



TTS ENERGY SERVICES

Capabilities

05/30/2019



We know rotating equipment.

Who We Are

The TTS Energy Services portfolio includes Reciprocating Technology Services (RTS) and Turbine Technology Services (TTS).

We are an OEM alternative that offers agility, innovation and experience delivering industry leading modernization, optimization, upgrades, custom services and aftermarket parts for power generation and gas compression clients.

- TTS has a global footprint and over 35 years of experience providing technical solutions in the power generation and gas compression industries.
- RTS shares the same experienced management team and drive. RTS is focused on the midstream market with a specialty for slow-speed legacy equipment.



We know rotating equipment.



Values We Honor

Safety Matters Most... Safety is not a gadget but rather a state of mind. We have our slogan, our signs and banners, our tailgate meetings, etc., but more notably, we simply look out for each other.

Customer Commitment... We are completely aligning with our clients and their success, delivering the highest quality, professionalism and ethical standards in everything we do.

Intellectual honesty... Tell it like it is, delivering the truth in direct and straightforward language. We are open to the possibility that our current understanding of the situation could be wrong.

Team attitude... Extending trust, respect, and support in all our interactions, to direct our collective energy at solving our client's problem.



Driven by Our Customer's Needs

- Emissions Compliance
- Power/Revenue Improvement
- Fuel Flexibility
- OEM Dependency
- Parts Availability & Management
- Reliability Improvement
- Maintenance



Safety Matters Most



*It's not just a catch line,
it's a culture.*

For RTS, safety is not a
gadget but rather a
state of mind.

We have our slogan, our
signs and banners, our
tailgate meetings, etc.,
but more notably, we
simply look out for each
other.

Communication is key
to good safety practices.





Turbine Technology Services

We know gas turbines.



We know rotating equipment.

TTS Products and Services



Since 1983, TTS has provided innovation, high quality solutions and engineering expertise to more than 400 clients worldwide.

Our offering to the mature gas turbine market includes:

- Controls and Control Panels
- Gas Turbine Parts Supply
- Conversions, Modifications and Upgrades
- Value Added Technologies
- Engineering and OnSite Services
- Power Plant Services
- DynaFlex Performance Services



We know rotating equipment.

TTS Leadership Team



TurbineTech.com



Our international management team is comprised of power industry professionals with several decades of experience providing gas turbine technology expertise.

From engineering and construction services to consultations and evaluations, our team is highly skilled in all operational aspects of your facility's equipment.



We know rotating equipment.

Controls & Control Panels



Power generated by heavy industrial gas turbines requires sophisticated controls.

TTS has decades of proven experience on all OEM turbine control systems and operating profiles.

Combine our controls experience and gas turbine expertise with an open architecture / non-proprietary solution, and our clients have the ability to:

- Lower overall plant operating costs
- Increase flexibility and availability
- Reduce risks



Gas Turbine Parts Supply



Parts you need, parts we deliver.

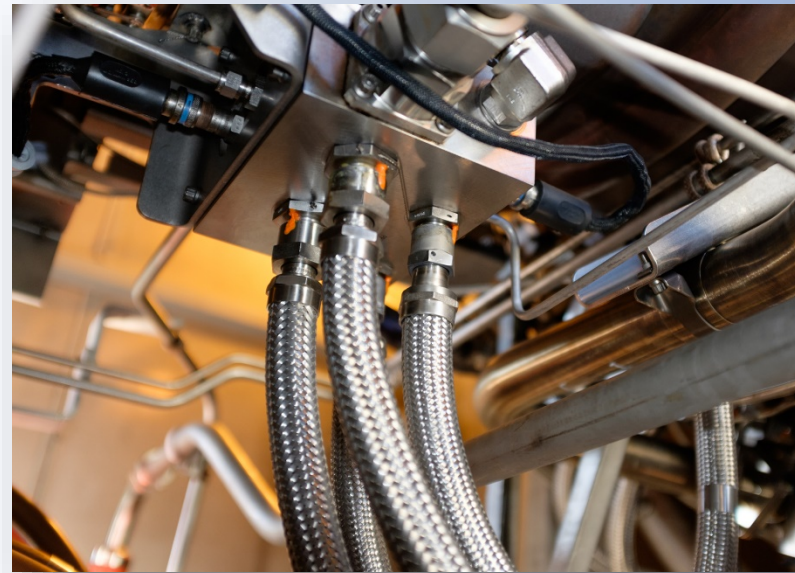
- End Devices
- Unit Spares
- Consumables
- Instrumentation
- Pumps
- Motors
- Valves
- Gaskets
- Nuts, Bolts, Lockplates
- Blade and Vane installation hardware
- Combustion system installation hardware
- Casing bolting
- Thermocouples
- RTD's
- Wiring
- Transmitters
- Switches
- Flame detectors
- Ignitors
- Control system components
- Inlet, exhaust and enclosure hardware
- Fuel nozzle hardware



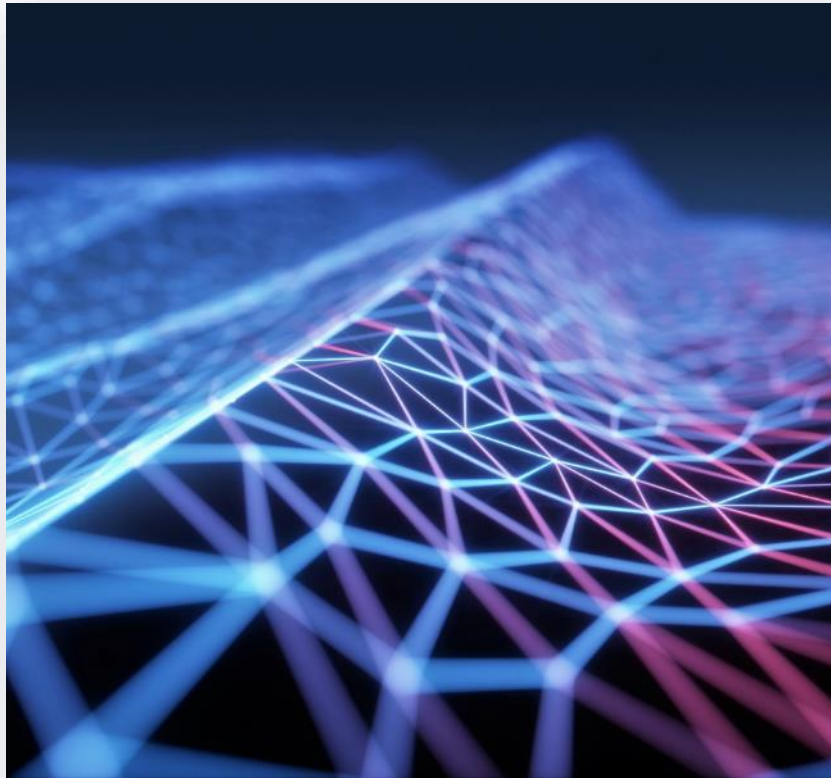
Conversions, Modifications and Upgrades

Increased reliability and efficiency, extended asset life, and reduced operating and maintenance costs.

- Turbine Control Systems
- Fuel Conversion Systems
- Balance of Plant Controls
- Electronic Valve Upgrades
- Auxiliary Systems Conversions
- Emissions Abatement Conversions
- Human Machine Interface
- Monitoring & Diagnostic Systems



Value Added Technologies



Keys to Improving Reliability and Availability

TTS offers three pieces to the puzzle for improving reliability and availability.



Upgrade Replacement HMI for Legacy Systems



The Parts Life Cycle Management Software



Condition Monitoring and Analytics for Gas and Steam Turbines



We know rotating equipment.

Engineering & OnSite Services



TTS has managed or served in leadership roles in commissioning more than 27MM kW.

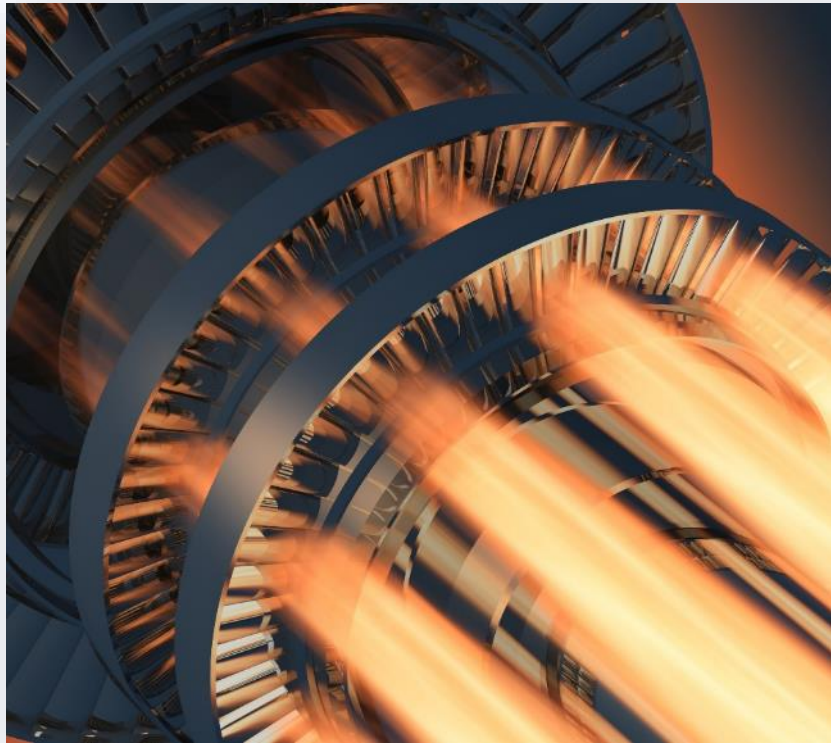
- Commissioning Services
- Consulting
- Instrumentation Calibration
- OEM Controls Engineering

Power Plant Services



- Surplus Equipment & Unit Relocations
- Engineering & Construction
- Site Contract Services
- Portable Power

DynaFlex Performance Services



DynaFlex Performance™ is TTS' platform providing operators a wide range of products and services for maximizing gas turbine output and efficiency, optimizing DLN combustor *dynamics* and emissions, and enhancing operational *flexibility*.

DYNAFLEX™
PERFORMANCE 



We know rotating equipment.





Reciprocating Technology Services

We know recips.



We know rotating equipment.

RTS Products and Services



We believe in working hard, being an advocate for our clients and listening carefully.

What we often hear is a need for a solution that gives us the opportunity to innovate.

Our offering to the gas compression market:

- Overhauls & Repairs
- New & Refurbished Parts
- Upgrades
- Controls & Control Panels
- Performance & Mechanical Analysis
- Troubleshooting



We know rotating equipment.

RTS Leadership Team



Frank Hoegler
President



Allen Laribee
Sales Manager



Tom Anderson
Operations &
Engineering Director



Larry Blaha
Operations Manager



Our extensive pipeline experience, breadth of service portfolio, and expertise in rotating equipment, electrification, automation, and digitalization delivers comprehensive solutions that address today's issues and challenges facing North American midstream operators.



We know rotating equipment.

Midstream Focus



RTS is a provider of commissioning, control solutions and maintenance services for midstream facilities including:

- Inlet stations at their starting points
- Compressors/pump stations along the way
- Terminals and storage facilities (including underground) at their end points.

Overhauls & Repairs

RTS performs overhauls for a variety of large engines such as:

- Enterprise (DeLaval)
- Dresser Rand – Clark©
- Dresser Rand – Ingersoll Rand©
- Dresser Rand – Worthington©
- GE – Cooper Bessemer©
- GE – Superior©



New & Refurbished Parts

Our most sought after deliverables include:

Idler Shaft Bearings

Rod Bearing shims

Main Bearing shims

Check Valves

Check Valves Rebuild Kits

Idler Shaft

Head Kits - Clean Burn

Head Kits - Dirty Burn

Jet Cells

Wesco Fuel Valves

Power Cylinder

Ring Sets

Rod Bearings

Main Bearings

Crosshead Bushing

Piston Carrier Bushing

Piston Carrier Bushing

Master Rod Bushing

Power Pistons

Front Oil Pump Conversion

Fuel Valve Rebuild Kit

Gaskets

O-Rings

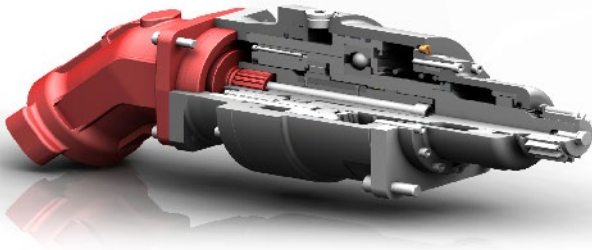


We know rotating equipment.

Upgrades

Despite the fact that overhauls may not happen for ten years some of the machines we work on, need upgrades for compliance, efficiency and reliability such as:

- Emissions and Compliance
- SCR Mapping and NOx Reduction
- Controls
- Engine and Compressor Performance
- Fuel Systems
- Starter Systems - EcoStart Hydraulic Starter Systems



The EcoStart system utilizes hydraulic energy to drive starting mechanisms for recip drivers.

The EcoStart self-contained hydraulic power unit is customized to each engine's specific starting requirements and can be utilized across multiple units to offer an economical, safe and emissions compliant starting system upgrade.



Controls & Control Panels

It's the Smart thing to do...

We Design, Manufacture, Install and Service Recip Control Panels

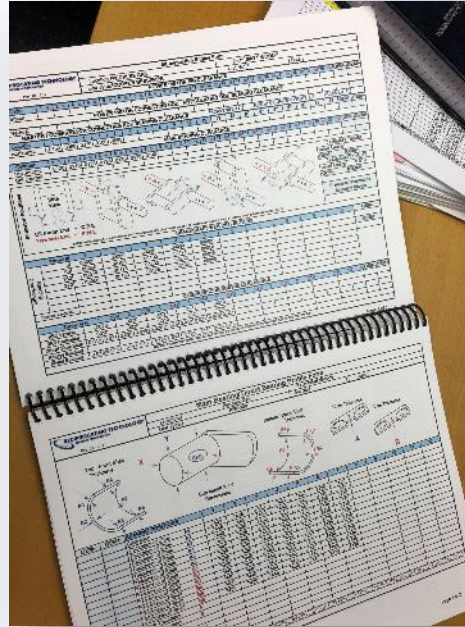
No matter if it is a GE-Cooper Bessemer® 8W-330 with 4,000 HP or, a 12,000 HP Dresser-Rand-Clark® TCVC-20, you have to control all of that power while managing emissions, pressures, temps, vibration, fuel consumption, combustion timing and a million other parameters.

RTS understands power and compressor operations with decades of experience providing us a distinct advantage in assisting you in either upgrading your control systems or building one from the ground up.



Customer Support

- After action detailed reports
- 24/7 Response
- Tooling
- Trained Services Teams
- Customized Training Programs
- Lunch and Learns
- Technical Support



To become comfortable with troubleshooting is one of the primary goals in training a big engine technician.



We know rotating equipment.



Performance & Mechanical Analysis



Engine and Compressor Measurement and Diagnostics for Total Unit Health

- Pressures
- Ultrasonic
- Vibration
- Ignition Integrity
- Horsepower
- Fuel Consumption
- Compressor Efficiencies
- Maintenance and Performance Recommendations
- Emissions Testing



Case Studies



We know rotating equipment.

Case Study

- Brownfield Commissioning



New dynamics on pipeline infrastructure necessitated... *Flexibility.*

Compressor station needed modifications including upgraded controls, valves and piping to make the site capable of flowing gas north or south; whichever direction the market forces demanded.

Turbine Frame 3 upgrades included:

- New dry gas seal system and new seal gas booster pumps.
- Selective catalytic reduction using ammonia.
- New covered ammonia storage tank and AFCU.
- New emission monitoring that is part of the SCR system and CO catalyst.

Turbine Frame 5 upgrades included:

- New regenerator.
- New suction throttling valve.
- Updated PLC software for the valve control.
- New equipment enclosure for SCR control panel and for power distribution panels.

Reciprocating engine upgrades included:

- New high-pressure fuel injection clean burn system.
- New PLC unit panel.
- New RTU enclosure for the three recip fuel meter runs.
- New dryer for the compressors in the pump room.
- New JW boiler system with a small electric fuel gas heater.
- New 5kva UPS system.



Case Study

- Greenfield Control Panels & Commissioning



265,000 HP Under Control

On June 13, 2016 a Texas pipeline company was awarded a 168-mile intrastate gas pipeline project by the Comisión Federal de Electricidad (CFE) – Mexico’s state-owned utility serving 37 million customers – to provide natural gas transportation services beginning in 2018 to meet Mexico’s growing electric generation needs.

The planned facilities include: 168 miles of intrastate pipeline, a compressor station located near Agua Dulce, TX with a total of 168,980 HP and a compressor station located near Brownsville, TX with a total horsepower of 96,560 HP.

That’s over a quarter million HP that needs to be managed and controlled. TTS was awarded the building and commissioning of the pipeline station control panels (SCP) and Emergency Shutdown Panels (ESD) for both facilities – 34 control panels total.

“The project is coming together very well. It won’t be long till we’ll be pushing gas into Mexico. On-time execution makes money.” Plant Manager.





TTS ENERGY SERVICES

Capabilities

TTSEnergyServices.com

TTSMidstream.com

TurbineTech.com

RecipTech.com



We know rotating equipment.