

**Improve Reliability of
Turbomachinery Lubrication
and Sealing Systems**

Fisher™ Pressure Control Solutions
For Turbomachinery Applications



Protect the integrity of your Turbomachinery support system

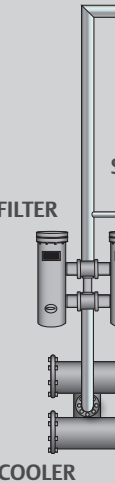
Turbomachinery lubrication and sealing systems play an integral role in keeping your plant up and running. Robust pressure control is required for reliable operation of these systems. Therefore, selecting the right pressure control solution is critical. Typical pressure control challenges are:

- Speed of response of the pressure control devices
- Incorrect sizing and selection of pressure control solutions
- Unstable operation of the pressure control devices

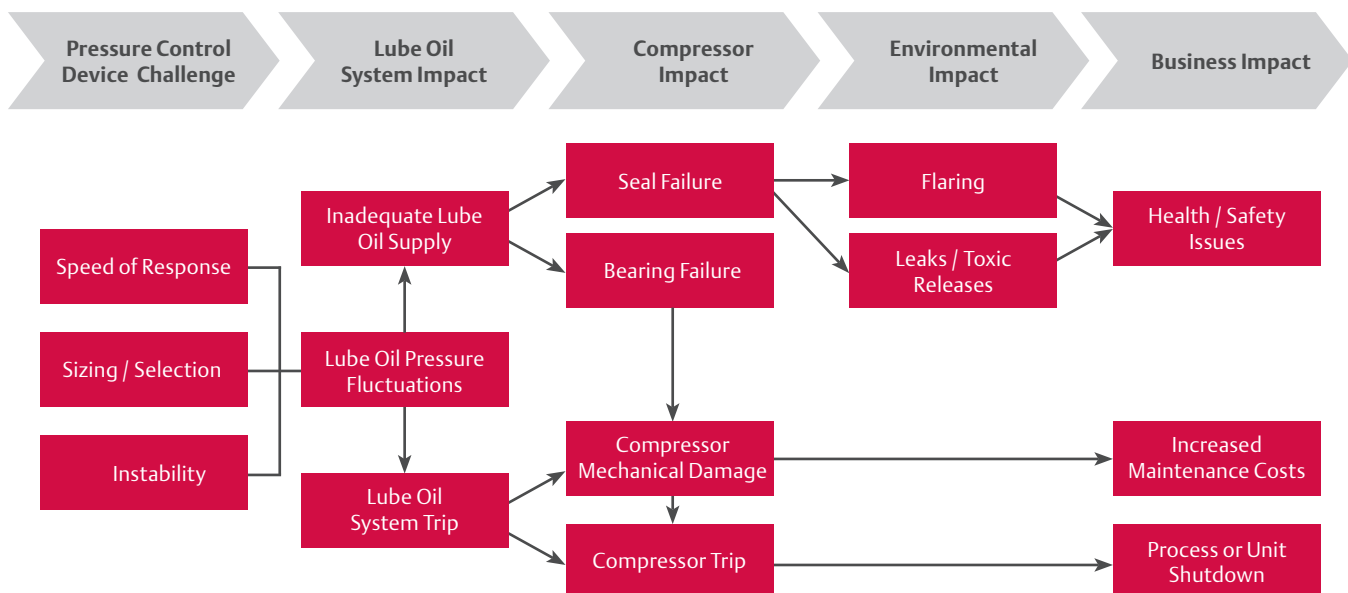
These challenges could result in unplanned shutdowns, increased maintenance costs and personnel health and safety issues.

Consistent pressure is crucial

Lube oil consoles are used in conjunction with rotating equipment. They supply the pressurized lubricating oil that is required for the seals and bearings of rotating equipment. Maintaining a constant supply of pressurized oil flowing throughout the console is key to rotating equipment longevity.



Pressure Control Challenges Could Significantly Impact Your Business



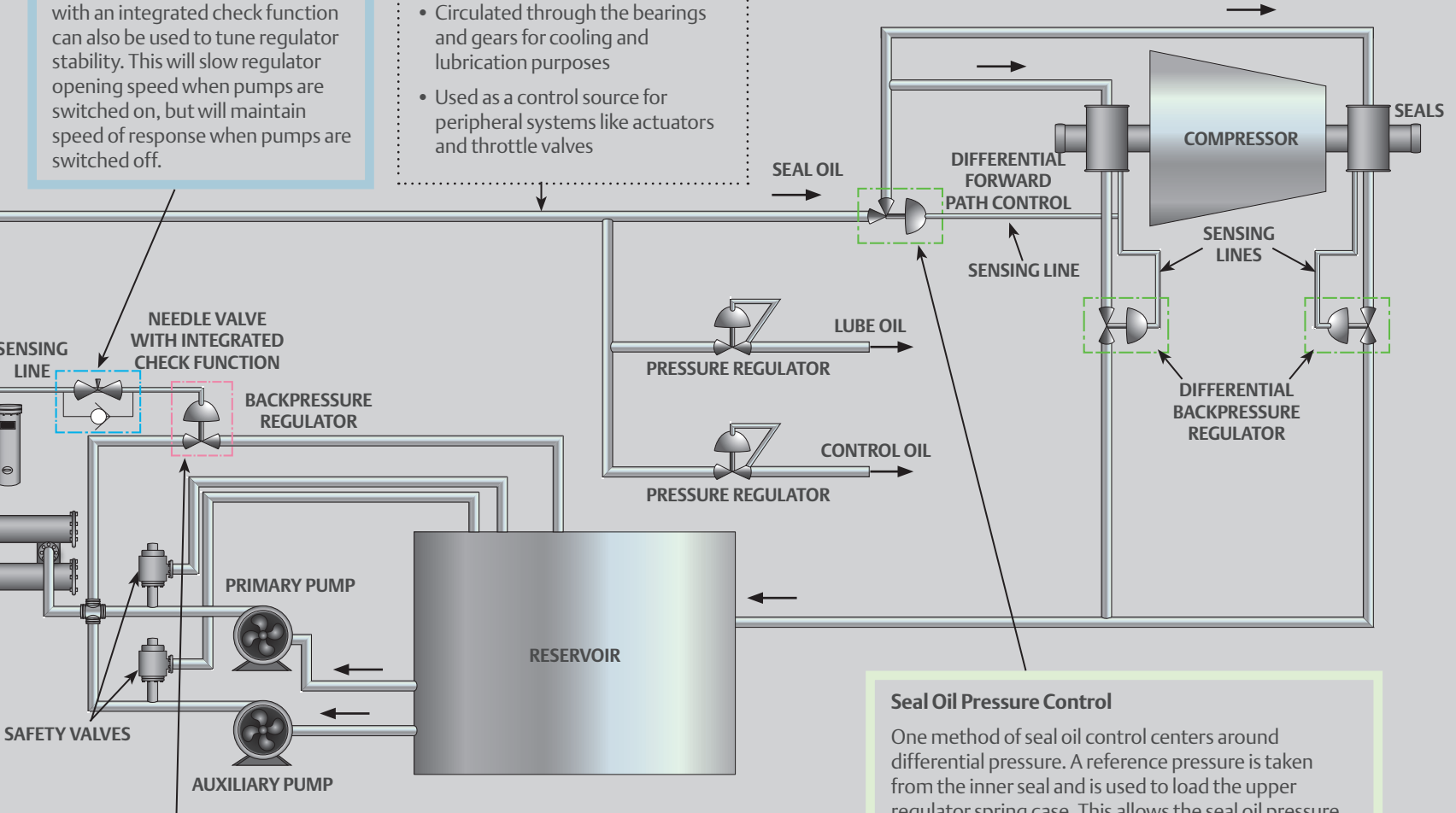
Tuning Backpressure Regulators

Regulator stability is a critical factor to consider in a lube oil console because rapid flow changes will occur in the system. Since most backpressure regulators will be external sensing, it is imperative to follow control line installation recommendations. A needle valve with an integrated check function can also be used to tune regulator stability. This will slow regulator opening speed when pumps are switched on, but will maintain speed of response when pumps are switched off.

Lube / Seal Oil System

Lubricating Oil Uses

- Used on rotating equipment seals to keep process media separated from atmospheric conditions
- Circulated through the bearings and gears for cooling and lubrication purposes
- Used as a control source for peripheral systems like actuators and throttle valves



Lube Oil Header Pressure Control

Lube oil header pressure can be generated by a two-pump system, where one pump acts as the system primary and the other pump operates as an auxiliary. These pumps can switch back and forth, causing sudden high-flow changes that must be controlled by a backpressure regulator. This header will typically include a filter and intercooler to keep lubricating oil free of debris and cooled, respectively. The backpressure regulator senses pressure downstream of the filter and intercooler to keep the pressure regulated into the downstream equipment.

Seal Oil Pressure Control

One method of seal oil control centers around differential pressure. A reference pressure is taken from the inner seal and is used to load the upper regulator spring case. This allows the seal oil pressure to rise in tandem with the inner seal pressure.

The two methods of control are forward path control or backpressure control. Forward path control focuses on maintaining downstream pressure through the seals, while backpressure control senses upstream pressure and allows excess pressure to bleed past the regulator downstream into the oil reservoir.

Emerson offers a broad portfolio of turbomachinery pressure control solutions that address these challenges and minimize the associated impacts. Fisher™ direct operated regulators provide the fast speed of response and precise control required for reliable operation of small, medium or large lube/seal oil systems. Our solutions are easy to size and maintain and they meet the API 614 standard for lube/seal oil systems.

Extend the life of your pressure control devices

Dry Gas Seal Systems are also used to provide a barrier that prevents process gas from escaping the compressor case to the atmosphere. However, these systems use gas as the sealing medium instead of oil.



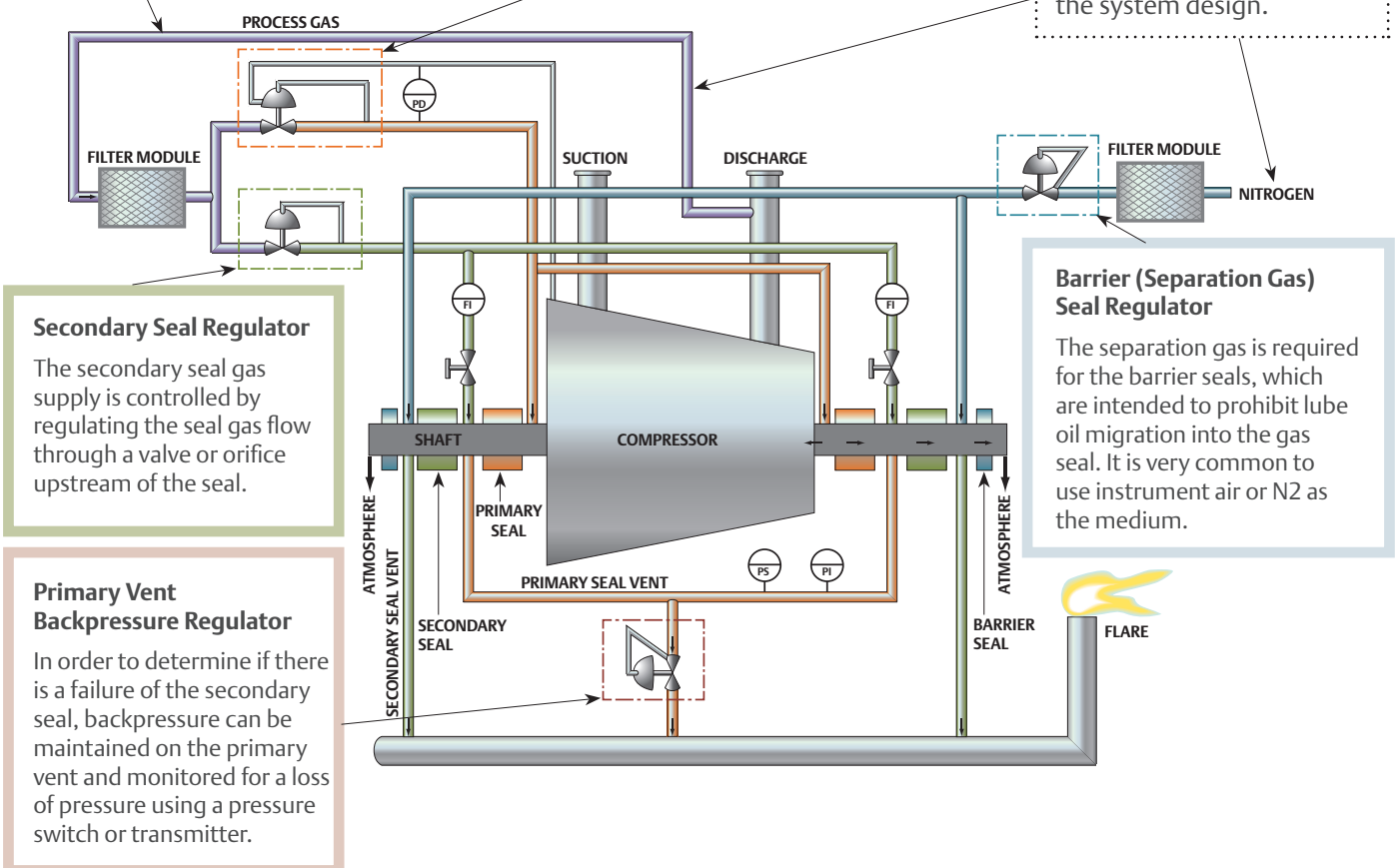
Seal Gas

The seal gas source must be available at sufficient pressure to cover the entire operating range of the compressor including transients. The seal gas should be at least 50 psi above the required sealing pressure. The industry standard is to use the compressor discharge, but quality and composition of the gas is extremely important. Seal gas should be free of solids greater than 10 microns and 99.97% liquid free.

Primary Seal Regulator

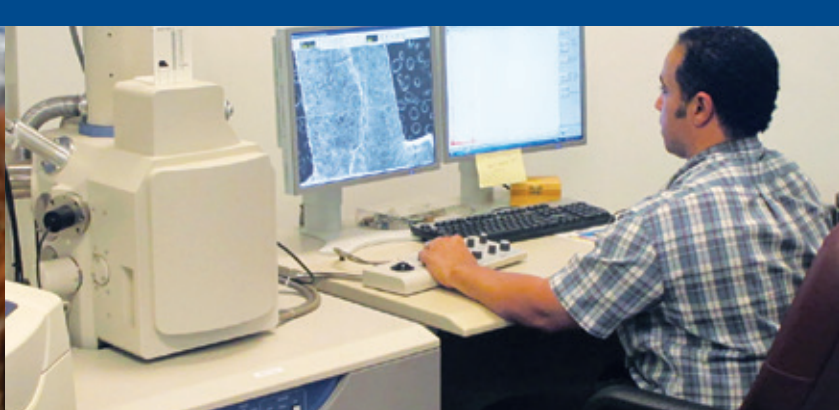
The primary sealing gas is controlled with differential pressure (DP). DP systems use a differential regulator to control the supply of seal gas to the seal by regulating the seal gas pressure to a predetermined value (typically 10 psi) above a reference sealing pressure.

Additional regulators may be required on gas systems to allow for multiple pressure cuts depending on the system design.



Innovative high pressure solutions for harsh environments

Dry gas seal systems typically require regulators that can withstand high loading pressures. Emerson offers solutions that were specifically designed to meet these high pressure requirements. Process gas can often contain sour gas contaminants, leading to valve wear and unplanned shutdowns. Emerson's portfolio includes NACE compatible materials which extend regulator service life in sour gas environments.



Over 50% of unplanned shutdowns are related to human factors. Rely on Emerson™ for expert assistance and training.

Minimize unscheduled downtime by increasing your knowledge

Expert help when you need it the most

Emerson state-of-the-art flow and materials labs provide an extensive worldwide network of engineers, application experts and sales professionals to help you size, select and troubleshoot your pressure regulators. Emerson test and evaluation teams provide flow, material and environmental testing under real-world operating conditions before you place them in your application.

Training to help you effectively maintain your systems

No other regulator manufacturer in the world offers more products and local services dedicated to safe, effective applications than Emerson. We strive to be the leader in training pressure control personnel.

Emerson offers a wide array of onsite and offsite training for all levels of your organization. Together with our local business partners we work with you to develop training that fits the needs of your team, whether it is application training for engineers, operational training for operators or maintenance training for technicians. With our courses, your personnel can learn to:

- Perform maintenance on regulators and relief valves
- Troubleshoot field problems
- Understand the influence of the service environment on regulator performance
- Properly size regulators and relief valves

Global Support and Service

Emerson has more than 2000 technical experts in nearly 200 offices; application support is just a call or click away.



Broad Portfolio. Robust Control. Reliable Operation.

PRESSURE REDUCING REGULATORS

MR95 Series



Body Size
NPS 1/4, 1/2, 3/4, 1,
1-1/2, 2 / DN 8, 15,
20, 25, 40, 50

Max Inlet
1000 psig / 68.9 bar

Outlet Range
2 to 400 psig /
0.14 to 27.6 bar



BACKPRESSURE REGULATORS

MR98 Series



Body Size
NPS 1/4, 1/2, 3/4, 1,
1-1/2, 2 / DN 8, 15,
20, 25, 40, 50

Max Inlet
600 psig / 41.4 bar

Outlet Range
2 to 375 psig /
0.14 to 25.9 bar



Type MR105



Body Size
NPS 1, 2, 3, 4 /
DN 25, 50, 80, 100

Max Inlet
400 psig / 27.6 bar

Outlet Range
5 to 300 psig /
0.34 to 20.7 bar



Type MR108



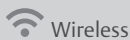
Body Size
NPS 1, 2, 3, 4 /
DN 25, 50, 80, 100

Max Inlet
400 psig / 27.6 bar

Outlet Range
5 to 300 psig /
0.34 to 20.7 bar



FEATURES AVAILABLE:



Wireless



Internal Sensing



External Sensing



Differential Control



Travel Indicator



Get real-time performance feedback

Wireless position indicators can be used to detect and troubleshoot regulator problems on your existing control system, before they impact your operation. They are great for users who need constant feedback about their regulator status. They can be mounted on various regulators to indicate real-time regulator performance, long-term degradation or a step change in process conditions.

Installation best practices to reduce instability and improve regulator operation

Proper installation of a regulator minimizes shutdowns and helps ensure safe equipment operation.

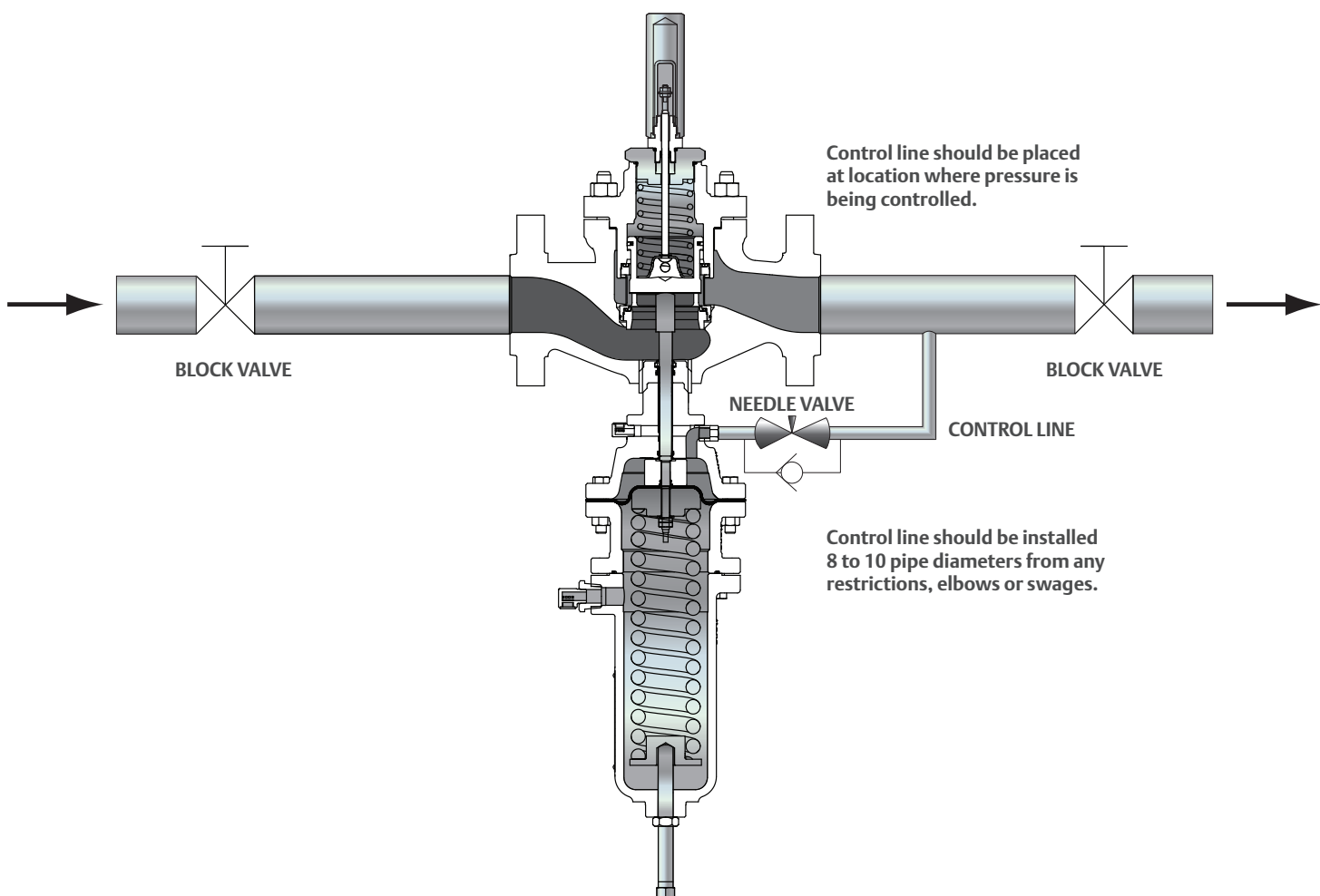
1. Control line placement

- Ensure control line is placed 8 to 10 pipe diameters from any restrictions or elbows
- If control line distance is more than 20 ft., increase control line size to account for line loss
- Ensure control line is located at desired pressure control point

2. To reduce instability

- Consider the use of a needle valve with an integral check valve to allow for tuning of regulator response speed
- Ensure proper valve sizing since an overly sized regulator considerably increases the probability of system instability
- For Fisher™ products utilizing a cage style design, consider switching to a linear or equal percentage cage for better low flow stability

Type MR105 Operational Schematic



Comprehensive Fisher™ Pressure Control Solutions for Optimal Turbomachinery Performance.



FISHER™

Our distribution network offers a full complement of sales and support staff, and more than 2000 technical experts strategically located across nearly 200 locations.

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