



ThermoSync[®] Thermowells and Probes

The Solution for Accurate Gas Flow Measurement

PGI-TST

March 2015

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



ENGINEERING YOUR SUCCESS.

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Please refer to our Technical Article “Reducing Thermowell Errors and Flow Stability Test Report – PGI-RTE” for additional data about the ThermoSync Thermowells and Probes. Additional test results regarding ThermoSync vs. Conventional Thermowells and Performance Evaluations can be obtained by calling Parker PGI’s Customer Service at 713-744-9850.

WARNING – USER RESPONSIBILITY

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

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The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.

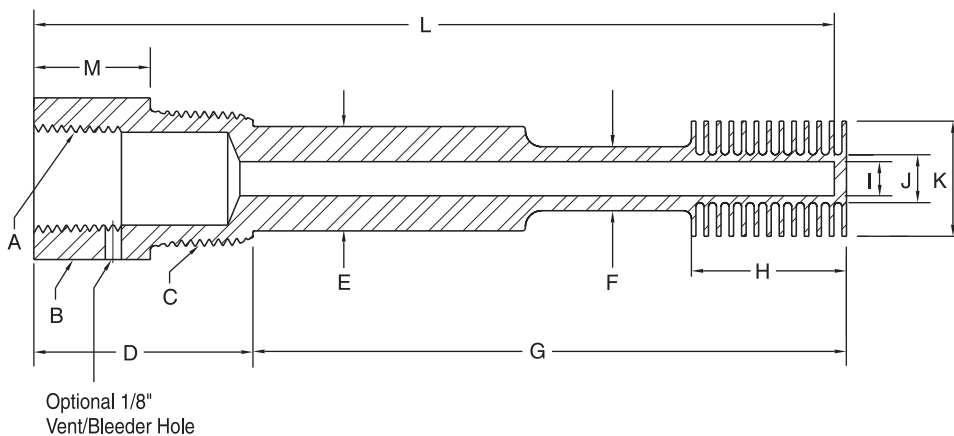
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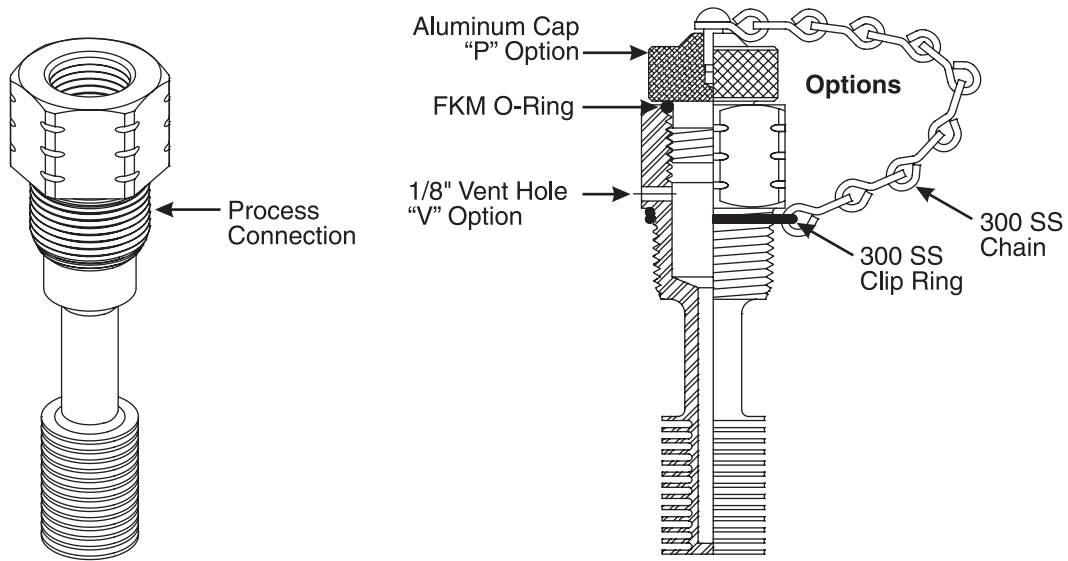


Part Number	A	B (in.)	Process Connection C	D (in.)	E (in.)	F (in.)	G (in.)	H (in.)	I (in.)	J (in.)	K (in.)	L (in.)	M (in.)	Stem
TAN-12C0-L2	1/2" FNPT	1.25	1/2" MNPT	1.69	0.633	.495	2.22	1.20	.260	.37	.645	3.88	.90	Stepped
TAN-12C0-L4	1/2" FNPT	1.25	1/2" MNPT	1.69	0.633	.495	2.96	1.20	.260	.37	.645	4.75	.90	Stepped
TAN-12C0-L8	1/2" FNPT	1.25	1/2" MNPT	1.69	0.633	.495	4.59	1.20	.260	.37	.645	6.37	.90	Stepped
TAN-12C0-L12	1/2" FNPT	1.25	1/2" MNPT	1.69	0.633	N/A	6.66	1.20	.260	.37	.645	8.45	.90	Straight
TAN-12C0-L24	1/2" FNPT	1.25	1/2" MNPT	1.69	0.633	N/A	9.89	1.20	.260	.37	.645	11.67	.90	Straight
TAN-34C0-L2	1/2" FNPT	1.25	3/4" MNPT	1.69	0.808	.495	2.22	1.20	.260	.37	.85	3.82	.90	Stepped
TAN-34C0-L4	1/2" FNPT	1.25	3/4" MNPT	1.69	0.808	.495	2.96	1.20	.260	.37	.85	4.56	.90	Stepped
TAN-34C0-L8	1/2" FNPT	1.25	3/4" MNPT	1.69	0.808	.495	4.59	1.20	.260	.37	.85	6.20	.90	Stepped
TAN-34C0-L12	1/2" FNPT	1.25	3/4" MNPT	1.69	0.808	N/A	6.66	1.20	.260	.37	.85	8.26	.90	Straight
TAN-34C0-L24	1/2" FNPT	1.25	3/4" MNPT	1.69	0.808	N/A	9.89	1.20	.260	.37	.85	11.49	.90	Straight
TAN-10C0-L4	1/2" FNPT	1.375	1" MNPT	1.69	0.808	.495	2.96	1.20	.260	.37	.85	4.75	.90	Stepped
TAN-10C0-L8	1/2" FNPT	1.375	1" MNPT	1.69	0.808	.495	4.59	1.20	.260	.37	.85	6.37	.90	Stepped
TAN-10C0-L12	1/2" FNPT	1.375	1" MNPT	1.69	0.808	N/A	6.66	1.20	.260	.37	.85	8.45	.90	Straight
TAN-10C0-L24	1/2" FNPT	1.375	1" MNPT	1.69	0.808	N/A	9.89	1.20	.260	.37	.85	11.67	.90	Straight

All Thermowells

Material: 316L SS
 Press/Temp: 4,900 PSI Max @ 330°F
 Flow: 100 FPS (L2, L4, L8, L12) or
 50 FPS (L24) max in 1000 PSI Natural Gas

NOTE: Use a thermal coupling paste or fluid to couple the probe to the well ONLY in the lower .5 inches of the well. DO NOT fill the well with thermal coupling fluid. Spring load the probe to contact the bottom of the well.



Process Connection Size			Material	Fits Pipeline Size		Options
TAN	-	XX	CO	-	XXX	- XXXXXXXX

Process Connection Size	
Code	Description
12	1/2" MNPT Process Connection
34	3/4" MNPT Process Connection
10	1" MNPT Process Connection (not available for the 2" Pipeline Size)

Fits Pipeline Size	
Code	Description
L2	2" Pipeline
L4	3" - 4" Pipeline
L8	6" - 8" Pipeline
L12	10" - 12" Pipeline
L24	16" - 24" Pipeline

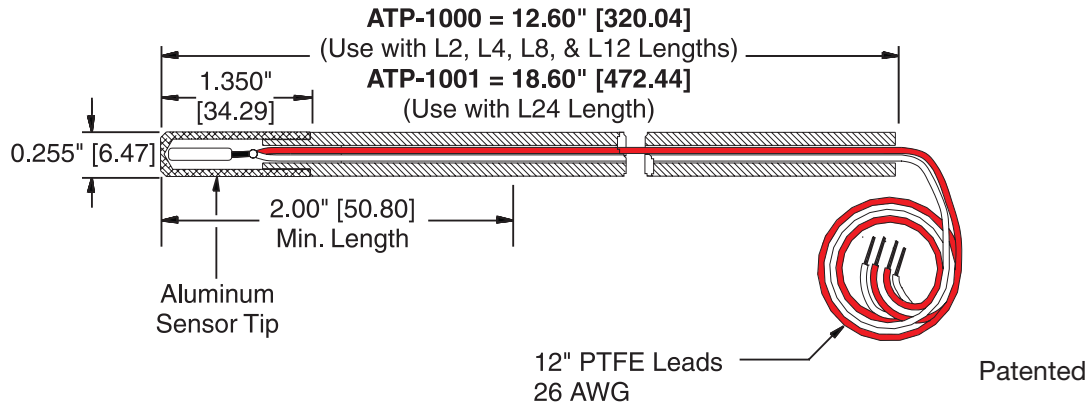
Material	
Code	Description
CO	316L Stainless Steel

Options	
Code	Description
P	Cap & Chain Assembly (can be ordered separately as Spare Part # ATA-1002)
V	Vent/Bleed Hole in Thermowell (1/8")
W1	316 SS Identification Tag

ATP-1000 & ATP-1001 Probe/Sensor

The ATP-1000/1001 RTD probes reduce thermal coupling errors from thermowells by using a unique two-piece protection tube. The body of the protection tube is made of insulating PVC plastic, thermally insulating the RTD sensor from the thermowell walls. This helps block the pipe thermal transfer down the protection tube to the sensor. The RTD sensor is mounted in a thermal conductive body for best accuracy and response.

For maximum accuracy, the ATP-1000 and ATP-1001 probes should be used with a TAN ThermoSync thermowell.



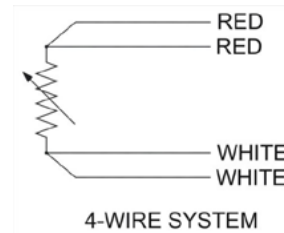
Specifications

- 4-wire platinum wire-wound RTD Element
- 100 Ohms at 0°C (IEC 751)
- PT 100 typical calibration coefficients (ITS-90)

A (°C)	3.90830×10^{-3}
B (°C)	-5.77500×10^{-7}
C (°C)	-4.18301×10^{-12}
Alpha (°C)	3.850×10^{-3}
Delta (°C)	1.49990
Beta (°C)	0.10863
- Band 5 sensor, interchangeability accuracy $\pm 0.025^\circ\text{C}$ at 0°C, $\pm 0.07^\circ\text{C}$ at 50°C¹
- Calibration and accuracy certification service available
- -40°C (-40°F) to +60°C (+140°F) temperature range
- Sensor has high thermal conductivity hard-anodized aluminum tip for maximum thermal transfer between the thermowell and sensor
- PVC protection tube thermally insulates the thermowell neck from the sensor
- 26 AWG PTFE leads
- Probe length user-cut to fit application
- Probe body is laser marked with serial number and ratings for calibration traceability

Sensor Lead Connections

The 4-wire probe can be used with 4-wire, 3-wire and 2-wire RTD transmitters. For 3-wire systems, use two red leads and one white lead. Insulate the unused white lead (do not connect the unused white lead). For 2-wire systems, connect both red leads to one terminal and both white leads to the other terminal.



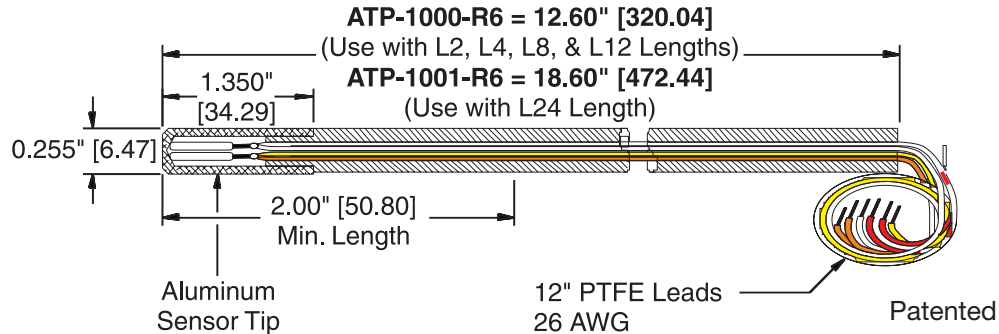
Protection Tube Cutting Procedure

1. Determine the probe length required for your installation. Be sure to leave room for the spring-loaded fitting.
2. Using a small tubing cutter, score the plastic tubing about half-way through. To prevent damage to the sensor leads, never cut through the plastic protection tube with the tubing cutter. **Minimum probe length is 2 inches.**
3. Remove the tubing cutter and apply bending pressure at the score mark. The protection tube should break at the score mark. If excessive pressure is required, use the tubing cutter to make the score deeper.



The ATP-1000/1001-R6 RTD Dual RTD probes reduce thermal coupling errors from thermowells by using a unique two-piece protection tube. The body of the protection tube is made of insulating PVC plastic, thermally insulating the RTD sensors from the thermowell walls. This helps block the pipe thermal transfer down the protection tube to the sensors. The RTD sensors are mounted in a thermal conductive body for best accuracy and response.

For maximum accuracy, the ATP-1000-R6 and ATP-1001-R6 Dual RTD probes should be used with a TAN ThermoSync thermowell.



Specifications

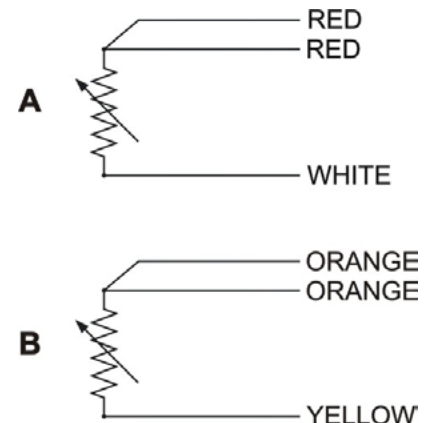
- 6-wire platinum wire-wound RTD element
- 100 Ohms at 0°C (IEC 751)
- PT 100 typical calibration coefficients (ITS-90)

A (°C)	3.90830×10^{-3}
B (°C)	-5.77500×10^{-7}
C (°C)	-4.18301×10^{-12}
Alpha (°C)	3.850×10^{-3}
Delta (°C)	1.49990
Beta (°C)	0.10863
- Band 5 sensor, interchangeability accuracy $\pm 0.025^\circ\text{C}$ at 0°C, $\pm 0.07^\circ\text{C}$ at 50°C¹
- Calibration and accuracy certification service available
- -40°C (-40°F) to +60°C (+140°F) temperature range
- Sensor has high thermal conductivity hard-anodized aluminum tip for maximum thermal transfer between the thermowell and sensor
- PVC protection tube thermally insulates the thermowell neck from the sensor
- 26 AWG PTFE leads
- Probe length user-cut to fit application
- Probe body is laser marked with serial number and ratings for calibration traceability



Sensor Lead Connections

The Dual RTD probe can be used with 3-wire and 2-wire RTD transmitters. For 3-wire systems, use the two red leads and one white lead for the first sensor, and the two orange leads and one yellow lead for the second sensor. For 2-wire systems, connect both red leads to one terminal and the white lead to the other terminal for the first sensor, and connect both orange leads to one terminal and the yellow lead to the other terminal for the second sensor.



Protection Tube Cutting Procedure

1. Determine the probe length required for your installation. Be sure to leave room for the spring-loaded fitting.
2. Using a small tubing cutter, score the plastic tubing about half-way through. To prevent damage to the sensor leads, never cut through the plastic protection tube with the tubing cutter. **Minimum probe length is 2 inches.**
3. Remove the tubing cutter and apply bending pressure at the score mark. The protection tube should break at the score mark. If excessive pressure is required, use the tubing cutter to make the score deeper.

Serial # 1634

Test Equipment

Model	Description	Serial Number	Calibration Date	Calibration Due
Hart 1521	6-1/2 Digit Thermometer	A13579	5/16/2001	
Hart 7102	-5 to 125 C Micro-Bath	A13424	2/12/2001	
Agilent 34401A	6-1/2 Digit Multimeter	US36130957	11/19/2003	11/19/2004

Test Measurements

Temperature °F	Temperature °C	Resistance
32.957	0.532	100.185
75.043	23.913	109.292
89.984	32.213	112.516
119.958	48.866	118.949

Temperature 22°C / 72°F

Date 8/13/2004

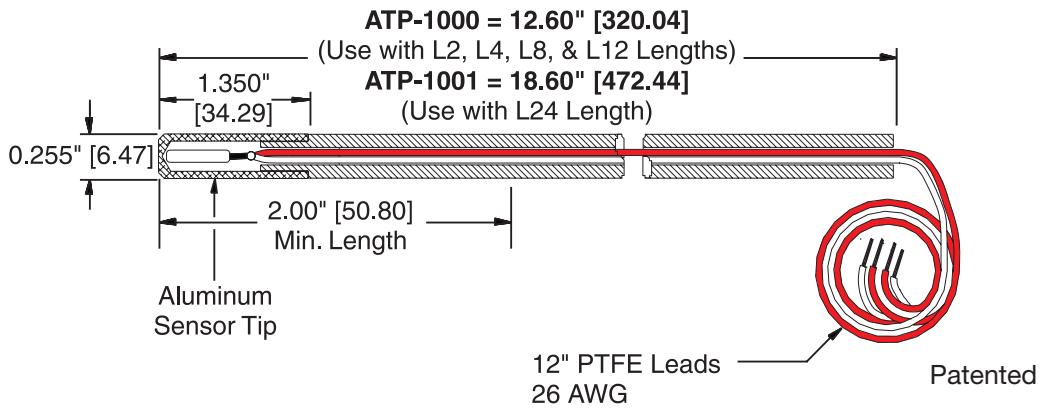
Callendar—Van Dusen Coefficients

Coefficient	IPRT Typical **	Calibrations Coefficient's
R @°C	100.000	99.969
Alpha	0.00385	0.00385698
Delta	1.4999	1.47929
Beta	0.10863	*
A	3.908300 E-03	3.91404 E-3
B	-5.77500 E-07	-5.70561 E-7
C	-4.18301 E-12	-4.18984 E-12

Calibration accuracy: +/- 0.025°C or +/- 0.05°F

* The beta coefficient is only used for temperatures below 0°C. The value for the beta coefficient is not solved because there are no samples below 0°C. Use the Typical beta coefficient.

** Coefficient's IAW ITS90.



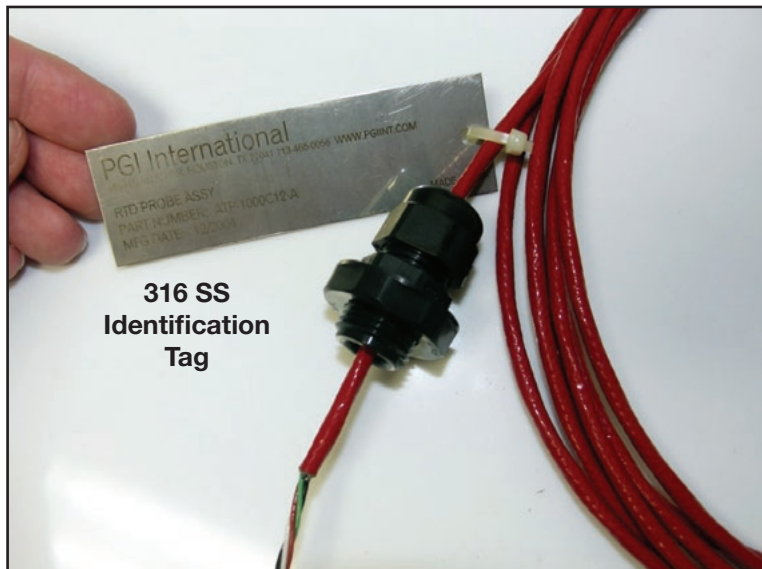
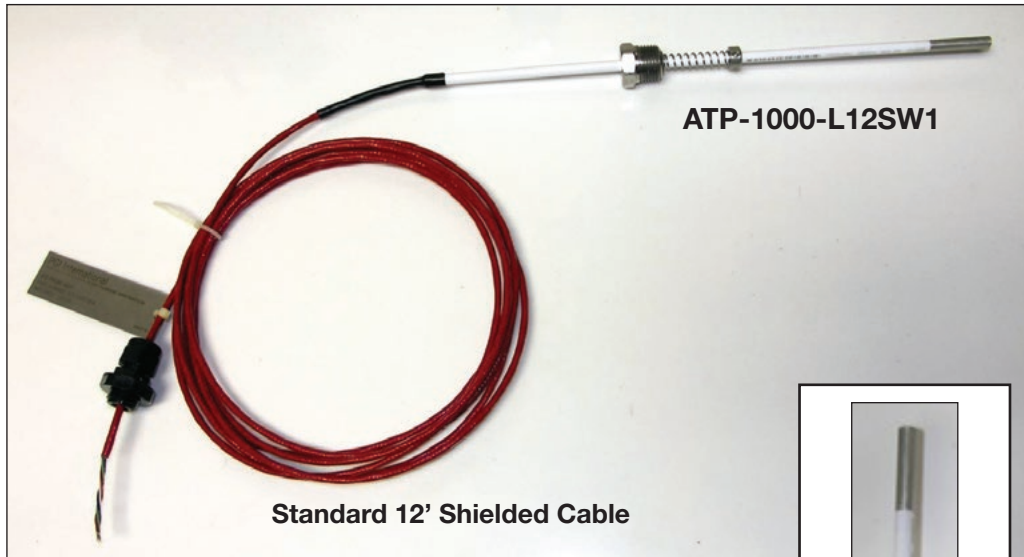
Probe/Sensor Length			Options	
ATP	-	XXXX	-	XXXXXXX

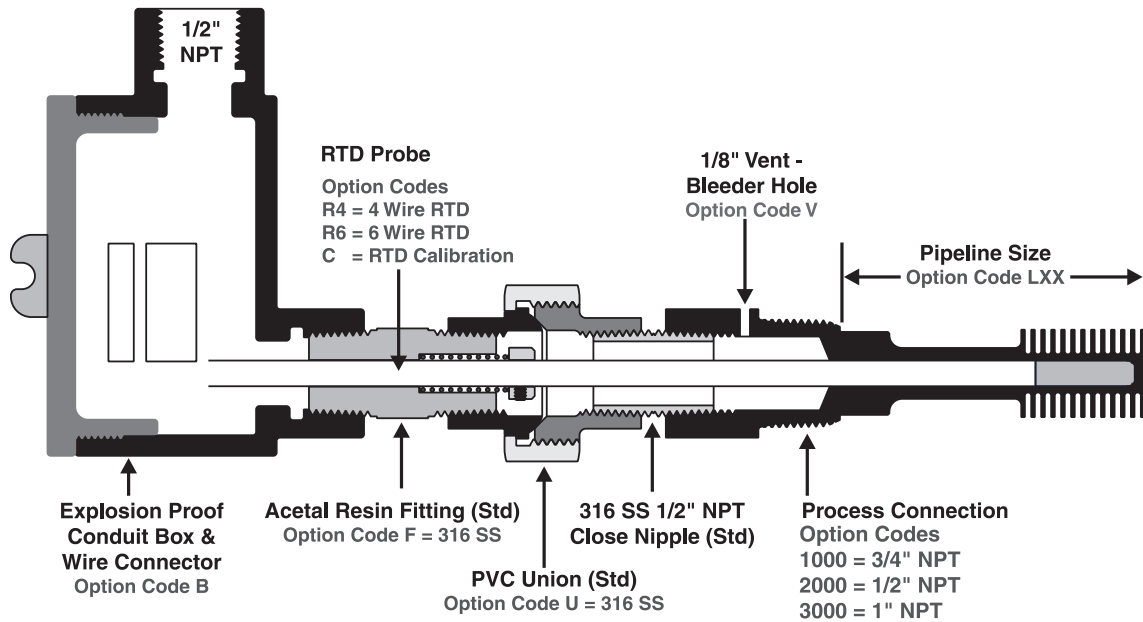
Probe/Sensor Length	
Code	Description
1000	12.60 Probe/Sensor Length
1001	18.60 Probe/Sensor Length

- All probe bodies are laser marked with a serial number and ratings of traceability.
- User cut to length with tubing cutter.

Options	
Code	Description
A	Armored Cable (valid only with LXX option)
C	RTD Calibration (4-Point or 6-Point, depending on RTD selected)
L12	12 foot Shielded Cable Leads with Weather-Tite Connector Seal
L24	24 foot Shielded Cable Leads with Weather-Tite Connector Seal
L50	50 foot Shielded Cable Leads with Weather-Tite Connector Seal
NXX	Non-Standard RTD Length (valid only with LXX option; 1 increments; minimum length 2)
R6	6-Wire Dual RTD Probe
S	Spring Loaded (includes Spring, Locking Collar and 1/2" MNPT fitting)
W1	316 SS Identification Tag
W1C	316 SS Tag with Calibration data (valid only with C option)

RTD Probe/Sensor Options





ATA Base Models consist of: 316 SS ThermoSync® Thermowell, 316 SS Close Nipple, PVC Union & Acetal Resin Fitting

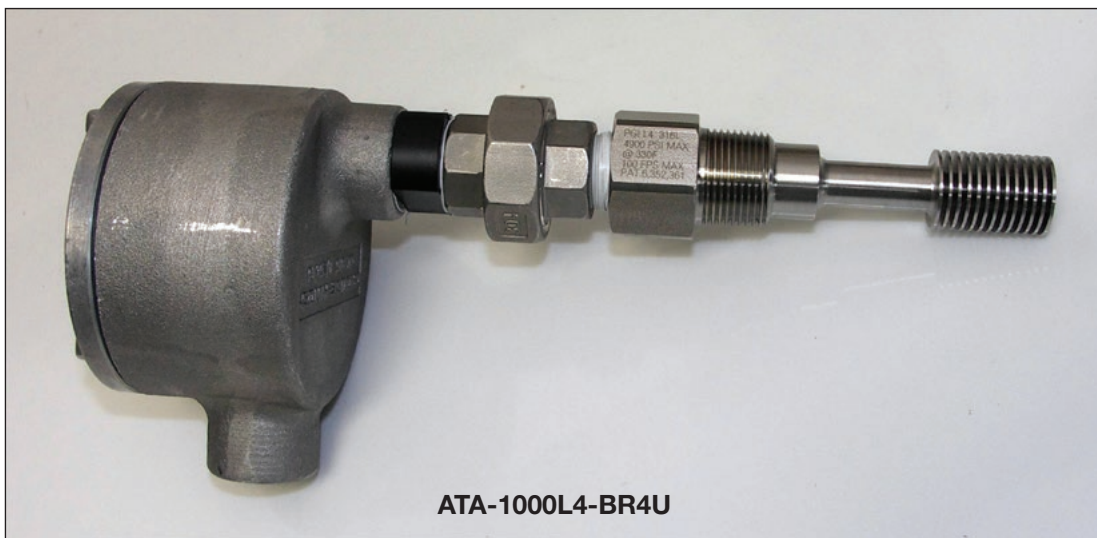
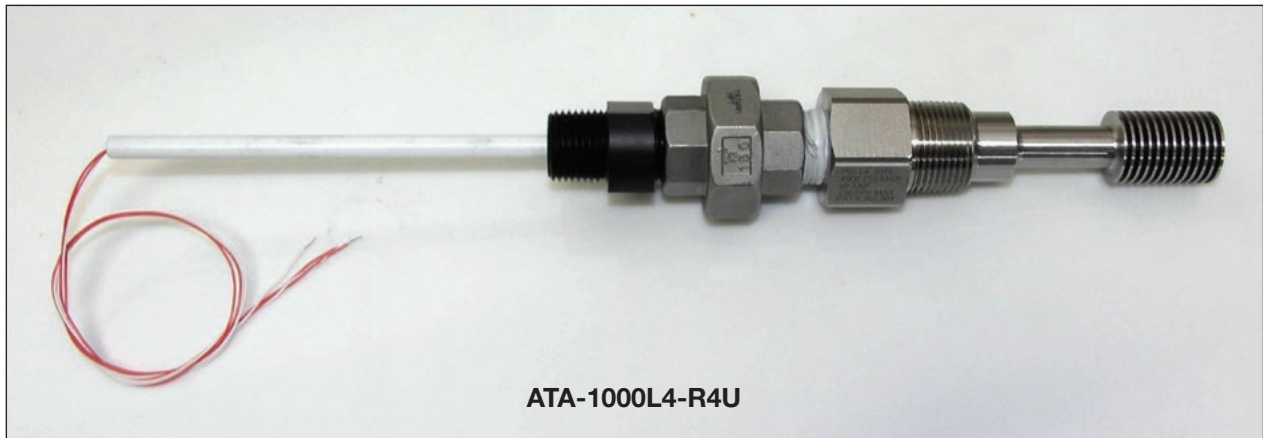
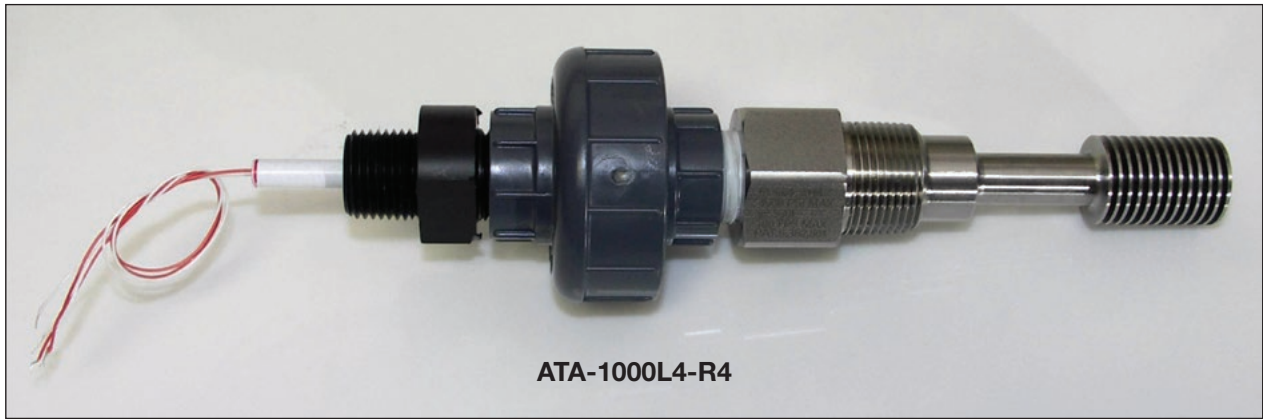
ATA Base Models consist of 316 SS ThermoSync Thermowell, 316 SS Close Nipple, PVC Union and Acetal Resin Fitting

Process Connection Size	Fits Pipeline Size	Options
ATA - XXXX	XXX	- XXXXXXXX

Process Connection Size	
Code	Description
1000	3/4" MNPT Process Connection
2000	1/2" MNPT Process Connection
3000	1" MNPT Process Connection (not available for the 2" Pipeline Size)

Fits Pipeline Size	
Code	Description
L2	2" Pipeline
L4	3" - 4" Pipeline
L8	6" - 8" Pipeline
L12	10" - 12" Pipeline
L24	16" - 24" Pipeline

Options	
Code	Description
B	Explosion-Proof Conduit Box (includes connector for RTD—1/2" NPT connections)
C	RTD Calibration (4-Point or 6-Point, depending on RTD selected)
F	316 SS RTD fitting (acetal resin standard)
P	Cap & Chain Assembly (can be ordered separately as Spare Part # ATA-1002)
R4	4-Wire Spring-Loaded RTD Probe
R6	6-Wire Spring-Loaded Dual RTD Probe
U	316 SS Union (PVC standard)
V	Vent/Bleed Hole in Thermowell (1/8")
W1	316 SS Identification Tag
W1C	316 SS Tag with Calibration data (valid only with C option)



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2. Price; Payment. Prices stated on Seller's Quote are valid for thirty (30) days, except as explicitly otherwise stated therein, and do not include any sales, use, or other taxes or duties unless specifically stated. Seller reserves the right to modify prices to adjust for any raw material price fluctuations. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2010). Payment is subject to credit approval and payment for all purchases is due thirty (30) days from the date of invoice (or such date as may be specified by Seller's Credit Department). Unpaid invoices beyond the specified payment date incur interest at the rate of 1.5% per month or the maximum allowable rate under applicable law.

3. Shipment; Delivery; Title and Risk of Loss. All delivery dates are approximate. Seller is not responsible for damages resulting from any delay. Regardless of the manner of shipment, delivery occurs and title and risk of loss or damage pass to Buyer, upon placement of the Products with the shipment carrier at Seller's facility. Unless otherwise stated, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferral of shipment at Buyer's request beyond the respective dates indicated will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions.

4. Warranty. Seller warrants that the Products sold hereunder shall be free from defects in material or workmanship for a period of twelve (12) months from the date of delivery or 2,000 hours of normal use, whichever occurs first. All prices are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **DISCLAIMER OF WARRANTY: THIS WARRANTY IS THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING DESIGN, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

5. Claims; Commencement of Actions. Buyer shall promptly inspect all Products upon receipt. No claims for shortages will be allowed unless reported to the Seller within ten (10) days of delivery. No other claims against Seller will be allowed unless asserted in writing within thirty (30) days after delivery. Buyer shall notify Seller of any alleged breach of warranty within thirty (30) days after the date the defect is or should have been discovered by Buyer. Any claim or action against Seller based upon breach of contract or any other theory, including tort, negligence, or otherwise must be commenced within twelve (12) months from the date of the alleged breach or other alleged event, without regard to the date of discovery.

6. LIMITATION OF LIABILITY. IN THE EVENT OF A BREACH OF WARRANTY, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE WITHIN A REASONABLE PERIOD OF TIME. **IN NO EVENT IS SELLER LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, USE OR LOSS OF USE OF THE PRODUCTS OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, WHETHER BASED IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE OF THE PRODUCTS.**

7. User Responsibility. The user, through its own analysis and testing, is solely responsible for making the final selection of the system and Product and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application and follow applicable industry standards and Product information. If Seller provides Product or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products or systems.

8. Loss to Buyer's Property. Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, will be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer ordering the items manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. Special Tooling. A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the Products, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller has the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

10. Buyer's Obligation; Rights of Seller. To secure payment of all sums due or otherwise, Seller retains a security interest in all Products delivered to Buyer and this agreement is deemed to be a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest.

11. Improper Use and Indemnity. Buyer shall indemnify, defend, and hold Seller harmless from any losses, claims, liabilities, damages, lawsuits, judgments and costs (including attorney fees and defense costs), whether for personal injury, property damage, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer,

Buyer's employees, or any other person, arising out of: (a) improper selection, application, design, specification or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Products; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.

12. Cancellations and Changes. Buyer may not cancel or modify or cancel any order for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller may change Product features, specifications, designs and availability.

13. Limitation on Assignment. Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.

14. Force Majeure. Seller does not assume the risk and is not liable for delay or failure to perform any of Seller's obligations by reason of events or circumstances beyond its reasonable control (hereinafter "Events of Force Majeure"). Events of Force Majeure shall include without limitation: accidents, strikes or labor disputes, acts of any government or government agency, acts of nature, delays or failures in delivery from carriers or suppliers, shortages of materials, or any other cause beyond Seller's reasonable control.

15. Waiver and Severability. Failure to enforce any provision of this agreement will not invalidate that provision; nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.

16. Termination. Seller may terminate this agreement for any reason and at any time by giving Buyer thirty (30) days prior written notice. Seller may immediately terminate this agreement, in writing, if Buyer: (a) breaches any provision of this agreement (b) appoints a trustee, receiver or custodian for all or any part of Buyer's property (c) files a petition for relief in bankruptcy on its own behalf, or one if filed by a third party (d) makes an assignment for the benefit of creditors; or (e) dissolves its business or liquidates all or a majority of its assets.

17. Governing Law. This agreement and the sale and delivery of all Products are deemed to have taken place in, and shall be governed and construed in accordance with, the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement.

18. Indemnity for Infringement of Intellectual Property Rights. Seller is not liable for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and refund the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller is not liable for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

19. Entire Agreement. This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged. The terms contained herein may not be modified unless in writing and signed by an authorized representative of Seller.

20. Compliance with Laws. Buyer agrees to comply with all applicable laws, regulations, and industry and professional standards of care, including those of the United Kingdom, the United States of America, and the country or countries in which Buyer may operate, including without limitation the U. K. Bribery Act, the U.S. Foreign Corrupt Practices Act ("FCPA"), the U.S. Anti-Kickback Act ("Anti-Kickback Act") and the U.S. Food Drug and Cosmetic Act ("FDCA"), each as currently amended, and the rules and regulations promulgated by the U.S. Food and Drug Administration ("FDA"), and agrees to indemnify and hold harmless Seller from the consequences of any violation of such provisions by Buyer, its employees or agents. Buyer acknowledges that it is familiar with the provisions of the U. K. Bribery Act, the FCPA, the FDA, and the Anti-Kickback Act, and certifies that Buyer will adhere to the requirements thereof. In particular, Buyer represents and agrees that Buyer will not make any payment or give anything of value, directly or indirectly to any governmental official, any foreign political party or official thereof, any candidate for foreign political office, or any commercial entity or person, for the purpose of influencing such person to purchase Products or otherwise benefit the business of Seller.

05/14



Parker's Motion & Control Technologies

At Parker, we're guided by a relentless drive to help our customers become more productive and achieve higher levels of profitability by engineering the best systems for their requirements. It means looking at customer applications from many angles to find new ways to create value. Whatever the motion and control technology need, Parker has the experience, breadth of product and global reach to consistently deliver. No company knows more about motion and control technology than Parker. For further info call 1-800-C-Parker.



AEROSPACE

Key Markets

- Aircraft engines
- Business & general aviation
- Commercial transports
- Land-based weapons systems
- Military aircraft
- Missiles & launch vehicles
- Regional transports
- Unmanned aerial vehicles

Key Products

- Flight control systems & components
- Fluid conveyance systems
- Fluid metering delivery & atomization devices
- Fuel systems & components
- Hydraulic systems & components
- Inert nitrogen generating systems
- Pneumatic systems & components
- Wheels & brakes



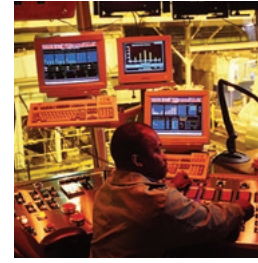
CLIMATE CONTROL

Key Markets

- Agriculture
- Air conditioning
- Food, beverage & dairy
- Life sciences & medical
- Precision cooling
- Processing
- Transportation

Key Products

- CO₂ controls
- Electronic controllers
- Filter driers
- Hand shut-off valves
- Hose & fittings
- Pressure regulating valves
- Refrigerant distributors
- Safety relief valves
- Solenoid valves
- Thermostatic expansion valves



ELECTROMECHANICAL

Key Markets

- Aerospace
- Factory automation
- Life science & medical
- Machine tools
- Packaging machinery
- Paper machinery
- Plastics machinery & converting
- Primary metals
- Semiconductor & electronics
- Textile
- Wire & cable

Key Products

- AC/DC drives & systems
- Electric actuators, gantry robots & slides
- Electrohydraulic actuation systems
- Electromechanical actuation systems
- Human machine interface
- Linear motors
- Stepper motors, servo motors, drives & controls
- Structural extrusions



FILTRATION

Key Markets

- Food & beverage
- Industrial machinery
- Life sciences
- Marine
- Mobile equipment
- Oil & gas
- Power generation
- Process
- Transportation

Key Products

- Analytical gas generators
- Compressed air & gas filters
- Condition monitoring
- Engine air, fuel & oil filtration & systems
- Hydraulic, lubrication & coolant filters
- Process, chemical, water & microfiltration filters
- Nitrogen, hydrogen & zero air generators



FLUID & GAS HANDLING

Key Markets

- Aerospace
- Agriculture
- Bulk chemical handling
- Construction machinery
- Food & beverage
- Fuel & gas delivery
- Industrial machinery
- Mobile
- Oil & gas
- Transportation
- Welding

Key Products

- Brass fittings & valves
- Diagnostic equipment
- Fluid conveyance systems
- Industrial hose
- PTFE & PFA hose, tubing & plastic fittings
- Rubber & thermoplastic hose & couplings
- Tube fittings & adapters
- Quick disconnects



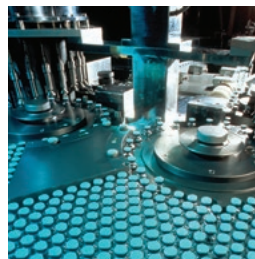
HYDRAULICS

Key Markets

- Aerospace
- Aerial lift
- Agriculture
- Construction machinery
- Forestry
- Industrial machinery
- Mining
- Oil & gas
- Power generation & energy
- Truck hydraulics

Key Products

- Diagnostic equipment
- Hydraulic cylinders & accumulators
- Hydraulic motors & pumps
- Hydraulic systems
- Hydraulic valves & controls
- Power take-offs
- Rubber & thermoplastic hose & couplings
- Tube fittings & adapters
- Quick disconnects



PNEUMATICS

Key Markets

- Aerospace
- Conveyor & material handling
- Factory automation
- Life science & medical
- Machine tools
- Packaging machinery
- Transportation & automotive

Key Products

- Air preparation
- Brass fittings & valves
- Manifolds
- Pneumatic accessories
- Pneumatic actuators & grippers
- Pneumatic valves & controls
- Quick disconnects
- Rotary actuators
- Rubber & thermoplastic hose & couplings
- Structural extrusions
- Thermoplastic tubing & fittings
- Vacuum generators, cups & sensors



PROCESS CONTROL

Key Markets

- Chemical & refining
- Food, beverage & dairy
- Medical & dental
- Microelectronics
- Oil & gas
- Power generation

Key Products

- Analytical sample conditioning products & systems
- Fluoropolymer chemical delivery fittings, valves & pumps
- High purity gas delivery fittings, valves & regulators
- Instrumentation fittings, valves & regulators
- Medium pressure fittings & valves
- Process control manifolds



SEALING & SHIELDING

Key Markets

- Aerospace
- Chemical processing
- Consumer
- Energy, oil & gas
- Fluid power
- General industrial
- Information technology
- Life sciences
- Military
- Semiconductor
- Telecommunications
- Transportation

Key Products

- Dynamic seals
- Elastomeric o-rings
- EMI shielding
- Extruded & precision-cut, fabricated elastomeric seals
- Homogeneous & inserted elastomeric shapes
- High temperature metal seals
- Metal & plastic retained composite seals
- Thermal management



ENGINEERING YOUR SUCCESS.

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