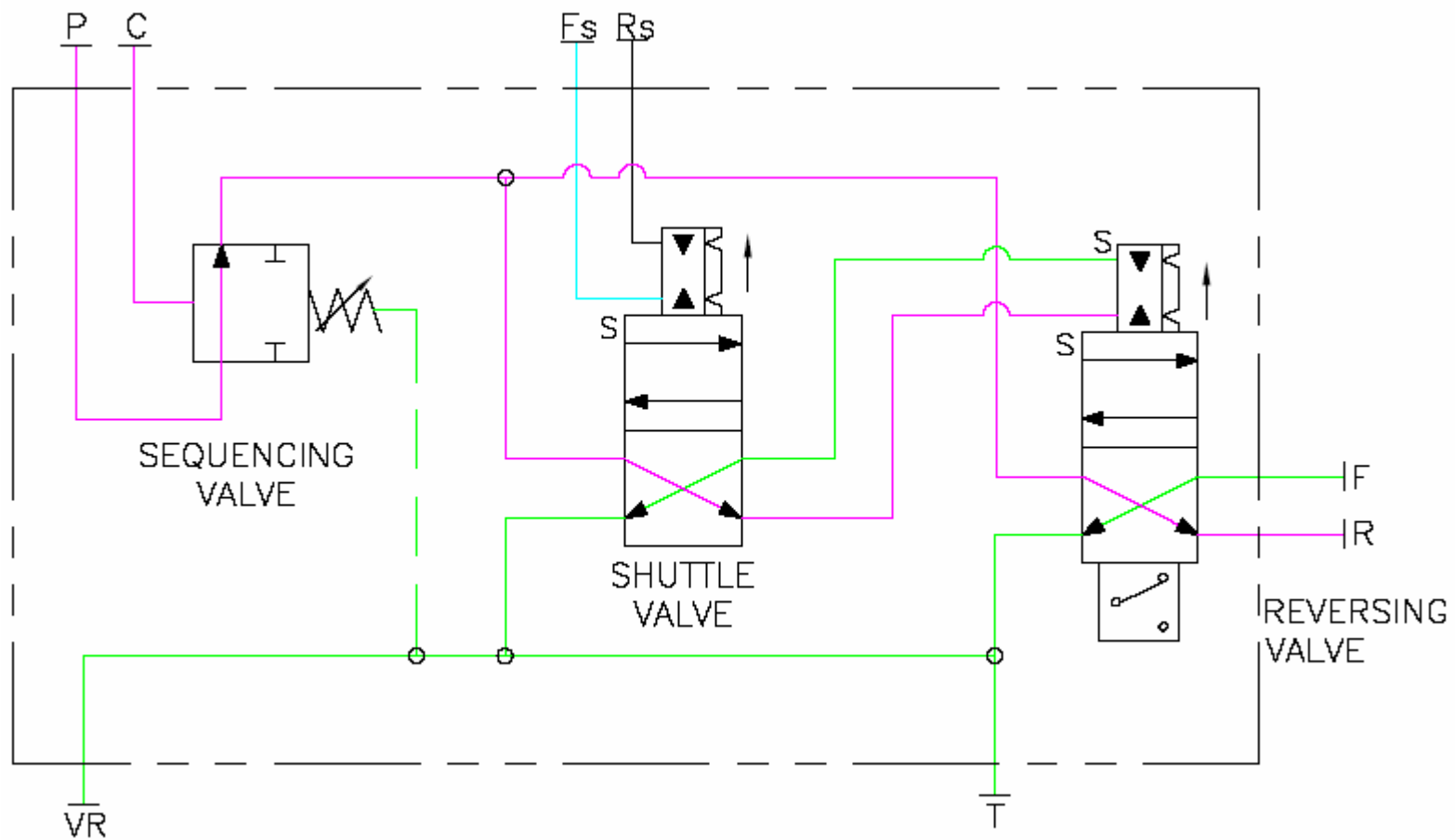
Hydraulic Ratchet System Description

- Ratchet system functions as a turning device for the gas turbine rotor (~2 rev/hr):
 - **Breakaway torque** to reduce the power requirements of rotor starting device,
 - **Rotor turning during cool-down** period (to prevent rotor bending),
 - **Rotor manual jogging** to enable turbine rotor inspection.
- Sequencing valve only used on machines with ratchet gear mounted on torque converter.
- Limit switch 33HR controls the stroking sequence of the gear.

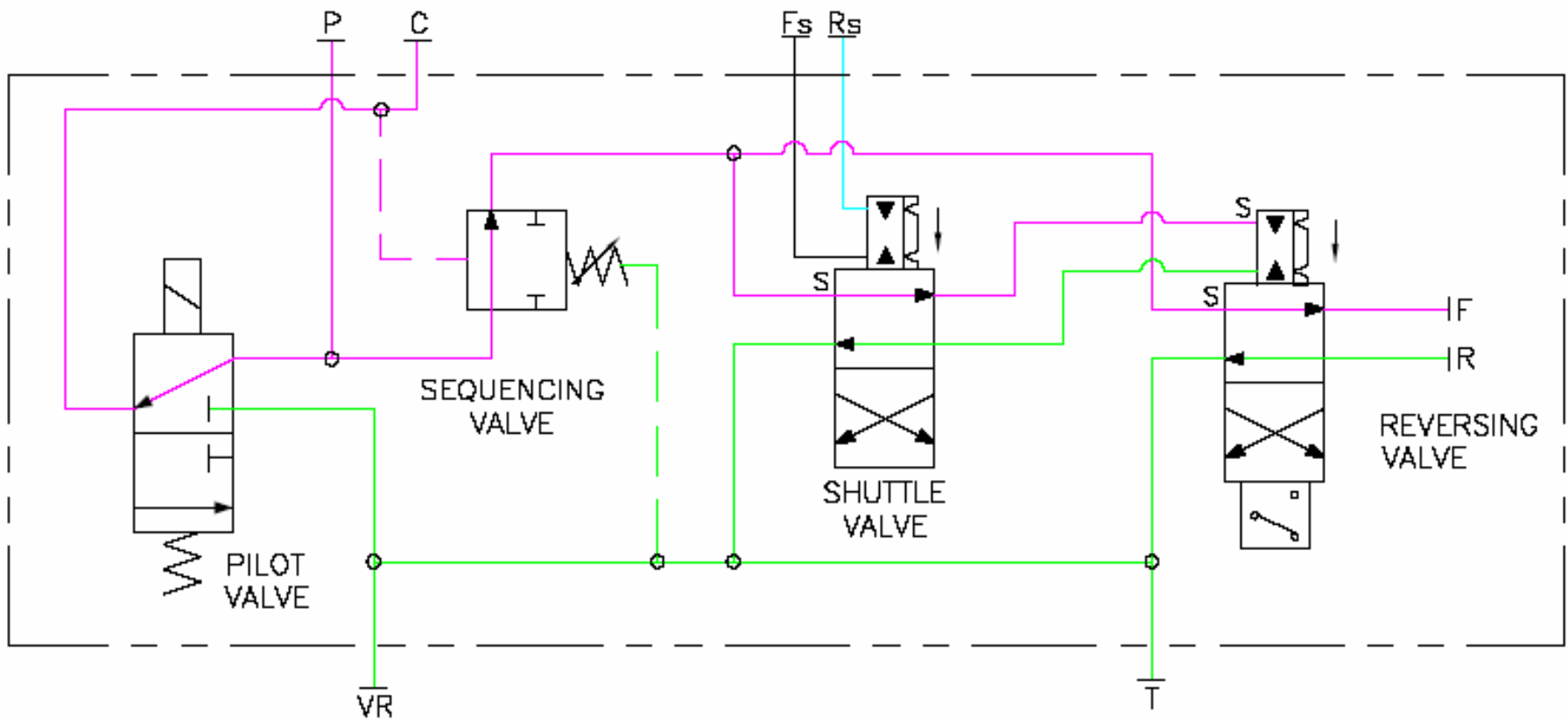
Functional Product Schematic



Functional Product Schematic



Functional Product Schematic





Hydraulic Sequencing Ratchet Valve Operational Specifications

Mounting: Special mounting orientation not required

Temperature:	Ambient Air	+5°F to +158°F
	Hydraulic Oil	+50°F to +180°F

Inspection Hours: Dependant on site specific Ratchet Valve Assembly duty cycle pattern. This may require up to 500 strokes per day or non-operational for 25,000 hours in a continuous period. Generally advised to check operation at least ever 6 months.

Hydraulic Supply: Generally oil that has been properly maintained and filtered to 40 micron with minimum of varnish. Valves have tight clearances and this extended usage in degraded oil will cause premature varnishing, stic-tion, and possibly valve seizure.

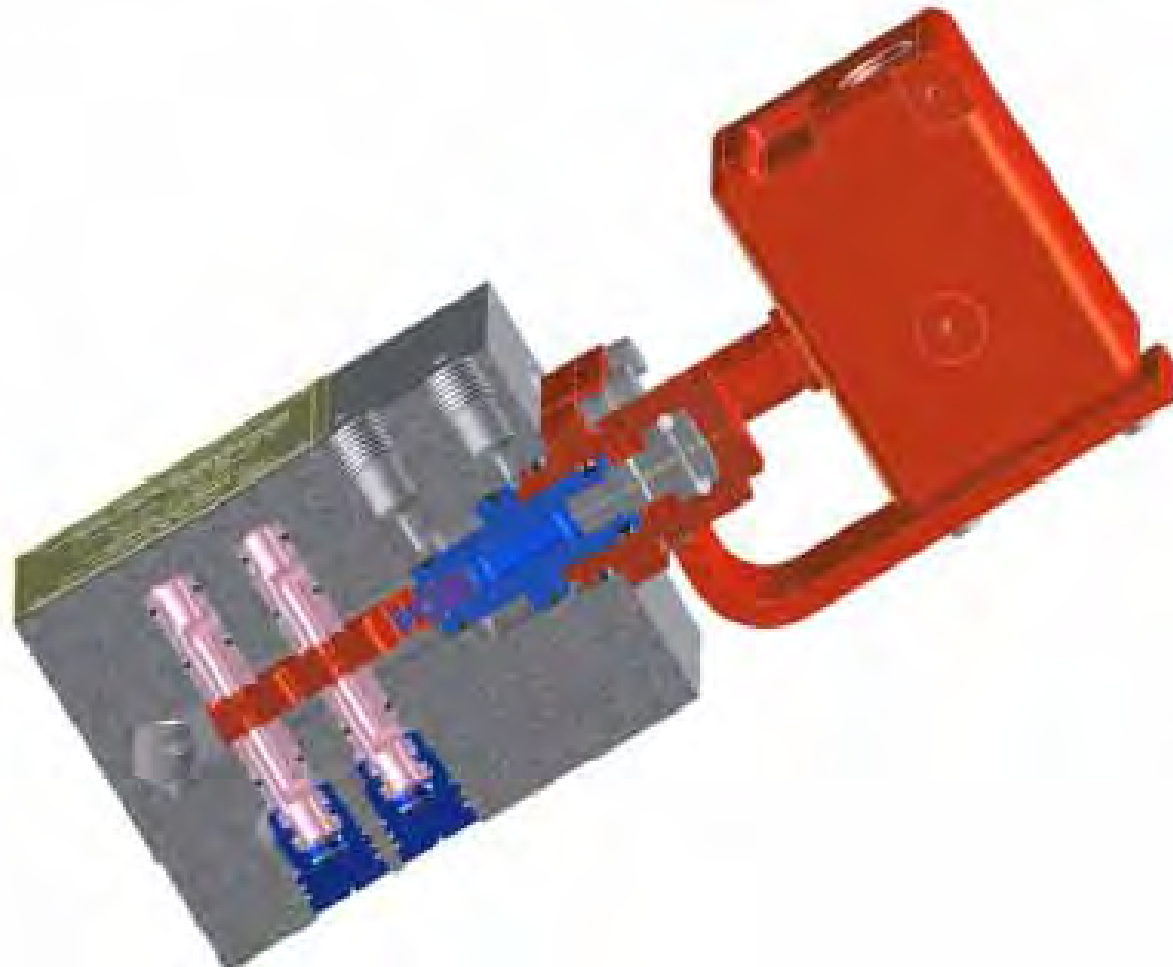
Explosion Rating: Switch and valve rated for Zone 2 per Directive 1999/92/EC. The valve alone is rated Equipment Group II, Category 3 per the ATEX Directive 94/9/EC.



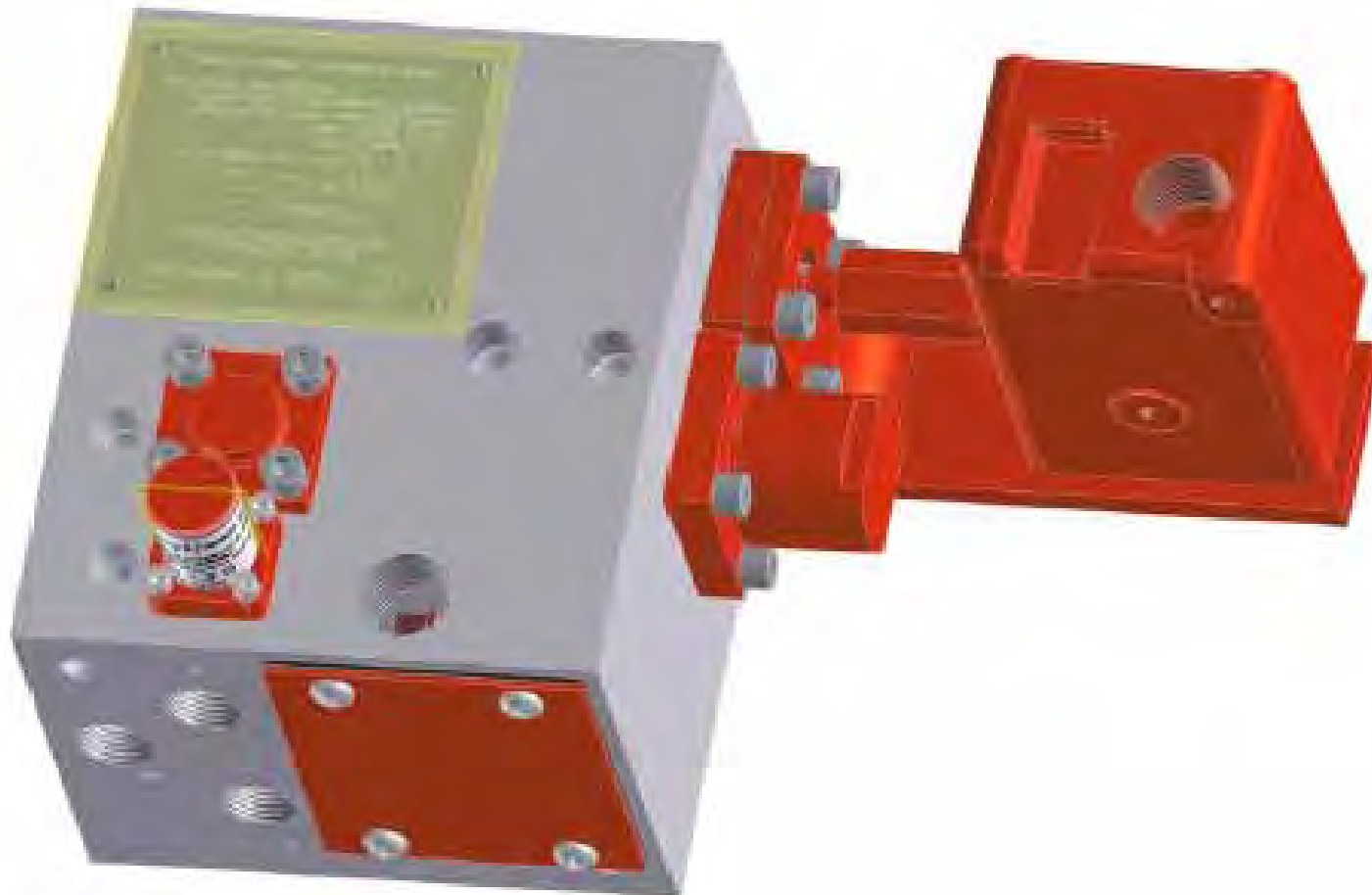
Principles of operation & Identifying Ratchet Assembly Issues:

- When checking the Hydraulic Ratchet system for problems, pressures should be checked at the cylinders rather than at the hydraulic ratchet pump discharge.
- A forward stroke of the ratchet advances the starting clutch about 45° during the approximately 10 sec stroke duration. The reset stroke duration is about 5 seconds.
- Upon completion of a normal ratchet cycle, the ratchet should shutdown in a forward stroke. This operation keeps the jaw clutch engaged. If the ratchet is not shutting down in a forward stroke, it is entirely possible that the problem lies with the operation or adjustment of the 33HR limit switch.

General information



General information





Young & Franklin, Inc. Original GE Frame 6(A-B) Products



**Inlet Guide Vane
Actuator**



Controller Assembly



**Liquid Fuel Oil Stop
Valve**



**Combined Control and
Stop/Ratio Valves**



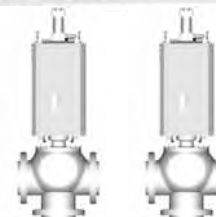
Control & Stop/Ratio Valves



**Liquid Fuel Oil Bypass
Valve**



**Hydraulic Ratchet
Sequencing Valve**



Splitter & Transfer Valves



Questions?

Young & Franklin Inc. is available to assist you with diagnosing problems and replacement parts.

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