



ELLIOTT GROUP
EBARA CORPORATION

Single-Stage Steam Turbines

■ ELLIOTT YR STEAM TURBINES



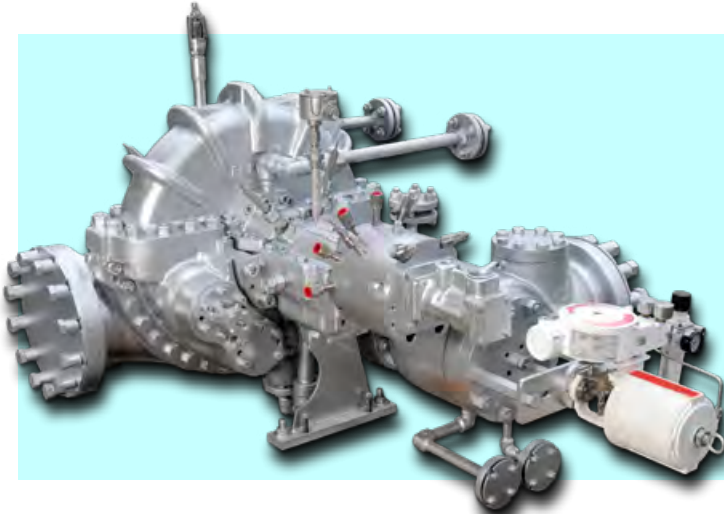
Elliott YR steam turbines are rugged and reliable pieces of precision turbomachinery. These masterpieces of Elliott engineering and craftsmanship serve thousands of customers continuously, day and night, under conditions ranging from humid tropical heat and rainfall to freezing icy tundra and snowfall. Many YRs have been performing for decades – day after day, year after year.

Elliott YR turbines are found driving pumps, compressors, fans, blowers, generators, sugar mill tandems, cane shredders, paper machine lineshafts, and in many other applications. Elliott YR steam turbine models are standardized and components are stocked, resulting in shorter leadtimes and faster turnarounds.



■ ELLIOTT YR TURBINE

Single-valve, single-stage Elliott YR turbines have a worldwide reputation for the highest quality, reliability and adaptability to serve a wide range of requirements. Available in multiple frame sizes and ratings up to 5,400 hp (4,027 kW), Elliott YR turbines are cost-effective in their design and perform under varying conditions.



■ ELLIOTT MULTI-YR TURBINE

For improved steam consumption, Elliott designed the Multi-YR (MYR) steam turbine product line. The MYR design combines the reliability and parts interchangeability of our popular YR turbine with the power and efficiency of multistage turbines. The MYR produces more power without additional steam, and can be installed in many areas where single-stage steam turbines currently are operating. Elliott MYR turbines are available up to 14,000 hp (10,440 kW).



■ STANDARD FEATURES

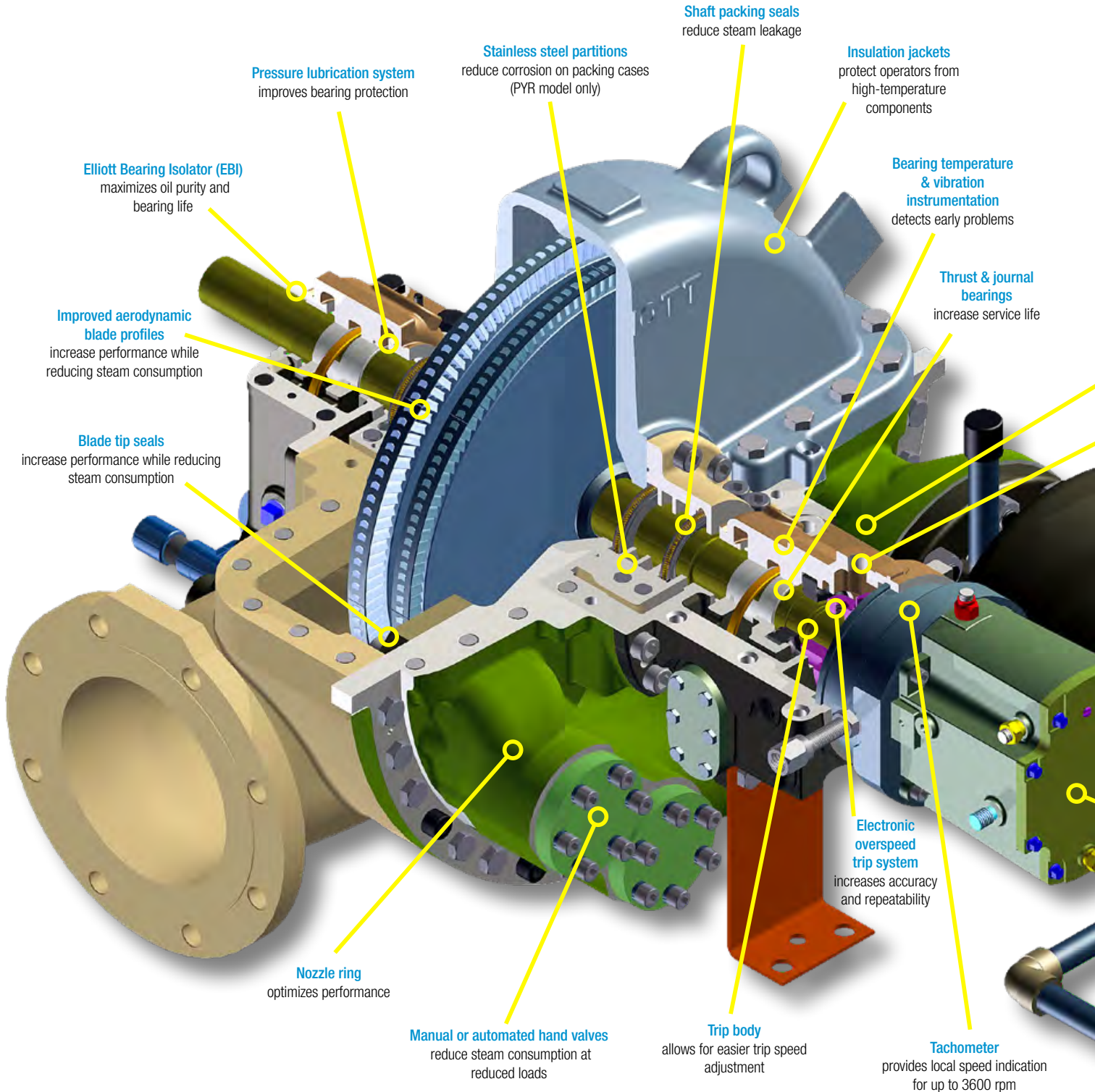
- ◆ Designed to API 611 standard
- ◆ Quick-start capability
- ◆ Horizontally split casing
- ◆ Built-up rotor construction
- ◆ Center line support
- ◆ Multiple shaft end configurations
- ◆ Carbon ring steam end
- ◆ Spark-proof, overspeed trip with independent trip valve
- ◆ Separate steam seal covers for ease of maintenance (except for AYR model)
- ◆ Ring-oiled, circulation or pressure lubrication
- ◆ Steam hand valves for optimal efficiency
- ◆ Sentinel warning device
- ◆ Dynamically balanced multi-plane rotor
- ◆ No-load mechanical run test using steam

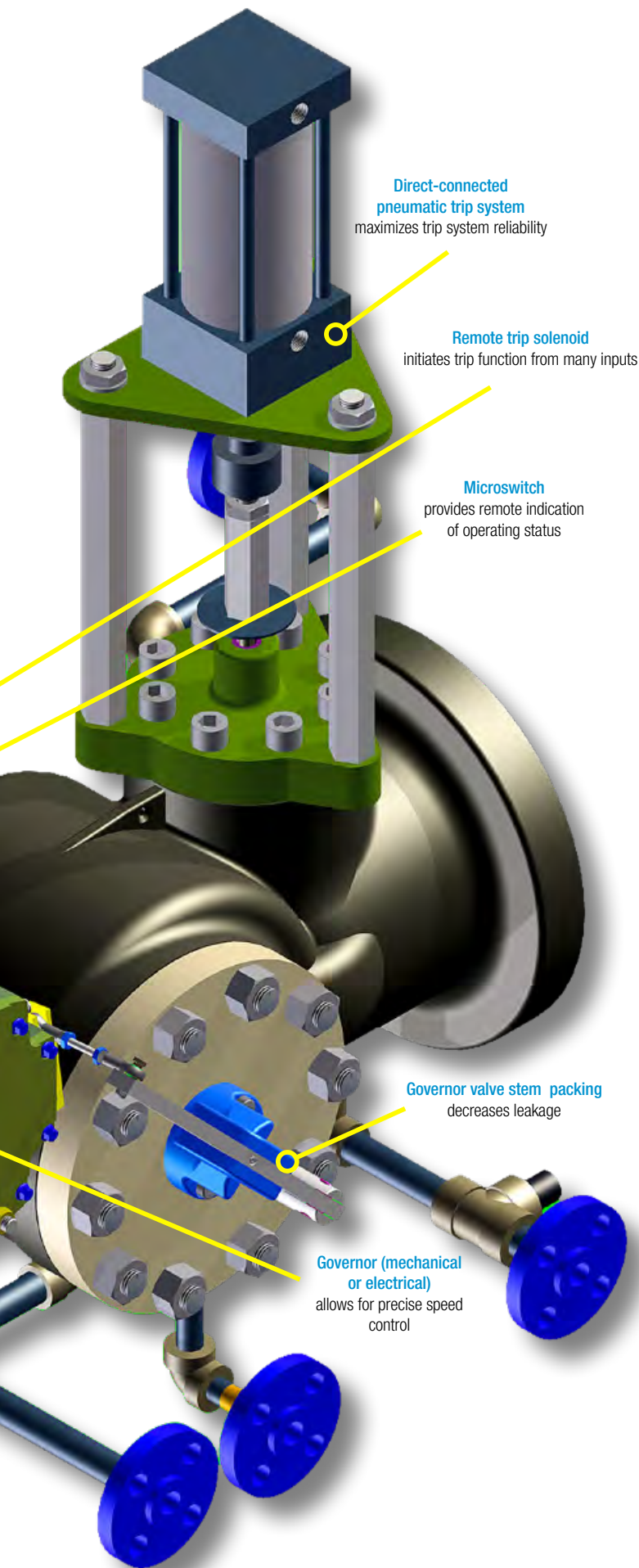
■ OPTIONAL FEATURES

- ◆ Designed to API 612 standard
- ◆ Solid, integral rotor
- ◆ At-speed rotor balance
- ◆ Tilting-pad journal and thrust bearings
- ◆ Bearing vibration and temperature instrumentation
- ◆ Steam seal upgrades (labyrinth, brush, mechanical)
- ◆ Electronic governors and trip systems
- ◆ Trip and throttle valves
- ◆ Thermal/acoustic insulation
- ◆ Shaft-mounted main oil pump
- ◆ Direct-connected pneumatic trip system
- ◆ Elliott Bearing Isolator (EBI)

■ ELLIOTT YR COMMON FEATURES & UPGRADES

Engineering expertise, rugged design, and precision manufacturing come together for years of service in Elliott YR steam turbines. These powerful workhorses provide exceptional value and performance in a broad range of mechanical and power generation applications, around the clock and around the globe.





Feature	Standard	Upgrade
Speed Control		
TG Series	X	
UG/PG Series		X
Electronic		X
Speed Protection		
Mechanical*	X	
Electronic		X
Governor Actuator		
Mechanical*	X	
Electric/Pneumatic		X
Trip Valve		
Integral	X	
Direct-Connected*		X
T&T Valve		X
Journal Bearings		
Liner*	X	
Tilting-Pad		X
Thrust Bearings		
Ball*	X	
Tilting-Pad		X
Rotor Shaft		
Built-Up*	X	
Solid		X
Rotor Blades		
Punched*	X	
Milled		X
Tip Seals	X	
Lubrication		
Ring-Oiled or Pressure	X	
Ring-Oiled Circulation	X	
Shaft Seals		
Carbon Rings*	X	
Labyrinth/Brush		X
Mechanical		X
Bearing Housing Seals		
Labyrinth*	X	
Elliott Bearing Isolator		X
Safety		
Sentinel Valve	X	
Insulation Jacket	X	

(* Shown)

■ GENERAL SPECIFICATIONS

Frame	PYR	AYR	BYR	BYRH & BYRHH	DYR & DYRH DYRM & DYRN	MYR
Initial pressure (psig/bar)	650/45	700/48	700/48	900/62	900/62	900/62
Initial temperature (F/C)	750°/400°	825°/440°	900°/482°	900°/482°	900°/482°	900°/482°
Exhaust pressure (psig/bar)	100/6.9	vac-100/6.9	vac-100/6.9	375/25.9	vac-350/24.1	vac - 250/17.2
Speed (rpm)	5000	7064	6675	7090	5770	8500
Wheel pitch diameter (inch/mm)	12/305	14/360	18/460	18/460	28/710	28/710
Number of stages (impulse type)	1	1	1	1	1	9
Inlet sizes (ANSI, inch)	3"	3"	3", 4"	3", 4", 6"	3", 4", 6", 8", 10"	3", 4", 6", 8", 10"
Exhaust size (ANSI, inch)	6"	6"	8"	8"	10", 12", 14", 16"	Up to 48"
Range of capacities (hp/kW)	200/150	750/560	to 1400/1044	to 3500/2610	to 5400/4027	to 14,000/10,440
Shipping weight (lb/kg)	550/250	870/400	1275/580	2300/1050	2600/1180	to 17,000/7710

■ PACKAGING SOLUTIONS FOR TURBOMACHINERY

Effective, efficient turbine packages begin with a thorough understanding of the site specifications, from the pad to the placement of panels and other components. Elliott Group is a global leader in the design, manufacture and packaging of rotating equipment, lubrication systems, and sealing and fueling systems for turbomachinery. Our packages are engineered to reduce installation and maintenance costs by consolidating the equipment footprint, minimizing on-site alignment, and tightly integrating all connections.



A standard steam turbine package can include:

- Elliott YR steam turbine
- Gearbox
- Baseplate
- Coupling
- Electrical system
- Lubrication & control-oil consoles
- Gland vacuum, sealing and leak-off systems

■ MANUFACTURING AND TESTING CAPABILITIES



Induction heating of rotor disks speeds the assembly of YR turbine rotors.



Elliott's Jeannette manufacturing plant has four test stands for simultaneous YR and MYR testing.

■ INTEGRATED MACHINERY CONTROLS

Tri-Sen control systems are standard offerings with all Elliott compressors and steam turbines. The Elliott Tri-Sen Turbomachinery Controls Alliance provides a single point of contact for the full scope of rotating equipment expertise and advanced turbomachinery controls. Users can turn to one source to address turbomachinery component questions, software issues, and retrofit application concerns.

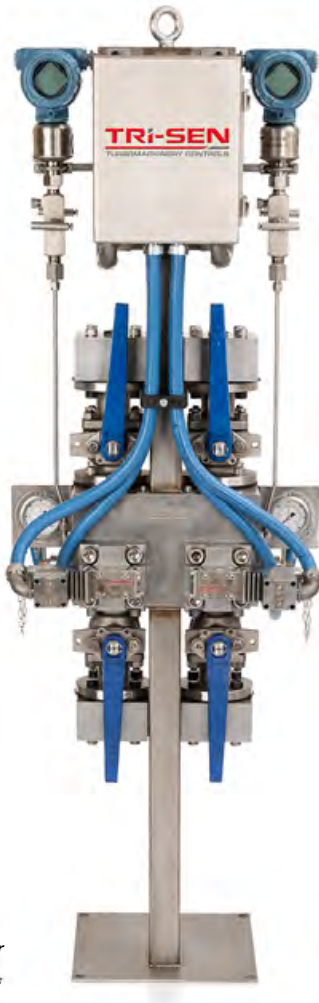
Through its alliance with Tri-Sen, Elliott provides machinery protection systems such as the TetraSentry hydraulic trip systems as standard offerings with new Elliott turbines and retrofit applications.



The Tri-Sen 310SV regulates speed and provides cascade control for process variables such as suction/discharge pressure or suction flow. The self-contained unit has manual push-button turbine controls, user-friendly software applications, and a 24-volt DC or optional 120/140-volt AC power supply.



The Tri-Sen TS300 is a self-powered digital controller providing automatic startup and speed control for single-valve general-purpose steam turbines driving a mechanical load.



The Tri-Sen TetraSentry is a dual parallel-redundant hydraulic trip block that's on-line testable and on-line repairable. The TetraSentry is connected to the hydraulic trip header in parallel with the turbine trip valve. During a trip action, the high capacity solenoid valves dump the trip header fluid to the reservoir faster than the supply orifice can refill it.

■ GLOBAL SERVICE AND SUPPORT

Elliott offers comprehensive service, support and training for all types of turbomachinery regardless of the original manufacturer. Our global service network provides installation, maintenance, repair, overhauls, parts, rerates, modifications, and training. Our service teams have the experience and expertise to keep equipment performance high and maintenance costs low.



Turn to Elliott for original, quality parts.



The Elliott YR Site Service program maintains Elliott YR turbines in North America's Gulf Coast region. Based in Elliott's Houston service center, fully stocked repair units are dispatched to handle common services such as standard inspections and replacement of worn or damaged parts. The site service team can also transport a turbine to an Elliott service center for more extensive overhauls and repairs.



Elliott Group is a global leader in the design, manufacture, and service of technically advanced centrifugal compressors, steam turbines, power recovery expanders, cryogenic pumps and expanders, and axial compressors used in the petrochemical, refining, oil & gas, liquefied gas, and process industries, as well as in power applications.

Elliott Group is a wholly owned subsidiary of Ebara Corporation, a major industrial conglomerate headquartered in Tokyo, Japan.



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T H E W O R L D T U R N S T O E L L I O T T



COMPRESSORS ■ TURBINES ■ CRYODYNAMICS ■ GLOBAL SERVICE