Intellinder™ Absolute Position Sensor
Product Catalog
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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 costs associated with gun drilling, as well as unprotected external sensors with complex linkages. 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. The sensor even enables monitoring in double-rodded cylinder applications without the necessity of bolt-ons.

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 for over one million cylinder cycles.

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

The bar code markings are wide enough to allow for misalignment of the rod-eye during welding, assembly stack-up, and torsion under loading, without impeding the sensor’s ability to read the rod’s position, for highly consistent, accurate monitoring.

The Intellinder Absolute Position Sensor is ideal for material handling, construction, waste handling, forestry and other extreme performance applications.
Whether used with the Parker family of hydraulic cylinders or in conjunction with other systems, this breakthrough position feedback technology offers several advantages over alternative approaches to position sensing.

Unlike magnetostrictive sensors, the Intellinder Absolute Position Sensor requires minimal cylinder modification and eliminates gun drilling. Its robust design enables a longer stroke and its compact size eliminates the dead zones associated with magnetostrictive sensors. In the unlikely event of a necessary repair, the Intellinder Sensor can be quickly removed and replaced without time-consuming removal of the entire cylinder.

In contrast with variable resistance sensors (string pots), the Intellinder Sensor never requires calibration, not even during initial installation. It also operates across a wider temperature range and can be expected to provide a longer, trouble-free service life.

When compared with the optics used in laser gauges, the Intellinder Sensor’s optical design is not subject to the dirt and fog associated with reflective mirrors. Its protected lens is highly resistant to dust and other contaminants.

An Eye for Performance

The Intellinder Absolute Position Sensor combines time-tested, highly engineered optics with a proprietary lens design that provides excellent resolution, linearity, repeatability, accuracy, and hysteresis. The resulting sharp bar code imaging translates into consistent, predictable control of your critical operations.

How It Works

With the Intellinder Absolute Precision Sensor, you simply turn the sensor “on” and look at the bar to identify precise position. No calibration is required.
Innovation at Work

Sensors can be installed in multiple independent configurations for monitoring and controlling diverse functions, such as auto-level, load management, and steering.

In addition, since versatile Intellinder Sensors are designed to be interchangeable across multiple systems and in diverse applications, inventory requirements and downtime can be significantly reduced. Only two screws and an electrical connector are required for setup, so installation and the bill of materials are greatly simplified.

This robust sensor technology also features health monitoring that continuously scans the rod surface to identify conditions that might, left undetected, cause sensor damage, seal leaks, and system downtime.

A unique design that eliminates linkages and removes the optical sensor from harm’s way, allows for easy installation on double-rodded cylinders to support limp-home applications.
Performance Tested

The Intellinder Absolute Position Sensor technology has been comprehensively tested and proven to retain signal strength and seal life, using a full range of industry standard and Parker customized testing protocols.

Cylinder Testing

Over 1 million cycles under Axial Load conditions per SAE J214 – sharp fidelity, no leaks

Over 1 million cycles under Side Load conditions – sharp fidelity, no leaks

Under Arizona Road Dust Testing – sharp fidelity, no leaks

Sensor Testing

The Intellinder Absolute Position Sensor retained fidelity and maintained seal integrity in:

- Environmental Testing – operating temperatures, thermal shock, humidity, and vibration
- Ingression Testing - dust and water in powerwash and fully immersed conditions
- Electrical Testing - radiated susceptibility, radiated emission, and electrical transients
Specifications

| Sensor Performance          | Accuracy ±0.010 in |
|                           | Resolution 0.0013 in |
|                           | Hysteresis 0.0038 in |
|                           | Repeatability 0.0014 in |
|                           | Linearity 0.0026 in |
| Salt Spray Corrosion Testing of Rods per ASTM B117 to 200 hours | Nickel Chrome Plated 1045 |
|                           | Chrome Plated 1045 |
|                           | Chrome Plated 17-4PH |
| Chemical Resistance        | Resistant to fertilizers, cleaners, bleach, moisture, and dust control agents |
| Environmental Robustness   | Operating Temperature: -40°C to 105°C |
|                           | Shock: Per IEC 68-2-27, 100g, 6 directions |
|                           | Vibration: Per SAE J1455, 12g RMS 25Hz to 2kHz |
|                           | Ingression: IP68, IP65 |
| Rod Diameter               | 1.0 to 5.0 in [25 to 125mm] |
| Stroke Length              | 0 to 96 in [2438mm] |
|                           | 0 to 20 ft [6096mm] (longer lengths also available) |
| Power Input                | 8-32VDC, <2W |
| Report Rate                | 10 to 1000 ms |
| Electrical Performance     | Supply Voltage: 8-32VDC (less than 2 watts) |
| Electrical Immunity        | EN 61000-6-4 |
| Radiated Susceptibility    | EN 61000-6-2 |
| Control/Networking Protocol| Data I/O Generic J1939 CAN: Proprietary PDU, 250 KBAud, 29-bit ID |
|                           | Networking: Up to 8 sensors per CAN network with separate PGNs |
|                           | Connector: Flying Leads or Deutsch 8-Pin |

Rod Testing

In testing to ASTM B117, marked rods remained corrosion free after 200 hours of exposure to salt spray. When tested for resistance to fertilizer, ammonia, bleach, battery acid, cleaners, moisture-control agents, and dust-control agents, the marked rods exhibited durability on par with standard chrome rods.
## Versatile in Application

<table>
<thead>
<tr>
<th>Real-World Validation with Sensor Positions as Shown</th>
<th>Application</th>
<th>Endurance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rear Steering Cylinder</td>
<td>Tactical Assault Vehicle with Rear Steering</td>
<td>Sustained performance for 2152 mls [3645 km]</td>
</tr>
<tr>
<td>Lift Cylinders</td>
<td>Off-Road Backhoe</td>
<td>Nine months of daily use</td>
</tr>
<tr>
<td>Tilt Cylinder</td>
<td>Telehandler with Lift, Tilt, and Frame Sway Capabilities</td>
<td>Accelerated Life Tested for the equivalent of seven years of field performance</td>
</tr>
</tbody>
</table>

The Intellinder Absolute Position Sensor has been field proven in these grueling high-performance applications.
The highly engineered Intellinder Absolute Position Sensor has been specifically designed to provide consistent monitoring and control in challenging high-performance applications like these.

Tilt Cylinder: This actuator controls the pivoting of the implement (forks shown here) at the end of the telescoping arm.

Extend Cylinder: This cylinder extends the telescoping arm. As shown here, the external cylinder is mounted inside the square cross-section arm; it can also be mounted external to and under the arm.

Lift Cylinder: This actuator controls the lift of the main arm, as it pivots about its base.

Steering Cylinder: This is typically a double-rodded cylinder that connects the steering linkages to the wheels on either side of a vehicle.

The Proof is in the Performance

With the Parker Intellinder Absolute Position Sensor you can deploy a wide range of functions such as electronic cushioning, auto-leveling, load monitoring, and return to position, improving productivity and reducing downtime. To further ensure optimum uptime, integrated condition monitoring provides on-screen alerts.

Lift, Extend, Handle
- Rough Terrain Forklifts
- Access Systems
- Forestry Vehicles
- Reach Stackers
- Gantry Cranes

Steer, Brake
- Truck Systems
- Skid Steer

Open, Close
- Door Systems
- Grabs and Buckets

Load, Tip
- Loader Arm

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Application Considerations

Parker Hannifin Corporation is the world’s leading diversified manufacturer of motion and control technologies and systems, providing precision-engineered solutions for a wide variety of mobile, industrial and aerospace markets. Parker has been supporting the mobile hydraulics industry with highly engineered solutions for over 90 years.

Intellinder technology is designed to provide load monitoring, auto-leveling, danger zone avoidance, speed control, auto-stow, and other challenging functions, in conjunction with the Parker IQAN Electronic Control System, Parker Hydraulics, and Parker Mobile Electronics.

Control Loop

A Parker Technical Representative can help you integrate Parker Absolute Position Sensor technology with system-compatible pumps, valves, cylinders, fittings, hoses, and mobile electronic controls for successful monitoring and control in harsh application environments.
Its fully integrated design makes the Intellinder Absolute Position Sensor easy to change-out should replacement be required. The system is so simple to install that it is virtually plug-and-play! Sensors are shipped standard with Deutsch DTM04-08 Connector.

Create a preliminary design based on the parameters in the chart above, using this rod diagram as your guide. Once you have identified the diameter, stroke, and length of your rod, along with the number of strips/degrees desired, your Parker Technical Representative can work with you to ensure a custom design to meet your requirements. Keep in mind that the additional build length to your cylinder will be minimal. Multiple redundancies can be built in by using two or more sensors mounted around a single piston rod.

Rod Diameter (OD) | Length of Stroke (SL) | Length of Rod (OAL) | Marking Coverage
--- | --- | --- | ---

Sensor Ordering Part Numbers
- V4 Series sensor (8 ft stroke) 376 8888 008
- V4 Series sensor (22 ft stroke) 376 8888 012
- V4 Series sensor with mm output 8 ft [2438mm] stroke 376 8888 011
- V4 Series sensor with mm output 20 ft [6096mm] stroke 376 8888 014

Accessories
- Installation kit 376 8888 004
- Installation kit (metric) 376 8888 003
- Deutsch connector kit (Sensor) 376 8888 006
- Deutsch connector kit (Controller) 376 8888 007
- Channel selector resistor kit 376 8888 005

Please consult the full Parker Cylinder Catalog for a complete range of bore, mount and porting options.