

Model SM500 Series



SUPERPROX[®] **Ultrasonic** **Proximity** **Sensors**

No delay **sensing**

- **Easy push-button setup for the specific application**
- **Onboard microprocessor for reliability and repeatability**
- **Non contact sensing range up to 2 m (79")**
- **Epoxy sealed in tough ULTEM[®] housing**
- **Virtually impervious to the harshest environments**
- **CE certified**
- **AC-powered models ETL listed**

**SUPERPROX[®] SM500
SERIES**



It is this discrete sensing program that enables the SUPERPROX[®] sensors to detect only those objects that are within a set "window" and to ignore all others. A simple push-button is used to set a window as small as 13 mm (1/2").

Used throughout plants in all industries, the SUPERPROX[®] Model SM500 (cable style) and Model SM550 (connector style) series of non contact sensors control various operations. Typical applications include loop control and end of roll detection, web breaks, and parts presence. The sensors are also used to detect containers and produce outputs for no container/no fill and no container/no cap control. In conveying operations, with objects in a captured state, these sensors are used for counting at speeds up to 2000 units per minute.

AC and DC models are available with a sensing range of 51 mm to 1 m (2 to 39") and 120 mm to 2 m (4.7 to 79"), respectively. These sensors carry the CE Mark and the AC-powered models are also ETL approved. The sensor housing meets NEMA 4X (indoor use only) and IP67 industry standards. A Dairy 3A compliant housing is available as an option.

This basic model series in the SUPERPROX[®] family of ultrasonic, non contact sensors offers reliable object detection where simple on/off control of the outputs is required. These "smart" sensors use the latest ultrasonic technology to ensure the ultimate in sensing reliability through a discriminating microprocessor, push-button setup program.

Control Compartment

A unique feature available to the user of these sensors is the ability to quickly set up each sensor for a specific application. The sensor is configured through either three or four slide switches, depending on the model, and a push-button (See Figure 1) located inside a wa-

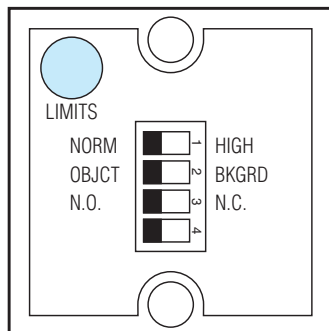


Figure 1

ter-tight control compartment on the sensor. To access the controls, remove the small square cover on the back of the sensor. Simply loosen the two flat-head cover screws and insert a small-blade screwdriver in either the top or bottom slot to remove the cover. A short plastic tether prevents separation of the cover from the sensor. NOTE: The switch settings may require changing for the intended application.

Sensor Configuration Switches

Switch 1 configures the sensor to operate in either a normal or a high sensitivity mode. Place this switch in the NORM position for sensing liquid or solid materials. Place the switch in the HIGH position for sensing soft or porous materials that will absorb some of the ultrasonic energy.

Switch 2 configures the sensor to operate in either an object or a background sensing mode. Place this switch in the OBJECT position to perform a sensing function for receiving the reflected ultrasonic energy directly off an object. Place this switch in the BKGRD position to perform a break-beam sensing function for receiving the reflected ultrasonic energy directly off a fixed background target.

Switch 3 selects the operating mode for the sensor output to be either normally open (N.O.) or normally closed (N.C.).

Switch 4 (Not used)

Model Reference Guide – SM500 Series

Use the guide below to ensure the correct model number is specified for the application. Please note that not all sensor model combinations are available.

EXAMPLE MODEL:

SUPERPROX® Product Series

Power/Connection Type

- 0...12 to 24 VDC / cable style
- 2...100 to 240 VAC / cable style
- 5...12 to 24 VDC / connector style
- 7...100 to 240 VAC / connector style

Sensing Function

- 0...Proximity - no on/off delay

Design Level

- A...Applies to all DC-powered models
- B...Applies to all AC-powered models

Sensing Range

- 0...51 to 635 mm (2 to 25")
- 1...51 to 1 m (2 to 39")
- 4...120 mm to 2 m (4.7 to 79")

Functionality

- 00...Standard proximity
- 44...Default window: ± 0.10 "
- 75...High gain, default window: $+0.5"/-0.25$ "
- 80...Delay: divide by 10 output
- 91...Default window: ± 0.05 " hysteresis: 0.02, ± 0.0625 " automatic setup window

Special Features

- ... No letter indicates standard sensor with no special features
- FS... Fluorosilicone transducer face
- AA... Remote limit setup (Available on cable models only.)
- AB... RS232, 4-digit/2-decimal place output
- AD... Limits push-button disabled
- AE... RS232, 5-digit/3-decimal place output
- AF... No LEDs

Housing Types

- ...No letter indicates standard ULTEM® plastic housing
- N...NORYL® Dairy 3A gray plastic housing

Remote Type

- ...No letter indicates standard coupler
- R...Right-angle sensing head with armor cable
- S...Straight sensing head with armor cable

Remote Cable Length

- ...No number indicates standard coupler
 - 1 ...254 mm (10")
 - 2 ...508 mm (20")
 - 3 ...762 mm (30")
 - 4 ...1016 mm (40")
 - 5P...1270 mm (50")
 - 6P...1524 mm (60")
- } Armored (standard) or PVC cable (specify P after number)
- } Available in PVC cable only

* ULTEM® and NORYL® are registered trademarks of The General Electric Company.

Sensor Limits Setup Push-button

First, during installation make sure the sensor face is as parallel as possible to the surface of the material being detected.

To set the limits, simply place an object at the desired distance from the sensor for one limit and press the LIMITS push-button once. This sets the first limit and switches the sensor output to an inactive state during the limit setup. While the LIMITS push-button is depressed, the multicolored LED located on top of the sensor is amber. Upon release of the push-button, the LED flashes amber indicating that the second limit needs to be set within 30 seconds. Place an object at the desired position for the second limit and press the LIMITS push-button once. Again, while the push-button is depressed, the LED is amber. Upon release of the push-button, the LED flashes amber momentarily and then turns green to indicate acceptance of both limits. If 30 seconds elapse before the second limit is set, the limits revert back to the previous settings.

At the same time, the sensor output switches from the inactive to the active state, placing the sensor into the operational mode and ready to use. When power is off or interrupted, the limits are retained in a nonvolatile memory.

When setting either limit if the echo from the object is too weak or distorted, the LED flashes RED for 10 seconds (or until the button is pressed again) indicating the limit setting was not accepted by the sensor. Attempt to set both limits again, being careful to keep the object surface parallel to the face of the sensor.

Minimum allowed distance between any two setup limits is 13 mm (1/2"). The multicolored LED flashes RED after the press and release of the LIMITS push-button for the second limit setting if the distance between the limit settings is less than 13 mm. The multicolored LED continues flashing RED either until the LIMITS push-button is pressed and released once for the first limit setting or until 10 seconds has elapsed. Pressing and releasing the LIMITS push-button once reinitiates the limit setup sequence. If 30 seconds elapse before the LIMITS push-button is pressed and released for the second limit setup, the limits revert back to the previous settings.

A special feature provides an automatic 13 mm (1/2") window limits setup function. Simply place an object within the sensing range of the sensor and press the LIMITS push-button twice in succession without moving the object. A limit is set on a line 1/4" in front and back of the object surface nearest the sensor.

Multicolored LED Indicator During Limit Setup

Prior to pressing LIMITS push-button

- Off - Sensing no object or object is outside the sensing range
- Red - Sensing an object outside the set limits
- Green - Sensing an object inside the set limits

LIMITS push-button depressed for first time

- Amber - Sensing a good object surface condition
- Red - Sensing no object or a poor object surface condition

LIMITS push-button released for first time

- Flashing Amber - First limit accepted, waiting for second limit
- Flashing Red - First limit not accepted; retry setting limit

LIMITS push-button depressed for second time

- Amber - Sensing a good object surface condition
- Red - Sensing no object or a poor object surface condition

LIMITS push-button released for second time

- Green, Red, or Amber - Second limit accepted
- Flashing Red - Second limit not accepted; retry setting both limits

Multicolored LED Indicator in Operational Mode

- Off - Sensing no object or object is outside the sensing range
- Red - Sensing an object outside the set limits
- Green - Sensing an object inside the set limits

Red LED Indicator in Operational Mode

The red LED serves as a visual indicator for the sensor output. The LED is illuminated when the output is in an active (ON) state.

Electrical Wiring

Sensor wires must be run in conduit free of any AC power or control wires.

Sensor Wire Colors

DC Models	Cable Style	Connector Style
+12 to 24 VDC	RED	BROWN
NPN/Sinking Output	WHITE	BLACK
PNP/Sourcing Output	GREEN	WHITE
Common	BLACK	BLUE

AC Models*

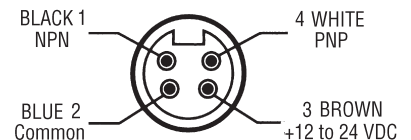
100 to 240 VAC	BROWN	BROWN
Switch Line Side	BLACK	BLACK
Switch Load Side	WHITE	WHITE
Neutral	RED	BLUE

*WARNING

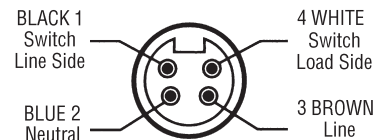
Not all cables are alike. Verify that connector pin outs and cable conductor colors match up with the wiring illustrations shown in the operating instructions.

View of Plug on Connector Style Sensor

DC Power Models

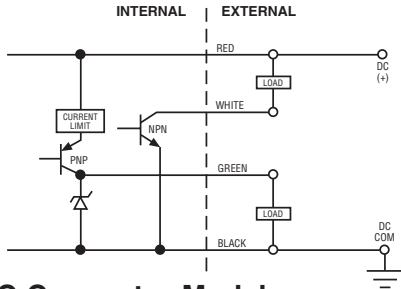


AC Power Models

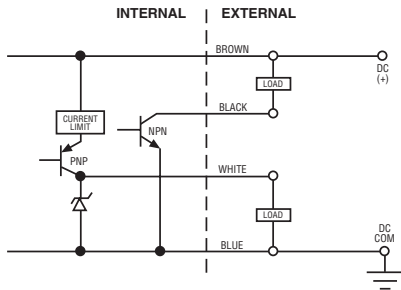


Outputs

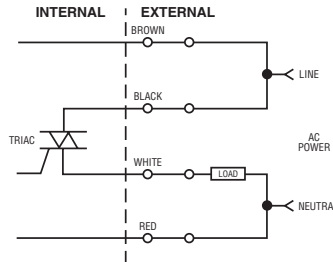
DC Cable Models



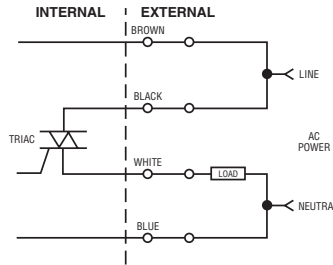
DC Connector Models



AC Cable Models

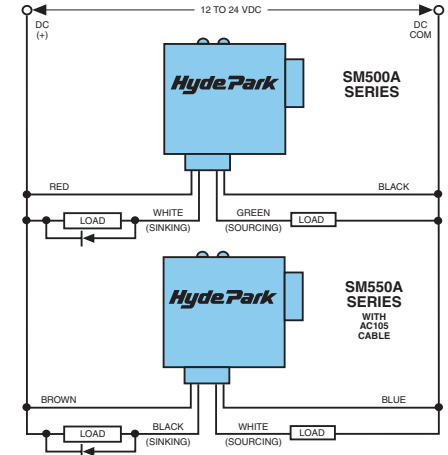


AC Connector Models

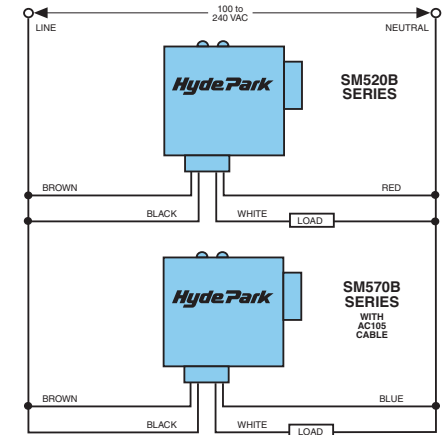


Sensor Wire Connections

DC Cable Models

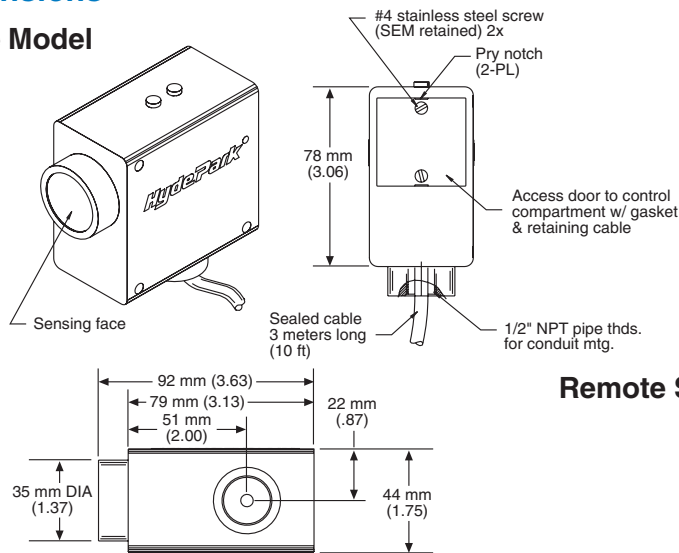


AC Cable Models

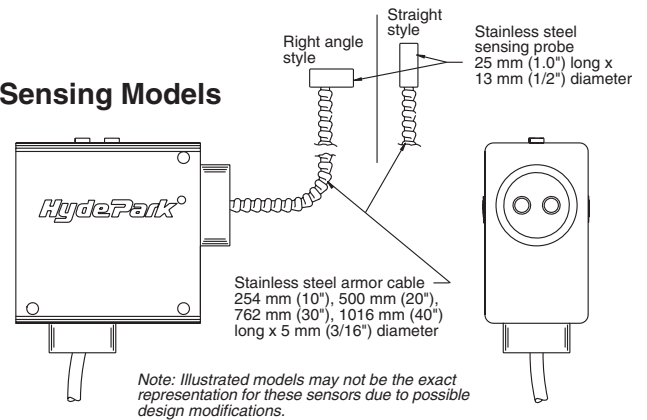


Dimensions

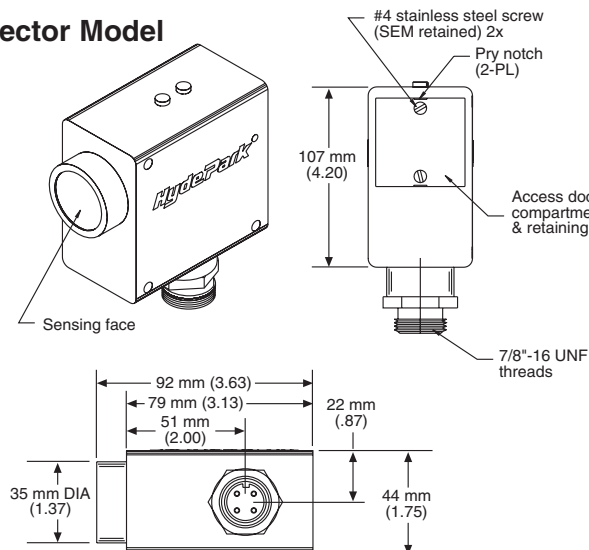
Cable Model



Remote Sensing Models

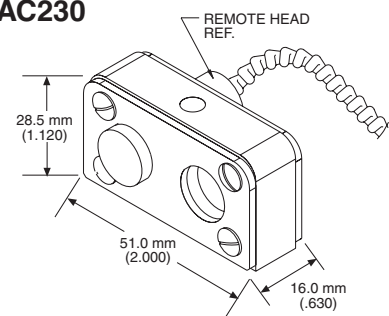


Connector Model



Mounting Accessories

AC230



Selection Chart

SM500 Series Proximity

Model No.	Power		Connection Style	Sensing Range				Transducer Style			Transducer Materials				Fast Response	Default Windows	Special Features
	100-240 VAC	12-24 VDC		Cable	Connector	2m (79")	1 m (39")	635mm (25")	254mm (10")	Standard	Rt. Angle	Remote	Silicone*	Fluorosilicone*			
SM500A-000•		■	■ (10')			■		■				■		■			
SM500A-000 AB		■	■			■		■				■		■			RS232 (4 digit/2-decimal place) output
SM500A-000 FS		■	■			■		■					■				
SM500A-000 R2		■	■			■			■ (20")			■		■			
SM500A-000 R3		■	■			■			■ (30")			■		■			
SM500A-000 R4		■	■			■			■ (40")			■		■			
SM500A-000 S1		■	■			■				■ (10")		■		■			
SM500A-000 S2		■	■			■				■ (20")		■		■			
SM500A-000 S4		■	■			■				■ (40")		■		■			
SM500A-044		■	■			■		■				■		■		± 0.1"	Hysteresis: 0.05, 0.2"W, 0 Limit
SM500A-075		■	■			■		■				■		■		± 0.5"/-0.25"	High Gain
SM500A-080		■	■			■		■				■		■			Delay: Divide by 10 output
SM500A-091		■	■			■		■				■		■		± 0.05"	*Hysteresis: 0.02±0.0625" automatic setup window
SM500A-091 AA		■	■			■		■				■		■		± 0.05"	Hysteresis: 0.02±0.0625" automatic setup window, Remote Limit Setup
SM500A-091 R2		■	■			■			■ (20")			■		■		± 0.05"	Hysteresis: 0.02±0.0625" automatic setup window
SM500A-091 R4		■	■			■			■ (40")			■		■		± 0.05"	Hysteresis: 0.02±0.0625" automatic setup window
SM500A-100•		■	■			■		■				■		■			
SM500A-100 AE		■	■			■		■				■		■			RS232 (5 digit/3 decimal place) output
SM500A-100 FS		■	■			■		■					■				
SM500A-100 R2		■	■			■			■ (20")			■		■			
SM500A-100 R3		■	■			■			■ (30")			■		■			
SM500A-100 R4		■	■			■			■ (40")			■		■			
SM500A-100 S3		■	■			■				■ (30")		■		■			
SM500A-191 R3		■	■			■			■ (30")			■		■			
SM500A-400•		■	■		■			■				■		■			
SM500A-400 AA		■	■		■			■				■		■			Remote Limit Setup
SM500A-400 S1		■	■		■					■ (10")		■		■			
SM520B-000•	■	■	■			■		■				■		■			
SM520B-000 FSS4	■	■	■			■				■ (40")			■				
SM520B-000 R3	■	■	■			■			■ (30")			■		■			
SM520B-000 R4	■	■	■			■			■ (40")			■		■			
SM520B-000 S4	■	■	■			■				■ (40")		■		■			
SM520B-075	■	■	■			■		■				■		■		± 0.5"/-0.25"	High Gain
SM520B-091	■	■	■			■		■				■		■		± 0.05"	Hysteresis: 0.02±0.0625" automatic setup window
SM520B-100•	■	■	■			■		■				■		■			
SM520B-100 N	■	■	■			■		■				■		■			
SM520B-100 R3	■	■	■			■			■ (30")			■		■			
SM520B-100R4	■	■	■			■			■ (40")			■		■			
SM520B-144	■	■	■			■		■				■		■		± 0.1"	Hysteresis: 0.05, 0.2"W, 0 Limit
SM550A-000•		■	■			■		■				■		■			
SM550A-000 R1		■	■			■			■ (10")			■		■			
SM550A-000 R2		■	■			■			■ (20")			■		■			
SM550A-000 R3		■	■			■			■ (30")			■		■			
SM550A-000 R4		■	■			■			■ (40")			■		■			
SM550A-000 S1		■	■			■				■ (10")		■		■			
SM550A-044		■	■			■		■				■		■		± 0.1"	Hysteresis: 0.05, 0.2"W, 0 Limit
SM550A-100•		■	■			■		■				■		■			
SM550A-100 R4		■	■			■			■ (40")			■		■			
SM550A-144		■	■			■		■				■		■		± 0.1"	Hysteresis: 0.05, 0.2"W, 0 Limit
SM550A-400•		■	■			■		■				■		■			
SM550A-444		■	■			■		■				■		■		± 0.1"	Hysteresis: 0.05, 0.2"W, 0 Limit

Selection Chart

SM500 Series (cont.) Proximity

Model No.	Power		Connection Style	Sensing Range				Transducer Style		Transducer Materials				Fast Response	Default Windows	Special Features	
	100-240 VAC	Version		Cable	Connector	2m (79")	1 m (39")	635mm (25")	254mm (10")	Standard	Rt. Angle	Remote	Straight				Silicone*
SM570B-000•	■			■		■		■					■				
SM570B-000 R2	■			■		■			■ (20")				■				
SM570B-000 R3	■			■		■			■ (30")				■				
SM570B-000 R4	■			■		■			■ (40")				■				
SM570B-000 S2	■			■		■				■ (20")			■				
SM570B-091	■			■		■		■					■		± 0.05"		Hysteresis: 0.02±0.0625" automatic setup window
SM570B-100•	■			■		■		■					■				
SM570B-100 R2	■			■		■			■ (20")				■				
SM570B-100 R3	■			■		■			■ (30")				■				
SM570B-100 R4	■			■		■			■ (40")				■				
SM570B-100 S3	■			■		■				■ (30")			■				
SM570B-100 S4	■			■		■				■ (40")			■				
SM570B-144	■			■		■		■					■		± 0.1"		Hysteresis: 0.05, 0.2" W, 0 Limit

• = Most commonly stocked sensors

* = See definition in *Sensing Terms*.

All possible sensor configurations are not listed here.

