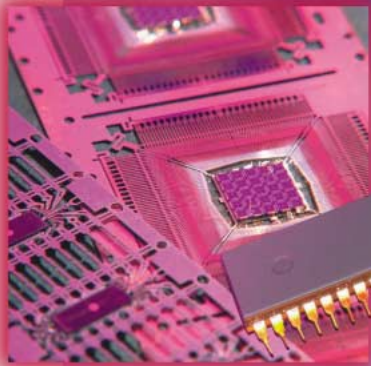


TEMPERATURE SENSORS WIRE AND CABLE

NEW HEIGHTS

IN

SENSING



· INNOVATION · & EXPERIENCE

· For over 80 years,
· Watlow's expertise
· and leadership
· have been proven
· in many industries.
· Our vast experience
· enables us to under-
· stand and solve your
· application problems.

· Aerospace

· Aircraft bonding

· Automotive and
· agricultural vehicles

· Cryogenic
· applications

· Engine test stands

· Food and beverage,
· including dairy

· Foundries

· Furnace survey work

· Glass, ceramic and
· brick manufacturing

· Heat treating and
· load thermocouples

· Incineration

· Industrial equipment
· testing

· In-house product
· testing

· Laboratory research
· and development

· Nuclear and
· conventional electric
· power plants

· Petrochemical plants

· Pharmaceuticals

· Plastics

· Semiconductor
· processing

· Steel, aluminum
· and other primary
· metal plants

· Vacuum heat treating



Air compressor temperature sensor

To sense over-temp conditions on industrial air compressors, Watlow developed the world's only positive temperature coefficient thermistor with a built-in thermal fuse. This produced an easy-to-install field retrofit kit.



PRECISE TEMPERATURE— THE CRUCIAL ELEMENT IN ANY INDUSTRIAL PROCESS

Achieving specified temperature levels is critical to your industrial process. It's imperative that temperature sensors are designed and manufactured to meet your specifications for accuracy and reliability. Watlow is committed to providing you with the most accurate, high-integrity temperature measurement products possible, from cryogenic to extreme high temperature refractory applications.

THE MOST COMPLETE LINE IN THE INDUSTRY

Watlow offers from stock the greatest breadth of contact temperature measurement sensors and related components. Whatever your contact temperature sensing need we can provide the optimum configuration, with the accuracy you require. Your thermal system can benefit from faster response time, longer service life and tighter accuracy. We can provide the following in ten days or less:

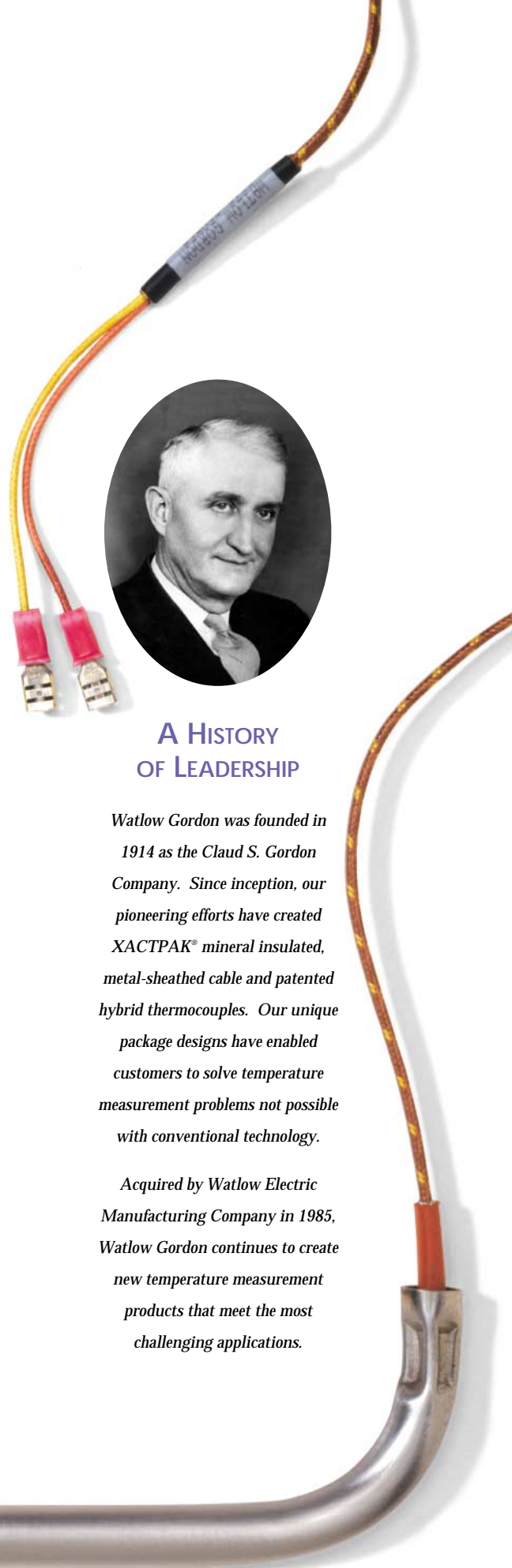
- Thermocouples from cryogenic -328°F (-200°C) to refractory 4200°F (2315°C) applications.
- RTDs with greater durability, accuracy and a high degree of interchangeability, including the industry's smallest sizes.
- Thermistors for fast response; available in a wide variety of base resistances.
- Custom molded packaging, using insert or injection molding to produce complex designs. Sensors are combined with transitions, housings, handles

and connectors to meet your requirements—including FDA, NSF and other agency approvals.

- SERV-RITE® thermocouple and thermocouple extension wire in more types and varieties of insulation than any other manufacturer.
- XACTPAK® MI metal-sheathed cable to withstand hostile atmospheres; available in sheath materials to fit your application exactly.
- Thermowells and protecting tubes available in standard and custom sizes, and in a variety of materials for virtually all applications.
- Connector and jack panel systems featuring standard size and miniature connectors, along with standard and high temperature versions.
- Extensive hardware to facilitate connections, terminations and mounting.

UNMATCHED SOURCE FOR THERMAL SYSTEM COMPONENTS

Watlow Gordon, and its parent company Watlow Electric Manufacturing Company, can provide single-source responsibility for the components of your entire thermal system. Whether it uses conduction, convection, immersion or radiant heat, Watlow can be your heat solutions resource. We've proven our leadership in developing new temperature measurement products, heater technology, and advanced temperature and power controls.



A HISTORY OF LEADERSHIP

Watlow Gordon was founded in 1914 as the Claud S. Gordon Company. Since inception, our pioneering efforts have created XACTPAK® mineral insulated, metal-sheathed cable and patented hybrid thermocouples. Our unique package designs have enabled customers to solve temperature measurement problems not possible with conventional technology.

Acquired by Watlow Electric Manufacturing Company in 1985, Watlow Gordon continues to create new temperature measurement products that meet the most challenging applications.

Diesel engine monitoring

Diesel engine sensor measures the temperature of exhaust gas in each cylinder of high horsepower diesel and gas engines. Sensor needed to be capable of operating in conditions of high vibration and shock, high humidity including washdowns and temperatures ranging from -40°F to 1400°F. This sensor is oil and fluid resistant and highly reliable with a warranted long life.



UNEQUALED ENGINEERING EXPERIENCE

Watlow has produced well over 300,000 custom designs and produces more exotic high-end sensors than anyone in the industry. Our engineers have broad experience in many industries, solving demanding application challenges. This experience base allows our engineers to quickly develop the best approach to any application problem. We offer complete prototyping and testing capabilities—sometimes designing, producing, testing and shipping in one day!



VERTICALLY INTEGRATED CONTROL OF MANUFACTURING

Watlow is a vertically integrated manufacturer of temperature sensing products. Our quality starts at the source of raw materials to produce consistent, accurate products.

From our state-of-the-art manufacturing and laboratory facilities, we can provide the testing, calibrating and compliance you require in accordance with American Society for Testing and Material Standards—all traceable to NIST standards (formally NBS).

SENSORS MANUFACTURED TO RECOGNIZED STANDARDS

THERMOCOUPLES, RTDs & THERMISTORS

Thermocouples—All Watlow thermocouples are manufactured in accordance with ANSI MC96.1 and ASTM E585 or E608 specifications. To ensure the greatest repeatability of readings in service, our advanced facilities have specially designed equipment, calibrated to NIST standards, that provide an optimum temperature profile for sensor calibration. This includes freeze point cells to expand calibration capabilities and act as a further exact reference. Calibration is available from -100 to 2600°F (-79 to 1427°C) plus selected gas temperatures; from liquid nitrogen -320°F (-196°C) to dry ice -108°F (-78°C).

RTDs—Highly accurate platinum RTDs (resistance temperature detectors) and RTDs using other alloys can be manufactured in rugged packages. In cases where space for sensor location is tight, we manufacture the smallest RTDs in the industry. Our RTDs offer a high degree of interchangeability.

All thermocouples and RTDs are calibrated with NIST traceable standards. Additionally, all EMF vs. temperature calibration procedures follow one or more of the following:

- AMS 2750C
- ANSI Circular MC96.1-1982
- ASTM E207, E220 and E230 (ANSI Approved)
- ASTM STP 470B
- ASTM E644 for RTDs
- NIST Special Publication 250-35

Thermistors—Available in a variety of negative and positive temperature coefficients.

All Watlow sensor products are made highly adaptable through our custom molded package design capability.



SERV-RITE INSULATED WIRE & EXTENSION WIRE

Watlow supplies SERV-RITE thermocouple and extension wire in the largest variety of wire types, lead configurations and insulation combinations. Custom constructions are available on short notice, including UL® listed PLTC applications.

Quality assurance for SERV-RITE wire is in accordance with MIL-Q-9858. All EMF vs. temperature calibration procedures follow one or more of the following standards:

- ASTM E270 and E220 (ANSI Approved)
- NBS Circular 590

ISO 9001



Registered Company
Richmond, Illinois USA

XACTPAK MINERAL INSULATED, METAL-SHEATHED CABLE

Watlow helped pioneer XACTPAK mineral insulated, metal-sheathed cable for demanding and hostile applications that would quickly destroy conventional wires and cables.

The outer sheath can be made from any malleable metal in a wide range of diameters, containing single or multiple wires. Easily formed or bent, it can accommodate virtually any configuration.

The available mineral insulations provide excellent high tempera-

ture dielectric strength to ensure signals are generated and carried faithfully to your instrumentation or controls.

XACTPAK is available with the following:

- Standard and special calibrations
- Compliance with recognized agency tolerances and specifications
- A variety of sheath materials to withstand hostile and corrosive environments
- Calibration for intended temperature range
- Temperature ranges from -32 to 2700°F (-35 to 1482°C)

DESIGN OPTIONS TO MEET YOUR SPECIFIC APPLICATION

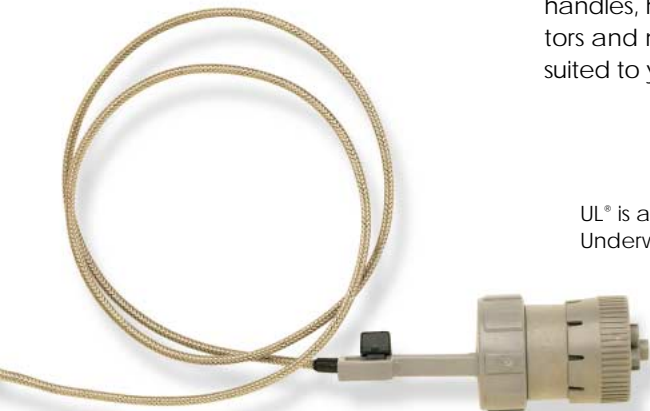
All Watlow sensor products are made highly adaptable through our custom molded package design capability.

When your application requires sensor packaging to withstand operating conditions or appearance requirements, Watlow has the experience and resources to design and manufacture the optimum solution. Our in-house insert and injection molding facilities enable us to combine sensor, probe sheath, transitions, handles, housings, cords, connectors and more, into the design best suited to your needs.

UL® is a registered trademark of Underwriter's Laboratories, Inc.

Turbine engine exhaust gas temperature sensor

The F-16 exhaust gas temperature sensor employs a unique sensor wear-sleeve design. This eliminated the weak points caused by welds in competing designs. In over 10 years there has not been a single failure





- Optical comparator
- RTD - Minimum immersion length
- RTD - Thermoelectric effect
- RTD - Self-heating
- Spurious EMF
- Tensile elongation
- Thermal cycling
- Time response
- Vibration resistance
- X-ray examination

LABORATORY SERVICES

We dedicate ourselves to providing qualified in-house laboratory services that prevent defects and assure full compliance to all customer performance standards. The Watlow Calibration Laboratory is operated in complete accordance with MIL-STD-45662 and ISO 10012-1. All data is stored and traceable in our computer. Special documentation packages, including certificates of compliance, can be tailored to meet your unique needs. A separate Product and Reliability Testing Laboratory is also maintained to service design characterization or performance boundary testing requirements.

Laboratory services can provide the following tests:

- Abrasion resistance
- Compaction density
- Corrosion - Molten aluminum
- Corrosion - Sulfuric acid
- Dielectric strength
- Drift
- End-to-end calibration (AMS 2750C)
- Electrical resistance
- Flammability
- Helium leak
- Humidity
- Insulation resistance
- Liquid penetrant
- Metallographic examination
- Micro-hardness

DEPENDABLE FIELD ENGINEERING

Our sales engineers can answer the toughest temperature measurement questions. Their extensive factory training and experience, backed by our engineering, laboratory and production personnel, helps them determine what will work best in your application.



FAST PRODUCT DEVELOPMENT

Our factory and field engineers have the experience to conceive, prototype and produce finished sensors in time frames uncommon to the rest of the industry. This includes the ability to create completely unique designs tailored to your sensing needs.

FAST, DEPENDABLE SHIPMENT

ORDER BY 11:00 A.M.—SHIP BY 3:00 P.M.

Watlow's extensive inventory makes same day shipment possible on many stock products including sensors, wire and cable products. Fast turnaround on made-to-order items is possible through "work teams," made up of tightly knit engineering, production,





Just-Time



marketing and customer service personnel.

Watlow can also provide you savings by shipping to meet just-in-time production schedules. Many customers recognize our quality and certify "ship-to-stock" without auditing.

With Watlow, you can also expect:

- 10-Day, or better, shipment on all standard and most custom sensor assemblies
- One and three-day shipment programs also available

GLOBAL MANUFACTURING FACILITIES MEET THE DEMANDS OF A WORLD ECONOMY

Watlow is a global supplier, manufacturing products to standards recognized worldwide. As evidence of our commitment, we've implemented the ISO 9000 standard quality system. This assures we will have the facilities and personnel needed to meet the challenges of an ever increasing world economy.

With manufacturing facilities in the United States, Europe and the Far East, we can meet the special demands of your global operations. Our standard-setting products are available worldwide with quick shipment.

Currently, Watlow's export department services over 40 countries.

DISTRIBUTION NETWORK SPEEDS CUSTOMER SERVICE

Strategically located in major industrial and commercial centers around the world, our extensive network of authorized distributors can offer technical support on a broad range of temperature measurement applications. They also maintain large inventories of stock products available for immediate shipment.

DEDICATED TO YOUR SUCCESS

Watlow believes in partnerships and investing in the success of your temperature measurement needs. We dedicate ourselves to your service with innovative sensor, wire and cable products that will meet, and exceed, your temperature measurement challenges of today and tomorrow.

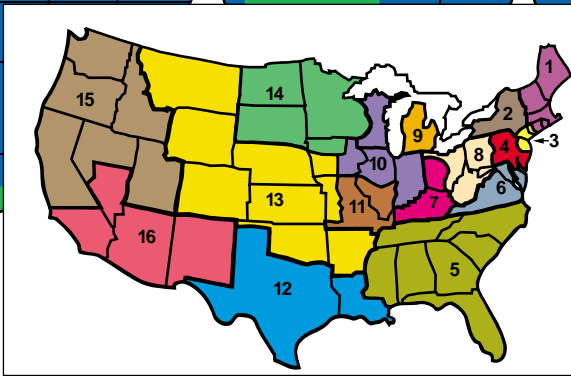
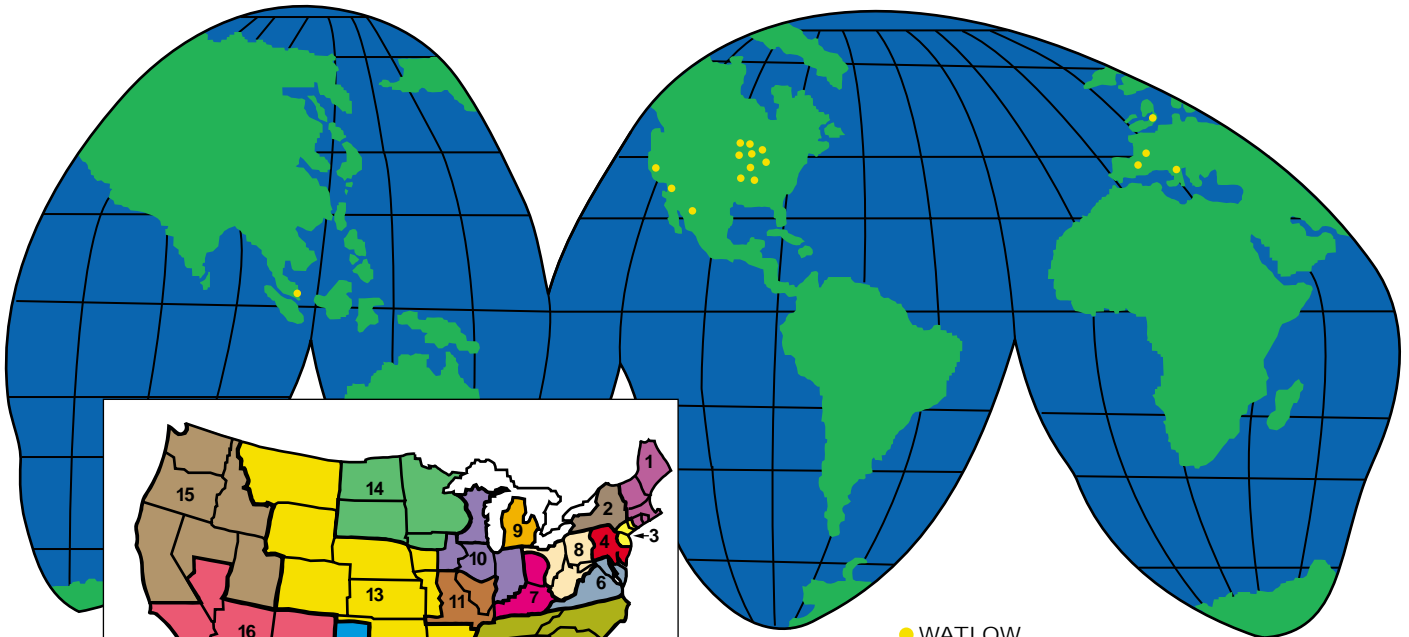
We will work hard to earn the privilege of becoming your preferred source.



Cook-and-hold oven meat probe

A cook-and-hold oven meat probe was designed with an NSF—National Sanitation Foundation—acceptable molded plastic handle. Both the handle and extruded Teflon® insulation on the lead wires were rated to 500°F (260°C).

Teflon® is a registered trademark of the E.I. du pont de Nemours & Company.



● WATLOW
Manufacturing and R & D Facilities

Watlow Products and Technical Support Delivered Worldwide

North American Sales Offices

Region 1 New England	603-882-1330
Region 2 New York, Upstate	716-438-0454
Region 3 New York/New Jersey	732-549-0060
Region 4 Philadelphia	215-345-8130
Region 5 Atlanta/Greenville Charlotte/Columbia Nashville Orlando Tampa/St. Petersburg Winston Salem/Raleigh	770-908-9164 704-847-4000 615-264-6148 407-351-0737 813-577-4511 910-766-9659
Region 6 Maryland/Virginia	410-840-8034
Region 7 Cincinnati	513-398-5500
Region 8 Cleveland Pittsburgh	216-467-1423 412-322-5004
Region 9 Detroit	248-651-0500
Region 10 Chicago Indianapolis Wisconsin	847-490-3900 317-575-8932 414-723-5990
Region 11 St. Louis	314-878-4600

Region 12

Austin	512-249-1900
Dallas	972-422-4988
Houston	281-355-6015

Region 13

Denver	303-665-2001
Kansas City	913-897-3973
Tulsa	918-496-2826

Region 14

Minneapolis	612-431-5700
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Region 15

Portland	503-245-9037
Sacramento	707-425-1155
San Francisco	408-980-9355
Seattle	206-861-8109

Region 16

Los Angeles	714-935-2999
Phoenix	602-708-1995
San Diego	619-728-9188

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China	86-21-6229-8917
Korea	82-2-563-5777
Singapore	65-777-5488
Taiwan	886-7-261-8397

European Sales Offices

France	33-1-3073-2425
Germany	49-7253-940050
Italy	39-2-5518-5161
United Kingdom	44-1159-418-444

Latin American Sales Office

Mexico	52-8-346-3644
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Watlow maintains a worldwide network of stocking distributors.

Your Authorized Watlow Distributor is:

