

## R-Series Rod Model RD4

**Temposonics-RD4**  
Measuring range 25 - 5000 mm

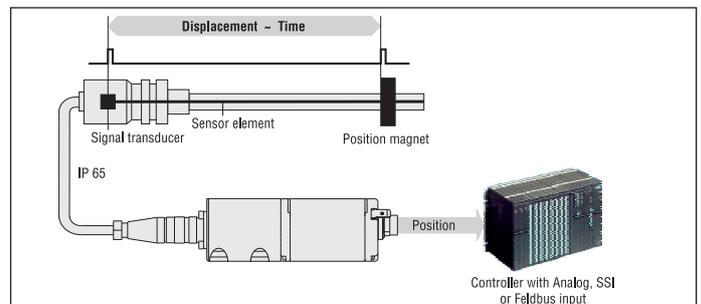


**Compact Sensor for  
Hydraulic Cylinders  
and Machine Manufacturing**



**New: Diagnostic LED**

- Rugged Industrial Sensor
- Linear and Absolute Measurement
- LEDs for Sensor Diagnostics
- Contactless Sensing with Highest Durability
- Superior Accuracy: Linearity better 0.02 %
- Repeatability 0.001 %
- Direct Output for Displacement + Velocity  
Analog / SSI / CANbus / Profibus-DP / EtherCAT
- Multi-Position Measurement: max. 20 Positions with 1 Sensor



### Magnetostriction

The absolute **Temposonics®** linear position sensors are based on the MTS developed **magnetostrictive** principle. That combines various magneto-mechanical effects and uses the physical high precise speed-measurement of an ultrasonic wave (torsion pulse in its sensor element) for position detection. Sensor integrated signal processing transforms the measurements signals directly into market standard outputs. The contactless principle - an external movable magnet marks the position - eliminates wear, noise and erroneous signal problems and guarantees the best durability without any recalibration.

### Form factor

**Temposonics® RD4** the extremely robust sensor, ideal for continuous operation under harshest industrial conditions is completely modular in mechanic and electronic design. A rod-shaped sensor housing protects the sensing element in which the measurement signal arises. The sensor head accommodates the complete modulare electronic interface with active signal conditioning. Double encapsulation ensures high operation safety and optimum EMC protection. The position transmitter, a permanent magnet fixed at the mobile machine part, drives contactlessly over the sensor's stroke and starts measuring through the housing wall.

# Temposonics-RD4

## Compact Sensor

**Temposonics-RD4** sensors were designed for installation into hydraulic cylinders, specifically for use in standard clevis head cylinders or any space limited cylinder application. They consist of:

- The pressure proof stainless steel sensor rod with fitting or threaded flange, which protects the sensing element in which the measurement signal arises. It fits into the bored piston rod.
- The external industrial housing (IP67) which accommodates the modular electronic interface with active signal conditioning. The sensor electronics is connected to the basic-sensor via side or bottom cable entry.

### Technical Data

<b>Input</b>	
Measured variables	- Displacement - Velocity - Multi-Position measurement max. 20 positions (CANbus, Profibus, EtherCAT)
Measuring range	25...5000 mm
<b>Output</b>	
Interfaces	Analog, SSI, CANbus, Profibus-DP, EtherCAT
<b>Accuracy</b>	
Resolution	Output dependent
Linearity	< ± 0,02 % F.S. (Min ± 50 µm)
Repeatability	< ± 0,001 % F.S. (Minimum ± 2.5 µm)
Hysteresis	< 4 µm
Ripple/Jitter	<b>Analog:</b> 0,01 % F.S. / <b>Digital:</b> < ± 10 µm
<b>Operating conditions</b>	
Manget speed	Any
Operating temperature	-40 °C ... +75 °C
Dew point, humidity	90% rel. humidity, no condensation
Protection	Sensor electronics IP67 (with professional mounted housing and connectors) Measuring rod with connecting cable for side cable entry IP65 Measuring rod with single wires and flat connector with bottom cable entry IP 30
Shock test	100 g (single shock IEC-Standard 68-2-27)
Vibration test	10 g / 10 - 2000 Hz IEC-Standard 68-2-6
Standards, EMC test*	Electromagnetic emission EN 50081-1 Electromagnetic immunity EN 50082-2 EN 61000-4-2/3/4/6, Level 3/4, criterion A, CE-qualified
*Measuring rod and connecting cable mounted inside metal housing	
<b>Form factor, Material</b>	
Diagnostic display	LED besides connector
Sensor electronics	Aluminum-diecasting housing
Measuring rod with flange	Stainless steel 1.4301 / AISI 304
- Operating pressure	350 bar, 700 bar peak
Position magnet	Ring magnets
<b>Electrical connection</b>	
Connection type	Connector or cable outlet (output dependent)
Input voltage	24 VDC (-15 / +20 %)
- Polarity protection	up to -30 VDC
- Overvoltage protection	up to 36 VDC
Current drain	100 mA typical
Ripple	< 1 % S-S
Electric strength	500 V (0 V ground to machine ground)

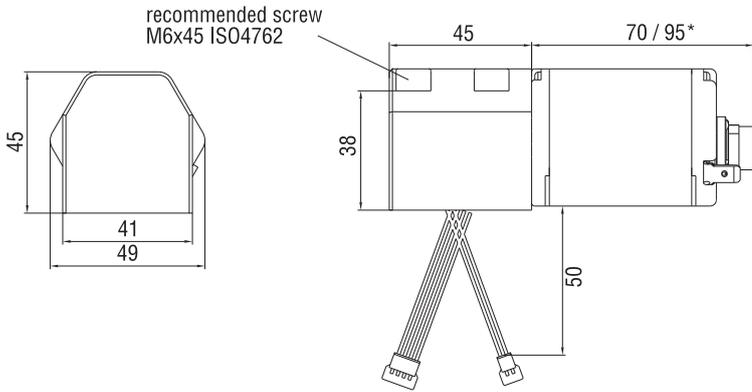
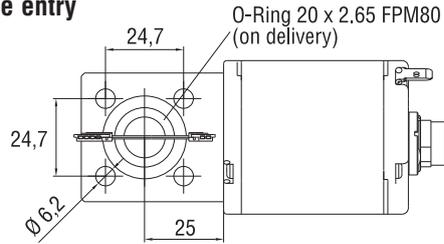
**Info: For detailed technical data and electrical connection for the outputs please see data sheets: R-Series Analog, SSI, CANbus, Profibus, EtherCAT**



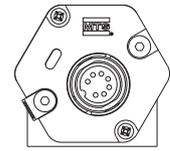
# Temposonics-RD4

Compact Sensor

Electronics with bottom cable entry for the measuring rod

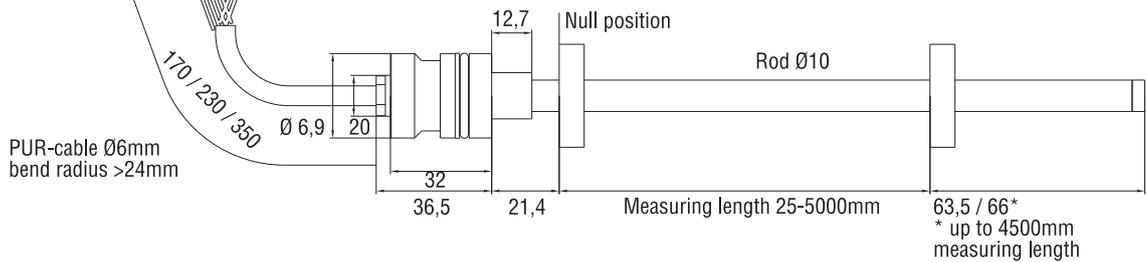


\* Housing length for Profibus, EtherCAT

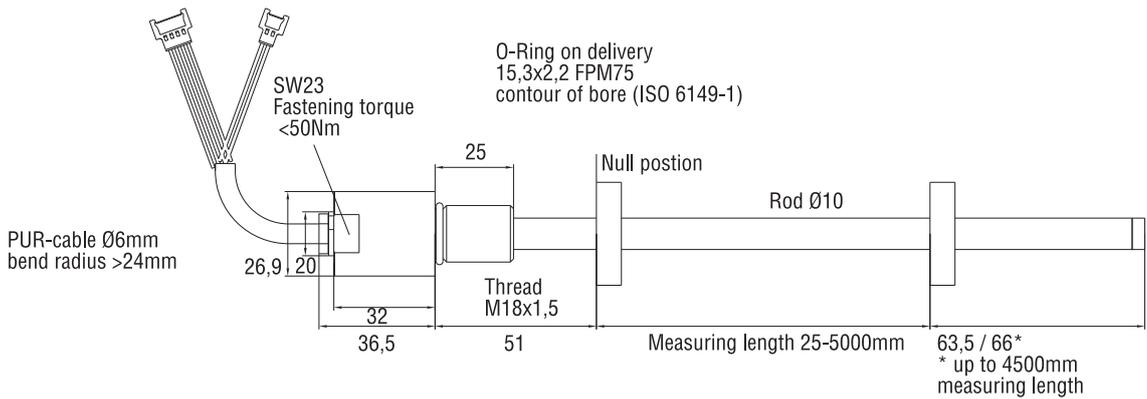


Connecting example SSI

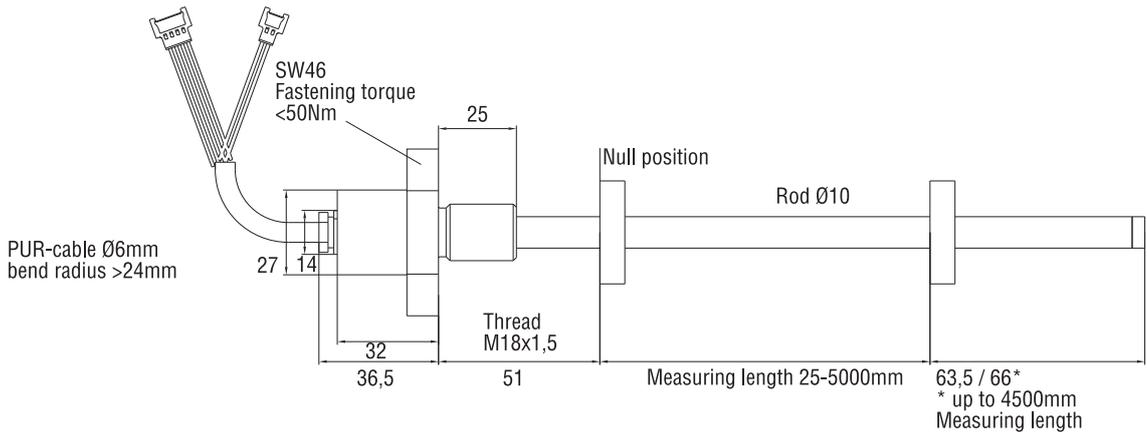
Rod Typ "S"



Rod Typ "M"

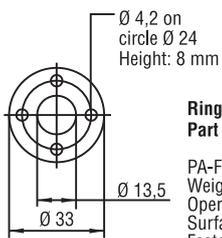


Rod Typ "C"



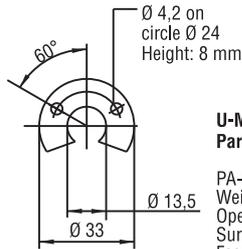
All dimensions in mm

**Selection of position magnets** (not on delivery, please order separately)



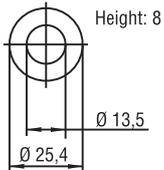
**Ring magnet OD33**  
Part No. 201 542-2

PA-Ferrit-GF20  
Weight ca. 14g  
Operating temperature: -40 ... +100°C  
Surface pressure max. 40 N/mm<sup>2</sup>  
Fastening torque for M4 screws max. 1 Nm



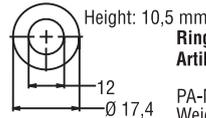
**U-Magnet M OD33**  
Part No.. 251 416-2

PA-Ferrit-GF20  
Weight ca. 11g  
Operating temperature: -40 ... +100°C  
Surface pressure max. 40 N/mm<sup>2</sup>  
Fastening torque for M4 screws max. 1 Nm



**Ring magnet OD25,4**  
Part No. 400 533

PA-Ferrit  
Weight ca. 10g  
Operating temperature: -40 ... +100°C  
Surface pressure max. 40 N/mm<sup>2</sup>



**Ring magnet OD17,4**  
Artikel Nr. 253 572

PA-Neobond  
Weight ca. 7g  
Operating temperature: -40 ... +100°C  
Surface pressure max. 20 N/mm<sup>2</sup>

**Sensor installation with fitting flange »S«**

**Cylinder mounting**

For installation in hydraulic cylinders, we recommend the sensor system consisting of the rod and the mounting flange, and the B type electronics.

Install the rod using the fit and seal it off by means of the O-ring and the supporting ring. Block the rod using a shoulder screw.

The adaptor plate of the separate electronics housing facilitates mounting on the outside of small cylinders. Advantage of this version: Connection to the measuring rod is via the bottom of the housing. Thus the sensor system is fully encapsulated and protected against external disturbances.

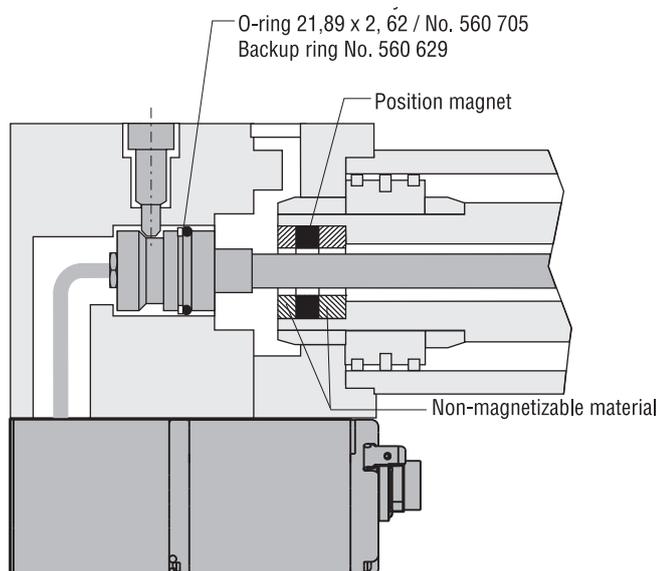
When installing the cylinder, please note:

- The position magnet should not grind over the measuring rod.
- The bore in the piston rod is dependent on the hydraulic pressure and the pistons velocity. The minimum drilling should be 13 mm. Do not exceed the peak pressure.
- The measuring rod should be protected against wear.

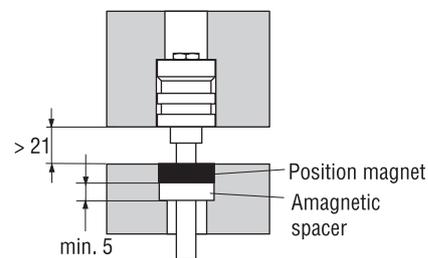
**Mounting ring magnet**

Mount the magnetic with the non-magnetic material for entrainment, screws, spacers, etc.

**Mounting example fitting flange »S« and sensor electronics with bottom cable entry**



**Minimum installation dimensions for magnetizable material**



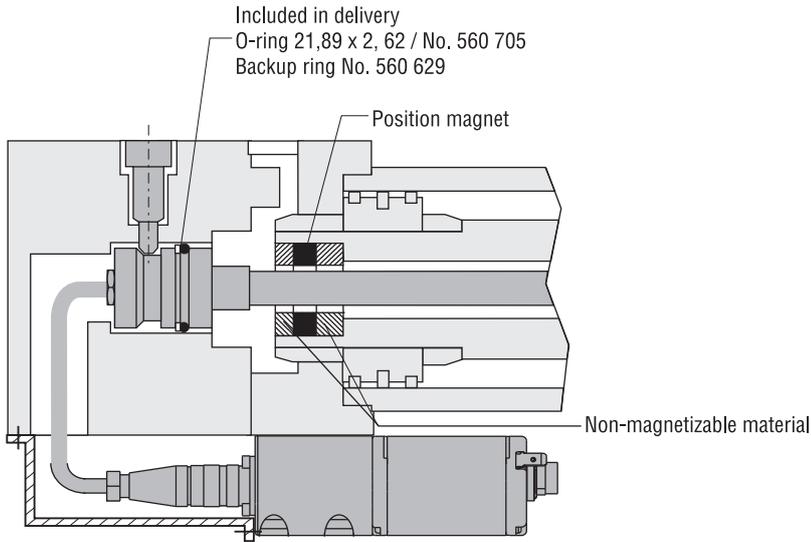
Bore in cylinder Ø13-17 mm to push single wires with flat connector through.

All dimensions in mm

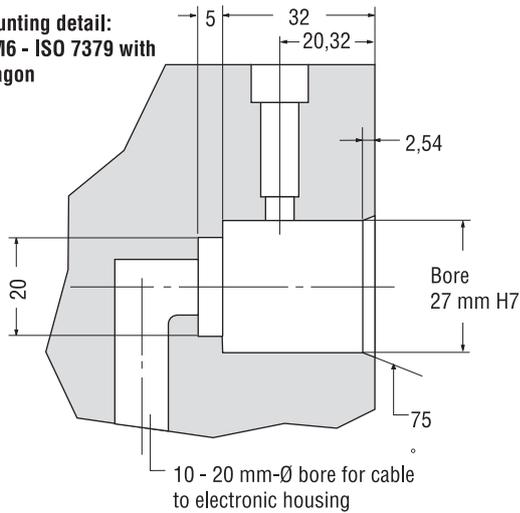
# Temposonics-RD4

Compact Sensor

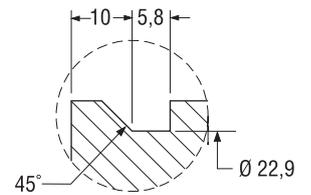
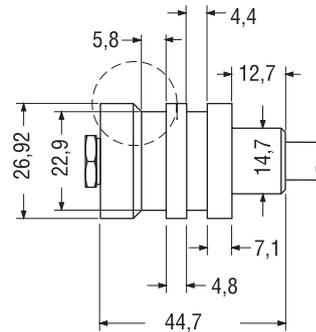
## Mounting example fitting flange »S« and sensor electronics with side cable entry



### Example mounting detail: Setscrew 8 M6 - ISO 7379 with internal hexagon



### Detail: Fitting flange



### ATTENTION

To fulfill the EMC standards for emission and susceptibility require a shielded housing for the interconnection cable. This cable has to be connected to machine ground.

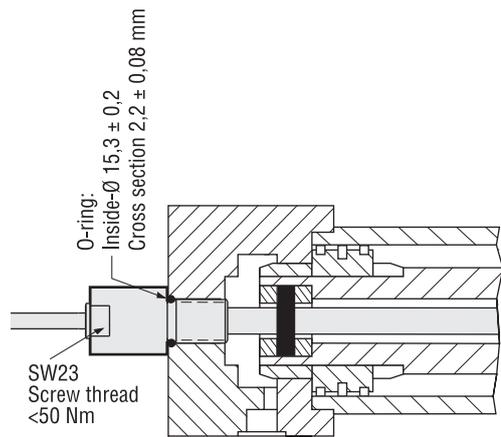
**Sensor installation with fitting flange »M« and »C«**

**Rod**

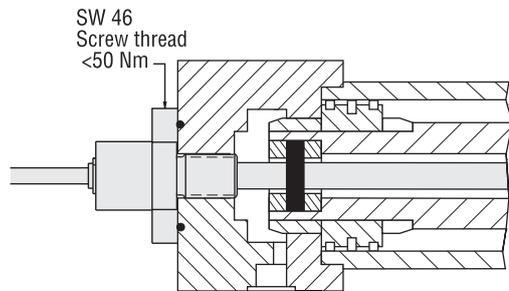
The sensor's pipe will be fixed via the threaded flange M18 x 1.5. Mounting should be with non-magnetizable material. If using magnetizable material please necessarily follow the displayed installation dimensions.

**Mounting example fitting flange »M«**

Sealing results from the provided O-Ring 15.3 x 2.2 mounted in the undercut.



**Mounting example fitting flange »C«**



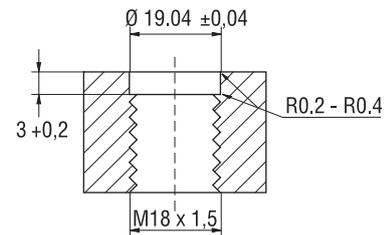
**Hydraulic sealing**

Recommended is a sealing of the flange facing with O-Ring (e.g. 21.89 x 2.62) in a cylinder cover nut or an O-Ring in undercut.

**Cylinder mounting**

- The position magnet should not grind over the measuring rod.
- The bore in the piston rod is dependent on the hydraulic pressure and the pistons velocity. The minimum drilling should be 10 mm. Do not exceed the peak pressure.
- The measuring rod should be protected against wear.

**Dimensions for O-Ring sealing thread M15 x 1.5**

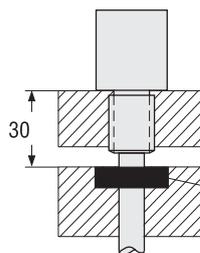


Alternative outline of the screwing bore according to ISO 6149-1.

**Position magnet**

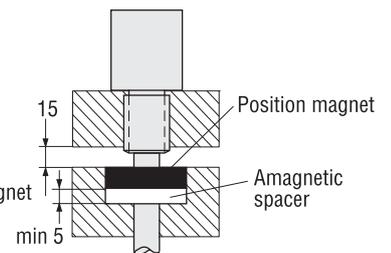
For accurate position measurement mount the magnet with non-magnetizable fastening material (screws, supports etc.).

**Non-magnetizable material**



Non-magnetizable material

**Magnetizable material**



Magnetizable material

# Temposonics-RD4

Compact Sensor

Temposonics RD4

**R D 4**

**M**

### Sensor rod style

- S** - Fitting flange
- M** - Threaded flange M18 x 1.5, HEX23
- C** - Threaded flange M18 x 1.5, HEX46
- High vibration Resistant sensor - option**
- B** - Mechanics like flange ,M
- P** - Mechanics like flange ,C

### Integral cable of sensor rod

For side cable entry:

- D1** - PUR-cable, length 250 mm
- D2** - PUR-cable, length 400 mm
- D3** - PUR-cable, length 600 mm

For bottom cable entry:

- R4** - Single wires with flat connector, length 170 mm
- R5** - Single wires with flat connector, length 230 mm
- R6** - Single wires with flat connector, length 350 mm

### Sensor electronics

- S** - Side cable entry
- B** - Bottom cable entry

### Measuring length

0025...5000 mm  
Standard: up to 1000 mm in 50 mm steps, longer 1000 mm in 250 mm steps

### Connection electronic housing

- D60** = 6-pin DIN (M16), male, standard
- R** \_\_\_ = Integral cable, PVC jacket, pigtail termination, standard
- H** \_\_\_ = Integral cable, orange polyurethane jacket with pigtail termination

#### Cable length:

Encode in feet if using US customary stroke length  
Encode in meters if using metric stroke length

→ \_\_\_ = 1 (01) to 99 (99) ft. or 1 (01) to 30 (30) meters.

### Output

#### 1 Output channel with 1 magnet (3 digit code).

##### Output #1 = Magnet position

- V01** = 0 to +10 Vdc      **A01** = 4 to 20 mA
- V11** = +10 to 0 Vdc      **A11** = 20 to 4 mA
- V21** = -10 to +10 Vdc    **A21** = 0 to 20 mA

#### 2 Output channels with 2 magnets (3 digit code)

##### Output #1 = Magnet #1 position

- V02** = 0 to +10 Vdc
- V12** = +10 to 0 Vdc
- V22** = -10 to +10 Vdc
- V32** = +10 to -10 Vdc
- A02** = 4 to 20 mA
- A12** = 20 to 4 mA
- A22** = 0 to 20 mA
- A32** = 20 to 0 mA

##### Output #2 = Magnet #2 position

- 0 to +10 Vdc
- +10 to 0 Vdc
- 10 to +10 Vdc
- +10 to -10 Vdc
- 4 to 20 mA
- 0 to 4 mA
- 0 to 20 mA
- 20 to 0 mA

#### 2 Output channels with 1 magnet (7 digit code)

##### Output #1 = Magnet position

- V01** \_\_\_ = 0 to +10 Vdc
- V11** \_\_\_ = +10 to 0 Vdc
- A01** \_\_\_ = 4 to 20 mA
- A11** \_\_\_ = 20 to 4 mA

##### Output #2 = Speed magnitude

- +10 (towards head)    0 (at rest)
- +10 (towards head)    0 (at rest)
- 20 (towards head)      4 (at rest)
- 20 (towards head)      4 (at rest)

- +10 (towards tip) Vdc
- +10 (towards tip) Vdc
- 20 (towards tip) mA
- 20 (towards tip) mA

[www.mtssensor.com](http://www.mtssensor.com)  
[www.temposonics-shop.de](http://www.temposonics-shop.de)

EXTENSION CABLE OPTIONS — **DJ008D6M (Adapter Cable 8 ft.)**

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