

# Model SM100 Series

## MICROSONIC® Thru-beam Sensors



**Industry proven, these MICROSONIC® sensors increase “Uptime” with reliable, thru-beam sensing in harsh, high-speed environments**

In response to problems directly attributed to the harsh environments in which sensors operate today, Hyde Park offers broad application solutions with this industry-proven line of ultrasonic thru-beam sensors. First produced in 1974, the MICROSONIC® SM100 Series sensors is the “workhorse” of the Hyde Park product line with tens of thousands of units continuing to perform a variety of thru-beam sensing functions throughout the world.

Using the world’s leading ultrasonic sensing technology,

the MICROSONIC® SM100 Series sensors performs precise object detection...from transparent containers to metal parts as small as 6.4 mm (1/4") diameter at speeds in excess of 2000 units per minute.

Unlike photoelectrics, these stainless steel sensors are virtually unaffected by splashing food, caustic cleaning solutions, frequent high-pressure washdowns, humidity, changing light conditions or colors, dust and ambient noise. The rugged sensors need no maintenance and require no sensitivity adjustments to compensate for inconsistent product materials.

Response times range from 4 milliseconds down to 0.6 millisecond. The 12 to 24 VDC circuitry and output signal make these sensors directly compatible with many programmable logic controllers, computers and other logic control systems.

- Self contained
- Meets NEMA 4X/IP67 standards
- Survives harsh environments
- No sensitivity adjustments
- Sensing ranges up to 1829 mm (72")



MICROSONIC® SM100 SERIES

## Operation

The MICROSONIC® sensors are continuous-wave devices that consist of an ultra-high-frequency transmitter and receiver positioned opposite each other, illustrated below, at a distance of up to 1829 mm (72"). During operation, the transmitter sends a continuous ultrasonic beam which is picked up by the receiver. When an object of any material or shape passes between the transmitter and receiver and breaks the beam, object presence is detected and the output of the receiver switches. Or, when a hole as small as 3 mm (1/8 inch) diameter

allows the beam to pass through to the receiver, the output of the receiver switches.

With all circuitry compactly sealed in the stainless steel transmitter and receiver probes, the MICROSONIC® sensors boast a narrow, constant, high-frequency sonic beam for high sensing resolution.

The thru-beam sensing mode is set up by mounting the sensors on the same axis opposite each other as shown in Figure 1. The distance (range) between the transmitter face and receiver face

can be up to 1829 mm (72"), depending on the model and range selected.

Positioning of the transmitter and receiver for operation is extremely important for the reliable detection of objects, particularly small ones. As the figure also shows, the width of the transmitted sound beam initially expands at a rate of 10 degrees (5 degrees each side of the common axis) as the distance between the transmitter and receiver increases. This means that, if the distance between the transmitter and receiver is too great and the object is too small, it is possible for the beam to "wrap around" the object enough to not cause the receiver output to switch, as shown in Figure 2.

Therefore, reliable detection of 13 mm (0.5") inch wide or smaller objects is achieved when the objects are allowed to pass near the face of either the transmitter or receiver. An alternative approach is to position the transmitter and receiver on parallel axes, as shown in Figure 3, so as to reduce the amount of beam reaching the receiver.

Where sensing distances are adversely affected as the environment becomes more contaminated, the MICROSONIC® sensors remain constant under adverse conditions where other sensor types fail.

## Transmitter/Receiver Combinations and Sensing Ranges

Because specific sensing needs vary from one type of application to another, the MICROSONIC® SM100 Series offers a variety of sensing ranges, connections and signal strengths to maximize efficiency and productivity. See the Sensor Selection Chart in this section for the best transmitter and receiver combination.

## Mounting

The MICROSONIC® thru-beam sensors should be mounted in brackets that allow them to be adjusted for proper alignment on the same axis. Hyde Park offers the Model AC201 Stainless, right angle, single-thru-beam, mounting bracket, which is illustrated, with dimensions, on Page 4-6.

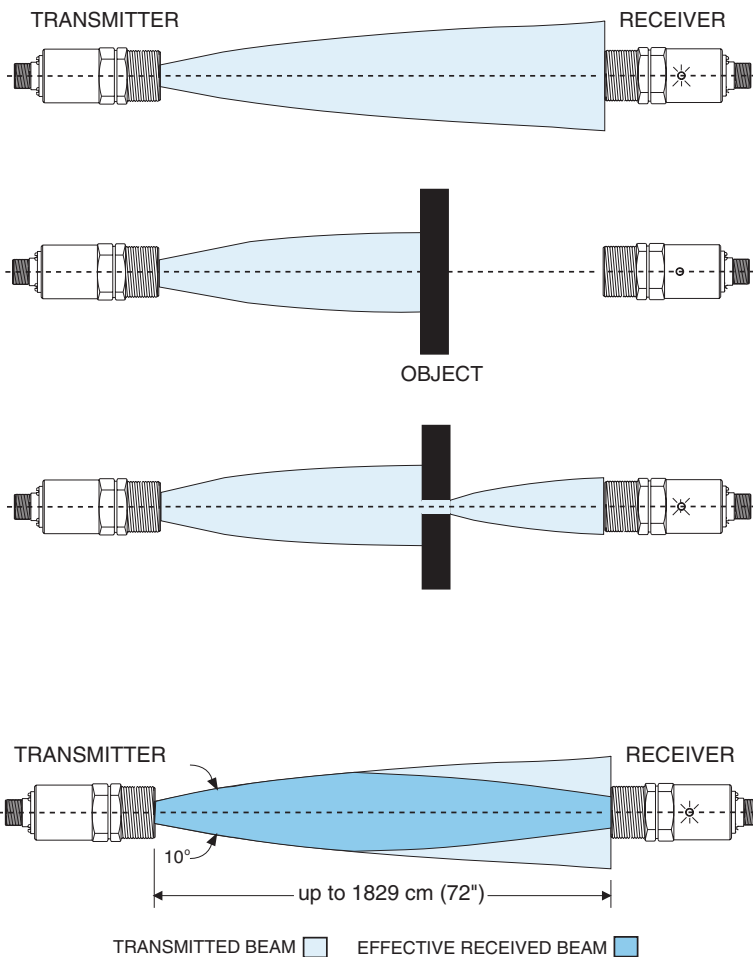


Figure 1, Thru-beam Pattern and Range

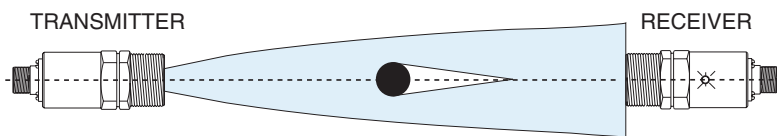


Figure 2

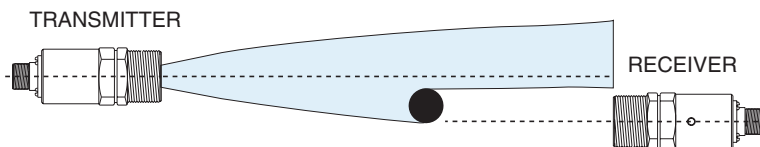


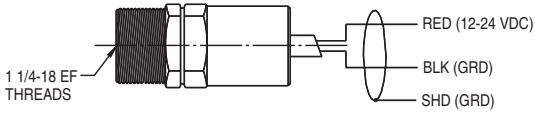
Figure 3

## Electrical Wiring

### Cable Style\*\*

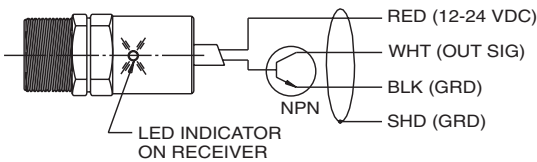
Transmitter Models, Standard Cable  
Length 3 m (10')

SM121, 126, 139, 141, 145, 147



Receiver Models, Standard Cable  
Length 3 m (10')

SM171\*, 176, 187, 189, 191, 193, 195,  
198, 199, 251, 258, CS101



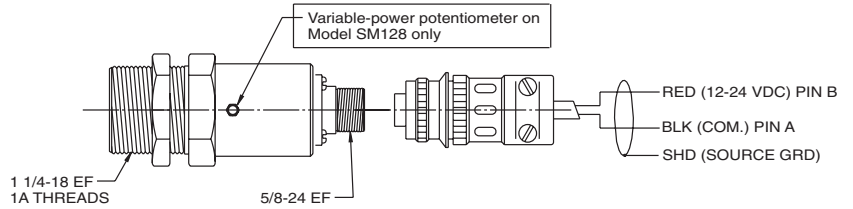
\* Operates only on 15 VDC power

\*\* Use Belden Cable No. 8423 and No. 9154 to extend receiver and transmitter cable length, respectively. Maximum recommended cable length is 152 m (500').

### Quick-disconnect (Amphenol) Style\*\*

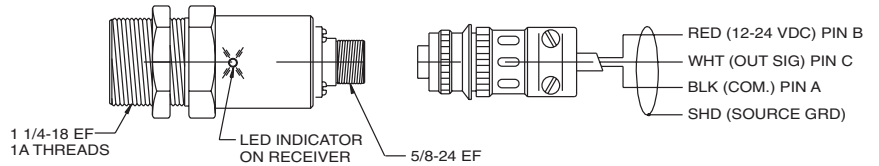
Transmitter Models with Model AC100 Amphenol, 2-conductor, 3 m (10')  
Mating Connector Cable:

SM120, 125, 128, 138, 140, 146



Receiver Models with Model AC150 Amphenol, 3-conductor, 3 m (10')  
Mating Connector Cable:

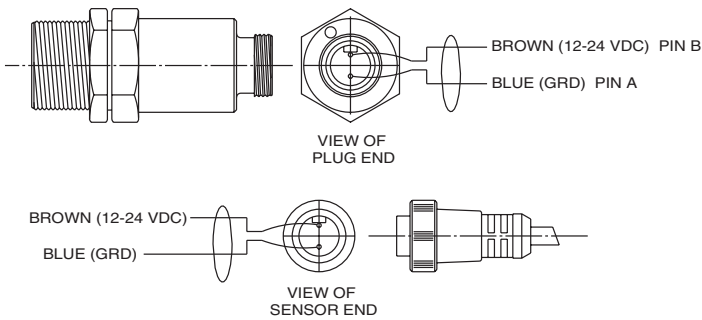
SM170, 175, 182, 186, 188, 190, 193C, 194, 198C, 199C, 250



### Quick-disconnect (watertight) Style

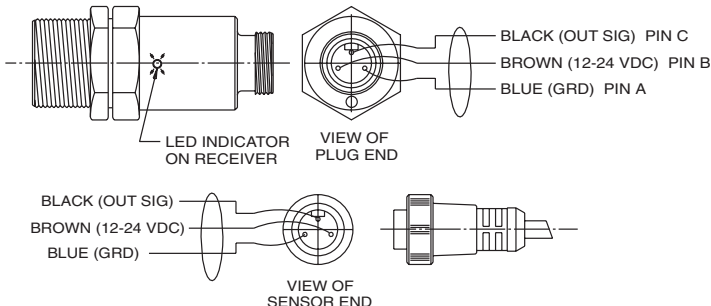
Transmitter Models with Model AC107  
"Mini" 2-conductor, 4 m (12') Mating  
Connector Cable

SM138WTC, 140WTC, 146WTC



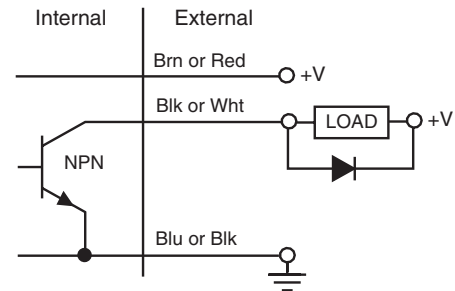
Receiver Models with Model AC108  
"Mini" 3-conductor, 4 m (12') Mating  
Connector Cable

SM186WTC, 190WTC, 250WTC,  
252WTC, 256WTC

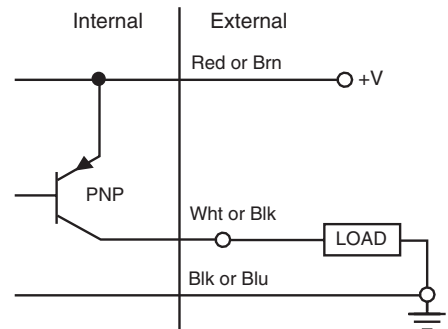


## Receiver Outputs

### NPN SINKING\*\*\*



### PNP SOURCING\*\*\*

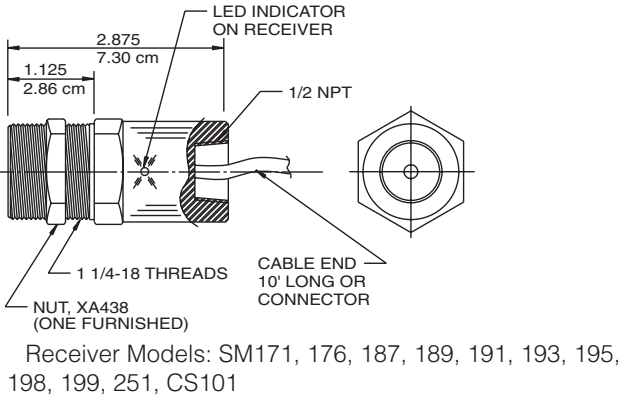
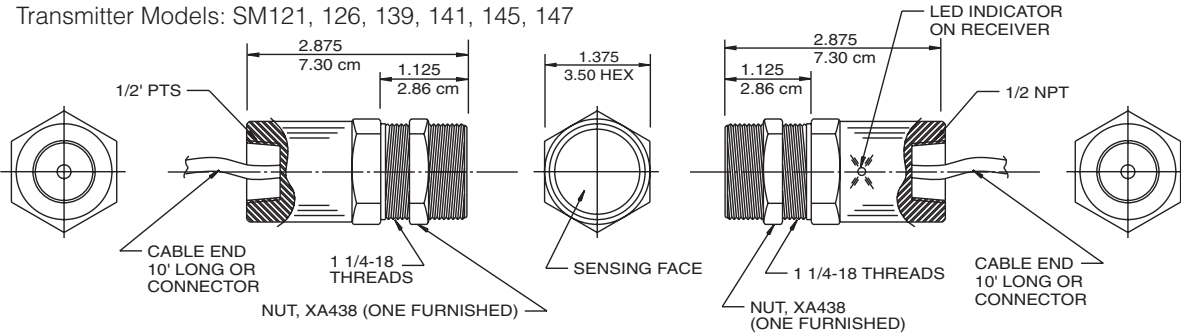


\*\*\* Cable conductor colors vary, dependent upon the sensor model number.

## Dimensions

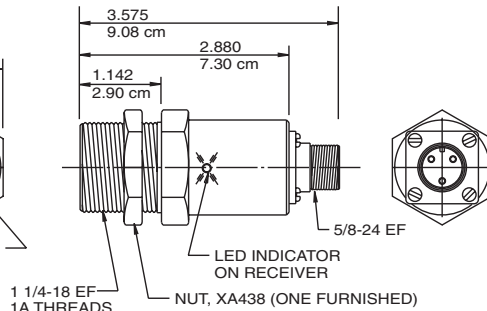
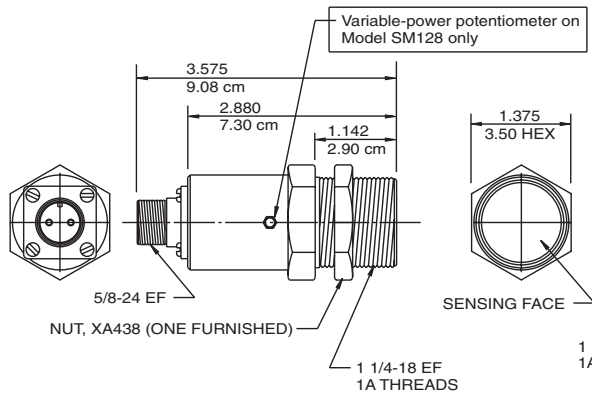
### Cable Style

Transmitter Models: SM121, 126, 139, 141, 145, 147



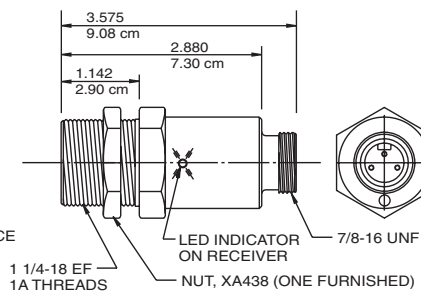
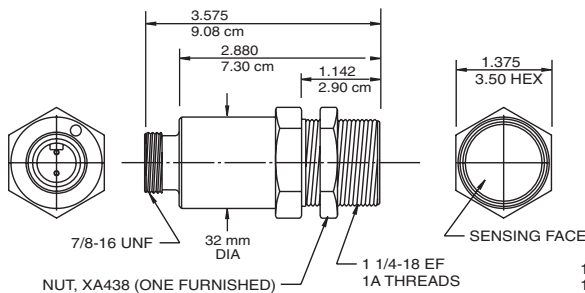
### Quick-disconnect (Amphenol) Style

Transmitter Models: SM120, 125, 128, 138, 140, 146



### Quick-disconnect (Watertight) Style

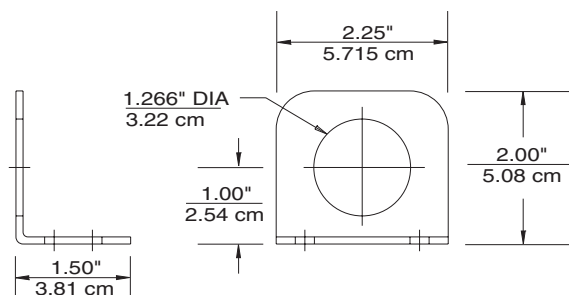
Transmitter Models: SM138WTC, 140WTC, 146WTC, 260WTC



## Mounting Accessory

For all of the above transmitters and receivers.

### Model AC201 Sensor Mounting Bracket



## General Specifications

### Sensing

Ranges:

381 mm (15"), 508 mm (20"), 635 mm (25"), 1016 mm (40"), 1829 mm (72")

Sonic Frequency: 180 kHz

Minimum-size Detection:

13 mm (0.5") at 381 mm (15") range

13 mm (0.5") at 508 mm (20") range

19 mm (0.75") at 635 mm (25") range

19 mm (0.75") at 1016 mm (40") range

25 mm (1.0") at 1829 mm (72") range

Repeatability: 0.79 mm (0.031") typical

### Power Requirements

Supply Voltage:

12 to 24 VDC + 10%, regulated supply

Current Consumption: 60 mA max.

(excluding load) per set

Power Consumption: 1.2 W max.

(excluding load) @ 15 VDC per set

### Output

NPN Sinking: 0 to 50 V, max.

Active low when beam is received: + 0.2 V; maximum

sink current 100 mA, noninductive

PNP Sourcing: 100 mA @ 24 VDC, max.

Receiver red LED "On" when beam is received

### Response Time

"On" 0.6 ms or 4 ms (Model dependent -

See Selection Chart)

"Off" 0.6 ms or 4 ms (Model dependent -

See Selection Chart)

### Indicators

Transmitter: None

Receiver:

Red LED: Illuminated when sonic energy is received, regardless of output state.

### Connections

Cable Style Models:

Transmitter:

305 cm (10'), 20 AWG, foil shield, lead-free, PVC jacket, 2-conductor

Receiver:

305 cm (10'), 22 AWG, foil shield, lead-free, PVC jacket, 3-conductor

Connector Style Models:

Amphenol (nonwatertight) Quick-disconnect Style Models:

Model AC100, Transmitter:

305 cm (10'), 20 AWG, foil shield, lead-free, PVC jacket, 2-conductor

Model AC150, Receiver:

305 cm (10'), 22 AWG, foil shield, lead-free, PVC jacket, 3-conductor

Watertight (WTC) Quick-disconnect Style Models:

Model AC107, Transmitter:

4 m (12'), 18 AWG, 2-conductor, 7/8-16 UN

Model AC108, Receiver:

4 m (12'), 18 AWG, 3-conductor, 7/8-16 UN

### Protection

Power Supply: ESD

Outputs: ESD

### Environmental

Operating Temperature Range:

0½ to 60½ C

Storage Temperature Range: -40½ to 100½ C

(-40½ to 212½ F)

Operating Humidity: 100%

Protection Ratings:

Cable Style: NEMA 4X, IP67

Amphenol Quick-disconnect: NEMA 1

Watertight Quick-disconnect: NEMA 4X, IP67

Chemical Resistance: Resists most acids and bases

including most food products. Polypropylene

transducer face is available to provide resistance to

corrosive chemicals, solvents and steam.

### Construction

Housing:

Shock and vibration resistant

Case: Stainless steel

Transducer Face: Buna rubber with sealed

fiberglass, standard; Polypropylene transducer

face available

Power Cable: Nontoxic PVC jacket

LED: Polycarbonate

## Accessories

**Model AC100**, 2-conductor, transmitter connector cable, 3 m (10'), for all SM100 series Amphenol connector-style transmitters

**Model AC107**, Straight, 2-pin, 2-conductor, mating connector cable, 4 m (12'), for all SM100 series, watertight, connector-style transmitters

**Model AC108**, Straight, 3-pin, 3-conductor, mating connector cable, 4 m (12'), for all SM100 series, watertight, connector-style receivers

**Model AC150**, 3-conductor, receiver connector cable, 3 m (10'), for all SM100 series Amphenol connector-style receivers

**Model AC160**, Cable grip for all cable-style, thru-beam sensors

**Model AC201**, Stainless, right-angle, single-thru-beam-sensor mounting bracket, slotted for adjustment

See page 5-1 for accessory photos.

# Transmitter Selection Chart

## SM100 Series (cont.) MICROSONIC® Thru-Beam

| Transmitter Model No. | Receiver Model No. | Power Version | Connection Style | NEMA Rating | Transmitter/Receiver Housing | Sensing Range | Remarks                            |
|-----------------------|--------------------|---------------|------------------|-------------|------------------------------|---------------|------------------------------------|
| SM120                 | SM170              | 15VDC         | Quick Disconnect |             | Stainless                    | 381mm(15")    | Amphenol connector                 |
|                       | SM188              | 15VDC         | Quick Disconnect |             | Stainless                    | 508mm(20")    | Amphenol connector                 |
| SM121                 | SM171              | 15VDC         | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    |                                    |
|                       | SM189              | 15VDC         | 305cm(10') Cable | 4X, IP67    | Stainless                    | 508mm(20")    |                                    |
| SM125                 | SM175              | 24VDC         | Quick Disconnect |             | Stainless                    | 381mm(15")    | Amphenol connector                 |
|                       | SM182              | 24VDC         | Quick Disconnect |             | Stainless                    | 381mm(15")    | Amphenol connector                 |
| SM126                 | SM176              | 24VDC         | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    |                                    |
| SM128                 | SM186              | 12-24VDC      | Quick Disconnect |             | Stainless                    | 635mm(25")    | Variable power, amphenol connector |
|                       | SM190              | 12-24VDC      | Quick Disconnect |             | Stainless                    | 381mm(15")    | Variable power, amphenol connector |
|                       | SM250              | 12-24VDC      | Quick Disconnect |             | Stainless                    | 635mm(25")    | Variable power, Amphenol connector |
| SM138                 | SM186              | 12-24VDC      | Quick Disconnect |             | Stainless                    | 1829mm(72")   | High power, amphenol connector     |
|                       | SM190              | 12-24VDC      | Quick Disconnect |             | Stainless                    | 1016mm(40")   | High power, amphenol connector     |
|                       | SM250              | 12-24VDC      | Quick Disconnect |             | Stainless                    | 1829mm(72")   | High power, amphenol connector     |
| SM138-WTC             | SM186-WTC          | 12-24VDC      | Quick Disconnect | 4X, IP67    | Stainless                    | 1829mm(72")   | High power, watertight connector   |
|                       | SM190-WTC          | 12-24VDC      | Quick Disconnect | 4X, IP67    | Stainless                    | 1016mm(40")   | High power, watertight connector   |
|                       | SM250-WTC          | 12-24VDC      | Quick Disconnect | 4X, IP67    | Stainless                    | 1829mm(72")   | High power, watertight connector   |
|                       | SM252-WTC          | 12-24VDC      | Quick Disconnect | 4X, IP67    | Stainless                    | 1829mm(72")   | High power, watertight connector   |
| SM139                 | SM187              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 1829mm(72")   | High power                         |
|                       | SM191              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 1016mm(40")   | High power                         |
|                       | SM193              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 1016mm(40")   | High power                         |
|                       | SM195              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 1016mm(40")   | High power                         |
|                       | SM198              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 1016mm(40")   | High power                         |
|                       | SM199              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 1016mm(40")   | High power                         |
|                       | SM251              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 1829mm(72")   | High power                         |
| SM140•                | SM186              | 12-24VDC      | Quick Disconnect |             | Stainless                    | 635mm(25")    | Amphenol connector                 |
|                       | SM190              | 12-24VDC      | Quick Disconnect |             | Stainless                    | 381mm(15")    | Amphenol connector                 |
|                       | SM193C             | 12-24VDC      | Quick Disconnect |             | Stainless                    | 381mm(15")    | Amphenol connector                 |
|                       | SM194              | 12-24VDC      | Quick Disconnect |             | Stainless                    | 381mm(15")    | Amphenol connector                 |
|                       | SM198C             | 12-24VDC      | Quick Disconnect |             | Stainless                    | 381mm(15")    | Amphenol connector                 |
|                       | SM199C             | 12-24VDC      | Quick Disconnect |             | Stainless                    | 381mm(15")    | Amphenol connector                 |
|                       | SM250              | 12-24VDC      | Quick Disconnect |             | Stainless                    | 635mm(25")    | Amphenol connector                 |
| SM140-WTC             | SM186-WTC          | 12-24VDC      | Quick Disconnect | 4X, IP67    | Stainless                    | 635mm(25")    | Watertight connector               |
|                       | SM190-WTC          | 12-24VDC      | Quick Disconnect | 4X, IP67    | Stainless                    | 381mm(15")    | Watertight connector               |
|                       | SM250-WTC          | 12-24VDC      | Quick Disconnect | 4X, IP67    | Stainless                    | 635mm(25")    | Watertight connector               |
|                       | SM252-WTC          | 12-24VDC      | Quick Disconnect | 4X, IP67    | Stainless                    | 635mm(25")    | Watertight connector               |
| SM141•                | SM187              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 635mm(25")    |                                    |
|                       | SM191              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    |                                    |
|                       | SM193              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    |                                    |
|                       | SM195              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    |                                    |
|                       | SM198              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    |                                    |
|                       | SM199              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    |                                    |
|                       | SM251              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 635mm(25")    |                                    |
| SM145                 | SM187              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 635mm(25")    |                                    |
|                       | SM191              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    |                                    |
|                       | SM193              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    |                                    |
|                       | SM195              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    |                                    |
|                       | SM198              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    |                                    |
|                       | SM199              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    |                                    |
|                       | SM251              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 635mm(25")    |                                    |
| SM146                 | SM186              | 12-24VDC      | Quick Disconnect |             | Stainless                    | 1016mm (40")  | Amphenol connector                 |
|                       | SM190              | 12-24VDC      | Quick Disconnect |             | Stainless                    | 635mm(25")    | Amphenol connector                 |
|                       | SM193C             | 12-24VDC      | Quick Disconnect |             | Stainless                    | 635mm(25")    | Amphenol connector                 |
|                       | SM194              | 12-24VDC      | Quick Disconnect |             | Stainless                    | 635mm(25")    | Amphenol connector                 |
|                       | SM198C             | 12-24VDC      | Quick Disconnect |             | Stainless                    | 635mm(25")    | Amphenol connector                 |
|                       | SM199C             | 12-24VDC      | Quick Disconnect |             | Stainless                    | 635mm(25")    | Amphenol connector                 |
|                       | SM250              | 12-24VDC      | Quick Disconnect |             | Stainless                    | 1016mm (40")  | Amphenol connector                 |

# Transmitter Selection Chart

## SM100 Series MICROSONIC® Thru-Beam

| Transmitter Model No. | Receiver Model No. | Power Version | Connection Style | NEMA Rating | Transmitter/Receiver Housing | Sensing Range | Remarks                            |
|-----------------------|--------------------|---------------|------------------|-------------|------------------------------|---------------|------------------------------------|
| SM147                 | SM187              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 1016mm (40")  |                                    |
|                       | SM191              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 635mm(25")    |                                    |
|                       | SM193              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 635mm(25")    |                                    |
|                       | SM195              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 635mm(25")    |                                    |
|                       | SM198              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 635mm(25")    |                                    |
|                       | SM199              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 635mm(25")    |                                    |
|                       | SM251              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 1016mm (40")  |                                    |
|                       | CS101              | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 1016mm (40")  | Receiver has polypropylene coupler |

• = Most commonly stocked sensors

All possible sensor configurations are not listed here.

# Receiver Selection Chart

## SM100 Series (cont.) MICROSONIC® Thru-Beam

| Receiver Model No. | Transmitter Model No. | Power Version | Connection Style | NEMA Rating | Transmitter/Receiver Housing | Sensing Range | Response time     | Remarks (Outputs N.O. unless noted)                      |
|--------------------|-----------------------|---------------|------------------|-------------|------------------------------|---------------|-------------------|--|
| SM170              | SM120                 | 15VDC         | Quick Disconnect |             | Stainless                    | 381mm(15")    | On 4ms, Off 4ms   | NPN/ Pull-up Res./Amphenol connector                     |
| SM171              | SM121                 | 15VDC         | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    | On 4ms, Off 4ms   | NPN/Pull-up Res.   |
| SM175              | SM125                 | 24VDC         | Quick Disconnect |             | Stainless                    | 381mm(15")    | On 4ms, Off 4ms   | NPN/Pull-up Res./Amphenol connector                      |
| SM176              | SM126                 | 24VDC         | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    | On 4ms, Off 4ms   | NPN/Pull-up Res.   |
| SM182              | SM125                 | 24VDC         | Quick Disconnect |             | Stainless                    | 381mm(15")    | On 1ms, Off 1ms   | NPN/Pull-up Res./Amphenol connector                      |
| SM186              | SM128                 | 12-24VDC      | Quick Disconnect |             | Stainless                    | 635mm(25")    | On 4ms, Off 4ms   | NPN sinking, amphenol connector                          |
|                    | SM138                 | 12-24VDC      | Quick Disconnect |             | Stainless                    | 1829mm(72")   | On 4ms, Off 4ms   | NPN sinking, amphenol connector                          |
|                    | SM140                 | 12-24VDC      | Quick Disconnect |             | Stainless                    | 635mm(25")    | On 4ms, Off 4ms   | NPN sinking, amphenol connector                          |
|                    | SM146                 | 12-24VDC      | Quick Disconnect |             | Stainless                    | 1016mm(40")   | On 4ms, Off 4ms   | NPN sinking, amphenol connector                          |
| SM186-WTC          | SM138-WTC             | 12-24VDC      | Quick Disconnect | 4X, IP67    | Stainless                    | 1829mm(72")   | On 4ms, Off 4ms   | NPN sinking, watertight connector                        |
|                    | SM140-WTC             | 12-24VDC      | Quick Disconnect | 4X, IP67    | Stainless                    | 635mm(25")    | On 4ms, Off 4ms   | NPN sinking, watertight connector                        |
|                    | SM146-WTC             | 12-24VDC      | Quick Disconnect | 4X, IP67    | Stainless                    | 1016mm(40")   | On 4ms, Off 4ms   | NPN sinking, watertight connector                        |
| SM187              | SM139                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 1829mm(72")   | On 4ms, Off 4ms   | NPN sinking  |
|                    | SM141                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 635mm(25")    | On 4ms, Off 4ms   | NPN sinking  |
|                    | SM145                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 635mm(25")    | On 4ms, Off 4ms   | NPN sinking  |
|                    | SM147                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 1016mm(40")   | On 4ms, Off 4ms   | NPN sinking  |
| SM188              | SM120                 | 15VDC         | Quick Disconnect |             | Stainless                    | 508mm(20")    | On 4ms, Off 4ms   | NPN/ Pull-up Res./ Amphenol connector                    |
| SM189              | SM121                 | 15VDC         | 305cm(10') Cable | 4X, IP67    | Stainless                    | 508mm(20")    | On 4ms, Off 4ms   | NPN/Pull-up Res.   |
| SM190•             | SM128                 | 12-24VDC      | Quick Disconnect |             | Stainless                    | 381mm(15")    | On 4ms, Off 4ms   | NPN sinking, amphenol connector                          |
|                    | SM138                 | 12-24VDC      | Quick Disconnect |             | Stainless                    | 1016mm(40")   | On 4ms, Off 4ms   | NPN sinking, amphenol connector                          |
|                    | SM140                 | 12-24VDC      | Quick Disconnect |             | Stainless                    | 381mm(15")    | On 4ms, Off 4ms   | NPN sinking, amphenol connector                          |
|                    | SM146                 | 12-24VDC      | Quick Disconnect |             | Stainless                    | 635mm(25")    | On 4ms, Off 4ms   | NPN sinking, amphenol connector                          |
| SM190-WTC          | SM138-WTC             | 12-24VDC      | Quick Disconnect | 4X, IP67    | Stainless                    | 1016mm(40")   | On 4ms, Off 4ms   | NPN sinking, watertight connector                        |
|                    | SM140-WTC             | 12-24VDC      | Quick Disconnect | 4X, IP67    | Stainless                    | 381mm(15")    | On 4ms, Off 4ms   | NPN sinking, watertight connector                        |
|                    | SM146-WTC             | 12-24VDC      | Quick Disconnect | 4X, IP67    | Stainless                    | 635mm(25")    | On 4ms, Off 4ms   | NPN sinking, watertight connector                        |
| SM191•             | SM139                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 1016mm(40")   | On 4ms, Off 4ms   | NPN sinking  |
|                    | SM141                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    | On 4ms, Off 4ms   | NPN sinking  |
|                    | SM145                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    | On 4ms, Off 4ms   | NPN sinking  |
|                    | SM147                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 635mm(25")    | On 4ms, Off 4ms   | NPN sinking  |
| SM193              | SM139                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 1016mm(40")   | On 4ms, Off 4ms   | PNP sourcing   |
|                    | SM141                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    | On 4ms, Off 4ms   | PNP sourcing   |
|                    | SM145                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    | On 4ms, Off 4ms   | PNP sourcing   |
|                    | SM147                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 635mm(25")    | On 4ms, Off 4ms   | PNP sourcing   |
| SM193C             | SM140                 | 12-24VDC      | Quick Disconnect |             | Stainless                    | 381mm(15")    | On 4ms, Off 4ms   | PNP sourcing, amphenol connector                         |
|                    | SM146                 | 12-24VDC      | Quick Disconnect |             | Stainless                    | 635mm(25")    | On 4ms, Off 4ms   | PNP sourcing, amphenol connector                         |
| SM194              | SM140                 | 12-24VDC      | Quick Disconnect |             | Stainless                    | 381mm(15")    | On .6ms, Off .6ms | NPN sinking, amphenol connector                          |
|                    | SM146                 | 12-24VDC      | Quick Disconnect |             | Stainless                    | 635mm(25")    | On .6ms, Off .6ms | NPN sinking, amphenol connector                          |
| SM195              | SM139                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 1016mm(40")   | On .6ms, Off .6ms | NPN sinking  |
|                    | SM141                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    | On .6ms, Off .6ms | NPN sinking  |
|                    | SM145                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    | On .6ms, Off .6ms | NPN sinking  |
|                    | SM147                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 635mm(25")    | On .6ms, Off .6ms | NPN sinking  |
| SM198              | SM139                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 1016mm(40")   | On 4ms, Off 4ms   | NPN sinking, no LED, with test point                     |
|                    | SM141                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    | On 4ms, Off 4ms   | NPN sinking, no LED, with test point                     |
|                    | SM145                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    | On 4ms, Off 4ms   | NPN sinking, no LED, with test point                     |
|                    | SM147                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 635mm(25")    | On 4ms, Off 4ms   | NPN sinking, no LED, with test point                     |
| SM198C             | SM140                 | 12-24VDC      | Quick Disconnect |             | Stainless                    | 381mm(15")    | On 4ms, Off 4ms   | NPN sinking, no LED, with test point, amphenol connector |
|                    | SM146                 | 12-24VDC      | Quick Disconnect |             | Stainless                    | 635mm(25")    | On 4ms, Off 4ms   | NPN sinking, no LED, with test point, amphenol connector |
| SM199              | SM139                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 1016mm(40")   | On .6ms, Off .6ms | PNP sourcing   |
|                    | SM141                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    | On .6ms, Off .6ms | PNP sourcing   |
|                    | SM145                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 381mm(15")    | On .6ms, Off .6ms | PNP sourcing   |
|                    | SM147                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 635mm(25")    | On .6ms, Off .6ms | PNP sourcing   |
| SM199C             | SM140                 | 12-24VDC      | Quick Disconnect |             | Stainless                    | 381mm(15")    | On .6ms, Off .6ms | PNP sourcing, amphenol connector                         |
|                    | SM146                 | 12-24VDC      | Quick Disconnect |             | Stainless                    | 635mm(25")    | On .6ms, Off .6ms | PNP sourcing, amphenol connector                         |
| SM250              | SM128                 | 12-24VDC      | Quick Disconnect |             | Stainless                    | 635mm(25")    | On 4ms, Off 4ms   | PNP sourcing, amphenol connector                         |
|                    | SM138                 | 12-24VDC      | Quick Disconnect |             | Stainless                    | 1829mm(72")   | On 4ms, Off 4ms   | PNP sourcing, amphenol connector                         |
|                    | SM140                 | 12-24VDC      | Quick Disconnect |             | Stainless                    | 635mm(25")    | On 4ms, Off 4ms   | PNP sourcing, amphenol connector                         |
|                    | SM146                 | 12-24VDC      | Quick Disconnect |             | Stainless                    | 1016mm(40")   | On 4ms, Off 4ms   | PNP sourcing, amphenol connector                         |
| SM250-WTC          | SM138-WTC             | 12-24VDC      | Quick Disconnect | 4X, IP67    | Stainless                    | 1829mm(72")   | On 4ms, Off 4ms   | PNP sourcing, watertight connector                       |
|                    | SM140-WTC             | 12-24VDC      | Quick Disconnect | 4X, IP67    | Stainless                    | 635mm(25")    | On 4ms, Off 4ms   | PNP sourcing, watertight connector                       |
|                    | SM146-WTC             | 12-24VDC      | Quick Disconnect | 4X, IP67    | Stainless                    | 1016mm(40")   | On 4ms, Off 4ms   | PNP sourcing, watertight connector                       |
| SM251              | SM139                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 1829mm(72")   | On 4ms, Off 4ms   | PNP sourcing   |
|                    | SM141                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 635mm(25")    | On 4ms, Off 4ms   | PNP sourcing   |
|                    | SM145                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 635mm(25")    | On 4ms, Off 4ms   | PNP sourcing   |
|                    | SM147                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                    | 1016mm(40")   | On 4ms, Off 4ms   | PNP sourcing   |



# Receiver Selection Chart

## SM100 Series MICROSONIC® Thru-Beam

| Receiver Model No. | Transmitter Model No. | Power Version | Connection Style | NEMA Rating | Transmitter/ Receiver Housing | Sensing Range | Response time   | Remarks (Outputs N.O. unless noted)     |
|--------------------|-----------------------|---------------|------------------|-------------|-------------------------------|---------------|-----------------|---|
| SM252-WTC          | SM138-WTC             | 12-24VDC      | Quick Disconnect | 4X, IP67    | Stainless                     | 1829mm(72")   | On 4ms, Off 4ms | NPN sinking, N.C., watertight connector |
|                    | SM140-WTC             | 12-24VDC      | Quick Disconnect | 4X, IP67    | Stainless                     | 635mm(25")    | On 4ms, Off 4ms | NPN sinking, N.C., watertight connector |
|                    | SM146-WTC             | 12-24VDC      | Quick Disconnect | 4X, IP67    | Stainless                     | 1016mm(40")   | On 4ms, Off 4ms | NPN sinking, N.C., watertight connector |
| CS101              | SM147                 | 12-24VDC      | 305cm(10') Cable | 4X, IP67    | Stainless                     | 1016mm(40")   | On 4ms, Off 4ms | PNP sourcing, polypropylene coupler     |

• = Most commonly stocked sensors

All possible sensor configurations are not listed here.

