Industrial gas turbines are essential elements in the modern energy infrastructure. In power stations they generate a growing percentage of the world’s electricity. As giant pumps they create the working pressure inside natural gas distribution networks. While gas turbines keep hospitals lit, factories turning and homes warm (or cool) all over the world, Meggitt’s industrial control valves and systems, continuously developed over more than 20 years, help them do it efficiently, safely and reliably.

Meggitt’s valves are accurate, precise and trustworthy, providing gas turbines with the consistent control they need to perform at peak efficiency. The accuracy and stability of our fuelling systems cuts maintenance costs, fuel consumption and carbon emissions. Fast and resilient, our hot air purge and blow-off valves optimise important operational procedures like fuel purging and load shedding, increasing safety, efficiency and reliability. If a throttle sticks open, our fail-safe fuel shut-off valves are frequently all that stands between a turbine shutdown and a multi-million-dollar repair bill. Often fitted in pairs to provide dual redundancy, they are highly reliable and very fast-acting.
WHY WE ARE NEEDED

It’s a hot summer’s day in Los Angeles, with the city’s air conditioners turned to ‘max’, when a local power station drops a generator. A leak in its ageing hydraulic control pipework has caused a pressure drop, automatically triggering a fail-safe fuel shut-off valve. Homes and businesses across the city have their electricity supplies disrupted while 50 megawatts of replacement capacity is found. As long as the turbine lies idle the operator’s revenue losses mount at $150,000 an hour.

India’s natural gas supply backbone is still bedding in, vulnerable to repair and maintenance delays caused by poor infrastructure, extreme weather and remote, inhospitable locations. When lightning strikes a poorly-earthed controller and knocks out a compressor, half the country could lose its gas supply if the problem isn’t fixed quickly. Without spare parts handy, it could take days, if not weeks, to fix.

Offshore gas platforms often rely on gas turbines to power everything they do. When a turbine shuts itself down unexpectedly due to a potentially serious fault condition that cannot be corrected while the machine is running, production is suspended. With the weight of the Gulf of Mexico bearing down on all that gas, pressure at the wellhead is so great it can’t simply be turned off. And if the gas can’t be consumed or processed, it must be flared. Until that turbine is back on line, they might as well be burning bank notes.

For gas turbine manufacturers and their customers, ultra-high reliability is the number one priority. Meggitt’s industrial gas turbine controls deliver what they need.

EXTREME ENVIRONMENTS

Meggitt’s industrial valves and control systems are derived from our own aerospace technology, famous for its low weight, precision and resilience in the extreme environment of an aircraft engine bay. Controlling land-based industrial gas turbines is equally challenging.

They must work hotter and harder than an aircraft engine, round-the-clock, day in, day out, running at or near full-load, like an aircraft permanently taking-off. They must shrug off some of the planet’s most challenging operating environments: from the hot sand and dust of the Saudi desert, to the salty gales of the North Sea, or the icy tundra of Arctic Canada.

Even so our valves are very low maintenance. Made entirely of stainless steel and other durable materials, many a ten-year-old Meggitt valve looks almost as fresh as the day it was installed, needing no more than a routine refresh. Turbine manufacturers know they can expect our valves to operate trouble-free for many years.

PIONEERING ‘MORE ELECTRIC’

High performance, low cost of ownership

We pioneered the fast, precise and reliable electric actuation of gas turbine control valves in the 1990s. Two decades of continuous development later and Meggitt is still an industry leader. Our electric valves are the most accurate, reliable and fast-acting industrial gas turbine controls available – and yet they are easy to maintain and cost less to own.

More electric means less cost

- Exceptional accuracy
- Lightning-fast operation
- Low-cost OEM installation
- Clean and maintenance-free
- Low running costs

SMART DESIGN BEATS BRUTE FORCE

We use smart engineering design to unlock the huge potential of electric actuation. The massive, brute-force actuators seen on many competitor valves are there simply to overcome enormous working pressures. Our aerospace experience told us there was a better way.

By carefully balancing internal pressures we are able to minimise the forces needed to actuate our valves. Smaller actuation forces allow us to use much lighter moving parts, thereby reducing inertia and greatly increasing operating speeds in time-critical applications. Less bulk also implies more efficient use of expensive, corrosion-resistant materials. Our sculpted valve bodies save weight, reduce cost and at the same time help cool our super-fast electric actuators.

Meggitt can design, test and manufacture industrial control valves with electric, hydraulic or pneumatic actuators, configured for OEM applications, aftermarket replacement or retrofit.

All our valves are designed for use on multiple-combustor, dry low emission and single-combustor turbines.
**Product highlights**
- All stainless steel construction — corrosion-resistant, long service life
- Custom design — to accommodate specific customer demands precisely
- Small and light — easy to fit, exchange and maintain
- Balanced forces — low inertia, fast response
- Precise and stable operation — reduced fuel consumption and emissions
- Resilient — operating temperatures up to 600°C (1100°F) and pressures up to 1500psi
- High speed, brushless, servo motors — super-fast and very reliable
- Zero maintenance under normal conditions
- Low cost of ownership

**PURGE VALVES**

Compressor bleed air is used to perform many vital ancillary gas turbine functions, including combustor fuel purging. Many industrial gas turbines are ‘dual fuel’, running on diesel as well as natural gas. When switching back to gas, even small amounts of residual diesel would quickly ‘coke up’ the fuel delivery tubes and nozzles if the combustor was not first cleaned — or ‘purged’ — using hot, high pressure bleed air from the turbine’s compressor.

Meggitt’s sleeve-style, hot air purge valves control this important process with exceptional reliability, speed and precision. The low weight and compactness of our purge and vent valves caused a sensation when they were first introduced.

- Our purge valves last between 10 and 20 years, despite the 600°C (1100°F) operating environment.
- Special contouring and material sculpting helps keep our actuators cool.
- Fast full-stroke performance is achieved by carefully balancing pressure forces.
- Meggitt purge valves are fitted by major gas turbine manufacturers around the world, already noting up more than 100 million field operating hours.

**FUEL METERING**

Fuel metering valves are a gas turbine’s throttle control. Industrial gas turbines generate power from the expansion of gases when fuel and air are burnt together. The proportions of the fuel and air mixture decide how fast the turbine spins and how much power it makes. Accurate and consistent fuel metering is vital to a turbine’s efficiency and reliability.

Meggitt’s sleeve- and globe-style fuel metering valves deliver a super-fast, 100 millisecond full-stroke response time. Along with their exceptional flow and positional accuracy, our precision fuel control valves work in tandem with our customers’ highly accurate engine control systems to provide excellent fuel efficiency and low emissions.

Originally developed for 20-to-60 megawatt aero-derivative gas turbine engines, the Meggitt product line has been expanded to include precision electric control solutions for aero and large frame engines.

**FUEL SHUT-OFF**

These failsafe valves are an industrial gas turbine’s crisis kill-switch. Deployed in pairs to provide dual-redundancy, they are the most important control device attached to any industrial gas turbine.

Meggitt’s high temperature, poppet-type fuel shut-off valves are extremely reliable, with more than 100 million field operating hours to their credit.

They are also super-fast, closing completely within the critical time window of just 100 milliseconds. Why 100 milliseconds? That’s all the time it takes — less than half the blink of an eye — for a turbine with its ‘throttle’ stuck open to turn a fuel metering malfunction into a multi-million dollar repair to shaft and blades.

**ALL IN ONE: TEST CELL FUEL METERING SKIDS**

Industrial gas turbines are tested extensively by OEMs prior to delivery and periodically removed from service for routine overhaul and retest in an OEM-accredited service centre.

Turbine test cells must replicate many different control infrastructures to accommodate and test-run a wide range of turbine models prior to recommissioning.

They do this by using movable fuelling ‘skids’; compact, manoeuvrable, self-contained systems that can be wheeled into position to provide any turbine with the fuelling systems it needs to be put through its paces in a safe and precisely-controlled manner.
Meggitt’s most recently delivered test-cell fuel ‘skid’ is the single largest fuel system we have ever made. Weighing around 2,000 lbs, its complex arrays of state-of-the-art valves and controllers — including six separate fuel delivery rails — can accommodate every GE LM engine model, including the latest LM2500+ G4. This is GE’s latest most powerful and most efficient of the LM2500 family of marine gas turbines, comprising five separate combustor manifolds. The skid can be customised readily to suit a wide range of other applications.

CUSTOM DESIGN AND CUSTOMER PARTNERSHIP

Close customer collaboration is an operational touchstone at Meggitt.

We first started making industrial gas turbine controls because many valves were off-the-shelf and a poor functional fit for customers’ often unique technical requirements.

Today, while we maintain a large and diverse catalogue of industrial control valves and systems, we remain a custom design house at heart.

The numerous variables in a typical industrial gas turbine installation ensure that almost every valve we make is a unique, engineered product, tailored to a very specific application and developed in close partnership with our customer.

WHO WE WORK FOR

OEM
General Electric, Rolls-Royce Energy, IHI, Siemens and Kawasaki to name a few

Aftermarket
Alliance Pipeline, Trans Canada Turbines, VBR, Wood Group, Petrobras, MTU, Stat Oil amongst many

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INDUSTRIAL GAS TURBINE CONTROLS
Just one of the Meggitt capabilities covered in Meggitt in a Minute, the group’s e-tour.