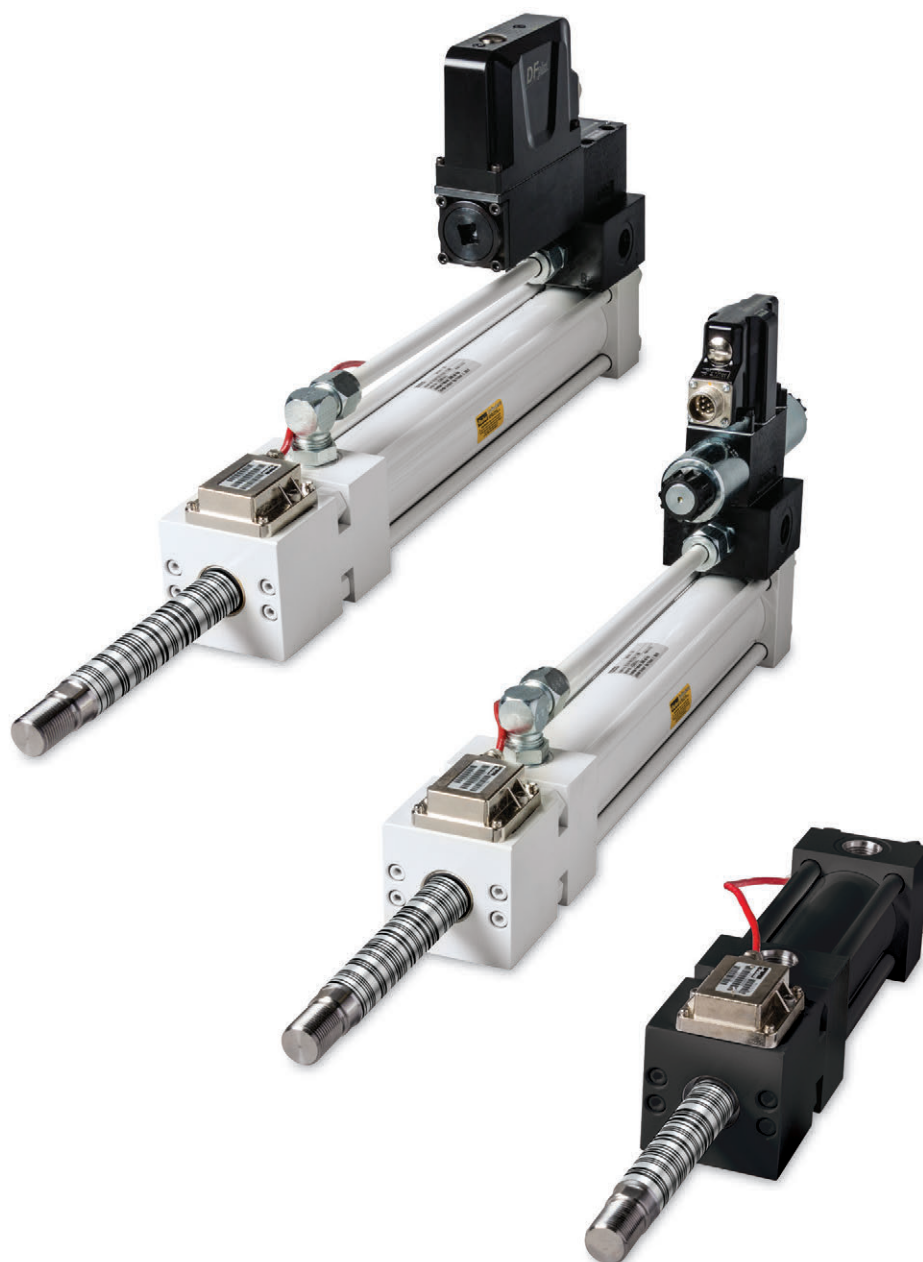




aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



Intellinder™

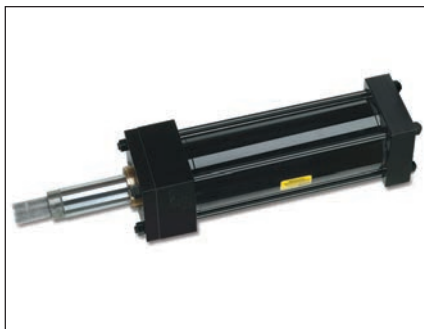
Absolute Position Sensor for Industrial Application



ENGINEERING YOUR SUCCESS.

**Series 3L**

- Bore Sizes 1.50" through 8.00"
- Removable Rod Gland
- 15 Standard Mounting Styles
- 1,000 psi Nominal Hydraulic Service

**Series 2H / 3H**

- Nominal pressure 3000 psi
- Standard temperature -10°F to +165°F
- Bore diameters 1.50" to 20.00"
- Piston rod diameter 1.000" - 10.000"

**Series RDH**

- Operating pressure of 3,000 psi
- Gross stroke lengths available in any practical stroke length
- 9 standard mounting styles
- 5 standard rod end styles (specials available for easy adaptability)
- Approximately 36% lower weight than comparable steel tie rod cylinder construction

In line with our policy of continuing product improvement, specifications and information contained in this catalog are subject to change.
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WARNING

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

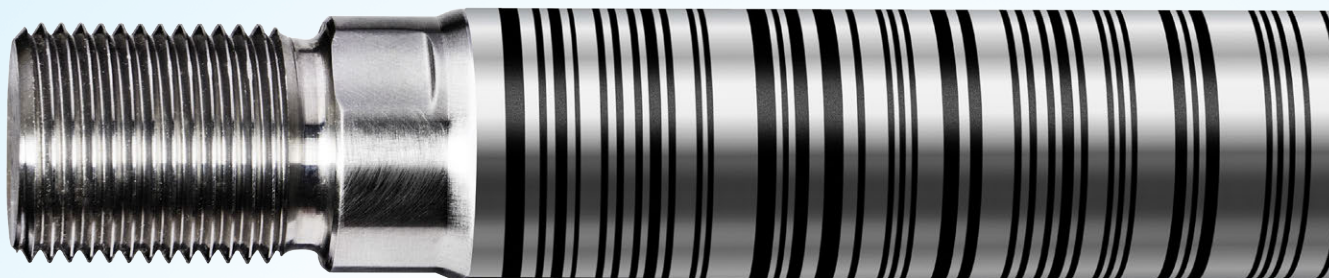
This document and other information from the Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having expertise. It is important that you analyze all aspects of your application, including consequences of any failure and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

Offer of Sale

The items described in this document are hereby offered for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by provisions stated on a separate page of the document entitled 'Offer of Sale'.

The Next Step In Position Sensor Technology



The evolution of position sensing technology has taken a smart step forward with the Intellinder Absolute Position Sensor design. By integrating a highly engineered sensor into the hydraulic cylinder, this Parker design eliminates the time and cost associated with gun drilling, as well as unprotected external sensors with complex linkages. Cylinder feedback installation is virtually plug-and-play.

The Intellinder Sensor signals absolute positioning, rather than position relative to the starting location of the rod. Position identifying bar codes are marked right on the rod so its position is communicated continually and directly to the controller. Position report occurs at power-on. Our design allows for full utilization of double-rod cylinder applications requiring position feedback.

This proprietary technology has undergone exhaustive laboratory and field testing to validate its ability to maintain signal fidelity in extremely challenging environments.

The Intellinder Absolute Position Sensor sustains performance in applications exposed to vibration, dust, gravel, corrosives, chemicals, axial load, side load, and immersion. It remains impervious to electronic noise and has been tested to ensure signal strength in the most rigorous applications.

The Intellinder Absolute Position Sensor performs across a wide range of temperatures and provides long stroke capabilities of 20 feet (6,096 mm). It features highly sensitive health monitoring to detect and diagnose potential cylinder malfunctions before they can disrupt operations.



Product is shown with optional white epoxy paint, black paint is standard.

Universal Optical Reader

No need to stock multiple probes, reader is standard across all stroke lengths.

Quick change out, non-pressurized housing allows for easy replacement without cylinder removal.

Absolute position monitoring, upon power up will provide actual position, no homing required.

Connectivity

Up to 300 feet cable length between Cylinder and Electronics.

Deutsch Style Connector with M12 circular adapter cable for cylinder ID tag and Bus termination.

Cylinder Construction

NFPA Standard cylinder dimension, only require addition of reader block.

Redundancy

Multiple Readers can be installed for redundant position measurement requirements.

Intellinder Absolute Position Sensor is ideal for applications such as:

- HydroPower Electric Generation Dams
- Civil Lock and Flood Control Dams
- Metal Fabrication
- Conveyor/Table Lifts for Material Handling

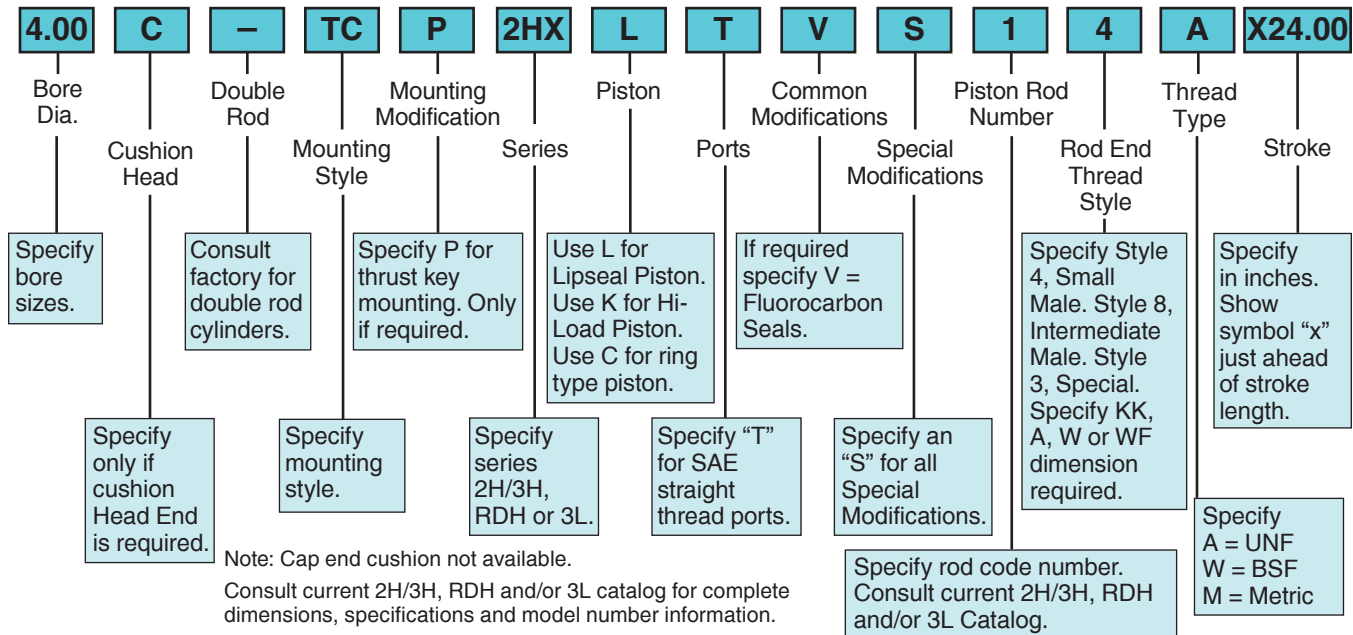
- Oil and Gas*
- Electric Power Generation*

*ATEX Pending



How to Order Basic Model with Valve and Feedback Code:

1. Specify the complete Parker Cylinder Model Number.
2. Specify the 6 digit Valve and Feedback Code.

Basic Model Numbers**Valve and Feedback Codes (Required for ordering)**

Valve Manifold		Valve Pattern Group		Valve Location		Feedback Option		Feedback Furnished		Feedback Enclosure	
Code	Description	Code	Description	Code	Description	Code	Description	Code	Description	Code	Description
N	N - None	N	N - Not Applicable	N	N - Not Applicable	N	N - None	NA	Hide	N	N - Not Applicable
B	B - Bolt-On	A	A - Servo Group A	H	H - Head	C	C - MTS LDT	NF	NF - No Feedback	A	A - False Stage
I	I - Integral	D	D - Servo Group D	C	C - Cap	F	F - LRT	1P	1P - Prepare to Accept - Piston rod will be drilled to accept a probe with an electrical stroke equal to the cylinder net stroke.	D	D - Light Duty
		G	G - D03 (Group G)			B	B - Balluff LDT	FR	FR - LRT Installed	F	F - Medium Duty
		H	H - D05 (Group H)			W	W - WaveScale	V0	V0 - 0 Vdc to +10 Vdc		
		J	J - D06 (Group J)			I	I - Intellinder - Specify reader mounting position.	V1	V1 - +10 Vdc to 0 Vdc		
		K	K - D07 (Group K)			X	X - Other, Please Specify	A0	A0 - 4 mA to 20 mA		
		M	M - D08 (Group M)					A1	A1 - 20 mA to 4 mA		
		X	X - Other, Please Specify					A4	A4 - Other Analog - Specify required output.		
								DE	DE - PWM, External Interrogation		
								DI	DI - PWM, Internal Interrogation		
								SS	SS - SSI Output		
								R0	R0 - Start/Stop		
								D4	D4 - Other Digital - Specify required output.		
								J0	J0 - J1939 Canbus Inch		
								J1	J1 - J1939 Canbus mm		
								J4	J4 - Other Intellinder - Specify required output.		

Feedback Options	
Code	Description
C	Common
B	Balluff
W	WaveScale
I	Intellinder

When ordering please specify Strip, Quadrant, Multi-strip or 360° etching.

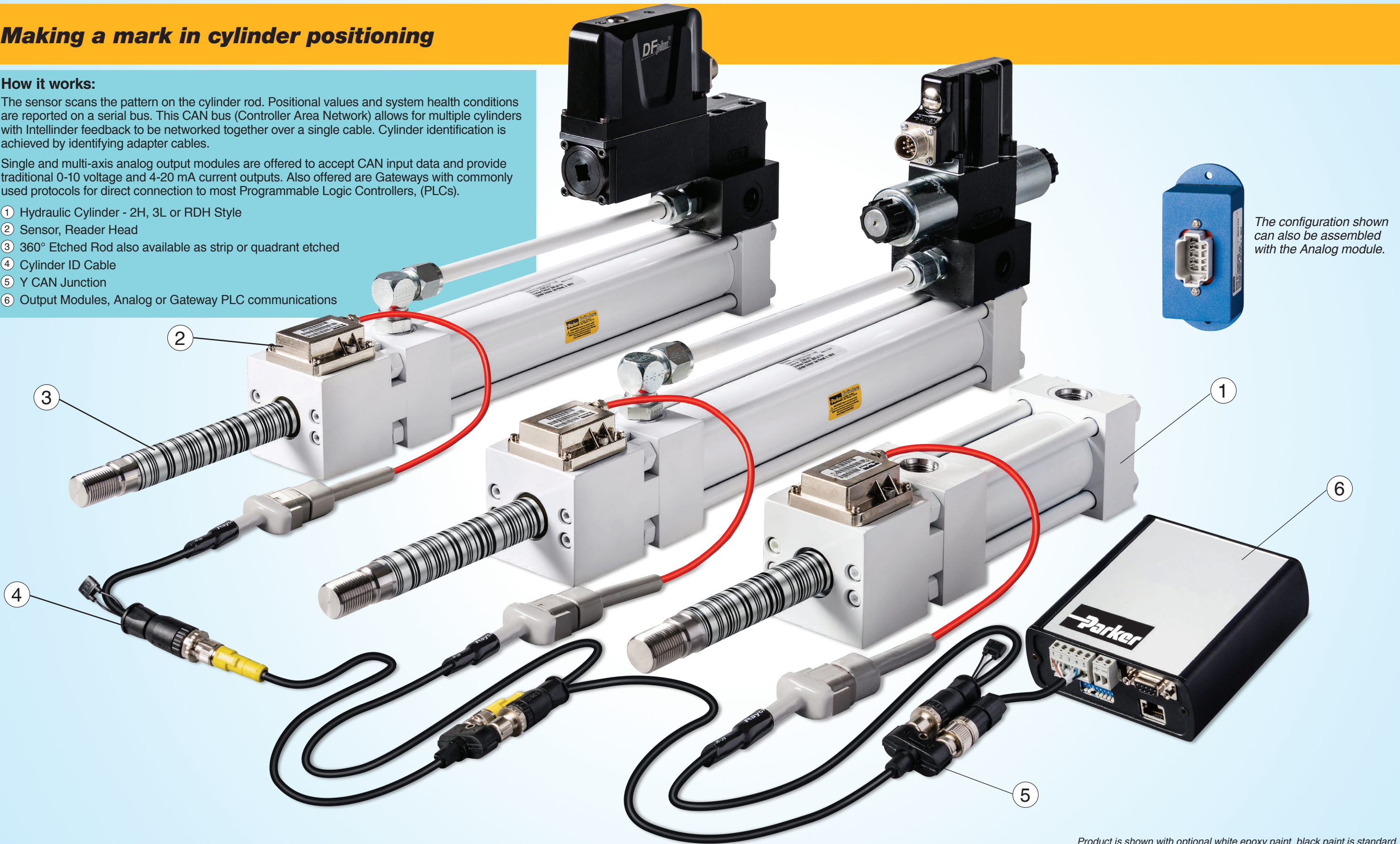
When ordering PLC Gateways or (4) axis Analog modules, order "JO" Feedback Furnished codes

Making a mark in cylinder positioning

How it works:
The sensor scans the pattern on the cylinder rod. Positional values and system health conditions are reported on a serial bus. This CAN bus (Controller Area Network) allows for multiple cylinders with Intellinder feedback to be networked together over a single cable. Cylinder identification is achieved by identifying adapter cables.

Single and multi-axis analog output modules are offered to accept CAN input data and provide traditional 0-10 voltage and 4-20 mA current outputs. Also offered are Gateways with commonly used protocols for direct connection to most Programmable Logic Controllers, (PLCs).

- 1 Hydraulic Cylinder - 2H, 3L or RDH Style
- 2 Sensor, Reader Head
- 3 360° Etched Rod also available as strip or quadrant etched
- 4 Cylinder ID Cable
- 5 Y CAN Junction
- 6 Output Modules, Analog or Gateway PLC communications



Product is shown with optional white epoxy paint, black paint is standard.

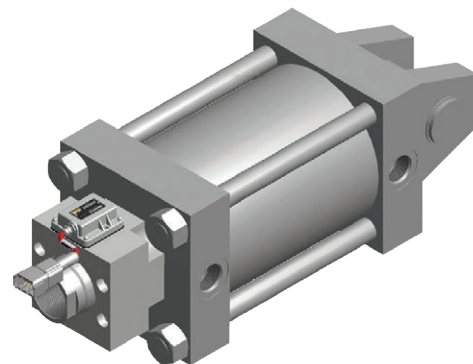
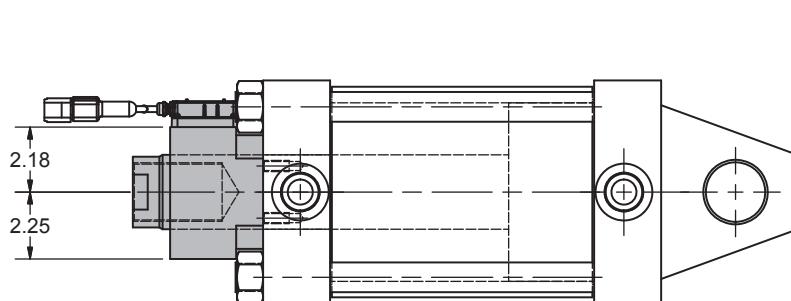
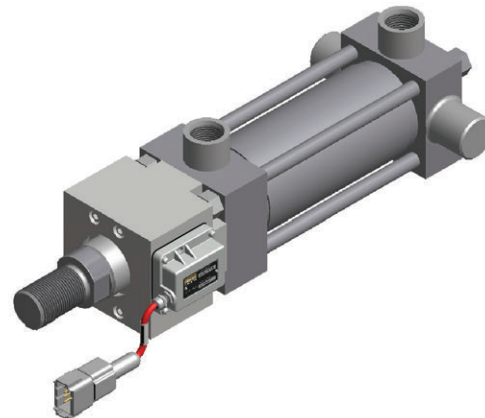
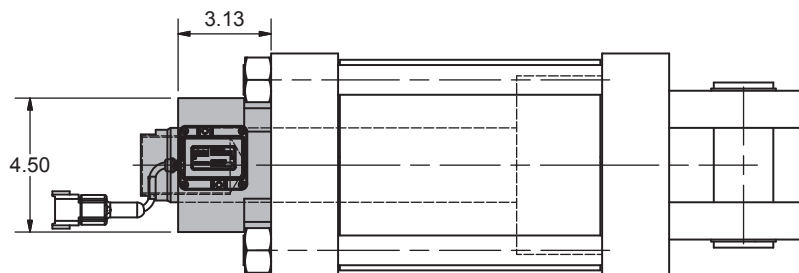
Specifications**Intellinder™****Absolute Position Sensor for Industrial Application**

General Specifications (Sensor)	
Resolution	0.0013 in (0.03 mm)*
Hysteresis	0.0038 in (0.10 mm)
Repeatability	0.0014 in (0.036 mm)
Linearity	0.0026 in (0.0027% FS)
Maximum velocity	40 in/s (1 m/sec)
Bore Diameter	No Limit
Rod Diameter	1" to 10"
Stroke Length	up to 240 in (6100 mm)
Rod Material	Chrome plated 1045 Chrome plated 17-4 PH Stainless
Mechanical	Vibration: 12g, 25Hz-2KHz Shock: 100g
Null Zone	None
Dead Zone	None
Cable Length	300 feet between Cyl and module ** 1 foot between reader and Y junction

Electrical Specifications (Sensor)	
Input Power	8-32VDC, <2W
Data I/O	Generic CAN, 250 KBaud, 29-bit ID
Networking	Up to 8 sensors per CAN network (Separate PGNs)
Connector	Deutsch 8-Pin (DTM06-8S), M12 5 Pin male (adapter cable assembly)
Update Rate	1-100 Hz (10-1,000 ms)
Temperature	Operating: -40° F to 221° F (SAE J1455)
Ingression	Immersion: IP 68 (10m, 30 min) Pressure wash: IP65
Electrical	EMI EN61000-6-2 (Radiated susceptibility)
	EN 61000-6-4 (Radiated Emission)
	Overvoltage to +36 VDC
	Reverse Polarity to -36VDC
	Short to GND, Short to 32VDC
	ESD: ±8kV

* On cylinder stroke lengths greater than 65", (1651 mm) analog resolution is 0.004" (0.1 mm)

** Above 130 feet terminating resistor values need to be evaluated, consult factory for values.

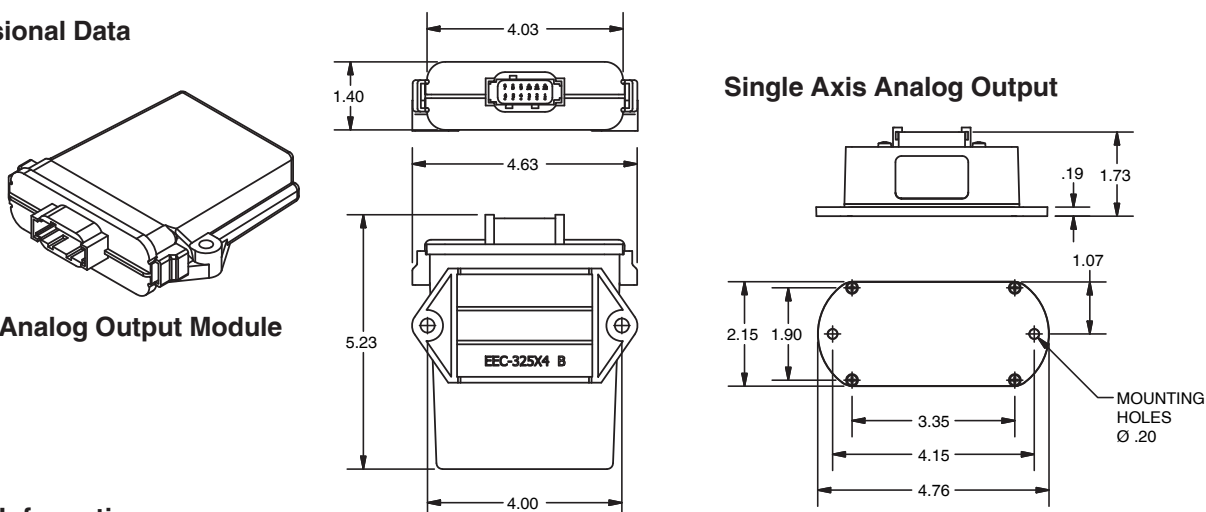
Basic Intellinder Dimensions

Analog Output Modules

Analog Output Modules (single and 4 axis units)	
Input Power	9-60 VDC
Current Draw	Single Axis: 29 mA at 24 VDC, 4 axis: 160 mA at 24 VDC
Outputs	0-10V, ± 10 V, 4-20 mA
Connector	Deutsch 8-Pin (DT06-8S), M12 5 Pin female (adapter cable assembly)
Update Rate	100 Hz (10 ms)
Output Resolution	.015%
Output Accuracy	.5%
Temperature	Operating: -40° F to 185° F Storage: -67° F to 257° F
Protection	IP67
Scale & Offset	Factory set, adjustable with Intellinder MD3 accessory.



Dimensional Data



4 Axis Analog Output Module

Single Axis Analog Output

Wiring Information

Analog Output Module Power Cable

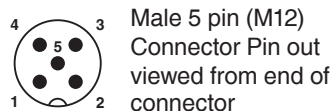


Power Cable Connection

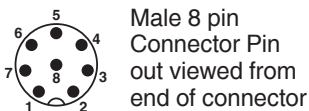
CAN Cable Connection

Single Axis Module

Power Cable (male)		
Pin	Wire Color	Description
1	Brown	Power (+)
2	White	Analog Common
3	Blue	Power Common
4	Black	Analog Out
5	Gray	N/C

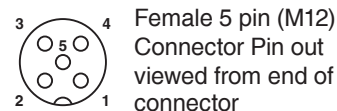
Male 5 pin (M12)
Connector Pin out
viewed from end of
connector4 Axis Module Power Cable
(Male Connector)

Power Cable (male) 4 axis		
Pin	Wire Color	Description
1	White	Analog Common
2	Brown	Power (+)
3	Green	Analog Common
4	Yellow	Analog Out, Axis: 3/7
5	Gray	Analog Out, Axis: 2/6
6	Pink	Analog Out, Axis: 1/5
7	Blue	Power Common
8	Red	Analog Out, Axis: 0/4

Male 8 pin
Connector Pin out
viewed from
end of connector

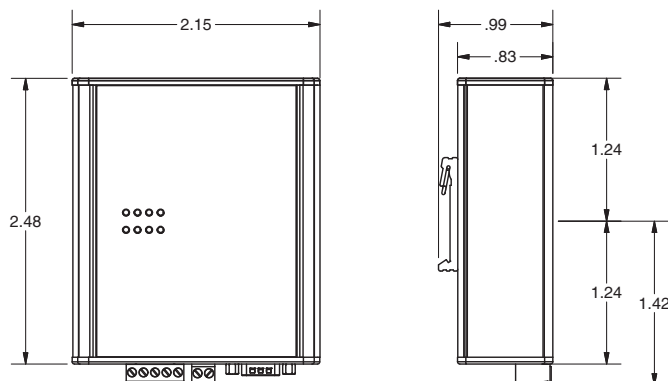
CAN Cable Female Connector

CAN Cable (female, programming)		
Pin	Wire Color	Description
1	—	Drain (shield)
2	Red	Power (+)
3	Black	Power Common
4	White	CAN H
5	Green	CAN L

Female 5 pin (M12)
Connector Pin out
viewed from end of
connector

PLC Gateways

Input Power	11-32 VDC
Current Draw	140 mA at 24 VDC
Communications	Ethernet TCP, Ethernet IP, Profibus, Modbus RTU
Temperature	Operating: 32° F to 158° F
Protection	IP20

**Calibration Module****Cylinder ID Cable****Programming Cable****M12 Cables****CAN Y Junction****Accessories Part Numbers**

Part No.	Description
0975530000	Single Axis Analog Output Module
0975540000	4 Axis Analog Output Module
0975550000	4-axis Cable, ID 0
0975560000	4-axis Cable, ID 1
0975570000	4-axis Cable, ID 2
0975580000	4-axis Cable, ID 3
0975590000	4-axis Cable, ID 4
0975600000	4-axis Cable, ID 5
0975610000	4-axis Cable, ID 6
0975620000	4-axis Cable, ID 7
0975630000	M12, 5 pin cable, 5 meters, male/female straight
0975640000	M12 5 pin cable, 10 meters, male/female straight
0975650000	M12, 5 pin cable, 5 meters, female/flying lead
0975670000	M12, 8 pin cable, 5 meters, female/flying lead
0975680000	CAN Y Junction Cable
0975730000	1- Axis Analog Output Module Cable assembly
0975660000	4-Axis Analog Output Module Cable assembly

PLC Gateway Module Part Numbers

Part No.	Description
0975690000	Ethernet IP/TCP
0975700000	Profibus
0975710000	Modbus RTU

Calibration & Diagnostics

Part No.	Description
0975510000	Calibration Module (MD3)
0975520000	Programming Cable

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The items described in this document and other documents and descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors ("Seller") are hereby offered for sale at prices to be established by Seller. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any item described in its document, when communicated to Seller verbally, or in writing, shall constitute acceptance of this offer. All goods, services or work described will be referred to as "Products".

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2. Price Adjustments; Payments. Prices stated on Seller's quote or other documentation offered by Seller are valid for 30 days, and do not include any sales, use, or other taxes unless specifically stated. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2010). Payment is subject to credit approval and is due 30 days from the date of invoice or such other term as required by Seller's Credit Department, after which Buyer shall pay interest on any unpaid invoices at the rate of 1.5% per month or the maximum allowable rate under applicable law.

3. Delivery Dates; Title and Risk; Shipment. All delivery dates are approximate and Seller shall not be responsible for any damages resulting from any delay. Regardless of the manner of shipment, title to any products and risk of loss or damage shall 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 deferment of shipment at Buyers' 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 eighteen months from the date of delivery to Buyer. The prices charged for Seller's products are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **DISCLAIMER OF WARRANTY: THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED HEREUNDER. 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 delivery. No claims for shortages will be allowed unless reported to the Seller within 10 days of delivery. No other claims against Seller will be allowed unless asserted in writing within 30 days after delivery. Buyer shall notify Seller of any alleged breach of warranty within 30 days after the date the defect is or should have been discovered by Buyer. Any action based upon breach of this agreement or upon any other claim arising out of this sale (other than an action by Seller for an amount due on any invoice) must be commenced within 12 months from the date of the breach without regard to the date breach is discovered.

6. LIMITATION OF LIABILITY. UPON NOTIFICATION, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE. **IN NO EVENT SHALL SELLER BE LIABLE TO BUYER 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, EVEN IF SELLER HAS BEEN NEGLIGENT, WHETHER 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, 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 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 shall have 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 shall retain a security interest in the goods delivered and this agreement shall be deemed 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 claim, liability, damages, lawsuits, and costs (including attorney fees), 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, improper application 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 Product; 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. Orders shall not be subject to cancellation or change by Buyer 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 with notice to Buyer.

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 shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (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 waive 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 written notice of termination. Seller may immediately terminate this agreement, in writing, if Buyer: (a) commits a breach of 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 by a third party (d) makes an assignment for the benefit of creditors, or (e) dissolves or liquidates all or a majority of its assets.

17. Governing Law. This agreement and the sale and delivery of all Products hereunder shall be 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 shall have no liability 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 return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability 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 shall 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.

20. Compliance with Law, U. K. Bribery Act and U.S. Foreign Corrupt Practices Act. Buyer agrees to comply with all applicable laws and regulations, including both those of the United Kingdom and the United States of America, and of the country or countries of the Territory in which Buyer may operate, including without limitation the U. K. Bribery Act, the U.S. Foreign Corrupt Practices Act ("FCPA") and the U.S. Anti-Kickback Act (the "Anti-Kickback Act"), 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 they are familiar with the provisions of the U. K. Bribery Act, the FCPA and the Anti-Kickback Act, and certifies that Buyer will adhere to the requirements thereof. In particular, Buyer represents and agrees that Buyer shall 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.



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04/15 / Bulletin HY08-0880-B1/NA



Parker Hannifin Corporation
Industrial Cylinder Division
500 South Wolf Road
Des Plaines, IL 60016 USA
phone (847) 298-2400
fax (800) 892-1008
www.parker.com/cylinder

Parker Hannifin Corporation
Motion and Control Division
160 Chisholm Drive
Milton, ON Canada L9T 3G9
direct (905) 693-3000
fax (905) 876-1958
www.parker.com