

# Temposonics®

Magnetostrictive, Absolute, Non-contact  
Linear-Position Sensors



## R-Series Model RD4 Direct Position and Velocity Output

Data Sheet Part Number  
Reference: 551166

R-Series  
RD4



Model RD4 compact sensor with detached electronics

### FULL RANGE OF OUTPUTS

- Voltage
- Current
- SSI
- CANbus
- Profibus
- POWERLINK
- EtherCAT®



### FEATURES

- R-Series Detached Electronics Sensor
- Linear, Absolute Measurement
- Non-Contact Sensing Technology
- Linearity Deviation Less Than 0.02%
- Repeatability Within 0.001%
- Full Range of Outputs: Voltage, Current, SSI, CANbus, DeviceNet, Profibus, EtherCAT® and POWERLINK
- Simultaneous Multi-Position and Velocity Measurements
- LEDs For Sensor Status and Diagnostics

### BENEFITS

- Detached Sensor Electronics Provide for the Smallest R-Series sensor Head
- Allows Isolating the Sensor Electronics From High Temperatures, High Vibration / Shock, or Other Environmental Extremes

### APPLICATIONS

- Clevis Mount Cylinders Having Minimal Space Available
- High Temperatures or High Vibration / Shock Levels that Require Remote Mounting of the Sensor Electronics
- Space Limited Applications

### TYPICAL INDUSTRIES

- Fluid Power
- Steel Mills
- Material Handling and Packaging
- Woodworking, Metalworking and Assembly Tools



## R-Series Model RD4

### Product Overview, Output and Specifications

#### Product overview

The Temposonics RD4 position sensor provides an added degree of flexibility compared to the standard R-Series rod style sensor package. The RD4 design utilizes a separate electronics housing and interconnection cable to allow installation of the sensor rod into small spaces. By relocating the electronics, the head of the sensor rod is reduced to its minimal size. This makes the RD4 ideal for use with clevis mount cylinders or any space limited cylinder application. Also, the RD4 sensor can be used for applications that require remote mounting of the sensor electronics due to environmental factors, such as, high temperatures or high levels of shock and vibration.

The RD4 interconnection cable exits the head of the sensor rod and connects to the electronics housing. The electronics housing, along with its mounting block, can be configured with either a side cable connection or a bottom cable connection. The side cable connection is for use with threaded rod styles; 'M', 'T', 'C' and 'D'. These threaded rod styles provide for easy sensor installation into a standard threaded port opening on the top of the cylinder end cap.

The bottom cable connection is for use with the pressure-fit rod style (i.e. style 'S'). The rod style 'S' requires an appropriately machined cavity in the cylinder end cap to house the head of the sensor rod. Also, a hole going through the end cap is needed to channel the interconnection cable to the electronics housing that mounts on the side of the end cap. Proper design and careful sensor installation is required to assure the correct fit and o-ring sealing. MTS factory assistance is recommended when designing for the rod style 'S' in all new RD4 applications.

#### Output options

The R-Series Model RD4 sensor is available in voltage, current, SSI, CANbus, DeviceNet, Profibus, EtherCAT® and POWERLINK outputs.

##### Important specification note:

For R-Series model specific specifications, consult the individual data sheets applicable to the sensor output(s) for your application.

#### Product specifications

Parameters	Specifications
<b>OUTPUT</b>	
<b>Measured output variables:</b>	Position, velocity, simultaneous multi-position and velocity measurements. (Measured output variables depend on the complete sensor model used.)
<b>Resolution:</b>	Output dependent
<b>Update times:</b>	Output dependent
<b>Non-linearity:</b>	$< \pm 0.02\%$ full stroke (minimum $\pm 50 \mu\text{m}$ ) <sup>‡</sup>  <sup>‡</sup> For rod style 'S' the linearity deviation can be higher in the first 30 mm (1.2 in.) of stroke length.
<b>Repeatability:</b>	$< \pm 0.001\%$ full stroke (minimum $\pm 2.5 \mu\text{m}$ )
<b>Hysteresis:</b>	$< 4 \mu\text{m}$ , $2 \mu\text{m}$ typical
<b>Outputs:</b>	Voltage, current, SSI, CANbus, DeviceNet, Profibus, POWERLINK and EtherCAT
<b>Measuring range:</b>	25 to 5080 mm (1 to 200 in.)
<b>ELECTRONICS</b>	
<b>Operating voltage:</b>	<b>+24 Vdc nominal:</b> -15% or +20% <b>Polarity protection:</b> up to -30 Vdc <b>Over voltage protection:</b> up to 36 Vdc <b>Current drain:</b> Output dependent <b>Dielectric withstand voltage:</b> 500 Vdc (DC ground to machine ground)
<b>ENVIRONMENTAL</b>	
<b>Operating conditions:</b>	<b>Operating temperature:</b> -40 °C (-40 °F) to +75 °C (+167 °F) <b>Relative humidity:</b> 90% no condensation

Parameters	Specifications
<b>EMC test<sup>‡</sup>:</b>	<b>Emissions:</b> IEC/EN 50081-1 <b>Immunity:</b> IEC/EN 50082-2 IEC/EN 61000-4-2/3/4/6, level 3/4 criterion A, CE qualified <sup>‡</sup> Sensor rod and interconnection cable is mounted inside a hydraulic housing or metal housing.
<b>Shock rating:</b>	100 g (single hit)/ IEC standard 68-2-27 (survivability)
<b>Vibration rating:</b>	10 g/10 to 2000 Hz, IEC standard 68-2-6 (operational)
<b>WIRING</b>	
<b>Connection type:</b>	Connector or integral cable (output dependent)
<b>ROD STYLE SENSOR (MODEL RD4)</b>	
<b>Electronic head:</b>	Aluminum housing with diagnostic LED display. (LEDs located beside connector/cable exit)
<b>Sealing:</b>	<b>Sensor electronics:</b> IP 67 (with professionally mounted housing and connectors) <b>Sensor rod head with interconnection cable:</b> Threaded style (IP 65) and pressure fit style (IP 30)
<b>Sensor rod:</b>	304L stainless steel
<b>Operating pressure:</b>	350 bar static, 690 bar peak (5000 psi, 10,000 psi peak)
<b>Mounting:</b>	Any orientation. Threaded flange M18 x 1.5 or 3/4 - 16 UNF-3A or non-threaded pressure fit
<b>Typical mounting torque:</b>	45 N-m (33 ft. -Lbs.)
<b>Magnet types:</b>	Ring magnet, open-ring magnet or magnet float

## Model RD4 sensor dimension references

### R-SERIES RD4 SENSOR WITH SIDE CABLE ELECTRONICS CONNECTION AND ROD STYLE 'M' OR 'T'

Drawing is for reference only, contact applications engineering for tolerance specific information.

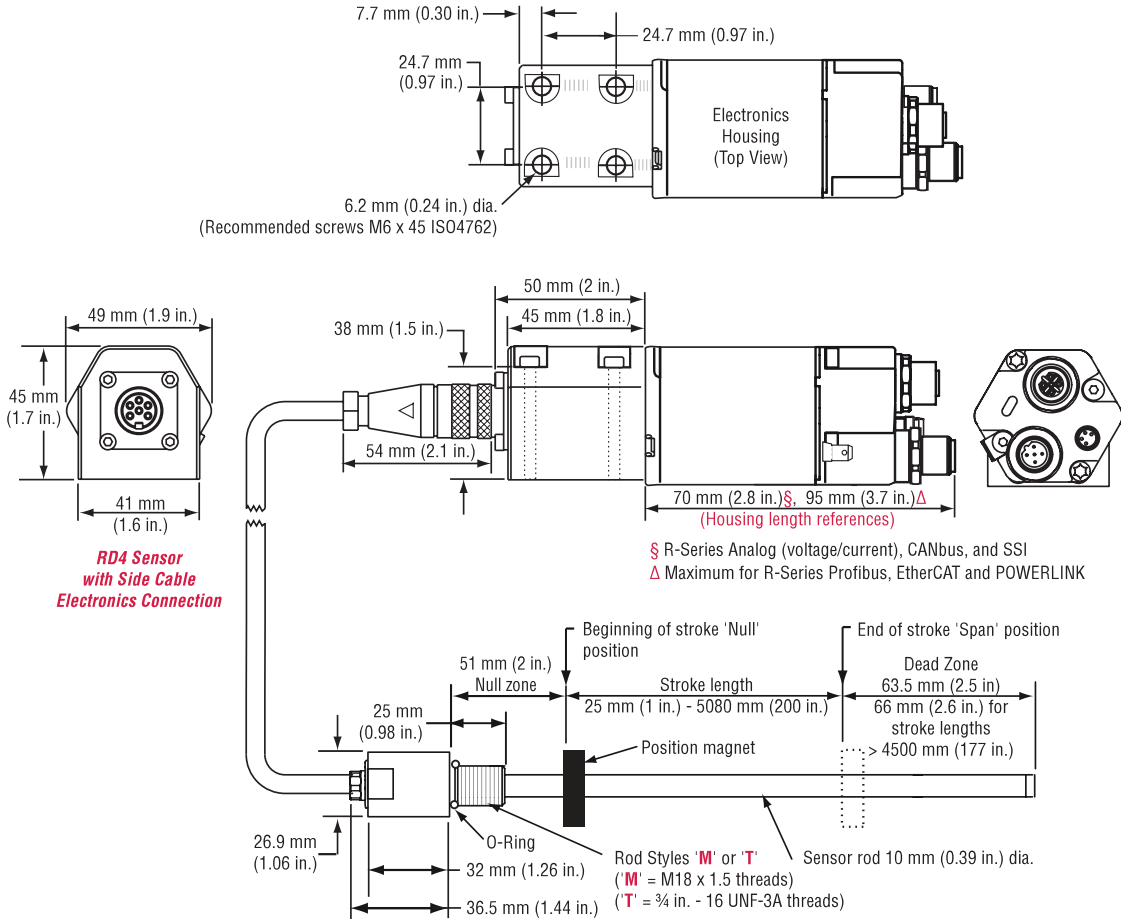


Figure 1. R-Series Model RD4 sensor with side cable electronics connection and rod style 'M' or 'T'

### R-SERIES RD4 SENSOR WITH SIDE CABLE ELECTRONICS CONNECTION AND ROD STYLE 'C' OR 'D'

Drawing is for reference only, contact applications engineering for tolerance specific information.

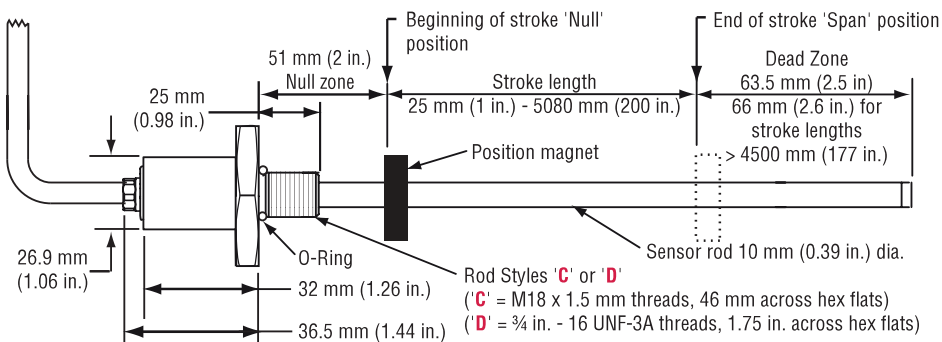
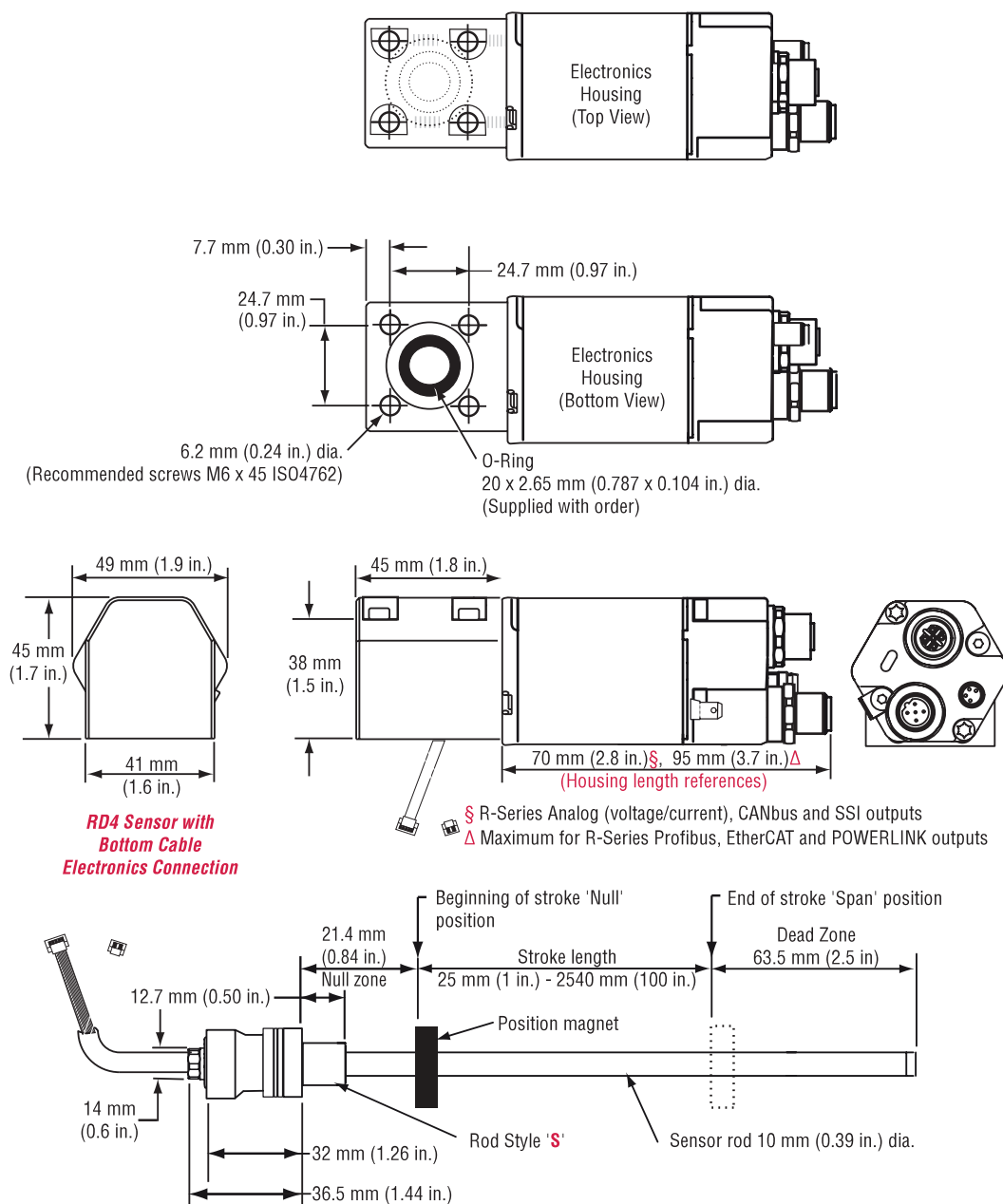


Figure 2. R-Series Model RD4 sensor with side cable electronics connection and rod style 'C' or 'D'

## R-Series Model RD4 Sensor Dimension References


**R-SERIES RD4 SENSOR WITH BOTTOM CABLE ELECTRONICS CONNECTION AND ROD STYLE 'S'**  
Drawing is for reference only, contact applications engineering for tolerance specific information.



**Figure 3.** R-Series Model RD4 sensor with bottom cable electronics connection and rod style 'S'

## Standard magnet selections (Model RD4)

Magnets must be ordered separately with model RH position sensors. The standard ring magnet (part number 201542-2) is suitable for most applications

 Refer to the Accessories section of this catalog for magnet, cable connector selections and detailed mounting and installation information.

## Sensor cylinder installation for side cable connection and threaded rod styles

### Cylinder Installation Note:

The position magnet requires minimum distances away from ferrous metals to allow proper sensor output. The minimum distance from the front of the magnet to the cylinder end cap is 15 mm (0.6 in.). The minimum distance from the back of the magnet to the piston head is 3.2 mm (0.125 in.). The non-ferrous spacer (part no.: 400633), provides this minimum distance when used along with the standard ring magnet (part no.: 201542-2).

R-Series  
RD4

### R-SERIES RD4 SENSOR CYLINDER INSTALLATION WITH SIDE CABLE CONNECTION AND ROD STYLES 'M' AND 'T'

Drawing is for reference only, contact applications engineering for tolerance specific information.

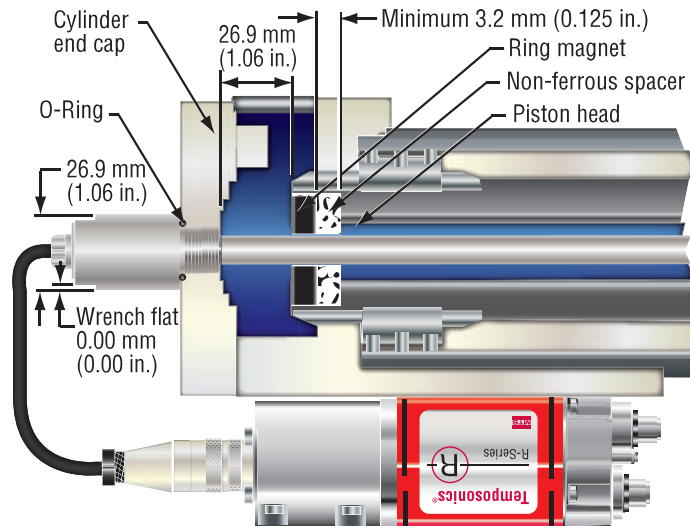


Figure 4. R-Series Model RD4 sensor installation using side cable connection and rod styles 'M' or 'T'

### R-SERIES RD4 SENSOR CYLINDER INSTALLATION FOR SIDE CABLE CONNECTION AND ROD STYLES 'C' AND 'D'

Drawing is for reference only, contact applications engineering for tolerance specific information.

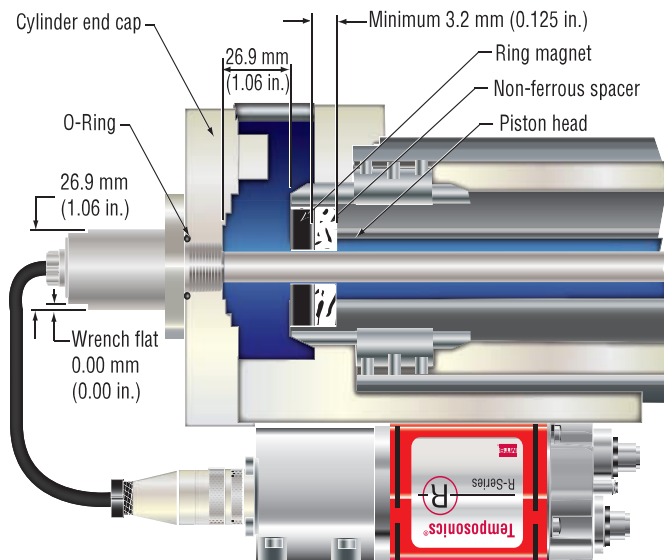


Figure 5. R-Series Model RD4 sensor installation using side cable connection and rod styles 'C' and 'D'

## R-Series Model RD4 Sensors

### Installation and Mounting References

#### Sensor cylinder installation for bottom cable connection and pressure fit rod style

##### R-SERIES RD4 SENSOR CYLINDER INSTALLATION FOR BOTTOM CABLE CONNECTION AND PRESSURE FIT ROD STYLE 'S'

Drawing is for reference only, contact applications engineering for tolerance specific information.

###### Pressure fit rod style 'S' installation Notes:

1. The position magnet requires minimum distances away from ferrous metals to allow proper sensor output. When using rod style 'S' mounted inside a cylinder end cap, the minimum distance from the front of the magnet to the cylinder end cap is 21 mm (0.83 in.).
2. The minimum distance from the back of the magnet to the piston head is 3.2 mm (0.125 in.). The non-ferrous spacer (part no.: 400633), provides this minimum distance when used along with the standard ring magnet (part no.: 201542-2).
3. In the event that the position magnet is to be secured in the piston head by using a ferrous circlip, then an additional non-ferrous spacer is recommended on the front side of the magnet (as shown below ‡).

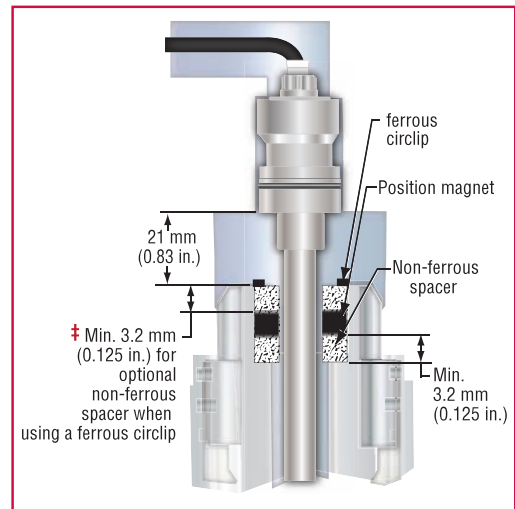
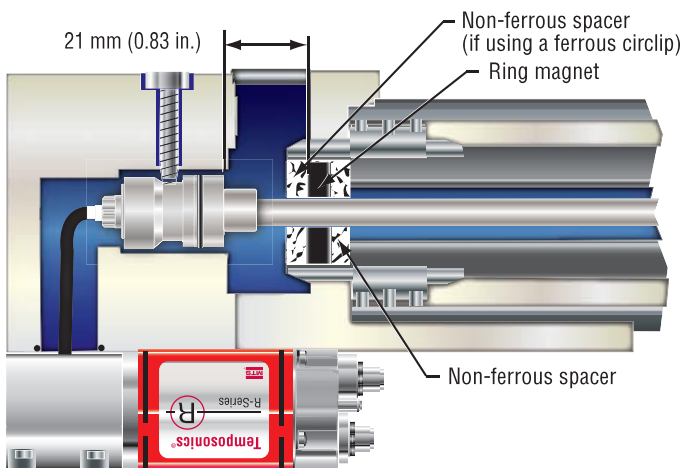


Figure 6. R-Series Model RD4 sensor installation using bottom cable connection and pressure fit rod style 'S'

#### Cylinder end cap mounting and pressure-fit rod style 'S' detail references

Drawings are for reference only, contact applications engineering for tolerance specific information.

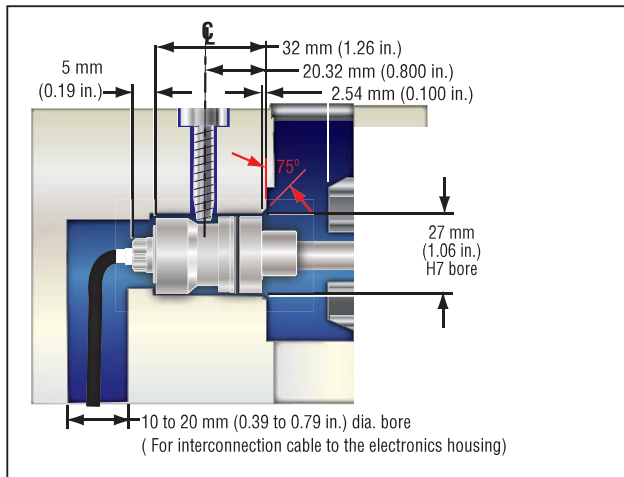


Figure 7. Cylinder end cap mounting detail reference

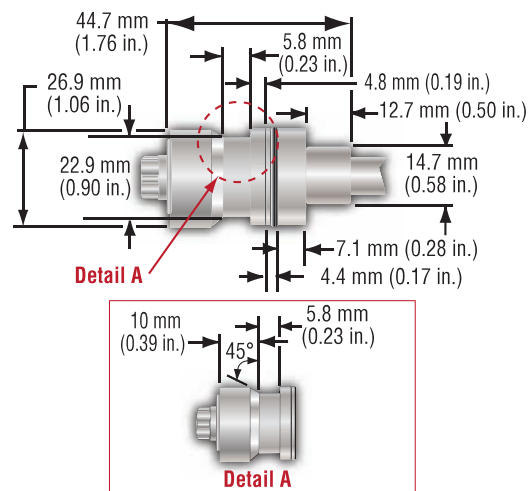


Figure 8. Pressure fit rod style 'S' details

(16 up to 26 depending on R-Series output)

To complete the sensor output model number, consult the specific ordering information page for the R-Series output you need.

**INPUT VOLTAGE NOTE:** number designation not required for input voltage (Standard 24 Vdc +20%, -15%) .

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